OKLAHOMA'S NONPOINT SOURCE MANAGEMENT PROGRAM

AND NONPOINT SOURCE ASSESSMENT REPORT



Drafted by:

Oklahoma Conservation Commission Water Quality Programs



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2000 - 2015

FINAL DRAFT

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Foreword from Secretary of Environment Brian C. Griffin

The water quality management landscape has changed dramatically over the past several years at both the national and state levels. Citizens are demanding that government officials take more aggressive steps to ensure that our precious water resources are protected for current and future generations and that our decisions be based on highly defensible, scientifically-based criteria and processes. We have made great strides over the past two decades in our attempts to restore Oklahoma's waters to the fishable/swimmable goals dictated in the Clean Water Act, and now we recognize that more innovative approaches are necessary in order to realize further progress.

Oklahoma's water quality management program involves the resources and oversight of more than seven State environmental agencies. Coordinating the efforts of these agencies has been cumbersome and somewhat inefficient in the past, but several new initiatives have prompted a much more effective approach to water quality management in Oklahoma. With the formation of Oklahoma's Water Quality Monitoring Council, we are focusing the resources of state, federal, local, and tribal entities on coordinating and improving our efforts to assess the condition of our state's water resources. Additionally, monitoring entities worked together to develop standardized protocols for making beneficial use attainment decisions. Both of these landmark initiatives have enabled Oklahoma to more accurately define the extent of water quality impairments in our state, in addition to better prioritizing waters and watersheds in need of immediate attention and restoration.

The importance of Oklahoma's nonpoint source (NPS) management program to the overall water quality management scheme is paramount. Without question, NPS pollution is a significant contributor to the remaining water quality impairments that exist within our state. Using the initiatives described above to more accurately define areas still impaired by NPS pollution, and using the same coordinated approach to implementing solutions to those impairments, Oklahoma can more effectively combat remaining water quality concerns.

Oklahoma's future plans for addressing remaining water quality impairments resulting from NPS pollution are contained in this document. Recognizing that most watersheds experience impairments from both NPS and point source pollutants, this document outlines a process that dovetails with other water quality management activities to achieve a holistic approach to water quality restoration. Monitoring and assessment activities are directed at identifying beneficial use impairments and threats, and standardized protocols are used in all monitoring activities to assure uniform, defensible decisions. Implementation activities to address NPS pollution are coordinated with other implementation efforts and remedies by following the same 303(d) list, Unified Watershed Assessment, Total Maximum Daily Loads, and Watershed Restoration Action Strategies used by other programs. Finally, educational and evaluative activities will ensure the long-term success of our efforts and assist in evolving and improving Oklahoma's NPS management program.

The State's NPS management program is vital to our achieving the overarching goal of restoring and protecting Oklahoma's treasured water resources. We have made significant progress in recent years in streamlining our approach, and further advancements will undoubtedly result as water quality management continues to evolve in Oklahoma. By making more informed decisions and better focusing the State's resources on true impairments, we look forward to more substantial, quantifiable improvements in water quality in the years to come.

EXECUTIVE SUMMARY

Nonpoint Source (NPS) pollution refers to diffuse pollutants that may seem minor but when summed together from an entire region, become significant. In general, NPS pollution does not result from a discharge at a specific location but generally results from land runoff, percolation, precipitation, or atmospheric deposition. The pollutants degrade aquatic systems by altering the physical and chemical quality and can result in drastic biological effects. Nonpoint Source pollution is a significant contributor to water quality problems in the State of Oklahoma. This document describes the processes and programs used by the State of Oklahoma to address NPS pollution and conserve and improve its natural resources through responsible care. The mission statement of the NPS Program in Oklahoma is as follows:

Conserve and Improve Water Resources through Assessment, Planning, Education, and Implementation

This mission statement guides the activities of the NPS Program by developing a foundation for conservation, improvement, and restoration of water resources. In establishing an effective program to address NPS pollution, a hierarchy of tasks is followed to insure that a sound and pragmatic approach is undertaken. As outlined in the mission statement, the four major components are addressed in the plan: Assessment, Planning, Education, and Implementation.

The Oklahoma NPS Program is built upon the foundation of water quality standards with long-term goals to attain and maintain beneficial uses in all the State's waters. These long-term goals lead to short-term goals of reducing NPS pollution in the State's priority watersheds through implementation programs, identifying sources of NPS pollution in the State, and increasing the coverage of water quality enhanced education programs. These goals and objectives are detailed in section I, the Introduction and Table 1 and serve three main functions including definition of the NPS related water quality problems with reference to severity and temporal extent of the problems, definition of methods to solve the problems, and implementation of actions to solve the problems. The goals for the next five to fifteen years (Table 1) target specific priority watersheds. These goals and objectives are ultimately the responsibility of numerous State and federal agencies. Further clarification of each agency's jurisdiction and responsibilities is seen in section VII beginning on page 136 of this report. Cooperation among State and Federal agencies of this program and is addressed through several avenues including the activities of the NPS Working Group, multi-agency review of this framework document, and facilitation by the Office of the Secretary of the Environment (OSE).

Water quality programs in the State utilize a variety of funding sources, detailed in Appendix C and described in Section VIII of the plan. NPS program activities are primarily funded under Section 319(h) of the Clean Water Act, along with State-Funded cost-share programs. The NPS program in Oklahoma will strive to increase the variety of funding sources it uses to address NPS issues in the State.

The State of Oklahoma follows a stepwise pattern in addressing the goals of the NPS Management Program. The process begins with assessment of physical, chemical, and biological health of waters of the state, including the watershed around them, to identify threats and impairments to the water resource, along with the cause, source, and extent of the problem. The primary function of assessment is identification of the problem, but it also serves to verify where programs or landowners are successful in reducing NPS pollution. This assessment process is mainly the responsibility of the Oklahoma Conservation Commission (OCC), but numerous other agencies contribute significantly to the process including the Oklahoma Water Resources Board (OWRB), Oklahoma Department of Environmental Quality (ODEQ), Oklahoma Corporation Commission (Corp. Comm.), Oklahoma Department of Wildlife Conservation, Oklahoma Department of Agriculture (ODA), Oklahoma Scenic Rivers Commission, United States Geological Survey (USGS), and the Army Corps of Engineers (COE).

The OCC is responsible for assessment of all identified non-point source categories except silviculture, urban storm water runoff and industrial runoff. The ODA is responsible for management of NPS pollution from silviculture and Poultry Feeding Operations, and the ODEQ is responsible for NPS pollution from urban stormwater and industrial runoff. In general, the OCC conducts physical, chemical, and biological monitoring in small and medium streams to focus on NPS pollution. The OWRB conducts physical, chemical and limited biological monitoring on medium and large rivers and all the State's major lakes. The ODEQ conducts or facilitates physical and chemical monitoring in association with discharges of waste or stormwater, in the formulation of Total Maximum Daily Loads (TMDLs), and extensive biological monitoring across the state. The Corp. Comm. conducts physical and chemical monitoring associated with oil and gas activities. The ODA facilitates or conducts monitoring associated with silvicultural activities and confined animal feeding operations. The Scenic Rivers Commission monitors water quality of various State Scenic Rivers, and all of these State monitoring programs are supplemented by the water quality and flow gauging stations of the USGS and the COE. It is important that data used for purposes of assessment be collected and evaluated following procedures defined in Oklahoma's Use Support Assessment Protocols and based on Oklahoma's Water Quality Standards.

The second step involves prioritization and planning. The State of Oklahoma prioritized its watersheds following strategies defined in the Clean Water Action Plan and developed a Unified Watershed Assessment (UWA). This UWA listed 150 stream segments or watersheds as priority one, or watersheds in need of immediate attention. This list included watersheds with limited historical information and watersheds where sources were believed to be primarily point source. The NPS Program, through the NPS Working Group (described in § IV of this document), narrowed this list to 24 watersheds immediately appropriate for NPS action. These 24 watersheds were selected because sufficient historical information had been collected to identify the nature of the problem, as well as serving as a comparison to see whether corrective actions were successful, the water quality problem primarily stemmed from NPSs, and a significant portion of the watershed was in Oklahoma where the program could affect practices independent of the actions of another state.

Following prioritization, a TMDL, Watershed Restoration Action Strategy (WRAS) (following the Clean Water Action Plan) or some other implementation plan is developed to reduce or remedy the problem. This plan is developed based on information collected during assessment that specifies the nature of the problem and defines the sources in the watershed where actions should be directed and by what magnitude. An important part of the plan is definition of goals of the implementation; these goals or measures of success are critical to evaluating the success of the implementation.

The third step, implementation, involves the application of remedial efforts, such as Best Management Practices (BMPs), educational activities, and other innovative practices that are tailored to address NPS water quality pollution. Specific projects are undertaken to demonstrate the effectiveness of innovative, but proven technology. The tools used in developing and implementing these projects are described in

§IV of this document. Monitoring is generally conducted during this stage to verify the success of the implementation.

Education is a critical portion of implementation. In general, the goal of most implementation projects is to achieve a level of change in an entire watershed. Landowners and other users of the watershed must become educated on the issues in order to effect behavior change over the entire watershed. They must understand the importance of the resource, what the problems are, and what they can do to reduce the problems. In most cases, NPS programs rely on voluntary cooperation of landowners to implement projects. Landowners must understand the importance of their cooperation, as well as how participation can help them protect their assets and improve their return.

The fourth stage of the process involves evaluation of the project and program to determine its successes and failures and to recommend changes for the next round of the process. This will involve post implementation monitoring of the water resources, or other evaluations of the success of the program (such as percent of priority areas with implemented practices or extent of education programs). Once this step has been completed and the outcome evaluated, the process can begin anew with assessment to determine where NPS related water quality concerns exist in the State of Oklahoma and what their causes and sources are. An important part of this process is review of the actual NPS program with respect to success and failures, in addition to its correspondence with, and function in, the State's overall environmental programs and with other federal programs. To facilitate this evaluation, this report will be formally revised at least every 5 years. In addition, less formal annual reviews will be conducted to allow the program to more efficiently address NPS concerns.

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List of Acronyms

ACOG-Association of Central Oklahoma Governments **AFO-** Animal Feeding Operation **BMPs- Best Management Practices BUMP-** Beneficial Use Monitoring Program CAFO- Confined Animal Feeding Operation COE- U.S. Army Corps of Engineers Corp. Comm.- Oklahoma Corporation Commission **CPP-** Continuing Planning Process CWA- Clean Water Act **CWAP-** Clean Water Action Plan DO- Dissolved Oxygen **EPA-** Environmental Protection Agency **GPS-** Global Positioning System **INCOG-** Indian Nations Council of Governments NPS- Nonpoint Source NRCS- Natural Resources Conservation Service **OCC-** Oklahoma Conservation Commission OCCHD- Oklahoma City County Health Department **OCES-** Oklahoma Cooperative Extension Service **OCS-** Oklahoma Climatological Survey ODA-Oklahoma Department of Agriculture ODEQ- Oklahoma Department of Environmental Quality **ODM-** Oklahoma Department of Mines **ODOT-** Oklahoma Department of Transportation ODWC- Oklahoma Department of Wildlife Conservation OSE- Office of the Secretary of the Environment **OSRC-** Oklahoma Scenic Rivers Commission **OSU-** Oklahoma State University OU- University of Oklahoma **OWQS-** Oklahoma Water Quality Standards **OWRB-** Oklahoma Water Resources Board **OWW-** Oklahoma Water Watch **PSA-** Public Service Announcements **QMP-** Quality Management Plan SRF- State Revolving Fund SOP- Standard Operating Procedure TMDL- Total Maximum Daily Load **USAP-** Use Support Assessment Protocols USDA- United States Department of Agriculture USFWS- United States Fish and Wildlife Service USGS- United States Geological Survey **UWA- Unified Watershed Assessment** WAG- Watershed Advisory Group WRAS- Watershed Restoration Action Strategy

I. <u>Introduction</u>

Purpose and Authority of the Document

Section 319 (h) of the Clean Water Act requires states to assess waterbodies threatened or impaired by NPS pollution and to develop a plan to address the identified threats or impairments. States must produce two main EPA approved documents to be eligible for funding through the 319 program. The first of these is a Nonpoint Source (NPS) Assessment Report that identifies waters threatened¹ or impaired by NPS pollution. The second requirement is a Nonpoint Source Management Program Document that outlines the measures by which NPS pollution will be assessed, evaluated, and remediated in the State of Oklahoma. This document describes the framework for controlling NPS pollution, given existing and potential water quality problems defined in the NPS Assessment Report.

In addition, this document must meet the needs of various federal and State requirements dealing with NPS pollution. For example, this document must meet the needs of the State's 208 (Water Quality Management Plan) planning requirements for dealing with NPS. The State Continuing Planning Process (CPP – VI) must also be amended to reference the NPS Management Program and the role of the NPS Management Program must be defined within the State's overall pollution control strategy.

Section 319 (h) authorizes funding support, as part of a State's overall financial support package, to implement the programs outlined in this plan. States must have an EPA approved Nonpoint Source Management Program Document in order to receive 319 funding, and the methods, practices and other activities to be employed in the NPS program must also be described in the NPS Management Program. This document describes the processes by which the State addresses NPS pollution in its waters.

Nonpoint Source Management Program Goals

Program Mission

The State's NPS program is a combination of many federal, State, and local agency programs. The Oklahoma Conservation Commission (OCC) is the State agency whose program specifically addresses the overall NPS pollution issue in Oklahoma. However, numerous other agencies play a vital role in the overall State NPS program through assessment, planning, education and implementation. The vision statement of the State's NPS program is:

Responsible Care for Oklahoma's Natural Resources

This vision allows for both protection and utilization of Oklahoma's natural resources. Responsible care implies that sound management techniques will be followed any time a human activity could affect the natural resources of our State. The statement implies that continual maintenance is required to insure protection of our natural resources.

The vision statement is further refined to address the State's water resources. Nonpoint source pollution may directly influence the air and soil, but all NPS pollution ultimately influences water. Activities that

¹ For purposes of this document, threatened refers to waters of the state that are fully supporting, but threatened.

occur within a watershed will affect the quality of the water, to varying degrees, draining from that basin. The following mission statement further delineates the NPS Program's Vision:

Conserve and Improve Water Resources through Assessment, Planning, Education, and Implementation

This mission statement guides the activities of the NPS Program by developing a foundation for conservation, improvement, and restoration of water resources. In establishing an effective program to address NPS pollution, a hierarchy of tasks is followed to insure that a sound and pragmatic approach is undertaken. As outlined in the mission statement, the four major components are addressed in succession: Assessment, Planning, Education, and Implementation.

Assessment is the starting point for addressing NPS pollution. Quantifying and identifying the causes and sources of NPS pollution and distinguishing real from perceived problems is the critical first step. Without knowledge of the magnitude or scope of the problem, any remedial action would be fruitless. Once the problem(s) and the cause(s) have been identified and isolated, a process to improve the situation can be developed. Using the information generated during the assessment phase, an appropriate plan is drafted to meet the needs of the situation. The plan development follows an overall management program plan that unifies or focuses the efforts of the NPS Program. A fundamental component of the plan is the development of a public awareness campaign to change current behaviors and to disseminate information. Educational efforts are an essential element in developing an effective program. The final component of a plan to manage NPS pollution is to undertake or execute the developed remediation plan. Demonstration projects designed to address the NPS pollution issues identified in the watershed are used as the fundamental tools for water quality improvement and protection. Monies are specifically available in § 319 of the Clean Water Act (CWA) and the State cost share program to implement these projects. Project implementation is a compilation of all previous activities. A breakdown in any of the preceding four parts leads to a less effective program.

Long Term Goal

By 2015, the State of Oklahoma's NPS Program will establish a State-approved Watershed Restoration Action Strategy, TMDL, or implementation plan (unless the original basis for listing a waterbody is no longer valid) to restore and maintain beneficial uses in all watersheds identified as impacted by NPS pollution in the 1998 303(d) List (Appendix A). The 1998 303(d) List identifies 8,156 miles of stream and 291,293 acres of lake area as impaired or fully supporting but threatened. By 2020, the State will attain and maintain beneficial uses in waterbodies listed on the 303(d) list as threatened or impaired by NPS pollution.

Short Term Goals

Goal One Beginning in 1999, the State of Oklahoma will follow the priorities established by the Unified Watershed Assessment, TMDL schedule, and the NPS Working Group following the schedules shown in **Table 1** to reduce NPS loading in the top ten priority watersheds by the percentages shown therein to address 653 stream miles (eight percent of the 303(d) listed streams and one percent of the state's total stream miles) and affect loadings to 104,688

Introduction

Priority Watersheds	Stream Miles and Lake Area Listed on 303(d) List*	Causes	General Sources	Short-term Goals	Projected Actions/Milestones	Projected Time Frame
		Nutrients	Agriculture, Wastewater	Reduce NPS Phosphorus Loading by 75% in the Beaty Creek Watershed; achieve overall reduction of mean instream P conc. in Beaty Creek of 0.05 mg/l	Preimplementation Monitoring- Cause and Source Identification Clean Lakes Study	1993-1997
Laka Eucha	1,916 lake acres or				Establish Watershed Advisory Group	1999
2,860 lake	area and 17 miles				WRAS Development	1999
acres and	or 21% of				TMDL Development	04/2000
stream	watershed stream miles are listed on the 303(d) list.				Develop 319 Workplan	1998
					Implementation of Practices	1999-2004
					Post-implementation Monitoring	2004-2006
					Evaluation of Measures of Success	2000-2007
	12,708 lake acres or 90% of the lake area and 175 miles or 39% of the stream miles are listed on the 303(d) list.	Nutrients, Siltation, Pesticides, Habitat Alteration, Organic Enrichment / DO, Ammonia, Metals, Pathogens, Unknown Toxicity	Agriculture, Wastewater, Construction, Removal of Riparian Vegetation, Land Development, Flow Regulation, Silviculture, Streambank Stabilization	Reduce NPS Loading in 175 miles or 39% of the Oklahoma portion of the Illinois River Watershed to a level that will no longer threaten or impair beneficial uses.	Preimplementation Monitoring- Cause and Source Identification National Eutrophication Survey USGS Monitoring Clean Lakes Study	1970-1999
450 miles of					Establish Watershed Advisory Group	1999
stream and					WRAS Development	1999
14,120 lake acres					TMDL Development	1996-2000
					Develop 319 Workplan	2000
					Implementation of Practices	2000-2005
					Post-implementation Monitoring	2005-2007
					Evaluation of Measures of Success	2001-2007

Table 1. Goals and Milestones for Top Ten NPS Priority Watersheds for the Next Five to Fifteen Years.

*- acreage and mileage values and percentages calculated from GIS analysis during UWA development.

Priority Watersheds	Stream Miles and Lake Area Listed on 303(d) List*	Causes	General Sources	Short-term Goals	Projected Actions/Milestones	Projected Time Frame
Wiston Laka		Nutrients, Organic Enrichment / DO.		Reduce NPS loading in 54	Preimplementation Monitoring- Cause and Source Identification Clean Lakes Study USGS Monitoring	1980s – 1999
7500 lake	of the lake area		Wastewater,	miles or 13% of	Establish Watershed Advisory Group	1990
acres and 422	and 54 miles or	Siltation, Metals,	Agriculture, Highway	a level that will	WRAS Development	2000
miles of	13% of the stream	Taste and Odor,	Maintenance,	no longer	TMDL Development	04/2000
stream	the 303(d) list.	Suspended Solids, Flow Alteration	Spills	threaten or	Develop 319 Workplan	2000
		110 11 11001001011		impair bonoficial usos	Implementation of Practices	2001-2006
				beneficial uses	Post-implementation Monitoring	2006-2008
					Evaluation of Measures of Success	2002-2009
Grand Lake- 46,500 lake acres and 389 stream miles in the State of Oklahoma	45,570 acres or 98% of the lake area and 101 miles of stream or 26% of the stream miles in Oklahoma are listed on the 303(d) list.	Nutrients, Organic Enrichment / DO, Pesticides, Metals, pH, Siltation, Unknown Toxicity	Agriculture, Construction, In-place Contaminants, Urban Runoff, Resource Extraction / Exploration, Mill and Mine Tailings	Reduce NPS loading in 101 miles (26%) of the Oklahoma portion of the watershed to a level that will no longer threaten or impair beneficial uses.	Preimplementation Monitoring- Cause and Source Identification Clean Lakes Study USGS Monitoring Load Verification Monitoring Establish Watershed Advisory Group WRAS Development TMDL Development Develop 319 Workplan Implementation of Practices Post-implementation Monitoring Evaluation of Measures of Success	1990 - 2000 2001 2001 1996-2000 2001 2002-2007 2007-2009 2003-2010
Keystone Reservoir- 405 miles and 23,600 acres	20,068 acres (85%) and 137 miles (34%) of stream miles are listed on the 303(d) list.	Priority Organics, Metals, Siltation, Organic Enrich. / DO, Thermal Strat., Flow Alt., Habitat Alt., Susp. Solids	Agriculture, Petroleum Act., Flow Reg., Channelization, Highway Maint., In- place Contams.		Planning on Keystone is Deferred Pending Revisiting by the NPS Working Group and Oklahoma Water Quality Monitoring Council	

Priority Watersheds	Stream Miles and Lake Area Listed on 303(d) List*	Causes	General Sources	Short-term Goals	Projected Actions/Milestones	Projected Time Frame
Broken Bow- 224 stream miles & 14,200 lake acres	24 miles (11%) of stream miles and 13,774 (97%) of the lake area is listed on the 303(d) list	Nutrients, Metals, Pesticides, Siltation, pH, Organic Enrich. / DO, Suspended Solids, Total Toxics	Nonpoint Source, Silviculture, Atmospheric Deposition, In- Place Contams.		Planning on Broken Bow is Deferred Pending Completion of Significant Implementation Efforts by ODA- Forestry and Potential Delisting from the 303(d) List	
				Peduce NPS	Preimplementation Monitoring- Cause and Source Identification	1993 – 2000
	43 miles or 63%	Nutrients, Metals,		loading in 43	Establish Watershed Advisory Group	2002
	of the stream	Siltation, pH, Organic Enrichment / DO, Suspended Solids, Habitat Alterations	Wastewater, Resource Extrapolation / Exploration	miles or 63% of the watershed to a level that will no longer threaten or impair beneficial uses.	WRAS Development	2001
Dog Creek- 67 stream	miles in the watershed are listed on the 303(d) list.				TMDL Development	1993-2000
miles					Develop 319 Workplan	2002
					Implementation of Practices	2003-2008
					Post-implementation Monitoring	2008-2010
					Evaluation of Measures of Success	2004-2011
	3977 acres or 97% of the lake area	Nutrients, Pesticides, Siltation, Suspended Solids, Unknown Toxicity, Exotic Species, Habitat Alterations	Agriculture, Petroleum Act., Channelization	Reduce NPS loading in 40 miles (41%) of the watershed to a level that will no longer threaten or impair beneficial uses.	Preimplementation Monitoring- Cause and Source Identification	1990s - 2001
					Establish Watershed Advisory Group	2003
Ft. Cobb- 98					WRAS Development	2001
stream miles	and 40 miles or 41% of the stream		Highway		TMDL Development	2000
and 4,100 lake acres	miles are listed on the 303(d) list.		Maint., Removal of Riparian Vegetation		Develop 319 Workplan	2003
					Implementation of Practices	2004-2009
					Post-implementation Monitoring	2009-2011
					Evaluation of Measures of Success	2005-2012

Priority Watersheds	Stream Miles and Lake Area Listed	Causes	General Sources	Short-term Goals	Projected Actions/Milestones	Projected Time Frame
	on 303(d) List*					
				Reduce NPS	Preimplementation Monitoring- Cause and Source Identification	1990s - 1999
				loading in 39	Establish Watershed Advisory Group	2004
Turkey	39 miles or 37%	Siltation		miles or 37% of	WRAS Development	2001
Creek- 105	of the stream	Siltation, Suspended Solids, Nutrients,	Agriculture	a level that will	TMDL Development	2000
stream miles	the 303(d) list.			no longer threaten or impair beneficial uses.	Develop 319 Workplan	2004
					Implementation of Practices	2005-2010
					Post-implementation Monitoring	2010-2012
					Evaluation of Measures of Success	2006-2013
	23 miles or 20%	Siltation, Pesticides,	Agriculture, Petroleum Activities,	Reduce NPS loading in 23 miles or 20% of	Preimplementation Monitoring- Cause and Source Identification	1990s - 2000
					Establish Watershed Advisory Group	2005
					WRAS Development	2001
Washita	of the stream		Channelization,	the watershed to	TMDL Development	2000
River- 111	miles are listed on	Nutrients	Streambank	a level that will	Develop 319 Workplan	2005
stream miles	the 303(d) list	Suspended Solids	Destabilization,	no longer	Implementation of Practices	2006-2011
	the 505(d) list.	Total Toxics	Removal of	threaten or	Post-implementation Monitoring	2011-2013
		Salinity	Riparian Vegetation	impair beneficial uses.	Evaluation of Measures of Success	2007-2014

acres of lakes (34% the 303(d) listed acres and ten percent of the state's total lake acres).

- **Goal Two** Beginning in the year 2000, the State of Oklahoma will identify pollutant sources within watersheds listed on the 303(d) list as threatened or impaired by NPS pollution. Conservation districts will complete source assessments for ten watersheds annually, beginning in 2000. Completion of ten source assessments per year would translate to the completion of 150 within fifteen years, addressing most of streams on the 303(d) list.
- **Goal Three** Beginning in 1999, the State of Oklahoma will work to increase the existing coverage of water quality enhanced education programs by sixty percent for a statewide coverage of 100 percent by 2015. Oklahoma already has substantial coverage by education programs (**Figure 1**). Each conservation district has an education program that focuses on natural resource management. In addition, many counties have enhanced programs that focus on conservation of natural resources for water quality protection. These programs are implemented by numerous education efforts including Blue Thumb, Oklahoma Water Watch, OSU Cooperative Extension Service, Oklahoma Department of Environmental Quality, and other programs. These enhanced programs currently exist in approximately 31 of 77 or 40% of Oklahoma counties. The NPS program will also spread these efforts to each of the top 10 priority watersheds seen in **Table 1**.



Figure 1. Oklahoma Counties with Enhanced Water Quality Education Programs.

- **Goal Four** Beginning in 2002, the State will draft ten Watershed Restoration Action Strategies annually until 2015 to address the remaining Priority One UWA watersheds not addressed in Table 1, according to the priority established by the NPS Working Group. This will equate to 150 WRASs drafted by 2015 or WRASs for all priority I watersheds as established by the UWA.
- **Goal Five** The NPS program will work with other State and Federal programs to identify alternative sources of funding to target and implement practices to achieve the long-term goal of beneficial use attainment by 2020 based on implementation plans developed by the State.

These goals are tied to specific actions and milestones in **Table 1** that are also summarized on page 86 in Section IV on Strategies, Actions, and Activities of the NPS Program.

Discussion of the Nine Key Elements and Organization of the Document

EPA developed new NPS Program guidance in 1996 that specified nine key elements that must be addressed in State Nonpoint Source Management Programs. A State that incorporates all nine key elements and has a proven track record of effective implementation will be formally recognized as a Nonpoint Source Enhanced Benefits State. Nonpoint Source Enhanced Benefits States will be afforded substantially reduced oversight and maximum flexibility to implement their State programs and to achieve water quality objectives.

These nine key elements are (and reference to their location in the body of the document):

1. Explicit short- and long-term goals, objectives and strategies to protect surface and groundwater. Long- and short-term goals and activities and milestones are described further in Section I, the Introduction and Table 1 of this document.

2. Strong working partnerships and collaboration with appropriate State, interstate, Tribal, regional, and local entities (including conservation districts), private sector groups, citizen groups, and Federal agencies. Partnerships and collaborations with appropriate public and private groups are further detailed in the Section III, NPS Management Programmatic Tools beginning on page 37 of this document with the discussion of the Nonpoint Source Working Group and local Watershed Advisory Groups. More discussion of various agency roles in the NPS program and the resources they have allocated for NPS pollution control efforts is found in the Section VII. Roles and Responsibilities on page 136.

3. A balanced approach that emphasizes both statewide NPS programs and on-the-ground management of individual watersheds where waters are impaired or threatened. The statewide approach to the Nonpoint Source Management Program is outlined in Section I, the Introduction and Section IV, Strategies, Actions and Activities to Achieve Water Quality Improvements beginning on page 86.

4. The State program (a) abates known water quality impairments resulting from NPS pollution and (b) prevents significant threats to water quality from present and future NPS activities. The means by which Oklahoma's program abates known water quality impairments and prevents significant threats from present and future NPS activities are detailed primarily in the Sections III and IV of this document.

5. An identification of waters and watersheds impaired or threatened by NPS pollution and a process to progressively address these waters. Oklahoma's Nonpoint Source Management Program's process of identification of waters impaired or threatened by NPS pollution and its process to address these waters is primarily referred to in Section II, Prioritization and Assessment of NPS pollution, beginning on page 11.

6. The State reviews, upgrades, and implements all program components required by § 319 of the Clean Water Act, and establishes flexible, targeted, and iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable. Measures and programs to achieve measures are discussed further in Table 1, and in sections III and IV of this document.

7. An identification of Federal lands and activities that are not managed consistently with State NPS program objectives. Inconsistencies or lack thereof between the State's NPS program and federal land management or federal programs are discussed primarily in Section V State and Federal Consistency section beginning on page 124 of this document.

8. Efficient and effective management and implementation of the State's NPS program, including necessary financial management. Nonpoint source projects include appropriate monitoring and/or environmental indicators to gauge effectiveness. The management and administration of Oklahoma's Nonpoint Source Management Program is described primarily Section VIII Program and Financial Management beginning on page 174 of this document.

9. A feedback loop whereby the State reviews, evaluates, and revises its Nonpoint Source Assessment and its NPS Management Program at least every five years. The feedback loop and revision of the Nonpoint Source Assessment and Management Program are described in Section IX. Process to Evaluate and Update the Management Plan, beginning on page 176 of this report.

What Is Nonpoint Source Pollution?

Nonpoint source pollution refers to diffuse pollutants that may seem minor but when combined from an entire watershed, become significant. In general, NPS pollution does not result from a discharge at a specific location (such as a pipe) but results from runoff, percolation, precipitation, or atmospheric deposition. Any pollutant, regardless of the concentration, can contribute to NPS pollution when released in a watershed. Precipitation washes pollutants from the air and land into streams and lakes, or into groundwater. The pollutants degrade aquatic systems by altering the physical and chemical quality and can result in drastic biological effects. The NPS problem can be intensified when natural buffering systems are adversely modified; for instance when the protective vegetation along a stream corridor is removed or when the shape or flow of a stream is altered.

Nonpoint source pollution is not as easy to pinpoint as sewage or industrial effluent from a point source. Seemingly minor or harmless activities that disturb the watershed or pollute the water can have cumulative effects. Common sources of NPS pollution include agriculture, forestry, oil and gas exploration and mining, surface and subsurface mining of various resources, septic systems, recreational boating, urban runoff, construction, road development and maintenance, physical changes to stream channels, habitat degradation, and negligent or uninformed household management practices. "Natural" sources of NPS pollution include impacts of wildlife populations and natural geology.

Extent of the Nonpoint Source Water Quality Problem

According to the Environmental Protection Agency (EPA) (Fact Sheet EPA841-F-96-004A), agricultural activities are the most important sources of water quality impairments. Roughly 60% of the surveyed stream miles and 50% of the surveyed lake acreage in the U.S. were impaired due to NPS pollution related to agriculture. Urban runoff was also identified as a major contributor of NPS pollution. Refer to Table 1 for the three leading sources of water quality impairment as identified in the *National Water Quality Inventory*, 1994.

Rank	Rivers	Lakes	Estuaries
1	agriculture ¹	agriculture	urban runoff
2	municipal point sources ²	municipal point sources	municipal point sources
3	stream habitat changes ¹	urban runoff ¹	Agriculture

Table 2. The Three Leading Sources of Water Quality Impairment for Various Waterbodies

1 = non-point source pollution

2 = point source pollution

Countless other studies identify agriculture as a major source of NPS pollution across the country (Mallin 2000, Gilliam et al. 1996, Line et al. 1996). Studies have also shown that implementation of best management practices (BMPs) can reduce NPS pollution from agriculture and improve water quality in receiving streams. Studies indicating agriculture as a major contributor to NPS pollution in Oklahoma watersheds include § 314 Clean Lakes Studies on Lake Wister (OWRB 1996), Lake Tenkiller (WQRL 1996), Lake Eucha (OCC 1997) and Lake Skipout (OCC 1996). Other studies which identify agriculture as a major source of NPS pollution in Oklahoma include Evaluation and Assessment of Factors Affecting Water Quality of the Illinois River in Arkansas and Oklahoma (OSU and Univ. of Ark. 1991), 1998 Natural Resources Conservation Service (NRCS) Little River Basin Report, and numerous reports from state agencies and universities.

The most prevalent NPS pollutants in Oklahoma are sediment and nutrients (OCC 1989, ODEQ 1998). Agricultural land, road building and maintenance, animal feeding operations, construction sites, septic tanks, silvicultural activities, oil and gas-related activities (exploration), mining activities (gravel, coal, etc.), streambank erosion, urban lawn and garden maintenance activities, and other land disturbances are contributors of these pollutants. Other common NPS pollutants include pesticides, pathogens (bacteria and viruses), salts, oil, grease, toxic chemicals, and heavy metals. Fish eating advisories, beach closures, habitat destruction, unsafe drinking water, fish kills, and many other severe environmental and human health problems result from NPS pollutants. These pollutants also ruin the beauty of clean water habitats by causing algal blooms, sedimentation, erosion, and other aesthetic effects.

As big a concern are the economic impacts that result from NPS pollution. Water quality problems in the State have become a tremendous obstacle requiring extremely large investments to remediate their effects. For the past 10-15 years, Oklahoma has expended considerable resources annually to restore and protect water resources damaged by NPS pollutants². However, efforts to reduce NPS pollution originally received significant attention following the dustbowl days when agriculture and various federal agencies devoted enormous resources towards reducing soil erosion. The State continues to realize the increasing significance of NPS pollution and to focus attention towards decreasing its impacts.

A coalition of numerous Federal, State, municipal, and community groups works to manage NPS pollution in Oklahoma. This coalition works toward this end through numerous avenues discussed in this plan. This document is the State of Oklahoma's Nonpoint Source Management Plan; it represents the interests, concerns, activities, goals and plans of Federal, State, and local agencies and organizations related to NPS pollution in Oklahoma.

² This sum is estimated from the amount of money associated with the 319-Grant Program, section 104 Wetland Program, and other similar expenditures.

II. Prioritization and Assessment of NPS Pollution

Prioritization of Oklahoma's NPS Management Program

Oklahoma has approximately 78,800 miles of streams and over 1,000,000 acres of lakes of which the State has only assessed a small percentage (approximately eight percent of stream miles (**Figure 2**) and sixty percent of reservoir area). In addition, much of the data available is dated or may somehow otherwise be of less than appropriate quality for the purposes of overall prioritization. This lack of assessment has been due to many factors, most of which stems from the lack of spatially and temporally consistent monitoring programs in the State. Oklahoma is currently implementing new monitoring programs and procedures for consistently evaluating water quality data, detailed later in the document, which directly address this shortcoming. However, in the mean time, Oklahoma must utilize the information it has to make decisions to direct its water quality programs.



Figure 2. Assessed Support of Beneficial Uses in Streams by Stream Mile.

Of the stream miles assessed and deemed fully supporting but threatened or not supporting beneficial uses to some degree, the majority (56%) are deemed threatened (**Figure 3**). The leading causes of nonsupport are siltation, pesticides, nutrients, and suspended solids. Nonpoint sources of pollution are major contributors to these causes.



Figure 3. Types of Nonsupport.

The State of Oklahoma determined that given the dated nature of the current NPS Assessment report (with respect to age of the data and the new State protocols for assessing beneficial use support, the most appropriate methods for immediate prioritization of NPS efforts would follow the watershed-based approaches detailed in federal guidance defining the Unified Watershed Assessment.

The 1998 Clean Water Action Plan (CWAP) was a major step toward identifying waters to target for restoration or protective measures. Following the CWAP, the State brought together all State, tribal, federal and local entities working in water quality to compile water quality information and prioritize watersheds. The State of Oklahoma developed a Unified Watershed Assessment (UWA) in 1998. The UWA was based on the 1988 319(h) NPS Assessment Report, the 1998 305(b) Report, and the 1998 303(d) List (**Figure 4**). Once the NPS Assessment Report has been updated based on current monitoring and USAP, this plan will more closely follow the recommendations of the NPS Assessment Report.



Figure 4. Development of Oklahoma's 1998 Unified Watershed Assessment.

Oklahoma's UWA lists 150 Priority I Watersheds (HUC 11) or watersheds in need of immediate attention to reduce pollution. **Figure 5** illustrates these priority watersheds delineated as HUC 11 digit watersheds. The UWA coverage represents approximately 40% of the total water resources of the state and 7829 miles or 96% of the stream miles and 273, 815 acres or 94% of the lake acreage listed on the 1998 303(d) list. Oklahoma's 1998 303(d) List of Threatened or Impaired Waterbodies identified 531 waterbody segments as impaired (or threatened to be impaired within two years) by 1431 impairments of 25 different types, primarily sediment and nutrient related (Appendix A). The magnitude of the list necessitates focusing programs on areas where the problem is believed to be most significant and where implementation efforts can be most effective given the type of impairment, population affected, and the likelihood of restoring the beneficial use support. The UWA helped delineate these areas.



Figure 5. Unified Watershed Assessment Watershed Prioritization

However, the UWA also considers factors such as proximity to major metropolitan areas and sourcewater issues in listing watersheds, thus not all UWA watersheds have 303(d) listed streams. In addition, the UWA includes watersheds with both point source and NPS related concerns. Because of these two factors, the OCC and the Nonpoint Source Working Group narrowed the UWA list to twenty-four watersheds most currently suitable for NPS control activities (Figure 6).

These twenty four represent watersheds where sufficient background information on the cause and extent of the water quality problem is available such that a NPS control program could be implemented and future information compared with that currently available to show water quality improvement (or lack of improvement) due to the NPS program. In addition, these watersheds were deemed suitable because most of the watershed lay within the boundaries of Oklahoma and NPS pollution was deemed the significant contributor to water quality problems. The state estimates, based on past demonstration programs, that an average of at least five years (fewer years in watersheds where efforts are already underway and more years in watersheds where information is lacking) will be required to implement



Figure 6. NPS Working Group Prioritization of Watersheds.

programs including assessment of the problem, planning, coordination, and implementation of remedial efforts and education to inform the local citizens about the importance of water quality and monitoring to demonstrate water quality improvements.

The State plans to measure its success in working towards its goals by systematically assessing water quality across the state and identifying threats, impairments, causes and sources. This assessment process is defined later document. The State will then systematically develop remedial strategies, implement and educate in these watersheds using tools described in the Tools section on page 37 such as Local Watershed Advisory Groups, Watershed Restoration Action Strategies, Total Maximum Daily Loads and other appropriate tools and activities described in the section beginning on page 86 of this report. Finally, the State will evaluate the success of these programs in working towards the long-term goals with follow up with monitoring as described in Table 1 and Section IV on page 86. For ubiquitous pollutants the State's objective is to pursue education and support the current permitting programs for things like AFO's and construction.

As stated previously, the Oklahoma program for NPS management follows a stepwise pattern beginning with assessment of the waters of the State, planning and prioritization, implementation and education, followed by evaluation of measures of success. The following section details the programs Oklahoma has in place for Assessment.

Assessment of NPS Pollution

Since 1981, the OCC has been designated "(to) act as the management agency having jurisdiction over and responsibility for directing NPS pollution prevention programs outside the jurisdiction or control of cities or towns in Oklahoma. The Commission, otherwise, shall be responsible for all identified non-point source categories except silviculture, urban storm water runoff and industrial runoff."(Title 82 O. S. §§ 1501-205 (19)). The ODA Forestry Division is responsible for NPS pollution from silviculture and the ODEQ is responsible for NPS pollution from urban stormwater and industrial runoff. In addition, Senate Bill 1170 of 1998 gave the ODA jurisdiction over NPS pollution prevention from Poultry Feeding Operations (Title 20.S. §§ 10-9.1 *et seq.* 1998). Senate Bill 549 gave ODA regulatory authority over all agricultural NPS pollution, unless otherwise noted in statute. In February 1987, the Federal Clean Water Act (CWA) (Public Law 100-4) was reauthorized and passage included a new section entitled, *319, Non-Point Source Management Programs*. This addition emphasizes that NPS pollution is a significant factor affecting the quality of the nation's water and subsequently preventing attainment of the mandate of the CWA—fishable and swimmable water.

EPA has charged each States' NPS Program with two primary tasks:

- Identify all waters being impacted by NPS pollution, and
- Develop a management program describing NPS pollution programs to be implemented to correct any identified problems.

In addition, each State's NPS Program is charged with an identification of all programs, including enforcement, to achieve implementation, cooperation with local, regional and interstate entities which are actively planning for NPS controls, and to report on program status of addressing NPS impacts and improving water quality.

Given such monumental tasks, the OCC has developed a new monitoring program, coordinated with other monitoring programs in the state, to address NPS issues in the State. Assessment of the State's water quality is the foundation for meeting the long-term goals for the State NPS program. To fully address NPS pollution, a dynamic monitoring program comprised of four stages has been adopted. The first stage includes a comprehensive, coordinated investigation and analysis of the causes and sources of NPS pollution throughout the State—Ambient Monitoring. The second stage involves more intensive, specialized monitoring designed to identify specific causes and sources of NPS pollution—Diagnostic Monitoring. The data from diagnostic monitoring can be used to formulate an implementation plan to specifically address the sources and types of NPS pollution identified in diagnostic monitoring. The third stage of monitoring, conducted during the execution of this implementation plan, is designed to perform or undertake remedial and/or mitigation efforts to address the NPS problems—Implementation Monitoring. Finally, the forth stage evaluates the effectiveness of the implementation through assessment and post-implementation monitoring—Success Monitoring.

Background

As stated above, NPS monitoring is required by federal mandate as well as State statute. However, monitoring is more than a requirement, it is the driving force behind the implementation of the NPS program and also generates a water quality database for the people of Oklahoma. Information deposited in this database can be used as a powerful tool to address water pollution issues within this State as well as surrounding States.

In general, the State of Oklahoma needs to be able to consider the following in the context of OWQS and USAP to definitively address NPS pollution:

- 1. What are the actual levels of pollution that prevent the attainment of the mandate of the CWA;
- 2. What levels of pollutants are due to natural sources and anthropogenic sources;
- 3. What levels of pollutants are reasonable to expect under present modern day land uses and are these levels protective of aquatic life;
- 4. What aquatic communities should be present in any given size stream in any given area of the State, based on OWQS;
- 5. What waterbodies are non-supporting due to NPS pollution;
- 6. What waterbodies show elevated or increasing levels of NPS pollutants that may threaten water quality;
- 7. What are the sources and magnitude of pollution loading within threatened or impaired waterbodies;
- 8. What land uses or changes in land use are sources or potential sources for pollutants causing beneficial use impairment;
- 9. What remedial efforts are effective at addressing sources of NPS water quality pollution;
- 10. Where a remediation program has been implemented, what reductions in pollutant loadings have been realized; and
- 11. Where a remediation program has been implemented, what is the beneficial use support status for that waterbody?

These monitoring needs are addressed in four stages. The first six needs are met through monitoring efforts of State agencies. The second stage addresses needs seven and eight, and is diagnostic in nature for planning remedial programs. Implementation practices (stage 3) address the needs of item nine. Finally, the fourth stage address needs ten and eleven, and is specific to assessing the benefits and water quality improvements of remedial programs.

The NPS monitoring program has been designed to determine, with regard to NPS pollution, beneficial use attainment status, identification of water quality pollutants, to aid in the identification of NPS pollution sources, to monitor the effectiveness of BMPs and to prioritize BMP implementation. The OWRB has sole responsibility for designating beneficial uses for waterbodies within the State. These assignments are listed and explained in OWQS. Water quality numerical criteria will be used to determine use attainment status, when available, in a manner consistent with OWRB's USAP.

Otherwise, biological and habitat assessments will be used in addition to physical and chemical data as a direct measure of fish and wildlife beneficial use support status in a manner consistent with OWQS and USAP. A statewide collection of positive reference streams could suggest the expected and achievable

community for any stream in the State for use with 785:45-12(e)(5) in OWRB's OWQS. Reference sites are being established for the various bioregions in Oklahoma. All monitoring data will be compared to the appropriate reference site and OWQS to determine its use attainment status. In addition, results from the assessments will be applied to the available standards and water quality criteria along with the decision criteria presented in the Water Quality Assessment (305(b) Reports) Guidance (USEPA, 1995). Protocols for determining beneficial use support (USAP) are found in the Oklahoma Administrative Code 785:46-15 (Appendix B). Streams will be considered non-supporting when OWQS are violated as determined by criteria and rules listed in OAC 785:46-15. Parameters not addressed in OAC 785:46-15 will be assessed using applicable State and federal rules and regulations to determine non-support.

NPS Monitoring Program

Nonpoint Source monitoring is the impetus for achieving the NPS Program's vision of conserving and improving water resources. To fully address NPS pollution, a dynamic monitoring program comprised of four stages or phases has been adopted and is discussed below.

Stage I: Assessment Monitoring

The Assessment Monitoring stage of the NPS Program is accomplished through a coordinated effort between several state and federal monitoring programs, most of which are described below and shown in **Figures 7** and **8**. The OCC's NPS Assessment Monitoring will be based on a rotational sampling protocol, which encompasses roughly 414 watersheds. Watersheds have been delineated based on the USGS 11-digit waterbody identification system and overlaid by the State's 11 whole basin planning management basins. Primary samples will be collected at the outlet of the HUC 11 basins along with an additional stream higher in the watershed. Rotational sampling will evolve from and sustain the monitoring effort underway by the OCC to eliminate gaps in the water quality data across the State. The program to eliminate data gaps began with the east half of the State and intensively monitoring 80 sites for impacts from NPS pollution. Funding is also in place to complete this basic monitoring in SW and NW Oklahoma.

The following discussion and strategy for achieving comprehensive monitoring coverage of the State is contingent on available funding. The current level of funding available through the CWA § 319(h) is adequate to sustain a yearly sampling effort of 130-150 sites. The monitoring program will be adjusted to meet the State's needs with the resources available.

Purpose for Assessment Monitoring

Fundamentally, the State must identify all waters within the State that are being impacted by NPS pollution, and develop a management program covering NPS pollution activities and remediation strategies. From this basic requirement, the following four reasons for monitoring have been developed.

Prioritization and Assessment of NPS Pollution



Figure 7. Types of Waterbodies Monitored, Mission of that Monitoring, and Types of Information Collected by Various State and Federal Agencies.



Figure 8. Key to Figure 7 Flowchart.

Beneficial Use Monitoring

Probably the most important reason for monitoring is to ensure that the State of Oklahoma is actually meeting the goals of The Clean Water Act. From the extensive and comprehensive monitoring protocol, the beneficial uses assigned to waterbodies will be thoroughly evaluated. The monitoring program is specifically directed at evaluating fish and wildlife propagation (785:45-5-12), agricultural uses (785:45-5-13), primary and secondary body contact recreation (785:45-5-16 & 17), and aesthetics (745:45-5-19).

In addition, other use designations, including public and emergency drinking water supplies (785:45-5-10 & 11), hydroelectric power generation (785:45-5-14), industrial and municipal process and cooling water (785:45-5-15), and navigation (785:45-5-18), will be indirectly evaluated. Assessment of beneficial use attainment is based on OWQS and evaluated following USAP.

Water Quality Trend Monitoring

Compilation of long-term water quality assessment data is necessary for developing preventative measures for addressing NPS pollution. Monitoring water quality trends over time will provide a warning of degradation in water quality. Factors such as land use, population density, cultural conditions, economic factors, climate and others, which affect water quality, will be evaluated within each 11-digit basin. The spatial selection of watersheds will be sufficient to associate changes in water quality with the aforementioned factors.

Development and Evaluation of Mitigation Strategies

Information generated during the monitoring program can be specifically applied to the development and evaluation of mitigation strategies. Consistent, reliable data will be available to land management agencies such as NRCS, ODWC, Conservation Districts, USFWS, ODA, USDA, *et cetera*, for development and evaluation of BMPs.

Stream Water Quality Data Source

Information gathered by the State will be available to citizens in an understandable form. This information will allow the public to make informed decisions on water related issues. In addition, the data will be available to State and federal agencies, universities, and environmental researchers as a base line reference and to support refinement of OWQS.

Monitoring Design

The OCC's monitoring effort is designed to evaluate the impact of NPS pollution on the quality of rivers and streams throughout the State. Monitoring will occur on a rotating basis so that the entire State is evaluated every five years. A comprehensive program involving chemical, physical, habitat, and biological parameters has been developed so that causes and sources of NPS pollution can be identified. The remainder of this section will discuss the spatial and temporal considerations, monitoring parameters, and the specific monitoring methods that will be used during the monitoring program.

Spatial Considerations

Oklahoma has been divided into approximately 414 watersheds based on the USGS 11-digit planning basins. See Figure 3 for the locations of these watersheds. These watersheds will serve as the monitoring sites for the rotational program. Evaluating changes using the 11-digit watershed designation is more sensitive than using larger watersheds. In larger basins, small effects caused by the early stages of a changing landuse will be obscured by the magnitude of water and pollution from the entire watershed.

The majority of 11-digit watersheds located entirely within the State of Oklahoma will be monitored at their outlet. In addition to the main outlet stream, a lower order stream situated higher in the watershed will be monitored concurrently. Sample collection at the outlet and within the watershed will allow for a general representation of water quality for the entire watershed. Watersheds that lie partially within the State will be monitored only if they have perennial water. Watersheds where the principal stream is flowing out of the State will be monitored as near as conveniently possible to the State line. Watersheds where the principal stream is flowing into the State will be monitored at their outlet. In the event that monitoring identifies a NPS problem, resources will be directed to determine which State is primarily responsible.

Not all of the 414 watersheds will be monitored. Watersheds that do not have perennial water, referring specifically to the presence of water but not flow, and watersheds that are actually a segment of a larger river being sampled by another agency will not be monitored. When the designated watershed is in a large river segment, the OCC will monitor a stream with perennial water that is a tributary to that large river. When there is a choice between several streams in such a watershed, an effort will be made to monitor a stream draining an area of land use different from the majority of the other streams being monitored in that region.

After assessing the 414 watersheds and removing those sites that do not meet the sampling criteria, 368 watersheds will be monitored during the rotational monitoring program. The current level of funding indicates available monies for 300 sites every five years (sixty sites per year for two years, with a maximum of 100 sites being monitored every year). The Oklahoma Water Quality Monitoring Council, the NPS Working Group and coordination with other monitoring agencies will assist in prioritizing the location of those sites. Refer to Figure 9 for a visual depiction of the selected watershed outlet sampling locations. All sites are located far enough upstream of the receiving waterbody so backwater effects will be negated. This includes alluvial water of the receiving waterbody as well as surface water. These sites are subject to confirmation by a field visit. Lack of landowner permission, lack of perennial water, and closed county roads are some of the reasons why a monitoring site may have to be rejected or moved.



Figure 9. OCC Proposed Rotating Basin Monitoring Program Sites.

Prioritization and Assessment of NPS Pollution

Temporal Considerations

To facilitate the collection of samples during the five year rotational period, the eleven whole basin planning management basins designated by Oklahoma agencies were divided into "basin groups" consisting of two to three basins. The pairing of basins depended on the number of streams within a management basin and the geographic location. Each year a new basin group will be monitored and will continue for two years; thus, at any given time the streams in four or five basins will be monitored. At the end of a rotation, the process will begin again with the initial basin group. Utilizing this strategy produces a comprehensive sampling protocol that consistently monitors the State. During a rotation, all 300 streams should have been monitored for two years, and at any given time 40% of the State will be undergoing assessment. Refer to **Figure 10** for locations of the whole basin planning management basins. The pairings are 1) Neosho-Grand (11070207190) & Upper Arkansas (11060002020), 2) Lower North Canadian (1110103060) & Lower Arkansas (11100301060), 3) Lower Canadian (11090204080) & Lower Red (11140103010), 4) Upper Red & Washita (11130202010) & Upper Canadian (11090204080).



Figure 10. Eleven Whole Basin Planning Watersheds (Paired by Colors).

Water Quality Considerations

Sites will be selected with the intention of monitoring waterbodies of varying levels of water quality. Attempts will be made to monitor sites with "good", "average" and "poor" water quality to maximize the uses of the data. Data can be used for developing and identifying reference sites and conditions as well as verifying or revising water quality or use attainment status of a waterbody of suspect quality.

Monitoring Parameters

All sites within a basin group will be monitored at specific time intervals during the two year period, depending on the parameter. The monitoring frequency has been planned to meet data quality objectives identified for the NPS program and to be consistent with the requirements specified in USAP. A listing of the parameters and sampling frequency is presented as follows:

Routine Physical and Chemical (Including Bacteria) Parameters

Sites will be monitored for physical and chemical parameters on a fixed interval schedule of ten sampling events per year. A fixed interval reduces biasing for optimal weather sampling. Samples will be collected during both baseflow and highflow conditions. Parameters that will be collected include: turbidity, pH, dissolved oxygen (DO), alkalinity, conductivity, water temperature, instantaneous discharge, nitrate (NO₃) plus nitrite (NO₂), orthophosphate (PO₄), total phosphorous (TP), total Kjeldahl nitrogen (TKN), ammonia (NH₄), chloride (Cl), sulfate (SO₄), total suspended solids (TSS), total dissolved solids (TDS), 5-day biochemical oxygen demand (BOD₅), and total hardness. *Enterococcus* and *Escherichia coli* will be monitored during the summer months only.

Biological and Habitat Collection

Sites will be monitored twice yearly for benthic macroinvertebrates and benthic habitat during the two year collection period. The sample collections are evenly divided between the winter and summer dry periods, thus utilizing the most stable index periods. Fish and fish habitat will be monitored once during each rotation cycle. This period was selected to minimize the impact on fish populations within small streams. Additional information on the geomorphology of the stream will be collected on selected streams. Specifically, width-to-depth ratios, bank full estimations, entrenchment calculations, and substrate type and size distribution will be estimated. This information will be used to develop a correlation with Rosgen stream type classification (Rosgen, 1996).

Toxic Compounds

When results of bioassessment indicate that toxic compounds have affected the fish and wildlife propagation beneficial use, the water and sediments will be sampled for biologically available forms of metals (Ag, As, Cd, Cr, Cu, Hg, Ni, Pb, Se, and, Zn). Currently, the State standards specify that total metal samples be collected, rather than dissolved metal samples (or biological available forms). If required, total metal samples will be measured along with biologically available forms. In addition, pesticides will be measured when biological and habitat assessments indicate the presence of unknown toxicity. Because there are over 50 modern pesticides in common use and many more in minor use, it is not cost effective to monitor for all of them. When pesticides are suspected to be a contaminant, a cooperative effort with the local districts and the local extension agents will be undertaken to identify which pesticides are used in the area of concern and at what time of the year. Monitoring for the suspect pesticides will occur during the application periods throughout the year. Financial resources will limit the degree and magnitude to which toxic evaluation will occur.

Land Use/Land Cover
Current land use/land cover in each of the 11-digit watersheds will be obtained through remote sensing. This information will initially be generated by "Landsat" satellite system, updated every five years. Information from this system will produce imagery with 30-meter resolution. Other factors connected with land use such as soil type, soil erodibility, slope, and others, are relatively constant, and will be compiled in-house. Soil testing may also be completed, such as that required by legislation associated with poultry litter application. Soil testing may be provided to poultry growers in priority watersheds to help meet their needs. Land use information is necessary for source delineation, but it should also be coupled with areas with good water quality to commend environmentally friendly landowners and uses.

Human Population

Human population will be monitored once every five years for each 11-digit watershed. This information is available on CD-ROM (Population and Housing Summary Tape File) generated by the US Department of Commerce, Bureau of Census. Information regarding, among others, urban expansion, septic tank density, and population will be assessed for each watershed.

Agricultural Use

Agricultural information with regard to crop type and acreage, domestic animal type and population as well as farm size will be monitored once every five years for each 11-digit watershed. The majority of this information is available on CD-ROM (Oklahoma Census of Agriculture), which is generated by the US Department of Commerce, Bureau of Census. However, local Conservation Districts and the ODA will assist in generating census numbers.

Climate

Compiling information from the Oklahoma Climate Survey's (OCS) mesonet system will monitor the varying effect of climate. Climatic factors will be monitored during the sampling period to correlate weather conditions with overall stream quality.

Future Monitoring

When technology information and financial resources become available, the monitoring program will be expanded to include other potential NPS pollutants such as endocrine disrupters. In addition, the program will be revamped to address the three-dimensional nature of NPS pollution. Eventually, the monitoring program will be designed to identify surface water, groundwater, and aerial borne NPS pollution causes and sources. For instance, we would like to install air deposition monitoring stations across the state to more accurately identify sources of NPS pollution.

Stage II: Diagnostic Monitoring

Information generated during the assessment phase of the monitoring program will illuminate the need for more specific and intensive watershed monitoring. This monitoring will be tailored to identify NPSs and address larger scale NPS problems within the watersheds. Where water quality threats or impairments have been identified, pollutant sources and loadings must be evaluated to facilitate the planning of remedial programs. This diagnostic phase is required to determine what NPS pollutant

sources must be addressed for water quality standards to be met. More intensive and specific monitoring is conducted to create a baseline for future implementation efforts. In addition to the project specific diagnostic monitoring, environmental impact investigations in response to specific events and contract monitoring will be performed at the request of other agencies and entities as resources allow.

Diagnostic monitoring of NPS pollution can occur in various forms and is completed by several agencies in Oklahoma. However, not all diagnostic monitoring in the state is NPS diagnostic monitoring. Some diagnostic monitoring may reveal point sources as a significant contributor. An example of NPS diagnostic monitoring would be watershed monitoring resulting from a lake assessment which suggested potential NPS pollution. Watershed monitoring would help identify potential NPS contributions from the watershed. Another example of NPS diagnostic monitoring would be Corp. Comm. investigation into sources of brine contamination in groundwater.

Stage III: Implementation Monitoring

Once a water quality problem or threat has been identified and intensively diagnosed, a remedial effort can be formulated to address the specific causes and sources of the problem. Implementation involves the application of remedial efforts, such as BMPs, educational activities, and other innovative practices that are tailored to address NPS water quality pollution. In the Clean Water Act, § 319(h), money is made available to demonstrate the effectiveness of these practices on a watershed level. Specific 319 (h) projects will be undertaken to demonstrate the effectiveness of innovative, but proven technology. Demonstrating the effectiveness of new approaches to water quality improvement generates a precedence on which further remediation activities can be based. To determine merit, a monitoring program is designed to provide data to substantiate or refute the effectiveness of the effort.

In general, the goal of most implementation projects is to achieve a level of change in an entire watershed. Many times the change desired is to upgrade water resources to meet or protect assigned beneficial uses. Implementation monitoring will be established within the project area, but a project may be a subset or an entire portion of a USGS HUC 11 watershed. Parameters that will be monitored will vary depending on the specific activities, but will include biological, habitat, physical and chemical monitoring, as well as more illusive monitoring such as information dissemination and edification and cost benefit analysis. In addition, the monitoring during this stage may indicate that more baseline information is necessary. Consequently, additional diagnostic monitoring may be needed to refine the goals and objectives of the implementation effort.

Stage IV: Success Monitoring

Implementation and demonstration projects designed to protect high quality areas or to address water quality impacts require monitoring to evaluate the effectiveness of the effort. Post implementation monitoring will be designed to meet the objectives of the project plan. In most project plans, post-implementation monitoring would be included; however, in certain circumstances additional monitoring outside of a specific 319(h) project plan will be required.

Monitoring will follow specific guidelines to effectively determine the efficacy of the project. Measures of success include whether assigned beneficial uses are being met and/or protected, has there been a change in behavior of stakeholders in the watershed, etc. Monitoring activities will be based on desired

output and goals of the remediation effort. Data quality objectives will be developed that will give adequate confidence for decisions based upon the data collected.

Monitoring Methods

Sample collection and data manipulation will follow accepted USAP. Specific sample collection methods for OCC's monitoring program have been outlined in the OCC's Standard Operating Procedures (SOPs) document (OCC, 1997). These methods have been subject to peer review by other State agencies, as well as EPA approval. The Oklahoma City County Health Department (OCCHD) Water Quality Laboratory will analyze the chemical parameters. A discussion of the quality assurance and quality control factors will be presented in the following sections, along with a discussion of how the data will be manipulated and evaluated. Should OCCHD no longer be an appropriate laboratory, for quality assurance or other reasons, OCC will use some other quality approved laboratory as listed in the OCC Quality Management Plan.

Use of the Data

The availability of comprehensive, complete data, collected under peer and EPA reviewed quality assurance project plans and interpreted using OWQS following USAP for the entire State, is a powerful tool for decision makers and planners. Reliable data over an extended period will allow for informed planning and development as well as remediation activities. The following three uses have been identified.

Development of 319 Management Program

Information derived from the data will direct the NPS Management Program by identifying actual causes and sources of NPS pollution. This avoids the political or unwarranted direction of funds and resources. Money and effort can be logically and scientifically directed to where it is really needed and where it will provide the most benefit.

Provide Sound Data for Inclusion in Water Quality Assessment Reports

The OCC's collection of data on a five year rotating basis, in addition to data collected annually by the state and federal programs listed in C, will facilitate a continuous update on the status of water quality in the State. This information can then be incorporated into assessment reports required by State and federal agencies. Data generated from this monitoring program will meet the requirements of the NPS Assessment mandate of the CWA through direct incorporation into the 319 Assessment Report. In addition, this information will provide excellent data for the 305 (b) Assessment Report, which is required by EPA every two years.

Dissemination of Information

The data generated from the OCC's monitoring program will be made available to the citizenry through Conservation District Offices, newspapers, and other media outlets, so that the public can make informed decisions on environmental matters related to water quality. The OCC will assemble its information into countywide informational brochures on a biannual basis to distribute to schools, district

offices, newspapers, and other outlets. A complete and updated list of data will also be available on the OCC Water Quality web page. This data will also be entered in STORET and forwarded to DEQ for inclusion in the State environmental database.

Water Quality Violations

During the course of monitoring, water quality violations will be discovered. These include, among others, turbidity, DO, pH, bacterial, salts of various kinds, aesthetics, metals and pesticides. Often these violations are due to NPS pollution. When violations are discovered, a list will be transmitted to OSE for appropriate agency distribution.

Other State Monitoring Programs with NPS Components

Some agencies have programs that also monitor for effects of NPS pollution, but were not developed with solely that focus. In effect, they do not specifically monitor for NPS pollution, nor can they always separate the impacts of PS from those of NPS pollution. These include programs that monitor for overall beneficial use attainment, effects of specific types of pollutant spills, or specific types of NPS pollution in limited areas of the State. However, these monitoring programs are essential to the NPS management program, and the State's water quality management program in general, by fulfilling the following functions:

Providing a larger and more appropriate measure when the endpoint of concern is Beneficial Use Attainment Status of waters of the State (i.e. 305 (b), 303 (d), etc.) OCC's program provides information about NPS impacts, but OWRB, USGS, and other agencies' monitoring programs better describe the total impacts to water quality in the State and across State boundaries. The "Big Picture" is critical in prioritizing water quality efforts to different large watersheds or areas of the State.

- Differentiating between point source and NPS portions of the pollutant load. The Rotating Basin Monitoring Program and Data Gaps projects generally monitor above point source discharges, whereas BUMP and USGS monitoring stations often fall below discharges. Coupling the programs together helps separate out the relative effects of the two types of sources.
- Filling in holes and supplementing in areas (geographically, temporally, and conceptually) the OCC program does not cover (Figure 11). Oklahoma is blessed with a vast number and extent of water resources, too many for any one agency to adequately monitor and assess. The multiple areas of expertise and manpower differ from one agency to the next and combining those resources results in a better overall product. A larger number of individualized programs better ensures that the needs of the State will be met.



Figure 11. Location of Various Program Monitoring Sites.

In addition, portions of these programs have been and continue to be eligible for funding under the State's 319(h) Program.

Oklahoma Water Resources Board Water Quality Monitoring Programs

The purpose of the OWRB's Clean Lakes Program is to evaluate, restore and maintain the recreational benefits of Oklahoma's publicly owned lakes, primarily municipal and major water supply lakes. The program consists of three distinct efforts: lakes assessment, citizens monitoring and diagnostic/feasibility studies. OWRB has also been charged statutorily with the responsibility for developing OWQS and evaluating beneficial use attainment. OWRB developed a Beneficial Use Monitoring Program to achieve those goals, among others.

Statewide Lakes Water Quality Assessment

The effectiveness of the State's Clean Lakes Program begins with a determination of baseline water quality conditions which, in turn, provides information concerning a particular lake's health status. Under the Lakes Water Quality Assessment Program, all "significant" public lakes (i.e., those with a surface area greater than approximately 100 acres) are investigated on a rotating basis, then evaluated as to their comparative health over time. This diagnostic monitoring is frequently used as a basis for conducting more intensive investigations on impaired or impacted water bodies. Based upon sampling conducted in 1992 through 1995, during which the trophic status of 116 State lakes (630,121 surface acres) was assessed, a large percentage of Oklahoma's lakes are characterized as experiencing water quality concerns or impairments (i.e., one or more beneficial uses is threatened). Almost 53 percent of

those lakes were determined to be eutrophic, or lakes in which uses are limited somewhat by high mineral and organic nutrient content and reduced oxygen, or hypereutrophic, lakes experiencing significant eutrophication.

OWRB gathers quarterly information on Oklahoma's major lakes on a 2 year rotating schedule. Vertical profiles at one meter intervals for dissolved oxygen (mg/l and % saturation), temperature, pH, salinity, conductivity, total dissolved solids, and oxidation-reduction potential are collected at a minimum of 3 sites per lake to represent riverine, transition, and lacustrine zones. Water samples are collected at surface and bottom layers in the lacustrine zone, and surface layers in the transition and riverine zones. Lake water quality parameters include alkalinity, total hardness, chloride, turbidity, sulfate, total suspended solids, total settleable solids, Secchi disk depth, chlorophyll *a*, nitrate nitrogen, nitrite nitrogen, ammonia nitrogen, Kjeldahl nitrogen, orthophosphorus, and total phosphorus. Algal identification and sediment samples may be collected as needed. In addition, other parameters such as pesticides, metals, etc., may be sampled on a case-by-case basis, should they be identified as a pollutant of concern. Sites are accessed by boats, which reduces lake bottom disturbance.

Data collection follows §314 Clean Lakes Program Guidance and Regulations as described in 40 C.F. R., Subpart H. to classify lakes using Carlson's Trophic State Index (as described in USAP). This information can be used to assess beneficial use attainment and to identify NPS pollutants that are impacting the water resource. Lakes identified as having a potential impairment will be further investigated through traditional §314 Clean Lakes Diagnostic and Feasibility Studies as described in §314 Clean Lakes Program Guidance and Regulations. This monitoring information can be used to suggest NPS impacts to lakes and to recommend restoration practices.

Utilizing 1992-95 Lakes Water Quality Assessment data in conjunction with similar data collected by the OCC and ODEQ, staff determined that 75 percent of the surface acres sampled had NPS pollution concerns, 74 percent were hypereutrophic or eutrophic, 41 percent had toxicity concerns, and 31 percent had recreational concerns.

The results of OWRB's 314 Lake Water Quality Assessment are included in the OCC's 319 Nonpoint Source Assessment Report. In addition, OWRB's Clean Lakes Studies often help focus State efforts toward watersheds where NPS control efforts are a priority.

Citizens Volunteer Monitoring (Oklahoma Water Watch Program)

Since the 1992 initiation of the Oklahoma Water Watch Program, created to promote establishment of semi-independent, community-based water quality monitoring programs, citizen involvement in lake assessment and protection has proven to be an invaluable tool to the OWRB's Water Quality Division. More than 2,000 volunteers across the State, trained by Board staff and others certified by the OWRB to conduct training sessions, routinely collect water quality information on a number of State lakes and associated river systems. Participants in the program learn how to collect water samples, conduct specific water quality tests and record resulting data.

This volunteer monitoring program collects valuable long-term data that can be included in the State's Nonpoint Source Assessment Report and utilized in directing NPS pollution control efforts.

Lakes Diagnostic & Feasibility Studies

Lake diagnostic and feasibility studies, the third component of the OWRB's Clean Lakes Program, assess the water quality status of Oklahoma's reservoirs, diagnose associated problems, identify sources of those problems and restore water quality. Individual lake studies and remediation are conducted in three phases. Phase I (diagnostic) projects require one year of intense water quality and quantity monitoring. Initially, researchers identify significant pollutants impacting the lake, then locate probable sources in the lake's watershed. Viable alternatives for controlling the pollution and restoring the lake are then developed.

The amount of funding dedicated to the implementation of recommended measures is dictated by the availability of federal and federal funds. Typically, remedial measures seek to reduce sediment and nutrient loading to the water body, such as through modification of land use practices in the watershed (especially farms, golf courses and residential areas) and physical modifications to the lake and/or dam. Phase II projects are expensive and difficult to fund due to the extent of State funds required.

Phase I work (conducted by OWRB, Oklahoma State University (OSU), and/or OCC) is underway or recently completed on a number of projects: Ada, Arcadia (east of Edmond), Atoka, Carmen (Alfalfa County), Chickasha, Claremore, Ellsworth, Eucha, Hefner, Henryetta, Hobart, Hunter Park (Kiowa County), Lawtonka, Meadowlake (Enid), Newkirk, Northeast (Zoo Lake, Oklahoma City), Perry, Skipout, Taylor, Tenkiller and Wister. These projects provided valuable information on causes and sources of NPS pollution in the associated watersheds. In effect, these Phase I projects laid the groundwork for NPS implementation projects which are now being conducted in Eucha and Tenkiller Watersheds and are soon planned for Wister Lake Watershed. Recent §319 Guidance further emphasizes the important relationship between §314 and §319 by suggesting that States can use up to 5% of their §319 funds to do §314 activities.

Beneficial Use Monitoring Program (BUMP)

In 1998, the Oklahoma State Legislature recognized the importance of a coordinated State monitoring effort by appropriating \$1 million to the OWRB for the creation of the Oklahoma Beneficial Use Monitoring Program (BUMP). The overall goal of BUMP is to document beneficial use impairments, identify impairment sources (if possible), detect water quality trends, provide needed information for the OWQS and facilitate the prioritization of pollution control activities. BUMP is composed of five key elements or tasks:

River and Stream Monitoring -- The OWRB is currently monitoring almost 200 sites on a monthly basis. These sites are segregated into two discrete types of monitoring activities. The first monitoring activity focuses on fixed station monitoring on rivers and streams. It is primarily based upon the 67 U.S. Geological Survey 8-digit hydrologic unit code basins present in Oklahoma. In general, at least one sample station will be located in each of the 67 watersheds (Figure 12). Following consultation with other appropriate State environmental agencies, the OWRB identified 84 fixed sites. The second component of river and stream monitoring focuses on 92 water quality sampling stations whose location will rotate on an annual basis. Stations and identified monitoring parameters were based upon Oklahoma's 303(d) list and the monitoring requirements of other State environmental agencies. Monitoring parameters are specific for each stream segment.



Figure 12. BUMP Fixed Station Stream Monitoring Sites (BUMP Rotating Sites Not Shown).

- Fixed Station Load Monitoring -- The OWRB will cooperate with the USGS and other agencies involved in collecting flow data to establish long-term flow monitoring stations in the State. Due to current financial constraints, this effort is currently being conducted on a limited basis.
- Fixed Station Lakes Monitoring -- Quarterly sampling of 50 to 60 State lakes (approximately onehalf of those monitored in the program) is underway; similar sampling of the remaining lakes will commence the second year. The effort involves the sampling of approximately three stations per reservoir, representing the lacustrine, transitional and riverine zones.
- Fixed Station Groundwater Monitoring -- This task will likely be initiated within the next two years. Currently, OWRB is evaluating historical groundwater data to identify data gaps and related needs.
- Intensive Investigation Sampling -- This element of BUMP, which involves intensive study of identified impaired waters in Oklahoma, should begin during the program's third year. Studies will be undertaken, as warranted, to document the source of the impairment and recommend appropriate restorative actions.

USGS Monitoring

The water resources mission of the U.S. Geological Survey is to provide the hydrologic information needed by others to help manage the Nation's water resources. To accomplish its mission, the Survey, in cooperation with State and local governments and other Federal agencies:

• Collects data on a systematic basis to determine the quantity, quality, and use of surface and groundwater, and the quality of precipitation.

- Conducts water resources investigations and assessments at national, State, and local scales, characterizes water resources conditions, and provides the capability to predict the impact on the resource of managerial actions, proposed development plans, and natural phenomena.
- Conducts basic and problem oriented hydrologic research that is likely to produce knowledge useful for the resolution of water resources problems facing the State, regions, and Nation.
- Acquires information useful in predicting and delineating water related natural hazards from flooding, volcanoes, mudflows, and land subsidence.
- Coordinates the activities of all Federal agencies in the acquisition of water data, and operates water information centers.
- Disseminates data and results through reports, maps, and other forms of public release.
- Provides scientific and technical assistance in hydrology to other Federal agencies, to State and local agencies, to licensees of the Federal Energy Regulatory Commission, and, on behalf of the U.S. Department of State, to international agencies.
- Administers the provisions of the Water Resources Research Act of 1984, which include the State Water Resources Research Institute Program (§ 104) and the Water Resources Research Grant Program (§ 105).

Specifically, the USGS Oklahoma District, with cooperation from various federal and State agencies, currently maintains and utilizes at least 63 surface water quality monitoring sites, 188 surface water flow stations, and eight groundwater flow stations. In addition, they are conducting numerous projects that involve additional monitoring. These projects include: Sediment Sampling, National Trends Network, Water Use, Marlow-Rush Springs Aquifer, High Plains Aquifer Water-Level Monitoring, Norman Landfill, High-Plains Aquifer, Oklahoma, Groundwater Resources Reconnaissance of Osage Reservation, Oklahoma, the Oklahoma Rainfall Frequency Atlas, Soil and Water Contamination of Ponca Area 31, Kay County, Oklahoma, and the Water-Quality Assessment, Sand Creek-Lower Caddo Creek near Ardmore. The USGS also monitors pollutant loadings from the atmosphere (National Air Deposition Sites).

ODEQ Surface Water Monitoring

The ODEQ facilitates and conducts surface water monitoring in concert with their permitting programs and TMDL development. ODEQ requires municipal, industrial, and stormwater dischargers to monitor their discharges to demonstrate permit compliance. This includes municipal monitoring of stormwater which in some cases includes biological and habitat monitoring. In addition, the ODEQ conducts or supplements existing monitoring efforts to provide data for TMDL development. ODEQ also conducts substantial biological monitoring across the state and has developed and maintained one of the most extensive collections of biological data in the state. This biological data is extremely useful for comparing historical and current fish communities across the state.

Groundwater Monitoring

Oklahoma State Department of Agriculture (ODA) Animal Waste Groundwater Monitoring:

ODA animal industry groundwater monitoring involves three separate but linked monitoring projects. The first project of the ODA Animal Industry Groundwater Monitoring Program began as a collection of sampling projects. Through these projects, 148 sites (140 active) in 19 counties are being sampled. Most of the sites are groundwater, however, 12 (11 active) surface water sites are also sampled. Twenty of the sites reflect samples from swine farms. The earliest data collected is 1991, but some sites have only been sampled since 1995 or later. 1,068 data points reflecting over 2100 analytical determinations have been collected. Most of the testing has been for nitrates and total phosphorus, with a few TKN. The data is collected and stored in an Excel spreadsheet.

The second project began in 1997 with the passage of House Bill 1522. ODA was directed to take groundwater samples at all swine farms. Generally, irrigation wells or livestock watering wells are sampled. This is still a relatively new project, and no summary of the information is currently available.

With the passage in 1998 of Senate Bill 1175, all LMFOs (swine facilities with more than 1,000 animal units) were required to install monitoring wells or a leak detection system by September 1, 1999 (Title 2 O.S. § 9-201 *et seq.* (1998)). Once installed, the Department will be monitoring the wells. These wells are located around the perimeter of the waste retention structures at the site.

ODA Pesticide Groundwater Monitoring:

The ODA monitors groundwater to determine and reduce the extent of threats to water resources due to pesticide pollution. The agency uses a statewide impact-monitoring scheme to assess the effects of pesticide use on groundwater resources in the State. The ODA uses a priority system based on the following for their monitoring program:

- Waters that are supporting designated uses and are priority waters.
- Waters that are supporting designated uses and, while not currently designated as priority waters, do have the potential of priority uses.
- All other waters that are not supporting designated uses or are threatened.
- All other water.

With these priorities, ODA is developing an agricultural impact file for each of the 77 counties to disclose areas of hydrogeologic vulnerability to pesticide, fertilizer, animal wastes, and other agricultural management practices.

The ODA monitoring plan will involve sampling groundwater on a routine basis, in response to a complaint, or in a pesticide-specific management plan as required by EPA to continue the use of that pesticide.

Collection, preservation, and analysis of samples will follow EPA guidelines.

ODEQ Groundwater Section

The ODEQ Groundwater Section is a pollution prevention program that uses advance planning to avoid contamination of groundwater, commonly referred to as Source Water Protection. They identify sources of possible pollution in the area of a water supply to avoid potential problems. The Section also

performs Global Positioning System (GPS) work. A base station for data collection and correction is currently being maintained. Geographic Information Systems (GIS) for the ODEQ are also being compiled. Additionally, the Section responds to all groundwater contamination complaints not the responsibility of other programs or agencies.

OWRB Groundwater Monitoring

The OWRB Planning and Management Section monitors groundwater across the State regarding issues of both quantity and quality. In addition, the OWRB is currently planning on increasing the scope of the BUMP program to include a groundwater component.

Oklahoma Corporation Commission Groundwater Monitoring

The OK Corporation Commission monitors surface and groundwater in relation to potential current or historical petroleum industry and retail underground and above ground storage tank pollution sites. In the past four years, Corp. Comm. staff have sampled over 100 streams and 1000 wells, groundwater springs, and groundwater seeps and have compiled this information into databases. In addition, under Corp. Comm.'s direction, responsible parties have taken tens of thousands of groundwater (mainly monitoring well) and surface water samples near suspected and confirmed pollution sites.

Poultry Producer Soil Testing

Recent legislation sought to curb potential pollution from the growing number of poultry operations in the State by placing several new requirements on growers in the State. These included registration of poultry growers, animal waste management plans, mandatory annual water quality education for growers, licensing of litter applicators, soil tests prior to litter application, and litter application based on the result of the phosphorus concentration in the soil. These operations are regulated by the ODA. The soil tests are either collected by the landowner where the litter will be spread or by agency personnel and are analyzed by the OSU College of Agriculture Soils Laboratory. The OSU soils lab also maintains a database of the soil test information that is available for various applications. This information is **not** intended to be used to target individual landowners as potential contributors; as much anonymity as possible has been maintained to protect the landowner, but make the data usable. It can be particularly useful in delineating high phosphorus content soils on a watershed basis.

Localized Monitoring Efforts

Numerous other agencies conduct monitoring in the state, but often with a more localized, rather than a statewide effort. These include monitoring conducted by Native American Tribes on tribal land for purposes of beneficial use support assessment, permitting, and various other programs. Indian Nations Council of Governments (INCOG) and Association of Central Oklahoma Governments (ACOG) conduct monitoring associated with the needs of the various municipalities they represent. The numerous Universities in the state conduct research and monitoring that is often critical in defining and identifying water quality problems in the State, but also in developing methods to more accurately and efficiently assess water quality. The Bureau of Reclamation conducts monitoring associated with the Bureau's projects and interests in the state and the United States Fish and Wildlife Service conducts extensive monitoring associated with endangered species, migratory birds, and other wildlife in the state.

And finally, numerous volunteer programs in the state monitor for a wide variety of parameters in order to assess water quality problems and sources of those problems.

Although much of this research is done on a localized scale, with specific purposes, it is often essential to supplementing the major monitoring programs and working towards the overall water quality goals of the State. This information is used in permitting, development of standards, and drafting and implementing TMDLs, implementation projects, and other remedial programs.

Consistency in Monitoring

With so many different agencies conducting monitoring efforts in the State and the use of much of this data from various sources in single documents, agencies realized the importance of standardizing methods of data collection and evaluation. With this in mind, the OWRB developed USAP to insure that different agencies and individuals considered the same parameters with at least a specified minimum amount of data collected over a temporally specific time period to make use support determinations. Although USAP, like OWQS, is an evolving document, it greatly reduces the potential for agencies to reach different conclusions on the water quality status of a certain waterbody.

However, USAP needs support documents and efforts to further insure data equivalency among programs. One mechanism to insure this consistency is through the efforts of the Water Quality Monitoring Council. OSE assembled a group of technical agencies and university researchers with water quality monitoring interests to devote time to solving water quality monitoring issues in the State. This council will perform a number of functions varying from evaluation and selection of Standard Operating Procedures to coordination of monitoring efforts to avoid duplication.

Another role the Water Quality Monitoring Council could play would be to provide consistent training between different agencies on water quality data collection techniques. Training and QA/QC sessions could further the efforts to achieve consistency among agencies as well as capitalizing on and sharing the knowledge and skills possessed by the varying agencies.

III. NPS Management Programmatic Tools

This section will describe the programmatic and technological resources available and used by the State for NPS controls.

Nonpoint Source Working Group

To more effectively consider all aspects of NPS pollution and associated remediation efforts, the OCC retailored the way in which guidance was received from the State. The NPS Working Group was reassigned to act as a guiding entity for developing and directing the NPS programs. Today, the NPS Working Group acts in a peer-review manner by providing input, opinions, and constructive criticism regarding the development and implementation of NPS policy and programs. The specific function of the group is divided into five purposes:

- 1. Assist in the revision of the NPS Management Plan;
- 2. Confirm the process of selecting priority watersheds;
- 3. Provide consensus in the planning of work in priority watersheds;
- 4. Develop in-state leadership regarding NPS issues; and
- 5. Promote consistency between State-State and Federal-State NPS policies.

The purpose of the NPS Working Group changed from its former role as an entity for evaluating 319 funding with changes in the EPA funding process, from a competitive grant award program to a baseline funding process. The previous competitive grant program was not always as effective as desired, nor did it foster NPS pollution management to the degree necessary to address the larger scale NPS pollution issues.

The current NPS Working Group is made up of 39 members from a variety of backgrounds, collected to include a broad representation of State, federal, and local agencies as well as special interest entities, environmental groups, and Native American representatives in the process of directing NPS pollution management. A diverse and multifaceted group allows the numerous interests and perspectives involved with NPS pollution management to be instilled into the NPS program. This type of arrangement also staves off conflicts and political manipulation. When all interests are given an opportunity to participate, it is the responsibility of each organization to voice opinions and to assertively participate prior to any decision making, rather than after the fact. Furthermore, when project funds are to be dedicated or a key decision is to be made, it is determined or decided based on a majority vote of the working group, not any one individual or agency. Thus, the political pressure that has influenced the process in the past has been reduced by using the working group format.

In addition, the NPS Working Group will help incorporate types of NPS pollution not under the jurisdiction of OCC (silviculture, runoff from confined animal feeding operations (CAFOs) and animal feeding operations (AFOs), oilfield or retail storage tank related, urban stormwater runoff, etc.) into the NPS program. The agencies responsible for other types of NPS pollution sit on the NPS Working Group and their participation will facilitate implementation and education efforts, where appropriate, in priority watersheds. For instance, when the 319 program addresses the Broken Bow Watershed, the ODA Department of Forestry Services will be integral in planning and executing the program through the NPS Working Group and the WAG because of the extensive silviculture in that watershed.

Watershed Planning Tools: Written Resources

A significant number of watershed based projects on a wide range of scales have been implemented throughout the U.S. and a number of watershed planning tools have been developed to address projects that focus on watershed issues. Watershed based projects may present any number of obstacles and challenges not present in other geographically referenced or nongeographically referenced projects, but many solutions to these problems exist, such as multistate agency jurisdiction or even multistate jurisdiction.

Examples of these tools include:

- River Network, 1996. "Starting Up, a Handbook for New River and Watershed Organizations," Portland, Oregon.
- Boling, D. 1994. How to Save a River: a Handbook for Citizen Action. Island Press, available through River Network, Portland Oregon.
- "Getting in Step: A Guide to Effective Outreach in Your Watershed," Council of State Governments.
- "Oklahoma Environmental Education Resource Guide," Oklahoma Department of Environmental Quality, Aug. 1998.
- "Directory of Environmental Professionals in Oklahoma 1996-1997," Environmental Institute Oklahoma State University. (Provides a list of environmental expertise within the State).
- Geographical Information Systems (GIS) Analysis. Presents and analyzes data in a visual and perhaps more understandable way to better target priority areas and practices.
- Coolie, J.L. and G.M. Cowie. 1989. Watershed Protection: Building a Local Program. Institute of Community and Area Development (ICAD), University of Georgia, Athens, GA.
- Oregon Conservation Network. 1997. Oregon Conservation Network Environmental Handbook. Portland, OR.
- Internet: volumes of information on and examples of watershed based programs are listed.
- U.S. EPA. 1999. Surf Your Watershed. http://www.epa.gov/surf/
- Kier Associates. 1995. Initiating Community-Based Watershed Planning from Watershed Restoration *In:* A Guide for Citizen Involvement in California by the Department of Commerce/NOAA/Coastal Ocean Program.
- Blue Mountain Watershed Steering Committee. 1993. Blue Mountain Watershed Conference. Understanding Watersheds and Developing a Cooperative Approach to Watershed Planning.
- Bedell, T.E. 1993. Watershed Management Guide for the Interior Northwest. Oregon State Univ. Corvallis, OR. (Order EM 8436 for \$12.25 @ Publications Orders, Agricultural Communications, Oregon State University, Admin. Services A422, Corvallis OR 97331-2119 (503) 737-2513.)
- Chaney, E., W. Elmore, and B. Platts. 1993. Managing Change: Livestock Grazing on Western Riparian. (Free from U.S. EPA Regional Offices.) (Revised from 1990 version.)
- Gordon, N., T. McMahon, and B. Finlayson. 1992. Stream Hydrology: An Introduction for Ecologists. University of Melbourne (John Wiley & Sons, New York, 526 pages.)
- "Miracle at Bridge Creek: How to Build a Natural Resource Coalition Among Groups at Odds" (1993) by Oregon State University Extension Service, Corvallis. (30 & 90 minute video.)
- Cleary, C.R. and D. Phillippi. 1993. Coordinated Resource Management Guidelines, Society for Range Management. (\$18.00 from SRM @ 1839 York St., Denver CO 80206 (303) 355-7070.)

Local Watershed Working Groups

Local working groups play an invaluable role in insuring the success of a watershed based project, at both the statewide and local level. One of the most successful types of local working group in Oklahoma has been a Watershed Advisory Group. The Watershed Advisory Group (WAG) is a locally led steering group, made up of representatives of local industries and other watershed interests. The group size is kept to a minimum to insure adequate, yet workable representation of interests and needs. Typical size is ten to fifteen members, made up of local citizens. It is important to emphasize that members of the WAG are not State or federal agency employees specializing in a certain area, but private citizens, producers, and local authorities. For instance, a State Department of Agriculture Employee would not represent cattlemen's interests. Instead a local cattle producer, perhaps a member of the Cattlemen's Association, would represent cattlemen's interests. The local Conservation District Boards recruit the members in a further effort to insure local interests are represented.

The main function of the WAG is to insure that the NPS pollution reduction implementation program is a successful, workable program with respect to local needs and other local issues, while at the same time, addressing the goals of the NPS Program. In fulfilling this role, the WAG is responsible for the following activities:

- Making recommendations to the OCCWQ staff and the conservation districts on which BMPs should be used in the demonstration project;
- Selecting the cost share rates to be used in the implementation of BMPs;
- Reviewing and concurring with the conservation animal waste plans and project agreements that have been developed for participants in the demonstration watershed

Additional duties of WAG members that are developed to ensure the group operates successfully and that as many of the pertinent local interests are represented as possible include:

- Attend 70% of all regularly scheduled meetings and 50% of all special meetings called by the chairperson;
- Work in cooperation with the conservation district boards in the watershed;
- Use the State and federal agencies for technical assistance in working with the cooperators in the watershed;
- In cooperation with local sponsors, host public informational meetings concerning the 319 program addressing what is the program, what is offered, what cost-share is available, who is eligible, etc.;
- Coordinate with the OCCWQ staff for the funding of the 319 demonstration project using the Watershed Coordinator (OCCWQ employee) as their spokesperson and responsible person for the day to day activities that affect the operation and workings of the 319 demonstration project;
- Host or conduct annual tours of the demonstration areas in the watershed;
- Use the Conservation Districts as the financial avenue for distribution of demonstration project funds;
- If a vacancy occurs on the WAG, the WAG will make a recommendation to the District Boards for filling the position.

The most successful WAGs to date have been the LeFlore and Latimer County WAGs in the Wister Lake Watershed. These groups have been active in numerous 319 programs in the watershed and in evaluating the results of the 314 feasibility recommendations to reduce phosphorus loading to the lake. In addition, these groups have successfully worked with their legislative representatives to further the efforts of their programs. These groups were the initial WAGs in the State and they have met consistently over at least a five year period to continue conservation efforts in the watershed.

Watershed Modeling

Watershed modeling is a useful method of extrapolating limited information to an entire watershed. In other words, use of land use, slope, and soils data to estimate locations in the watershed most likely to be responsible for the bulk of the pollutant loading. However, due to the very fact that modeling generally involves extrapolation and predictions about what might or should happen, its outputs should be used and interpreted with caution. Modeling should only be used as an initial step to allocate resources, and never in the absence of real-world field data. Before the results of any model can be trusted, field data must be collected to verify its applicability and accuracy in predicting results specific to the area in question.

Because of the inherent complexities in modeling and the caution that must be used in interpreting its results, EPA has developed an extensive reference document with respect to watershed modeling. Watershed modeling of NPS pollution completed and endorsed by the OCC will follow the guidelines and procedures described in this document. The EPA's Office of Water has available online a Watershed Modeling Tools Module that lists guidelines for watershed modeling. These guidelines include suggestions as to when a model can be useful and choosing the best type of model for the particular application.

Total Maximum Daily Loads

Total Maximum Daily Loads (TMDLs) are one of the tools available to assess and reduce pollution to water resources. A TMDL is the total maximum allowable daily load that will protect water quality, yet allow development and land use in the basin. TMDLs are often required to address water quality problems identified on States' 303(d) lists. EPA mandates that States must address 303 (d) listed streams within a given period of time. Recent lawsuits against EPA and various States over failure to address 303 (d) lists have increased the emphasis on removing water body segments from the list. In order to be removed from the list, a TMDL or some other type of reparatory activity (i.e. Corp. Comm. adjacent pollution cleanups) must be completed. Development and Implementation of TMDLs are the most common means by which these problems are addressed. Water body segments may also be removed from the list if it is determined that the original listing was done in error, or current data on the segment does not support listing. Removal of segments from the list is subject to EPA approval.

In order to complete a TMDL for a given body of water, an accurate estimate of the current loading must be made, along with an estimate of what portion of that load is derived from point source, NPS, and background loading. The TMDL must then assign the allowable load from each of the different source categories. The allowable load is the load that optimizes water resource protection given available resources. While estimating the portion of the load contributed by point sources is generally straightforward based on discharge records of flow and with increasing frequency concentration, ease of collection from a single location, and available literature estimates specific to treatment type and population treated, estimating the NPS portion of the load is difficult and often requires considerable data. Types of data necessary include not only water quality/loading data, but also land use types, soil types, topography, weather patterns, etc. Estimates of the NPS portion of the load are commonly made using computer modeling that adds to the difficulty and uncertainty in forming the estimate. The NPS portion of the load is often a predicted quantity rather than a measured quantity.

The ODEQ is the State agency responsible for developing TMDLs in Oklahoma. This designation is appropriate as they are also the agency responsible for NPDES permitting of wastewater discharges across the State. The TMDL concept fits in appropriately with the determination of allowable loads for dischargers. Many other state agencies play a role in TMDL development, including INCOG, ACOG, OCC, DOA, to name a few. The OCC's role in the TMDL process is to assist ODEQ in determination of the NPS allocation of the loading, whether in the form of data collection and sharing or load estimation through modeling efforts. The OCC has land use and water quality data associated with NPSs of pollution from watersheds across the State. In addition, the partnership between the OCC and local conservation districts greatly advances the ability to collect local data such as land use or storm event data.

A TMDL is of little consequence if it is not implemented. The TMDL merely suggests the allowable load necessary to protect the resource. Implementation of a TMDL requires development of some type of implementation plan, specifying how the pollutant load from point and nonpoint sources will be reduced or maintained. In Oklahoma, these implementation plans will generally be detailed in the Watershed Restoration Action Strategies facilitated by OSE or other similar documents.

The TMDL process has become an integral part of water quality management in all States. Implementation of TMDLs to protect water quality will require implementation of NPS as well as point source load reductions. While point source reductions can be accomplished through regulatory avenues, NPS reductions often require voluntary action on the part of landowners and users. One of the best ways to insure voluntary cooperation is to adequately represent local interests in the development of the TMDL by soliciting input from local citizens and agencies throughout the process. The most common means by which this is accomplished is through a period of public review. Unfortunately, it is difficult to ensure a truly public review. Most of the review is completed by State agencies, rather than by people directly affected by the TMDL.

The relationship between OCC and local conservation districts provides an avenue to address the problem of adequate public review. Input and review through a local conservation district or local working group will be an integral part of NPS TMDL efforts completed by the OCC. Local input will be included throughout the TMDL process, both during formulation of the TMDL and planning and implementation of the TMDL.

Best Management Practices for the Control of NPS Pollution

Section 319(b) of the Clean Water Act requires each State to identify the BMPs that will be used to control pollution for each NPS category. EPA defines BMPs as:

"schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. Best Management Practices also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage."

Simply put, BMPs are the most effective and practical resource treatments to control or reduce NPS pollution for a given situation. There are three basic types of BMPs: 1) practices that reduce the pollutants available for transport by the normal rainfall/runoff process (changes in management), 2) devices that reduce the amount of pollutants in the runoff before it is discharged to a surface water body (structural practices), and 3) vegetative practices. In implementing BMPs, economics and acceptability of practices must be considered in determining which practices are applicable.

In many cases, management practices may be all that are necessary to achieve the water quality goals. Management practices are usually the most economical practices to apply. If management practices are not adequate to achieve water quality goals, vegetative and structural practices may be needed. Generally, structural practices are the most expensive.

BMPs may be required by law in some circumstances. For instance, EPA requires an NPDES Stormwater permit for all construction sites five acres and larger, and has proposed lowering this in 1999 to all sites one acre and larger. This would include many new and renovating industrial, commercial, rural agricultural business, residential, and oil and gas exploration and production sites in the State. Erosion controls and other BMPs could be required in the permit. In another instance, the State of Oklahoma requires that before poultry litter can be spread, soil testing must be performed and the litter applied based on soil phosphorus values.

Other State regulations that require BMPs include:

- OWRB rule 785:45-5-10 (5) General Criteria (A) for Public and Private Water Supply (PPWS) sources, which states that "*The quality of the surface waters of the state which are designated as public and private water supplies shall be protected, maintained, and improved where feasible, so that the waters can be used as sources of public and private water supplies;*
- OWRB rule 785:45-5-25 (c)(6) Non-Point Source Discharges *Best management practices for control* of non-point source discharges should be implemented in watersheds of water bodies designated "ORW", "HQW", or "SWS" in Appendix A of this Chapter. (SWS are sensitive water supplies; HQW are high quality waters; ORW are outstanding resource waters).
- OWRB rule 785:45-5-19(a) Aesthetics *To be aesthetically enjoyable, the surface water of the state must be free from floating materials and suspended substances that produce objectionable color and turbidity.* This can include sediment, excess nutrients, and other pollutants.
- Corp. Comm. rule 165:10-7-4 *The Commission hereby adopts the State water quality standards established and promulgated by the Oklahoma Water Resources Board (OWRB)*, which includes the above rules.

• Corp. Comm. rule 165:10-7-6 Protection of Municipal Water Supplies *The Commission, upon application of any municipality or other governmental subdivision, may enter into an order establishing special field rules within a defined area to protect and preserve fresh water and fresh water supplies.*

These regulations are very important parts of an overall program to protect Oklahoma's water resources, but they cannot function alone. Many voluntary efforts are necessary to further results of these regulations. In addition, due to resource availability, it is often difficult to enforce these regulations. In other words, the regulations exist and are very useful in forwarding voluntary efforts, but few avenues exist through which they can actually be enforced. In many cases, this lack of direct enforceability is desirable because it fosters a better relationship between landowner and agency. Agencies can offer assistance without threatening fines. This makes a landowner more likely to cooperate in areas where specific regulations do not necessarily exist.

It is difficult to separate out exactly how successful these regulations have been in furthering water resource protection from NPS pollution from other efforts. However, they often provide agencies with the impetus and ability to develop programs that would have been difficult to get off the ground without them. For instance, OCC specifically considers high quality waters differently from other waters and this consideration allows proactive programs to be developed rather than retroactive programs. Broken Bow Watershed is not threatened, compared to many other watersheds in the State, but its status as a high quality water and its increasing levels of NPS pollution allowed it to be ranked by the UWA and NPS Working Group as a top priority watershed.

References to manuals and guides that describe BMPs have been arranged in the following section by NPS category. In most cases, different practices can be selected to solve a particular NPS problem. This flexibility improves the implementability of these practices to accomplish the goal of improved water quality, because it allows the planner to select practices most compatible with the operation under consideration.

BMPs For Each Nonpoint Source Category

0900 Nonpoint Source

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- M. D. Smolen, OSU Biosystems & Ag Engineering, Dept.
- W. Lee, OCES SW District
- M. D. Beem, OCES SE District
- M. J. Fram, OCES NE District

1100 Non-irrigated Crop Production References

(See References For 1000 Agriculture)

CTIC. BMPs for Water Quality. WQBMP1-0993. Conservation Technology Information Center, W. Lafayette, IN.

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OSU Publications:

E-831 Wheat Production and Pest Management in Oklahoma

F-2232 Available Nitrogen and Small Grain Production

T-157 Relationship between Available Soil P Forms and their Role in Water Quality Modeling

L-249 Soil Testing ... The 1st Right Step

L-250 Soil Nitrate Survey of Wheat Fields in Garfield County-Turkey Creek Watershed

CR-2201 Using Biosolids as a Plant Nutrient Source

F-2207 How to get a good soil sample

F-2210 Use of fertilizer on cotton

F-2226 Reclaiming slick spots and salty soils

F-2229 Soil pH and Buffer Index

F-2232 Available Nitrogen and small grain production

F-2235 Available nitrogen: Bermuda grass and other forages

F-2236 Knowing when to fertilize

PT-94-6 Fate of nitrogen and phosphorus in the environment

PT-96-25 Use oaf Animal manure as a plant nutrient

E-832 OSU Extension Agent's handbook of Insect, Plant Disease, and Weed Control

F-7462 Rinsing and disposing of pesticide containers

F-7459 Pesticides in Groundwater

VT751 Wellhead Protection: Safeguarding Rural Water (video)

VT437 Aerial Pesticide Drift Management (video)

F-1715 Erosion potential in Oklahoma Wheat land

F-1221 Planting and conservation tillage

L-Boll weevil management in Oklahoma

F-7318 Integrated Control of Musk Thistle in Oklahoma

F-2245 Using Lagoon Effluent as Fertilizer

F-2246 Using Poultry Litter as Fertilizer

F-2249 Managing Phosphorus From Animal Manure

F-2250 - Using Stockpiled Feedlot Manure as Fertilizer

F-5034 Riparian Forest Buffers

- Ron Clark, NRCS
- Hailin Zhang, OSU Soil Fertility, Plant & Soil Sciences
- Nicholas Basta, OSU Plant & Soil Sciences
- V. Johnson, OSU Soil Fertility, Plant & Soil Sciences
- Miles Karner, OCES Altus

- Jim Stiegler, OSU Plant & Soil Sciences
- Wes Lee, OCES SW District
- Gerrit Cuperus, OSU Entomology & Plant Pathology
- Mark Gregory, OCES Area Agronomy Specialist, SW District
- Lonnie Sellers, OCES Area Agronomy Specialist, SW District
- Bob Woods, OCES Area Agronomy Specialist, NE District
- Roger Gribble, OCES Area Agronomy Specialist, NW District
- OCES County Educators

1200 Irrigated Crop Production

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OSU Publications (see list under non-irrigated) F-1512 Groundwater Quality and Treatment F-1515 Irrigation Wellhead protection checklist F-1516 Irrigation Wellhead protection F-2401 Classification of Irrigation Water Quality F-2404 Irrigation Water Qualities

Experts

- Chris Stoner, Agricultural Engineer, USDA-NRCS
- Mike Kizer, Water Mgt & Water Quality, OSU Biosystems & Ag Engineering.
- M. D. Smolen, OSU Water Quality Biosystems & Ag Engineering Dept.

1300 Specialty Crops

References

(See References For 1000 Agriculture)

OSU Publications:

F-6000 Fertilizing commercial vegetables

F-6005 Mulching garden soils

F-6232 Fertilizing Pecan and Fruit Trees

CR-6250 Use of Legumes in Pecan Orchards

E-879 Turfgrass Pest Management: A Guide to Major Rufgrass Pests in Oklahoma

- F-6710 IPM in the Greenhouse Series: Integrated Pest Management for Commercial Greenhouses
- F-6711 IPM in the Greenhouse Series: Scouting and Monitoring for Pests in the commercial greenhouse

F-6712 IPM in the Greenhouse Series: Information on Insecticides for Greenhouse Growers

- E-838 Ornamental Pest Management
- E-951 Water Quality Handbook for Nurseries
- E-951 Insert Card Best Management Practices (BMPs) for Nurseries to Protect Water Quality

Experts

- CES County Educators
- Sharon von Broembsen, OSU Entomology and Plant Pathology
- W. Cuperus, OSU Entomology and Plant Pathology
- Michael Schnelle, OSU Horticulture and Landscape Architecture

1400 Pasture Land

References

(See References For 1000 Agriculture)

NRCS. 1997. National Range and Pasture Handbook. 190 VI. USDA NRCS Grazing Lands Technology Institute.

OSU Publications:

- PT 96-36 Selecting Forage for Nutrient Recycling
- 95-12 Broomsedge Management
- F-2567 Grazing Systems for Pastures
- F-2581 Reseeding Marginal Cropland to Perennial Grasses
- F-2207 How to get a good soil sample
- F-2236 Knowing When to Fertilize
- F-5034 Riparian Forest Buffers

Experts

- Steve Glasgow, Grazing Lands Specialist, USDA-NRCS
- Terry Bidwell, Rangeland Ecology & Mgt Specialist, OSU Plant & Soil Sciences
- Larry Redmon, Forage Management, OSU Plant & Soil Sciences
- V. Johnson, Soil Fertility, OSU Plant & Soil Sciences
- Hailin Zhang, Soil fertility, OSU Plant & Soil Sciences
- Mark Gregory, OCES Area Agronomy Specialist, SW District
- Bob Woods, OCES Area Agronomy Specialist, NE District
- Roger Gribble, OCES Area Agronomy Specialist, NW District
- OCES County Educators

1500 Range Land

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- Mark Moseley, Range Conservationist, USDA-NRCS
- Terry Bidwell, Rangeland Ecology and Mgt Specialist, OSU Plant & Soil Sciences
- Larry Redmon, Forage Management, OSU Plant & Soil Sciences
- David Engle, Rangeland Ecology and Management, OSU Plant & Soil Sciences

- Mark Gregory, OCES Area Agronomy Specialist, SW District
- Bob Woods, OCES Area Agronomy Specialist, NE District
- Roger Gribble, OCES Area Agronomy Specialist, NW District
- OCES County Educators

1600 Feedlots-All Types

References

(See References For 1000 Agriculture)

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OSU Publications: F-8208 Dead Bird Disposal F-1734 What is a Waste Management System? F-1735 Production and Characteristics of Swine Manure F-1736 Lagoons for Livestock Waste Treatment. F-2248 Sampling Animal Manure For Analysis F 2249 Managing Phosphorus from Animal Manure F-2246 Using Poultry Litter As Fertilizer F- 2245 Using Lagoon Effluent as Fertilizer F-2250 Using Stockpiled Manure as Fertilizer PT-98-18 How P Addition And Removal Affects Soil Test P Index PT-96-36 Selecting Forages For Nutrient Recycling PT-98-01 Science Based Phosphorus Management From Animal Manure PT-98-07 Animal Manure Can Raise Soil pH PT-98-08 Animal Manure and Soil Quality Swine Waste Treatment: Odors, Energy and Economics Workshop

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Experts

- Johnny Green, Environmental Engineer, USDA-NRCS
- Doug Hamilton, Waste Management Specialist, OSU Biosystems & Ag Engineering
- Hailin Zhang, Animal Waste Management, OSU Plant & Soil Sciences
- Jack Wallace, OCES Area Livestock Specialist, SW District
- James Britton, OCES Poultry Specialist, Poteau, OK

1700 Aquaculture

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- Quang Pham, ODEQ
- George Luker, Aquaculture Specialist, Langston University

- Ken Williams, Water Quality Specialist, Langston University
- Marley Beem, OCES Aquaculture Specialist
- Mitch Fram, OCES Area Water Quality Specialist, NE District

1800 Animal Holding/Management

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Experts

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Silviculture

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Experts

- Kurt Atkinson, ODA Forestry Services Division
- John Norris, Forest Water Quality Specialist, ODA Forestry Services Division
- Bill Ross, Forest Management Specialist, OSU Department of Forestry
- Don Turton, Forest Hydrology, OSU Department of Forestry
- Edwin Miller, OSU Department of Forestry
- Mike Barrick, Forester, USDA NRCS

2100 Harvest, Restoration, Residue Mgt

References

(See References For 2000 Silviculture)

Kurt Atkinson, ODA Forestry Services Division

- Edwin Miller, OSU Department of Forestry
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Experts

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- D.J. Turton, OSU Department of Forestry
- Mike Barrick, USDA-NRCS

2300 Road Construction / Maintenance

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Experts

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- D.J. Turton, OSU Department of Forestry
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Experts

- Jody Stringer, Urban Engineer, USDA-NRCS
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- Don Mooney, ODEQ
- M. D. Smolen, OSU Biosystems & Ag Engineering Dept.
- J. Barfield, OSU Biosystems & Ag Engineering Dept.
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• T. Haan, OSU Biosystems & Ag Engineering Dept.

4100 Storm Sewers (Except end of pipe)

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Experts

• Don Mooney, ODEQ

4200 Combined Sewers

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- Wayne Craney, ODEQ Enforcement Municipal & Industrial Wastewater
- Chris Wisniewski, ODEQ Certif./Water-Wastewater Plant & Laboratory Operators
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4300 Surface Runoff

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Experts

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- J. Turton, OSU Forestry Department
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5100 Surface Mining

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- Geoff Canty, OCCWQ

5200 Subsurface Mining References (see references for surface mining)

Experts (See Experts For 5100 Surface Mining)

5300 Placer Mining References ODM Regulations

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5400 Dredge Mining **References** See COE Regulations

Experts

- Ramona Wagner, Section Chief, Environmental Restoration Support Section, COE
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5500 Petroleum Activities

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- M. D. Smolen, OSU Biosystems & Ag Engineering Dept.
- J. Turton, OSU Forestry Department
- Richard Heizer, NRCS
- Kenneth Risenhoover NRCS, Leflore County
- Lori Hammon, NRCS, Latimer County

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ODEQ Regulations

252:647 Sludge and Land Application of Wastewater 252:510 Municipal Solid Waste Landfills

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- J. Thung, ODEQ Municipal Wastewater Land Application
- Danny Hodges, ODEQ Sludge Land Application
- Chris Wisniewski, ODEQ Certification Landfill Managers and Operators
- Chris Varga, ODEQ Enforcement, Solid Waste
- N. T. Basta, OSU Plant & Soil Sciences

6100 Sludge

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252:615 Industrial Wastewater Systems
252:605 Discharges-OPDES (NPDES)
252:640 Residential Sewage Disposal
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- Quang Pham, ODEQ General NPDES Permits
- H.J. Thung, ODEQ Water/Wastewater Treatment Plans/Lines Designs/Specs/Statutes
- Wayne Craney, ODEQ Enforcement Municipal & Industrial Wastewater
- Chris Wisniewski, ODEQ Certif./Water-Wastewater Plant & Laboratory Operators
- Cynthia McElfresh/Ali Parker, ODEQ Industrial Discharge Monitoring Reports
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ODEQ Regulations

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Experts

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Experts

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6600 Hazardous Waste

References

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Experts

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- Dianne Wilkins, ODEQ- Waste Minimization
- Tammy Johnson, ODEQ- Enforcement Hazardous Waste

7000 Hydromodification

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- Stephen Weber, ODEQ, 404 Permit Certification
- Russ Dutnell, Environmental Engineer, OCC-Water Quality Programs
- Donald Sanders, Branch Chief, Hydrology & Hydraulics, COE
- Mark McVay, COE

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- Ramona Wagner, Section Chief, Environmental Restoration Support Section, COE
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- Paul Koenig- Environmental Specialist Supervisor, OWRB- Water Quality Division

7300 Dam Construction

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Experts

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- Russ Dutnell, Environmental Engineer, OCCWQ
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- Catherine Sharp, ODEQ
- Dianne Wilkins, ODEQ- Waste Minimization
- Tammy Johnson, ODEQ- Enforcement Hazardous Waste
- Paul Koenig, OWRB, Environmental Specialist Supervisor
- Mike Kastl, OCC Abandoned Mine Reclaimation Program
- Dan Sebert, OCC District Operations Program (Wetlands)
- Shanon Haraughty, OCC Water Quality Programs

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References

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Experts

(See experts for 0900- NPS)

Mitigative Measures

If controlling the source of the pollution is determined to be unfeasible, or sources of pollution have been controlled but residual water quality problems remain, then mitigative measures may be considered. Listed below are references to be utilized and experts to be contacted when evaluating the use of mitigative measures for lakes.

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Experts

- Paul Koenig, OWRB
- Steve Nolen, COE
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- Dale Toetz, OSU, Dept. of Zoology
- Shanon Haraughty, OCC

BMP Selection Criteria

There is no generic method by which these different control techniques can be ranked either qualitatively or quantitatively. Frequently a single BMP is not adequate to address a NPS problem, rather, a system of BMPs is preferred. Site specific conditions determine which practices are best, and even whether a particular approach is appropriate. Key factors that influence the suitability of a particular BMP include the following:

- Effectiveness at controlling pollutant of concern
- Technical feasibility
- Local acceptance
- Cost effectiveness
- Operation and maintenance considerations (ease, cost and reliability)
- Life of BMP.

New BMP Selection Criteria

In addition to the above considerations, new BMPs should be evaluated by experts for their suitability. Wherever possible, research should be conducted to determine both the effectiveness for pollution control and the economics of implementation. In addition, the following guidance should be utilized:

EPA. 1993. Guidance Manual for Developing Best Management Practices (BMP). EPA 833 B-93-004.

Best Management Practice (BMP) Demonstration Projects

Best Management Practice Demonstration Projects serve dual purposes. The first objective is educational— to *demonstrate* to landowners and land users practices that will protect and improve water quality and reduce the impacts of NPS pollution. The second objective is to *implement* practices that will reduce the impacts of NPS pollution and protect / improve water quality. The projects, by definition, are demonstration projects, focusing on demonstrating practices on a small scale (subwatershed) that can be applied on a large scale (whole watershed/large basin) to reduce impacts of NPS pollution. The projects are designed, based on information collected during diagnostic monitoring that describes the nature and suspected cause of the water quality problem, to put practices in place that correct or reduce the impacts of NPS pollution.

The very demonstrative nature of the projects and the general voluntary nature of BMP implementation guarantees that they can only be successful if landowners and users are willing to implement and maintain the practices. This "buy in" by local interests is sought through multiple avenues. The primary avenue to encourage landowners and users to implement and maintain practices is in how the projects are funded. Funding is provided to implement projects on a cost-share basis. Thus, the landowner and user has to provide some effort to implement the practice that increases the likelihood that they will maintain the practice.

The amount or percentage of cost-share incentive provided is another avenue through which local buy-in is sought. WAG members, conservation district board members, and other local sponsors work with OCC staff to prioritize the BMPs that are needed to address the water quality issues in the watershed. Higher priority BMPs receive higher percentage cost-share rates. For example, riparian areas, a high priority BMP and also a hard sell to some landowners, have a higher cost-share rate than some form of pasture management like sprigging, a lower priority BMP and more desirable to many landowners.

OCC BMP implementation cost-share rates may or may not be similar to cost-share rates supported by other programs such as the NRCS Environmental Quality Incentives Program (EQIP). The local decision-makers (WAG, conservation district board, and other local sponsors) usually look at how well programs such as EQIP are accepted by the local citizens and which BMPs are successfully implemented. The decision makers consider issues such as whether the BMP failed to be implemented because the cost-share percentage was too low or the program was too restrictive for good management by the land user. The result of this comparison with other cost-share programs is that some percentages provided by OCC cost-share programs are higher than EQIP and some are lower. The local decision makers may also determine that more local ownership of the problems is necessary and thus cost-share percentages should be lower.

In order for a program to be acceptable and thus implemented by landowners, the practices suggested and available for funding must appear reasonable and worthwhile to local people. In other words, the practice must obviously benefit the landowner, and not just some guy downstream who wants to fish. Therefore, another avenue through which local interest and needs are insured is through the role of the WAG in determining which BMPs will be funded. The WAG is given a laundry list of NRCS BMPs applicable to correct the problems particular to the watershed and presented with information from technical experts on the problems and causes in the watershed. They are also provided with information on how each BMP works and which problems it is effective in solving. The WAG then determines which practices they feel should be supported with cost-share funds and at what percentages and makes these recommendations to the OCC. The OCC is given final authority to fund practices or deny practices and set rates, however, the WAG has been selected to make informed, meaningful decisions and OCC generally respects these decisions.

In addition, OCC contacts the district conservationists within the watershed to survey the needs for BMP implementation based on their knowledge of the watershed. This information is used to assess the funding needed to implement practices and improve water quality in the watershed. The WAG's decisions regarding BMPs to be funded and cost-share rates are also presented to the conservation district and subject to their approval.

Beyond the local cooperation cultivated through the efforts of the WAG in determining which BMPs to implement and what percentage of cost-share to be funded, further efforts to insure proper implementation of BMPs include:

- Design, layout, and approval of structural BMPs is performed by NRCS technicians
- Project coordinator or representative makes visual inspection of nonstructural BMPs (vegetative, incentive payments, etc.) before certification completion
- All materials and incentive payments will require receipts and completion statements from participants

- The project coordinator must sign off on all payments before submission to district board for processing payments
- An annual review and status inspection will be completed in insure participants are maintaining the BMP for the life of the practice.

Examples of BMP Demonstration Projects currently underway or planned in the near future are detailed in § V B. These include projects such as Streambank Restoration projects where the stream channel is reshaped to a more natural configuration and native materials and vegetation are used to stabilize the banks. Other BMP Demonstration projects include subwatershed projects where landowners are offered cost-share incentives to put in BMPs to protect water quality. Water quality is measured before and after implementation to show improvement due to installation of practices.

Education Planning and Resource Section

Introduction

Through educational efforts on watershed and statewide levels, OCC, OCES, OWRB, ODEQ, and OSRC will promote public awareness of NPS pollution and its impacts and engage the public in implementation of NPS Management Programs. Direct communication and discussions of water quality issues with the public can help to reconnect people and communities with the resources of the State and with the watershed in which they live. Building that connection necessitates providing information about threatened resources, as well as empowering and inspiring action at all levels, from locally led citizen efforts to State agency programs. The underlying message relayed through these efforts is that an informed and involved public provides the greatest and longest lasting environmental protection.

The environmental education programs listed in this plan provide learners with an appreciation of the world around them as well as the knowledge, skills and motivation to make informed decisions when human actions threaten natural resources. An informed citizenry can bring about change through both personal practices and their influence on public policy decisions. Applying the principles and philosophy of environmental education to NPS projects will enable environmental agencies such as those listed above to organize and enlist the support of local citizens in accomplishing and sustaining NPS priority projects.

If NPS educational programs are to succeed in achieving lasting impacts, they must focus on issues that simultaneously address citizens' concerns and environmental protection needs. Programs will only be effective if there is general support of the people affected, such that personal interests coincide with watershed and statewide implementation plans of OCC.

This section outlines a framework for planning educational efforts for NPS Management Programs, and provides guidelines for tailoring efforts to the watershed level or for a statewide educational campaign. Evaluating educational efforts is essential. Suggested evaluating techniques are also included.

Education Planning Framework

Issue Identification by Target Audiences

A good understanding of the concerns and limitations of the target audience is needed as the foundation for effective educational programs. This can be achieved in a number of ways including focus groups, active observation and interactions with individuals representative of the larger group, and surveys. It is vital that the contacts made be with a true cross section of the target community and not be based on convenience.

It is only after a true picture is developed of the multitude of concerns of the audience that specific programs and strategies should be selected. For instance, in an impoverished community, retaining land ownership and creating sufficient income are likely to be leading issues – environmental concerns must appear to conflict with these goals. The full range of motivations must be examined and used appropriately, including economic interest, human health concerns, environmental and conservation ethics, and even the broader societal good.

Educational Program Planning

This section outlines a framework for tailoring educational efforts to the needs and concerns of the people who live, and make their living, in targeted watersheds. The framework is also adaptable to a statewide educational thrust. The approach, based on The North American Association for Environmental Education (NAAEE) framework for environmental education, is designed to develop target audience-specific educational programs that guide a learner from awareness to action.

In this framework, we identify educational "subjects," then specific audiences to be targeted. Each target audience is then addressed at five levels: (a) awareness, (b) knowledge, (c) attitudes, (d) skills, and (e) action. These levels are defined below:

Awareness

Enhance visibility of the overall issue of water pollution, related societal issues, and potential problemsolving strategies. At this level, education seeks to identify audience needs and goals of the community in the context of 319 capabilities

Knowledge

Increase fundamental understanding of the processes as well as likely social, political and economic, and environmental impact of the desired actions. Develop a firm grasp of potential solutions to water quality problems and analyze their impact.

Attitudes

Audience members' attitudes should change as they develop a deeper appreciation of and respect for the potential quality of their water resources. Raising awareness and increasing knowledge helps to change attitudes. While this may be the most difficult step to achieve, it is essential to bringing about change. Attitudinal change may be reflected by the desire for skills and ultimately changes in behavior. Although many in the public may not go on to develop skills or exhibit the behavior that will restore or protect water quality, development of a favorable attitude is valuable in itself. A favorable attitude is

essential for support of appropriate public policy and a climate that is conducive to improving and protecting water quality.

<u>Skills</u>

The target audience will acquire the skills necessary to bring about change in practice. Examples include riparian area management, integrated pest management, stream restoration, recycling, and public participation.

Action/Participation

The target audience and stakeholders will apply their knowledge and skills and demonstrate commitment to conserve, protect and improve water quality by taking action as individuals or collectively. Examples include implementing BMPs, completing "service projects", or influencing public policy.

Example Programs

The following are examples of educational programs that could be undertaken with designated targeted audiences after the issue identification process has determined which subjects are needed. Tools such as existing curricula, appropriate delivery methods, and ideas for evaluating accomplishments (results) are also presented. Note that very specific audiences are sometimes targeted in an effort to better educate. Additional subjects and-target audiences may be identified as planning proceeds.

i. Subject: Soil Conservation and Erosion Control

- <u>Audience</u>: New Rural Landowners
- <u>Audience acquires</u>:
- Awareness: Recognize erosion signs and understand importance of soil loss
 - Tools: NRCS photo series, conservation posters, and public service announcements (PSAs)
- Knowledge: Soil conservation BMPs and how to choose between them, environmental impact of sediment, cost of erosion in soil quality and productivity, management alternatives that reduce erosion, and how to employ soil conservation practices without raising costs or losing productivity
 - Tools: Conservation District and OCES "Welcome to the County" Meeting, Ag field days, rainfall simulator demonstrations, CTIC Core 4 publications and information, forage, grazing, and crop demonstration plots, and pond protection demo's
- Attitude: Improved confidence in ability to control soil erosion and interest in promoting conservation in community
- Skills: Use of common farm equipment to install and maintain BMPs and attention to details such as location of turn rows and forage planning

- Action: Implementation and maintenance of soil conservation BMPs by a given percentage of those attending trainings and promotion of conservation among others in the community. As a spin-off benefit, significant numbers of other new rural landowners in the county will become aware of the benefits of soil conservation BMPs and request information or participate in events.
 - Tools: cost-share, technical assistance, and incentive payments
- ii. Subject: Soil conservation, Erosion and Sediment Control
- <u>Audience</u>: Developers, contractors, and public officials
- <u>Audience acquires</u>:
- Awareness: Recognize that removal of cover causes erosion and damage to water resources and aquatic communities
 - Tools: NRCS photo series, conservation posters, PSAs, media articles
- Knowledge: Identifying soil conservation BMPs and choosing between them, environmental impact of sediment, use of mulch, timing, and need for storm water management
 - Tools: Blue Thumb, OCES, and other environmental education programs with short courses on erosion and sediment control and field trips
- Attitude: Recognition of need for erosion and sediment control
- Skills: Design and installation of erosion control plans and BMPs and planning for good housekeeping on construction sites
- Action: Adherence to the spirit and letter of storm water regulations, local ordinances for erosion and sediment control, and avoidance of erosion related nuisance
 - Tools: model ordinances and examples of successful erosion control programs
- iii. Subject: Animal Waste Management
- <u>Audience</u>: Landowners using poultry litter
- <u>Audience acquires</u>:
- Awareness: consequences of incorrect application of poultry litter both legal and environmental
 - Tools: posters, newsletters from district, various education programs, agriculture media, poultry integrators, poultry companies, or ODA
- Knowledge: Understanding soil phosphorus buildup, eutrophication, and their undesirable effects
 - Tools: photos, slides, field tours to lakes, streams, and farms, Secchi disk demonstrations, displays, OCES educators, CTIC education programs, NRCS, Poultry Education program, and ODA inspections

- Attitude: Willingness to alter fertilization and waste management practices
- Skills: Soil sampling, spreader calibration, record keeping, litter nutrient valuation, and use of buffers widths to protect surface waters
 - Tools: seminars, field meetings, tours, free record books, Extension Educators, NRCS, Poultry Education program, and ODA inspections
- Action: Improvements in poultry litter application practices as measured by surveys and spot checks and improvements in compliance by regulated producers
 - Tools: Incentives; technical assistance, industry, and farm organization backing
- iv. Subject: Pesticide Management
- <u>Audience</u>: Urban and suburban residents
- <u>Audience acquires</u>:
- Awareness: Rainfall and sprinkler water can transport misapplied yard pesticides to surface and groundwater
 - Tools: PSAs, media, groundwater model, posters, 4-H mall days, and websites
- Knowledge: Effects of pesticides in streams and groundwater; importance of label instructions, who to ask for advice, how to calibrate applications, importance of avoiding impending rainfall, ways pesticides can be kept off driveways and streets, understanding risk of shallow groundwater and nearby surface water and sandy soils, and use of integrated pest management (IPM) techniques and biological alternatives
 - Tools: Blue Thumb volunteer educators, OCES Master Gardeners, brochures, fact sheets, newspaper columns, sewer in a suitcase, CTIC Core 4 materials, and IPM short courses.
- Attitude: Appreciation of need and desire to use greater care with yard and garden pesticides
- Skills: Calibration, mixing, and cleanup procedures, conservative purchasing habits and proper disposal of unwanted products, scouting for pests, and recognition of beneficial organisms
- Action: Adoption of IPM and selection of IPM lawn maintenance companies
- v. Subject: Pesticide Management (2)
- <u>Audience</u>: Farmers and ranchers
- <u>Audience acquires</u>:
- Awareness: Carelessness can contaminate drinking water supplies and damage stream life
 - Tools: websites, posters, District and OCES county newsletters, and CTIC Core 4 materials

- Knowledge: Effects of pesticides on groundwater and streams, understanding toxicity, persistence, runoff, and infiltration indices, need for backflow prevention, importance of following labels, chemical mixing pads for mixing and loading applications, and triple washing of pesticide containers, proper scouting and use of threshold numbers, timing of applications, and weather considerations
 - Tools: IPM publications, "50 Ways Farmers Can Protect Groundwater", farm organization bulletins, OCES fact sheets, OCES newsletter "Pesticide Reports", and CTIC Core 4 materials
- Attitude: Concern for personal health, legal liability, and economic self-interest as motivators for improved pesticide practices
- Skills: Hands-on work with planning and implementation of pesticide use BMPs such as scouting, spill pads, air gap devices, container rinsing etc.
- Action: Pesticide container recycling events, farm tours, and demonstrations of mixing pad installation.
- vi. Subject: Nutrient Management Agriculture and Cropland
- <u>Audience</u>: Crop consultants
- <u>Audience acquires</u>:
- Awareness: Excess nitrogen or phosphorus can be damaging to water quality
 - Tools: posters, flyers, personal contacts, OCES, OCC, and ODA newsletters
- Knowledge: Conservative soil testing and fertilizer recommendations, effectiveness of subsoil testing for nitrate, effect of soil pH, and preferred variety selection
 - Tools: short courses for CCA credit, fact sheets, soil testing program with reliable laboratory results, and CTIC Core 4 program
- Attitude: Willingness to recommend practices for environmental protection
- Skills: Standard skills of the profession
- Action: Offer environmentally sensitive producer management recommendations
- <u>vi.</u> <u>Subject</u>: Nutrient Management Agriculture and Cropland (2)
- <u>Audience</u>: Crop producers
- <u>Audience acquires</u>:
- Awareness: Excess nitrogen or phosphorus can result in unappealing pond and lake appearance, fish kills, bad tasting drinking water from lakes, and human health effects (nitrogen) in groundwater
 - Tools: posters, flyers, personal contacts, PSAs, public meetings, CTIC information, and ag media

- Knowledge: Pollution prevention planning for the farm, effectiveness of soil testing and conservative fertilizer recommendations that produce crops at lower cost, effectiveness of subsoil testing for nitrate, effect of soil pH, preferred variety selection, and buffer strip effectiveness
 - Tools: OCES fact sheets, CTIC materials, reliable, rapid soil testing laboratory with effective, conservative recommendations, demonstration plots, tours, and short courses
- Attitude: Willingness to try practices that differ from the traditional
- Skills: Recordkeeping, soil testing, analysis of cropping records to minimize fertilizer input, and buffer strip design and management
 - Tools: Workbooks and software for recordkeeping, seminars and classes for farm management
- Action: Selection of crop and fertilizer practices to protect the environment
 - Tools: Incentive payment and leadership from industry and crop consultants

vii. Subject: Nutrient Management – Agriculture and animal production

- <u>Audience</u>: Animal producers -- grazing
- <u>Audience acquires</u>:
- Awareness: Excess nutrients can be damaging to the environment, animal manure can damage water quality, trampling of riparian areas degrades water quality, and watershed awareness
 - Tools: posters, flyers, personal contacts, PSAs, public meetings, and agricultural media
- Knowledge: Pollution prevention planning for the farm, nutrient management recommendations, soil testing, and riparian management
 - Tools: OCES fact sheets, CTIC materials, reliable, rapid soil testing laboratory with effective, conservative recommendations, tours, and short courses
- Attitude: Pollution prevention can be economically beneficial and willingness to try practices that differ from the traditional
- Skills: Grazing and forage management and recognition of grass height riparian condition factors
- Action: Improved manure application, forage management and grazing distribution practices, forage, and riparian condition monitoring
 - Tools: Incentive payment, industry (Cattlemen's Association, Farm Bureau, etc.), and watershed leadership
- vii. Subject: Riparian Management
- <u>Audience</u>: Farmers and ranchers

- Audience acquires:
- Awareness: What riparian areas and flood plains are, how they help water quality, and watershed awareness
 - Tools: County and district newsletters farm media, CTIC materials, flyers, OCES Stream model, and watershed leadership
- Knowledge: Riparian areas are important to productivity and land value and grazing and crop production systems that are economical can also enhance functioning of riparian area
 - Tools: Riparian Area Management Handbook and related curricula, seminars, and tours
- Attitude: Appreciation of brush and tall vegetation as protective of streams, recognition of streambank clearing and overgrazing as harmful practices, and willingness to change practices.
 - Tools: Stream models and ag industry leadership
- Skills: Recognize when riparian areas/floodplains are functioning properly, management of crops and grazing to improve condition
 - Tools: all of above
- Action: Participate in stewardship incentive and other programs that improve riparian and floodplain management, and manage grazing in riparian pastures through fencing, rotation, alternate water supplies, etc.
 - Tools: incentives, industry, and watershed leadership

viii. Subject: Groundwater Protection

- <u>Audience</u>: Rural residents, youth
- <u>Audience acquires:</u>
- Awareness: There are links between activities on land surface, quality of groundwater, and safety of well water
 - Tools: PSAs, flyers, news media, school environment fairs
- Knowledge: How wells and septic systems function, how groundwater becomes polluted, which contaminants are likely to be health risks, proper waste management, and spill prevention
 - Tools: Oklahom*A*Syst seminars, classroom enrichment, and groundwater models
- Attitude: Well and septic system maintenance and proper waste management are protective of family and environmental health and willingness to take protective actions
 - Tools: Oklahom*A*Syst seminars and free water testing
- Skills: Drawing good water samples, finding assistance with maintenance, and assessment of home and farmsteads for groundwater safety
 - Tools: One-on-one home visits in targeted communities

- Action: Performing private wellhead assessments and correcting problems found
- ix. Subject: Stream Habitat
- <u>Audience</u>: Youth
- <u>Audience acquires:</u>
- Awareness: Streams are fun places, stream habitat affects our ability to use and enjoy the resource, and watershed awareness
 - Tools: Field trips, camps, videos, Caring For Planet Earth
- Knowledge: What's in a stream, stream life depends on good habitat and water quality, health of riparian area affects stream habitat, and land use affects stream habitat
 - Tools: 4-H Aquatic Stewardship Projects, Lifestyles of the Wet 'n Wild, Project WET activities, camps, scouting activities, outdoor classrooms, Blue Thumb activities, OWW activities, and streamwalk field trips
- Attitude: Desire to spend time exploring streams and willingness to participate in stream improvement activities
 - Tools: same as above, activities <u>must be fun</u>
- Skills: Collecting invertebrates, seining a stream for fish, angling, habitat assessment, water quality monitoring
 - Tools: Same as above plus: Oklahoma Blue Thumb, Oklahoma Water Watch, Scouting, 4-H Wildlife Habitat Evaluation Program and Competition, and ODWC fishing clinics
- Action: Participate in above activities, help local watershed organizations and cleanups, volunteer duty in Caring for Planet Earth, and construct outdoor classrooms
- <u>x. Subjec</u>t: Stream Habitat (2)
- <u>Audience</u>: Streamside landowners
- <u>Audience acquires</u>
- Awareness: Stream health affects our ability to enjoy the resource and maintain land values and watershed awareness
 - Tools: PSAs, flyers, news media, Caring for Planet Earth, community and watershed leadership, and websites.
- Knowledge: What's in a stream, stream life depends on good habitat and water quality, riparian areas affect stream habitat and land value and protect against land loss during flood events, and landuse patterns affect streams

- Tools: Public meetings and watershed fairs, OCES stream model and related curricula, fact sheets, demonstration sites on Partners for Wildlife areas, Blue Thumb, OWW, and other education programs, and websites
- Attitude: Willingness to adopt management practices protective of streams
- Skills: Evaluating stream health; finding technical assistance
 - Tools: See above
- Action: Participation in Blue Thumb, Stream Team, OWW, and watershed organizations adoption of management practices on private land, and participation in stream cleanups
- xi. Subject: Watershed management
- <u>Audience</u>: Resource management personnel
- <u>Audience acquires</u>:
- Awareness: A water resource includes more than the creek, river, or lake after which it is named
 - Tools: flyers, fact sheets, displays and speakers at resource-related technical conferences
- Knowledge: Effective management of a water resource includes planning on a scale that includes the entire watershed
 - Tools: workshops and annual training modules
- Attitude: Look beyond localized situations and consider watershed-level solutions
 - Tools: agency leadership
- Skills: Communication of watershed management concepts one-on-one and in group situations
- Action: Management thrusts directed toward watersheds rather than political boundaries

xii. Subject: Watershed management (2)

- <u>Audience</u>: Agricultural producers
- <u>Audience acquires</u>:
- Awareness: Protecting a water resource involves more than just the boundary of a creek, river, or lake itself. Everyone lives in a watershed.
 - Tools: flyers, brochures, newsletters, newspaper columns, and agricultural media
- Knowledge: Runoff and infiltration carry potential pollutants and nature does not always "purify" pollutants before they reach surface water resources

- Tools: workshops, maps, groundwater model, time series aerial photos, and water treatment plant visits
- Attitude: Appreciation of the "big picture" and an open mind: if we all do a little, together we can do a lot to improve surface water quality
- Skills: Evaluation of landuse practices in light of watershed health
- Action: Annual cleanup or management days, evening cookouts at watershed lake or stream sites, and formation of watershed management partnerships across boundary lines (i.e., riparian buffer initiatives, farm management training programs)
 - Tools: incentives, cost-shares, agency grant programs

<u>xiii.</u> <u>Subject</u>: Watershed management (3)

- <u>Audience</u>: County commissioners and other decision-makers
- <u>Audience acquires</u>:
- Awareness: A water resource includes more than the creek, river, or lake after which it is named
 - Tools: flyers, brochures, community meetings, agency and association newsletters.
- Knowledge: Land use decisions and practices affect larger areas than where the immediate activity takes place
 - Tools: workshops, inserts in handbooks, presentations and displays at agency conferences
- Attitude: Consider watershed effect in the decision-making process
- Skills: Assessment of landuse plans and practices in light of watershed health
- Action: Watershed impacts of activities are assessed during planning
 - Tools: technical assistance, agency leadership, and community or watershed association pressure

xiv. Subject: Watershed management (4)

- <u>Audience</u>: Youth
- <u>Audience acquires:</u>
- Awareness: A water resource includes more than the creek, river, or lake after which it is named
 - Tools: Scouting and 4-H programs, environmental camps, and Caring for Planet Earth fair display
- Knowledge: Anything that affects one portion of a watershed affects everything downstream too
 - Tools: Classroom enrichment, outdoor classrooms, rainy day walks, stream model, volunteer programs (Blue Thumb, 4-H projects, OWW), internet

- Attitude: My actions affect everyone's water and a sense of wonder and curiosity
- Skills: Exploring watersheds, interviewing and surveying, and using information resources
- Action: Participate in volunteer projects to improve water quality and become active in community affairs
 - Tools: 4-H, OWW, Blue Thumb, OCLA Lake Sweep, and local watershed associations
- xv. Subject: Watershed management (5)
- <u>Audience</u>: All residents
- <u>Audience acquires</u>:
- Awareness: A water resource includes more than the creek, river, or lake after which it is named
 - Tools: flyers, brochures, PSAs, mass media, and community meetings
- Knowledge: Anything that affects one portion of a watershed affects everything downstream too
 - Tools: Home*A*Syst, Blue Thumb education programs, OWW education programs, Caring For Planet Earth display, local watershed association programs, and environmental fairs
- Attitude: My actions affect everyone's water
- Skills: few needed
- Action: Changing the routine to include good stewardship of resources including lawns, gardens, fields, streambanks, and waste management
 - Tools: recycling, composting, xeriscaping, and pesticide collection days
- xvi. Subject: Household Hazardous Wastes
- <u>Audience</u>: All residents
- <u>Audience acquires</u>:
- Awareness: Household hazardous wastes can damage the environment
 - Tools: posters, flyers, public service announcements, and ODEQ programs
- Knowledge: Identification of household hazardous products and how to properly use and dispose of them and dates and location of community collection events
 - Tools: media, environmental fairs, "mall days", Family Community Education meetings, Blue Thumb programs, Home*A*Syst, and ODEQ programs

- Attitude: Willingness to read labels, avoid spilling oil on the ground, use collection events, and recycle and concern for environmental impact
- Skills: few needed
- Action: Organize collection events, use hazardous products according to label or save for proper disposal, or recycling

xvii. Subject Domestic Wastes

- Audience: Rural and suburban homeowners
- <u>Audience acquires</u>:
- Awareness: Failing septic tank or drainfield can damage the environment
 - Tools: posters, flyers, public service announcements, and ODEQ and Oklahom*A*Syst programs
- Knowledge: Proper siting of septic system, maintenance of septic system, and how to find access points to your septic system
 - Tools: Oklahom*A*Syst and DEQ programs
- Attitude: Willingness to maintain septic system
- Skills: few needed
- Action: Pump septic tank at regular intervals as recommended, install septic systems that match soil, community, and environmental constraints

xviii. Subject: Lake and Pond Management

- <u>Audience</u>: Urban, suburban, and rural residents
- <u>Audience acquires:</u>
- Awareness: Lakes are influenced by their watersheds, fertilizer, household chemicals, and erosion impacts
 - Tools: posters, flyers, PSAs, and mass media.
- Knowledge: Lawn and garden recommendations, identification & proper disposal of household hazardous products, how to test soil and obtain fertilizer recommendations, and IPM
 - Tools: OCES publications, soil testing program, county extension office, master gardener groups, community/watershed groups, OWW, Blue Thumb, and Oklahom*A*Syst programs

- Attitude: Willingness to avoid over use of chemicals on lawns and gardens, to try IPM methods, and to dispose of hazardous wastes properly
- Skills: Soil testing, plant selection, and IPM techniques
- Action: Reduce fertilizer use, apply fertilizers at the proper times to minimize environmental impact, use non-chemical pest control when possible, select plants that require few inputs, and join Master Gardeners, Blue Thumb, or OWW

xix. Subject: Lake and Pond Management

- <u>Audience</u>: Youth
- <u>Audience acquires:</u>
- Awareness: Lakes are valuable and are influenced by their watersheds and fertilizer, household chemicals, and erosion impacts lakes
 - Tools: posters, games, environmental fairs, and environmental day camps
- Knowledge: Everything we do in the watershed affects lake quality, fish and other organisms that live in the lake
 - Tools: Aqua Times, Project WET, sewer in a suitcase, EcoCamp, Blue Thumb, OWW, OCES Environmental Stewardship projects, Outdoor classrooms, Fishing Clinics, and scouting
- Attitude: Respect for lakes, water quality, and lake habitat and willingness to participate in volunteer lake or pond improvement projects, such as Lake Sweep or monitoring
- Skills: Assessment techniques; observational skills
 - Tools: 4-H club meetings and projects, volunteer monitoring, and class projects
- Action: Community service projects, teaching younger students, leadership activities, and volunteer monitoring
 - Tools: Blue Thumb program, OWW, 4-H
- xx. Subject: Solid Waste
- <u>Audience</u>: Rural Residents
- <u>Audience acquires</u>:
- Awareness: Illegal dumps can pollute drinking water supplies and degrade aesthetics and landfill space is expensive and limited
 - Tools: posters, PSAs, media items, classroom materials, and displays

- Knowledge: Learn about the numbers of illegal dumps in the county and how they threaten specific water supplies, train trash cops, learn how to recycle or dispose of household trash and household hazardous wastes
 - Tools: Solid Waste Institute programs, displays and presentations using aerial photos, topographic maps, groundwater maps, OCES and ODEQ fact sheets, county solid waste authorities, and websites
- Attitude: Appreciate importance of preventing and cleaning up illegal dumps, develop personal responsibility for the environment, and support community trash disposal systems or commercial systems
- Skills: Effectively working with local law enforcement and solid waste officials
- Action: Increased number of tickets issued for illegal dumping as a result of citizen cooperation and promote community action and support for cleanup and enforcement of anti-litter laws

xxi. Subject: Solid Waste (2)

- <u>Audience</u>: Youth
- <u>Audience acquires</u>:
- Awareness: Illegal dumps can pollute drinking water supplies and degrade land
 - Tools: 4-H projects, displays and public speaking, and 4-H Mall Days
- Knowledge: Water can carry pollutants from trash dumps to water sources and proper landfills are expensive and space is limited
 - Tools: School enrichment, outdoor classrooms, Blue Thumb programs, use of groundwater models, AWRA posters, ODEQ materials, and Project WET activities
- Attitude: Appreciate importance of recycling and preventing and cleaning up illegal dumps
- Skills: How to handle unwanted substances at home and on the farm, recycling, and composting
- Action: Household and farm hazardous waste cleanup days, collection events, school recycling programs, and composting

Watershed-Specific Education

Every watershed is unique, not only in terms of hydrologic and technical factors, but also in terms of local people's beliefs, customs and concerns. Localize the educational effort by getting to know the watershed, its people and the resources located within the designated area. Before setting educational goals and objectives, compile relevant demographic data and talk to local leaders and decision makers to form a general profile of the watershed community. Determine the existing level of environmental literacy, or how much the people know about water quality, and identify any controversial issues. A

series of focus group sessions is useful here. Understanding the historical and current culture of the watershed community and its economic base will open communication and may help overcome obstacles or prevent misconceptions about the watershed program. Enlisting the support and assistance of citizens in the watershed is a critical first step. It often will require more time than initially thought to achieve such support. Local people may need to see results on issues of importance to them before they commit to a new issue. Local OCC, OSU Extension, and other local level agency professionals should take the lead to plan strategies for gaining support since they already have an established network of relationships in the area. Agency professionals at higher levels will need to both respect the insights of their local level coworkers and be willing to modify objectives to reflect local realities.

Local leaders, decision makers, and opinion leaders constitute some of the local resources that must be utilized for success of the education program. By simply seeking the advice of conservation districts, OSU extension offices, educational institutions, tribal offices, civic clubs, business leaders, environmental and conservation groups, landowners, chambers of commerce and other organizations or agencies it is possible to transform negative or neutral attitudes into positive ones. These contacts will help identify community resources and sensitivities that will determine the success or failure of the program. Take the necessary steps to insure that all entities know each other and are prepared to work together. Do not "reinvent the wheel" by producing new educational materials: use or adapt existing materials whenever they are available. Be prepared to share credit by discussing factors like which logos to use on mailings and how to handle interviews with the press to insure fair billing.

Consult the local resource people to determine the most effective and efficient method to deliver educational messages. Certain landowners may require personal visits. Active civic groups may prefer a presentation at one of their meetings. Perhaps classroom presentations to elementary and middle schools will be the best way to reach students and their parents with the NPS message. Do not limit the number of formats or distribution methods employed. If, for example, a watershed program presentation were to be made at a town meeting, direct mail would notify area residents, flyers posted at community centers would provide additional notification, and media contacts would invite accurate newspaper or television coverage. In all forms of communication, make a strong effort to avoid jargon, which the public will not understand. For examples, terms such as BMP or NPS or even infiltration or runoff are likely to be unknown or murky for the majority of the public. Develop good listening skills and be flexible in how you communicate. Always strive to understand the motivations of your audience.

People respond to a variety of incentives to participate in activities. Give-aways may help improve attendance, but be certain that the event itself offers information that both addresses the audience concerns and is presented in an interesting manner. Children love to receive T-shirts, coloring books, magnets, buttons or pencils. Adults enjoy free stuff, too. Providing food is helpful with some audiences, baby-sitting service might help with other audiences. Enjoyable learning experiences are useful with children, and a social experience can be very attractive for older youth.

The educational goals and objectives of an event should inform and inspire the watershed audience to participate in the NPS program. Confer with local leaders and decision-makers during your planning to ensure that realistic goals are set and that objectives are manageable. Tailor the goals and objectives to meet the most important educational needs of the target audience.

Use the framework of Awareness, Knowledge, Attitude, Skills, Action in your planning to evaluate each item in terms of the change it is expected to produce. For example, an awareness program should aim to make a certain number of people or fraction of the community aware of the project and its objectives. The desired action might be a certain number of farmers signing-up for conservation plans or following through on implementation of BMPs.

Statewide Education

Water does not respect political boundaries and people do not isolate themselves within watersheds. There is no reason to expect people on one side of a watershed boundary to have significantly more knowledge than those on the other side of the boundary. For this reason, its is both reasonable and desirable to support a watershed effort by improvements in the general level of knowledge of the substate or statewide area. A riparian management project may be an priority in a specific watershed, but it is much less likely to be successful without a general understanding in the region of what "riparian" means and some of the management alternatives available to landowners. A general educational foundation resulting from statewide programs will facilitate successful watershed-specific programs.

To distribute the water quality message statewide the same basic framework (awareness, knowledge, attitude, skills and action) is important. The difference is primarily in the extent to which the educational program can be effective in achieving the latter framework items. For example, awareness and knowledge are reasonable goals for a statewide program. Going beyond this to developing skills and fostering action, however, is likely to take more concentrated effort using approaches such as "train the trainer" to reach farther. Ultimately, change is a local, community by community process.

Statewide programs to reach deeply into communities can be achieved by working with such groups as Conservation Districts, teachers, environmental organizations, farm organizations, farm coops, Votechs, libraries, and community action groups. Valuable assistance and cadres of trainers may also be found through 4-H, FFA, and community organizations as well as the Oklahoma Association of Conservation Districts, the Sierra Club, the Nature Conservancy, Farm Bureau, Farmers Union and other agencies such as the Scenic Rivers Commission, Oklahoma Water Watch, OSU Cooperative Extension Service, Blue Thumb, or any other education program with an environmental emphasis.

The educational messages for statewide programs will be more general, at least at first. Programs addressing recycling, soils conservation, solid waste, pesticide use and disposal, and riparian management are suitable for statewide application. Greater depth can be achieved in watershed programs for each of these, and trainer groups can be fostered where there is available expertise. Once the audience is identified, let leaders within that group help identify resources and appropriate delivery methods. Then, set goals and objectives to move the audience from awareness to action.

Evaluation

It means answering questions: Have the people in the watershed become involved in improving the area's water quality? Did participants learn the major points of the workshop? Has the statewide educational effort increased awareness about NPS? These sorts of questions allow educators to improve the quality of their planning, strategizing, communications and other skills.

Assessing the effectiveness of any educational program is essential. Evaluation reveals successes – "what works" – and failures – "what does not work". It means answering questions: Have the people in the watershed become involved in improving the area's water quality? Did participants learn the major points of the workshop? Has the statewide educational effort increased awareness about NPS? These sorts of questions allow educators to improve the quality of their planning, strategizing, communications and other skills.

NPS educational efforts should be evaluated during implementation as well as after program conclusion. During implementation step evaluations should ask if the right audience is being reached with the right message in the most efficient way. Are all available resources being used effectively to communicate the most important messages? Are the chosen goals and objectives appropriate for a watershed or better suited for the statewide strategy? Answers to these questions will either affirm the direction of the educational program or provide guidance on how to adjust or improve the program. Schedule step evaluations appropriately for the length of the educational effort.

When the educational plan has reached completion, an overall program evaluation is required. This evaluation will assess the entire plan's successes and failures and should provide quantitative information on audience changes in awareness, knowledge and skill level as well as participation rates in the NPS program. Potential evaluation tools include mail questionnaires, telephone surveys and focus group interviews.

Moreover, the education plan should be considered an ongoing, continual process. Groups should be revisited with new information and to obtain feedback from the group as to how the education program impacted either their views, their lives, or their watershed. In this manner, an educational program serves to educate not only the public and watershed residents, but also the people implementing the water quality education program.

Conclusion

Effective NPS education programs aim to reconnect people with the resources upon which they depend. Making the connection between healthy drinking water and healthy streams is an excellent starting point. Awareness leads to understanding of the threats to those resources, e.g., what are common NPS pollutants and how do they affect drinking water? How do NPS pollutants affect fish and other species in aquatic or terrestrial environments? The more that people see a connection between their lives and the condition of the watershed, the more likely they are to see themselves as having a role in safeguarding and improving water quality. At the same time, NPS educators must take care not to overwhelm people with negative news about the decline or desiccation of the resources. The predominant tone must be a positive one about what can be done, by individuals, communities, and governmental agencies. People are empowered to act when they have the proper skills and confidence that their actions will result in positive change.

This document lists numerous resources which are available to guide people in their efforts to be involved in environmental protection, specifically protection related to watersheds. Many of these are detailed in the tools section beginning on page 36 of this document.

SRF Funding for NPS Projects

Funding for various point source related pollution reduction projects such as WWTF upgrades is more readily available than funding for NPS pollution reduction problems. Civic bonds and programs such as the State Revolving Fund (SRF) have provided organized groups with the means to reduce point source pollution. Nonpoint Source pollution reduction program funding has been significantly more difficult to obtain because the activities that result in NPS pollution are generally dispersed over a wide area, a number of different land owners and may be difficult to distinguish. Funding for NPS pollution reduction activities has generally been limited to federal programs such as NRCS's EQIP and EPA's 319 funding. These sources are strictly limited by federal guidelines as per the strategy for prioritizing usage of these funds and the type of activities that can be funded.

Recognizing the success of the State Revolving Fund loan program for point source related pollution reduction activities and the scarcity of NPS funding, the State opted to develop a policy whereby a portion of the SRF would be available as low interest loans to be used for NPS pollution reduction activities. The language and requirements of the SRF program limit its applicability to organized groups with the capability to pay back the loan; therefore, private individuals are not able to utilize the program. However, this program can be especially useful for municipalities with stormwater runoff concerns and can also be useful to rural water districts with specific NPS concerns.

Because the SRF NPS program is a loan, rather than a cost-share program or money given outright, the requirements of the implementation are significantly different from that of other NPS implementation programs. There is no required education component or monitoring to show effectiveness. This means that a larger portion of the fund goes towards actual implementation of the practices.

The State Revolving Fund Loan Program is managed by the OWRB. Current Oklahoma SRF funds are in high demand and are well-utilized by point source related interests. In addition, the existing state legislation hinders the usage of these funds for NPS related efforts until all point source issues are resolved. Given the strong support from federal partners to use SRF funds for NPS efforts in the future, the State of Oklahoma will pursue SRF funding for NPS controls.

Historical Data

In evaluating the water quality of the State's waters, it is often necessary to evaluate historical data either as an indication of change or perhaps because historical data is all that exists for a certain waterbody. Section 305 (b) and 319(h) guidance mandates that all available data must be used to evaluate the quality of the State's waters. Federal programs associated with § 314, 319, and 305 (b) must reference past reports associated with the same programs. Historical data must be considered. It is often our only means by which we can determine if the waterbody is actually being impaired by anthropogenic sources or whether the water quality condition is natural for that stream.

However, because sampling techniques and quality assurance have evolved with technology, historical data may not hold up to current quality assurance measures. Therefore, whenever older reports and data are referenced, care must be given in evaluating such data to ensure the correct actions are taken as a result of such data review. For instance, in the NPS Assessment, data over five years old is considered "evaluated data" and not given the same weight as newer data. It is desirable to collect current data

whenever possible, but when historical data must be used, its limitations and constraints must be recognized.

This is not to imply that historical data is inferior in quality to current data, merely that the data quality standards were generally different in the past and the possibility exists that it may not be entirely comparable to current data. Data may have been collected for slightly different purposes than it is currently being used. For instance, sites may have been situated in such a way that they would bias the data as it is currently being used; sites may have overemphasized or diluted the effects of certain types or sources of loading rather than considering the overall beneficial use support status of the stream and the overall affect of NPS loading.

IV. <u>Strategies, Actions, and Activities to Achieve Water Quality</u> <u>Improvements</u>

Strategies to Achieve Water Quality Improvements

Oklahoma's strategy to achieve the long- and short-term water quality goals described in the introduction follows a stepwise pattern. Initial work focuses on statewide efforts towards assessing NPS pollution across the State so that an overall characterization of NPS pollution in the State can be made. This characterization is primarily useful for prioritizing both spatially and by pollutant or source the efforts necessary to reduce NPS pollution in the State. This prioritization is necessary to insure the optimal use of available resources towards achieving long-term goals. Thus, the process Oklahoma uses to address NPS pollution to waters of the State is as follows: 1) statewide monitoring to assess NPS pollution across the State and identify spatially and by pollutant (sediment, nutrients, etc.) hot spots or priority areas; 2) diagnostic monitoring in those hot spot or priority areas to further define potential sources and extent of NPS pollution, 3) planning and implementation of efforts, either watershed specific or statewide, to address those specific pollutants and sources; and 4) followup monitoring and planning to address successes and failures to be used in future efforts.

The statewide and watershed based strategies are integrally tied to one another. On a statewide basis, Oklahoma will continue to identify and verify waters and watersheds impaired by NPS pollution and unimpaired waters that are threatened or otherwise at risk. This process is updated at least every five years in the NPS Assessment Report and every two years in the 303(d) list. Further, on a watershed basis, Oklahoma will annually implement a process to progressively address these identified waters by conducting more detailed watershed assessments and developing and implementing watershed implementation plans. The State will follow a simple cyclical process of identifying waters of concern through monitoring, identifying pollution sources, planning and implementing measures to remedy the water quality problem and continued monitoring to verify that the pollution has been abated and no new pollution is occurring. The process of identifying watersheds and their water quality is outlined in the monitoring section beginning on page 15. This section in turn describes the planning process involved to establish WRASs, implementation plans and 319 projects to remedy identified water quality problems.

The statewide and watershed based strategies can also operate independently of one another. There are many ubiquitous pollutants that are best controlled at a statewide, rather than a watershed level. This section will also address planning of strategies for these pollutants. Statewide strategies of education, incentives and regulation should be in place to prevent further degradation and to prevent additional waters of the State from becoming impaired. Statewide strategies will be described on a categorical basis by source because specific measurable water quality goals, measurable loads, or concentrations of pollutants are not feasible measures of successful implementation. Some watersheds have particular interests that set them apart from the statewide prioritization strategy and warrant watershed implementation. For instance, even though the Mountain Fork/Broken Bow Watershed has few water quality problems, its pristine status mandates proactive implementation to preserve its integrity. This pristine status is the result of landowner activities that preserve the resource. It is important to protect these practices as well as use them as examples that may be transferred to other watersheds.

Conservation districts are the key to successful planning for most NPS categories. Districts within each watershed must be kept current with available data and participate in the decision making and planning process. Districts are uniquely capable to conduct watershed assessments and to inventory what practices are needed. Conservation districts have knowledge of land and people at the local level. Districts are also the repositories of land treatment records and conservation plans. Many districts will need additional staff, training, and equipment to become aggressively involved in watershed planning. Conservation districts are the logical coordinator for watershed advisory groups and public participation for restoration actions.

Specific Strategies and Actions to Address Goals

Numerous programs address NPS pollution and water quality in the State and the long-term success of those programs is not yet predictable. The programs range from education efforts of nearly every State and federal agency to actual pollution control programs. For the overall NPS program to be successful, many changes in practices and attitudes of the citizens of Oklahoma will be necessary. There is no way of knowing how quickly those changes could take place. However, the State has a much more comprehensive approach to achieving those changes than ever before. Citizens are becoming more aware of NPS issues and more concerned about water quality. This concern extends to all generations, which suggests that sustained organized efforts to reduce the impacts of NPS pollution will have greater potential to be successful than ever before.

The State has identified a number of actions necessary to address the long- and short-term goals in the stepwise manner of assessment, prioritization and planning, implementation and education, and finally evaluation of success of the project. These actions are detailed in Table 3 and in the following sections.

Watershed-Based Actions to Address Goals

Systematically identify waters and watersheds threatened or impaired by NPS pollution based on OWQS at least every 5 years through the year 2020. The specific action for identifying NPS threats and impairments is to monitor water quality and the integrity of the aquatic community and habitat in 300 streams in the State through a rotating program lasting five years, beginning in 2002. The Oklahoma Water Resources Board's (OWRB) Beneficial Use Monitoring Program (BUMP) will also contribute significantly to this goal by monitoring larger streams and lakes across the state. Numerous other agencies also conduct monitoring programs to evaluate the status of the State's waters. It is imperative within this goal that threats to pristine waters (e.g., waters identified within the WQS for additional protection such as Scenic Rivers and Outstanding Resources Waters) be identified. This goal falls under the responsibilities of the OWRB, the OCC, the Oklahoma Department of Environmental Quality (ODEQ), the Oklahoma Department of Wildlife Conservation (ODWC), the Oklahoma Department of Agriculture (ODA), the Oklahoma Corporation Commission (Corp. Comm.), the Oklahoma Scenic Rivers Commission, and the Office of the Secretary of the Environment (OSE). This information will be used in the 319 NPS Assessment Report (every 5 years), the 305(b) Report (every 2 years), and on the 303(d) List (every 2 years).

Actions	Methods to Achieve Action	Projected Time Frame
Nonpoint Source	Annual Review by NPS Working Group in the form of Annual Report	Formal Revision every five
Management Program	Bi-annual Review by NPS Working Group to Evaluate Measures of	years- 2000, 2005, 2010, 2015,
	Success	2020
Nonpoint Source	Rotating Basin Small Watershed Monitoring Program- Complete circuit	Formal Revision every five
Assessment Report	of State Every 5 years- approximately 300 sites dep. on available funds.	years- 2000, 2005, 2010, 2015,
	OWRB BUMP Monitoring Program- Approximately 100 fixed sites and	2020
	90 rotating sites on rivers and streams. Also gathering quarterly	
	information on 50-60 lakes on a two year cycle.	
	Additional Monitoring by various agencies and groups	
Contribute to Revised	• The State will revise the 303(d) List according to federal and state	• 2000, 2002, etc.
and Updated 303(d)	requirements. Revision of the 303(d) list equates to more accurate	
List	representation of water quality threats and impairments in the State.	
Contribute to Revised	• The State will Update the UWA every year following revision of the	1998, 2001
and Updated UWA	303(d) list	
	Prioritize for NPS based on UWA using NPS Working Group	
Draft TMDLs for	• ODEQ has committed to a 12 year time frame for developing TMDLs-	Priority I Waters: '98 – '00
303(d) Waters	• The State expects significant revision to the 303(d) list to occur during	Priority II Waters: '00-'03
	the next several years that will result in changes in the TMDL	Priority III Waters: '04-'07
	schedules.	Priority IV Waters: '08-'10
	• New guidance is pending for TMDLs that will (add more text here)	
WQS Implementation	• Each State environmentally agency is statutorily required to draft a Water	2001
Plan	Quality Standards Implementation Plan by 2001	
Support and Utilize	• OCC will coordinate the NPS Working Group to evaluate and advise on	Group will meet at least twice
the NPS Working	the direction of the NPS Program and to ensure better intra-agency	per year in addition to mail to
Group	cooperation and a more effective program.	address NPS issues.
Education Programs	• Promote education programs like Blue Thumb, Cooperative Extension	• Blue Thumb will expand
	Service, Oklahoma Water Watch, and ODEQ's Sourcewater Protection	enhanced education efforts
	Program	to 4 new Conservation
	• Supplement existing water quality programs with NPS specific programs?	Districts (CDs) annually
	Improve partnership with NRCS to promote water-quality related	through 2002.
	education programs within EQIP priority areas.	• 2 additional CDs annually '03
		- '10

 Table 3. Statewide or Programmatic Actions and Milestones to Achieve Goals.

		All Watershed implementation
		efforts will include an education
		component.
Improving Data	• All OCC data will be incorporated into a single database	• May 2000
Accessibility and	• OCC data will be available through internet in a user-friendly environment	• Web Accessibility by 2000
Sharing	• All OCC data will be available through contact with a data manager	• All OCC data entered into
	OCC data will be combined with other national water quality data	STORET by 2001
Utilize and Improve	• OWRB's BUMP and other agency monitoring programs collect data to	• Monitors more than 300
Oklahoma Water	develop standards more appropriate to protect the State's Waters	streams annually, 30 major
Quality Standards and	Oklahoma will continue to develop Water Quality Standards to more	lakes annually (60
Use Support	appropriately address NPS pollutants (i.e. sediment, nutrient, and	biannually), and monitors
Assessment Protocols	biological criteria)	groundwater related to
	Oklahoma environmental agencies worked together to develop Use	quality and quantity issues.
	Support Assessment Protocols to consistently define the quality of the	
Current and Dessent	State's waters	
Support and Research	• Continue to develop and demonstrate new methods to better address NPS	• Incorporate new strategies
Technology	fluvial geomorphology for streambank restoration, etc.)	demonstration programs (at
reemiology	• Continue to research new methods and activities other states are using to	least one program per year)
	address NPS pollution	• Attend and make
	 Participate in Oklahoma Water Quality Monitoring Council 	presentations at no less than
	• Tarterpate in Oklanoma Water Quanty Monitoring Council	six national and regional
		conferences annually
		• Provide data, expertise,
		physical and financial
		assistance with development
		of OWQS.
Annual Reports and	• The State will conduct annual reviews of the overall program and each	Annually through 2020
Semiannual Project	project. These reviews include progress towards goals as well as financial	
Reports	review.	• Semi-annually through
	• The State will prepare and submit semiannual progress reports to EPA	2020.
	summarizing activities pertaining to specific projects with regard to	
	progress towards goals of the project.	

- Monitor land use trends to identify where water bodies may be threatened. The State will review available land use data within each of the top priority watersheds, along with the water monitoring watersheds, every five years through the year 2015. Land use information is an essential tool in any NPS program, and current land use information will help prioritize implementation efforts within priority watersheds. The OCC will accept responsibility to meet this goal, with the cooperation of local conservation districts, the Natural Resources Conservation Service (NRCS), and other pertinent agencies.
- Continued monitoring of waters identified as impaired or threatened by NPS pollution. The State will continue monitoring waterbodies listed on the 303(d) list to determine the current beneficial use support status (based on USAP and OWQS) and whether immediate action is required. The OCC's monitoring program will review and monitor 20% of the 303(d) water bodies listed for NPS-related insults (streams and rivers only) annually beginning in 2000 to achieve 100% by 2005. In addition, the OWRB monitoring effort is focusing on a considerable number of these 303(d) waterbodies including all lakes. Steps have been taken to avoid duplication of effort between programs. Other monitoring programs that can be used to further this goal include the United States Geological Survey (USGS), ODWC, Corp. Comm., and the Oklahoma Scenic Rivers Commission. The Oklahoma Water Quality Monitoring Council should facilitate achievement of this goal and cooperation between programs.
- **Groundwater monitoring**. The State will develop by 2005, and implement by 2010, a comprehensive groundwater monitoring strategy that will coordinate agency statutory responsibilities and programmatic requirements of FIFRA, Source Water Protection, and citizen and municipal well monitoring. The OWRB, ODEQ, Corp. Comm., and OCC are all responsible for monitoring groundwater. USGS also contributes significantly to the groundwater monitoring effort in the State. The OWRB BUMP program plans to develop a groundwater monitoring component that will focus on current gaps and needs in the State's groundwater monitoring efforts.
- Identify pollutant sources within watersheds listed on the 303(d) list as threatened or impaired by NPS pollution. Source assessments must be completed to allow planning of implementation measures and must also identify threats to groundwater. Specific goal: conservation districts will complete source assessments for ten watersheds annually, beginning in 2000. Completion of ten source assessments per year would translate to the completion of 150 within fifteen years, addressing the majority of streams on the 303(d) list. Source assessments should be conducted by the agency(ies) responsible for identifying the waterbody as impaired or threatened by NPS pollution, generally the OCC, OWRB, Corp Comm., or ODEQ, although other agencies could contribute.
- **Prioritize watersheds for planning and implementation**. The Oklahoma NPS program will either revise and update the current Unified Watershed Assessment (UWA) specifically for NPS or implement some other revised NPS watershed prioritization based upon guidance within two years as the current UWA becomes obsolete. The prioritization system must allow priority for protecting pristine waters as well as restoration of impaired waters. Use of the continually updated UWA priority list will focus NPS efforts in the same geographic areas as other water quality based State programs. This coordination of efforts results in a greater likelihood for protection and attainment of beneficial uses. This prioritization of NPS activities based on the UWA will be accomplished by the Nonpoint Source Working Group, and facilitated by the OCC.

- Draft Total Maximum Daily Loads (TMDL), Watershed Restoration Action Strategies (WRAS) and implementation plans to address pollutants in priority watersheds. Annually, WRASs, TMDLs, and implementation plans must be completed to initiate a process of remedying identified impairments within Oklahoma water bodies. Implementation resources for large-scale watershed NPS controls are foreseen to be adequate for one or two large watersheds per year. Resources may also be available for small-scale (i.e. subwatershed or stream reach) projects. The State of Oklahoma will plan no more than two, large-scale watershed NPS control projects and no more than two small-scale projects per year. The watersheds will be addressed in order of their priority rating as determined by the NPS Working Group. TMDLs are the responsibility of ODEQ, although other agencies can assist in their development. ODEQ has already committed to a 12-year time frame to complete TMDLs for all streams on the 303(d) list, ending in 2010. WRAS development is directed through OSE. WRASs are currently planned for the top ten watersheds on the UWA priority list. Nonpoint source implementation plans are generally developed by the OCC and subject to approval by the NPS Working Group. One or two large-scale NPS implementation projects, combined with the implementation efforts of other programs such as EOIP and source water protection, will have been planned to address 1998 303(d) listed waters by 2015.
- **Implement groundwater protection education and demonstration programs**. The NPS Program will include and coordinate with OWRB, ODEQ, USGS, OSU Cooperative Extension, Corp. Comm., ODA, and other agencies with groundwater authority or expertise on projects involving groundwater remediation and protection measures identified within the watershed. While aquifers do not coincide with surface watersheds, savings will result from reducing overhead costs by running one program, rather than two. The specific goal for groundwater protection is to implement a groundwater protection education component with each large-scale watershed project, thus twenty to thirty programs by 2020.
- Implement, demonstrate, and educate to remedy water quality problems associated with NPS pollution. The State will implement programs to address identified NPS pollution problems and sources as identified in WRASs, TMDLs and implementation plans. Large-scale watershed programs may require multiple years' resources. The State will initiate one or two large-scale watershed NPS programs each year, depending on resources and current needs in the priority watersheds. Implementation of one or two large-scale projects plus smaller implementation efforts will work towards reduction of NPS pollution and protection of beneficial uses in NPS impacted watersheds by the year 2020. This is generally the responsibility of the OCC and NRCS. However, assistance and partnerships with other agencies and groups will be critical to the success of the program.
- The State will research and identify alternate funding sources to work towards the goals of the NPS Program. For instance, the State will provide cost share assistance funding for priority watersheds using State and federal funds. Many practices in a non-regulatory voluntary program necessary to control NPS pollution need substantial financial incentives to assure widespread implementation. The NPS program goal is to provide State funds for incentives within each priority watershed project. Inclusion of State funded cost-share assistance insures focus on priority watersheds at multiple levels, including landowner, local government, State agency, and State legislature. These State funds can be used to supplement and match federal funds from sources such

as EQIP. These cost share funds are generally given to the OCC to be administered through conservation districts, or through the OWRB to be administered through the State Revolving Loan Program. Other potential funding sources are detailed in Appendix C.

- **Provide training for watershed coordinators.** The State will provide training for Watershed Coordinators and WAG members on current methods and technologies in watershed management through seminars, symposiums, and various other training sessions. These training sessions will educate Watershed Coordinators on successes and failures of other watershed programs.
- The NPS program will promote use of fluvial geomorphological principles for stream restoration within each priority watershed project or at two sites yearly. The program will also promote use of these methods statewide to prevent further stream habitat degradation. The NPS program goal is to have these methods demonstrated at two sites yearly. Although two sites per year translates to a maximum of forty projects by 2020 funded specifically through the NPS program, demonstration of the success of these methods. State agencies are constantly approached by private individuals who have streambank or ditch erosion concerns and are looking for a cost-effective means of reducing the problem. Forty projects spread across the State will be a powerful educational tool to demonstrate the importance of riparian areas and further implementation projects in priority watersheds with streambank erosion concerns. The OCC will include projects to further this goal in their program.
- Follow-up monitor and evaluate performance of each implementation project. The purpose of this goal is to insure that each project implemented will receive adequate follow-up monitoring to determine if the objectives of the project are met. The State will plan follow-up measures and implementation based upon this goal. Follow-up monitoring supports and verifies whether the State program is successful in striving towards the goal of beneficial use attainment and protection. This is generally the responsibility of the OCC, but other monitoring efforts (BUMP, USGS, etc.) could supplement this effort. The NPS Working Group will consider the results of this follow-up monitoring in directing the development of future NPS activities.
- **Support nutrient export activities from nutrient sensitive areas to nonsensitive watersheds**. There is increasing recognition that in certain areas of concentrated animal agriculture, efforts to comprehensively address manure-derived nutrient management issues should entail "export" activities. Such activities are necessary to address the imbalances that commonly exist when much of the nutrients imported in the feed grains pass through the animals and are accumulated on the production farms through land application of the manure or litter. In addition, export activities should be complementary to on-farm nutrient management practices. State and federal agencies involved in NPS pollution and animal waste management activities in Oklahoma have already recognized the need for nutrient export activities and such activities are being funded in the state.

State Wide Short-Term Actions to Achieve Goals

As stated previously the NPS program places priority on meeting watershed goals to attain and maintain beneficial uses. Priority must, however, also be placed on educating the public and programs on

addressing the most common pollutants. At this time, the most common pollutant identified statewide is sediment and the pollution it causes.

- Implement Blue Thumb Education Programs. The objectives of this action are to educate the public to recognize waters impaired by NPS pollution (based on USAP and OWQS). The OCC's Blue Thumb Education Program focuses specifically on NPS pollution with efforts to promote citizen monitoring and to establish at least 46 new district or local Blue Thumb programs conducting local NPS education and citizen monitoring by the year 2015. A significant goal of education efforts in the State is also to provide citizens with the knowledge they need to reduce NPS pollution resulting from their own practices. The Blue Thumb education programs will coordinate with, and supplement when possible, NPS related activities of other education programs including the OWRB's Oklahoma Water Watch Program, Project WET, Oklahoma Scenic Rivers Commission Education Program and ODEQ, NRCS, and OSU Cooperative Extension education efforts. These education efforts will focus on all types of NPS pollution, but tailor the program to specifically address watershed specific pollutant priorities.
- **Continued support for existing education programs**. Blue Thumb and other aforementioned education programs have demonstrated substantial community participation and success at implementing education programs to control NPS pollution.
- Implement source education and coordinate with existing programs for the most common NPS pollutants, sediments and nutrients. The NPS Program will sponsor education programs and coordinate with existing education efforts in specific areas to reduce and eliminate sources of the most common NPS pollutants.
- **Implement source reduction and wellhead protection programs to reduce groundwater pollution**. The 319 Program will coordinate with and supplement the ODEQ's source water protection programs to protect groundwater. The immediate goal for this is to determine a coordination plan between the programs by the year 2005.
- **Implement source group continuing education self-policing programs**. The NPS program will promote programs with producer groups to implement a self-policing educational program. An example of this would be the education credits provided to poultry growers through water quality programs presented by OSU Extension, OCC, or ODA.
- **Investigate NPS related pollution complaints**. Nonpoint source related pollution complaints will be investigated to determine if there is a regulatory authority and to determine other measures necessary to remedy verified impairments. The specific goal is to investigate all of the fifty plus NPS pollution related citizen complaints received annually. This goal is initially the responsibility of ODEQ, although they can assign complaints to be investigated by the agency(ies) whose statutes assign them jurisdiction over the specific type of complaint.
- **Implement source control programs**. Source control protection activities may be implemented as needed within individual watersheds or as excess funding becomes available. These programs focus on halting or preventing pollution at its point of origin rather than on reducing the impacts of pollution after it is already on the ground. Examples of source control programs include urban NPS

education programs, programs to provide septic tank upgrades, cleanup of brine-contaminated soils, and litter export programs. Source control programs fall under the jurisdiction of various agencies, depending upon the source. Agencies who may participate in these types of programs include OCC, ODEQ, OWRB, ODA, NRCS, OSE, Corp. Comm., and any pertinent agency.

Short-term Programmatic Actions Necessary to Allow Implementation of the Goals.

- Plan and implement annual workplans following the recommendations of the NPS Working Group and federal guidance to implement the goals outlined in this management program. Annual work programs will effectively be amendments to this NPS management program. To achieve the long-term goals the State will plan annual 319 workplans and seek other funding sources to control NPS pollution. This will generally be the responsibility of the OCC, although other State and federal agencies will participate in furthering the programs. In addition, the NPS Working Group will review and advise in development of these plans.
- The OCC will continue to coordinate the State of Oklahoma's NPS Working Group to advise and assist in planning NPS programs in support of the State long-term goal of strong working partnerships and collaboration with appropriate State, interstate, Tribal, regional, and local entities (including conservation districts), private sector groups, citizen groups, and Federal agencies to control NPS through 2015. The NPS program will conduct frequent meetings of the State NPS Working Group to help direct, coordinate and plan NPS control within the State. The NPS Working Group will provide a forum to allow various agencies and programs to participate in and influence the State's NPS program. The NPS Working Group should also facilitate communication about and cooperation between NPS related efforts of various State, federal, and independent programs.
- Oklahoma environmental agencies will execute water quality standards implementation plans within areas of their jurisdiction. As per the requirements of new State legislation to expedite and coordinate efforts to reduce water pollution in the State of Oklahoma, each State environmental agency shall have promulgated by July 1, 2001, a Water Quality Standards Implementation Plan for its jurisdictional areas of environmental responsibility in compliance with the Administrative Procedures Act. Each agency shall review its plan at least every three years thereafter to determine whether revisions to the plan are necessary. These plans should be the basis for additional NPS control activities within the State.
- The State will conduct annual financial reviews of each project. The State will provide efficient and effective management and implementation of the State's NPS program, including necessary financial management. This will generally be the responsibility of the OCC and OSE.
- The State will conduct program management as outlined in the annual Technical Support Work Program and each agency Quality Management Plan (QMP). The Technical Support Work Program is the responsibility of the OCC and QMPs are the responsibility of each State agency.
- All NPS monitoring and project data will be entered into STORET by 2001. This will be completed by the OCC.

- **The State will prepare Annual 319 Reports and Semiannual Project Reports**, to be completed by the OCC and other cooperating agencies.
- The NPS Program will contribute to federally mandated State planning requirements including NPS components to UWA, 303(d) list, EQIP planning. This function will be performed generally by the Nonpoint Source Working Group, facilitated by the OCC.
- The NPS Program will participate in The Oklahoma Water Quality Monitoring Council. This function will be accomplished by the OCC, based on recommendations of the Nonpoint Source Working Group.
- The NPS Program will contribute to and assist with the OWRB's development of biological criteria, nutrient criteria and sediment criteria. This will mainly be accomplished through cooperation between the OCC and OWRB, although other important sources of data include ODEQ, ODWC, and other agencies.
- The NPS program will include watershed planning and technical assistance to conservation districts and other entities for watershed planning and NPS control. The OCC and NRCS will mainly provide this service, although other agencies including ODEQ, OWRB, ODA, OK Corp. Comm., OSU Extension Service, Oklahoma Scenic Rivers Commission, and ODWC can provide valuable assistance.
- The NPS program will evaluate and disseminate new NPS control practices. This goal will mainly be a target of the OCC and NRCS programs, although other agency programs also incorporate this goal.
- The NPS program will provide data and information to the public in a user-friendly format. Access to OCC data (reference sites, water quality, land use, biological, etc.) and information (reports and technical bulletins) will ultimately be available through the Internet in a concise, easily interpreted format by the year 2005. In addition, the name and contact information of OCC personnel will be provided should more advanced or thorough information be required. This goal will mainly be part of the OCC program, although other agencies have made significant strides and continue to improve in their ability to provide the public with easily understandable information.

Current and Planned Nonpoint Source Activities

The OCC has developed a process to address NPS pollution through the implementation of various projects and water quality related activities. Following the guidance provided by EPA, the OCC tries to employ a balanced approach that emphasizes both statewide programs as well as watershed specific activities. More recently, the attention has focused on larger watershed projects, but there is still significant amount of effort directed at statewide and regional projects. Overviews of the watershed and statewide projects currently in place and planned for the next few years are provided in this section. The current and future activities are coordinated with the goals and objectives mentioned previously in this text.

This section will discuss the ongoing and planned activities, which have been divided into watershed programs and statewide specific activities. A description of the active projects along with the current status is presented chronologically.

Current NPS Work Programs:

The OCC has numerous projects in place to achieve the long-term goals for the State's water resources. The projects in progress were planned under the authority of the previous NPS management plans and represent an evolution of the NPS program. Substantial local, State, and federal resources have been devoted to these projects. For continuity, these projects, their objectives, their schedules and milestones are by reference part of this State NPS management plan revision. A condensed version of each project is presented below.

At the end of 1998, the OCCWQ Program had a total of 45 active projects including 40 319(h) and five 104(b) grants. These included partnerships with various state and federal agencies, tribes, and nonprofit organizations. The FY 99 Work Program focused the entire budget on Lake Eucha in Delaware County. In addition to OCCWQ projects, other projects associated with the NPS program include EQIP implementation and education programs and countless University, Cooperative Extension, Kerr Foundation, and other research projects devoted to development and implementation of techniques to more accurately assess and remediate NPS pollution, to name a few.

As the State's NPS technical lead agency, OCC is involved in many of the current projects. However, one of the short-term programmatic goals of the NPS program is to develop and maintain the NPS Working Group. As the NPS Working Group becomes more established, more cooperation between entities should follow, and more projects can be detailed in which more agencies and varied funding sources are involved.

Watershed Activities

1992 104(b)(3): Illinois River Riparian Corridor Restoration

The Illinois River in Cherokee and Adair counties, is one of the most popular recreational areas in the State. Unfortunately, segments of the river are experiencing severe erosion. One site, in particular, is Echota Bend in Cherokee County. Echota Bend is an unstable bend of the River characterized by a fifteen to twenty foot high eroding bank. Aerial photography indicates that the bank migrated
approximately 500 feet down valley between 1938 and 1990. The banks have continued to erode at a rate of approximately ten feet a year since that. An estimated 200,000 yd³ of material have been lost from this site since 1938. The OCC and the OSRC proposed that a riparian corridor restoration project be undertaken to prevent further erosion. Rather than using traditional "hard control" methods such as rip-rap or gabion baskets, which are generally ineffective, unsightly, and extremely costly, OCC and OSRC proposed to incorporate the principles of fluvial geomorphology into a design that would consider the natural tendencies of the river and work with the river rather than against it. The techniques employed in this project were developed by Dave Rosgen (1996), continuing and expanding upon work performed by L.B. Leopold (1964, 1994), M.G. Wolman (1954), and many others. The techniques involve assessing the fluvial geomorphology in the system, determining the "stream type" of the river, and physically modifying the channel geometry to a stable configuration. These techniques, though tried and proven elsewhere in the country, had never been attempted in Oklahoma.

Construction began on May 4, 1997. Approximately 25,000 yd³ of material was moved, nineteen loads of rock were shipped in, and seventeen root wad revetments and two rock veins were installed. The channel was rerouted, an oxbow lake was constructed and the high bank was sloped back. Since it was completed, the bend is not experiencing the extreme bank erosion and has become a more recreational area. Although the project seems to have been successful, the true test will be time. Will the design channel remain stable for five years, ten years, or longer? Will the channel transport the water and sediment loads delivered by the watershed without changing plan, pattern or profile, and without agrading or degrading? Only time and monitoring will answer these questions.

<u>1992</u> 104(b)(3): Development of Canoer Only Access Area and Informational Activities Directed at Recreational Users of the River

The recreational uses of the Illinois River in Cherokee and Adair counties generate a significant tourist industry; however, the intensive human contact also creates the potential for significant NPS pollution. The objective of the project is to develop a canoe landing area with restroom facilities, trash receptacles, cookers, and walk areas. Canoers are encouraged to use this area as opposed to other "natural" sites along the river. Information and promotional information on protecting water quality and other issues will be available at this facility. The water quality objective of the project is to reduce the NPS pollution from a significant source—recreational users. Success was measured by the amount of trash collected through trash bag distribution and the reduction on streamside trash and through the waste that is kept from entering the river as a result of the installation of pit-toilet facilities.

The objectives of this project appear to have been successful to date. The canoer access area was constructed in 1994 and it has been estimated that over 3,000 gallons of raw sewage have been prevented from entering the river. Moreover, trash bags provided to canoers have been effective at preventing 110 - 120 tons of litter from being deposited in the riparian area.

1993 104(b)(3): Grand Lake Basin Management Program

The Grand Lake O' the Cherokees Watershed is located in northeastern Oklahoma in Delaware, Mayes, and Ottawa Counties. Recently, concerns have arisen that changing land uses within the Grand Lake basin may be contributing to decreased water quality within the basin. In nearby areas of the country, runoff from confined animal operations areas have been shown to contribute significant quantities of

nutrients to receiving streams. Although land use in the Grand Lake Basin is primarily agricultural, fewer confined animal operations exist within its bounds than further south in Oklahoma and Arkansas. Still, significant loadings of nutrients are derived from agricultural land in Kansas and Oklahoma. Other potentially significant sources of NPS pollution in the watershed include septic systems, primarily those in the near lake area. Nutrient loading in these streams has reduced their quality as well as that of downstream reservoirs.

For these reasons, and to assure that the water quality within the Grand Lake basin is maintained at a level which fully supports the designated uses within the watershed, it was proposed that a Basin Management Plan be developed. The primary objective of the Grand Lake Basin Management Plan was to protect the water quality in Grand Lake from further degradation, so that this extraordinary resource may be preserved for future generations. A secondary benefit of the Grand Lake Basin Management Plan was to protect the water quality in the feeder streams and rivers flowing into Grand Lake.

The project is divided into two phases. During the first phase, the area of the basin having the greatest nutrient loading impact on Grand Lake would be identified. This included accounting for both point and NPSs of loading to the lake and monitoring and modeling, considering land use, the areas contributing the greatest nutrient load. Phase two was to focus on those areas identified in the first phase since improved management from those areas would have the greatest impact on the pollutant loading to Grand Lake.

1994 319(h): Poteau River Comprehensive Watershed Management Program

This project is designed to establish a comprehensive watershed management program for one of Oklahoma's highest priority water bodies. The program implements a watershed strategy based on TMDLs for each source and source area, BMP demonstrations in priority subwatersheds, and an overall water quality educational program to improve knowledge and behavior among area farmers and residents.

The overall objective is to reduce loading of nitrogen, phosphorus, and sediment to the Poteau River, Fourche-Maline Creek, and Wister Lake in LeFlore and Latimer counties by addressing all sources in a comprehensive, balanced program. Potential sources include poultry litter disposal areas, urban areas subject to storm water runoff, county roads, areas disturbed by seismic surveys, oil and gas, mining, or silviculture. The project will estimate loadings from all categories of point and NPSs by subwatershed, estimate their overall impact on the trophic status of Wister Lake, then develop targets for pollution prevention.

The project consists of several different efforts: 1) assess watershed loadings; 2) conduct demonstrations and educational programs; 3) quantification using modeling for each type of load reductions anticipated with each type of BMP implemented; 4) use modeling to estimate expected load reductions if BMPs were implemented on all impacted land within the watershed; 5) determination that water quality standards could be maintained if all BMPs within the watershed protection strategy were implemented; and 6) continuation of monitoring program.

1995 319(h): Meadow Lake Ecosystem Restoration Project in Enid, Garfield County, Oklahoma

This project was designed to implement BMPs in the Meadow Lake Watershed to control NPS pollution from agriculture and urban areas and is being conducted by the Oklahoma Water Resource Board (OWRB). The objectives are to educate the public on BMPs that control NPS pollution, develop wetland protection and management plans, and to improve the inflowing water quality to Meadow Lake through BMP implement in the watershed.

1995 319(h): Little Deep Fork TMDL support and BMP Implementation

Water quality monitoring on Little Deep Fork Creek and subsequent modeling for the waste load allocations for the towns of Bristow and Depew in Creek County has shown the need to control NPS to allow these point sources to meet water quality standards down stream. EPA recommended that a phased TMDL be conducted to characterize and correct for NPSs of nutrients identified by previous studies. Little Deep Fork Creek is listed as high priority on the State's 303(d) list with pesticides, nutrients, siltation, salinity, and organic enrichment/dissolved oxygen listed as causes. Sources for this stream are listed as storm sewers, surface runoff, petroleum activities, wastewater, nonirrigated crop production, specialty crops, pastureland, and rangeland. The objectives of this project are to provide support for the implementation of the TMDL by targeting and implementing BMPs for reducing nutrients and sediments to the creek. The specific water quality goal for this project is to achieve improvements in water quality such that water quality standards will be maintained after the additions of effluent from the towns of Depew and Bristow.

1996 319(h): Turkey Creek Demonstration Watershed Project

Land use in the Turkey Creek Watershed in Alfalfa, Major, Garfield, and Kingfisher counties is primarily wheat and cattle production. Subsequently, nutrients, suspended solids, and siltation problems threaten the water quality. Tributary streams in this area are frequently plowed to the stream bank and the smallest watercourses are plowed over. The Turkey Creek Demonstration Project is multifaceted and designed so that each phase builds on the previous one. The objective is to establish the groundwork and build local support for a continuing process to control NPS impacts to Turkey Creek. This project includes monitoring, technical assistance, education, and a demonstration of management practices directed at the improvement of the water resources and stream health of Turkey Creek.

FY 1996 319(h): Illinois River Watershed Implementation Program

Although much work has been conducted towards understanding and improving problems in the Illinois River Basin in Cherokee and Adair counties, there has been no single, comprehensive program that addresses the wide range of pollution sources within the Illinois River Basin. A successful, comprehensive program will require the participation of many different State and federal agencies working towards a long-term, basin wide solution to river problems. The purpose of this workplan is to propose a cooperative effort that will address the Illinois River Basin as a whole and will establish specific solutions to water quality problems.

With an overall goal of improving water quality in the Illinois River Basin, specific objectives include:

- 1. Implementation of BMPs in the Illinois River Basin in those watersheds;
- 2. Identification of control measures for decreasing nutrient loading in Illinois River tributaries;

- 3. Transfer of information from successful demonstration projects to other watersheds; and
- 4. Creation of a management program to coordinate all aspects of watershed remediation.

FY 1996 319(h): Phase 2 of TMDL for Dog Creek and Cat Creek Watersheds

Severe dissolved oxygen stress within the lower segments of Dog Creek and Cat Creek in Rogers County indicate the need for NPS controls and possible physical stream channel modification, in conjunction with advanced treatment improvements at the Claremore wastewater treatment plant (WWTP). Numerous NPS pollution contributions to the lake water quality problems have been identified. These problems include excessive nutrients from home septic system and animal waste, sediments, and metals from abandoned coal strip mines. This project is designed to integrate a watershed based approach to solve the water quality problems in Dog Creek and Claremore Lake. A Phase II TMDL will consist of chemical and biological characterization of the Dog Creek and Cat Creek watersheds relating to NPSs and pre-BMP implementation conditions, assessing any limitations in stream channel hydraulics that could be corrected to improve reoxygenation and aquatic community habitat, refinement of the original wasteload allocation model to account for NPSs and physical limitations in stream hydraulics, and development of education programs for facilitating TMDL goals.

FY 1996 319(h): Illinois River Basin Education Program (continuation)

This project is a continuation of the previous Illinois River Education Program (FY 1992 319(h)), with newly identified concerns and new activities. Specifically the Draft Illinois River Management Plan provides a new public context, interest, and support from the public and agencies such as the Oklahoma Scenic Rivers Commission, which is responsible for Management Plan implementation.

This project is based on needs identified in 1992. This project is a concentrated effort to get pollution control information in the hands of the poultry-cattle producers of the basin, and to continue educating the public about the relationship of land use to water quality. Particular emphasis will be placed on riparian management systems, nutrient management systems, and waste disposal. The goal is to address three primary problems: nutrient enrichment of the Illinois River and Lake Tenkiller, habitat degradation in the Illinois River tributaries, and a poorly informed public.

FY 1997 319(h): Fourche Maline Watershed Education Project: Education through Demonstration of Best Management Practices to Reduce Sediment Loading to the Fourche Maline Creek and Lake Wister

The Fourche Maline Creek Watershed encompasses over 179,000 acres in Latimer and LeFlore Counties and is the major drinking water source for both counties. In recent years the water quality of Fourche Maline Creek has become threatened. The goal of this project is to reduce sediment and nutrient loading to the Fourche Maline and ultimately Lake Wister. A multiagency approach is used to: 1) establish an infrastructure of watershed information as a basis for demonstrating the benefits of long-term land and water management to the public; 2) assist in decreasing sediment and nutrient loads; and, 3) utilize identified NPS sites and available descriptive data as a basis for demonstrating, educating and teaching BMPs to reduce sediment within the watershed.

FY 1997 319(h): Demonstration of Best Management Practices in the Salt Fork Watershed

The Salt Fork of the Arkansas River (Alfalfa and Woods counties) and two small tributaries flow into the Great Salt Plains Wildlife Refuge and the Great Salt Plains Reservoir. Excessive siltation in the lake and its tributaries has eliminated spawning habitat and promoted fish kills during hot summers. The lake also has excessive algae blooms and is only partially supporting for warm-water fishery.

This project is designed as an education and demonstration project, with goals to improve the nutrient management and tillage management skills of twenty percent of producers directly through intense educational and demonstration activities, and to show fifty percent reduction of erosion, fertilizer use, and pesticide use on ten demonstration sites. Activities include installing ten demonstration sites at suitable locations throughout the watershed, conducting educational programs to teach the use of BMPs, and promoting continued support for BMP implementation through agribusiness cooperators, Certified Crop Consultants, OCES agents, and other important actors.

FY 1997 319(h): Twin Cave Water Quality and Pollutant Source Assessment

Twin Cave is habitat for a federally endangered cavefish, cave crayfish and gray bats as well as several rare and potentially endangered species. Located at the western edge of the Ozark highlands, Twin Cave is approximately one mile south of the Drowning Creek arm of Grand Lake of the Cherokees in Delaware County, Oklahoma. Limited water quality investigations have shown the presence of chlorinated hydrocarbons threatening the cave fauna. The presence of the as yet unidentified hydrocarbons regardless of their toxicity illustrates the vulnerable nature of the cave system to NPS pollution. Land uses and potential threats to the cave water quality in the area include illegal dumps in sink holes and in loosing streams, the spreading of chicken litter and the expanding chicken industry of northeastern Oklahoma, land clearing for cattle production, cattle in the surface streams and riparian areas, home wells, septic systems, and surface and underground fuel storage tanks.

The objectives of this project are to begin a process to protect the cave system and endangered and threatened fauna from water quality threats. The specific objectives for which the project tasks are written are:

- Identify suspected pollutants entering the cave stream;
- Delineate the cave watershed and hydrology;
- Assess land use in cave watershed and identify sources of pollutants; and
- Draft an implementation plan and a 319(h) workplan for education and demonstration of BMPs to protect the cave system.

FY 1997 319(h): Turkey Creek Watershed: Implementation of Community Education and Best Management Practices to Reduce NPS at Problem Well Sites

Several public water systems in the Turkey Creek Watershed (Garfield, Alfalfa, Kingfisher, and Major Counties) have high levels of nutrient contamination in their supply wells attributable to NPSs. Levels of nitrogen exceed public water supply maximum contaminant levels. Focus of this project is to use education efforts to reach citizens in the watershed to make them aware of the impact they have on the quality of waters of the State and secondarily their impact on groundwater used for consumption. This project is intended to compliment and build upon the FY 96 319(h) workplan for Turkey Creek.

The objective of the project is to prevent NPS pollution from affecting groundwater of the Turkey Creek Watershed by using education, BMPs and implementation /demonstration in well head protection areas.

Statewide/Regional Activities

1993 104(b)(3): Biological Assessment Techniques in Small Reservoirs

The goal of this project was to examine the efficacy of bioassessment metrics protocols in determining the integrity of biological communities in small lakes as opposed to the larger ones for which they were developed. The project is designed to determine if a smaller sample size is sufficient to classify and assess these smaller reservoirs.

1993 319(h): Remediation of Underground Mine Areas through Treatment With Fly Ash

There are several regions in Oklahoma where turn-of-the-twentieth century mining activities have left behind extensive undermined areas ranging in size from a few to several thousand acres. Over time, most of these mined areas have become inundated through ground and surface water infiltration with the unfortunate result that many of these mines have developed surface water discharges. The quality of water that is discharged varies between mines. Coal mine drainage is characterized by low pH values with elevated concentrations of aluminum (Al), manganese (Mn), iron (Fe), and occasionally other metals such as nickel (Ni) and zinc (Zn). Discharges from coal mines has been identified in Oklahoma's § 319 Assessment as being a significant source of NPS pollution in several watersheds.

Numerous methods have been devised to address the adverse environmental impacts associated with acid mine drainage (AMD). However, these developments have historically relied on control devices or "active treatments" which fall short of addressing the problem. More recent treatment strategies have involved passive systems, which are less intensive from an operation and maintenance standpoint. Alkaline generating "wetlands" and anoxic limestone drains (ALDs) are two passive treatments that have received considerable attention. In the past twenty years significant advancements have been made in designing and developing these systems; however, limitations remain. With respect to underground mines, a more functional approach may be the amelioration of AMD through treatment with alkaline coal combustion byproducts (CCBs). Groundwater and infiltrating surface water collect within the mine workings to form pools or reservoirs of AMD. If these pools can be treated *in situ*, then the adverse effects associated with the discharge water can be minimized or prevented. Coal combustion byproducts can address the AMD problem by:

- Altering the chemical conditions in the injection area;
- Precipitating, to some extent, the existing dissolved metal species;
- Neutralizing the acid already produced; and
- Imparting alkalinity to the mine water.

Consequently, the water discharged from the seep will have a reduced metals load, a higher pH, and improved buffering capacity.

This project is being conducted at the seepage site near an abandoned mine near the town of Red Oak, in Latimer County, OK.

1993 319(h): Technical Assistance for the Establishment and Maintenance of Riparian Corridors

The effects of land use practices on the quality of surface and groundwater resources are well documented and an extensive knowledge base exists concerning techniques, which will protect these resources. Unfortunately the information is typically concentrated in centralized State offices and is not effectively transferred to the landowners where it is needed. In some cases this information can be highly technical and difficult to explain; however, in most cases it is relatively simple and can easily be transmitted in an effective manner to landowners and conservation district personnel.

The overall water quality objective of this project is the improvement of surface and groundwater quality through educational efforts, behavioral changes, and the implementation of BMPs directed towards water quality protection and improvement. Workshops will be coordinated by OCES and sponsored by the OCC and Rural Conservation and Development Coordinators. Local Conservation Districts will provide personnel to the meetings and will establish landowner contacts to encourage their attendance. The ODA will provide technical assistance concerning the establishment of riparian zones, tree planting, and livestock management. The NRCS will provide additional technical assistance.

1993 319(h): Clearview Creek Demonstration Project

One of the most often identified sources of NPS pollution in Oklahoma is salt damaged areas resulting from oilfield activities. Salt damaged areas occur from spillage of brines produced during oilfield exploration activities. The brines produced during drilling have very often been mishandled and have left extensive areas characterized by destabilized and eroded soil. These areas contribute sediment, salts, oils, and sometimes metals to adjacent waterbodies during runoff events with a resulting serious degradation of water quality and biological integrity.

The primary objective of this project is the restoration of the proposed site in Okfuskee County through simple and cost effective measures. A secondary objective is the transfer of the information gathered during this project to the many other areas in similar condition. The area would be restored to wetland or riparian zone status through site shaping, capping highly salted areas with clay and soil and desalting of soils, and site revegetation. Soil amendments included fluidized bed ash, gypsum, sulfur, and poultry litter.

Restoration activities occurred during the fall of 1995 and post monitoring and touch-up work occurred during 1996 and 1997. The project has been successful at reducing erosion and establishing vegetation. The project final report and informational brochure are nearing completion.

1993 319(h): Technical Assistance to Improve the Quality of Groundwater-Surface Water Interactions

Groundwater resources in several areas of western Oklahoma are very shallow and are responsible for maintaining significant base flow levels in streams even during the very dry summer months. Because of the topography, climate, tillable soils, and the availability of shallow groundwater supplies, these areas are also intensively farmed with correspondingly high levels of fertilizer and pesticide. This demonstration project has shown that in some fields fertilizer use is excessive and has contaminated shallow groundwater. Taken together, this information suggests that there is a significant interaction

between ground and surface water with groundwater discharges resulting in loading of NPS pollutants, some of which are toxic.

The overall water quality objective of these activities is the improvement of the quality of ground and surface water through educational efforts, behavioral changes of landowners and land users, and of the implementation of BMPs. The project also looked at characterizing the interactions between surface and ground water in areas of intensive agriculture.

<u>1994 319(h):</u> Demonstrating BMPs to Protect Surface Water Quality from Land Application of Animal Wastes

Poultry, swine and dairy production has grown significantly across the region and represents an important economic opportunity. However, this increase in production has led to an increase in the potential for surface and groundwater contamination resulting from improper manure application rates, timing and placement. The implementation of BMPs (BMPs) for manure management systems is critical to water quality protection. This demonstration project provided the mechanism to disseminate and demonstrate state-of-the-art recommendations and technologies for land application of animal manure to permanent pastures.

This project demonstrated the effectiveness of BMP recommendations and technologies in reducing nitrogen and phosphorus losses in surface runoff from land application of animal manure to permanent pastures in two critical watersheds in eastern Oklahoma.

Based on these demonstrations the following conclusions can be made:

- Slope should be considered when developing BMP recommendations;
- Aeration has no significant effect and should not be considered a BMP;
- Increasing litter application rate increases nutrient losses;
- P from triple super phosphate fertilizer is more mobile that poultry litter—from a water quality perspective, poultry litter is the preferred P fertilizer for permanent pasture; and
- Based on current information, no recommendation can be made at this time between animal wastes and commercial N fertilizer

1994 319(h): Farm and Ranch Wellhead and Groundwater Assessment—Pilot Program

This is an intense pilot project designed to use the Oklahoma version of Farm-A-Syst to teach well users how to protect groundwater and their own water supplies. Successful completion of the pilot project will lead to wide-scale implementation throughout the OCES and Conservation Districts across Oklahoma. Farm-A-Syst is a set of fact sheets and worksheets to help well users protect their wells from contamination. The overall objective is to educate well users about well protection and to test and perfect the use of Farm-A-Syst. Success of the project will be based on increasing the knowledge level of participants, convincing them to protect groundwater quality through some or all of the items specified in the fact sheets and worksheets.

The project introduces the issue of drinking water protection through the news media, in meetings with community organizations, and through volunteer and classroom activities with youth and homemakers. A well water testing program was offered as a means to bring participants into the project.

1994 319(h): Dairy Waste Management Implementation Project

Oklahoma has a significant number of dairies that are currently faced with the need to properly dispose of waste collected in dairy lagoon systems. It is believed that a lagoon clean out program coupled with a sound waste management program will provide educational opportunities to dairy operators that currently are not available.

For water quality purposes, proper dairy lagoon clean out and disposal of waste material on a periodic basis is a must. However due to the extreme cost of the equipment it is prohibitive for an individual dairy person to go out and purchase such equipment. The first objective of this project is to purchase the necessary equipment for dairy lagoon clean out and to establish a cooperative effort coordinated by local conservation districts whereby this equipment is made available to dairies which will allow them to utilize this technology. A second objective is to educate dairy owners in other parts of the State concerning the need for proper lagoon clean out, the use of soil sampling and proper sampling of lagoon contents to determine where waste should be properly applied and the proper application rates.

Grady and Wagoner County Conservation Districts are participating in this program.

1995 319(h): Small Farm Livestock Pollution Prevention Program

This project educates small livestock producers about management and recycling of animal waste nutrients to prevent pollution. Considerable effort has been devoted to educating operators of large CAFOs; however, very little effort has been focussed on the numerous small operations that are prevalent throughout eastern central and southwestern Oklahoma. The objective is to educate producers of small livestock farms about pollution control practices, teaching them to implement the practices by keeping records for planning and documentation of waste and nutrient management.

1995 319(h): Erosion Control and Abatement Practices for County Road Systems

County roads are low cost, low volume roads; however, they are not insignificant since they are the primary means of transportation in the rural areas. The problems associated with county roads in Oklahoma are numerous, including, sheet and gully erosion, lack of vegetation due to overgrazing and field crops, and rutting of road surfaces.

This project was designed to provide assessment procedures for identifying the problems and their severity and provide possible solutions, as options, for minimizing the severity of the problems. The erosion control measures to be implemented include: establishment of grass waterways, terracing of the side slopes (shoulders), and vegetation of the side slopes as well as other appropriate BMPs. Corp. Comm.'s practice of allowing oily soils from production and pollution sites to be applied to county roads to help control dust and erosion was not evaluated. Project sites are in McClain and Cleveland counties.

1995 319(h): Use of Staged Wetlands for Mitigation of Acid Mine Drainage

Acid mine drainage (AMD) is a significant water pollutant that has drastically degraded thousands of miles of streams and creeks across the country. This problem has plagued the environment since

humans began mining operations. Although federal action has been taken to prevent future pollution from current operations, the mining industry has left a legacy of closed mines that continue to defile local ecosystems. This problem is particularly evident in the southeastern portion of Oklahoma.

Due to the drastic impacts associated with AMD, this form of water pollution has received extensive attention for several decades. Numerous mitigation methods have been attempted to treat this problem and attained varying degrees of success. Most strategies fell short of curing the problem primarily because the pollution was not eliminated, but was simply relocated from one site to another. Compounding this situation are financial considerations. Active control technologies are often expensive, elaborate, and require regular attention resulting in increased overall costs due to operation and maintenance expenses. Thus, many active control techniques are impractical in the treatment of AMD. Ideally, the cause of the pollution should be addressed; or at the very least, the pollution should be treated in such a manner that it does not pollute another site.

The proposed project seeks to incorporate this premise in a holistic approach. Water quality problems in the Pit Creek Watershed (Latimer County) will be dealt with in a manner that emphasizes passive biological and physical/chemical processes. A passive constructed wetland system will be employed to function as a water treatment plant. Polluted water will enter a series of cells in which the water is chemically and biological acted upon, resulting in an effluent of vastly improved quality. Some of the pollutant constituents will be converted into biomass or soil substrate, the majority of the remainder will be converted into stable precipitates.

1995 319(h): Organic Waste as a Treatment for Acid Mine Drainage

This project explores the use of organic waste materials to treat AMD. Organic wastes e.g. cattle, horse and chicken manure, is used to promote microbial activity for the removal of metals. This project is paired with the Staged Wetlands Project and is being conducted in the Pit Creek Watershed in Latimer County.

1995 319(h): Bank Stabilization through Stream Restoration

A large number of the streams in Oklahoma are not meeting their assigned beneficial uses because of sedimentation. The source of the sediment in many of these waterbodies is from bank erosion. Past and current land use activities in both urban and rural watersheds have resulted in streams that have been straightened, channelized, narrowed, widened, dredged, dammed, or any combination of the above. Often riparian zones are nonexistent, due to urban development, livestock mismanagement, or greedy tilling practices. The result has been that streams that had reached a stable configuration, capable of transporting the sediment load and the flood flows in the basin, are now unstable and incapable of transporting the sediment load in the stream, and are much more prone to flooding. As streams tend towards a stable configuration bank erosion increases and more sediment is delivered to the system.

The objective of this project is to demonstrate that fluvial geomorphology techniques can be successfully used to arrest bank erosion while simultaneously improving aquatic habitat and water quality. The project sites include streambanks on Chilocco Creek in Kay County and Lost Creek in Oklahoma County. Additionally, our secondary objective is to inform and educate the public, the Conservation Districts, the NRCS field personnel, agriculture extension personnel and any other

interested party on the basic principles of fluvial geomorphology and how it relates to streambank erosion, aquatic habitat and water quality.

1995 319(h): Improving Water Quality Through Animal Waste Management

Groundwater is the major source of drinking water in rural Oklahoma; however, this commodity is continually threatened by NPS pollution from agricultural activities. Unfortunately, efforts to characterize and inventory groundwater resources have not kept pace with efforts directed towards surface water resources. The effect of land uses on groundwater quality, particularly nitrate concentration, has generated an increasing level of concern as the number of many of these sources has increased across the State, including commercial fertilizers, animal wastes, and septic tanks.

The objectives of the project are to provide a numerical model that can be used for predicting the impact on groundwater associated with various land uses, particularly agriculture and animal farms; to predict the migration of plumes through the soil media in the project area; to extrapolate from laboratory and field data (using the numerical model) the extent of surface water impact occurring through groundwater discharge; and to provide a user friendly software which will serve to identify the potential sources of groundwater impact and predict the impact of different management practices.

1995 319(h): Environmentally Sound Grazing System for Utilization of Nutrients from Poultry Litter

A rapidly expanding poultry industry produced nearly 200 million birds from 600 contract growers in thirteen eastern counties in 1993. Most litter is land applied to forage crops for grazing or haying. Primary concerns with land application of litter include surface and groundwater contamination with nutrients and microbes. Producers often use general guidelines for application based on tradition rather than research based recommendations. One objective of this demonstration is to provide unbiased information to producers. Improved litter nutrient management in combination with intensively managed grazing and haying and should prevent buildup of P in soils and reduce the loss of P to runoff. Acceptance of the recommended practices, however, is dependent on demonstrating to farmers that the practice is both economic and workable in a production system. This demonstration will show that water quality can be protected and profitability maintained through improved grazing management. The project site chosen was in the Poteau River Watershed in LeFlore County.

1995 319(h): Nutrient trading to support North Canadian River TMDL

Nutrient trading between the load allocation for NPS and waste load allocation for point source dischargers has been proposed as a means for saving money in the wastewater treatment facilities. Nutrient trading between NPS load allocations and waste load allocations could potentially result in less stringent discharge permits to the river and cost savings to the cities. This project will serve as a case study on nutrient trading, with the results of this project being compiled into a nutrient trading strategy document.

1995 319(h): Illinois River Jones Porta-Potties and Trash Bags

Inadequate restroom facilities for recreational users on the Illinois River in Cherokee and Adair counties has been cited as a significant cause for the release of untreated human waste. In an effort to further reduce the

human waste load to the river from the 300,000 tourists each year that use the river, temporary placement of portable toilets and trash facilities will be placed nearer the river for immediate access. The objective of this project is to reduce the release of untreated human waste to the Illinois River by providing increased accessibility to sanitary facilities for river users and to reduce the load of litter to the river from recreational users through the distribution of trash bags.

The six year program is designed to promote awareness as well as prevent NPS pollution in the river. To date the program has been successful at preventing raw waste and trash from being deposited in the riparian zone.

1996 319(h): Capture and Recycle Technology for Pollution Prevention in the Nursery Industry

This project addresses the problem of reducing pollutants in irrigation tailwaters from Oklahoma nurseries. The project will demonstrate the technology through cooperation with a nursery on the Illinois River in Cherokee County. The proposed "capture and recycle" technology consists of an engineered hydraulic system with appropriate treatment practices to allow reuse of irrigation tailwater. Reuse of these waters will reduce nutrient and pesticide pollution to offsite waters and the treatment system will prevent disease problems, making the technology more acceptable to the industry.

The project will demonstrate capture and recycle technology for pollution prevention from nursery systems. Reductions in discharge of nitrogen, phosphorus, and pesticides will be accomplished primarily by reducing the amount of nursery runoff water leaving the site. The technology will be transferred to the nursery industry through an extensive education program. Design and management information will be incorporated into agricultural engineering design courses and horticulture courses to transfer the information to future generations of designers and managers.

FY 1996 319(h): Stream Assessment to Fill Data Gaps for Eastern Oklahoma

The OCC is charged by State statute with the task of monitoring NPS impacts to the State's waters. Unfortunately there are substantial gaps or holes in the data where the availability of information is limited. Specific projects are scattered throughout the eastern portion of the State, but the areas between projects are unassessed. A complete data set is needed to develop an assessment protocol for evaluating the health of streams in the State. Surveying the streams in the eastern half of Oklahoma will fill remaining data gaps for water quality, habitat and biological data. This serves two purposes: to complete our reference stream database for the eastern half of the State. In addition, the completion of the reference stream database will make future assessments less costly, faster and add more certainty to the conclusions.

In 1997, 417 stream were evaluated based on a modified rapid biological assessment. Based on the information generated from this initial evaluation, the list was reduced. Eighty streams were selected for more intensive work. Selection was based on habitat score and presumptive water quality conditions so that the final list will contain streams covering a wide range of water quality and habitat conditions. The number of streams chosen from each ecoregion was proportional to the number of stream miles contained in each ecoregion. Chemical, physical and biological assessment will be conducted on these 80 streams in 1999.

FY 1997 319(h): Swine Waste Management Education

Southeastern Oklahoma is rapidly developing an intensive swine production industry. Some sources indicate suggest that total production will be more than one million pigs per year. A tremendous amount of swine waste will be produced by contract growing facilities with little experience in proper management and utilization of these wastes in a pollution control system. Contract growers and their neighbors need education about the environmental concerns associated with manure production and management and the concept of recycling nutrients through crops such as forage and livestock.

In this project, OCES and Conservation District personnel will work with small groups of producers to teach them waste management and nutrient recycling concepts and to help them develop pollution prevention plans. Sites will be developed on cooperating farms to demonstrate the replacement of fertilizer with waste liquids and solids, management and selection of vegetation to recycle waste nutrients efficiently, and grazing systems for conversion of waste nutrients. The project will focus in two areas of Oklahoma, the Holdenville area, which includes Hughes, Seminole, Pontotoc, and Okfuskee counties, and the Idabel area in McCurtain County. The Holdenville area drains primarily into the Canadian River and Lake Eufaula, and the Idabel area drains into the Red River. Each of these areas is sensitive to nutrients from animal waste.

FY 1997 319(h): Wellhead Protection Education for Communities and Homeowners

This project is an education and BMP implementation program that aims to reduce the risk of contamination of groundwater from a wide range of potential pollutants including nitrates, pesticides, and volatile organic compounds. It targets communities in four Southeastern Oklahoma counties (Hughes, Seminole, Pottawatomie, and Pontotoc counties). Overall objectives will be to implement a complete inventory of pollutant sources in each wellhead delineation zone, establish community action programs to implement groundwater protective measures, and educate residents of each community about the source of their drinking water and what they can do to protect it. Early in the project, goals for BMP implementation will be established for each wellhead area.

FY 1997 319(h): Watershed Protection through Manure Marketing (Pilot Program)

This project is a pilot program to implement an electronic market for agricultural wastes. Initially the market will focus on broiler litter, since litter is generally perceived as a marketable product, and much buying and selling of litter takes place in Eastern Oklahoma and Western Arkansas.

The Oklahoma Litter Market will be modeled after OCES' successful Haymarket program. Litter quality and quantity will be tested by an independent certified grader. Movement across watershed boundaries will be tracked using location of buyers and sellers. The intention is to use three years of funding to establish the market. The market will become self supporting after the initial startup. The project will also conduct an economic analysis of the market to verify the value of litter for alternative uses and determine information needs to facilitate expanded litter marketing. Results of the economic analysis, as well as, market statistics will be delivered to users via a quarterly newsletter. Results will be transferred to the general public through fact sheets, publications, articles, and field demonstrations.

The complete network of sites will include the poultry producing counties: McCurtain, LeFlore, Sequoyah, Adair, Cherokee, Delaware and Ottawa and counties on the "fringe" of the poultry producing area that have the potential to accept litter: Choctaw, Haskell, Muskogee, Wagoner, Mayes, Rogers, and Craig Counties. The Extension Area Agricultural Economics Specialist located in Claremore will serve as Market Coordinator.

FY 1997 319(h): Implementation of Nonpoint Source BMPs in Fourche Maline arm of Lake Wister

Evaluation of the available data identified problems in Wister Lake associated with accelerated eutrophication. Wister is a shallow lake with a short residence time. High total phosphorus, high turbidity, low redox, low Secchi depth, and hypolimnetic anoxia classified Wister Lake as a hypereutrophic system. Water quality data suggested nutrients and turbidity were the primary causal factors of poor water quality in Wister Lake. The source of these pollutants is from both point and NPSs within the lake watershed. A TMDL for phosphorus has been completed for Wister Lake.

The overall objective of this project is to implement the two general methods identified in the Phase I report to reduce sediment resuspension in Wister Lake. One technique, reduction of effective fetch, implements an established management technique to create a physical barrier to reduce and diffuse wave energy. The second technique involves the establishment of an aquatic plant community to create a barrier between the sediment water interface. Water quality data collected as part of the Phase I 314 project will serve as baseline data for future comparisons. Water quality monitoring will determine the success of the fetch reduction effort while standard aquatic plant community assessment methods will be used to determine the success of the aquatic vegetation effort.

FY 1997 319(h): Stream Assessment to Fill Data Gaps for Southwestern Oklahoma

The OCC is charged by State statute with the task of monitoring NPS impacts to the State's waters. Unfortunately there are substantial gaps or holes in the data where the availability of information is limited. Specific projects are scattered throughout the State, but the areas between projects are unassessed—particularly in the western part of the State. A complete data set is needed to develop an assessment protocol for evaluating the health of streams in the State. Surveying the streams in the southwest quarter of Oklahoma will fill remaining data gaps for water quality, habitat and biological data. This serves two purposes: to help complete our reference stream database for the State. In addition, the completion of the reference stream database will make future assessments less costly, faster and add more certainty to the conclusions. Available resources dictated that this project focus on filling in gaps in the southwestern section of the State, with a later project to focus on data gaps in the northwestern section of the State.

FY 1997 319(h): Statewide Lake Water Quality Monitoring Program

The OWRB is conducting a rotating lake sampling program on water bodies owned and operated by municipalities that are monitored by volunteers. Physical and chemical data will be collected to identify lakes experiencing water quality impacts due to NPS pollution. Information generated from this study will be used to develop BMP strategies to preserve or restore water quality.

FY 1998 104(b) (3): Bank Stabilization through Riparian Restoration

A large number of the streams in Oklahoma are not meeting their assigned beneficial uses because of sedimentation. The source of the sediment in many of these waterbodies is from bank erosion. Past and current land use activities in both urban and rural watersheds have resulted in streams that have been straightened, channelized, narrowed, widened, dredged, dammed, or any combination of the above. Often riparian zones are nonexistent, due to urban development, livestock mismanagement, or greedy tilling practices. The result has been that streams that had reached a stable configuration, capable of transporting the sediment load and the flood flows in the basin, are now unstable, incapable of transporting the sediment load in the stream, and are much more prone to flooding. As streams tend towards a stable configuration bank erosion increases and more sediment is delivered to the system.

The OCCWQ Program has already completed two riparian restoration projects using the fluvial geomorphology principles (FY 1992 104 (b) and FY 1995 319 (h)). The goal of the project is to implement a riparian restoration project using fluvial geomorphology on at least one stream and to provide educational information on riparian/wetland restoration, functions and values, and water quality benefits. This project will focus on Spring Creek in Cherokee County, OK.

FY 1998 319(h): Stream Assessment to Fill Data Gaps for Northwestern Oklahoma

The OCC is charged by State statute with the task of monitoring NPS impacts to the State's waters. Unfortunately there are substantial gaps or holes in the data where the availability of information is limited. Specific projects are scattered throughout the State, but the areas between projects are unassessed—particularly in the western part of the State. A complete data set is needed to develop an assessment protocol for evaluating the health of streams in the State. Surveying the streams in the northwest quarter of Oklahoma will fill remaining data gaps for water quality, habitat, and biological data. This serves two purposes: to help complete our reference stream database for the State and to provide a current assessment of water quality and biological conditions in this part of the State. In addition, the completion of the reference stream database will make future assessments less costly, faster and add more certainty to the conclusions.

FY 1998 319(h): Lake Eucha Watershed Implementation Project

Lake Eucha (Delaware County) and its tributaries are currently supporting their designated beneficial uses. However, a recently completed (April, 1996) Clean Water Act § 314 Diagnostic and Feasibility Study indicated excessive nutrient loading and eutrophication threaten these uses. Degradation of these waters would impact the cities of Tulsa and Jay, Oklahoma who depend on the lake to supply their populations (approximately 370,000 people) with drinking water and high quality recreational areas. Eutrophication is being caused by elevated nutrient loading from Beaty Creek and Spavinaw Creek to Lake Eucha. The phosphorous in Beaty Creek likely originates from NPS pollution resulting from agricultural practices associated with the poultry industry. The phosphorous in Spavinaw Creek likely originates from a combination of both point source pollution (Decatur WWTP) and NPS pollution (agricultural practices associated with the poultry industry).

The intent of this project is to demonstrate the benefits of proper animal waste application on the water resources of the Lake Eucha Watershed. The project also considers the intent of recent legislation aimed

at poultry producers and attempts to help them meet the requirements of that legislation in the Eucha Watershed. Objectives of the project are to:

- promote consistency in the way Arkansas and Oklahoma write animal waste plans;
- determine if producers are following the recommendations of the animal waste plans;
- determine if the animal waste plans should recommend lower P application rates;
- promote protection and reestablishment of buffer zones and riparian areas;
- provide technical assistance to producers in the development of total resource conservation plans;
- provide educational assistance to producers through producer meetings, workshops, and individual contact;
- demonstrate practices on a subwatershed necessary to achieve the nutrient control needed to protect Lake Eucha;
- coordinate the activities of the various agencies and groups working within the watershed; and
- monitor the effectiveness of the project.

Relationship Between Actions and Activities of the NPS Management Plan

Table 4.	Actions and	Related	Activities	of the	NPS	Management Plan	1
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Action	Activities to Address the Goals
ID Waters	Statewide Monitoring; Selecting Priority Watersheds; Twin Cave Water Quality and
affected by NPS	Pollutant Source Assessment; Biological Assessment Techniques in Small
pollution	Reservoirs; Farm and Ranch Wellhead and Groundwater Assessment—Pilot
	Program; Stream Assessment to Fill Data Gaps for Eastern Oklahoma; Stream
	Assessment to Fill Data Gaps for Southwestern Oklahoma; Statewide Lake Water
	Quality Monitoring Program; Stream Assessment to Fill Data Gaps for Northwestern
	Oklahoma;
Monitor Land	Statewide Monitoring; Selecting Priority Watersheds; Stream Assessment to Fill
Use Trends	Data Gaps for Eastern Oklahoma; Stream Assessment to Fill Data Gaps for
	Southwestern Oklahoma; Grand Lake Basin Management Program; Poteau River
	Comprehensive Watershed Management Program; Little Deep Fork TMDL support
	and BMP Implementation; Turkey Creek Demonstration Watershed Project; Illinois
	River Watershed Implementation Program; Phase 2 of TMDL for Dog Creek and Cat
	Creek Watersheds; Twin Cave Water Quality and Pollutant Source Assessment; Lake
	Eucha Watershed Implementation Project
Monitor	Statewide Monitoring; Selecting Priority Watersheds; Biological Assessment
impaired waters	Techniques in Small Reservoirs; Farm and Ranch Wellhead and Groundwater
and follow-up	Assessment—Pilot Program; Stream Assessment to Fill Data Gaps for Eastern
monitoring after	Oklahoma; Stream Assessment to Fill Data Gaps for Southwestern Oklahoma;
implementation	Statewide Lake Water Quality Monitoring Program; Stream Assessment to Fill Data
	Gaps for Northwestern Oklahoma;
Groundwater	Twin Cave Water Quality and Pollutant Source Assessment; Turkey Creek
Monitoring	Watershed: Implementation of Community Education and Best Management
	Practices to Reduce NPS at Problem Well Sites; Technical Assistance to Improve the
	Quality of Groundwater-Surface Water Interactions; Farm and Ranch Wellhead and
	Groundwater Assessment—Pilot Program; Wellhead Protection Education for

	Communities and Homeowners
Identify	Statewide Monitoring; Selecting Priority Watersheds; Twin Cave Water Quality and
Pollutant	Pollutant Source Assessment; Little Deep Fork TMDL support and BMP
Sources	Implementation; Phase 2 of TMDL for Dog Creek and Cat Creek Watersheds;
	Biological Assessment Techniques in Small Reservoirs; Farm and Ranch Wellhead
	and Groundwater Assessment—Pilot Program; Stream Assessment to Fill Data Gaps
	for Eastern Oklahoma; Stream Assessment to Fill Data Gaps for Southwestern
	Oklahoma; Statewide Lake Water Quality Monitoring Program; Stream Assessment
	to Fill Data Gaps for Northwestern Oklahoma;
Prioritize	Selecting Priority Watersheds
Watersheds for	
Planning &	
Implementation	
Draft TMDL,	Little Deep Fork TMDL support and BMP Implementation; Phase 2 of TMDL for
WRAS, and	Dog Creek and Cat Creek Watersheds; Nutrient trading to support North Canadian
implementation	River TMDL: Watershed Restoration Action Strategies NPS Component and Other
plans to address	Established or Planned NPS Watershed Activities Five Year Schedule: Development
pollutants	of Canoer Only Access Area and Informational Activities Directed at Recreational
1	Users of the River; Grand Lake Basin Management Program; Poteau River
	Comprehensive Watershed Management Program: Meadow Lake Ecosystem
	Restoration Project: Turkey Creek Demonstration Watershed Project: Illinois River
	Watershed Implementation Program: Fourche Maline Watershed Education Project:
	Education through Demonstration of Best Management Practices to Reduce
	Sediment Loading to the Fourche Maline Creek and Lake Wister: Demonstration of
	Best Management Practices in the Salt Fork Watershed: Turkey Creek Watershed:
	Implementation of Community Education and Best Management Practices to Reduce
	NPS at Problem Well Sites: Clearview Creek Demonstration Project: Dairy Waste
	Management Implementation Project: Lake Eucha Watershed Implementation Project
Implement	Turkey Creek Watershed: Implementation of Community Education and Best
Groundwater	Management Practices to Reduce NPS at Problem Well Sites: Technical Assistance
Protection	to Improve the Quality of Groundwater-Surface Water Interactions: Farm and Ranch
Education and	Wellhead and Groundwater Assessment—Pilot Program: Wellhead Protection
Implementation	Education for Communities and Homeowners: Improving Water Quality Through
Programs	Animal Waste Management: Swine Waste Management Education
Implement and	Development of Canoer Only Access Area and Informational Activities Directed at
Educate to	Recreational Users of the River: Grand Lake Basin Management Program: Poteau
reduce Water	River Comprehensive Watershed Management Program: Meadow I ake Ecosystem
Quality	Restoration Project: Little Deep Fork TMDL support and BMP Implementation:
Problems from	Turkey Creek Demonstration Watershed Project: Illinois River Watershed
NPS pollution	Implementation Program: Fourche Maline Watershed Education Project: Education
TH S Pollution	through Demonstration of Best Management Practices to Reduce Sediment Loading
	to the Fourche Maline Creek and Lake Wister. Demonstration of Rest Management
	Practices in the Salt Fork Watershed: Turkey Creek Watershed: Implementation of
	Community Education and Best Management Practices to Reduce NDS at Problem
	Well Sites: Remediation of Underground Mine Areas Through Treatment With Ely
	Ash: Technical Assistance for the Establishment and Maintanance of Dinarian
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	Corridors; Clearview Creek Demonstration Project; Demonstrating BMPs to Protect
	Surface Water Quality from Land Application of Animal Wastes; Farm and Ranch
	Wellhead and Groundwater Assessment—Pilot Program; Dairy Waste Management
	Implementation Project; Small Farm Livestock Pollution Prevention Program;
	Erosion Control and Abatement Practices for County Road Systems; Use of Staged
	Wetlands for Mitigation of Acid Mine Drainage; Organic Waste as a Treatment for
	Acid Mine Drainage; Bank Stabilization through Stream Restoration; Improving
	Water Quality Through Animal Waste Management; Environmentally Sound
	Grazing System for Utilization of Nutrients from Poultry Litter; Illinois River Jones
	Porta-Potties and Trash Bags: Capture and Recycle Technology for Pollution
	Prevention in the Nursery Industry; Swine Waste Management Education; Wellhead
	Protection Education for Communities and Homeowners: Watershed Protection
	through Manure Marketing (Pilot Program); Implementation of NPS BMPs in
	Fourche Maline arm of Lake Wister; Bank Stabilization through Riparian
	Restoration; Lake Eucha Watershed Implementation Project
Streambank	Illinois River Riparian Corridor Restoration; Technical Assistance for the
Restoration	Establishment and Maintenance of Riparian Corridors; Bank Stabilization through
	Stream Restoration; Bank Stabilization through Riparian Restoration
Education	Statewide Education Program – Statewide Blue Thumb; Development of Canoer
Programs	Only Access Area and Informational Activities Directed at Recreational Users of the
	River; Poteau River Comprehensive Watershed Management Program; Meadow
	Lake Ecosystem Restoration Project; Turkey Creek Demonstration Watershed
	Project; Illinois River Watershed Implementation Program; Illinois River Basin
	Education Program (continuation); Fourche Maline Watershed Education Project:
	Education through Demonstration of Best Management Practices to Reduce
	Sediment Loading to the Fourche Maline Creek and Lake Wister;): Demonstration
	of Best Management Practices in the Salt Fork Watershed; Turkey Creek Watershed:
	Implementation of Community Education and Best Management Practices to Reduce
	NPS at Problem Well Sites;): Technical Assistance for the Establishment and
	Maintenance of Riparian Corridors; Technical Assistance to Improve the Quality of
	Groundwater-Surface Water Interactions; Demonstrating BMPs to Protect Surface
	Water Quality from Land Application of Animal Wastes; Farm and Ranch Wellhead
	and Groundwater Assessment—Pilot Program; Dairy Waste Management
	Implementation Project; Small Farm Livestock Pollution Prevention Program; Bank
	Stabilization through Stream Restoration; Improving Water Quality Through Animal
	Waste Management; Environmentally Sound Grazing System for Utilization of
	Nutrients from Poultry Litter; Illinois River Jones Porta-Potties and Trash Bags;
	Swine Waste Management Education; Wellhead Protection Education for
	Communities and Homeowners; Lake Eucha Watershed Implementation Project
Implement	Turkey Creek Watershed: Implementation of Community Education and Best
Source	Management Practices to Reduce NPS at Problem Well Sites; Technical Assistance
Reduction and	to Improve the Quality of Groundwater-Surface Water Interactions; Farm and Ranch
Wellhead	Wellhead and Groundwater Assessment—Pilot Program; Wellhead Protection
Protection	Education for Communities and Homeowners; Improving Water Quality Through
Programs	Animal Waste Management; Swine Waste Management Education

Planned NPS Activities

Future efforts are currently slated to address five watersheds as identified by the NPS Working Group. In addition to these projects, there are nine WRASs under development or being proposed for watersheds in need of water quality improvement. The remaining ten watersheds identified as top priority by the NPS Working Group will be addressed, beginning with WRASs, in the same manner.

The manner in which 319 demonstration funds are used has changed significantly from the competitive grant process that generated numerous smaller two to three year projects. The current program focuses 319 demonstration on a few larger watersheds with five year projects. For instance, the majority of the FY 98 budget was dedicated to the Lake Eucha Watershed with the idea that a large central focus of money and resources will be more effective at managing NPS pollution than spreading the money thinly through various small budget grants. It is OCC's belief that centralizing activities on the priority watersheds in the State will improve that water quality overall. However, the OCC will balance the program so that statewide or regional efforts are also included.

Planned Watershed Activities

Future NPS pollution activities utilizing 319 monies will be directed at the twenty four watersheds identified through the UWA process and the priorities identified in the TMDL schedule as detailed in the prioritization section beginning on page 11. The top five in the list include Lake Eucha Watershed, Illinois River Watershed, Baron Fork Watershed, Lake Wister Watershed, and Broken Bow Reservoir and/or Mountain Fork River Watershed. FY 1999 efforts will focus in the Illinois River Watershed (including the Baron Fork River) and FY 2000 efforts will begin in the Wister Lake Watershed. After addressing these watersheds focus will move down the list to the other watershed in need.

Annually, WRASs will also be completed to initiate a process of remedying identified impairments within Oklahoma water bodies. Implementation resources for large scale watershed NPS controls are foreseen to be adequate for one or two large watersheds (i.e. Illinois River, Lake Eucha) per year. Resources may also be available for a number of small scale projects. The State of Oklahoma will plan no more than two large scale watershed NPS control projects and two small scale projects per year.

In addition, monitoring by OCC, OWRB, ODEQ, ODA and other programs listed in the monitoring section beginning on page 15 will be conducted to support State TMDL commitments for waterbodies on the 303(d) list where NPS pollutants are of concern. Monitoring will be for water quality parameters, stream physical condition, biological, and watershed source inventory. Objectives of NPS monitoring for TMDL are to help determine the TMDL load allocations for NPS and to provide necessary data for planning implementation.

Planned Statewide/Regional Activities

As discussed above, the direction of NPS activities is moving towards larger scale activities with watershed directives. For the most part, regional activities will focus on special NPS pollution sources, educational efforts, and tangential activities. Some of the projects that will be pursued in the future include statewide Blue Thumb, Project Wet, Oklahoma Water Watch, source control activities, monitoring, and other miscellaneous projects directed at NPS pollution management.

The Blue Thumb Program

The Blue Thumb program began in Tulsa in 1993 and has expanded to several counties and continues to grow as an important tool in managing NPS pollution. The program has expanded to a statewide program to foster new Blue Thumb programs throughout the State. The Blue Thumb Program has been a highly successful effort on the part of the Tulsa and Oklahoma County Conservation Districts, and an overall success in addressing NPS pollution. Blue Thumb continues to build partnerships with businesses, educate urban citizens, and spread the word about NPS pollution. To date there are three active counties with programs, Tulsa, Oklahoma and Latimer, but steps have been taken to expand the program to rural areas and other urban communities across the State.

The goal of the statewide program is to develop environmental volunteer education programs through a "train-the-trainers" concept. The idea is to have an ongoing education program operated by local people so the watershed community has an active role in protecting and improving water quality. Blue Thumb volunteers assist local leaders in addressing the many problems that face watersheds. A key element of this is establishing cooperation and positive working relationships among all agencies. As follow through, the statewide Blue Thumb will conduct conferences for local leaders and volunteers to interact, gain training, and share ideas and experiences. The project addresses program goals of educating the public about NPS pollution control. It builds support among the population for environmental goals, and builds community pressure to address pollution problems through local regulatory authorities or persuasion.

Project WET

Project WET is an educational program that provides curriculum and activity guides for kindergarten through twelfth grade students. It is a collection of water related activities that are designed to educate on the importance of water and the intrinsic relationship in people's lives. In Oklahoma, Project WET is sponsored by the OCC, OWRB, and the ODEQ. The goal of the Oklahoma Project WET program is to facilitate and promote the awareness, appreciation, knowledge, and stewardship of water resources through the development and dissemination of classroom ready teaching aids. The program is grounded in the following beliefs, reflected in the curriculum:

- Water is important for all water users (e.g., energy producers, farmers and ranchers, fish and wildlife, manufacturers, recreationists, rural and urban dwellers).
- Wise water management is crucial for providing tomorrow's children social and economic stability in a healthy environment.
- Awareness of and respect for water resources can encourage a personal, lifelong commitment of responsibility and positive community participation.

Oklahoma Water Watch and Other Education Programs

Oklahoma Water Watch and other programs such as Project Learning Tree, Oklahoma Scenic Rivers Commission Education Program, Wonders of Wetlands, and many other programs are critical to the overall education efforts of the State. As mentioned before in the document, no single program, directed by a single agency, can accomplish all the education goals of this program. Only by working in coordination with one another can the various programs have adequate staff and resources to meet all the

environmental education needs of the State. Although not every program focuses solely on NPS pollution and prevention measures, all programs encourage respect for water resources and educate about the complexity and importance of the resources.

Source Control Activities

Urban Areas

NPS pollution from urban areas can contain a wide array of substances and can play a major role in the quality of urban streams. In general, urban streams are of poor quality both from a chemical and biological viewpoint. The biological integrity of an urban stream is closely associated with both the quality of runoff water and quantity, as the large peak discharges typical of Oklahoma can have a catastrophic effect on stream ecosystems. Some sources of urban NPS pollution are relatively difficult to control, such as street runoff, while others, such as construction site runoff, are more easily correctable by BMP implementation.

Jurisdictional control of urban runoff lies with the ODEQ through their role in permitting storm water discharges. Local government entities, through the efforts of City Managers, Planning Directors, and Public Works Directors, and Conservation Districts personnel will play a major role in NPS control efforts by providing the institutional framework for BMP implementation in municipally controlled, operated, or constructed facilities and in providing direct contact with private industry and landowners. The OCES can also be expected to play a significant role in this regard. Conservation Districts have historically focused their efforts on agricultural areas; however, in urban areas their mission has been changing to reflect the increased attention on urban conservation. With their expertise in BMP implementation, Conservation Districts should play a major role in urban conservation efforts.

- 1. Sources Of Urban Runoff Pollutants
 - Erosion
 - Atmospheric Deposition
 - Construction Materials
 - Service Stations and Other Storage Tank Site Locations
 - Careless Handling of Automobile Fluids
 - Manufactured Products
 - Plants and Animals
 - Non-Stormwater Connections
- 2. Primary Substances Found In Urban Runoff
 - Sediment
 - Oil and Grease
 - Salts
 - Biological (i.e. fecal bacteria)
 - Oxygen Demanding Substances
 - Nutrients
 - Toxics
- 3. Activities To Address Urban NPS Pollution

- Community Education
- Household Hazardous Waste Program

Oilfield Related

With over 200,000 active or abandoned oilfield sites in Oklahoma, the potential for NPS pollution from these areas is high. Current control practices greatly reduce the potential for NPS pollution from current activities; however, the large area to be covered and the limited personnel and other resources available means that some problems may be missed. In addition, a large number of sites were established before the advent of controls, and in these areas contaminated soils and large ground water pollution plumes continually contribute salt and petroleum compounds plus solids from destabilized soils to receiving waters. Problems related to oilfield brines are much more significant and longer lasting than those from oil.

Jurisdictional responsibility for oilfield related NPS pollution rests with Corp. Comm. Since oilfield production wastes are exempt from RCRA and CERCLA and their liability rules, and many of the largest problems are related to historic practices, Corp. Comm. often cannot locate a responsible party to effect cleanup of abandoned sites.

- 1. Sources Of Oilfield Runoff Pollutants
 - Erosion Resulting From Current Practices and Historic Sites With Poor Vegetative Cover
 - In-place Soil Contaminants, both Surface and Subsurface (In Old Buried Pits)
 - In-Place and Migrating Groundwater Pollution Plumes
 - Manufactured Products
- 2. Primary Substances Found In Oilfield Runoff
 - Solids (drilling muds, cuttings)
 - Salts from Oilfield Brines
 - Metals
 - Oil and Gas Condensate
 - Sediment
- 3. Activities To Address Oilfield Related NPS Pollution (Currently unfunded)
 - Oilfield-damaged Area Inventory old brine pits and surface sites
 - Location of Groundwaters and Streams Impaired and Threatened
 - Reclamation of abandoned oilfield site(s) (Note The OERB Voluntary Cleanup Fund can address only a portion of the surface sites)
 - Remediation of subsurface soils and contaminated groundwater plumes

Rural Roads

The number of road miles per capita in Oklahoma is relatively high with a majority of these being unpaved rural roads. In many areas, and especially in western Oklahoma, erosion of these roads is a serious problem. It is not uncommon in western Oklahoma to find roadbeds cut 15-20 feet into the land surface as a result of decades of road erosion. Although runoff and washouts of these roads are common

and present transportation problems to area residents, the amount of solids and attached substances washing into creeks creates a serious threat to water quality, water quantity, and wildlife propagation.

- 1. Sources Of Rural Road Pollutants
 - Erosion
- 2. Primary Pollutants Found In Rural Road Runoff
 - Sediment
 - Oil and Grease
 - Herbicides
- 3. Activities To Address Rural Road Related Pollution
 - Rural Road Remediation
 - Update Existing Inventory
 - Prioritization of Rural Road Areas
 - Education
 - Rural Road Demonstration Project
 - Promoting Vegetation as a Means of Erosion Control

Mine Lands

This category addresses NPS pollution occurring as a result of current or historical extraction of minerals or other materials including coal, salt, gravel, clay, rock, and sand. Although there is a wide variety of materials found at these different mine types, the most common NPS concern is deposition of solids into streams and downstream receiving waters. The quality of these solids varies from relatively inert minerals to those containing heavy metals and organic compounds. Control of NPS pollution from active mines entails implementation of BMPs during operation and site reclamation after extraction is completed. NPS control from historic or abandoned sites involves reclamation of sites to a nonpolluting condition.

- 1. Sources of Mine Land Pollutants
 - Erosion
 - Atmospheric Deposition
 - Hydrology or Mine Water

2. Primary Pollutants Found In Mine Land Runoff

- Sediment
- Heavy Metals
- Oxygen Demanding Substances
- pH Altering Substances
- 3. Activities to Address Mine Land Related NPS Pollution
 - Funding for Mine Land Reclamation Projects
 - Coordinate Investigation and Restoration Efforts with AML and RAMP programs
 - Examination of Reclaimed Mine Sites (Program Development)

• Remediation of Mine Areas Using Alkaline Materials and Passive Treatments

Hydrostructure/Tailwater

The majority of rivers in Oklahoma are dammed, sometimes more than once, for the purposes of providing drinking water supply, flood control, navigation control, hydroelectric generation, fish and wildlife propagation, and recreation. Discharges from these impoundments are necessary in order to manage reservoir levels, flood control, and generation of electric power. The power of these discharges is immense and can cause significant habitat destruction, streambank erosion, loss of riparian areas, and habitat loss due to fluctuating water levels. The primary source of concern from hydrostructure discharge is the depletion of oxygen in tailwaters due to poor mixing and the discharge of anoxic bottom waters. In some instances, anoxic conditions can exist for many miles downstream, while in others this is confined to the immediate vicinity of the dam. Extensive research conducted by the Corps of Engineers to address this problem indicates that solutions must be individualized to each lake due to their unique properties.

- 1. Sources Of Hydrostructure/Tailwater Pollutants
 - Erosion
 - Depth of Discharge Water
- 2. Primary Pollutants Found In Hydrostructure/Tailwaters
 - Sediment
 - Oxygen Demanding Substances
- 3. Activities to Address Hydrostructure/Tailwater Related NPS Pollution
 - Modification of Tailwater Quality

In-Place Contaminants

This category deals with NPS pollution from an unlimited variety of sources and includes any contamination resulting from NPS discharge from in-place sources and not included under other categories. This includes, but is not limited to, animal dip pits, fuel storage areas, spill sites, dumpsites, and waste storage areas.

- 1. Sources Of In-Place Contaminant Pollutants Due to the variety of NPS categories in this category, virtually all sources of pollutants are possible.
- 2. Primary Pollutants Associated With In-Place Contaminants The pollutants found are dependent upon the characteristics of the individual source. All possible pollutant categories are potentially present when the variety of sources are considered as a whole.
- 3. Activities to Address In-Place Contaminant NPS Pollution
 - Inventory of In-place Contaminant Sources
 - In-place Contaminant Prioritization System

• Prioritization of In-place Contaminant Sites

Industrial Parks

NPS pollution from industrial parks is primarily composed of contaminated runoff from areas where fuel, raw and finished products, and wastes are stored or transported. This could include a myriad of different compounds and in this regard control measures would be industry specific. It is difficult to separate this from the urban category since most industrial parks are in urban areas; however, the large number of parks and their uniformity in terms of effective BMPs suggests that they be treated separately and as a unique category.

- 1. Sources Of Pollutants from Industrial Parks
 - Atmospheric Deposition
 - Accidental Spills
 - Manufactured Products
- 2. Primary Pollutants Associated With Industrial Parks
 - Oil and Grease
 - Other Pollutants
 - Heavy Metals
 - Oxygen Demanding Substances
- 3. Activities to Address Industrial Park NPS Pollution
 - Industrial Park Inventory

Open or Illegal Waste Disposal Sites

NPS contamination from open or illegal dumping sites poses a significant potential threat to the State's natural resources. Most illegal dumps occur in low lying areas that serve as water conduits such as streams, ditches, and gullies, therefore the impact to waterbodies can be considerable. Potential contaminants include toxic contaminants or derivatives contained in oil, antifreeze, freon, pesticides, household cleaners, paint and various solvents along with metals, plastics, organic matter, batteries, tires, and even explosives, to name a few.

A number of programs exist to address this problem. OSU cooperative extension has been working on a program to inventory, classify, and map the illegal dumping locations in the State. Another program, the Trash Cop Program, funded by the State tipping fee tax monies, provides communities with the means to police illegal dumping in their areas, fine the offenders, and provide and maintain dumpsters in rural areas. During this two year program over 4,600 illegal dumps have been located and about 3,000 cleaned up. However, the program only covered about half of Oklahoma counties so many more dumps likely exist in the rural areas of the state. The Tribal Open Dump Cleanup Project assists Tribes with closure or upgrades of open dump sites, along with post-closure maintenance of the sites. In addition, ODEQ, OCES, Blue Thumb, and other programs hold household hazardous waste collections that allow citizens to dispose of hazardous substances free of charge.

1. Sources of Pollutants from Open or Illegal Waste Disposal Sites

- Humans
- 2. Primary Pollutants Associated with Illegal Disposal Sites
 - Oil and Grease
 - Toxics- antifreeze, solvents, freon, etc.
 - Heavy metals
 - Oxygen Demanding Substances
 - Other pollutants
- 3. Activities to Address Pollution from Open or Illegal Waste Disposal Sites
 - Inventory, Mapping, and Classification of Sites
 - Tribal Open Dump Cleanup Project
 - Trash Cop Program
 - Cooperative Extension Services and Programs
 - Household Hazardous Waste Collections

Septic Systems (On-Site Sewage Disposal)

A significant percentage of residences in Oklahoma rely on septic tanks, lagoons, or other onsite methods for disposal of sewage. The potential for surface or groundwater contamination is likely in areas where septic tanks are densely located and where geophysical conditions increase the likelihood of contaminant escape from disposal areas. The primary substances associated with NPS problems from these practices are nutrients and pathogenic organisms.

- 1. Sources of Pollution from Septic Systems
 - Plants and Animals
- 2. Primary Pollutants Associated With Septic Systems
 - Nutrients
 - Biological
 - Oxygen Demanding Substances
- 3. Activities to Address Septic System Related NPS Pollution
 - Review of Statutes
 - Inventory of On-site Sewage Disposal System
 - Demonstration Project

Recreation

Recreational activities offer a significant contribution to the quality of life in Oklahoma; however, the dense concentration of people associated with recreational events can often lead to NPS pollution. Most of the pollution associated with recreational activities is covered under other categories of the NPS Management Program and is thus not included in this section. This would include such factors as access roads and construction activities. The primary focus of this category then will be on litter and illicit sewage disposal.

- 1. Sources Of Pollution from Recreation
 - Plants and Animals
- 2. Primary Pollutants Associated With Recreational Activities
 - Nutrients
 - Biological
 - Litter
- 3. Activities to Address NPS Pollution Related to Recreation
 - Education

Agriculture

Nationally, agriculture is recognized as an extensive source of pollutants. Crop production perennially exposes large areas to wind and rain creating a great potential for erosion. Sediments, particle bound and dissolved nutrients and pesticides have been show to be entering the State's waters from croplands. Animal production operations, many of which are now licensed and are therefore less likely to pollute, are potential sources of NPS pollution because of the large number of animals in a small location, sometimes without adequate methods of dealing with waste. In addition, animal production operations may import large quantities of nutrients into the watershed as animal feed, but those nutrients are less efficiently exported as animal products. This may result in a concentration of nutrients in a watershed. Irrigation return flow, specifically exempted from NPDES regulation in the Clean Water Act, is a source for salts, nutrients and pesticides.

Great strides have been made towards reducing water quality threats from agriculture. Producers are committed to protecting their resources and voluntarily implement conservation practices and participate in incentive programs such as EQIP and CRP that protect water quality. In addition, all poultry feeding operations as specified by Oklahoma legislation are currently registered with the ODA. In addition, large swine facilities are required by statute to be licensed by the ODA. However, the potential for pollution from various agricultural practices remains unless certain precautions are taken. Very few, if any, of these threats cannot be addressed with the voluntary implementation of BMPs.

The following list inclusive of most agricultural activities summarizes most potential sources of agricultural NPSs of pollution.

- 1. Sources Of Pollution from Agriculture
 - Non-irrigated crop production
 - Irrigated crop production
 - Specialty crops
 - Pasture land
 - Range land
 - Feedlots all types
 - Animal holding or management areas
- 2. Primary Pollutants Associated With Agricultural Activities

- Sediment
- Oxygen Demanding Substances
- Nutrients
- Heavy Metals
- Biological
- Oil and Grease
- Salts
- Other Pollutants
- Habitat impacts
- 3. Activities to Address NPS Pollution Related to Agriculture
 - Watershed Management Plan Implementation
 - Commitment to Watershed Management in Long Range Total Resource Conservation Plans
 - Recommendation of Candidate Watersheds for Implementation
 - Development of a NPS Based Ranking and Prioritizing System for Watershed Units
 - Evaluation of New BMPs
 - Development of Small Watershed Plans for Larger River Basins
 - Certify, Train, and Monitor Commercial Pesticide Applicators Emphasizing Protection of Water Quality
 - Certification of Private Pesticide Applicators Emphasizing Protection of Water Quality
 - Participation in Agricultural Related Meetings to Emphasize Water Quality Protection
 - Assessment of the Effectiveness of Pesticide and Fertilizer Management in Protecting Water Quality
 - Evaluation of the Effectiveness of Nutrient Management
 - Monitor Animal Waste Management Activities
 - Promote nutrient reduction in sensitive watersheds through litter or manure export programs
 - Promote development of new raw or processed manure or litter markets
 - Demonstrate effective use of manure or litter for crop production in nutrient insensitive watersheds
 - CTIC Core 4 Approach: a partnership approach which focuses on four core systems: conservation tillage, crop nutrient management, weed and pest management, and conservation buffers to help agricultural producers improve farm profitability while addressing environmental concerns

V. State and Federal Consistency

Federal Consistency Review

The Federal consistency provision in § 319 Clean Water Act provides an opportunity to improve NPS management by promoting communication and cooperation between State and Federal agencies. As a required task of the lead NPS pollution agency, the OCC is authorized to review Federal activities for consistency with Oklahoma's NPS management program. The management program forms the template to which all assistance and projects are compared. By referring to the specific goals, objectives, and authorities contained in Oklahoma's management program Federal programs can be evaluated to determine if they meet the direction of the State.

Program Review

The OCC will review and evaluate all Federal financial assistance programs and development projects for their effect on water quality and consistency with the Management Program. The review process involves two levels. The first level evaluates the Federal program. The intent of this level of review is to determine if the Federal program satisfies the components of the management program. The frequency of the review varies depending on the dynamic nature of the program under review.

The program review process will be completed using the following criteria:

- Meets the requirements of § 319 of the Clean Water Act;
- Meets the OWQS;
- Is consistent with implementation schedule and projects identified in the 319 Management Program;
- Identifies BMPs or BMP process;
- Identifies a process for onsite application of BMPs; and
- Identifies a process for modification of BMPs.

The second level of review addresses individual development projects. In order to evaluate a Federal project, the appropriate State agency, depending on project content, should undertake the review process. As outlined in the Federal Consistency Guidance Document, the OCC will act as the single point of contact; however, other State agencies will review the project for content and consistency. Each reviewing agency will inform the OCC of the ultimate findings. To aid in the review process, a series of eight questions has been developed to act as a checklist.

The following checklist is used for planned projects:

- Which NPS pollution activities are associated with the project that are included in Oklahoma's management program?
- Are there State approved conservation practices (BMPs) included for each NPS activity included?
- For NPS activities which do not have the approved conservation practices, are there practices identified that demonstrate a knowledgeable and reasonable effort to minimize resulting water quality impacts?
- What process, including feedback from water quality monitoring, exists for modifying the approved or specialized conservation practices in order to protect beneficial uses of water?

- What is the appropriate beneficial use of water for the waterbodies in the project area?
- Is the project consistent with the prioritization of watersheds as identified in the NPS Pollution Management Plan?
- Have the water quality standards and criteria applicable to protecting the beneficial uses been identified?
- Does pre-project planning and design include an analysis of water quality resulting from implementation of the proposed activity sufficient to predict exceedence of water quality criteria for the beneficial use(s) or in the absence of such criteria, sufficient to predict the potential for beneficial use impairment?

Specific Federal assistance programs include the following:

- Department of Defense
 - Defense installations
 - Corps of Engineers
- Department of the Interior
 - Bureau of Land Management
- Office of Surface Mining Reclamation and Enforcement
- United States Fish and Wildlife Service
- Department of Transportation
 - Federal Highway Administration
- Federal Aviation Administration
- EPA
 - Office of Air and Radiation
 - Office of Water
 - Office of Research and Development
 - Office of Administration
 - Office of Enforcement and Compliance Assurance
- USDA, Forest Service
- USDA Natural Resource Conservation and Farm Services Agency

The specific Federal assistance projects for review include:

- USDA Forest Service
- Forest plans
- Soil and water improvement projects
- Recreational development
- Timber activities
- Chemical/pesticides
- Wetland protection
- Hydrologic modification
- Forestry incentive programs (FIP)
- Forestry stewardship programs
- USDA, Natural Resource Conservation & Farm Service Agency

- Conservation Reserve Program (CRP)
- Environmental Quality Incentive Program (EQIP)
- Water Quality Incentive Program (WQIP)
- Wetland Reserve Program (WRP)
- Rural Abandoned Mine Program (RAMP)
- DOI, Bureau of Land Management
 - Watershed projects
- Mineral Exploration and Development
- DOI, Fish and Wildlife Service
- Management of wildlife
- Fish restoration
- Wildlife restoration
- DOI, Surface Mining Reclamation and Enforcement
- Regulation of coal mining and reclamation of abandoned mine lands
- DOD, Defense Installations
- Land Management Plans
- Waste Management Plans
- Revegetation Plans
- DOD, Corps of Engineers
- Dredging
- Channel improvement
- Erosion control structures
- Dams or flood control works

In addition, State NPS programs must be consistent with federal and State guidelines. For instance, NPS implementation projects must carefully consider endangered species and or critical habitat in planning BMPs. Various federal programs have accompanying guidance and federal funds must be used in accordance with those guidelines.

The State also has guidelines that define the direction and limitations of certain programs, either as outlined in statute, interagency MOUs, or as otherwise defined. Certain rights and jurisdictions must be considered prior to implementation projects, such as property rights of downstream or upstream individuals. In addition, prior to implementation activities in areas with known or likely historical significance, clearance must be obtained from the State Historical Department to ensure important historical areas are protected.

VI. Other State Approved Plans and Programs with NPS Authorities

Continuing Planning Process (CPP)

The Continuing Planning Process (CPP) is required by the Clean Water Act § 303 (e)(3)(A)-(H) and 40 CFR § 130.5. The CPP is required to be updated on an annual basis and describes the water quality programs implemented within the State. The document also describes present and planned water quality management programs and the strategy to be used by the State in conducting these programs. The CPP is the master water quality planning document for the State; it defines the process by which the Water Quality Management Plan (WQMP), or 208 Plan, is developed and implemented. The Statewide WQMP is the guiding document that describes the process used in identifying pollution sources and the implementation of programs for the abatement or prevention of water pollution in the State.

The CPP document is drafted by the ODEQ and is, in essence, a step up from this document. This document describes the NPS water quality management programs in the State while the CPP describes the process by which all state water quality programs interrelate. This document also provides the framework for incorporating the NPS Program into the State's overall Water Quality Program.

Oklahoma Water Quality Standards

The Oklahoma Water Resources Board (OWRB) is responsible for development of water quality standards to protect beneficial uses and aid in the prevention, control, and abatement of water pollution. Standards serve to establish water quality targets for specific waters and assist in the development of water-quality based discharge permits which specify treatment levels required of municipal and industrial wastewaters. Oklahoma's Water Quality Standards are maintained by the OWRB and updated at least every three years. Water Quality Standards should assist in the development of plans to abate and prevent NPS pollution, not just provide the basis for developing point source permits.

Beneficial uses, specifically their identification, assessment, and protection, are vital to water quality standards implementation. Currently recognized beneficial uses include public and private water supply, fish and wildlife propagation, agriculture, hydropower, municipal and industrial process and cooling water, primary body contact recreation (such as swimming), secondary body contact recreation (such as boating or fishing), navigation and aesthetics. All uses receive equal protection, for each has its unique environmental and economic importance to Oklahoma. Equal protection for all beneficial uses is mandated by the federal Clean Water Act, and all State agencies strive to implement programs towards that end. Physical, chemical and biological data on Oklahoma's rivers, streams and lakes are used to ascertain the condition of individual waters, determine appropriate present and future beneficial uses, and set realistic standards to protect them.

Through assignment of as many beneficial uses as are attainable, OWQS ensure that existing water quality is not unduly impacted. Science-based narrative and numerical criteria imposed in the Standards ensure attainment of beneficial uses, as well as limit waste and pollution of State waters. In water bodies of quality greater than that required to protect beneficial uses (such as Scenic Rivers, municipal

water supply lakes and waters possessing critical habitat for endangered species), the Standards' antidegradation policy statement provides more stringent protection.

Although all of Oklahoma's surface waters receive broad protection through the Standards document, explicit protection is afforded to approximately 27,000 stream and river miles and 5,000 lakes. Beneficial uses have also been assigned to the State's major groundwater basins.

The OWRB coordinates development of Water Quality Standards Implementation Documents to ensure that standards are translated into permits and implementation plans in a consistent, clear and scientifically sound manner. As in development of the Standards document itself, an extensive public participation process is utilized to ensure that the State's water quality based permitting process strikes an appropriate balance between environmental protection and sound public policy.

Source Water Protection Plan

The following text was taken from ODEQ's website describing the Source Water Protection Program.

Amendments to the Safe Drinking Water Act (SDWA) required the development of a Source Water Protection Program and required two tasks to be completed within four years. Funding for this program was set aside from the Drinking Water State Revolving Fund. The first task is to delineate all sourcewater protection areas, and the second is to assess the delineated area for risks of contamination. Further implementation steps are voluntary on the part of the State. ODEQ Water Quality Division has proposed the following program to achieve this mandate based on the approved procedures of the Wellhead Protection program.

Two-thirds of the 1997 funds will be used to delineate and assess source water protection areas as required under § 1453 over a four year time span as allowed by the SDWA. The remainder of these funds will be used to establish and implement wellhead protection programs under § 1428.

Delineation Procedures

Delineation of Surface Watershed Protection Areas

All surface water sources will be delineated. ODEQ will map the watershed using geographical information systems (GIS) and provide maps to the system owner outlining the zones that should be protected. The watershed delineation map will show source, intake location, potential sources of contamination in the drainage, land use, and watershed boundary. The GIS group in the Water Quality Division will produce these maps with input from the PWS Engineering Unit. The three protection zones are:

Zone A: 600 feet from the spillway elevation water level of source. The existing State Reservoir Sanitation Law specifies a protection zone of 600 feet around a non-municipal reservoir. An acceptable option for municipalities would be a larger 660-foot zone that is authorized by condemnation statutes. This is a very critical zone and every effort should be made to achieve maximum protection within this zone. For river intakes this zone would be 600 feet from both sides of the stream bank upstream to a restricting structure such as a dam.

Zone B: $\frac{1}{2}$ mile from the spillway elevation water level of source. This is an intermediate protection zone and priority should be give to implementation of controls that limit potential to the water supply source. For river intakes this zone would be $\frac{1}{2}$ mile from both sides of the stream bank upstream to a restricting structure such as a dam.

Zone C: Rest of the watershed to the headwaters.

Delineation of Wellhead Protection Area

The State of Oklahoma has an EPA approved Wellhead Program. Using all available information sources, ODEQ delineates wellhead protection area and provides GIS maps outlining the zones that should be protected. The three protection zones are:

Zone A: 300-foot radius from the wellhead defined by regulation

Zone B: 1-year time of travel zone

Zone C: 10-year time of travel zone

Contamination Source Inventory Procedure

Once the protection areas have been delineated, additional GIS location information available from ODEQ databases such as permitted discharges, wastewater impoundments, landfills, and other potential sources of pollution will be incorporated into draft maps to inventory potential pollution sites in the delineated area. ODEQ Water Quality Division will also incorporate location data from other State regulatory agencies such as the Oklahoma Corporation Commission (Corp. Comm.), Oklahoma Department of Agriculture, (ODA) and OCC into the mapping process as this information becomes available. Information from federal agencies such as United States Geological Survey (USGS) or United States Department of Agriculture (USDA) may also be incorporated.

State Assessment Process

Following the completion of the source inventory, ODEQ Water Quality Division will use the information to complete assessments of the delineated area to determine susceptibility to contamination. This determination may be completed in conjunction with vulnerability analysis for monitoring relief.

The ODEQ WQD plans to post maps of the delineated areas and potential sources of contamination on the Internet. Hard copies of the completed assessments will be provided to each water system and will be available to interested consumers locally.

Implementation Procedures

Local teams will be responsible for implementation as described below with technical assistance provided by ODEQ, Oklahoma Rural Water Authority, and Oklahoma Municipal League.

The implementation of the surface water source protection program should be a 6-step program. The 6 steps are:

- 1. Designation of a local team for the water system.
- 2. Technical portion of the delineations (mapping, etc.) based on information available in State GIS files and local information gathered by the water system's team completed by ODEQ and provided to the water system. The water system will have opportunity to provide additional information regarding land use and other pertinent data to finalize the map.
- 3. Inventory of additional potential sources of contamination completed by a local team. ODEQ personnel may assist the local team in obtaining accurate GPS locations of contamination sources. ODEQ will then produce final watershed maps for the system.
- 4. Develop a management plan that addresses potential sources of contamination. ODEQ will provide guidance material to the system with a menu of suggested methods that might be implemented to protect their watershed.
- 5. Develop a contingency plan for provision of water in an emergency situation.
- 6. ODEQ would provide educational and informational assistance to water systems through Water Quality and Customer Assistance Divisions to educate governing boards, local teams, and consumers in the need of protecting their source.

Final maps of delineated areas will be provided use in implementation of protection activities and regulation. ODEQ will insert a permit provision in OPDES permits that require immediate notification of water systems in the event of a by-pass or other violation of discharge limits.

The implementation of the currently approved wellhead protection program is summarized as follows. The 5 steps are:

- 1. Designation of a local team for the water system.
- 2. Technical portion of the delineations (mapping, etc.), based on information available in State GIS files and local information gathered by the water system's team to be completed by ODEQ. ODEQ will provide the draft wellhead protection area delineation maps to the water system.
- 3. Inventory of additional potential sources of contamination to be completed by a local team. ODEQ personnel may assist the local team in obtaining accurate GPS locations of contamination sources once sources are determined. ODEQ will then produce final watershed maps for the system.
- 4. Develop a management plan that addresses potential sources of contamination. ODEQ will provide guidance material to the system with a menu of suggested methods that might be implemented to protect their delineated area.
- 5. Develop a contingency plan for provision of water in an emergency situation.

ODEQ will provide educational and informational assistance to water systems through Water Quality and Customer Assistance Divisions to educate governing boards, local teams, and consumers in the need of protecting their source.

Final maps of delineated areas will be available for use in implementation of protection activities and regulation. In addition to ODEQ efforts it is anticipated that two outside contracts will be used to assist in the implementation process. These contracts are as follows.

- OKLAHOMA RURAL WATER ASSOCIATION CONTRACT: The contractor shall provide services to a minimum of twenty-four small water systems (less than 10,000 population) at no cost to the systems. These services will assist the water system in local efforts to assemble teams, locate potential sources of pollution, develop contingency plans, and implement management practices and controls to protect drinking water sources consistent with the approved source water protection plan. These services shall be provided to systems identified in need of assistance by ODEQ or at the request of the water system.
- OKLAHOMA MUNICIPAL LEAGUE CONTRACT: The contractor shall assist municipalities by the development of model ordinances that will be protective of their water supply sources.

Public participation in development of the plan will be insured through methods such as Informational workshops on the draft plan conducted for Oklahoma Rural Water Association, Oklahoma Municipal League, Water Pollution Control Federation, NCRS, County Extension Agents, Oklahoma Society of Environmental Health Professionals and any other related groups, Draft plan distribution to all participants of the Wellhead Advisory Council, Public Meeting before the Water Quality Council, and Public Meeting before the ODEQ Board.

Public participation in implementation will be addressed by providing materials to the water system regarding the assembling of an implementation team, providing technical assistance and guidance to local implementation teams from Customer Service Division of ODEQ, and providing technical assistance to local teams with contract assistance from Oklahoma Rural Water Association.

State Pesticide Management Plan

The following text was paraphrased from the Oklahoma State Pesticide Management Plan, a document developed by the ODA.

Introduction

The Oklahoma State Pesticide Management Plan is simply based on management of impacts that may be harmful to the quality of waters of the State. Most of the plan is based around protection of groundwater resources from pesticides because although surface water is very vulnerable to potential impacts, it can be reclaimed much more quickly than groundwater. Natural decontamination and breakdown of pesticides generally occurs in surface water due to degradation from sunlight, etc. However, groundwater resources are much more difficult to reclaim and pesticides remain and accumulate at harmful concentrations more readily than in surface waters. Surface water protection is incorporated
into the plan, however, with the consideration that a significant quantity of surface water eventually becomes groundwater and any soluble contaminant will travel into groundwater during recharge.

The plan outlines goals and objectives, agencies with responsibility, statutes, available resources, the planning and monitoring process, and finally, a strategy for preventative action, response to detections, enforcement and information dissemination.

Goals and Objectives

The overall goal of the plan is to prevent pollution to groundwater through management and regulation of the resource to protect the people of Oklahoma and to enhance the economic and social well being of the State. The objectives of the goal are:

- To assure that groundwater withdrawals, recharges, and related activities do not endanger the value of aquifers and associated surface water resources
- To maintain or remediate the quality of groundwater at levels consistent with intended best use
- To prevent degradation consistent with public health, economic, social, and environmental goals
- To monitor groundwater to determine baselines, trends, and conformation with standards
- To ensure the availability and transfer of pertinent information, data, strategies, and studies to involved institutions and the public
- To regulate all manageable discharges, withdrawals, injections, and recharges.

Roles and Responsibilities of Cooperating Federal and State Agencies

The plan specifies the roles and responsibilities of numerous federal and State agencies, citing statutes and the varying breakdown of responsibility within agencies. Federal Agencies with varying authorities in pesticide management include U.S. EPA Region VI in Dallas; USDA including the NRCS, Consolidated Farm Service Agency, Federal Cooperative Extension Service, Rural Economic Community Development, Hydraulic Engineering Research Unit, and the U.S Forest Service; U.S. Department of Interior, specifically the USGS, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, and the U.S. Bureau of Indian Affairs; the U.S. Army Corps of Engineers. State agencies with pesticide management responsibilities include the lead agency, the ODA, the Secretary of Environment (OSE), the ODEQ, the OCC, the OWRB, the Oklahoma Department of Mines, Corp. Comm., the Oklahoma Department of Wildlife Conservation (ODWC), the OSU Cooperative Extension Service (OCES), the Oklahoma Climatological Survey, Grand River Dam Authority, RedArk Development Authority, Scenic River Commission, University Center for Water Research (OSU), Oklahoma District Associations, and various local entities.

Wetland Management Plan

The following text was taken from the Oklahoma Wetland Management Program, a document developed primarily by the OCC, in cooperation with other State and federal agencies.

Oklahoma's Comprehensive Wetlands Conservation Plan provides the State with a focussed strategy for identifying, understanding, managing, and enjoying one of Oklahoma's most versatile natural resources. The plan offers a comprehensive look at Oklahoma's wetlands and their future conservation needs. The plan identifies issues that are unresolved and the limitations on wetland data and science.

The need for a State wetlands strategy lies in the recognition that in Oklahoma, wetland conservation and management are shared responsibilities among local, State, and federal agencies as well as conservation organizations, private corporations, landowners, and other interested groups. Individually, no agency or group has been given either the exclusive mandate or resources to adequately protect wetlands. Wetlands conservation and management are accomplished only through cooperative and continued efforts of these groups and individuals.

The plan emphasized that through discussion, information exchange, cooperation and sharing of resources a coordinated approach to wetland management can be accomplished. The plan recognizes that without cooperation from private landowners there is little hope of long-term success for wetland protection. The plan promotes a voluntary approach to wetland management that uses education, technical assistance, and incentives to bring the private sector into wetland management as a willing partner. The plan identifies Oklahoma's goals for a comprehensive wetland strategy.

"The goals for the State of Oklahoma are to conserve, enhance, and restore the quantity and biological diversity of all wetlands in the State."

Assessment of Wetland Issues

Definition of Wetlands

The plan recognizes that there are many definitions for wetland used in the United States, but most are fundamentally alike and generally address the elements of hydrology, hydrophytic vegetation and hydric soils. For a general definition of wetlands, the plan recommends that the definition for wetland developed by the national Academy of Sciences be used as the State's general definition. The plan also recognizes that there are many reasons to define and categorize wetlands. When wetlands are defined for regulatory purposes by the federal or State government, the plan recommends that the State support the current EPA and the U.S. Corps of Engineers wetland delineation procedures and definition. When wetlands are defined for landscape management such as wetland habitat assessment, a broader interpretation of the definition is appropriate.

Functional Uses of Wetlands

Oklahoma's wetlands are a valuable natural resource that, if maintained and properly managed, can provide important benefits to the public and the environment. Wetland functions are directly beneficial to people and the integrity of the environment where they are found. The functions associated with

Oklahoma's wetlands are: water quality enhancement, reduction of flood impacts, biological productivity, groundwater influences, recreation, education, timber production, and agriculture production. The plan recommends a consistent statewide program to evaluate the quality and functions of wetlands and to monitor their condition.

Inventory of Wetlands

There are two predominant statewide wetland inventories in Oklahoma; the U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory and the NRCS's Wetland Inventory completed for the swampbuster provisions of the 1985 Farm Bill. The plan recommends that the State of Oklahoma develop a complete inventory of all wetlands for multiple needs. The State should pursue a cooperative effort with USFWS, EPA, NRCS, and the Corps to record soils, hydrology, and wetland data on a standardized base map that can be maintained in a Geographical Information System (GIS).

Standards for Beneficial Uses of Wetlands

The OWRB has evaluated how OWQS currently protect wetlands and how they might be modified to provide additional protection. Wetlands in Oklahoma receive some protection through the OWQS. Oklahoma's environmental statutes do not specifically address wetlands. However, within the definition of "Waters of the State", marshes receive special mention as do all other bodies or accumulations of water. This affords wetlands some baseline protection by OWQS. However, to date, no enforcement action concerning wetland has been based on the existing OWQS; therefore it is uncertain if the current standards can adequately protect wetlands. The plan recommends that a technical workgroup be established to review and expand upon the recommendations of the OWRB evaluation (this technical workgroup has been established is working on the problem). The work needs to be completed in time for inclusion in the 2000 OWQS revision process.

Measures to Ensure Protection of Property Rights of Landowners

Because the majority of Oklahoma wetlands are in private ownership, private landowners are the State's most important wetland managers. The success of wetland conservation and management in Oklahoma will ultimately be determined by private landowners. The plan's recommendation for insuring that private landowners be willing partners with the State rests on education, technical assistance, and incentive programs. The success of the USFWS's Partners for Wildlife Program and USDA's Wetland Reserve program provides a solid foundation for the likelihood of this approach being successful.

Oklahoma currently has two pieces of legislation that attempt to address the issue of federal wetlands regulation in the State. This legislation, codified at 80 O.S. 1991, § 1, Subsections C and D, deals with the issue of takings. No court cases testing this legislation have occurred since its passage.

Recommended Measures to Mitigate Wetland Losses

Successful mitigation of Oklahoma's wetlands losses will require a better characterization of wetland functions and a more thorough inventory of Oklahoma's wetland resources. The State must develop a more comprehensive monitoring system to track gains and losses of wetlands. The plan recommends that the State should look at establishing a wetland bank(s) to guide financial resources into constructive

Other State Approved Plans and Programs with NPS Authorities

projects to restore, enhance, and create wetlands, in that order of priority. In Oklahoma, wetland banks are a new concept. The Oklahoma Department of Transportation is in the process of establishing a wetland bank for use in mitigating highway construction projects. This effort should serve as a model for the development of a statewide program.

VII. Roles, Responsibilities and Oversight

The numerous state and federal agencies in Oklahoma are assigned specific areas of responsibility through federal and state statutes. These areas of responsibility with respect to pollution source codes are concisely, but not entirely depicted for the main state agencies in Table 4 and with more detail in the following text. Each environmental agency in the State of Oklahoma has its responsibilities spelled out in statute. These responsibilities are detailed in the subsection titled Statutory Responsibilities. In addition, agencies and non-governmental organizations have been asked to contribute discussion of their relative roles in future NPS planning, education and implementation programs. Entities have indicated available programs and resources. Discussion of these roles and responsibilities are detailed in the subsection titled Agency Authorities and Responsibilities beginning on page 147. It is important to include sections in this discussion as one describes statutes and the other describes how those statues have been interpreted by the different agencies and incorporated into their programs.

Source	Agency(ies)	Agency(ies)	Source	Agency(ies)	Agency(ies)
	with	with		with	with
	Authorities	Regulatory		Authorities*	Regulatory
	*	Authorities			Authorities
Nonpoint Source	OCC, NRCS	ODA, ODEQ	Dredge Mining		ODM
Agriculture	OCC, NRCS	ODA	Petroleum Activities		Corp. Comm.
Non-irrigated Crop	OCC, NRCS	ODA	Mill Tailings	OCC	ODM,
Production					
Irrigated Crop	OCC, NRCS	ODA	Mine Tailings	OCC	ODM,
Production					
Specialty Crops (e.g.	OCC, NRCS	ODA	Land Disposal		ODEQ
truck farming &			(Runoff or Leachate		
orchards)			from permitted areas)		
Pasture Land	OCC, NRCS	ODA,	Sludge		ODEQ
Range Land	OCC, NRCS	ODA,	Wastewater		ODEQ
Feedlots-All Types	OCC, NRCS	ODA	Landfills		ODEQ
Aquaculture	ODWC	ODEQ	Industrial Land		ODEQ
			Treatment		
Animal Holding /	OCC, NRCS	ODA,	On-Site Wastewater	OCC	ODEQ
Management			Systems		
Silviculture	OCC, NRCS	ODA	Hazardous Waste		ODEQ
Harvesting,	OCC, NRCS	ODA	Hydromodification	OCC	COE, ODEQ,
Restoration, Residue					
Management					
Forest Management	OCC, NRCS	ODA	Channelization	OCC	COE, ODEQ,
Road Construction		ODA, ODOT	Dredging		COE
/Maintenance					
Construction		ODOT	Dam Construction	OCC, NRCS	COE, OWRB,
Highway/Road/Bridge		ODOT	Flow Regulation /	NRCS	COE
			Modification		
Land Development	OCC	ODEQ,	Bridge Construction		ODOT
Urban Runoff	OCC	ODEQ	Removal of Riparian		OCC
			Vegetation		
Storm Sewers (Other		ODEQ	Streambank	OCC	COE
than end of pipe)			Modification /		
			Destabilization		

Table 4. Agencies with Authorities Related to Specific Sources of Pollution.

Combined Sewers		ODEQ	Atmospheric		ODEQ
			Deposition (and Acid		
			Rain)		
Surface runoff	OCC	ODEQ, ODA	Waste Storage /		ODEQ
			Storage Tank Leaks		
Resource Extraction /		Corp. Comm.,	Highway Maint. &		ODOT
Exploration / Devel.		ODM	Runoff		
Surface Mining		ODM	Spills	ODWC, OCC,	ODEQ, Corp.
					Comm.
Subsurface Mining		ODM	In-place Contam.s		ODEQ
Placer Mining		ODM			

*- **not** regulatory authorities

Statutory Responsibilities

Title 27A of the Oklahoma Statutes defines the statutory roles and responsibilities of State environmental agencies. Below is a summary of statutory jurisdiction and responsibilities.

Each State environmental agency shall:

- a. Implement and enforce the laws and rules within its jurisdictional areas of environmental responsibility;
- b. Utilize and enforce the OWQS;
- c. Seek to strengthen relationships between State, regional, local and federal environmental planning, development and management programs;
- d. Cooperate with other State environmental agencies regarding programs to resolve environmental concerns;
- e. Cooperate with all State agencies and local or federal governmental entities to protect, foster, and promote the general welfare, and the environment and natural resources of this State;
- f. Have the authority to disseminate information and educate within their respective areas of environmental jurisdiction; and
- g. Participate in hearings conducted by the OWRB for the consideration, adoption or amendment of the OWQS, and be able to present written comments to OWRB at the same time staff recommendations are submitted for Board review and consideration.
- Each State environmental agency shall develop a Water Quality Standards Implementation Plan for its jurisdictional areas of environmental responsibility by July 1, 2001. These plans should be reviewed at least every three years to determine whether revisions to the plan are necessary. These plans describe the processes, procedures and methodologies the State agency will utilize to ensure that programs within its jurisdictional areas of responsibility will comply with antidegradation standards and lead to restoration, maintenance, and support of beneficial uses.

i. Each environmental State agency shall develop, implement and utilize a complaint investigation and response process that will give all authorized State agencies the ability to investigate, mitigate, resolve, and respond to complaints in a timely manner.

The Secretary of Environment (OSE)

The Secretary of Environment or successor cabinet position has the following jurisdictional areas of environmental responsibility:

- a. Powers and duties for environmental areas designated to such position by the Governor;
- b. The recipient of federal funds disbursed pursuant to the Federal Water Pollution Control Act. OSE will disburse the funds to each State agency with environmental responsibilities based upon its statutory duties and responsibilities relating to environmental areas;
- c. Coordinate pollution control and complaint management activities of the State to avoid duplication of effort including the development of a common data base for water quality information for use by all State agencies and the public;
- d. Act on behalf of the public as trustee for natural resources under the federal Oil Pollution Act of 1990, the federal Comprehensive Environmental Response, Compensation and Liability Act of 1980, the federal Water Pollution Control Act and any other federal laws providing that a trustee for the natural resources is to be designated. The Secretary is authorized to make claims against federal funds, receive federal payments, establish and manage a revolving fund in relation to duties, and to coordinate, monitor and gather information from and enter into agreements with the appropriate State agencies with environmental responsibilities;
- e. Development and implementation of public participation procedures for development or modification of the federally required list of impaired waters (303(d) report), the water quality assessment (305(b) report), the NPS State assessment (319 report), and the continuing planning process document.

Department of Environmental Quality

The Department of Environmental Quality shall have the following jurisdictional areas of environmental responsibility:

- a. All point source discharges of pollutants and storm water to waters of the State which originate from municipal, industrial, commercial, mining, transportation and utilities, construction, trade, real estate and finance, services, public administration, manufacturing and other sources, facilities and activities, except those which fall under the responsibilities of ODA or Corp. Comm.;
- b. All dischargers required by federal regulations to obtain a federal National Pollutant Discharge Elimination System (NPDES) permits including but not limited to: municipal and industrial discharges, facilities which store grain, feed, seed, fertilizer, and agricultural chemicals which

must have an NPDES permit storm water runoff. Any point source discharge related to agriculture, as specified in paragraph 1 of subsection D of § <u>1</u>-3-101 of Title 27A of the Oklahoma Statutes (Those not specified as subject to ODEQ or ODA authority remain under authority of EPA),

- c. All NPS discharges and pollution except those that fall under the responsibilities of the ODA, the Corp. Comm., or the OCC; including refineries, petrochemical manufacturing plants and natural gas liquid extraction plants, manufacturing of oil and gas related equipment and products, bulk terminals, aboveground and underground storage tanks not subject to the jurisdiction of the Corp. Comm., and other facilities, activities and sources not subject to the jurisdiction of other agencies.
- d. Technical lead agency for point source, NPS and storm water pollution control programs funded under § 106 of the federal Clean Water Act, for areas within the Department's jurisdiction;
- e. Surface water and groundwater quality and protection and water quality certifications;
- f. Waterworks and wastewater works operator certification;
- g. Public and private water supplies;
- h. Water, waste, and wastewater treatment systems including, but not limited to, septic tanks or other public or private waste disposal systems;
- i. Underground injection control pursuant to the federal Safe Drinking Water Act and 40 CFR Parts 144 through 148, except for wells regulated by the Corp. Comm.;
- j. Air quality under the Federal Clean Air Act and applicable State law, except for indoor air quality and asbestos as regulated for worker safety by the federal Occupational Safety and Health Act and by Chapter 11 of Title 40 of the Oklahoma Statutes; including Air emissions from all facilities and sources subject to operating permit requirements under Title V of the Federal Clean Air Act as amended;
- k. Hazardous waste and solid waste, including industrial, commercial and municipal waste; also transportation, discharge or release of deleterious substances or solid or hazardous waste or other pollutants from rolling stock and rail facilities.
- 1. Superfund responsibilities of the State under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, except the planning requirements of Title III of the Superfund Amendment and Reauthorization Act of 1986;
- m. Radioactive waste and all regulatory activities for the use of atomic energy and sources of radiation except for the use of sources of radiation by diagnostic x-ray facilities;
- n. Hazardous substances other than branding, package and labeling requirements;

- o. Emergency response as specified by law;
- p. Environmental laboratory services and laboratory certification;
- q. Freshwater wellhead protection;
- r. Groundwater protection for activities subject to the jurisdictional areas of ODEQ;
- s. Environmental regulation of any entity or activity, and the prevention, control and abatement of any pollution, not subject to the specific statutory authority of another State environmental agency:
- t. Development and maintenance of a computerized information system of water quality data, including but not limited to the results of surface water and groundwater quality monitoring in a manner that is accessible to the State environmental agencies and to the public;
- u. Stormwater runoff or point source discharge from commercial manufacturers of fertilizers, grain and feed products, and chemicals, and over manufacturing of food and kindred products, tobacco, paper, lumber, wood, textile mill and other agricultural products;
- v. Wastewater discharge (either PS or NPS) from slaughterhouses, but not including feedlots at such facilities;
- w. aquaculture and fish hatcheries;
- x. discharges of pollutants and storm water to waters of the State from surface impoundments and land application of wastes and sludge and other pollution originating at such facilities;
- y. The ODEQ shall routinely provide the OCC with a list of permit approvals for inclusion in the OCC database.

Oklahoma Water Resources Board

The OWRB shall have the following jurisdictional areas of environmental responsibility:

- a. Water quantity including water rights, surface water and underground water, planning, and interstate stream compacts;
- b. Weather modification;
- c. Dam safety;
- d. Flood plain management;
- e. Processing and prioritization of applications for grant funds or loans from the Flood Hazard Mitigation Account and enter into grant or loan agreements for use of such funds after receipt

from the Department of Civil Emergency Management; promulgation of rules to administer the Flood Hazard Mitigation Financial Assistance Program, issuance of investment certificates to provide funds to meet demand for load funding from Flood Hazard Mitigation Financial Assistance Program, entrance into loan agreements to eligible entities for flood hazard mitigation projects, and entrance into agreements with the Oklahoma Dept. of Civil Emergency Management or other agencies to monitor and measure flood events.

- f. State water/wastewater loans and grants revolving fund and other related financial aid programs;
- g. Administration of the federal State Revolving Fund Program including making application for and receiving capitalization grant awards, wastewater prioritization for funding, technical project reviews, environmental review process, and financial review and administration;
- h. Technical lead agency for clean lakes eligible for funding under § 314 or other applicable sections of the Federal Clean Water Act or other subsequent State and federal clean lakes programs; administration of a State program for assessing, monitoring, studying and restoring Oklahoma lakes with administration to include receipt and expenditure of funds from federal, State and private sources for clean lakes and implementation of a volunteer monitoring program to assess and monitor State water resources;
- i. Statewide water quality standards and their accompanying USAP, anti-degradation policy and implementation, and policies generally affecting OWQS application and implementation including mixing zones, low flows and variances or any modification or change thereof pursuant to § 1085.30 of Title 82 of the Oklahoma Statutes;
- j. Groundwater protection for activities subject to the jurisdictional areas of environmental responsibility of the Board;
- k. Development of classifications and identification of permitted uses of groundwater, in recognized water rights, and associated groundwater recharge areas;
- 1. Establishment and implementation of a statewide beneficial use monitoring program for waters of the State in coordination with the other State environmental agencies;
- m. Coordination with other State environmental agencies and other public entities of water resource investigations conducted by the USGS for water quality and quantity monitoring in the State;
- n. Development and submission of a report concerning the status of water quality monitoring in this State;
- o. Licensing of all persons engaged in the commercial drilling or plugging of groundwater wells, monitoring wells, observation wells, wells utilized for heat exchange purposes, geotechnical borings, and installation of water well pumps in this State;
- p. Administration of the Well Drillers and Pump Installers Remedial Action Indemnity Fund.
 Monies in the Indemnity Fund shall only be expended for remedial actions necessary, without

notice and hearing, to protect groundwater from pollution or potential pollution from wells, or boreholes under the jurisdiction of the Board that do not meet minimum standards for construction or that have been abandoned.

State Department of Agriculture (ODA)

The State Department of Agriculture shall have the following jurisdictional areas of environmental responsibility except as provided in other parts of this section:

- a. point source discharges and NPS runoff from agricultural crop production, agricultural services, livestock production, silviculture, feed yards, livestock markets and animal waste;
- b. pesticide control;
- c. forestry and nurseries;
- d. fertilizer;
- e. facilities that store grain, feed, seed, fertilizer and agricultural chemicals;
- f. dairy waste and wastewater associated with milk production facilities; and
- g. groundwater protection for activities subject to the jurisdictional areas of environmental responsibility of the Department.

The State Board of Agriculture shall have the following powers, which shall be in addition to those given in other parts of this Code:

- a. Promulgate rules as the Board deems necessary, expedient or appropriate to the performance, enforcement or carrying out of any of the purposes, objectives, or provisions of this Code;
- b. Initiate and prosecute civil or criminal actions and proceedings when deemed necessary to enforce or carry out any of the provisions of this Code;
- c. Appoint authorized agents to make inspections or investigations and to perform other services for the Board or any division of the ODA;
- d. Have jurisdiction over all matters affecting animal industry and animal quarantine regulation;
- e. Issue stop-sale orders and quarantine regulations;
- f. Enter into cooperative agreements and coordinate with the federal government or any State, or any department or agency of either;

- g. Revoke, or suspend for any period up to one year, any license issued by the ODA, when the Board finds that the holder of such license has violated any of the provisions of this Code or any rule of the Board;
- h. Have jurisdiction over all matters affecting agriculture as contained and set out in this title, which have not been expressly delegated to another State or federal agency.
- i Have jurisdiction over the importation of exotic livestock. For purposes of this paragraph, the term "exotic livestock" means commercially raised animals of the families bovidae, cervidae, antilocapridae and ratites, and animals of the order Galliformes.

Corporation Commission (Corp. Comm.)

The Corporation Commission has exclusive jurisdiction, power and authority, it is its duty to promulgate and enforce rules, and issue and enforce orders governing and regulating:

- a. conservation of oil and gas;
- b. field operations for geologic and geophysical exploration for oil, gas and brine, including seismic survey wells, stratigraphic test wells and core test wells;
- c. exploration, drilling, development, producing or processing for oil and gas on the lease site;
- d. exploration, drilling, development, production and operation of wells used in connection with the recovery, injection or disposal of mineral brines;
- e. reclaiming facilities only for the processing of salt water, crude oil, natural gas condensate and tank bottoms or basic sediment from crude oil tanks, pipelines, pits and equipment associated with the exploration, drilling, development, producing or transportation of oil or gas;
- f. underground injection control pursuant to the federal Safe Drinking Water Act and 40 CFR Parts 144 through 148, of Class II injection wells, Class V injection wells utilized in the remediation of groundwater associated with underground or aboveground storage tanks regulated by the Corp. Comm., and those wells used for the recovery, injection or disposal of mineral brines as defined in the Oklahoma Brine Development Act. Any substance that the United States EPA allows to be injected into a Class II well may continue to be so injected;
- g. tank farms for storage of crude oil and petroleum products located outside the boundaries of refineries, petrochemical manufacturing plants, natural gas liquid extraction plants, or other facilities subject to the jurisdiction of the ODEQ with regard to point source discharges;
- h. construction and operation of pipelines and associated rights-of-way, equipment, facilities or buildings used in the transportation of oil, gas, petroleum, petroleum products, anhydrous ammonia or mineral brine, or in the treatment of oil, gas or mineral brine during the course of transportation but not including line pipes in any natural gas liquids extraction plant, refinery,

reclaiming facility other than those specified in this subsection, mineral brine processing plant or petrochemical manufacturing plant;

- i. handling, transportation, storage and disposition of saltwater, mineral brines, waste oil and other deleterious substances produced from or used in connection with the drilling, development, producing and operating of oil and gas wells;
- j. spills of deleterious substances associated with facilities and activities specified this subsection or associated with other oil and gas extraction facilities and activities;
- k. subsurface storage of oil, natural gas and liquefied petroleum gas in geologic strata;
- 1. groundwater protection for activities subject to the jurisdictional areas of environmental responsibility of the Commission;
- m. construction, operation, maintenance, site remediation, closure and abandonment of the facilities and activities described in this subsection;
- n. When a deleterious substance from a Corp. Comm. regulated facility or activity enters a point source discharge of pollutants or storm water from a facility or activity regulated by the ODEQ, the Department shall have sole jurisdiction over the point source discharge of the commingled pollutants and storm water from the two facilities or activities insofar as Department regulated facilities and activities are concerned;
- o. For purposes of the Federal Clean Water Act, any facility or activity which is subject to the jurisdiction of the Corp. Comm. and any other oil and gas extraction facility or activity which requires a permit for the discharge of a pollutant or storm water to waters of the United States shall be subject to the direct jurisdiction of the federal EPA and shall not be required to be permitted by the ODEQ or the Corp. Comm. for such discharge;
- p. aboveground and underground storage tanks that contain antifreeze, motor oil, motor fuel, gasoline, kerosene, diesel, or aviation fuel and that are not located at refineries or at the upstream or intermediate shipment points of pipeline operations, including, but not limited to, tanks from which these materials are dispensed into vehicles, or tanks used in wholesale or bulk distribution activities, as well as leaks from pumps, hoses, dispensers, and other ancillary equipment associated with the tanks, provided that any point source discharge of a pollutant to waters of the United States during site remediation or the disposal of contaminated soil, media, or debris which is hazardous shall be regulated by the ODEQ; and
- q. the Petroleum Storage Tank Release Environmental Cleanup Indemnity Fund and Program and the Leaking Underground Storage Tank Trust Fund.

The Conservation Commission (OCC)

The Conservation Commission shall have the following jurisdictional areas of environmental responsibility:

- a. Soil conservation, erosion control and NPS management except as otherwise provided by law;
- b. Monitoring, evaluation and assessment of waters to determine the condition of streams and rivers being impacted by NPS pollution. In this capacity, the OCC shall serve as the technical lead agency for NPS categories as defined in § 319 of the Federal Clean Water Act or other subsequent federal or State NPS programs, except for activities related to industrial and municipal stormwater or as otherwise provided by State law;
- c. Wetlands strategy;
- d. Abandoned mine reclamation;
- e. Cost-share program for land use activities;
- f. Assessment and conservation plan development and implementation in watersheds of clean lakes, as specified by law;
- g. Complaint data management;
- h. Coordination of environmental and natural resources education;
- i. Federal upstream flood control program;
- j. Groundwater protection for activities subject to the jurisdictional areas of environmental responsibility of the Commission;
- k. The OCC may establish and maintain an environmental and natural resources geographic data base system. Such system shall include but not be limited to pollution complaints filed with the State agencies with environmental responsibilities, and resolutions of complaints and such other data;
- 1. The Commission shall annually submit a report to the Speaker of the House of Representatives, the President Pro Tempore of the Senate, and the Governor containing the total number of pollution complaints filed, the total number of and type of complaints addressed by each State environmental agency, the total number of such complaints resolved, the total number of complaints remaining to be resolved, the average time frame for resolving such complaints, the historical comparison of complaint resolution in previous years, and any other information which the Commission believes is pertinent in regard to pollution complaints.

Department of Mines

The Department of Mines shall have the following jurisdictional areas of environmental responsibility:

a. Mining regulation;

- b. Mining reclamation of active mines; and
- c. Groundwater protection for activities subject to the jurisdictional areas of environmental responsibility of the Commission.

Department of Wildlife Conservation (ODWC)

The Department of Wildlife Conservation shall have the following jurisdictional areas of environmental responsibilities:

- a. Investigating wildlife kills; and
- b. Wildlife protection and seeking wildlife damage claims.

Department of Public Safety

The Department of Public Safety shall have the following jurisdictional areas of environmental responsibilities:

- a. Vehicle inspection for air quality;
- b. Hazardous waste, substances and material transportation inspections as authorized by the Hazardous Materials Transportation Act; and
- c. Inspection and audit activities of hazardous waste and materials carriers and handlers as authorized by the Hazardous Materials Transportation Act.

Department of Labor

The Department of Labor shall have the following jurisdictional areas of environmental responsibility:

- a. Regulation of asbestos in the workplace pursuant to Chapter 11 of Title 40 of the Oklahoma Statutes;
- b. Asbestos monitoring in public and private buildings; and
- c. Indoor air quality as regulated under the authority of the Oklahoma Occupational Health and Safety Standards Act, except for those indoor air quality issues specifically authorized to be regulated by another agency.

Department of Civil Emergency Management

The Department of Civil Emergency Management shall have the following jurisdictional areas of environmental responsibilities:

- a. Coordinate all emergency resources and activities relating to threats to citizens' lives and property pursuant to the Oklahoma Civil Defense and Emergency Resources Management Act;
- b. Administer and enforce the planning requirements of Title III of the Superfund Amendments and Reauthorization Act of 1986 and develop other emergency operations plans that will enable the State to prepare for, respond to, recover from and mitigate potential environmental emergencies and disasters pursuant to the Oklahoma Hazardous Materials Planning and Notification Act;
- c. Administer and conduct periodic exercises of emergency operations plans pursuant to the Oklahoma Civil Defense and Emergency Resources Management Act;
- d. Administer and facilitate hazardous materials training for State and local emergency planners and first responders pursuant to the Oklahoma Civil Defense and Emergency Resources Management Act; and
- e. Maintain a computerized emergency information system allowing State and local access to information regarding hazardous materials' location, quantity and potential threat.

Agency Roles and Responsibilities

Members of the NPS Working group were surveyed to assess their agency's responsibilities, available resources, and interest in NPS programs. The results of the surveys are seen below.

Cherokee Nation

a. Organization Constituency

The Cherokee Nation has global membership and includes the Native American Tribal Government.

b. Organization Goals / Mission with Regard to NPS Control

The Cherokee Nation works in cooperation with State agencies to address NPS control.

c. Current / Planned Programs to Control NPS

Currently, the Cherokee Nation has no programs to control NPS pollution, but is trying to remain current regarding State and federal regulations and programs.

d. Resources Available to Control NPS

Funding for environmental projects is extremely limited, but the Cherokee Nation maintains a staff of eighteen Environmental Specialists with varied environmental expertise and experience.

e. Organization Role in Planning NPS Watershed Projects

The Cherokee Nation is the lead agency for the Inter-Tribal Environmental Council and would like to be notified about NPS watershed projects statewide to keep the Native American Tribes in Oklahoma informed about environmental issues.

f. Principle Concerns and Priorities Regarding NPS Sources

The Cherokee Nation's NPS priorities are in the northeast region of the State where they hold jurisdictional boundaries, but the Cherokee Nation would try to address the entire State regarding NPS because of its leadership role with the Inter-Tribal Environmental Council.

Oklahoma Water Resources Board (OWRB)

a. Agency Responsibility/Authority

OWRB is responsible for promulgating Oklahoma's Water Quality Standards (OWQS) (OAC 785:45-46). OWRB is the designated State agency for assessing, monitoring, studying, and restoring Oklahoma's lakes (O.S. 82 § 1085.29). OWRB is responsible for defining eutrophic water bodies (SB 1170) and for identifying "Nutrient-Limited Watersheds" and "Nutrient-Vulnerable Groundwater" (SB 1170 and 1175).

b. Agency Goals / Mission with Regard to NPS Control

The mission of the OWRB is to protect and manage the waters of the State to ensure that all Oklahomans have adequate quantities of good water.

c. Current / Planned Programs to Control NPS

OWRB currently has regulatory programs to develop protocols for determining attainment of assigned beneficial uses of water. OWRB is also working on mandates related to identification of "Nutrient-Limited Watersheds" and "Nutrient-Vulnerable Groundwater" and defining eutrophic water bodies in the OWQS. All of the initiatives mentioned are statewide in scope and involve the environmental State agencies in planning and implementation. OWRB plans to implement criteria for NPS in OAC 785:46.

d. Resources Available to Control NPS

OWRB has the Water Quality Programs Division, which works to promote and implement OWQS and works with the Planning and Management Division to protect groundwater quality. OWRB has staff expertise available to deal with lake assessments, intensive lake studies, and inlake restoration to address NPS impacts. OWRB is also working with other State agencies to aid in the design and implementation of a statewide monitoring program to assess attainment of beneficial uses of water. Funding to conduct monitoring on lakes across the State is needed to document NPS impacts. Funding is also required to document beneficial use impacts on waters across Oklahoma, and a standardized protocol for documentation purposes is needed.

e. Agency Role in Planning NPS Watershed Projects

OWRB should be involved in planning watershed projects which consider OAC 785:45 and OAC 785:46 and should be consulted as necessary to determine how the rules mentioned apply to a project. OWRB should also be involved in the planning and implementation of any project which involves inlake work to be performed or whose purpose or justification for implementing the project was based on lake water quality impairments or whose success will be measured on improvements to lake water quality. OWRB requests to be involved in any projects which involve lake implementation or implementation of BMPs to improve lake water quality.

f. Principle Concerns and Priorities Regarding NPS Sources

OWRB priority watersheds regarding NPS include Lakes Eucha/Spavinaw, Oklahoma City municipal lakes and their watersheds, Tenkiller/Illinois River, Grand Lake, Lake Wister, Broken Bow Lake, and Lake Oologah.

Oklahoma Department of Environmental Quality (ODEQ)

a. Agency Responsibility/Authority

ODEQ has environmental authority concerning aquaculture and fish hatcheries, fertilizer and ag chemical manufacturers, slaughterhouses, and agricultural product storage facilities. ODEQ is also responsible for all point source discharges, surface water and groundwater protection, underground injection, water, waste, and wastewater treatment systems (O.S. 27A § 1-3-101). ODEQ shall establish, implement, amend, and enforce the Water Quality Management Plan (O.S. 27A § 2-6-103). ODEQ is also responsible for developing a wellhead protection program and groundwater protection education program (O.S. 27A § 2-6-310.2, 3). ODEQ also has powers and duties in addition to those required by law (O.S. 82 § 1085.75). ODEQ also assists with maintaining and improving water quality and in preventing and eliminating the pollution of waters within the "scenic river area" (O.S. 82 § 1457).

b. Agency Goals / Mission with Regard to NPS Control

ODEQ is dedicated to providing quality service to the people of Oklahoma through comprehensive environmental protection and management programs. These programs are designed to assist the people of the State in sustaining a clean, sound environment and in preserving and enhancing the natural surroundings where Oklahomans live. ODEQ will accomplish its mission through regulatory and nonregulatory means to achieve a balance that sacrifices neither economic growth nor environmental protection. ODEQ will focus on community-based customer services and nonregulatory approaches, maintenance of a responsive, accurate and timely environmental complaints process and emergency response system, and compliance activities to maintain or improve environmental quality.

c. Current / Planned Programs to Control NPS

ODEQ's current programs that assist in controlling NPS pollution include the Stormwater Program, Source Water Program, Wellhead Program, Review/Certification of 404 Permits, and Construction Standards/Inspections of On-site Systems. ODEQ plans to expand the Stormwater Program to apply to smaller sites and towns. d. Resources Available to Control NPS

ODEQ has two Stormwater Engineers (FTEs) available to assist with NPS pollution control.

e. Agency Role in Planning NPS Watershed Projects

ODEQ is responsible for establishing TMDLs and should be consulted accordingly for NPS watershed projects. ODEQ should also be involved from the beginning of the planning of any watershed project addressing waters included on the 303(d) list.

f. Principle Concerns and Priorities Regarding NPS Sources

ODEQ priorities regarding NPS include waterbodies on the 303(d) list, Illinois River/Lake Tenkiller Watershed, and Poteau River/Lake Wister Watershed. ODEQ is also concerned about the actual NPS identification and control methods.

Oklahoma Department of Agriculture – Water Quality Services Division (ODA-WQSD)

a. Agency Responsibility/Authority

ODA-WQSD is responsible for CAFOs (Title 2 O.S. § 9-201 *et seq.*, see SB 1175) with constitutional authority for livestock issues (Okla. Const. Art. 6 § 31), and poultry feeding operations from the Registered Poultry Feeding Operations Act (Title 2 O.S., § 10-9.1 *et seq.*, see SB 1170)

b. Agency Goals / Mission with Regard to NPS Control

ODA-WQSD goal is to achieve an ideal environment for CAFOs in which the needs for agricultural production and new jobs are properly balanced with the need for clean air and clean water.

c. Current / Planned Programs to Control NPS

Currently, ODA-WQSD performs CAFO licensing and poultry feeding operation registration, which require animal waste management plans. ODA-WQSD also requires certification for commercial and private poultry waste application.

d. Resources Available to Control NPS

ODA-WQSD conducts inspections and advises how one can come into compliance, but there is no funding or in kind contributions available through this agency. Funding is needed to assist facilities that are in violation and cannot afford to come into compliance.

e. Agency Role in Planning NPS Watershed Projects

ODA-WQSD should be involved in planning and consulted regarding any and all NPS watershed projects that involve animal feeding operations.

e. Principle Concerns and Priorities Regarding NPS Sources

ODA-WQSD feels the NPS Workgroup needs to address watershed issues and specific sources that involve animal feeding operations.

Oklahoma Department of Agriculture – Forestry Services Division (ODA-FSD)

a. Agency Responsibility/Authority

ODA-FSD is responsible for instituting a broad program of education and action in the protection, reforestation, harvesting and wise use of forests and their products throughout Oklahoma, which includes the conservation of soil, water, and wildlife (O.S. 2 § 1301-103). ODA-FSD also administers silviculture BMPs and identifies silviculturally related NPS pollution.

b. Agency Goals / Mission with Regard to NPS Control

ODA-FSD's goal is to minimize the impact of forestry activities on water quality, as well as to use forestry practices, such as tree planting, to help solve water related problems.

c. Current / Planned Programs to Control NPS

Currently, ODA-FSD manages a statewide comprehensive program of actions to prevent NPS problems related to forestry activities and to increase the use of forestry practices to help solve water related problems with the cooperation of landowners and forestry industry. These programs include forestry BMPs, landowner technical assistance and forest management planning, education and training to raise awareness of NPS, BMP compliance monitoring, demonstrations of water quality management, logger "tailgate" sessions, water quality monitoring, riparian area restoration, logger certification, and cost-share practices.

ODA-FSD plans to place greater emphasis on landowner and logger education and forest industry contacts, as well as participate in special projects such as Eastern State College's Project 2000, the Illinois River Management Plan, the Kiamichi River Project of The Nature Conservancy, and State-level planning projects. ODA-FSD will support the Master Woodland Owners Program of OSU Cooperative Extension. ODA-FSD will also implement the BMP Compliance Monitoring Protocol adopted by the southern States, and develop the forestry cost-share program. ODA-FSD also intends to complete the fact sheet and videotape series on BMPs and low-cost practices to control or prevent erosion.

d. Resources Available to Control NPS

ODA-FSD has one forester assigned to all aspects of the forest water quality program. There are fifteen field foresters available to assist landowners and other agencies with forestry aspects of watershed planning projects. ODA-FSD has access to the USDA Forest Service liaisons with EPA and with specialists in other States to help address local water quality issues. Demonstration road BMPs are also available for workshops, tours, or other educational endeavors. The federal Stewardship Incentives

Program received \$85,000 in federal funds for landowner cost-shares. ODA-FSD contributes \$60,000 in State resources directly to the forest water quality program.

ODA-FSD requires additional resources to increase the ability to address NPS problems related to forestry. Logger and landowner education needs to be intensified (\$15,000 per year). ODA-FSD needs to develop the BMP compliance-monitoring program to track BMP implementation trends in a way that is comparable to other southern State forestry agencies (\$20,000 per year). ODA-FSD also needs to complete development of the fact sheets and video series on forestry BMPs and low-cost erosion control practices (\$25,000), and State-appropriated funding is needed for the forestry cost-share program (\$100,000 per year or more).

e. Agency Role in Planning NPS Watershed Projects

ODA-FSD requests to be consulted on watershed projects where forestry practices may be contributing to NPS problems, and where forestry practices can provide part of the solution to other environmental problems.

f. Principle Concerns and Priorities Regarding NPS Sources

ODA-FSD priorities regarding NPS are watersheds in the eastern third of Oklahoma, which offer commercial forestry opportunities, so the impacts of timber harvesting and forest road practices on water quality can be minimized. Interests include managing stream corridors, restoring riparian areas, and controlling erosion. ODA-FSD's principle concern involves making landowners, loggers and the industry more aware of the need to protect water quality while managing their forests so that problems are prevented.

Oklahoma Corporation Commission (Corp. Comm.)

a. Agency Responsibility/Authority

Corp. Comm. regulates oil and gas exploration and production, related activities, and pipelines. Corp. Comm. also regulates retail underground and aboveground storage tanks (OAC 165:25, part 15, subchapter I).

b. Agency Goals / Mission with Regard to NPS Control

Corp. Comm.'s mission regarding NPS control is to prevent pollution, and to see that it gets cleaned up to a level which does not put the public at risk when it does occur.

c. Current / Planned Programs to Control NPS

Corp. Comm.'s current NPS program is regulatory, with rules about how oil and gas related material should be properly handled and disposed of. The program also includes guidelines for responsible party (RP) leak and spill cleanup for oil and gas products and brine, when a responsible party can be located.

If funding becomes available, Corp. Comm. plans to locate all petroleum and brine impacted water bodies in the State and initiate soil and water remediation as feasible.

d. Resources Available to Control NPS

The resources and personnel available for NPS control at Corp. Comm. are limited. State funding is available to plug a portion of the known problem wells, and for enforcement of current rules, but no funds are allocated for location or cleanup of sites without responsible parties. Any NPS control program must be implemented into current regulatory activities, using the present personnel, unless additional funds become available. Some federal funds from the OPA 90 fund are being made available for plugging and cleanup activities near Lake Oolagah. Otherwise, for the rest of the State, Corp. Comm has no federal or State funds, and the OERB Voluntary Cleanup Fund has sufficient monies to clean up only part of the many surface sites. Activities at other abandoned and historical sites will have to wait until funding and personnel become available.

e. Agency Role in Planning NPS Watershed Projects

Corp. Comm. requests that they be consulted for all NPS watershed projects in oil and gas producing areas, when pollution from retail storage tanks is suspected, and when sources are related to their regulatory activities.

f. Principle Concerns and Priorities Regarding NPS Sources

Corp. Comm.'s priorities regarding NPS are watersheds in oilfield areas.

Office of the Secretary of Environment (OSE)

a. Agency Responsibility/Authority

OSE has the authority to receive and disburse Clean Water Act funds, including 319 funds. OSE also has the authority to coordinate all pollution control activities of the State, including NPS activities (O.S. 27A § 1-2-101.2, 3).

b. Agency Goals / Mission with Regard to NPS Control

OSE takes very seriously the "fishable/swimmable" goal of the Clean Water Act and will work diligently to ensure that the NPS Management Program strives for this goal through a combination of voluntary and, when necessary, regulatory approaches. As the grant recipient for all Clean Water Act funds, and as the agency charged with coordinating all pollution control activities for the State, OSE will work with the OCC to insure that all NPS control activities meet appropriate State and federal guidance and priorities. OSE will also cooperate with other State environmental agencies to insure that agencies are performing tasks within their clear areas of jurisdictional authority.

c. Current / Planned Programs to Control NPS

N/A.

d. Resources Available to Control NPS

In addition to funds provided by the Clean Water Act grant programs, OSE can provide in-kind services and match for grant administration and assistance.

e. Agency Role in Planning NPS Watershed Projects

As the Clean Water Act grant administrator and coordinator of all pollution control activities, OSE should be kept informed of all 319 activities. OSE will remain involved in all 319(h) activities. Additionally, OSE will coordinate with the OCC prior to the implementation of any changes in scope or direction with regard to Oklahoma's NPS Management Program. As the lead agency for Oklahoma's UWA and WRAS efforts, OSE will work with the OCC to insure that the State's watershed restoration priorities are addressed in the NPS Management Program. As chair of the State's Water Quality Monitoring Council, OSE will also work with the OCC to coordinate 319 Assessment activities with Oklahoma's other water quality monitoring programs.

f. Principle Concerns and Priorities Regarding NPS Sources

The major priority for OSE is to substantiate the State's 303(d) list. The State's NPS program could assist in this effort by assessing those stream segments identified as having NPS impacts for which no supporting documentation can be found.

National Resource Conservation Service (NRCS)

a. Agency Responsibility/Authority

NRCS is responsible for soil and water conservation and assists farmers with grants and aid in these areas (PL 74-46, PL 74-461). NRCS is also responsible for planning and installing watershed-based projects on private lands (PL 83-566). NRCS provides assistance for farm irrigation, land drainage, establishment and operation of erosion control nurseries, and making conservation plans and surveys (PL76-159).

b. Agency Goals / Mission with Regard to NPS Control

NRCS's mission is to provide leadership in a partnership effort to help people conserve, improve, and sustain natural resources and the environment.

c. Current / Planned Programs to Control NPS

NRCS has NPS programs, which provide technical and financial assistance statewide. These programs include Conservation Technical Assistance, Environmental Quality Incentives Program, Wetlands Reserve Program, Wildlife Habitat Incentive Program, Forestry Incentives Program, Watershed Surveys and Planning, Watershed Protection and Flood Prevention Operations, Conservation Farm Option, Resource Conservation and Development, Grazing Lands Conservation Program, and Outreach for Socially Disadvantaged Farmers. NRCS also provides the Stewardship Incentive Program in

conjunction with the Forest Service and Conservation Reserve Program in conjunction with the Farm Service Agency.

d. Resources Available to Control NPS

NRCS provides technical assistance to all 77 counties of Oklahoma with natural resource conservation planning and application. NRCS also provides financial assistance associated with their current programs.

e. Agency Role in Planning NPS Watershed Projects

NRCS requests that they are notified of all planned watershed projects, and will assist with planning the projects if funding is available.

f. Principle Concerns and Priorities Regarding NPS Sources

NRCS requests assistance with identifying areas impaired by nutrients.

Storm Water Quality Management (SWQM), City of Oklahoma City

a. Agency Responsibility/Authority

SWQM has the legal authority to control, prohibit, or inspect the contributions of pollutants to the municipal system (40 CFR, part 122). No polluted waters can be discharged in any area under the jurisdiction of Oklahoma City without approval of EPA or ODEQ (Local code § 47-5). Further authority is given under the Stormwater Drainage Utility Enactment Ordinance (OKC code, ch. 57, article 5). This authority is limited to the city limits of Oklahoma City.

b. Agency Goals / Mission with Regard to NPS Control

The goal of SWQM is to prevent or address any source of contamination of the community's waterways through education, public awareness, monitoring, stream restoration, inspections, investigations and enforcement.

c. Current / Planned Programs to Control NPS

Currently, SWQM has NPS programs in the OKC limits in conjunction with Oklahoma City Blue Thumb, Integrated Pest Management Steering Committee, Oklahoma Clean, and Governor's Environmental Crimes Task Force. The programs include Dry Weather Monitoring, Pollution Investigations, Storm Event Sampling, Review Construction Blue Prints, Construction Erosion Inspections, HAZMAT Emergency Spill Response, Hazardous Household Waste Collection, Whole Effluent Testing, Master Watershed Survey, Public Information and Training, Pesticide/Herbicide Reduction, and Industrial Screening. Future plans of SWQM are to develop and implement a fullservice household hazardous waste and recycling center for public access. SWQM also plans to characterize all 197 micro watersheds in OKC jurisdiction to prioritize funding.

d. Resources Available to Control NPS

The SWQM staff are trained in erosion control, industrial inspections, hazardous material handling and spill responses, water quality monitoring, chemical analysis, and storm water sampling. The NPS programs are funded by the enterprise fund, which is a drainage utility fee, based on water meter size.

e. Agency Role in Planning NPS Watershed Projects

SWQM requests that they be consulted when NPS watershed projects involve enhancement or severe degradation in any of the 197 micro watersheds in the municipal city limits.

f. Principle Concerns and Priorities Regarding NPS Sources

SWQM requests assistance with erosion seminars and habitat restoration in OKC. Also, continued work with OKC Blue Thumb is necessary to characterize the 197 micro watersheds and for water quality monitoring.

United States Geological Survey (USGS)

a. Agency Responsibility/Authority

USGS is one of the federal agencies that will carry out the actions of the Clean Water Action Plan to meet the goals of the plan. USGS will play a leadership role in monitoring, modeling, and assessing pollutant transport of nitrogen and phosphorus. USGS will also play an active role in more than 30 additional actions.

b. Agency Goals / Mission with Regard to NPS Control

N/A

c. Current / Planned Programs to Control NPS

N/A

d. Resources Available to Control NPS

USGS resources consist of technical assistance by providing data and scientific expertise in planning and evaluating the effectiveness of NPS controls. Data and reports are published and publicly available. Limited Federal Matching funds are available to partially finance USGS support of State and Tribal programs.

e. Agency Role in Planning NPS Watershed Projects

USGS may be contacted to provide information to aid NPS watershed projects. USGS may be able to provide published reports and data and can cooperate in data collection, particularly water-quality sampling during stormwater runoff and ground-water sampling. USGS also can interpret NPS impact

on groundwater through the use of specialized chemical analyses to determine age and source of contaminants and application of numerical models. USGS can determine frequency of high flow events and threshold of data collection activities, and develop TMDL models.

f. Principle Concerns and Priorities Regarding NPS Sources

USGS interests are statewide, but are particularly critical in basins crossing State lines and in basins with Indian interests.

Indian Nations Council of Government (INCOG)

a. Agency Responsibility/Authority

INCOG is responsible for controlling NPS pollution and water quality (PL 92-500v, § 208 and 40 CFR, part 126). This responsibility is given via administrative actions (40 CFR, part 131.2).

b. Agency Goals / Mission with Regard to NPS Control

INCOG's primary mission regarding NPS is developing the NPS component of TMDLs for municipal and, less frequently, industrial dischargers. INCOG's water quality studies within their planning region include a NPS component. INCOG also studies urban stormwater runoff and rural NPS impacts on municipal drinking water supplies.

c. Current / Planned Programs to Control NPS

Currently, INCOG does not have any NPS control projects, although there are grant supported projects to identify and characterize NPS in certain watersheds. There are five studies underway which will eventually have BMPs for NPS control, which will be funded by 319. Little Deep Fork Creek TMDL is funded by a 104(b)(3) grant for phase one TMDL and modeling with OCC performing all other phases of TMDL under 319 grant. Dog Creek TMDL is funded by a 104(b)(3) grant to complete NPS studies with OCC performing all other phases of TMDL under 319 grant, and OWRB is leading the education component under 319 agreement with OCC. Bird Creek Metals is funded by a 604(b) grant to assess low levels of cadmium within the Tulsa portion of the Bird Creek Watershed. Arkansas River Metals is funded by 104(b)(3) grants to monitor background metals in the Arkansas River for NPDES permit compliance. Eucha / Spavinaw is funded by a 604(b) grant to support and management of water quality studies to protect Tulsa's drinking water supply. INCOG plans to implement Stormwater Assistance to Small Communities funded by a 104(b)(3) grant to support compliance with phase two stormwater regulations within the INCOG region.

d. Resources Available to Control NPS

INCOG does not perform NPS control or demonstration projects, but they do perform water quality studies to assess impacts of NPS and BMP effectiveness. Funding for these studies will primarily be from 604(b) and 104(b)(3) grants.

e. Agency Role in Planning NPS Watershed Projects

INCOG is the Watershed Management Planning Agency for the INCOG Region and should be informed about all watershed programs and activities within the INCOG region. INCOG should also be consulted and invited to participate in NPS watershed projects in this region.

f. Principle Concerns and Priorities Regarding NPS Sources

INCOG's highest priority is the protection of drinking water reservoirs in their region. Lakes Eucha and Spavinaw are being intensively studied regarding NPS, with future studies to include Lake Hudson, Lake Oolagah, Grand Lake, Lake Bixhoma, Shell Lake, and Lake Sahoma. Another priority for INCOG is urban stormwater NPS because of Tulsa's existing NPDES stormwater permit and the anticipated impacts of Phase two stormwater regulations on INCOG member cities.

City of Tulsa

a. Organization Constituency

The City of Tulsa is a local government with interests in providing safe, quality drinking water for northeast Oklahoma residents.

b. Organization Goals / Mission with Regard to NPS Control

Tulsa's goal is to ensure that the impacts to the source water for Tulsa, and numerous rural water districts, are minimized while users share the resource.

c. Current / Planned Programs to Control NPS

Currently, Tulsa has several programs to control NPS pollution. A Nutrient-Algae Relationship and Target Nutrient Concentration for the Eucha-Spavinaw-Yahola Lake Complex is a system specific program funded by TMUA with involvement from COT, OWRB, TMUA, CCHD, USGS, and private laboratories. Development of GIS database of point and NPSs is watershed specific with funding from TMUA. Coordination of the Monitoring, Assessment, and Evaluation Work Group is funded by TMUA, and the program is system specific with INCOG. Quantification of phosphorus movement from soil within Eucha Watershed through computer modeling is funded by TMUA and OSU. Nutrient management coordination for the Eucha Watershed is funded by TMUA and also involves Foundation for Organic Resource Management. The Litter Marketing Program is statewide through ODA and is funded through the State's general tax revenue funds.

Tulsa plans to implement a point source characterization study in the Eucha Watershed with ODEQ, which will be funded by the State's general tax revenues. Demonstration of the Benefits of Poultry Litter and Instream Nutrient Transient Analysis are proposed programs through OSU which will be statewide and watershed specific respectively

d. Resources Available to Control NPS

Tulsa has environmental monitoring and ODEQ certified laboratory services. The services provide monitoring, investigating, sampling, testing, and analyzing streams, groundwater, surface water, and stormwater. Tulsa also has a Lake Staff experienced in lake/reservoir management and eutrophication-related problems in such waterbodies.

e. Organization Role in Planning NPS Watershed Projects

Tulsa would like to participate in NPS watershed projects through the NPS pollution work group and may want to participate in the Oklahoma Water Quality Council. Tulsa requests to be consulted during the initial planning phase of a project if the watershed has similar problems to Tulsa's or if the project includes Tulsa's municipal lakes.

f. Principle Concerns and Priorities Regarding NPS Sources

Tulsa's principle concerns are Lake Eucha and Spavinaw Lake. Nuisance aquatic growth needs to be addressed in Lake Eucha, and in-place nutrients in sediments need to be addressed in Spavinaw Lake.

Oklahoma Attorney General (OAG)

a. Agency Responsibility/Authority

OAG has the authority to prosecute violations of Environmental Quality Code, Injunction (O.S. 27A § 3-2-504). OAG is responsible for providing legal services to the OCC, Directors of Conservation Districts, and the Department of Mines (O.S. 27A § 3-2,3-103 and 45 § 43/769). OAG must also prosecute civil/criminal actions on behalf of State administration and represent State agencies (O.S. 74 § 18b and §201).

b. Agency Goals / Mission with Regard to NPS Control

N/A

c. Current / Planned Programs to Control NPS

N/A

d. Resources Available to Control NPS

OAG is available to provide legal advice to agencies undertaking NPS control programs and to provide representation in cases where legal action is necessary.

e. Agency Role in Planning NPS Watershed Projects

No response- missing page.

f. Principle Concerns and Priorities Regarding NPS Sources

No response- missing page.

Oklahoma Department of Wildlife Conservation (ODWC)

a. Agency Responsibility/Authority

ODWC has authority to investigate violations of O.S. 29 § 7-401 and § 7-401a, and O.S. 27.b. Agency Goals / Mission with Regard to NPS Control

ODWC's mission as stated in our agency's Strategic Plan is to manage Oklahoma's wildlife resources and habitat to provide scientific, educational, aesthetic, economic and recreational benefits for present and future generations of hunters, anglers, and others who appreciate wildlife, with the goal of conserving, sustaining, enhancing, and protecting fish and wildlife resources, habitat, and biodiversity.

c. Current / Planned Programs to Control NPS

ODWC has programs underway in its Wildlife Division to restore wetlands and in its Fisheries Division to protect fisheries from the impacts of NPS pollution. The Natural Resources Section conducts environmental reviews for impacts to wildlife as well as fish and wildlife kill investigations.

d. Resources Available to Control NPS

None specifically available to target NPS pollution only.

e. Agency Role in Planning NPS Watershed Projects

No response - missing page Participation in NPS Working Group and assistance with NPS projects related to ODWC's authority.

f. Principle Concerns and Priorities Regarding NPS Sources

No response - missing page.

Oklahoma Department of Transportation (ODOT)

a. Agency Responsibility/Authority

ODOT is required to comply with NEPA rules and regulations including, OWQS, §§ 404/401 of the CWA, and any requirements for NPDES on State user discharge.

b. Agency Goals / Mission with Regard to NPS Control

The mission of ODOT is to provide a safe, economical, effective, and environmentally sound transportation network for the people, commerce, and communities of Oklahoma.

c. Current / Planned Programs to Control NPS

Currently, ODOT operates under the "Standardized Specifications for Highway Construction", which contains descriptions and procedures for reducing sediment runoff from construction sites.

d. Resources Available to Control NPS

ODOT incorporates controls for NPS pollution into each design plan and all construction projects, with funding from federal or State sources.

e. Agency Role in Planning NPS Watershed Projects

ODOT requests to be informed about the workings and goals for NPS projects, and ODOT should be consulted when they effect or will be effected by a NPS project.

f. Principle Concerns and Priorities Regarding NPS Sources

N/A

Oklahoma Municipal League (OML)

a. Organization Constituency

OML is a statewide organization of municipal governments, which currently includes 439 cities and towns.

b. Organization Goals / Mission with Regard to NPS Control

OML's mission is to keep city and town officials informed and educated about NPS control.

c. Current / Planned Programs to Control NPS

Currently, OML does not have any programs to control NPS, but they plan to use their publication to notify municipal officials of activities and of any informational/educational materials and opportunities regarding NPS.

d. Resources Available to Control NPS

N/A

e. Organization Role in Planning NPS Watershed Projects

OML can help to keep municipal officials informed about NPS activities and forward recommendations on their behalf.

f. Principle Concerns and Priorities Regarding NPS Sources

OML requests to be informed about NPS control activities. OML is also particularly concerned about any unfunded mandates.

Pawnee Nation—Department of Environmental Conservation and Safety

a. Organization Constituency

The Pawnee Tribe has about 28,000 acres of land in north central Oklahoma within the lower Black Bear Creek Watershed primarily used for agriculture.

b. Organization Goals / Mission with Regard to NPS Control

The Pawnee Nation's goal is to educate its people and land users about the importance of BMPs to control NPS pollution.

c. Current / Planned Programs to Control NPS

Currently, the Pawnee Nation conducts NPS education through Pawnee Blue Thumb. Funding for this project is provided by EPA 104/106 CWA projects. This project involves Pawnee Nation, Pawnee County Conservation District, City of Pawnee, and Pawnee Public Schools working with Bureau of Indian Affairs (BIA) and NRCS throughout Pawnee County. Pawnee Nation plans to develop water quality standards, which will include education about NPS pollution. The program will be regional, involving Pawnee Nation, BIA, NRCS, and Pawnee County Conservation District.

d. Resources Available to Control NPS

Pawnee Nation has resources available through 106 and 104(b)(3) CWA projects to fund NPS programs.

e. Organization Role in Planning NPS Watershed Projects

Pawnee Nation requests to be notified about NPS planning activities in Payne, Pawnee, and Kay Counties and in the lower Black Bear Creek Watershed.

f. Principle Concerns and Priorities Regarding NPS Sources

Pawnee Nation's principle concerns regarding NPS sources are septic waste, erosion from road construction activities, erosion from failure to implement BMPs for cropland, and buffer strip/riparian zone removal.

Nongovernmental Organizations Interests and Responsibilities

Oklahoma Farmers Union (OFU)

a. Organization Constituency

The membership of the OFU is both rural and urban, with 113,000 members. OFU is affiliated with the National Farmers Union and interests include insurance, farm, and rural issues.

b. Organization Goals / Mission with Regard to NPS Control

The goal of the OFU is to strengthen the family farm, which includes a voluntary approach to NPS control.

c. Current / Planned Programs to Control NPS

Currently, OFU does not have any programs other than 319 programs in place to control NPS pollution. OFU does have a youth education program, which could possibly be used to inform about NPS pollution.

d. Resources Available to Control NPS

OFU is county organized, which could be used as a resource for gathering information. OFU does not have funding to control NPS pollution.

e. Organization Role in Planning NPS Watershed Projects

OFU would like to be notified of all proposed NPS watershed projects in order to keep their members informed.

f. Principle Concerns and Priorities Regarding NPS Sources

OFU is concerned that control of NPS pollution will become a regulatory program, private property rights will be overlooked, and stringent regulations will be placed on agriculture and rural citizens.

Central Oklahoma Metropolitan Environmental Association (COMEA)

a. Organization Constituency

COMEA is a regional association including 26 cities and towns, eight counties, and Tinker Air Force Base.

b. Organization Goals / Mission with Regard to NPS Control

COMEA's mission is to improve the environment of central Oklahoma. With specific regard to NPS, COMEA will begin operating a drop-off facility for household hazardous wastes with expansion plans to manage conditionally exempt small quantity generator (CESQG) wastes.

c. Current / Planned Programs to Control NPS

Currently, the cities and towns that are members of COMEA fund COMEA's regional NPS program. COMEA will begin operating a permanent drop-off facility for household hazardous wastes later this

year with future plans to expand operations to manage CESQG wastes. The program will be regional and on going with a significant public education component. COMEA is receiving a start-up grant from ODEQ to begin these operations.

d. Resources Available to Control NPS

COMEA has no funding available for programs other than the ones mentioned above.

e. Organization Role in Planning NPS Watershed Projects

COMEA would like to be involved in planning NPS watershed projects in the greater OKC metro area.

f. Principle Concerns and Priorities Regarding NPS Sources

COMEA needs on-going funding assistance for operation costs for properly managing household hazardous waste.

Oklahoma Farm Bureau (OFB)

a. Organization Constituency

Farm Bureau is local, State, and national with one in every county in Oklahoma. OFB has over 115,000 member families and there are more than four million member families nationwide. OFB's interests include presentation of products in agriculture.

b. Organization Goals / Mission with Regard to NPS Control

OFB's mission is to closely monitor the regulation on NPS pollution and take action to protect the rights of landowners.

c. Current / Planned Programs to Control NPS

Members of OFB are in programs to control NPS pollution on an individual basis. A few counties are interested in forming watershed groups to control NPS. OFB is interested in actively participating in NPS control, and they plan to use OCC as a training and funding resource for water quality monitoring kits.

d. Resources Available to Control NPS

OFB can be used to relay information regarding NPS to its members through the Farm Bureau Journal, letters, statewide annual meeting and other meetings, and web site.

e. Organization Role in Planning NPS Watershed Projects

OFB requests to be contacted early for all NPS watershed projects so they may contribute to the planning process.

f. Principle Concerns and Priorities Regarding NPS Sources

OFB's principle concerns involve anything that is related to agriculture—terracing, filter strips, retention ponds, etc. OFB is concerned that agriculture is being unfairly blamed for pollution to the waters of the State. OFB wants scientific data to determine where the real water quality problems are originating. OFB needs accurate data to determine load allocations of different sources. OFB wants problems to be communicated to landowners when agriculture is a known problem so they may become part of the solution. OFB is also concerned that impairment of the State waters is over-estimated in order to get federal funds. OFB feels OCC should be more informative about when and where point sources negatively impact waters of the State.

Sierra Club, Oklahoma Chapter

a. Organization Constituency

Sierra Club is a national grassroots organization with 2,300 members in the Oklahoma Chapter. Sierra Club's interests are to convert concern about the health of the environment into effective environmental action and promote public environmental education.

b. Organization Goals / Mission with Regard to NPS Control

Sierra Club's mission with regard to NPS control is to see that water quality management is performed properly to insure the health of present and future generations.

c. Current / Planned Programs to Control NPS

The Sierra Club, Oklahoma Chapter publishes a bimonthly newsletter, funded by local members, which concentrates on public education of NPS and other environmental concerns. Sierra Club, National has awarded grants for public environmental education the last two years to the Oklahoma Chapter for efforts in water quality education, focusing on CAFOs.

d. Resources Available to Control NPS

Sierra Club can provide volunteers statewide, who will provide time, labor, and expertise in the NPS programs.

e. Organization Role in Planning NPS Watershed Projects

Sierra Club requests to be consulted and involved in all levels of planning for NPS watershed projects so their volunteers can be informed and utilized to the fullest extent.

f. Principle Concerns and Priorities Regarding NPS Sources

Sierra Club's priority watersheds are the impaired HUC watersheds. Sierra Club requests that communication with local, State, and federal agencies remain open, honest, and forthcoming to meet their goal of public education and volunteer participation.

The Nature Conservancy (TNC)

a. Organization Constituency

TNC is a non-profit international conservation organization.

b. Organization Goals / Mission with Regard to NPS Control

TNC's mission is to preserve biological diversity, so NPS pollution must be controlled to preserve aquatic diversity.

c. Current / Planned Programs to Control NPS

TNC does not have any current NPS control programs, but they plan to initiate a community-based conservation program on the Kiamichi River Watershed. This program is not yet funded, but it will build a local coalition of citizens, landowners, corporations, conservation groups, and State and federal agencies to address key issues, increase awareness, and create a conservation plan for key portions of the watershed.

d. Resources Available to Control NPS

None

e. Organization Role in Planning NPS Watershed Projects

TNC requests to be informed about all watershed projects, but they will only participate in projects within their current or future project areas.

f. Principle Concerns and Priorities Regarding NPS Sources

TNC's watershed priorities are the Kiamichi River and Little River with concerns regarding sedimentation and nutrient inputs.

The Trust for Public Land (TPL)

a. Organization Constituency

TPL is a national conservation organization specifically established to conserve land for people, including watershed protection and river corridor protection. TPL's work is undertaken in all venues form wilderness areas to inner city areas. TPL serves as both partner and problem solver for public agencies with which it works.

b. Organization Goals / Mission with Regard to NPS Control

TPL's mission is to be an effective agency partner for purposes of lining up and acquiring properties or conservation easements for property protection when NPS issues arise.

c. Current / Planned Programs to Control NPS

N/A

d. Resources Available to Control NPS

TPL can provide expertise and experience in real estate transactions, legal analysis and on the ground negotiation for acquisition of properties and conservation easements to aid in NPS pollution control. TPL can act quickly and effectively in coordination with its agency partners to implement those land conservation measures and efforts that will accomplish the agencies' goals and objectives.

e. Organization Role in Planning NPS Watershed Projects

TPL will work with OCC to identify properties that are important to NPS work and identify who owns or controls these properties. TPL will then contact and negotiate with landowners about an acquisition fee or conservation easement to reach NPS goals.

f. Principle Concerns and Priorities Regarding NPS Sources

N/A

Oklahoma Wildlife Federation (OWF)

a. Organization Constituency

OWF is a statewide organization concerned about wildlife habitat and environmental quality.

b. Organization Goals / Mission with Regard to NPS Control

OWF's mission is to preserve wildlife and its habitat for future generations, which includes good water quality.

c. Current / Planned Programs to Control NPS

Currently, OWF focuses on member education of statewide NPS problems. OWF is active statewide, but is more active on a few watersheds with high member interest. This program is performed with the aid of OCC, ODWC, OWRB, ODEQ, ODOM, and city managers. OWF, which is currently member-funded, plans to conduct watershed specific, education campaigns, as information becomes available.

d. Resources Available to Control NPS
OWF major resource is people, who can aid with NPS control.

e. Organization Role in Planning NPS Watershed Projects

OWF requests to be involve in the planning process for NPS watershed projects so they can assess whether needs can be met with their volunteer base.

f. Principle Concerns and Priorities Regarding NPS Sources

OWF requests information regarding the control of NPS so members can be informed. OWF would like zip codes by watersheds so outreach can be facilitated. OWF needs assistance with training volunteers in watershed monitoring and education about BMPs.

University of Oklahoma Health Sciences Center Department of Occupational and Environmental Health (OUHSC-OEH)

a. Agency Responsibility/Authority

OUHSC-OEH has no jurisdiction over water quality or NPS.

b. Agency Goals / Mission with Regard to NPS Control

OUHSC-OEH has no agency goals or mission regarding NPS control.

c. Current / Planned Programs to Control NPS

OUHSC-OEH has no current or planned programs to control NPS.

d. Resources Available to Control NPS

OUHSC-OEH has no resources to control NPS.

e. Agency Role in Planning NPS Watershed Projects

OUHSC-OEH would be willing to participate in designing a plan for NPS watershed projects.

f. Principle Concerns and Priorities Regarding NPS Sources

OUHSC-OEH has no priorities or needs regarding NPS sources.

Oklahoma State University Cooperative Extension Service (OCES)

a. Organization Constituency

OCES is the public service arm of the OSU Division of Agriculture and Natural Resources. As part of the Landgrant University System, OCES is affiliated with the USDA-Cooperative State Research,

Education, and Extension Service (USDA-CSREES) with educators in each of the 77 counties in Oklahoma and a system of subject-matter specialists at 10 locations around the state plus Stillwater.

b. Organization Goals / Mission with Regard to NPS Control

As part of the National Water Quality Program, OSU-CES subscribes to the seven National Extension Water Quality Goals (http://www.reeusda.gov/nre/water/stategi.htm).

c. Current / Planned Programs to Control NPS

OSU-CES has many NPS water quality education projects. Caring for Planet Earth educates the public about NPS pollution control. Eco Camp teaches youths about environmental impacts of economic development. Erosion and Sediment Control Design is a short course for engineers and other designers of urban stormwater systems affiliated with OKC-Blue Thumb project. Battle Branch Hydrologic Unit Area Project and Peacheater Creek Hydrologic Unit Area Project are NPS projects funded by USDA in cooperation with NRCS, FSA, and OCC in the Illinois River Basin. Oklahom*A*Syst educates residents about groundwater and is funded by USDA-CSREES in cooperation with OCC, ODEQ, and NRCS. 4-H Youth Water Quality Education is a youth education program funded by USDA.

OSU-CES plans to implement educational programs for minority communities in Okfuskee County in cooperation with Langston University and ODEQ. A Poultry Producer Environmental Education will be implemented in cooperation with NRCS, the poultry industry, and ODA. Other programs include a Riparian Education Program, education about septic tank maintenance and environmental impacts, and aquaculture pollution control in cooperation with Langston University.

d. Resources Available to Control NPS

N/A

e. Organization Role in Planning NPS Watershed Projects

N/A

f. Principle Concerns and Priorities Regarding NPS Sources

N/A

Oklahoma Agricultural Experiment Station (OAES), Oklahoma State University

a. Organization Constituency

OAES is the research arm of the Division of Agriculture and Natural Resources at OSU. Through the Landgrant University System, OSU participates in regional water quality projects to solve water quality problems and demonstrate technology to control NPS pollution.

b. Organization Goals / Mission with Regard to NPS Control

The mission of OAES is to conduct research and demonstration of technologies for protection and management of the natural resources of the State.

c. Current / Planned Programs to Control NPS

Currently, OAES is conducting research in a number of areas, including waste utilization for animal producing facilities, natural resource assessment technologies, approaches to accurate formulation of TMDLs, pollutant loadings from forest roads, and pollution control technologies for poultry litter management. OAES is also addressing techniques for assessing nutrient enrichment status of lotic systems and statewide assessment technologies. OAES plans to improve the concepts for watershed management and TMDL formulation.

d. Resources Available to Control NPS

N/A

e. Organization Role in Planning NPS Watershed Projects

N/A

f. Principle Concerns and Priorities Regarding NPS Sources

N/A

The University of Oklahoma (OU)

a. Agency Responsibility/Authority

None

b. Agency Goals / Mission with Regard to NPS Control

None

c. Current / Planned Programs to Control NPS

OU currently does not have any NPS programs, but there is a proposal for an environmental education project to address NPS.

d. Resources Available to Control NPS

OU has research expertise in the areas of water quality and wetlands to aid NPS control.

e. Agency Role in Planning NPS Watershed Projects

OU has an interest in watershed projects and are willing to aid with planning NPS watershed projects.

f. Principle Concerns and Priorities Regarding NPS Sources

N/A

Oklahoma Association of Conservation Districts

a. Organization Constituency:

The Oklahoma Association of Conservation Districts is a State organization made up of the 88 local conservation districts and their 445 district directors who are public officials. OACD is affiliated with the National Association of Conservation Districts (NACD) which is a national association of over 3000 conservation districts. The purpose of the association is to promote conservation in the State and provide assistance to local conservation districts. The association provides education and training opportunities for district directors, sponsors statewide conservation programs and events, provides awards for outstanding conservation activities, and participates in the legislative process to advance the cause of conservation in the State.

b. Organization Mission or Goals:

Conservation districts are one of the principal delivery systems for implementing NPS management practices. OACD has supported efforts to increase both State and federal funding for NPS management programs over the past 25 years. OACD advocates a voluntary approach to NPS management that provides landowners and land-users with education, technical assistance, and financial assistance.

c. NPS categories of authority (R) /interest (I) :

900	Domestic Waste Water lagoons	Ι
1000	Agriculture	R
1100	Non-irrigated Crop Production	R
1200	Irrigated Crop Production	R
1300	Specialty Crops	R
1400	Pasture Land	R
1500	Range Land	R
1600	Animal Operations	R
1700	Aquaculture	Ι
1800	Animal Holding/Management	R
1900	Manure Lagoon	R
2000	Silviculture	R
2100	Harvesting, Restoration, Residue Management	R
2200	Forest Management	R
2300	Road Construction /Maintenance	Ι
3000	Construction	Ι
3100	Highway/Road/Bridge	Ι
3200	Land Development	R

4000	Urban Runoff	R	
4100	Nonindustrial (permitted)	Ι	
4200	Industrial permitted	Ι	
4300	Other urban runoff	Ι	
5000	Resource Extraction	Ι	
5100	Surface Mining	Ι	
5200	Subsurface Mining	Ι	
5300	Placer Mining		
5400	Dredge Mining	Ι	
5500	Petroleum Activities	Ι	
5600	Mill Tailings		
5700	Mine Tailings	Ι	
6000	Land Disposal (Runoff or Leachate from permitted	areas)	Ι
6100	Sludge	R	
6200	Wastewater	Ι	
6300	Landfills	Ι	
6400	Industrial Land Treatment	Ι	
6500	On-Site Wastewater Systems(septic Tanks)	Ι	
6600	Hazardous Waste	Ι	
6700	Septage disposal	Ι	
7000	Hydromodification		
7100	Channelization	Ι	
7200	Dredging	Ι	
7300	Dam Construction	Ι	
7400	Flow Regulation/Modification	Ι	
7500	Bridge Construction	Ι	
7550	Habitat Modification	R	
7600	Removal of Riparian Vegetation	R	
7700	Streambank Modification/Destabilization	R	
7800	Drainage/Filling of wetlands	R	
7900	marinas		
8000	Other		
8100	Atmospheric Deposition (and Acid Rain)	Ι	
8200	Waste Storage/Storage Tank Leaks	Ι	
8300	Highway Maintenance and Runoff	Ι	
8400	Spills		
8500	In-place Contaminants		
8600	Natural		
8700	Recreational Activities		
8800	Upstream Impoundment	R	
9000	Source Unknown		

d. Current Programs to Control NPS:

OACD works cooperatively with the OCC and local conservation districts in sponsoring educational, training and field demonstrations that promote improved NPS management techniques. OACD has

promoted the establishment of a statewide conservation cost-share program to address water quality and soil erosion needs in Oklahoma. In 1998 the State legislature authorized a cost-share program and provided 1.75 million dollars of funding.

e. Planned Programs to Control NPS:

OACD will continue to work cooperatively with the OCC and local conservation districts to promote educational and training opportunities on NPS management on a statewide basis. OACD intends to promote continuing funding for the State cost-share program that will provide funds to districts to address local priorities and funds to address NPS problems in impaired watersheds.

f. Resources Available to Control NPS:

OACD will continue to promote NPS control through education and training of conservation district directors. This should improve the ability of local conservation district boards to carry out NPS programs.

g. Organization Role in Planning NPS Watershed Projects:

OACD, as a statewide organization would like to review data and provide input on the selection of priority watersheds. Local conservation districts should individually be involved in the planning and implementation of watershed projects.

h. Principle Concerns and Priorities Regarding NPS Sources:

Sediment control and nutrient management on agriculture lands are of greatest interest to OACD.

VIII. Program and Financial Management

Each State agency working within the NPS program receiving federal funds through the EPA submits an annual Quality Management Plan following EPA QA/R-2: EPA Requirements for Quality Management Plans. QMPs are drafted by each agency and submitted for review and concurrence by the Oklahoma OSE. The QMPs describe each agency's program management in detail.

Title 27A O.S.Supp. 1996, § 1-2-101 provides that the Secretary of Environment has jurisdictional areas of environmental responsibilities that include: powers and duties for environmental areas as designated by the Governor; recipient of Clean Water Act funds; and coordination of pollution control activities to avoid duplication of effort. The mission of OSE is to enhance and protect Oklahoma's environment for the benefit of its citizens through effective administration of Clean Water Act funds granted to the State of Oklahoma and coordination and promotion of the State's environmental programs and endeavors.

The OSE is the grant recipient of the Clean Water Act § 319 (h) funding for the State of Oklahoma. As the grant recipient, OSE serves as liaison between EPA Region 6 and entities (State agencies, universities, etc.) receiving 319 (h) funds. From inception of the grant, OSE handles all communications with EPA, from submitting proposed work plans, negotiations of the final work plan, submittal of deliverables, and revisions to the work plans. OSE also participates in the Nonpoint Source Working Group.

Financial responsibilities include submittal of the grant application package, financial reports, disbursement of grant funds, and grant close out. All procedures are outlined in the OSE's Standard Operating Procedure document, which is revised every two years to stay current with changes in the State.

319 grants implemented by the OCC are managed financially by the OCC comptroller. The following guidelines are used in managing those funds:

- All items charged against EPA 319 Grants must first be approved by WQ Director;
- Initials and task to be charged to must be placed on invoice for payment by WQ Director;
- Claim for payment will be audited, processed and approved by Comptroller. Appropriate task will be included with fund and account at time of processing;
- Expenditure summaries are queried at the end of each month, by task, and charged against the referenced 319 grant. A request for funds is then made;
- This summary and request for funds is reviewed by the WQ Director;
- All records and supporting documentation are maintained at the commission office until disposition authorization is provided by the appropriate agency;
- All State and federal funds are audited yearly by the Oklahoma State auditor and inspector;

• The State cost share program management is managed according to rules adopted by the OCC and on file with the Oklahoma Secretary of State.

The NPS program in Oklahoma has consistently relied on only a few sources of funding to finance its efforts. These have included 208 funds, 319(h) funds, 106 funds, and some state cost-share funds. However, a much broader array of funds are available than these few sources. Recent changes in program guidances have loosened up or otherwise increased funding such as SRF and EQIP education funding for more NPS-related issues. The State will increase its efforts to fund the NPS related efforts defined under this plan through additional sources such as EQIP, SRF, and confirmed annual state monies. Appendix C details the majority of funding sources available for water quality related programs.

Process to Evaluate and Update the Management Program

The Nonpoint Management Program serves as the guiding document for NPS pollution activities in the State. Consequently, having the ability to regularly review and revise the document is key to effective management. At a minimum, the EPA requires a thorough revision every five years, which the OCC is committed to accomplish. This revision will be drafted by the OCC, but reviewed, approved, and directed by the NPS Working Group, approved by and routed through OSE to EPA for final approval. The review and revision will be based on success towards achieving long and short-term goals of the Management Program. However, given the dynamic nature of NPS management, the OCC has incorporated several procedures to reevaluate and update the Management Program more frequently.

The OCC annually reviews the NPS program and the progress made on achieving milestones outlined in the Management Program. The progress of the NPS program is updated in the annual report. In addition, annual updates to the Management Program will be made, when necessary, to incorporate new activities and strategies. Annual work plans and the WRASs will also serve as annual supplements to the Management Program. These documents refine the specific activities that will be undertaken in a given year or in a specific watershed. More detail is provided in these documents than is contained in the Management Program that was drafted months or several years before. Furthermore, a progress report, in the form of an annual report, will be generated and submitted to the Nonpoint Source Working Group for review and evaluation. In addition to this annual review of the Management Plan by the NPS Working Group to assess the successes and failures of the program. Through constructive debate and dialogue, any warranted modifications to the Management Plan will be considered.

An additional mechanism for evaluating and updating the Management Program is through recent State legislation that requires the development of a Water Quality Standards Implementation Plan for each environmental agency. This plan is similar in purpose to the NPS Pollution Management Program in that processes and procedures utilized by the OCC and other environmental agencies are reported in an operations document. Each State environmental agency is required to draft a plan which outlines how their activities will comply with antidegradation standards, maintain water quality beneficial uses, remove threats to beneficial uses, and restore beneficial uses not being supported. Each State environmental agency is required to draft a plan by July 2001 and subsequently every three years thereafter. Since NPS pollution management activities will be addressed in these Implementation Plans, they can be used to update the Management Program. The Implementation Plans will be an important tool in developing a dynamic Management Program.

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APPENDIX A:

1998 303(d) List



Figure A. 1998 303(d) Listed Waters of Oklahoma.

Waterbody I.D.	Name					Cau	se(s)							Sc	ource	(s)				Priority	Schedule	Comments
OK121500020150	Adams Creek	500	1000	1100					5100	8500										2	2000-2003	
OK520700020080	Adams Creek	1200							6200											2	2000-2003	Beggs discharge
OK310820020140	Allen's Lake	1300							5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1994 sampling/data.
OK311510010020	Altus-Lugert Lake	1400							0006											4	2008-2010	
OK520620010100	American Horse Lake	006							0006											4	2008-2010	
OK310800020100	Arbuckle Lake	1300							8200	0006										4	2008-2010	Included from duplicate listing for Rock Creek(Arbuckle Res.)
OK520710020020	Arcadia Reservoir	200	2100						1000	4000										2	2000-2003	Clean Lakes report forthcoming.
OK120400010060	Arkansas River	006	1200						1400	1500	1600	6200								1	1998-1999	Muskogee, Ft. Howard & OG&E are located in this segment
OK120410010080	Arkansas River	200	300	1700					1500	1800	4100	4300	6500	1100	1300	1400				1	1998-1999	
OK120420010010	Arkansas River	200	300	500	1700				1500	1800	4100	4300	6500	1100	1300	1400				1	1998-1999	Metals detected in discharges
OK120420010130	Arkansas River	200	300	500	1700				1500	1800	4100	4300	6500	1100	1300	1400				1	1998-1999	Metals detected in discharges
OK220200020010	Arkansas River	1100	1200						1400	1500	1600	4100	4300	5100	7300	1100				2	2000-2003	
OK621200010010	Arkansas River	006	300						0006											2	2000-2003	
OK621200010040	Arkansas River	300	006	1100	2100				1000	8300	8500	8600								2	2000-2003	
OK621200010200	Arkansas River	100	006	1100	1600				8600	1100	1200									2	2000-2003	Oilfield pollution no longer a known problem
OK621200020010	Arkansas River	100	006	1100	1600	2100			1400	1500	7600									2	2000-2003	Oilfield pollution no longer a known problem
OK220200010010	Arkansas River	1100	1200						0006											3	2004-2007	
OK621210000030	Arkansas River	900	1100	1200	2000	2100			100	8300										3	2004-2007	
OK120410010010	Arkansas River	200	300	1700					1000	4000										4	2008-2010	
OK621210000010	Arkansas River	400	006	1100	2100				1000	4000										4	2008-2010	
OK120400010010	Arkansas River	006	1200						1400	1500	1600	6200								1	1998-1999	Muskogee, Ft. Howard & OG&E are located in this segment
OK621010010010	Arkansas River, Salt Fork	200	500	006	1100	2100			1100	0006										3	2004-2007	Oilfield pollution no longer a known problem
OK621010010160	Arkansas River, Salt Fork	100	200	900	1100	1200	1600	2100	1100	1200	1400	1500	1600	7100	7600	7700	8300			3	2004-2007	Oilfield pollution no longer a known problem
OK621010010220	Arkansas River, Salt Fork	100	200	900	1100	1600	2100		1100	1200	1400	1500	7100	7600	7700	8300				3	2004-2007	Oilfield pollution no longer a known problem
OK621000010010	Arkansas River, Salt Fork	200	500	700	900	1100	1300	2100	5500											4	2008-2010	
OK621000020010	Arkansas River, Salt Fork	500	700	2100					0006											4	2008-2010	Oilfield pollution no longer a known problem
OK410400080020	Atoka Lake	500	006	1100	2100				1100	1400	1500									3	2004-2007	Nutrients added to causes. Metals cause code moved from duplicate listing. Priority raised.

Waterbody I.D.	Name					Caus	se(s)							So	urce((s)				Priority	Schedule	Comments
OK310840020080	Baker Lake	900	1100	2100	2400				1500	7400	8300									4	2008-2010	Oilfield pollution no longer a known problem
OK121700030370	Ballard Creek	600	900	1200	2500				0006											1	1998-1999	Priority raised. Included in Illinois River project
OK220100040080	Bandy Creek	1200							6200											2	2000-2003	Included in Wister Lake project. Completion not expected by 2000. Priority lowered.
OK310830030200	Barnitz Creek	900							1100	1200	1400	1500								3	2004-2007	
OK121700020310	Baron Fork	200	900	1100					1000	1800	7400									1	1998-1999	Priority raised. Included in Illinois River project. Cause code 1100 added 1998 per OSRC input. Source codes 1800, 7400 added 1998 per AG input.
OK121700050010	Baron Fork	200	900	1100	1200	1600			1100	1300	1400	1500	1600	1800	2000	6500	7400	7600	7700	1	1998-1999	Priority raised. Included in Illinois River project. Source code 7400 added 1998 per AG input.
OK121700050170	Baron Fork	900	1100						1100	1400	1500	1600	1800	2000	6500	7400	7600			1	1998-1999	Included in Illinois River project. Cause code 1100 added 1998 per OSRC input. Source code 7400 added 1998 per AG input.
OK311200000030	Beaver Creek	1200	1500						7000	9000										3	2004-2007	
OK311210000010	Beaver Creek	500	900	1100	1200	2100			1100	1400	1500	1800	4000	7700						3	2004-2007	
OK621210000050	Beaver Creek	100	1100	2100					1500											4	2008-2010	Oilfield pollution no longer a known problem
OK121600020190	Big Cabin Creek	500							5000											4	2008-2010	
OK121600060010	Big Cabin Creek	500	1000	1100	2100				5100	8500										4	2008-2010	
OK620900020100	Big Creek	1100	2100						0006											4	2008-2010	
OK620900020110	Big Creek	100							9000											4	2008-2010	
OK410210060160	Big Eagle Creek	200	1000						1800	2000	2200	0006								1	1998 - 1999	Source codes 1800, 2000, 2200 added 1998 per USFWS input. Potential Leopard darter habitat. Priority raised.
OK121300010010	Bird Creek	200	500	1200					900	6200										2	2000-2003	
OK121300020010	Bird Creek	200	1200						900	6200										2	2000-2003	
OK520800010050	Bird Creek	1200							6200											2	2000-2003	
OK121300030010	Bird Creek	500							900											4	2008-2010	Pawhuska TMDL completed by INCOG. Priority lowered.
OK121300030290	Bird Creek	1100	2100						900											4	2008-2010	Pawhuska TMDL completed by INCOG. Priority lowered.
OK621000010130	Birds Nest Creek, Tributary	1300							5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1994 sampling/data.
OK311600020110	Bitter Creek	800	900	1300					1200	6200										3	2004-2007	Source code 6200 added 1998 per Farm Bureau input.
OK621100000100	Bitter Creek	1100	1600	2100																4	2008-2010	Oilfield pollution no longer a known problem
OK621200030010	Black Bear Creek	200	1100	1600	2100				1100	1200	1300	1400	1500	1800	7600	7700	8300	0006		2	2000-2003	Oilfield pollution no longer a known problem
OK621200030260	Black Bear Creek	100	200	1100	1600	2100			1100	1200	1300	1400	1500	1800	7600	7700	8300	0006		2	2000-2003	Oilfield pollution no longer a known problem
OK220600030020	Blue Creek	500							8500											4	2008-2010	
OK410600010010	Blue River	900	2200						1800	5000										2	2000-2003	Source code 1800 added 1998 per AG input.

Waterbody I.D.	Name					Cau	se(s)							So	ource(s)			Priority	Schedule	Comments
OK410600020010	Blue River	900	2100						1100	1300	1800								2	2000-2003	Source code 1800 added 1998 per AG input.
OK121300030300	Bluestem Reservoir	1100	2100						1500										4	2008-2010	
OK620910040140	Bluff Creek	500	1100	2100					3000	4100	4300								4	2008-2010	
OK310830030100	Boggy Creek	200							1000										4	2008-2010	
OK620910010090	Boggy Creek	100	200	600					1000	0006									4	2008-2010	
OK120410020070	Boynton Lake	006							0006										4	2008-2010	
OK220100030010	Brazil Creek	500	006	1000	2100				1100	1300	1400	1500	1600	5100					3	2004-2007	
OK410210050020	Broken Bow Lake	500	006	1100	1200	2100	2400		006	4300	8500	0006							2	2000-2003	Source/cause codes moved from duplicate listing. Mercury detected in fish. DO added to causes.
OK620900040090	Brush Creek	1100	2100						1100	1500	1800	7700							2	2000-2003	
OK220600050100	Brushy Creek	200	500	1000	1200				8500	0006									3	2004-2007	
OK220600030010	Brushy Creek	200							0006										4	2008-2010	
OK620920050010	Buffalo Creek	200							0006										4	2008-2010	
OK120400020160	Butler Creek	1100							4100	4300									4	2008-2010	
OK410100010450	Buzzard Creek (Millerton)	1200							6200										1	1998-1999	
OK410100010456	Buzzard Creek, Tributary (Millerton)	1100	1200						6200										1	1998-1999	
OK310810010150	Byars Lake	1100	2100						8600										4	2008-2010	
OK311300010020	Cache Creek, East	200	1200						006	1000									3	2004-2007	
OK311300030010	Cache Creek, East	1100	2100						1000	1100									4	2008-2010	
OK311310020020	Cache Creek, West	200							0006										4	2008-2010	
OK310800030010	Caddo Creek	200	006						1300	1400	1500	0006							3	2004-2007	
OK310800030260	Caddo Creek, tributary (S24,T2S,R3W)	1300							5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1995 sampling/data.
OK310800030270	Caddo Creek, tributary (S3,T2S,R3W)	1300							5500										4	2008-2011	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK121510020050	California Creek	200							0006										4	2008-2010	
OK520700030220	Camp Creek	200	1100	1300					1100	1500	1800	0006							4	2008-2010	
OK520700030230	Camp Creek	100							0006										4	2008-2010	
OK220600010010	Canadian River	1700							0006										2	2000-2003	
OK520610020010	Canadian River	200	006	1200					1000	1800	3200								2	2000-2003	Source code 3200 added 1998 per Farm Bureau input. Source code 1800 added 1998 per USFWS input.

Waterbody I.D.	Name					Cau	se(s)	1								So	ource	(s)				Priority	Schedule	Comments
OK520620010010	Canadian River	1700									1100	1200	1300	1400	1500	1600	1800					2	2000-2003	
OK22030000010	Canadian River	500	900	1100	2000						5000											3	2004-2007	
OK220600010119	Canadian River	100	200	900	1100	1200	1600	1700	2100		1100	1200	1400	1500	3200	6500	7100	7600	8300			3	2004-2007	Oilfield pollution no longer a known problem
OK520600010010	Canadian River	100	200	900	100	1200	1600	1700	2100		1100	1200	1400	1500	1800	3200	6500	7100	7600	8300		3	2004-2007	Oilfield pollution no longer a known problem. Source code 1800 added 1998 per USFWS input.
OK520600020010	Canadian River	100	200	900	1100	1200	1600	2100			1100	1200	1400	1500	3200	6300	6500	7100	7400	7600	8300	3	2004-2007	Oilfield pollution no longer a known problem
OK520610010010	Canadian River (Norman)	200	900	1200							1000	4000										1	1998-1999	Source code 4000 added 1998 per Farm Bureau input.
OK520710010010	Canadian River, Deep Fork	200	500	900	1100	1700	2100				1000											3	2004-2007	
OK520710020060	Canadian River, Deep Fork	200	006	1100	1700						3000	4100	4300	6500	7100	7300	7500	7600	8300	8400		3	2004-2007	
OK520600030010	Canadian Sandy Creek	200									0006											4	2008-2010	
OK410700000120	Caney Creek (Durant)	1200	1500	Γ							6200	7000										1	1998-1999	
OK121700040010	Caney Creek (Stillwell Foods)	700	1200								6200	0006										1	1998-1999	
OK121400010010	Caney River	900	1100	2100				Π		┭	1000	4000										3	2004-2007	
OK121400030010	Caney River	900	1100	1500				Π		┭	1100	1300	1400	1500	7400	7600	8300					3	2004-2007	
OK720500010020	Canton Lake	200	900	1100	2100			Π		┭	1100	1200	1400	1500								4	2008-2010	
OK121600030360	Carey Bay, Grand Lake	100	200	500	600	900	1200				1000	1100	1400	1500	1600	1800	3000	4000	5000	8500	0006	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK620900040280	Carl Blackwell Lake	1100	2100					Π		┭	1000	4000										4	2008-2010	
OK620920040070	Carmen Lake	500	006	1100	2300	2400	2500				900	1100	8500	0006								3	2004-2007	Priority lowered.
OK220100010180	Caston Creek	1200									6200											3	2004-2007	
OK121500020390	Cat Creek	1200		Γ							6200											1	1998-1999	
OK310830030070	Cavalry Creek	200	006	1100	2100						1100	1200	1400	7700								3	2004-2007	
OK310830030080	Cavalry Creek, South Fork	200	006	1100	2100						1100	1200	1400	7700								3	2004-2007	
OK121600030340	Cave Springs Branch	100	600	900	1200	2100	2200	2500			1100	1200	1400	1500	1600	1800	6200	7200				1	1998-1999	Source code 6200 (Simmons Industries) and cause code 2100 added 1998 per AG input. Priority raised. Potential Ozark cavefish habitat.
OK520700050060	Chandler Lake	900								\top	900											4	2008-2010	
OK520520000110	Cherry Creek	900	1200								900											2	2000-2003	
OK621100000010	Chickaskia River	500						Π			0006											4	2008-2010	
OK121600030220	Chigger Cove, Grand Lake	100	200	500	900	1200		Π			1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK120420020160	Childres Creek	1200	1300								5500	6200										2	2000-2003	Included in Polecat Creek TMDL completed by INCOG. Some oilfield remediation completed. Continuing salinity problem documented by INCOG. Kiefer flow increase requested.

Waterbody I.D.	Name					Cau	se(s)								Sc	ource	(s)				Priority	Schedule	Comments
OK620910040100	Chisholm Creek	500	006	1100	2100					3100	3200	4100	4300	7100	7600	0006					3	2004-2007	
OK121500010070	Chouteau Lake	200								0006											4	2008-2010	
OK121500010210	Chouteau Lake	200								0006											4	2008-2010	
OK121500020020	Chouteau Lake	200								0006											4	2008-2010	
OK121510020320	Chouteau Lake Creek	200								0006											4	2008-2010	
OK220600030060	Chun Creek	1200								6200											2	2000-2003	
OK620920020010	Cimarron River	006	1100	1200	2100					1100	1200	1600	8500								3	2004-2007	Oilfield pollution no longer a known problem
OK620900010010	Cimarron River	200	1100	1300	1700	2100				006	8600										4	2008-2010	
OK620900010080	Cimarron River	200	1100	1300	1700	2100				1000	5500	8300	0006								4	2008-2010	
OK620900010170	Cimarron River	200	1100	1300	1600	1700	1900	2100		1100	1200	1400	1500	1600	1800	5500	7600	8300	8400	0006	4	2008-2010	
OK620900020010	Cimarron River	200	1100	1300	1600	1700	1900	2100		1100	1200	1400	1500	1600	1800	5500	7600	8300	8400	0006	4	2008-2010	
OK620900030010	Cimarron River	200	1100	1300	1600	1700	1900	2100		1100	1200	1400	1500	1600	1800	5500	7600	8300	8400	0006	4	2008-2010	
OK620910010010	Cimarron River	1100	2100							1100	1200										4	2008-2010	Oilfield pollution no longer a known problem
OK620910020010	Cimarron River	1100	2100							1100	1200										4	2008-2010	Oilfield pollution no longer a known problem
OK620920010010	Cimarron River	1100	2100							1100	1200	1800									4	2008-2010	Oilfield pollution no longer a known problem. Source code 1800 added 1998 per USFWS input.
OK620920030010	Cimarron River	1100	2100							1100	1200										4	2008-2010	Oilfield pollution no longer a known problem. Source code 1800 added 1998 per USFWS input.
OK410400020010	Clear Boggy Creek	200	900	1100	2100					1100	1300	1400	1500	4100	4300	0006					3	2004-2007	
OK410400040010	Clear Boggy Creek	200	900	1100	2100					1100	1300	1400	1500	4100	4300	0006					3	2004-2007	
OK621200010270	Cleveland Lake	900	1100	2100						900											4	2008-2010	
OK310830030280	Clinton Lake	1100	2100	2400						1100	1200	1400	1500	5500	7700						4	2008-2010	
OK120410010100	Cloud (Cane) Creek	200	900							1100	1400	1500	1800	4100	4300	0006					3	2004-2007	
OK120410020010	Cloud (Cane) Creek	200	006							0006											3	2004-2007	
OK220600020010	Coal Creek	900	1200							1100	1500	4100	4300								2	2000-2003	
OK121500010100	Coal Creek	100								0006											4	2008-2010	
OK520700010140	Coal Creek	500								8500											4	2000-2003	Henryetta TMDL completed by ODEQ. Priority lowered.
OK410400030090	Coal Creek, Tributary	1300								5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1993 sampling/data.
OK410400060040	Coalgate Municipal Lake	900	1100	2100	2200	2500				006	1000										3	2004-2007	Priority raised.

Waterbody I.D.	Name					Cau	se(s)							Sc	ource	(s)				Priority	Schedule	Comments
OK310830060010	Cobb Creek	900	1100	2100					1100	1200	1300	1400	1500	1800	8300					3	2004-2007	Fort Cobb project. Source code 1800 added 1998 per BuRec input.
OK310830060050	Cobb Creek	200	006	1100	2100				1100	1200	1300	1500	7100	8300	0006					3	2004-2007	Oilfield pollution no longer a known problem. Fort Cobb project
OK121400010040	Collinsville Lake	100							9000											4	2008-2010	
OK311310020190	Comanche Lake	900	1100	2100					0000											4	2008-2010	
OK120400010400	Coody Creek	100	1300						0006											4	2008-2010	
OK121400050020	Copan Lake	2100							1000											4	2008-2010	
OK620900010140	Cottonwood Creek	200	1200						100	1600	4000									3	2004-2007	
OK620910010050	Cottonwood Creek	200	1200						1000	4000										3	2004-2007	
OK620910040010	Cottonwood Creek	200	1200						1100	1200	1400	1500	1600	1800	4100	4300				3	2004-2007	
OK121600030500	Council Cove, Grand Lake	200	500	100	1100				1000	3000	4000	5000	8300							1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121600030260	Courthouse Hollow Cove, Grand Lake	200	500	006	100		1200		1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK520610010230	Cow Creek	1200							6200											2	2000-2003	OKC South Canadian plant is on this stream
Ok621200030340	Cow Creek	900	1100	1600	2100	2400			900	1000	1100	1400	4300	7600	7700					2	2000-2003	Corrected name. Not Perry Lake
OK311200000060	Cow Creek	100	200	006	1200				1000	9000										3	2004-2007	
OK621200030340	Cow Creek	900	1100	2100					1000											3	2004-2007	
OK310830060130	Crowder Lake	900	1200	2100					1000											3	2004-2007	Added 1998 based on OWRB assessment
OK520520000060	Crutcho Creek	100							0006											4	2008-2010	
OK520520000070	Crutcho Creek	100							0006											4	2008-2010	
OK520520000090	Crutcho Creek	100							0006											4	2008-2010	
OK520520030270	Crutcho Creek	100	500						9000											4	2008-2010	
OK720500010260	Crystal Beach Lake	900	2100	2200					4100	4300										4	2008-2010	
OK620900020120	Cushing Lake	100	2100	2400					1100	1400	1500									3	2004-2007	Priority raised.
OK311310030040	Deep Red Creek	200	1100	2100					0006											4	2008-2010	
OK220600020080	Deer Creek	900	1600						1000											2	2000-2003	
OK520620010080	Deer Creek	900	1100						1100	1300	1400	1500	1800							2	2000-2003	Source code 1800 added 1998 per USFWS input.
OK520620060010	Deer Creek	900	1100						1100	1300	1400	1500	1800							2	2000-2003	Source code 1800 added 1998 per USFWS input.
OK621000010100	Deer Creek	900	1100	2100					1000											3	2004-2007	

Waterbody I.D.	Name					Cau	se(s)								So	ource	(s)				Priority	Schedule	Comments
OK621000040010	Deer Creek	006	1100							1100	1400	1500									3	2004-2007	
OK620910040120	Deer Creek	2100								0006											4	2008-2010	
OK121600030300	Dilar Cove	100	200	500	600	900	1000	1200		1000	1100	1400	1500	1600	1800	3000	4000	5000	8500	0006	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121300010140	Dirty Butter Creek	1600								7600											4	2008-2010	
OK120400020010	Dirty Creek	200								0006											2	2000-2003	
OK120400010020	Dirty Creek (Checotah)	200	500	1000						0006											2	2000-2003	
OK120400020030	Dirty Creek, South Fork	100	500	800						8500											4	2008-2010	
OK121500020360	Dog Creek (Claremore & others)	006	1600							5000											1	1998-1999	
OK121500040010	Dog Creek (Claremore & others)	006								0006											1	1998-1999	
OK31120000080	Dry Creek	1600	2100							0006											4	2008-2010	
OK520700040020	Dry Creek	200								0006											4	2008-2010	
OK621000040080	Dry Creek, Tributary	1300								5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK620910060140	Dry Salt Creek	1200								6200											2	2000-2003	
OK621100000030	Duck Creek	200								0006											4	2008-2010	
OK121600030080	Duck Creek Cove, Grand Lake	100	500	006	1000	1200				1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK620920040010	Eagle Chief Creek	200	006	1100	1600	2100				1100	1200	1400	1500	1600	0006						3	2004-2007	
OK121600030350	Echo Bay, Grand Lake	100	200	500	600	006	1200			1000	1100	1400	1500	1600	1800	3000	4000	5000	0006		1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121400040020	Eliza Creek	200								0006											4	2008-2010	
OK311500030120	Elk City Lake	2100								006											4	2008-2010	
OK311500010100	Elk Creek	100	1100	2100						0006											4	2008-2010	Elk City WLA completed by ODEQ.
OK311500030030	Elk Creek	100								8400											4	2008-2010	
OK520810000100	Elk Creek	500								0006											4	2008-2010	
OK120400020190	Elk Creek (Checotah)	200								0006											2	2000-2003	
OK620910050070	Elmer Lake	900	1100	2100						0006											4	2008-2010	
OK310810030060	Elmore City Lake	1100	2100							1100	1300	1400	1500								4	2008-2010	
OK121600050070	Eucha Lake	006								1000	1600										1	1998-1999	Source codes 1000, 1600 added 1998. Priority raised. Potential Ozark cavefish habitat.
OK220600010020	Eufaula Lake	1500								7400											4	2008-2010	

Waterbody I.D.	Name				Сац	ise(s)								Sc	ource	e(s)			Priority	Schedule	Comments
OK220600010050	Eufaula Lake, Canadian River Arm	2100 1100							1100	1400	1500								4	2008-2010	
OK520500010020	Eufaula Lake, Canadian River Arm, (LWR)	1200 1100	2100						1100	1400	1500								4	2008-2010	
OK220600010090	Eufaula Lake, Mill Creek Arm	600 100	006	1100	2100				1100	1400	1500								4	2008-2010	Oilfield pollution no longer a known problem
OK720500020220	Evans Chambers Lake	1600 1100	2100						1100	1200	1400	1500	4100	4300					4	2008-2010	
OK720500010280	Field Station Lake	2100 900	2200						1100	1200	1400	1500	4100	4300					4	2008-2010	
OK310830060080	Fivemile Creek	1100 900	2100						1100	1200	1300	1400	1500	7100	7600	8300			3		2004 - 2007
OK121600070110	Fivemile Creek	1200 900							1100	1500	1600	1800							1	1998 - 1999	Priority raised 1998. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK310800030260	Flag Creek	1900							5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK121600010240	Flat Rock Bay Ft. Gibson Lake	300							8500										4	2008-2010	
OK121300010120	Flat rock Creek	1600							7600										4	2008-2010	
OK121700060010	Flint Creek	500 200	600	006	1100	1200	1700		1100	1400	1500	1600	1800	6500	7600	0006			1	1998-1999	Included in Illinois River project. Cause code 1100 added 1998 per OSRC input.
OK310830060020	Fort Cobb Reservoir	2100 200	2600						006	100									3	2004-2007	Priority raised. Fort Cobb project
OK121600010050	Fort Gibson Lake	300 200	500	900	1100				1100	1200	1400	1500	4000	4300	6500	8500			4	2008-2010	
OK121600010200	Fort Gibson Lake, Upper	300							8500										4	2008-2010	
OK720500030010	Fort Supply Lake	2100 1100							006	4300									4	2008-2010	Priority lowered. Impairment may be due to natural conditions.
OK720500030020	Fort Supply Lake	500 200	900	1100					1100	1200	1500	0006							4	2008-2010	Priority lowered. Impairment may be due to natural conditions.
OK310840010020	Foss Reservoir	1300 200	2100						1000	0006									4	2008-2010	Cause code 1300 & source code 9000 added 1998 per Farm Bureau & BuRec input.
OK220100040010	Fourche Maline Creek	006							1300	1400	1500	1600							2	2000-2003	Included in Wister Lake project. Completion not expected by 2000. Priority lowered.
OK121500030070	Fourmile Creek (Oolagah)	1200							006	6200									1	1998-1999	
OK311310030120	Frederick Lake	2100							1000										4	2008-2010	
OK310810040050	Fuqua Lake	500							0006										4	2008-2010	
OK220600040010	Gaines Creek	500 200	1000	1100	2100				5100	8500									2	2000-2003	
OK410100010460	Garland Creek (Weyerhauser)	1200							6200										2	2000-2003	
OK410300010020	Gates Creek	2200 900							0006										3	2004-2007	
OK410300010030	Gates Creek	006							0006										3	2004-2007	
OK520700010080	Gentry Creek	1100 900	2100						1100	1400	1500								3	2004-2007	
OK120400020110	George's Fork	900							6200										2	2000-2003	

Waterbody I.D.	Name					Cau	se(s)							So	ource	(s)					Priority	Schedule	Comments
OK310820020130	Gladys Creek	100							8500	0006											4	2008-2010	Added from duplicate listing for Lower Gladys Creek
OK410210080010	Glover Creek, Middle	900	100	2200					1100	1400	1500	1600	1800	2200	5400	8100					1	1998 - 1999	Source codes 1800, 2200, 5400 added 1998 per USFWS input. Priority raised. Potential Leopard darter habitat.
OK410210010020	Glover River	1000							1800	2200	5400	0006									1	1999 - 1999	Source code 5400 added 1998 per USFWS input. Priority raised. Potential Leopard darter habitat.
OK311310020200	Grama Lake	006	2200	2400					0006												4	2008-2010	
OK621010010020	Great Salt Plains Lake	200	500	006	1100	2100			1100	1200	1400	1800	8300								4	2008-2010	Source code 1800 added 1998 per USFWS input.
OK120400010130	Greenleaf Lake	100	006						0006												4	2008-2010	
OK620910040060	Guthrie Lake	2100							0006												4	2008-2010	
OK620910030220	Hackberry Creek	1200							6200												2	2000-2003	Waukomis discharge
OK311600020170	Hall Lake	100							0006												4	2008-2010	
OK311100010130	Hauani Creek	1100							0006												4	2008-2010	
OK311100010140	Hauani Lake	2100							1100	1400	1500										4	2008-2010	
OK311800000040	Haystack Creek	900	1100	1600	2100				1100	1200	1400	1500									3	2004-2007	
OK311100030130	Healdton City Lake	100	200	900	1100	2100			1000	1400	1500	8300									4	2008-2010	Added from duplicate listing for Healdton Lake
OK620910040200	Hefner Lake	200	006						1000												4	2008-2010	
OK311210000080	Hell Creek	1100	1600	2100					1100	1300	1400	1500									4	2008-2010	
OK120420020300	Heyburn Reservoir	300	500	1100	1300	2100			900	1000											3	2004-2007	
OK311100010160	Hickory Creek	200	006						1100	1400	1500	0006									3	2004-2007	
OK311100020010	Hickory Creek	200	900						1100	1400	1500	0006									3	2004-2007	
OK520700030270	Hillbilly Creek	1200							6200												1	1998-1999	Added 1998. Potential impacts from Paden discharge due to UAA results
OK311500030060	Hobart Lake (Rocky Hobart)	900	1100	2100					1100	1200	1400	1500									4	2008-2010	
OK520810000030	Hog Creek	500							0006												4	2008-2010	
OK121300040070	Hominy Creek	200							0006												4	2008-2010	
OK121600030170	Horse Creek Cove	200	500	006	1000				1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700		1	1998-1999	Included in Grand Lake project. Afton TMDL completed. Potential Ozark cavefish habitat.
OK410210010060	Horse Head Creek	100							1800	2200	0006										1	1998-1999	Cause codes 1800, 2200 added 1998 per USFWS input. Priority raised. Potential Ouachita rock- pocketbook, Winged mapleleaf habitat.
OK121600040040	Hudson Creek (Fairland)	1200	2200						6200												1	1998-1999	
OK121600020020	Hudson Lake, Lower	500	100	1100					5100	8500											4	2008-2010	
OK121600020140	Hudson Lake, Upper	500	1000	1100					5100	8500											4	2008-2010	

Waterbody I.D.	Name					Cau	se(s)								So	ource	(s)					Priority	Schedule	Comments
OK410300020020	Hugo Lake	006	1100	2100	2400					1100	1400	1500	2300									4	2008-2010	
OK121400030020	Hulah Lake	500	2100							0006												3	2004-2007	
OK121700020010	Illinois River	1100	1200	1500						006	7400											1	1998-1999	Included in Illinois River project. Cause code 1100 added 1998 per OSRC input.
OK121700020210	Illinois River	1100	1200	1500						006	7400											1	1998-1999	Included in Illinois River project. Cause code 1100 added 1998 per OSRC input.
OK121700020300	Illinois River	500	900	1100	1200					1100	1300	1400	1500	1600	1800	3100	3200	6500	7400	0006		1	1998-1999	Priority raised. Included in Illinois River project
OK121700030010	Illinois River	500	900	1100	1200					1100	1300	1400	1500	1600	1800	3100	3200	6500	7400	0006		1	1998-1999	Priority raised. Included in Illinois River project
OK121700030080	Illinois River	500	900	1100	1200					1100	1300	1400	1500	1600	1800	3100	3200	6500	7400	0006		1	1998-1999	Priority raised. Included in Illinois River project
OK121700030280	Illinois River	500	900	1100	1200					1100	1300	1400	1500	1600	1800	3100	3200	6500	7400	0006		1	1998-1999	Priority raised. Included in Illinois River project
OK121700030350	Illinois River	900	1100	1200	2200					006	1100	1300	1400	1500	1600	1800	3100	3200	6500	7300	7400	1	1998-1999	Priority raised. Included in Illinois River project
OK121700010010	Illinois River	1200	1500							006	7400											2	2000-2003	Priority lowered. Segment below Lake Tenkiller
OK121500020110	Inola Creek	1200								6200												2	2000-2003	Inola discharge
OK310820010160	Ionine Creek	900	1100	2100						1100	1500	1800	7700									3	2004-2007	
OK310820010200	Ionine Creek, East	900	1100	2100				\Box		1100	1200	1400	1500	1800	7700							3	2004-2007	
OK310820010210	Ionine Creek, West	900	1100	2100						1100	1200	1400	1500	1800	7700							3	2004-2007	
OK310820010160	Ionine River	900	1600	2100						1100	1500	1800	7700									3	2004-2007	
OK410310010020	Jackfork Creek	200	900					$\left[\right]$		1000	1800											1	1998-1999	Cause code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK121600010150	Jackson Bay, Ft. Gibson Lake	200	300	900	1100			\square		1100	1200	1400	1500	4300	6500	8500						4	2008-2010	
OK311200000140	Jap Beaver Lake	2100						\square		0006												4	2008-2010	
OK310800030140	Jean Neustadt Lake	2400								006												4	2008-2010	
OK621210000020	Kaw Lake (Arkansas River)	200	900	1100	1200	2100	2600	\square		100	1400	1500	5500									4	2008-2010	
OK621210000040	Kaw Lake, Arkansas River Arm	900	1100	1200	1400	1500	1600	2000	2200	1100	1400	1500	7400	8300								4	2008-2010	Oilfield pollution no longer a known problem
OK621210000060	Kaw Lake, Beaver Creek Arm	900	1100	1200	1400	1500	1600	2000	2200	1100	1400	1500	7400	8300								4	2008-2010	Oilfield pollution no longer a known problem
OK121400010320	Keeler Creek (Ochelata)	1100	1200							6200												1	1998-1999	
OK620900010020	Keystone Lake	300	500	2100						0006												3	2004-2007	
OK621200010020	Keystone Lake	300	900	1100	1200	1400	1500	2100		1100	1200	1400	1500	7400	8300	8500						3	2004-2007	Oilfield pollution no longer a known problem
OK621200010050	Keystone Lake, Arkansas	300	900	1100	1200	1300	1400	1500	2100	1100	1200	1400	1500	5500	7400	8300	8500					3	2004-2008	
OK620900010090	Keystone Lake, Cimarron	1100	1200	1400	1600	2100				1100	1200	1400	1500	7100	7400	7600	8300	8600				3	2004-2009	Oilfield pollution no longer a known problem

Waterbody I.D.	Name					Cau	se(s)							So	ource	(s)					Priority	Schedule	Comments
OK410300010010	Kiamichi River	900	1000	2100	2200	2600			1100	1400	1500	1800	8100								1	1998 - 1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK410300020010	Kiamichi River	900	100	1100	2100				1100	1400	1500	1800	8100								1	1998 - 1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK410310010010	Kiamichi River	1000							1800	8100											1	1998 - 1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK410310020010	Kiamichi River	1000							1800	8100											1	1998 - 1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK620910020020	Kingfisher Creek	006	1100	2100					1000												2	2000-2003	
OK720500020130	Kiowa Creek	200							1000												4	2008-2010	
OK121300010040	Knudson Creek	100							0006												4	2008-2010	
OK310830060040	Lake Creek	100	200	006	1100	1600	2100		1100	1200	1300	1400	1500	1800	7100	7600	8300				3	2004-2007	Priority raised. Fort Cobb project. Source code 1800 added 1998 per BuRec input.
OK311510010040	Lake Creek	006	1100	2100					1000												4	2008-2010	
OK410400040170	Lake Creek	200	1100	2100					3200	4100	4300	0006									4	2008-2010	
OK121600030020	Lake O' the Cherokees (Grand)	200	500	900	1000	1200	2400		1000	1100	1400	1600	1800	3000	4000	4300	5000	6500	8500	8700	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121600030060	Lake O' the Cherokees (Grand)	200	500	006	1000	1200			1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700		1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121600030380	Lake O' the Cherokees (Grand)	200	500	1000	1100				3000	4000	5000	8500									1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121600030290	Lake O' the Cherokees, Honey Creek	100	600	900	1200	2200			1100	1400	1500	1600	1800	6200	0006						1	1998-1999	Priority raised. Included in Grand Lake project. Source code 6200 (Simmons Industries) and cause code 2200 added 1998 per AG input. Potential Ozark cavefish habitat.
OK121600030150	Lake O' the Cherokees, Lower Middle	200	500	900	100	1200			1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700		1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121600030280	Lake O' the Cherokees, Middle	100	200	500	600	900	1000		1000	1100	1400	1500	1600	1800	3000	4000	5000	8500	0006		1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121600040020	Lake O' the Cherokees, Neosho	200	500	1000	1100				1000	1100	1400	1500	3000	4000	5000	8500					1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121510010130	Lightning Creek	900	1100						1100	1400	1500	5100									3	2004-2007	
OK311210000050	Little Beaver Creek	200	900	1100	2100				1100	1200	1300	1400	1500	1800	7700	9000					3	2004-2007	
OK121600060080	Little Cabin Creek (Welch)	500	1000	1100	2100				5100	8500											2	2000-2003	
OK121400020140	Little Caney River	1100	2100						1000												4	2008-2010	
OK121400050010	Little Caney River	1100	1600	2100					1100	1300	1400	1500	7600	7700	8300						4	2008-2010	
OK520620060040	Little Deep Fork	1200							6200												2	2000-2003	
OK520700060010	Little Deep Fork Creek (Bristow & Depew)	200	900	1100	1200				1100	1300	1400	1500	4100	4300	6200						1	1998-1999	Oilfield pollution no longer a known problem
OK121500040030	Little Dog Creek	500	1000	1100	2100				500												1	1998-1999	
OK311500030050	Little Elk Creek (Hobart Lake)	006	1100	2100	2200				1100	1200	1400	1500									3	2004-2007	

Waterbody I.D.	Name					Cau	se(s)							So	urce(s)			Priority	Schedule	Comments
OK121600070120	Little Fivemile Creek	900	1200						1100	1500	1600	1800							1	1998 - 1999	Priority raised. Potential Ozark cavefish habitat.
OK121610000160	Little Pryor Creek	500	100	1100	2100				5100	8500									4	2008-2010	
OK410200010010	Little River	1000							1800	2000	8100	0006							1	1998 - 1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK410210020010	Little River	200	900	1000	1100	2100			1800	2000	8100	0006							1	1999 - 1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK520800010010	Little River	200	2600						0006										4	2008-2010	
OK520800010090	Little River	200							0006	6300									4	2008-2010	
OK520810000080	Little River	500							0006										4	2008-2010	
OK620900040050	Little Stillwater Creek	1100	2100						1100	1500	1800	7700							4	2008-2010	
OK520500020090	Little Wewoka Creek	1600	2100						0006										4	2008-2010	
OK311300030010	Liverty Lake, East Cashe Creek	900	2200						0006										4	2008-2010	
OK121600010170	Long Bay, Ft. Gibson Lake	200	300	006	1100				1100	1200	1500	4300	6500	8500					4	2008-2010	
OK310820020070	Louis Burtschi Lake	900							0006										4	2008-2010	
OK410210070010	Lukfata Creek	200	1000						1800	8100	0006								1	1998-1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK121600040100	Lytle Creek	1200							6200										1	1998-1999	Added 1998. Potential impacts from Picher discharge due to UAA results
OK121520010130	Madden (Lightening Creek)	900	1100						1000										3	2004-2007	
OK520620010010	Mark Creek	1700							1600										4	2008-2010	
OK410400020020	Mayhew Creek (Boswell)	900							6200										2	2000-2003	
OK220600020030	McAlester Lake	200	1100	2100					1100	1400	1500								4	2008-2010	
OK310820020110	McCarty Creek	1300							5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1994 sampling/data.
OK410400050280	McGee Creek	500							0006										3	2004-2007	
OK311300040060	Medicine Creek	500							8500										4	2008-2010	
OK621010030010	Medicine Lodge River	200	1100	2100					0006										4	2008-2010	
OK520700040370	Meeker Lake	2000	2100	2200					0006										4	2008-2010	
OK520610010200	Merkle Creek	100	200	900	1100	1600	2200		1100	4100	4300	7600	7700	8500					3	2004-2007	Oilfield pollution no longer a known problem
OK220600010100	Mill Creek	100	600	900	1100	2100			1100	1400	1500								3	2004-2007	Oilfield pollution no longer a known problem
OK410400040090	Mill Creek, tributary (S29,T2N,R7E)	1300							5500										4	2008 - 2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK410600010300	Mineral Bayou (Durant)	1200							6200										1	1998-1999	

Waterbody I.D.	Name					Cau	se(s)							So	ource(s)	 	 _	Priority	Schedule	Comments
OK121300010030	Mingo Creek	500							0006										4	2008-2010	
OK121300010030	Mingo Creek (unlisted trib.)	100	500						0006										4	2008-2010	
OK220100010170	Morris Creek (Howe)	1200							6200										1	1998-1999	
OK520700020290	Morris Lake	2100							0006										4	2008-2010	
OK410210040010	Mountain Fork River, Lower	1000							1800	8100									1	1998-1999	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK410210050010	Mountain Fork River, Middle	200	1000	1100	1200	2100			1800	2000	8100	9000							1	1998-2000	Source code 1800 added 1998 per USFWS input. Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.
OK410210060010	Mountain Fork River, Upper	200	1000						1800	2200	8100	0000							1	1998-2001	Source codes 1800,2200 added 1998 per USFWS input. Priority raised. Potential Leopard darter habitat.
OK311100010280	Mud Creek	200	1200	1300	2100				0000										3	2004-2007	
OK311100040010	Mud Creek	200	1100	2100					1100	1300	1400	1500	0006						4	2008-2010	Oilfield pollution no longer a known problem
OK410200010210	Mud Creek	100	1000						0006										4	2008-2010	
OK220600050060	Mud Creek , Trib (Krebs)	1200							6200						\Box				2	2000-2003	
OK410400050010	Muddy Boggy Creek	200	900	1700					1100	1300	1400	1500	1800	9000					3	2004-2007	
OK410400010070	Muddy Boggy River	200	900	1700					0006					\square					3	2004-2007	
OK121600060040	Mustang Creek	1200							7200					\square					2	2000-2003	Ketchum discharge
OK121600030010	Neosho (Grand) River	900	1200						1100	1400	1600	1800	6500	8700					1	1998-1999	Included in Grand Lake project. Potential Neosho madtom, Winged mapleleaf habitat.
OK121600030050	Neosho (Grand) River	900	1200						1100	1400	1600	1800	6500	8700	\Box				1	1998-1999	Included in Grand Lake project. Potential Neosho madtom, Winged mapleleaf habitat.
OK121600030140	Neosho (Grand) River	900	1200						1100	1400	1600	1800	6500	8700					1	1998-1999	Included in Grand Lake project. Potential Neosho madtom, Winged mapleleaf habitat.
OK121600030270	Neosho (Grand) River	100	600	900	1200				1100	1400	1500	1600	1800	0006					1	1998-1999	Included in Grand Lake project. Potential Neosho madtom, Winged mapleleaf habitat.
OK121600030370	Neosho (Grand) River	200	300	500	900	1100	1200		1100	1400	1500	8500			\Box				1	1998-1999	Included in Grand Lake project. Potential Neosho madtom, Winged mapleleaf habitat.
OK121600030430	Neosho (Grand) River	500	100	1100					8500						\Box				1	1998-1999	Priority omitted in 1996. Included in Grand Lake project. Potential Neosho madtom, Winged mapleleaf habitat.
OK121600040010	Neosho (Grand) River	500	1100	1200					1100	1400	1500	8500		\square					1	1998-1999	Potential Neosho madtom, Winged mapleleaf habitat.
OK121600010040	Neosho (Grand) River	200	300	006	1100				1100	1200	1400	1500	4300	6500	8500				4	2008-2010	Priority lowered. Located in Ft. Gibson segment, not Grand Lake
OK121600010190	Neosho (Grand) River	300	1200						6200	8500				\square					4	2008-2010	Priority lowered. Located in Ft. Gibson segment, not Grand Lake
OK121600010280	Neosho (Grand) River	300	1200						6200	8500				\square					4	2008-2010	Priority lowered. Located in Ft. Gibson segment, not Grand Lake
OK121600020010	Neosho (Grand) River	500	1000	1100	1200				5100	8500				\square		T			4	2008-2010	Priority lowered. Located in Hudson Lake segment, not Grand Lake
OK121600020130	Neosho (Grand) River	500	1000	1100	1200				5100	8500						Τ			4	2008-2010	Priority lowered. Located in Hudson Lake segment, not Grand Lake
OK121600020170	Neosho (Grand) River	1200							7400					\square					4	2008-2010	Priority lowered. Located in Hudson Lake segment, not Grand Lake

Waterbody I.D.	Name					Cau	se(s)									So	ource	(s)			Priori	ty	Schedule	Comments
OK621210000220	Newkirk Country Club Lake	900	1100	1200	1600	2200	2400				006	1000	4300	8000	8500						2		2000-2003	
OK121500020130	Newt Graham Lake	500	1000	1100	2100			Π			5100	8500									4		2008-2010	
OK121500030020	Newt Graham Lake	500	1000	1100	2100						5100	8500									4		2008-2010	
OK121600010180	North Bay, Ft. Gibson Lake	200	300	900	1100						1100	1200	1400	1500	4300	6500	8500				4		2008-2010	
OK410400050120	North Boggy Creek	2100									900										4		2008-2010	
OK520510000010	North Canadian River	100	200	900	1100	1200	1600	2100	2500	0058	1100	1200	1400	1500	7600	8300					2		2000-2003	Oilfield pollution no longer a known problem
OK520510000110	North Canadian River	100	200	900	1100	1200	1600	1700	2100		1100	1200	1400	1500	4100	4300	7600	8300			2		2000-2003	Oilfield pollution no longer a known problem
OK520500010010	North Canadian River	200	900	1100	1200	2100					1100	1200	1400	1500							3		2004-2007	
OK720500010010	North Canadian River	200	900	1100	1200	2100					1100	1200	1400	1500							3		2004-2007	
OK720510000010	North Canadian River	100	200	900	1900	2100	2500				9000										3		2004-2007	
OK520520000010	North Canadian River (Metro OKC)	100	900	1200	1700						1000	4100	4300	6200							1		1998-1999	
OK520530000010	North Canadian River (Metro OKC)	900	1200								1000	1200	1400	6200							1		1998-1999	
OK620910040260	Northwood Lake	200	900	1100	2100						1100	1200	1400	1500	1600	3100	3200	6500			4		2008-2010	
OK621200030190	Oak Creek (Glencoe)	1200									6200										2		2000-2003	
OK311100030130	Oil Branch Creek, Tributary	1300									8400										4		2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK520700020290	Okemah Lake	1100	2100								9000										4		2008-2010	
OK520700010290	Okmulgee Creek	100	700	1600	1900						4100	6200	7100	8500							4		2008-2010	
OK620930000040	Old Settlers Irrigation Ditch	1300									1200										4		2008-2010	
OK121510010020	Oologah Lake	200	1100	2100							1100	1400	1500								2		2000-2003	
OK720510000030	Optima Lake	2100									900	1000	1800								4		2008-2010	Source codes 1000, 1800 added 1998 per USFWS input.
OK311500010080	Otter Creek	200									0006										4		2008-2010	
OK410300020220	Ozzie Cobb Lake	1100	2100								1400	1500									4		2008-2010	
OK121600060240	Pawpaw Creek	500	100	1100	2100						5100	8500									4		2008-2010	
OK121500020100	Pea Creek	1200									6200										2		2000-2003	Inola discharge
OK121700050120	Peacheater Creek	006									1300	1400	1500	1600	1800	2000	6500	7600			1		1998-1999	Included in Illinois River project
OK621200030350	Perry Lake	006	1100	2100							1100	1400	1500								2		2000-2003	
OK220600040040	Pit Creek (P & K Coal Mines & other past mining activity)	500	100								5000	5100	8500								3		2004-2007	Priority lowered. Extensive data collection needed.

Waterbody I.D.	Name					Cau	se(s)								So	ource	(s)			Priority	Schedule	Comments
OK120420010040	Polecat Creek	200	500	800						1100	1300	1400	1500							4	2008-2010	Oilfield pollution no longer a known problem. Polecat Creek TMDL completed by INCOG. Channel improvements and highway construction completed. Sludge management plan implemented by Sapulpa. Priority lowered.
OK120420020010	Polecat Creek	200	500	800						1100	1300	1400	1500							4	2008-2010	Oilfield pollution no longer a known problem. Polecat Creek TMDL completed by INCOG. Channel improvements and highway construction completed. Sludge management plan implemented by Sapulpa. Priority lowered.
OK120420020050	Polecat Creek	200	500	800						1100	1300	1400	1500							4	2008-2010	Oilfield pollution no longer a known problem. Polecat Creek TMDL completed by INCOG. Channel improvements and highway construction completed. Sludge management plan implemented by Sapulpa. Priority lowered.
OK120420020290	Polecat Creek	200								1200	1400	1500								4	2008-2010	Oilfield pollution no longer a known problem. Polecat Creek TMDL completed by INCOG. Channel improvements and highway construction completed. Sludge management plan implemented by Sapulpa. Priority lowered.
OK520610010210	Pond Creek	1200								6200										2	2000-2003	
OK220100020010	Poteau River	500	006	1100	1200	2000	2100	2200		1100	1300	1400	1500	1600	6200	8300	8400			2	2000-2003	Included in Wister Lake project. Completion not expected by 2000. Priority lowered.
OK220100010010	Poteau River (Poteau)	500	1100							0006										4	2008-2010	Poteau TMDL approved by EPA. Basis for other listings not determined. Priority lowered.
OK310800030260	Pretty Branch Creek	1300								5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited sampling/data over 5 years old.
OK310800030270	Pretty Branch Creek, Tributary	1300								5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited sampling/data over 5 years old.
OK121610000010	Pryor Creek	200	300	006	1200					4100	4300	8500	0006							3	2004-2007	
OK121610000050	Pryor Creek	200	300	900	1200					4100	4300	8500	0006							3	2004-2007	
OK121610000150	Pryor Creek, Upper	500	1000	1100	2100					5100	8500									4	2008-2010	
OK520610030040	Purcell Lake	900	1200							1000										3	2004-2007	Added 1998 based on OWRB assessment
OK520700040360	Quapaw Creek, South	100								0000										4	2008-2010	
OK310840010060	Quartermaster Creek	1100	1300	2100						1200	1400	1500	1800							4	2008-2010	Cause code 1300 added 1998 per Burec input. Foss Lake tributary.
OK310830020060	Rainy Mountain Creek	900	2100							1000										3	2004-2007	
OK410300010040	Raymond Gary Lake	2400								0006										4	2008-2010	
OK121300010110	Recreation Lake	1100								0006										4	2008-2010	
OK311100010010	Red River	200	1700							0006										4	2008-2010	
OK311100010190	Red River	200	006	1100	2100					1100	1200	1400	0006							3	2004-2007	
OK410100010010	Red River, below Garland (Weyerhauser)	1200								6200										3	2004-2007	
OK311800000010	Red River, Elm Fork	200	006	1100	2100					1100	1200	1500	0006							3	2004-2007	
OK311500010020	Red River, North Fork	200	500	900	1100	2100				1100	1200	1400	0006							3	2004-2007	

Waterbody I.D.	Name					Cau	se(s)							So	ource	(s)			Priority	Schedule	Comments
OK311510010010	Red River, North Fork	200	006						1100										3	2004-2007	
OK311600020010	Red River, Salt Fork	900	1100	1600	2100				1100	1200	1400	1500							4	2008-2010	
OK621200050010	Red Rock Creek	200							0006										4	2008-2010	
OK220200020020	Robert S. Kerr Lock & Dam	2100							1000	0006									4	2008-2010	Source code 1000 added 1998 per USFWS input.
OK310800020122	Rock Creek	006	1100	2100					1500	3200	3100	4300	6500						3	2004-2007	Oilfield pollution no longer a known problem
OK121600020180	Rock Creek	500	1000	1100					5100	8500									4	2008-2010	
OK310800010012	Rock Creek	1300							0006										4	2008-2010	
OK310810030040	Rock Creek (Elmore City Lake)	1100	2100						1000										4	2008-2010	
OK310810010090	Rush Creek	200	1100	2100	2200				0006										4	2008-2010	Basis for listing unknown. Priority lowered.
OK121700060090	Sager Creek	900							0006										1	1998-1999	Priority raised. Included in Illinois River project
OK120420020130	Sahoma Lake	900	1100	2100	2400				006	1000	4300	6500	8500						4	2008-2010	Basis for listing undetermined. No known problems with water supply source.
OK220200020030	Sallisaw Creek	200							1600	1800	5700	0006							4	2008-2010	
OK220200030010	Sallisaw Creek	200	1000						1100	1400	1500	1600	1800	5700	0006				4	2008-2010	
OK520700030100	Salt Creek	200	006	1100	1300				1100	1300	1400	1500	0006						3	2004-2007	Oilfield pollution no longer a known problem
OK520800010100	Salt Creek	200	006	1100	2100				1100	1300	0006								3	2004-2007	Oilfield pollution no longer a known problem
OK520800030010	Salt Creek	200	006	1100	1300				1100	1300	1400	1500	0006						3	2004-2007	Oilfield pollution no longer a known problem
OK621200010430	Salt Creek	1100	2100						1100	1300	0006								4	2008-2010	Oilfield pollution no longer a known problem
OK621200040010	Salt Creek	200	1100	2100					1100	1400	1500	0006							4	2008-2010	
OK310800030020	Sand Creek (Ardmore & Total Petroleum	600	1200						6200										1	1998-1999	
OK310840020070	Sandstone Creek	100							0006										4	2008-2010	
OK311600010040	Sandy Creek (Lebos)	200	1300						1200										4	2008-2010	
OK220200040010	Sans Bois Creek	200	500	1000	1100	2100			500	1100	1400	1500	1600	1800	5700	0006			4	2008-2010	
OK410310030020	Sardis Lake	100	200	006	1200				1100	1400	1500	0006							4	2008-2010	
OK120400020240	Shady Grove Creek	500	900	1000	2200				5000	8500									4	2008-2010	
OK520510000120	Shan Creek	1200							6200										2	2000-2003	
OK310820010080	Shannon Springs Lake	2500							0006										4	2008-2010	
OK310820010090	Shannon Springs Lake	1100							4100	4300									4	2008-2010	

Waterbody I.D.	Name					Cau	se(s)							So	ource	(s)				Priority	Schedule	Comments
OK520510000280	Shawnee Twin Lakes	1100	2100						1000											4	2008-2010	
OK121700050180	Shell Branch (Westville)	1200							006	1000										1	1998-1999	Westville TMDL completed by ODEQ
OK620910030010	Skeleton Creek	100	200	500	600	1100	1500	2100	1100	1200	1400	1500	1600	1800	0006					4	2008-2010	Oilfield pollution no longer a known problem
OK620910030170	Skeleton Creek	100							0006											4	2008-2010	
OK620910030240	Skeleton Creek	1003							0006											4	2008-2010	
OK121300040080	Skiatook Lake	200							0006											4	2008-2010	
OK120410010220	Snake (Duck) Creek	200	006						1100	1400	1500	0006								4	2008-2010	Basis for listing undetermined
OK120410030010	Snake Creek	200	006						1300	1400	1500	0006								4	2008-2010	Basis for listing undetermined
OK22030000030	Snake Creek (Stigler)	1200							6200											4	2008-2010	
OK120400020030	South Fork	1200							6200											2	2000-2003	
OK121600050150	Spavinaw Creek	006							1000	1600										1	1998-1999	Source codes added. Priority raised. Potential Ozark cavefish habitat.
OK520500020220	Sportsman Lake	1100	2100						0006											4	2008-2010	
OK520600030030	Spring Brook Creek	1200							6200											3	2004-2007	
OK121600010290	Spring Creek	006	1600						900	1000	7600	7700								2	2000-2003	
OK520710020030	Spring Creek	200	006	1100	1700				3000	4100	4300	6500	7100	7300	7500	7600	8300	8500		3	2004-2007	
OK310830010020	Spring Creek	2200							006	1000										4	2008-2010	
OK310840020240	Spring Creek	100							0006											4	2008-2010	
OK121600040030	Spring River	500	1100						1100	1400	1500	1800	5600	5700	8500					1	1998-1999	Cause codes 5600, 5700, 1800 added 1998 per Wyandotte & Quapaw Tribe input. Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK520100000190	Squirrel Creek (Tecumseh)	006							6200											2	2000-2003	
OK311210000060	Stage Stand Creek	1100	1600	2100					1100	1400	1500	7700								4	2008-2010	
OK520810000130	Stanley Draper Creek	200	1100	1500	1600	2100			7300	7500	7600	7700								4	2008-2010	
OK620900030020	Stillwater Creek	200	900	1100	1600	2100			1100	3000	7700	0006								2	2000-2003	
OK620900040010	Stillwater Creek	200	006	1100	2100				1100	1400	1500	1800	3000	7700	0006					2	2000-2003	
OK620900040040	Stillwater Creek	1100	2100						3100	3200										2	2000-2003	
OK620900040070	Stillwater Creek	1100	2100						7700											2	2000-2003	
OK620900040270	Stillwater Creek	100							9000											2	2000-2003	
OK621010030100	Stink Creek	1100	2100						1100											4	2008-2010	

Waterbody I.D.	Name					Cau	ise(s)							So	ource	(s)			Priority	Schedule	Comments
OK311500010050	Stinking Creek	100							006	1300									4	2008-2011	Listed in 1994 for threatened impacts from Altus SE discharge. UAA resulted in habitat limited fishery use for the tributary receiving the discharge. Cause code 1200 removed 1998. Source code 800 removed 1998. Not a valid code. Basis for other listings not determined. Priority lowered.
OK520700030240	Stroud Lake	1100	1600	2100					1400	1500									4	2008-2010	
OK310830050010	Sugar Creek	900	1100	1600	2100				1100	1200	1400	1500							3	2004-2007	
OK720510000160	Sunset (Guymon) Lake	2400							0006										4	2008-2010	
OK121700030020	Tahlequah Creek (Tahlequah)	100	1200						6200	0006									1	1998-1999	
OK121600040060	Tar Creek	500							5600	5700	8500								4	2008-2010	Mining causes added
OK310840020060	Taylor Lake	900	1100	2100					1500	7400	8300								4	2008-2010	Oilfield pollution no longer a known problem
OK520510000200	Tecumseh Creek (including Fire Lake)	200	006	1200	1600				006	4300	7600	8000							4	2008-2010	Listing based on old data. Needs verification. Priority lowered.
OK520510000220	Tecumseh Lake	006	1100	2000	2100	2200			1100	1400	1500	8600							4	2008-2010	
OK311300010050	Temple Lake (Mooney)	006	2100						0006										3	2004-2007	
OK121700020020	Tenkiller Ferry Lake	006	1200	1500					1000	7400									1	1998-1999	Priority raised. Included in Illinois River project
OK311100010020	Texoma Lake, Red River	200	800	1100	2200				1100	1200	1800	0006							4	2008-2010	
OK311100010030	Texoma Lake, Red River Arm, Lower	200	006	1100	2100				1100	1200	1400	0006							3	2004-2007	
OK311100010080	Texoma Lake, Red River Arm, Lower	200	006	1100	2100				1100	1200	1500	9000							3	2004-2007	
OK310800010050	Texoma Lake, Washita River	200	600	900	1100	1300	2100		1100	1200	1300	1400	1500	1800	7100	7600			4	2008-2010	
OK310800010011	Texoma, Washita River Arm, Lower	200	1100						1100	1200	1300	1400	1500	1800	0006				4	2008-2010	
OK121600030480	Three Finger Cove, Grand Lake	200	500	1000	1100				1000	3000	4000	5000	8500						1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK520810000020	Thunderbird Lake	200	500	2100	2200				006	1000									4	2008-2010	
OK620900010400	Tiger Creek, Tributary	1300							5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK311500020060	Tom Steed (Mountain Park) Reservoir	1100	2100						0006										4	2008-2010	
OK311600020060	Turkey Creek	200	1300						1200										2	2000-2003	
OK620910060010	Turkey Creek	006	1100	2100					1100	1200	1400	1500	1600	1800					2	2000-2003	
OK620910020030	Turkey Creek	006	1100	2100					1100	1200	1400	1800							3	2004-2007	
OK520510000100	Turkey Creek, Tributary	1300							5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK310830020110	Vanderwork Lake	900							0006										3	2004-2007	
OK121500010060	Verdigris River	200																	4	2008-2010	TMDL completed by DEQ. Basis for other listings undetermined. Priority lowered.

Waterbody I.D.	Name					Cau	se(s)							Sc	ource	(s)			Priority	Schedule	Comments
OK121500010200	Verdigris River	200																	4	2008-2010	TMDL completed by DEQ. Basis for other listings undetermined. Priority lowered.
OK121500020010	Verdigris River	200																	4	2008-2010	TMDL completed by DEQ. Basis for other listings undetermined. Priority lowered.
OK121500020120	Verdigris River	500	1000	1100	2100				5100	8500									4	2008-2010	TMDL completed by DEQ. Basis for other listings undetermined. Priority lowered.
OK121500020500	Verdigris River	1500							7400	8400									4	2008-2010	TMDL completed by DEQ. Basis for other listings undetermined. Priority lowered.
OK121500030010	Verdigris River	500	1000	1100	2100				5100	8500									4	2008-2010	TMDL completed by DEQ. Basis for other listings undetermined. Priority lowered.
OK121510010010	Verdigris River	200	1100						1100	1400	1500								4	2008-2010	
OK311100010250	Walnut Bayou	200	900	1100	2100				1100	1300	1400	0006							3	2004-2007	
OK311100030010	Walnut Bayou	200	006	1100	2100				1100	1300	1500	0006							3	2004-2007	
OK520610010110	Walnut Creek	200							0006										4	2008-2010	
OK620910010140	Walnut Creek	200							0006										4	2008-2010	
OK311100030070	Walnut Creek (Walnut Bayou)	200	006	1100	2100				1100	1300	1400	1500	8300	0006					3	2004-2007	
OK311100030160	Walnut Creek, Tributary	1900							5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1993 and 1996 sampling/data.
OK311300010080	Walters Lake	1600	2000	2100	2200				0006										4	2008-2010	
OK410400030310	Wapanucka Lake	1100							0006										4	2008-2010	
OK621200030440	Warren Creek, Tributary	1300							5500										4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK310810010190	Washington Creek	1100							1400	1500	1800	3200							4	2008-2010	
OK310830010010	Washita River	200	900	1100	1300	2100			1100	1200	1300	1400	1500	1800	7100	7600			1	1998-1999	Anadarko WLA completed by ODEQ
OK310830020010	Washita River	200	900	1100	1300	2100			1100	1200	1300	1400	1500	1800	7100	7600			1	1998-1999	
OK310830030010	Washita River	200	900	1100	1300	2100			1100	1200	1300	1400	1500	1800	7100	7600			1	1998-1999	
OK310800010010	Washita River	100	200	900	1100	1300	2100	2600	0000										3	2004-2007	
OK310800020010	Washita River	200	900						1100	1200	1800	7100	7600	0000					3	2004-2007	
OK310820010010	Washita River	200	900	1100	1300	2100			1100	1200	1300	1400	1500	1800	7100	7600			3	2004-2007	
OK310840010010	Washita River	100	200	900	1100	1300	2100		0006										3	2004-2007	
OK311210000020	Waurika Lake	900	1100	2100					1100	1400	1500	1800							4	2008-2010	
OK120400010070	Webbers Falls Reservoir	900	1200						1000										4	2008-2010	
OK520500010220	Weleetka City Lake	100							0006										4	2008-2010	
OK520500010210	Weleetka Creek	100							0006										4	2008-2010	

Waterbody I.D.	Name					Caus	se(s)							So	ource	(s)				Priority	Schedule	Comments
OK121600030210	West Bay, Grand Lake	200	500	006	1000	1200			1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121700050210	West Brook	600	006	1200	2200				1100	1400	1500	1500								1	1998-1999	Priority raised. Included in Illinois River project
OK311310020010	West Cache Creek	200							1000											4	2008-2010	
OK311500020040	West Otter Creek	1100	2100						1000											4	2008-2010	
OK520700060210	West Spring Creek, Tributary	1900							5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited sampling/data over 5 years old.
OK520500010270	Wetumka City Lake	1100	2100						1100	1400	1500									4	2008-2010	
OK520500020010	Wewoka Creek	200	006	1100					1100	1300	1400	1500	0006							3	2004-2007	Oilfield pollution no longer a known problem
OK520500020190	Wewoka Lake	1100	2100						1000											4	2008-2010	
OK310810010020	Wildhorse Creek	200							0006											4	2008-2010	
OK310810030010	Wildhorse Creek	1100	1300	2100					5500											4	2008-2010	
OK310810040140	Wildhorse Creek	200	1300	1600	2100				0000											4	2008-2010	
OK310810010240	Wildhorse Creek, Tributary	1300							0000											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1994 sampling/data.
OK310810030130	Wildhorse Creek, Tributary	1300							5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK310810040170	Wildhorse Creek, Tributary	1300							5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited 1997 sampling/data.
OK310810010220	Wiley Post (Maysville) Lake	1100	2100						1100	1400	1500	1800								4	2008-2010	
OK310830060030	Willow Creek	900	1100	2100					1100	1200	1300	1400	1500	1800	7100	7600	8300			3	2004-2007	Fort Cobb project. Source code 1800 added 1998 per Burec input.
OK220100020020	Wister Lake	900	1100	1500	2000	2100			7400	0006										2	2000-2003	Included in Wister Lake project. Completion not expected by 2000. Priority lowered.
OK720500030020	Wolf Creek, Tributary at Beaver Creek	1300							5500											4	2008-2010	Added 1998. Pollution problem related to petroleum activities. Limited sampling/data over 5 years old.
OK720500020020	Wolf Creek	200	006	1100	2100				1100	1200	1500	0006								3	2004-2007	
OK720500030010	Wolf Creek	200	900	1100					1100	1200	1500	0000								3	2004-2007	
OK520700010170	Wolf Creek	100							0006											4	2008-2010	
OK121600030400	Wolf Creek Cove, Grand Lake	500	1000	1100					8500											1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK121600030240	Woodward Hollow Cove, Grand Lake	2100							1000	1100	1400	1600	1800	3000	4000	5000	6500	8500	8700	1	1998-1999	Priority raised. Included in Grand Lake project. Potential Ozark cavefish habitat.
OK410200010150	Yanabee Creek	1200							6200											1	1998-1999	Priority raised. Potential Ouachita rock-pocketbook, Winged mapleleaf habitat.

	EPA Cause Codes		EPA Source Codes		
Code	Cause	Code	Source	Code	Source
100	Unknown Toxicity	900	Nonpoint Source	5600	Mill Tailings
200	Pesticides	1000	Agriculture	5700	Mine Tailings
300	Priority Organics	1100	Non-irrigated Crop Production	6000	Land Disposal (Runoff or
400	Nonpriority organics	1200	Irrigated Crop Production		Leachate from permitted areas)
500	Metals	1300	Specialty Crops (e.g. truck farming & orchards)	6100	Sludge
600	Ammonia	1400	Pasture Land	6200	Wastewater
700	Chlorine	1500	Range Land	6300	Landfills
800	Other inorganics	1600	Feedlots-All Types	6400	Industrial Land Treatment
900	Nutrients	1700	Aquaculture	6500	On-Site Wastewater Systems
1000	рН	1800	Animal Holding/Management	6600	Hazardous Waste
1100	Siltation	2000	Silviculture	7000	Hydromodification
1200	Organic Enrichment/DO	2100	Harvesting, Restoration, Residue Management	7100	Channelization
1300	Salinity	2200	Forest Management	7200	Dredging
1400	Thermal Stratification	2300	Road Construction /Maintenance	7300	Dam Construction
1500	Flow Alteration	3000	Construction	7400	Flow Regulation/Modification
1600	Other Habitat Alterations	3100	Highway/Road/Bridge	7500	Bridge Construction
1700	Pathogens	3200	Land Development	7600	Removal of Riparian Vegetation
1800	Radiation	4000	Urban Runoff	7700	Streambank Modification/Destabilization
1900	Oil and Grease	4100	Storm Sewers (Other than end of pipe)	8000	Other
2000	Taste and Odor	4200	Combined Sewers	8100	Atmospheric Deposition (and Acid Rain)
2100	Suspended Solids	4300	Surface runoff	8200	Waste Storage/Storage Tank Leaks
2200	Noxious Aquatic Plants	5000	Resource Extraction/Exploration/Development	8300	Highway Maintenance and Runoff
2300	Filling and Draining	5100	Surface Mining	8400	Spills
2400	Total Toxics	5200	Subsurface Mining	8500	In-place Contaminants
2500	Exotic Species	5300	Placer Mining	8600	Natural
		5400	Dredge Mining	8700	Recreational Activities
		5500	Petroleum Activities	8800	Upstream Impoundment
				9000	Source Unknown

Appendix B

APPENDIX B

DRAFT

USE SUPPORT ASSESSMENT PROTOCOLS

Appendix B

DRAFT revised 8 Oct 99

SUBCHAPTER 15. USE SUPPORT ASSESSMENT PROTOCOLS (USAP)

785:46-15-1. Scope and applicability;

(a) **General.** The rules in this Subchapter provide protocols for determining whether beneficial uses in waterbodies are being supported. These rules are not intended and should not be construed to limit any actions by federal or state agencies or citizens to prevent pollution or to limit remedies to abate pollution from a single incident or activity or series of incidents or activities.

(b) **Method for assessing use support.** Subchapter 15 and Appendix C of this Chapter contain tests which compare ambient concentrations to criteria or screening levels. When such tests exist they must be used to determine beneficial use support on or after October 1, 2000.

(c) **Data used for USAP.** Data shall be collected and analyzed in a manner consistent with testing procedures specified in OAC 785:45-1-4 or other EPA accepted protocols.

(d) **Significance of assessment that use is not supported.** A determination based upon application of the rules in this Subchapter or in Appendix C of this Chapter that a beneficial use is not supported or partially supported creates a presumption that the use is impaired.

785:46-15-2. Beneficial use support criteria;

(a) **General.** The use assessment protocols in this section are intended to apply in the absence of more specific protocols found in this Subchapter or in Appendix C of this Chapter. For example, protocols for certain toxicants to protect the Fish and Wildlife Propagation beneficial use do not follow the rules presented in this section. These protocols are spelled out later in this Subchapter and in Appendix C.

(b) Short term average numerical parameters not listed in Appendix C.

(1) Short term average numerical parameters are based on exposure periods of less than seven days. Short term average parameters to which this section applies include, but are not limited to,

2
sample standards and turbidity. This subsection does not apply to beneficial uses combined with parameters in Appendix C.

(2) A beneficial use shall be deemed to be fully supported for a given parameter whose criterion is based upon a short term average if 10% or less of the samples for that parameter exceed the applicable screening level prescribed in this Subchapter.

(3) A beneficial use shall be deemed to be fully supporting but threatened if the use is supported now, but, because of anticipated sources or adverse pollution trends, may not be supported in the next five years unless pollution prevention or control action is taken. A downward trend over the past two years shall cause the removal from threatened status.

(4) A beneficial use shall be deemed to be partially supported for a given parameter whose criterion is based upon a short term average if 11% to and including 25% of the samples for that parameter exceed the applicable screening level prescribed in this Subchapter.

(5) A beneficial use shall be deemed to be not supported for a given parameter whose criterion is based upon a short term average if greater than 25% of the samples for that parameter exceed the applicable screening level prescribed in this Subchapter.

(c) Long term average numerical parameters not listed in Appendix C.

(1) Long term average numerical parameters are based on exposure periods of seven days or longer. Long term averages to which this section applies include , but are not limited to, fish consumption water column numerical criteria and yearly mean standards. This subsection does not apply to beneficial uses combined with parameters in Appendix C.

(2) A beneficial use shall be deemed to be fully supported for a given parameter whose criterion is based upon a long term average if the mean of the sample results does not exceed the long term average.

(3) A beneficial use shall be deemed to be fully supporting but threatened if a waterbody fully supports a use now, but, because of anticipated sources or adverse pollution trends, may not be supported in the next five years unless pollution prevention or control action is taken. A downward trend over the past two years shall cause the removal from threatened status.

(4) Partial support cannot be assessed for long term average criteria to which this section applies because means are compared with screening levels.

(5) A beneficial use shall be deemed to be not supported for a given parameter whose criterion is based upon a long term average if the mean of the sample results exceeds the criterion or screening level.

785:46-15-3. Spatial and temporal coverage;.4

(a) **General.** Assessment of beneficial use support shall only be made where and when Oklahoma's Water Quality Standards are applicable.

(b) **Spatial coverage for large streams (non-wadable).** The extent of assessment in terms of stream miles shall be determined after a review of existing data, spatial distribution of monitoring sites, sources of pollution and influence of tributaries. Major hydrological features, such as the confluence of a major tributary or a dam, may limit the spatial extent of an assessment based on one station. Absent a showing to the contrary, a single monitoring site is considered representative of no more than 25 stream miles for large streams.

(c) **Spatial coverage for wadable streams.** Absent a showing to the contrary, a single monitoring site is considered representative of no more than 10 stream miles for wadable streams.

(d) **Spatial coverage for lakes.** The extent of support of uses in terms of lake surface acres shall be estimated based on the spatial distribution of monitoring sites having the requisite number of samples, sources of pollution, influence of tributaries and best professional judgement. Arms or portions of a lake may be treated separately from the main body of a lake. Absent a showing to the contrary, a single site shall not be deemed representative of an entire lake or an arm over two hundred and fifty surface acres in size.

(e) **Spatial limitation for sampling sites.** For purposes of this Subchapter, samples shall not be taken within any regulatory mixing zone.

(f) Temporal coverage for streams.

(1) Samples collected for USAP shall be taken to avoid temporal bias.

(2) Seasonality must be represented in the sampling scheme.

(3) Data more than five years old cannot be used for USAP except in OAC 785:46-15-2(b)(3)

and (c)(3) or if no data exists for the past five years.

(g) Temporal coverage for lakes.

(1) Samples collected for USAP shall be taken to avoid temporal bias.

(2) Seasonality must be represented in the sampling scheme.

(3) Data more than ten years old cannot be used for USAP except in OAC 785:46-15-2(b)(3)

and (c)(3) or if no data exists for the past ten years.

785:46-15-4. Minimum number of samples;

(a) **Streams.** Except when OAC 785:46-15-6 applies, ten samples are usually required to assess beneficial use support due to field parameters including, but not limited to, DO, pH and temperature, and due to routine water quality constituents including, but not limited to, coliform bacteria, dissolved solids and salts. However, fewer samples are required if the specified percentage of screening level exceedances is assured. For example, if the specified percentage of screening level exceedances is 25%, and 3 out of 4 samples exceed the screening level, it may be assumed that the beneficial use is not supported.

Analyses may be aggregated to meet the ten sample minimum requirements in large stream reaches that are 25 miles or less in length, if water quality conditions are similar at all sites. Analyses may be aggregated to meet the ten sample minimum requirements in wadable stream reaches that are 10 miles or less in length, if water quality conditions are similar at all sites.

(b) **Lakes.** Except when OAC 785:46-15-6 applies, a minimum of twenty vertical profiles are required for assessment of field parameters including but not limited to DO, pH and temperature on lakes or arms of lakes of more than two hundred and fifty surface acres. A minimum of twenty samples is necessary for other routine water quality constituents including, but not limited to, coliform bacteria, chlorophyll a,

and dissolved solids on such lakes. Ten total samples are required on lakes or arms of lakes smaller than two hundred and fifty surface acres. Analyses may be aggregated to meet the data requirements of this subsection.

(c) **Toxicant values.** At least five samples are required to determine beneficial use support (but not partial or non-support) for all toxicants in water. Samples may be aggregated consistent with spatial and temporal parameters as described in OAC 785:46- 15-3.

785:46-15-5. Values below minimum quantification level (MQL);

(a) **General.** As many individual data points as possible shall be used in the analysis of beneficial use support.

(b) **Criteria above MQL's.** For sample values below MQL, when criteria are above MQL, appropriate nonparametric statistical measures shall be used.

(c) **Criteria below MQL's.** Fifty percent of the criterion may be used in beneficial use support assessment if the criterion is below MQL.

785:46-15-6. Magnitude of criteria exceedance;

(a) **General.** The magnitude of exceedance, as well as frequency of exceedances, shall be used in determining beneficial use support. Samples must be taken during conditions when water quality standards apply.

(b) **Toxicants.** If two or more toxicant concentrations exceed criteria or screening levels to protect human health by two orders of magnitude or more, the associated beneficial use shall be deemed not supported.

(c) **DO.** If more than two stream dissolved oxygen (DO) concentrations are observed to be below 2 mg/L in any given year, the Fish and Wildlife Propagation beneficial use shall be deemed to be not supported.

(d) **Other parameters.** The magnitude and frequency of exceedances to be used for determining beneficial use support for parameters other than toxicants and DO shall be as prescribed in the rules in this Subchapter and Appendix C of this Chapter.

785:46-15-7. Assessment of Fish and Wildlife Propagation support;

(a) **Scope.** The provisions of this Section and Appendix C of this Chapter shall be used to determine whether the beneficial use of Fish and Wildlife Propagation designated for a waterbody is supported.

(b) Screening levels for dissolved oxygen (DO) in streams.

(1) Screening levels for DO in habitat limited aquatic communities shall be 4.0 mg/L from April1 through June 15 and 3.0 mg/L for the remainder of the year.

(2) Screening levels for DO in warm water aquatic communities shall be 4.0 mg/L from June 16 through October 15 each year and 5.0 mg/L for the remainder of the year.

(3) Screening levels for DO in cool water aquatic communities and trout fisheries shall be 5.0 mg/L from June 1 through October 15 each year and 6.0 mg/L for the remainder of the year.

(c) DO in lakes.

(1) If greater than 70% of the volume of water in a lake or an arm of a lake is less than 2 mg/L, the Fish and Wildlife Propagation beneficial use shall be deemed to be not supported.
(2) If 50% to and including 70% of the lake water volume is less than 2 mg/L, the Fish and Wildlife Propagation beneficial use shall be deemed to be partially supported.

(d) Screening levels for DO in lakes. The screening level for surface DO in lakes shall be 4 mg/L.

(e) Criteria for toxicants.

(1) Statewide acute and chronic criteria for toxicants are listed in the table in OAC 785:45-5-12(e)(6)(G).

(2) The assessment of support of a designated aquatic life use subcategory shall be based on ranges of acute and/or chronic criteria exceedances among concentration measurements as specified in Appendix C of this Chapter.

(f) **pH criteria.** With respect to pH criteria, the assessment of support of the Fish and Wildlife Propagation beneficial use shall be based on ranges of pH measurements falling outside the screening interval, as prescribed in Appendix C of this Chapter. A screening interval for pH is defined by the pH criteria in OAC 785:45-5-12(e)(3).

(g) **Biological criteria.** If data demonstrate that an assemblage of fish or macro invertebrates from a waterbody is significantly degraded from that expected for the subcategory of the Fish and Wildlife Propagation beneficial use designated for that waterbody consistent with OAC 785:45-5-12(e)(5), then that subcategory may be deemed to be not supported or partially supported by the appropriate state environmental agency.

(h) Criteria for turbidity. Criteria for turbidity are listed in OAC 785:45-5-12(e)(9)(A).

785:46-15-8. Assessment of Primary Body Contact Recreation support;

(a) **General.** Geometric means, percentages of fecal coliform concentrations exceeding screening levels, and criteria exceedances as specified in this Section and Appendix C of this Chapter shall be used to determine whether the Primary Body Contact subcategory of the Recreation beneficial use designated for a waterbody is supported.

(b) **Screening levels.** Criteria to protect the Primary Body Contact Recreation beneficial use are prescribed in OAC 785:45-5-16(c) and apply from May 1 through September 30. Screening levels which shall be used to assess the support of Primary Body Contact Recreation shall be as follows.

(1) For the fecal coliform group, the screening level shall be a density of 400 colonies per 100 ml.

(2) For E. coli, the screening level shall be a density of 235 colonies/100ml in lakes and Scenic Rivers and 406 colonies/100ml in all other Primary Recreation use areas.

(3) For enterococci, the screening level shall be a density of 61 colonies/100ml in.10 lakes and Scenic Rivers and 108 colonies/100ml in all other Primary Recreation use areas.

785:46-15-9. Assessment of Public and Private Water Supply support;

(a) **Toxicants.** Criteria exceedances as provided in Appendix C of this Chapter shall be used to determine whether the Public and Private Water Supply beneficial use designated for a waterbody is supported. Criteria to protect this beneficial use are prescribed in OAC 785:45-5-10.

(b) **Bacteria.** Coliform criteria to protect Public and Private Water Supplies are listed in OAC 785:45-5-10(3). The screening level for USAP is 5000/100ml for the fecal coliform group.

(c) **Threatened water supplies.** Water supplies shall be assumed threatened when toxicants are detected but do not exceed water quality criteria and/or some drinking water use restrictions have occurred and/or the potential for adverse impacts to source water quality exists.

785:46-15-10. Assessment of Agriculture support;

(a) **General.** Criteria exceedances as provided in this Section and Appendix C of this Chapter shall be used to determine whether the Agriculture beneficial use designated for a waterbody is supported or is impaired.

(b) **Yearly mean standards.** Criteria for chlorides, sulfates and TDS are expressed as yearly mean standards in OAC 785:45 Appendix F. The mean of all chlorides, sulfates and TDS is compared to the yearly mean standard. If the mean exceeds the yearly mean standard, the use shall be deemed to be not supported.

(c) **Sample standards.** Individual concentrations of chlorides, sulfates and TDS shall be compared against the sample standards in OAC 785:45 Appendix F.

(d) Use support. TDS less than 700 mg/L and chlorides and sulfates less than 250 mg/L always support the Agriculture beneficial use.

(e) **Site specific criteria.** In some cases segment averages in Appendix F are not appropriate for an entire segment. Yearly mean standards and sample standards developed from site specific data may be used for USAP in these cases.

785:46-15-11. Nutrients;

(a) **General.** OAC 785:45-3-2(c) prohibits water quality degradation by nutrients which will interfere with the attainment or maintenance of any existing or designated beneficial use. OAC 785:46-13-3(a)(1) requires maintenance of any existing or designated beneficial use. A waterbody shall be presumed to be nutrient threatened if one or more beneficial uses is threatened by nutrients.

(b) **NLW areas.** The Board may make a determination that a waterbody is nutrient-limited based upon a demonstration that excess nutrients may be impacting a beneficial use. NLW areas must be placed in OAC 785:45 Appendix A.

(c) **Consequence of identification as nutrient-limited watershed** (**?NLW**"). If a lake and its watershed is identified as NLW in OAC 785:45 Appendix A, the Board or other appropriate state agency may cause an NLW Impairment Study to be performed in order to determine whether the waterbody's beneficial uses is or are impaired. Areas which are designated "NLW" shall be considered fully supporting but threatened unless determined to be not supporting or partially supporting one or more beneficial uses by an impairment study. If an impairment study shows that beneficial uses are no longer threatened removal of the NLW designation in OAC 785:45 Appendix A. shall be recommended.

(d) **Determining nutrient threats for streams.** The dichotomous key in OAC 785:46 Appendix D must be used to determine nutrient threats for streams.

(e) Nutrient threatened streams require an impairment study.

(f) **Beneficial use support.** A determination that a beneficial use is not supported or partially supported may be made upon a demonstration that excess nutrients interfere with the attainment of that beneficial use. Waterbodies determined to be nutrient impaired must be so identified in the responsible agencies' implementation plan.

785:46-15-12 Assessment of Fish Consumption support;

(a) **Scope.** The provisions of this section shall be used to determine whether the beneficial use of Fish Consumption designated for a waterbody is supported.

(b) **Fish consumption criteria.** The Fish Consumption beneficial use shall be deemed to be not supported during any time that aquatic life closures or "no consumption" advisories are in effect. The Fish Consumption beneficial use shall be deemed to be partially supported when restricted consumption is in effect or a fish or shellfish ban is in effect for a sub-population

(c) **Water column criteria.** Water column criteria for protection of the Fish Consumption beneficial use are listed in OAC 785:45-5-20(b)(2) and shall be used to determine beneficial use support.

DRAFT APPENDIX C. FRAMEWORK FOR EVALUATING USE SUPPORT

BENEFICIAL USE (Parameter Criteria/ Screening Levels)	FULLY SUPPORTED* (All uses are fully supported)	PARTIALLY SUPPORTED (One or more uses are partially supported and remaining uses are fully supported)	NOT SUPPORTED (One or more uses are not supported)			
FISH AND WILDLIFE PROPAGATION						
Dissolved Oxygen	0-10% do not meet screening level	11-25% do not meet screening level	>25% do not meet screening level			
Toxicants	for any individual parameter, not more than one exceedance	for any individual parameter, criteria exceeded more than once, but in less than 10% of samples	for any individual parameter, >10% of samples exceed criteria			
pH-other than natural causes	0-10% do not fall within screening interval	11-25% do not fall within screening interval	>25% do not fall within screening interval			
PRIMARY BODY CONTACT RECREATION (for recreation season from May 1 through September 30)						
Fecal Coliform geometric mean of 400 colonies/100ml	geometric mean met and 0- 25% exceed screening level	geometric mean not met and/or >25% exceed screening level				
E. coli geometric mean of 126 colonies/100ml enterococci geometric mean of 33 colonies /100ml	geometric mean met and/or screening level not exceeded during the recreation season	partial support is not assessed	geometric mean not met and screening level exceeded during recreation season			
PUBLIC AND PRIVATE WATER SUPPLY						
Surface Water Human Health Criteria for Water and Fish (toxic substances) and for Raw Water	contaminants do not exceed criteria more than 10% of time and/or drinking water use restrictions are not in effect	contaminants exceed water quality criteria 11 - 25% of time and/or drinking water use restrictions resulted in need for more than conventional treatment	contaminants exceed water quality criteria > 25% of time and/or drinking water use restrictions resulted in closures			
AGRICULTURE						
Chlorides, Sulfates and TDS	0-10% exceed sample standard and the mean does not exceed the yearly mean standard TDS < 700 mg/L, sulfates or chlorides < 250 mg/L	11-25% exceed sample standard and the mean does not exceed the yearly mean standard	> 25% exceed sample standard and /or the mean exceeds the yearly mean standard			

*A beneficial use shall be deemed to be fully supporting but threatened if a waterbody fully supports a use now, but may not in the next five years.

DRAFT APPENDIX D.

Classification Key for Nutrient Threatened Streams

1. Stre	am order 1,2 o	r 3?		
	Yes	go to 2		
	No	go to 9		
		U		
2. Stre	am slope > 20	ft/mi?		
2.541	Yes	go to 3		
	No	go to 2		
	110	50101		
3 P >	0.24 mg/L or m	nitrite + nitrate >	> 4 95 mg/L?	
5.1 >	V_{ac} so to 5			
	No	not threatened		
	NU	not uneatened		
1 D \	0.15 mg/I or m	vitrita nitrota >	$\sim 2.4 \text{ mg/L}$ 2	
4.1 /	Vac	range + range > 5	2.4 mg/L:	
	i es	go to 5		
	NO	not threatened		
5 3371	1	, <u>1</u> 12	0	
5. wh	at is the percen	t canopy shadin	lg ?	
	Greater than 8	30%	not threatened	
	Less than 80%	6	go to 6	
6. Wh	at type of turbio	dity?		
	Organic	go to 7	1	
	Inorganic	go to 8		
7. How much phytoplankton?				
	See stream bottom at > 18 in. depth or turbidity < 20 NTU go to 13			
	Cannot see str	ream bottom at	> 18 in. depth or turbidity > 20 NTU	threatened
8. Hov	w much suspen	ded solids?		
	See stream bo	ottom at > 18 in.	depth or turbidity < 20 NTU	go to 13
	Cannot see str	ream bottom at	> 18 in. depth or turbidity > 20 NTU	not threatened
9. Stre	am slope > 20	ft/mi?		
<i></i>	Yes	go to 10		
	No	go to 10		
	110	501011		
10 P	> 1.00 mg/L or	nitrite + nitrate	>4.65 mg/J ?	
10.1 /	Yes	σ_0 to 12	> 1.05 mg/L1	
	. . .			

No not threatened

- $\begin{array}{ccc} 11. \ P > 0.36 \ mg/L \ or \ nitrite + nitrate > 5.0 \ mg/L? \\ Yes & go to \ 12 \\ No & not \ threatened \end{array}$
- 12. How much inorganic turbidity?

Turbidity > 20 NTU	not threatened
Turbidity < 20 NTU	go to 13

13. What is bottom type? Mud/soft not threatened Rock/hard threatened

Appendix C- Funding

APPENDIX C

FUNDING

Many funding sources are available to support programs and activities related to nonpoint source pollution in Oklahoma. Funding sources include but are not limited to the following:

Abandoned Mine Land Reclamation Program (OSM) Provides for the restoration of eligible lands and waters mined and abandoned or left inadequately restored.

Clean Water Act §104(b)3 Research, Investigation, Training and Information (EPA) Grants to State agencies, Tribes, other public or nonprofit private agencies, institutions, organizations and individuals. The purpose of these grants is to conduct and promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys and studies relating to causes, effects, extent, prevention, reduction and elimination of pollution. Section 104(b)3 grant require a 5% match and can be utilized in the following areas:

National Pollutant Discharge Elimination System (NPDES) State Program: to support the watershed approach for projects involving NPDES permit activities, stormwater runoff and sludge treatment and disposal.

Groundwater: to study aquifer vulnerability.

Public Private Partnership (P3): to State or local agencies to perform a variety of activities that involve a cooperative effort on the part of the public agency or agencies and one or more private entities.

State Wetlands Development Grants: to States/Tribes to develop and refine new and/or existing wetlands programs. These grants require a 25% match.

Wetlands: to create and enhance wetlands and to develop educational programs

Clean Water Act §106 Water Pollution Control Program (EPA) Grants to State agencies and Tribes for work relating to ground and surface water. Primary areas of funding include: 1) to State/interstate agencies to assist them in administering for the prevention, reduction, and elimination of water pollution, including enforcement directly or through appropriate State law enforcement officers or agencies; 2) to help fund permitting, enforcement, monitoring and water quality standard activities; 3) to Tribes for the development of water quality standards and monitoring programs; and, 4) to be used basically for a State's base groundwater program (CSGWPP), wellhead protection and pesticides in groundwater.

Clean Water Act §205(g) Construction Management Assistance Grants (EPA) Grants for States to manage the delegated activities of the construction grants program. There are no new funds in this program.

Clean Water Act §205(m) and 601(a) Capitalization Grants for State Revolving Fund (SRF)

(**EPA**) Grants to States to capitalize the SRF Loan Program to provide other assistance specified in Title VI to communities for the purpose of addressing wastewater treatment, nonpoint source control and estuary protection needs. A 20% match is required with this program.

Clean Water Act §314 Lake Restoration – Clean Lakes (EPA) Grants to States to implement methods and procedures to protect and restore publicly owned freshwater lakes. There are no new funds in this program.

Clean Water Act §319(h) Nonpoint Source Implementation (EPA) Grants to designated State agencies to implement the State's NPS management program to control NPS pollution. States may choose to grant funding to other entities for project implementation. A 40% match is required with this program.

Clean Water Act §604(b) Water Quality Management Planning Set-aside from a State's Title VI (**State Revolving Loan**) **funds (EPA)** Grants to States to carry out water quality management planning. The States must pass-through 40% of these funds to regional planning agencies, unless the Governor, in consultation with affected parties, determines that regional planning agency participation will not significantly assist the State in its water quality management planning efforts.

Clean Vessel Act Grant Program (USFWS) Provides financial support for development or improvement of marina sanitation facilities in order to maintain and improve water quality.

Conservation Reserve Program (CRP) (FSA) Provides annual payments and cost-share assistance to landowners to conserve and enhance soil and water resources, including wetland and wildlife habitat.

Emergency Watershed Protection (NRCS) Provides technical and financial assistance to preserve life and property threatened by excessive erosion and flooding. Eligible activities include clearing debris from waterways, restoration of vegetation, stabilization of banks.

Environmental Education Grants Program (EPA) Provides financial support for projects which design, demonstrate or disseminate environmental education practices, methods, or techniques.

Environmental Quality Incentive Program (NRCS) Provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner.

Five Star Restoration Challenge Grant Program (EPA) Provides support for community-based wetland and riparian restoration projects that build diverse partnerships and foster local natural resource stewardship.

Forest Stewardship Program (ODA/ODWC) Grants are designed to promote good land stewardship by helping rural landowners implement a multiple-use (grazing, timber management, reforestation, wildlife habitat enhancement, soil conservation and recreation) management strategy on their land.

Integrated Research, Education, and Extension Competitive Grants Program – Water Quality (USDA) Provides support to integrated, multifunctional agricultural research, extension, and education activities that address water quality priorities in the United States agriculture.

Oklahoma Cost-Share Program (OCC) Provides cost-share assistance for water quality benefits.

Oklahoma General Revenue Funds Provides financial assistance to State agencies for water quality related programs.

Partners for Fish and Wildlife Conservation (USFWS) Provides technical and financial assistance to private landowners to voluntarily restore wetlands and other fish and wildlife habitats on their land. The program emphasizes the reestablishment of native vegetation and ecological communities for the benefit of fish and wildlife in concert with the needs and desires of private landowners.

Safe Drinking Water Act §1442(b)(3)(c) (EPA) Grants to States, Tribes, and municipalities (as defined in the Safe Drinking Water Act) to develop and implement wellhead protection programs.

Safe Drinking Water Act §1452 (a)(1)(B) Drinking Water State Revolving Fund (EPA) Grants to State for the purpose of establishing State loan funds for public water systems to finance the cost of complying with the National Primary Drinking Water regulations and to protect public health. A portion of the grant can be set aside for administrative expenses, State Drinking Water Program Management, Source Water Protection activities, small systems technical assistance, operator certification programs and capacity development activities.

Save Our Streams Program (Izaak Walton League of America) Provides support to protect and restore America's soil, woods, water, air, and wildlife.

Wetland Reserve Program (WRP) (NRCS) Provides payments and cost-share assistance to landowners for the restoration and protection of wetlands.

Wildlife Habitat Improvement Program (WHIP) (ODWC) Grants to develop, preserve, restore and manage wildlife habitat on private lands.

Wildlife Habitat Incentives Program (WHIP) (NRCS) Provides private landowners with technical and financial assistance to establish and improve fish and wildlife habitat.

Appendix D

NPS WORKING GROUP COMMENTS AND OCC RESPONSES TO DRAFT ONE OF THE NPS MANAGEMENT PROGRAM

Comments and *OCC Responses* to the Draft Nonpoint Source Management Plan (Comments in standard text or italicized, OCC responses are italicized or underlined)

Broiler Producers Council

I appreciate the opportunity to submit comments on The Nonpoint Source Management Plan.

In general, after reading the Plan in its entirety, it communicates an overall logical way to go about finding, controlling, and preventing Non-point Source Pollution within the State of Oklahoma. We commend OCC on their efforts in preparing this document.

Specific concerns of the plan are as follows:

Page 4

"With this in mind, the OCC as the technical lead agency, views our vision statement as one that encompasses the state's vision concerning NPS pollution...."

From the prospective of the Broiler Producers Council, the state's vision has been one that poultry producers are great polluters. We do not believe this to be the case.

OCC concedes that it has not always been easy to determine the exact source of pollution in the state and it is our hope that our increased monitoring efforts will help clarify and define sources. In addition, we hope that our implementation programs can help poultry producers meet the new requirements that have been placed on them by offering educational opportunities, soil tests, and other technical assistance. If you have other ideas as to how we can improve this program to be less biased against and more beneficial towards the poultry industry, please let us know and we will try to incorporate them.

"Assessment is the starting point for addressing NPS pollution. Quantifying and identifying the causes and sources of NPS pollution and distinguishing real from perceived problems is the critical first step. A breakdown in any of the proceeding 4 parts leads to a less effective program."

The above statements were taken from **I**. Vision Statement, but immediately following that is **II**. Introduction which includes **EPA Fact Sheet EPA841-F-96-004A**. The information that EPA uses to put together these fact sheets comes from the state's reports. We are all aware of the problems and flaws with the reports to EPA (303d, 305b, etc). I do not believe that turning around and using EPA's fact sheet is conducive to proper quantification or identification of the causes and sources of Oklahoma's NPS pollution. I do realize that OCC will be quantifying and identifying the causes and sources of Oklahoma's NPS pollution by proper and scientific water monitoring, but to include this fact sheet here tends to take away from the credibility of the program.

We agree that there are likely errors in the 303(d), 305(b), and various reports written for EPA by our state. Those errors may have been transferred to the fact sheet in summarization of the reports. However, those errors were made by the state, not by EPA. EPA is the lead technical water quality agency at the federal level and this program is an EPA program. It is appropriate that we reference EPA's recommendations in this program. However, given the errors that may be in the fact sheet, it is also important to cite other studies (especially those specific to Oklahoma) that draw the same conclusions as the fact sheet or studies that refute the conclusions of the factsheet with actual data. We have added citations of several studies that support the factsheet conclusions to the text. We are not aware of any studies in Oklahoma that refute the findings of the factsheet with data. However, if you

know of such studies, please let us know and we will review them and cite them in the report.

Page 6

"Agricultural land, small and medium-sized animal feeding operations, construction sites, and other areas of disturbance are major contributors of these pollutants."

We are concerned that you chose to include small and medium-sized animal feeding operations here as "major" contributors of sediment and nutrient pollution. All poultry operations are currently regulated by ODA and must be licensed (permitted), and inspected annually. They are required to follow proper guidelines to land apply their litter. When point source dischargers are within their permit limits, they are not considered polluters. Let's give the same credibility to the laws that govern poultry operations. We recognize that this statement unfairly distinguished only a few agricultural sources as being the major contributors on NPS pollution in the state. We have changed the statement to include many other potential sources and stricken the word "major" from the text. "Small and medium-sized animal feeding operations" refers to all agricultural operations, not just poultry operations. However, you brought up an important point concerning the regulation on poultry operations and the new steps that they must undertake in order to reduce NPS pollution. This should be added to the text. References to this effort and the NPS program's commitment to assisting with this effort have been added throughout the text.

Page 7

I thought that the discussion of the <u>Nine Key Elements</u> that must be addressed in State Nonpoint Source Management Programs was excellent and very informative. The same statement applies for Section III. Other State Approved Plans And Programs With NPS Authorities And To Be Adopted By Reference, pages 11 - 18.

Page 22 Eighth bullet:

• "Continue state participation in acquisition programs though the North American Waterfowl management plan administered by the Oklahoma Department of Wildlife Conservation."

We do not feel that either our state or federal government should be spending the citizen's money (tax dollars) to purchase more property.

This comment addresses the section on the Wetland Management Program. This text was paraphrased from an approved plan and we cannot change the intent of that plan at this point in time. However, there have been numerous comments on this section regarding the Wetland Management Plan and we will forward these comments to the appropriate groups.

Pages 23 - 27

The outline of the Goals for Oklahoma's NPS Program is an excellent goal outline. We hope that these goals can be carried out.

Page 27

Since 1981, the Oklahoma Conservation Commission (OCC) has been designated "(to) act as the management agency having jurisdiction over and responsibility for directing nonpoint source (NPS)

pollution prevention programs outside the jurisdiction or control of cities or towns in Oklahoma. The Commission, otherwise, shall be responsible for all identified nonpoint source categories except silviculture, urban storm water runoff and industrial runoff."

Senate Bill 1170 of 1998 gave ODA (The Oklahoma Department of Agriculture) jurisdiction over nonpoint source pollution prevention from some AFOs (Poultry Feeding Operations). Excellent point. This has been clarified in the text.

Page 29

"...waterbody reference sites will serve as comparison points for determining the attainable aquatic communities. A statewide collection of positive reference streams will reveal the expected and achievable community for any stream in the state. References sites have been, or are in the process of being established for the various bioregions in Oklahoma."

When the list of reference sites is complete, we hope it will be published to OCC's website for easy public access.

Great idea and this indeed is something we hope to make available. This has been clarified in the text and in the goals.

Page 32

iv. Stream Water Quality Data Source

"Information gathered by the OCC will be available to the citizens of the state in a form that will be understandable."

We are pleased that OCC is going to do this.

Pages 52 – 53 VI. Tools

The background info on the Nonpoint source Working Group, and the list of Watershed Planning Tools - Written Resources is very helpful and informative, as is the discussion of Local Watershed Working Groups.

Page 55 D. Watershed Modeling -

"Watershed modeling is a useful method of extrapolating limited information on a watershed to the entire watershed. In other words, use of landuse and soils data to estimate locations in the watershed most likely to be responsible for the bulk of the pollutant loading. However, due to the very fact that it generally involves extrapolation and predictions about what might or "should" happen, its outputs should be used and interpreted with caution."

We have some concerns about using watershed modeling to interpret nonpoint source pollution within a watershed. When modeling indicates water quality impairment, actual sampling should be performed adequate to verify the impairment, before a proposal of Antidegradation implementation. OCC agrees that modeling should not be used as a sole indicator of impairment. This will be clarified in the text. Modeling should be used as a first step to indicate potential hotspots, but monitoring must always follow to verify before any implementation follows.

Page 56

"While estimating the portion of the load contributed by point sources is generally straightforward (based on discharge records), estimating the nonpoint source portion of the load is difficult and often requires considerable data."

We are under the impression that no nutrient discharge records are required of point source dischargers, that TMDLs are based on the permit estimates for nutrients. If we are inaccurate, disregard this particular comment. Point source discharge records should be required for nutrients and used in the TMDL process.

You are partially correct in that many point sources are not required to collect or keep records pertaining to nutrient concentrations in their discharge. However, more and more dischargers have nutrients written into their permits and are required to collect that data. It may not be long before all dischargers are required to keep records on that information, whether it is written in the permit or not. Regardless, the intent of the text was that whether or not dischargers keep records, it is relatively easy to collect the information by simply going the end of the pipe and collecting samples on a routine basis. There is no pipe from which to collect NPS pollution discharge. In addition, extensive research has been done on what levels of pollution are generally discharged by the different types of treatment systems, dependent upon population of the municipality and types of discharges treated by the system (i.e. all domestic, or partially industrial, etc.). Literature values exist that allow you to estimate (fairly accurately) what types of concentrations you would expect to be discharged from a particular type of treatment plant. When you combine this information with the discharger's required flow records, you can estimate the PS contribution to the load. It is much more difficult to estimate the NPS contribution to the load, with regard to specific sources. We have added text to this section to clarify why it is easier to estimate the PS load than to estimate the NPS load.

..."One of the best ways to insure voluntary cooperation is to adequately represent local interests in the development of the TMDL by soliciting input from local citizens and agencies throughout the process of TMDL development. The most common means by which this is accomplished is through a period of public review.

...Input and review through a local conservation district or local working group will be an integral part of nonpoint source TMDL efforts completed by the OCC. Local input will be included throughout the TMDL process, both during formulation of the TMDL and planning and implementation of the TMDL."

Periods of public review come after a process has been completed. We are glad to see that OCC will be involving the public during the process. We hope that OCC will actively involve the local conservation district for the purpose of soliciting input from interested stakeholders within the watershed that is to have a TMDL performed on it.

We believe that this could be a major role for the conservation district within the TMDL process, especially when loading is allocated.

Pages 60-78

The inclusion of **References** for each nonpoint source category into the management plan is great.

Pages 79 - 81

The Plan includes an excellent discussion of the Education Planning Framework.

Page 85

"...Some watersheds have particular interests that set them apart from the statewide prioritization strategy and warrant watershed implementation. For instance, even though the Mountain Fork/Broken Bow Watershed has few water quality problems, its very pristine state mandates proactive implementation to preserve its integrity."

We support the protection of existing water quality associated with pristine conditions; however, we feel that the fact that the water is in pristine condition, is a direct result of land management practices of the landowners within that watershed. Furthermore, that any "protection" afforded to that watershed should have the full approval of those landowners (voluntary BMPs) within the watershed, before implementation.

This is an excellent point. Landowners certainly deserve credit for the pristine condition of those systems. Too often we focus on a few peoples' negligence without supporting many landowners responsible efforts to control pollution. We agree that watershed "Protection" should have approval of the landowners. Our state and nation has established a strategy to protect our water using both regulation (NPDES, CAFO, Storm Water Permits) and voluntary BMPs. The Management Plan principally addresses the voluntary aspect of the overall strategy. We hope that by using watershed advisory groups, representation of landowners through the conservation districts, and public participation requirements for watershed restoration action strategies, that approval of land owners can be achieved. We realize that watershed protection cannot be achieved if its residents do not desire it.

Page 113

"...Large confined animal operations (CAFOs) are now subject to NPDES regulation, small operations however, remain as nonpoint sources of pollutants."

This implies that:

- 1) NPDES permitted operations are not sources of pollution.
- 2) Animal feeding operations not NPDES permitted are automatically considered to be polluters.
- 3) All animal feeding operations should be subject to NPDES permits.

All Oklahoma poultry and swine feeding operations as specified by Oklahoma legislation are currently licensed (permitted) and regulated by ODA.

Good point. We have changed the language in this section to give credit for corrective actions already taken and to no longer make the false implications listed above.

Page 117

The section IX. Roles, Responsibilities And Oversight is excellent.

I appreciate the efforts put forth by OCC staff in preparing the Nonpoint Source Management Plan, and the opportunity to submit comments on the Plan. Thank you, on behalf of The Broiler Producers Council.

Sincerely,

Judi Barrett

Office of the Secretary of the Environment

General Comments:

Water Quality Standards -- Overall, I think the NPS Management Plan outlines excellent goals for the NPS management program in Oklahoma. However, I am concerned that some of the methods and objectives for achieving those goals may prove inadequate. Specifically, I am most concerned about the processes for identifying beneficial use impairment and for measuring the success of NPS implementation projects.

In Section IV.A., you mention that the "NPS program must be built upon the foundation of water quality standards with the goals to maintain beneficial use support in all the states (*sic*) waters." While I couldn't agree more with this statement, the OCC's practice of making beneficial use impairment decisions based on criteria that are not contained in Oklahoma's Water Quality Standards ("WQS") (e.g., biological and habitat information) is counterproductive. I would encourage the OCC to work more cooperatively with the state's WQS agency, the Oklahoma Water Resources Board ("OWRB"), to promulgate criteria and protocols for determining beneficial use impairment prior to using those criteria and protocols in any of the OCC's decision-making processes. This will insure that the OCC's decisions are based on methods that have been thoroughly evaluated by the state's environmental agencies and tested through the public participation requirements that are inherent in the WQS-setting process.

The OCC utilizes Oklahoma Water Quality Standards to make use support attainment assessment decisions and always has in the manner that was appropriate at the time. OCC collaborated with the OWRB to interpret narrative criteria for the 319-assessment report. OCC has also been involved with determining methods to interpret narrative criteria for the biological condition of the state's waters. In fact, much of the OWRB standard operating procedure for biocriteria development is based upon OCC SOPs.

As stated in the Management Plan, now that Use Support Assessment Protocols have been and continue to be developed, we will follow those protocols. OCC will strive to work more cooperatively with OWRB to develop those criteria and protocols. We will continue to attend all the meetings, comment on the proceedings, and offer comments and suggestions on the documents. In addition, we are willing to provide OWRB our quality-control assessed and cleared data when it becomes available. OWRB has generously provided field review of some of our procedures. We would be pleased to return the favor in the spirit of cooperation.

The OWRB has processes in place, not to mention the statutory authority, to develop biological, nutrient and sediment criteria. As the agency with statutory authority for promulgating standards, the OWRB should direct and facilitate any efforts to develop criteria (e.g., biological, sediment, and nutrients) and protocols (e.g., reference stream comparisons) for assessing maintenance of beneficial uses. To date, the OWRB and other state environmental agencies have been given only limited involvement in the OCC's efforts to develop such water quality decision-making tools. Your comment in section IV.B.2.j. about *facilitating* development of biological, nutrient, and sediment criteria is contradictory to the OCC's statutory authority under 27A O.S., unless you intend for the §319(h) program to fund the OWRB's efforts to facilitate criteria development.

We believe facilitating in a process of developing nutrient and sediment criteria is not contradictory to our statutory authority. The intent of the management plan language was not to imply that OCC was going to develop them, rather that we would make it easier to develop them. OWRB has requested our assistance in that endeavor. In 1995, OCC and OWRB staff drafted a MOU mapping out biological criteria development and agency roles for monitoring to support biocriteria. A large part of the current OCC monitoring program was developed based upon that draft MOU. Both agencies concurred with the MOU, however, it was not endorsed formally. It should be made more consistently clear in the document that the OWRB is responsible for developing these criteria. This has been corrected throughout the text.

This is not to say that the OCC's current efforts to develop new decision tools are unnecessary and unwarranted. Without a doubt, the OCC should be a major contributor to the development of such criteria, and the resources available under §319(h) should be utilized to aid in the development of such criteria. Rather, the OWRB is clearly responsible for facilitating such activities and, thus, should play a more critical role in the OCC's efforts.

We agree the OWRB is responsible for the development of criteria. However, we don't see the problem with OCC facilitating in their development. It would seem there is some confusion regarding the meaning of the word facilitate. More direct language such as "contribute to" or "help" will be added to the text to help clear up this misunderstanding.

Water Quality Monitoring – Following this same line of reasoning, it seems premature for the OCC to increase its efforts to identify further beneficial use impairments until the tools used to make impairment determinations are promulgated into the state's WQS. By scaling back on ambient and trend monitoring efforts, more §319(h) funds could be spent on implementing measures to reverse the numerous impairments already identified and on developing more efficient tools for identifying impairments (e.g., biological criteria, reference streams, etc.).

One of the requirements for participation in the 319 program and receiving funding from that program is that the state of Oklahoma (statutorily through OCC) must assess, monitor and evaluate nonpoint source pollution in the waters of the state. That means whether OWOS have numerical criteria for sediment or not (for example), we are still responsible for reporting to EPA on the impacts or lack of impacts to water from sediment. In the same manner, it is much more cost effective to screen for potential impacts from pesticides and metals through the use of habitat assessment and biological collections than through running expensive pesticide assays on all the streams in the state- we're talking differences of thousands of dollars per year per site to adequately monitor for pesticides in the water column. Many of these pesticides have very short half lives and break down hydrologically very quickly, which is obviously something desirable in a pesticide. What it means, though, is that a very short window of time exists to measure the pesticide once it runs off the field and enters the stream. However, just because it has a short half-life doesn't mean it does not affect the aquatic life cycle. Pesticides are developed to be quickly lethal. It doesn't have to sit in the stream for a week to affect the community. However, once again, I would state that OCC follows OWOS and will follow OWRB's Use Support Assessment Protocols in its reporting of whether or not streams are being affected by NPS pollution. In the past, that has merely meant following the letter of the narrative criteria to implement EPArecommended decision-making tools. Now that the OWRB has developed (with other state agencies facilitating) Use Support Assessment Protocols, we will follow those to the letter. In addition, OWRB has requested that we make biological and habitat data available to them for use in biological criteria development. We are currently preparing that data for this inter-agency transfer.

Specific Comments:

§ III.B. -- The discussion of Oklahoma's WQS was omitted. Because it is the very foundation of the State's water quality management programs, including the NPS program, allowing agency and public comment on this particular section is critical prior to the finalization of the NPS Management Program. Actually, the draft available through the NPS working group server had that section addressed, only the original draft forwarded to OSE and EPA omitted this section. However, we recognize this as a mistake; in the hurry to get the first draft out and begin the comment period, and in hopes that OWRB (and other pertinent agencies, depending on which hole in this document we're discussing) would provide some assistance in filling in the holes, we knowingly sent out the document in a rough format. Please be assured that this section will be available for public comment. In fact, this section will likely be pulled from OWRB literature pertaining to the program.

§ III.C.4.a. – The numbers contained in the last three columns of the first row should be verified. It appears that the "# Systems" and "Population" values may need to be switched.

This information was pulled directly off the ODEQ webpage section on the source water protection program. We will contact ODEQ to verify the data and the data format.

§ IV.A. – I am encouraged to see that both of your primary, long-term goals emphasize the link between the NPS Management Program and WQS.

Despite the obvious misunderstanding, OCC WQ has always followed OWQS in its NPS program. Some parameters have a hard number to compare to while others just have a narrative description, but we have never intentionally contradicted OWQS in our assessment of NPS impacts.

§ *IV.B.* (*bullet 1*) – See "Water Quality Monitoring" comments above. While monitoring "the aquatic community and habitat" is a worthwhile goal, using this information to make beneficial use impairment determinations prior to having criteria and protocols incorporated in WQS is premature.

The USAP protocol being developed by OWRB acknowledges that aquatic community and habitat information can be used to assess beneficial use attainment, as long as sufficient evidence is presented to the Board (in essence the Board, I'm not sure what exact body they reference in the document) to show that indeed the beneficial use is not being met (and that sufficient data has been collected and analyzed using a scientifically valid technique). It has been clarified throughout the document that use support attainment decisions based on habitat and biological information are subject to Board review and approval (as per USAP). In addition, OWQS does contain narrative biological criteria that OCC follows to the letter. This text, as stated in OWQS 45-5-12(e)(5), states that "A) Aquatic life in all waterbodies designation Fish and Wildlife Propagation (excluding waters designated "Trout, put and take") shall not exhibit degraded conditions as indicated by one or both of the following: i) comparative regional reference data from a station of reasonably similar watershed size or flow, habitat type and Fish and Wildlife beneficial use subcategory designation or ii) by comparison with historical data from the waterbody being evaluated." This text is taken from the most current approved version of OWQS, with amendments effective July 1, 1998.

If it is premature to monitor habitat and aquatic community, then it is also premature to monitor nutrients and sediment, basically nonpoint source pollution in general, because we don't have numerical criteria for those parameters written in the OWQS.

§ *IV.B.* (*bullets 7 and 9*) – In the discussion for bullet 7, you mention that "the state of Oklahoma will plan <u>two</u> large-scale watershed NPS control projects per year," while in bullet 9 you state that "<u>one</u> large-scale watershed NPS control program" will be initiated each year. Is there a discrepancy here?

Good point, thanks for catching the discrepancy. In actuality, generally one new large-scale project will be planned per year, although depending on the basin, perhaps as many as two will occur. This has been corrected in the text.

§ IV.B.2.i. – The correct name is the Oklahoma Water Quality Monitoring Council. *This has been corrected in the text.*

§ *IV.B.2.j.* – Again, OCC and the NPS Program should contribute to the development of biological, nutrient and sediment criteria. However, as the agency with statutory authority for WQS development, the OWRB should "facilitate" the development of such criteria.

The discrepancy between the apparent interpretation of and the meaning intended in the text has been corrected.

§ V.A. (bullet 4) – As stated earlier, using aquatic community presence/absence indicators to make beneficial use support determinations should be based on WQS. *Please refer to the answer to the previous comment.*

§ *V.A.* – In the last paragraph of this section, you state: "biological and habitat assessments will be used in addition to physical and chemical data as a direct measure of fish and wildlife beneficial use support status." Again, these determinations should only be made based on protocols promulgated in Oklahoma's WQS. Furthermore, you state in the last sentence of this paragraph that "parameters not addressed in OAC 785:46-15 will be assessed using applicable state and federal rules and regulations to determine non-support." Specifically, what are these other "applicable state and federal rules and regulations," and how will they be used to make support determinations?

Again, please refer to the previous response to comments pertaining to this matter. These other applicable state and federal rules and regulations would only come into play as written in the Use Support Assessment Protocols where it is stated that concerning parameters for which no Use Assessment Protocol yet exists, alternative methods may be used for assessment of use support attainment upon approval by OWRB and, I would assume, the Oklahoma Water Quality Monitoring Council. In making support decision for parameters not addressed in the USAP, OCC will follow the OWQS (OAC 785:45), the CFR where applicable, and any state promulgated rule not located in OAC 785:46-15. Please remember the assessment report is subject to public review and hence are the methods.

§ V.B.1. – OCC's Stage I assessment monitoring will provide invaluable data and information on the impacts of NPS pollution to the state's waters. Nonetheless, I have several concerns about this activity. First of all, the OCC is charged with looking only at NPS impacts to the state's waters. With such a rigorous monitoring network devoted to monitoring NPS impacts, I am concerned that your results will show a disproportionate amount of NPS causes of impairment, while point source impacts will be largely ignored. The OWRB's Beneficial Use Monitoring Program ("BUMP"), on the other hand, is designed to identify all beneficial use threats and impairments regardless of source. How will the OCC insure that Stage I monitoring does not implicate NPS pollution to the exclusion of point sources, yet remain within its statutory authority to only monitor NPS impacts?

That is a very good question. However, it is not the responsibility of OCC to compare the amount of PS impacts to NPS impacts, we are merely charged with assessing NPS impacts, as stated in your comment. Monitoring the extent and degree of PS impacted waters falls under the jurisdiction of the OWRB and ODEQ. The compilation of the 305(b) report is the appropriate venue for distinguishing between the

degree of waters impacted by PS and the degree impacted by NPS, which falls under the responsibility of the ODEQ. We are monitoring for NPS impacts to water quality, but cannot control whether someone monitors for PS impacts to water quality. Nor can 319 money be used for the purpose of identifying the extent and degree of PS impacts. Given the nature of the two large monitoring programs ongoing in the state where OWRB monitors larger systems and OCC monitors smaller systems (concentrating on streams without PS discharges) in many of the same areas, it is likely that ODEQ can compare the information to help discern between the two. However, the ability to make sound determinations based on comparison between the two programs is limited because the OWRB's program fails to collect flows, which would help allow the data to be compared to data from other sources. In addition, BUMP is not conducted under an EPA approved QAPP, which raises questions concerning the quality assurance of the data. Furthermore, you must recognize the considerable resources devoted to monitoring point sources expended by the regulated community. These data also should be considered in the balance between point source and NPS monitoring efforts.

Secondly, the OWRB's BUMP effort was designed to identify those watersheds where further, more intensive monitoring efforts (e.g., OCC's Stage II monitoring) may be necessary to qualify and quantify potential beneficial use impairments/threats. Is OCC's Stage I monitoring duplicative with the BUMP effort, and why is OCC's Stage I monitoring a necessary addition to BUMP? If OCC's Stage I monitoring is necessary, how will the OCC insure that it complements BUMP?

The BUMP program and the rotating basin monitoring program (RBMP) were developed for two separate reasons, BUMP to evaluate beneficial use attainment in waters of the state and facilitate development of water quality standards, and RBMP to monitor nonpoint source pollution, specifically, across the state. These primary goals of the programs are manifested in the following fundamental differences between the two programs:

- 1. BUMP focuses mainly on larger streams with the intent of determining whether or not beneficial uses are being supported. BUMP monitoring stations are not generally located to allow for differentiation between NPS and PS pollution. RBMP monitors smaller streams above PS discharges to differentiate between PS and NPS pollution. In addition, RBMP can come closer to determining the exact source of the pollution by monitoring closer to the source. BUMP watersheds are generally too big to differentiate between which practice is contributing the bulk of the load, but RBMP watersheds are small enough such that perhaps only one or two potential sources exist.
- 2. *RBMP* monitors streams of different known qualities, ranging from impaired, threatened, and high quality waters in order to develop reference streams for different areas of the state so we know what the "natural" water quality is. For example, water in the western part of the state naturally has more sediment in it than water in the northeastern part of the state. Developing reference streams will allow us to better account for natural conditions in the water rather than blaming the sediment in western streams on man's activities. BUMP monitoring stations were not chosen with that purpose in mind, indeed, their optional stations concentrate on 303(d) streams and which are potentially streams of "poor" water quality. This monitoring of 303(d) streams is necessary to verify whether or not those streams should remain on the list. Many were placed on the list with old data and methods not acceptable today and therefore need to be reviewed using current methods and criteria.
- 3. The RBMP focuses on monitoring major NPS pollutants and their impacts on water quality. BUMP cannot accomplish the same because it only monitors chemistry in streams. BUMP monitoring program does little to estimate the impacts of that chemistry on the animals that live in the stream. Because it collects WQ samples 10 times a year, it provides snapshots of what the water is like those

10 times a year and this information can be broadcast to estimate what the water is like the remainder of the year. By collecting WQ samples 10 times a year and sampling the animals that live in the water, RMPB collects a better estimate of what the water is like over a longer term. The biological sampling provides a more long-term view) of water quality because, in essence, you're monitoring the impacts of the chemistry in the stream on the other 355 days of the year that you didn't collect samples.

- 4. The BUMP program does not collect flow during its sampling, although it can estimate it at many of its stations through use of USGS flow data. OCC collects flow every time it samples. Flow is essential for calculating loadings (the major component for calculating Total Maximum Daily Loads (TMDLs). It is very possible to collect the same concentration at different flows. Concentration in streams means little in the absence of flow data.
- 5. The RBMP data is all collected under EPA-approved quality assurance project plans (QAPP) and thus has EPA approval on methods of collection and data analysis. BUMP is not an EPA-funded program and thus EPA-approved quality assurance plans have not been deemed necessary. OCC's Quality Management Plan details that only data collected under EPA-approved QAPP's can be used by OCC in their reports.
- 6. BUMP conducts statewide monitoring on an annual basis, limiting the detailed information it can collect from each area. RBMP monitors statewide on a 5 year basis, concentrating efforts in smaller portions of the state for two years at a time. This allows the RBMP program to collect more detailed data than the BUMP program. This detailed data such as landuse, biological (fish, aquatic insects, and algae), and habitat data is extremely valuable in identifying sources and effects of NPS pollution. The BUMP program can only collect water chemistry and physical data such as temperature.
- 7. BUMP is a state-funded program with no guarantees that it will be funded the following year. RBMP is less subject to the whims of state legislators and as a priority identified in the NPS Management Plan, will continue to be funded as long as resources allow.

These are the main reasons the utility of the BUMP data to make determinations about NPS pollution in the state is limited. This is not to say that the BUMP program is not important to the state. BUMP monitors larger rivers, it monitors water quality on a greater scale and assesses overall statewide water quality, a task that is required by the Clean Water Act. OCC program funding is not sufficient to do this and monitor NPS nor is it within OCC's statutory authority to monitor for point source impacts. The OCC program was fine-tuned considering the BUMP program to complement it, when possible, and avoid duplication. The two programs follow the same protocols to make determinations about whether or not the water body is meeting its assigned beneficial uses. In addition, both programs are collecting a monumental amount of data; much more data than either program would be capable of collecting individually without sufficient increases in staff and budget. This information can be very helpful in allowing the state to more accurately characterize the status of its water resources.

§ V.B.1.c.ii. – According to this section, OCC's Stage I monitoring will utilize biological and habitat information to make support determinations. My concerns for utilizing criteria and protocols that have not "weathered" the peer review and public participation process (i.e., WQS process) have been stated already.

Again, OCC has followed procedures outlined in OWQS and has committed to following procedures outlined in USAP for making use support determinations. Our use of biological and habitat information to make use support determinations follows the EPA's RBP and has weathered the peer review and public participation process on a state, national, and international level. In addition, OWRB and other

agencies have reviewed our protocols and utilize them; indeed, we've even trained them in the use of our protocols. Once again, we follow OWQS and USAP in making use support determinations.

§ V.B.2. through § V.B.4. – The other monitoring types mentioned in these sections seem more logical and appropriate for the OCC to undertake. My only advice is that you explain how implementation and success monitoring will incorporate WQS as the ultimate goal for design and success.

Good point- text has been added to clarify the use of OWQS in determination of success. Please be reminded, however, that not all projects or measures of success as identified in our workplans, are related to attainment of OWQS. Some measures of success include installation of x number of septic systems or offering education opportunities to x percentage of the watershed population. However, where appropriate, attainment of OWQS or moving closer towards attainment of OWQS is an important measure of success.

§ V.B.6 – This section details numerous OCC protocols that will be used to make beneficial use support assessments. Again, beneficial use support determinations should be based on WQS, rather than internal (OCC) protocols.

This comment has already been addressed.

§ V.B.6.b. – The "comprehensive, complete data for the entire state" made available by OCC's efforts will only be a "powerful tool for decision-makers and planners" if it is supported by Oklahoma's WQS. *This comment has already been addressed*.

§ *V.C.1.* – The importance of LWQA, Water Watch, Phase I projects and BUMP to the state's NPS Management Program should be emphasized in this discussion. The narrative provides an adequate description of each program, but fails to discuss the importance of these programs to NPS Management in our state. Additionally, the heading for this section, "Lakes Assessment," does not adequately fit the programs listed in this section. Specifically, Water Watch and BUMP are both designed to monitor both streams and lakes. A more appropriate heading might be "OWRB Monitoring."

Good point- changes have been made to clarify the importance of the programs listed above to the NPS management program, along with the proper heading for the section.

§ VI.F. – In § VI.C., you state that the WAG is responsible for "making recommendations . . . on which BMPs should be used in the demonstration project." However, in this section you claim that the WAG will determine the BMPs to be funded (see paragraph 6). I have always been unclear on the role of the WAG in this regard. Which of the above statements is true? In my view, it is more appropriate for the state to develop these projects based on state priorities, and allow the WAG to work only within the boundaries established by the state. My fear is that BMPs that favor production, rather than environmental protection, could be selected for funding if the decision is left to the WAG.

A very understandable fear, confusing text, and also a valid point. Text has been modified to further elucidate the role of the WAG and the role they play in determining the BMPs to be funded in this section. The WAG is provided with a list of BMPs, all of which, if properly installed and maintained, will improve water quality in the watershed. Certainly, some of the BMPs, like riparian buffer establishment, seem more environmentally based than something like pasture improvement. However, because these are voluntary programs and OCC is not in favor of unnecessary regulations on producers, we would rather cooperate with them to meet water quality needs and their needs. None of the practices we recommend are production-based at the expense of water quality if properly installed.

§ VII.A.1.b. – Again, I am concerned about the potential for jurisdictional overlap between the OCC and OWRB. In this section, you explain the importance of the volunteer monitoring component of the Blue Thumb program. Title 27A O.S. 1-3-101(C)(8) gives OWRB clear authority for "implementation of a volunteer monitoring program to assess and monitor state water resources." Why is the volunteer monitoring component of Blue Thumb a necessary addition to the OWRB's Water Watch program, and how will OCC insure coordination with the agency statutorily charged with volunteer monitoring?

A very good question that is now appropriately answered in this section of the report. Indeed both the OWRB's Water Watch Program and the OSU Extension education efforts should be addressed in this section as they all fulfill valuable roles in the water quality education of the state. Text has been added to clarify the differences between the programs as well as the importance of both programs and the benefits of having as many sound education programs as possible in the state. Neither program is capable of providing a comprehensive statewide water quality education program, there's simply too much to do and too many variable strengths that the different agencies can offer. However, with multiple programs, the varying needs of different groups are more easily met. In addition, more of the state's private citizens have the opportunity to participate in the work of the different agencies if multiple education programs exist than if a single program was operated by a single agency. Otherwise, only the OWRB would have the opportunity to educate people about water quality and to utilize the fantastic resource of trained volunteer monitors.

§ VII.A.1.d. – In the last sentence of the second paragraph, you claim that the state has committed to developing twelve WRASs. To my knowledge, the state has only committed to drafting three WRASs, thus far. We have plans to collect further data/information on six additional watersheds in preparation for future WRAS activities. In the fifth paragraph, you should add that the "short list" of three priority watersheds is for both FY-99 and FY-00 restoration efforts.

Thanks for the clarification on this point. We're all a little sketchy on the details of the WRAS process. Text has been corrected to clear up this problem.

§ VII.A.2.a. – In the first paragraph, you mistakenly included the Farmers Union as a member of the state's UWA working group. The UWA working group is made up of six state agency representatives, two federal government representatives (USGS and NRCS), and one tribal representative (Caddo Tribe of Oklahoma).

This mistake has been corrected in the document and the UWA group correctly described.

§ VII.B.1. – In the last sentence of this section, you state that the entire FY-99 work program was spent on Lake Eucha. Is this correct? I thought the majority of the FY-99 money went to the Illinois River Basin.

Typo. This has been corrected in the text.

§ VII.B.2. – What are the 10 WRASs under development or proposed for development? I am not aware of this effort.

Apparently there were only 9. The 3 currently proposed and/or developed, and 6 others planned for further study.

§ VII.B.2.a. – I don't recall the NPS Working Group selecting the Turkey Creek watershed as a top five priority. At the 22 October 1998 Working Group meeting, OCC discussed Lake Eucha, Illinois River, Baron Fork River, Poteau River/Lake Wister, and Mountain Fork/Broken Bow Reservoir as the top five

that were selected. How did Turkey Creek make it on the top five list, and where does Turkey Creek rank in the State's Unified Watershed Assessment?

Turkey creek was selected a as priority area in 1996 by the NPS working group. Also that year, OSU proposed to do a TMDL for sediment on the creek. We determined that this was inappropriate because the data on the creek was so old that a proper project could not be planned. Hence the FY 96 Turkey Creek project was established. While the UWA does not list Turkey Creek as top priority, we believe it would be a mistake to drop this watershed and efforts already in motion until we have established that the waterbody is meeting beneficial uses.

In the second paragraph of this section, you state that two large-scale and two small-scale projects will be developed each year. What if the state decides that all of its §319(h) resources are needed for just one large-scale project? This statement may be unnecessarily inflexible for the state's NPS management program.

This was a mistake, the text should correctly read "no more than 2 large-scale projects and two small scale projects". The plan is to address one large-scale project per year, unless additional needs have been identified in the previous year's large-scale project. If additional needs are identified, in effect, two large-scale projects will be developed. This discrepancy has been corrected in the text. In addition, critical text was not transferred to this text which has now been added to clarify the priority watersheds.

§ VII.B.2.c.viii. – More detail should be provided in this section about DEQ's authority over septic systems and how OCC will coordinate NPS resources with DEQ's responsibilities.

This is not really the appropriate place for this information, given the brevity and content covered in relation to other source categories. DEQ's authority over septic systems is covered in sections IV.B.1., IX.A.6. and other areas of the text, as is OCC's capacity to coordinate with DEQ in septic system improvement.

§ IX.A. – Although Senate Bill 549 contains statutory roles and responsibilities, the more appropriate legal citation for these responsibilities is "Title 27A O.S. (1999 Supp.)." *This has been corrected in the text.*

§ IX.A.3. – The last paragraph of this section appears to be out of place. *It has been moved to where it was supposed to be.*

§ *IX.B.2.a.* – The statement, "OWRB is also designated to administer, receive, and manage all federal Clean Water Act monies, which come through the Office of the Secretary of Environment," is incorrect and should be deleted. This responsibility is more accurately stated in § IX.B.7.a.

This text has been deleted. The text was taken directly from OWRB's response to the NPS working group survey.

§ *IX.B.3.a.* – The first two sentences of this section -- "ODEQ is responsible for activities concerning Concentrated Animal Feeding Operations (O.S. 2 § 9-205.2). ODEQ has environmental authority concerning aquaculture, agricultural storage facilities, and point and nonpoint source discharges related to agriculture (O.S. 2 § 9-208)" – are incorrect and should be stricken. Most of these activities are under the jurisdiction of the Oklahoma Department of Agriculture.

We asked DEQ to further review this section and make the necessary corrections to the document. This section has been changed to correctly delineate ODEQ's statutory responsibilities.

IX.B.7. – Had I known that the information collected during the NPS Working Group efforts would be used for this purpose, I would have provided different information. Therefore, please make the following changes to this section:

b. Agency Goals/Mission with Regard to NPS Control

OSE takes very seriously the "fishable/swimmable" goal of the Clean Water Act and will work diligently to ensure that the NPS Management Program strives for this goal through a combination of voluntary and, when necessary, regulatory approaches. As the grant recipient for all Clean Water Act funds, and as the agency charged with coordinating all pollution control activities for the state, OSE will work with the OCC to insure that all NPS control activities meet appropriate state and federal guidance and priorities. OSE will also cooperate with other state environmental agencies to insure that agencies are performing tasks within their clear areas of jurisdictional authority.

c. Current/Planned Programs to Control NPS N/A

d. Agency Role in Planning NPS Watershed Projects

As the Clean Water Act grant administrator and coordinator of all pollution control activities, OSE will remain involved in all 319(h) activities. Additionally, OSE will coordinate with the OCC prior to the implementation of any changes in scope or direction with regard to Oklahoma's NPS Management Program. As the lead agency for Oklahoma's Unified Watershed Assessment and Watershed Restoration Action Strategy efforts, OSE will work with the OCC to insure that the state's watershed restoration priorities are addressed in the NPS Management Program. As chair of the state's Water Quality Monitoring Council, OSE will also work with the OCC to coordinate 319 Assessment activities with Oklahoma's other water quality monitoring programs.

This section has been changed in accordance with your wishes to better reflect the role and responsibility of OSE in the NPS program.

I realize that my comments are rather pointed, and I hope the OCC will not take offense at my candid analysis of the draft NPS Management Plan. My only objective is to eliminate some of the historical problems I have witnessed with the state's water quality management programs. Many of these problems are especially evident in the debate concerning Oklahoma's 303(d) list. I feel very strongly that if the OCC will work to address my two overarching concerns (i.e., water quality standards and water quality monitoring), the state's NPS Management Program will evolve into a more functional and constructive program.

Again, I appreciate the opportunity to review and comment on this extremely important document. I look forward to your response as you attempt to address not only my concerns, but also the concerns of the other members of Oklahoma's NPS Working Group. Please do not hesitate to contact me if I can be of any assistance in your efforts.

Sincerely,

J. D. Strong Director of Environmental Affairs CC: The Honorable Brian C. Griffin, Secretary of Environment The Honorable Dennis V. Howard, Secretary of Agriculture Mike Thralls, Executive Director, Oklahoma Conservation Commission Brad Lamb, Nonpoint Source Coordinator, U.S. EPA Region 6 (6WQ-EW)

Oklahoma Corporation Commission

General Comments

1. Most of this plan reads like the Oklahoma Conservation Commission 319 plan. The inclusion of other state and non-state agencies in the management and planning process is not very evident. We appreciate your concern with regard to the involvement of other agencies in the management and planning process of this plan. This plan is meant to be the State of Oklahoma's plan for NPS management. Although OCC is closely involved, it should not be considered as merely their plan for NPS management. This has been addressed in the text and corrected. What was not made evident and has been corrected by reference is that much of the text with regard to other agencies' authorities came from agency documents or web sites. These sources have been referenced in the plan in order to give proper credit.

The Nonpoint Source Working Group was divided into numerous committees that were supposed to draft text describing the various aspects and requirements of this document. Some provided excellent and very comprehensive text, such as the NRCS's contribution to the BMP section of the document. Others provided no suggestions, as the groups found it hard to find the time to meet and discuss the text. In those cases, OCC has tried to draft some skeleton text as the initial version of the document. It is our hope that this first review of the document by other agencies will help flesh out these sections.

In that manner, this review process is intended to serve as a means of other agency involvement. It is the responsibility of the OCC to draft this document, not the responsibility of any other state agency. While we could merely have asked other agencies to draft segments pertaining to their own individual jurisdiction, that would have likely resulted in a document even more disjointed and tedious. Thus it made more sense for us to put something loosely together and then have it reviewed by other agencies and let them fill in the gaps rather than having each agency draft a version of the section of the plan that corresponded to their statutory area of jurisdiction. We will make every attempt to respond to the comments and make corrections as necessary from all reviewers to develop a document that the Nonpoint Source Working Group approves of.

2. When will the Commission's compiling of reference streams program be completed? When will this list be made public? Are you planning to use this to make impairment decisions, or incorporate it into the state's water quality standards?

Actually, the compilation of reference streams is an evolving entity. Different implementation and monitoring efforts require different types of reference streams. Changes occur in landuse in a watershed that may alter a stream's status from a potential reference site to a potentially impacted site. We are a long way from having a list of reference streams for each ecoregion across the state. The compilation and verification of such a list is one of the purposes of the rotating basin monitoring program. Since that program monitors streams for 2 years every five years, in most parts of the state, it will be at least five years before we have sufficient data to show whether or not streams could be used as

reference streams. Incorporating selected waterbodies in to the standards as reference streams will be at the discretion of the OWRB. We do have a list of streams we are currently or will soon be monitoring which we consider to be likely reference streams for our east and west of I-35 projects. However, until these projects are completed between October 2000 (East of I-35) and October 2002 (West of I-35), we cannot confirm whether these streams should be considered as reference sites or not. A specific task of each of those projects is to compile a suggested list of reference streams for the particular part of the state. We can't use reference streams to make impairment decisions unless their use has been detailed in the OWRB's Use Assessment Protocols. The OWRB would like to incorporate the data collected on these reference streams in their efforts to develop Biocriteria.

3. Your report often refers to water quality problems caused by agriculture. Please reference any good studies done as to the percentage of stream problems from agriculture, oil & gas, point sources, urban impacts, etc. in the state.

Very few studies look at the state as a whole because few projects are effective on that scale. Most efforts focus at the watershed level or smaller. Studies that look at water quality problems in the state as a whole are generally required, and thus completed by federally funded programs or agencies such as EPA or NRCS. EPA's reports, of course, include 305(b), 319(h), 314

It is also important to point out that in reference to water quality problems in this document, we are referring only to those related to nonpoint source pollution. Point Source-related problems are not appropriate to discuss. However, you make a good point that more studies should be referenced in the document and an attempt has been made to correct this deficiency wherever appropriate.

4. Your maps should include discharging point source locations, and in the future the Commission should plan to try to identify water bodies impacted by point sources. Color-coded maps identifying stream segments impacted by different causes and sources would be a useful tool in separating impacts related to agriculture, oil & gas, point sources, urban impacts, etc. in the state.

OCC does not have statutory authority or jurisdiction regarding point source impacts to water quality, as has been repeatedly suggested by the agencies responsible for PS dischargers. Although we do have information about the location of point sources, our monitoring sites are structured around an attempt to avoid monitoring streams impacted by point sources. In some cases, we have no choice but to monitor streams downstream of a point source discharge, but in those cases, we seek methods of discerning between point source and nonpoint source effects such as also monitoring upstream of the discharge, detailed landuse surveys in the watershed, comparison to similar streams that have no point source discharge, etc.

The OCC agrees that a color-coded stream map as described would be an excellent tool in separating impacts related to agriculture, oil and gas, point sources, urban impacts, etc. in the state. Our Nonpoint Source Assessment Report will have such a map pertaining to nonpoint source pollution sources and cause codes. However, it is not within our authority to designate streams as being impacted by point source pollution. Thus, such a map would not be an appropriate part of the Nonpoint Source Management Plan unless it is based on determinations of point source impact made by the ODEQ or OWRB. Such a map would be more appropriate in a document such as the 305(b) report or included with the 303(d) list.

5. One major goal should be to make all data available in a user friendly format.

Excellent point. This is a definite goal of the program, but one that was not well clarified in the document. Availability of data in a user-friendly format will be added to the plan as a goal.

Specific comments

6. Page 5 Reference: Fact Sheet EPA841-F-96-004A

Given the oversimplification and errors in this and other material from EPA, this should be included only as an example of poor product.

The details related in this factsheet are based on information our state and other states provided EPA, not information EPA erroneously collected. If there were errors made in the presentation of the facts on this sheet, they were made by people at the state level, not EPA. EPA merely summarized what states gave them. In addition, where is the information to prove that this fact sheet contains conclusions that were in error? Yes, simplification is definitely involved when the results of 50 huge documents are summarized, but where is the information to show that the resulting conclusions are truly in error? I believe that is merely a statement of opinion. EPA is the predominant federal agency with an emphasis on water quality and protection of beneficial uses. As such, they have devoted significant resources towards the development of invaluable reference tools. As with every large collection of references, certainly some are more valid and well developed than others, but surely it is a gross generalization to suggest that material from EPA is full of oversimplification and errors. However, if you have valid studies and data to show that this or other material from EPA is indeed erroneous, please share it with us and we'll make appropriate changes in the document. As per your previous suggestion, further studies which support the EPA fact sheet will be referenced in the document such that the statement it makes is not supported by only a single reference.

7. Page 5 (1st paragraph)

"...Monies are specifically available in the Section 319 of the CWA and that state cost share program to implement these projects."

You should list or make a table showing how much money is available, for what projects.

Why do only certain agencies and types of projects ever seem to qualify?

The amount of money available to the state of Oklahoma varies from year to year. However, we could certainly include a table of past project budgets.

8. Page 9

"The State identifies waters impaired by nonpoint source pollution by examining currently available information (e.g., in reports under sections 305(b), 319(a), 303(d), 314(a), and 320). The State identifies important unimpaired waters that are threatened or otherwise at risk from nonpoint source pollution. The State identifies the primary categories and subcategories causing the water quality impairments, threats, and risks. The State periodically revises and updates the identification of impaired or threatened waters."

If you are going to reference these documents, you should also go on at equal length with their historical problems and inaccuracies!

The text that you are referring to is a description of key element #5, taken directly from EPA guidance describing what reports must be referenced in order to meet the requirements of one of the nine key elements of a nonpoint source program. EPA requires that we consider these reports in our determinations about which waters of the state are impaired by nonpoint source pollution. The

constraints and limitations of each report must be considered when planning and prioritizing NPS pollution control programs. While these reports are required to be used, we will consider the age, methods, and criteria in how they are used in the program. Where information is out of date or if criteria or methods have changed additional monitoring will be employed to verify the reported information prior to any actions. Language discussing this will be added to the planning sections.

9. Page 12 (2nd paragraph, regarding beneficial uses)

"...All users receive equal protection, for each has its unique environmental and economic importance to Oklahoma...."

Why? Is recreational fishing or hunting as important as growing food that feeds millions? The mandate that all uses receive equal protection is taken directly from the Clean Water Act. However, recreational fishing and hunting is not the main goal of the fish and wildlife propagation beneficial use. Perhaps better termed aquatic life support, it protects our water resources as having the potential to support aquatic life. The OCC supports the concept that all uses should receive equal protection as they are all really tied together. What good is it to have water that is good enough to irrigate crops, but not good enough to support aquatic life? Chances are, if water cannot support aquatic life, it can also be harmful to humans. Why should Oklahoma sacrifice the quality of its water, one of its most valuable natural resources (and yes, recreational use is a valuable industry too), to feed millions in other states? If we do not protect the water resources we have, we won't have any in the future to use to grow food to feed millions of people. In addition, it is much more cost effective to prevent pollution than to clean it up. We have to give all beneficial uses equal value because no one has the authority to claim that one is more important than the other.

10. Page 19 (2nd paragraph)

"The goals for the State of Oklahoma are to conserve, enhance, and restore the quantity and biological diversity of all wetlands in the state."

I truly doubt that we intend to restore anywhere near the quantity of wetlands that have been drained for farming or development or drowned to make lakes!

This text was taken directly from Oklahoma's Wetland Management Program, a document in its final format, approved by EPA, which was available for public comment. I don't believe the text is implying that we will restore all wetlands as they existed prior to settlement. However, our system of reservoirs, flood control structures and sediment retention systems has created a number of new wetland systems. The goal is to support both quality and quantity of the wetlands we currently have.

There have been a number of comments in reference to the Wetlands Management Program. However, that document is in final approved format and this is not the correct forum to make those changes. It will certainly be noted that a number of concerns have been raised concerning the program, which is likely soon due for revision. This management plan must reference other plans as they currently stand and so we cannot make changes to the NPS Management Program with reference to the Wetlands Management Program. We will forward all comments received pertaining to the Wetlands Management Program to the Wetlands Program and encourage them to revise the document. We will incorporate revisions to the Wetlands Section of this plan once the Wetlands Management Program has been revised.

11. Page 19 1. Definition of Wetlands
For a general definition of wetlands, the plan recommends that the definition for wetland developed by the national Academy of Sciences be used as the state's general definition."

Please quote or attach. I also think we should adopt one authority for wetlands definitions and delineation, such as the NRCS, and not add in a suite of others such as the EPA and Corps of Engineers delineations and definitions.

Please see comments above.

12. Page 20 4. Standards for Beneficial Uses of Wetlands

I support establishing this as a beneficial use. Better rules and standards need to be approved as part of the OWRB process.

OCC agrees wholeheartedly with this statement. We also agree that the rules and standards must be approved as part of the OWRB process.

13. Page 21 "Objective 11:To establish a comprehensive statewide wetlands mapping program." How good is the NRCS Wetland Inventory completed in the 1980's? Does it simply need updating, or are there major flaws in scope and methodology? *We will forward this comment pertaining to the Wetlands Management Program to the Wetlands Program.*

14. Page 22 "Some key actions items associated with these objectives are: Continue state participation in acquisition programs through the North American Waterfowl Management Plan administered by the Oklahoma Department of Wildlife Conservation." Explain what this is, what it does.

Please refer to previous comments dealing with wetlands in general and this program in particular.

15. Page 26 "4. Implement source Reduction and Wellhead Protection Programs to Reduce Ground Water Pollution. "The 319 program will coordinate and supplement source water protection programs to protect ground water...."

Isn't wellhead protection (which is too often a joke, done by rote models rather that a decent study taking into account aquifer conditions, sources, and flow patterns) a DEQ function?

Good point- source water protection is primarily a DEQ function. Amendments to the Safe Drinking Water Act required the development of a Source Water Protection Program. Funding for this program was set aside from the Drinking Water State Revolving Fund. The amendments required two tasks to be completed within 4 years. The first is to delineate all sourcewater protection areas, and the second is to assess the delineated area for risks of contamination. Further implementation steps are voluntary on the part of the state. ODEQ Water Quality Division has proposed a program to achieve this goal based on the approved procedures of the Wellhead Protection program. However, 319 projects attempt to focus on major NPS-related WQ concerns in different areas, and in some areas, part of that concern is contamination of wells due to NPS pollution. We've had several projects with education components related to wellhead protection, as well as cost-share funds available for wellhead protection. Septic systems also fall under the jurisdiction of ODEQ; however, OCC and conservation districts can offer cost share assistance to improve these systems as well as education programs related to the importance of septic system maintenance and adequately constructed systems. Text has been added to the document to clarify this.

16. Page 28 (2nd bullet)

"What levels of pollutants are due to natural sources and how much is due to anthropogenic sources"

This is critical basic information, which should be gathered before any TMDLs are even considered! This is an excellent point and the answer varies widely from stream to stream. OCC agrees that this information should be gathered as part of the TMDL process. Several methods exist for estimating the percent loading due to background levels as opposed to anthropogenic sources. The most common method involves monitoring and/or modeling (with appropriate verification with actual data) the load from reference subwatersheds with little or no development and comparing those loadings to developed subwatersheds in the basin. OCC utilizes this method whenever appropriate. This is another reason behind our development of reference streams for the state.

17. Page 36 #4. Future Monitoring

"When technology information and financial resources become available, the monitoring program will be expanded to include other potential NPS pollutants, such as endocrine disrupters." It would be better to first improve our current inadequate monitoring program, coordinating AND FUNDING monitoring of known pollutants with other state agencies, especially monitoring streams which have never or infrequently been assessed, rather than having off after the unknown!

OCC completely agrees with this statement which is why we talked about this as a future potential effort, with the stipulation that when technology, information and financial resources become available, the monitoring program will be expanded. We would certainly not add another suite of parameters or emphasis to our monitoring program at the expense of parameters that already have criteria in OWQS. However, it would be a grave error to decide that we have a handle on all the parameters we will ever be concerned with. Nutrients are a prime example of the fact that you never know what might be causing problems in our water resources- point sources are just now being required to monitor phosphorus output because we've realized the problems it might cause. New research indicates a frightening number of bacterial strains are becoming resistant to antibiotics and are able to travel in viable form through waterways. It is possible that one day we may need to monitor those strains the same way we monitor E coli.

OCC believes we are making great strides at improving our monitoring of NPS pollution to water resources through our rotating basin monitoring program. The physical and temporal coverage, as well as the number of parameters monitored and the extent of the collections is broad and should provide as extensive an estimate of NPS impacts to waters of the state as we can hope to get.

18. Page 46 River and Stream Monitoring -- "The OWRB is currently monitoring almost 200 sites on a monthly basis".

Is there duplication with Conservation Commission sites? Again, need coordination with other agencies!

This issue has been addressed on numerous occasions as per whether or not there is duplication with other programs. However, it was obviously not made clear in this document, although I'm not sure this document is the appropriate place to validate the need for BUMP. Please refer to the response to the previous comment (OSE) regarding this matter. The two programs were developed with seemingly similar, but in actuality, very different objectives. There is little, if any, overlap and the overlap that exists, exists for the purposes of program comparison and quality control issues. The OWRB's program lacks several essential components necessary for separation between point source and various types of nonpoint source pollution. The OWRB's monitoring program is not sufficient to monitor, evaluate, and assess nonpoint source pollution in the state. However, OCC believes the BUMP monitoring can be

very beneficial to the state and is necessary to tie the smaller arena of NPS pollution to the larger question of overall state water quality.

19. Page 44 iii. Dissemination of Information

....A complete and updated list of data will also be available on the OCC Water Quality web page. Great! When?

We're working on it as we speak. Data availability in a user-friendly format is a high priority. It is also a monumental task, and we realize that we been talking about having the data available over the web for a while now. However, we are correcting our personnel deficiencies and have acquired the Oracle software that will allow us to upload data to STORET. Our goal is to have data available on STORET and/or our web page during the year 2000. Our ultimate goal is to have our data available in a format such that you access a map of sites, point and click on a site, and pull up a data summary of information pertaining to that site.

20. Page 56 (1st paragraph)

"....In order to be removed from the list, a TMDL or some other type of reparatory activity must be completed. TMDLs are the most common means by which these problems are addressed."

Not necessarily true. Corp Comm fixes many stream pollution problems through adjacent pollution cleanups. You should also enumerate the ways to remove a water body from the 303d list, from finding errors to monitoring to demonstrate no problem now.

Excellent point. Text has been added to clarify what was meant by "some other type of reparatory activity." Certainly Corp. Comm. pollution reduction efforts are effective means by which to remove streams from the list. However, TMDLs remain as the most common means by which streams are removed from the list, simply because the majority of streams that will remain on the list cannot be remediated by anything other than watershed-scale pollution reduction activities, rather than single-site clean-ups.

21. Page 91 #2. CURRENT AND PLANNED NONPOINT SOURCE ACTIVITIES "At the end of 1998, the OCCWQ Program had a total of 45 active projects including 40 319(h) and 5 104(b) grants...."

Is there a report on the work done and various findings, when a project is completed?

Yes, final reports, along with semi-annual progress reports, are a component of nearly all 319 projects. In addition, an annual report is written which summarizes the results and activities of the OCC WQ programs 319 program.

I notice again that only certain agencies and types of projects ever seem to qualify. As usual, 319 money is basically for agriculture, not for solving other problems. It would be nice if 319 money was made available in proportion to need rather that dedicated to priorities set by only one agency. For example, Oil & Gas related problems are alleged for involvement in at least 10% of 303d streams, yet NO 319h or other federal NPS money has ever been made available to solve those problems!

In the past, OCC accepted project proposals from various agencies and universities and awarded monies for a number of demonstration projects every year. Most of these projects were related to agriculture. With changes in the 319 guidance on the way the money can be used and the emphasis on priority watersheds, OCC has altered its approach and now plans to focus on a single effort a year, rather than 7-10 smaller projects. With particular reference to oil and gas related problems, Wister Lake is one of the high priority watersheds where NPS pollution from oil and gas activities has been

noted as a significant problem. OCC would like to work with the Corp. Comm. to address these problems in this watershed, and has already surveyed Corp. Comm. through the NPS working Group as per what activities and or needs pertinent to this priority watershed Corp. Comm. views as being appropriate or desired. As efforts to develop a project in that watershed continue, please be assured that OCC will work with Corp. Comm. to ensure that the project considers NPS pollution from oil and gas related activities. Past 319 projects have been directed to solve oil field problems. Please refer to the FY 93 319 project on Clearview Creek demonstrating technology to reclaim a severely eroded abandoned oilfield site. Also please refer to OSU Cooperative Extension Water Quality Series E-940 "Pollution Prevention at Exploration and Production Sites in Oklahoma". This document was paid for with 319 funds. The FY 97 319 project in Latimer County is working with exploration companies to demonstrate practices that will reduce erosion from seismic lines and oil field roads.

OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY

October 11, 1999

TO: Phillip Moershel

FROM: Jon Craig

SUBJECT: Draft of the Oklahoma Nonpoint Source (NPS) Management Plan

The DEQ has reviewed the draft NPS Management Plan and offers the following comments.

1) General

The priorities for monitoring, assessment and implementation should be based on the needs identified as part of the 303(d) listing and TMDL processes, as reflected in the Unified Watershed Assessment. The waterbodies identified as impaired or threatened due to NPS on the states 303(d) List should be the highest priority for monitoring and assessment activities under the NPS Management Plan. Once monitoring and assessment is complete and a TMDL is completed these waters should continue to high priorities for Best Management Practices (BMP) Demonstration Projects and 319 funding. *OCC agrees that the UWA should define the priorities for monitoring, assessment, and implementation and indeed follows this priority list in developing those activities. We agree that 303(d) listed waters should have high priority for monitoring. Indeed, we are including 303(d) listed waters in our monitoring program. Monitoring of 303(d) listed waters is a specific goal of the program. Our monitoring program doesn't cover all of the 303(d) listed waters, nor should it. OWRB is monitoring a significant number of those streams and for OCC to do the same would represent duplication of efforts.*

2) VI.G. Best Management Practices For The Control Of NPS Pollution

Several of the references to DEQ "Experts" need to be updated.

- Code 1700 Aquaculture, add Quang Pham
- Code 3000 Construction, add Don Mooney
- Code 3200 Land Development, add Don Mooney
- Code 4000 Urban Runoff, add Don Mooney
- Code 4200 Combined Sewers, remove David Hargrove and Mike Moe
- Code 6000 Land Disposal, change Mike Moe to Quang Pham

- Code 6200 Wastewater, remove David Hargrove and Mike Moe
- Code 6400 Industrial Land Treatment, change Mike Moe to Quang Pham
- Code 6500 On-Site Wastewater Systems, change Mike Moe to Quang Pham, change Laird Hughes to Chris Wisniewski
- Code 7100 Channelization, add Stephen Weber, 404 permit certification

• Code 7200 Dredging, replace Christy Hughes with Stephen Weber, 404 permit certification *These corrections have been made in the text.*

3) IX.B. Agency Authorities and Responsibilities.

The DEQ has no statutory responsibility for Confined Animal Feeding Operations. *These corrections have been made in the text.*

Thank you for the opportunity to review this plan and if we can be of any further assistance, please contact Bob Bednar at 702-8197

Oklahoma Department of Wildlife Conservation

October 13, 1999

RE: Nonpoint Source Management Plan

Phil Moershel Oklahoma Conservation Commission 413 NW 12th Oklahoma City, OK 73102-3706

Dear Phil:

The Oklahoma Department of Wildlife Conservation (ODWC) has reviewed the Nonpoint Source Management Program 1999 Update and has the following comments regarding the document.

On page 145, number 14, a, Agency Responsibility and Authority, ODWC has authority to investigate violations of O.S. 29 § 7-401 and § 7-401a, and O.S. 27. Same page, 14, b, Agency Goals/Mission with Regard to NPS Control, ODWC's mission as stated in our agency's Strategic Plan is to manage Oklahoma's wildlife resources and habitat to provide scientific, educational, aesthetic, economic and recreational benefits for present and future generations of hunters, anglers, and others who appreciate wildlife, with the goal of conserving, sustaining, enhancing, and protecting fish and wildlife resources, habitat and biodiversity. Under 14, c, Current/Planned Programs to Control NPS, ODWC has programs underway in its Wildlife Division to restore wetlands and in its Fisheries Division to protect fisheries from the impacts of NPS pollution. The Natural Resources Section conducts environmental reviews for impacts to wildlife as well as fish and wildlife kill investigations.

Thank you for the text we can add to this section. The ODWC's programs are now more accurately described in the Management Program.

Under the Wetland Management Plan, beginning on page 18, ODWC has commented on Oklahoma's Comprehensive Wetlands Conservation Plan in two previous letters dated December 16, 1994 and May

3, 1996. Our comments and concerns relative to the Comprehensive Wetlands Conservation Plan are the same as reflected in our two previous letters. Additionally, on page 19 of the NPS document, regulatory efforts should be included as a method for accomplishing wetland conservation and management. Also, on page 19, fish and wildlife habitat should be included under the functions associated with Oklahoma's wetlands. In addition to evaluating wetland quality and functions, the quantity of wetlands should also be assessed. On page 20, ODWC should be added to the list of agencies that should pursue a cooperative effort to record soils, hydrology and wetland data. Under some key action items associated with wetland objectives on page 22, acquisition programs through the North American Waterfowl management plan should be changed to wetland conservation programs. Also, ODWC WHIP, NRCS WHIP, and NAWMP/NAWCA should be added to the voluntary landowner assistance programs for wetland conservation.

We greatly appreciate the comments on the Wetlands Management Program Section. Obviously, this plan is in need of revision. Unfortunately, it has been approved and currently stands as the State's Wetlands plan. We can't make changes to the plan, but will forward these comments to the group responsible for the plan, with the suggestion that the plan is in need of revision. Once the Wetlands plan has been revised, we will change this part of the Management Program to reflect the new Wetlands Plan.

ODWC supports the two long-term goals stated in the NPS Program Plan, to attain and maintain beneficial uses; and the short-term goals and objectives laid out to achieve the long-term goals. As a specific comment, however, we request further clarification on the terms "the state" and "NPS Program" as used throughout the short-term goals for both watersheds and statewide, and the statewide short-term goals to attain and maintain beneficial uses. In some cases, "the state" appears to reference the Oklahoma Conservation Commission (OCC). In other instances, it is not clear who "the state" is meant to be. Further clarification on each state agency's role in accomplishing the goal or objective is needed. Also, under the short-term programmatic goals, it is not clear how "the state" or the "NPS Program" will accomplish these goals and objectives. Also, who does the "NPS Program" refer to under (h), (i), (j), (k), (l), and (m) of this section? For example, (l) reads "The NPS Program" is and how will it evaluate and disseminate these practices would be helpful.

The vague language in this section was indeed confusing. We've added text to clarify the roles of different agencies with respect to the goals of the management program. We hope these changes have been sufficient to clarify that although the OCC is one of the main agencies responsible for the NPS program, many other state and federal programs participate and contribute in invaluable ways to the success of the program.

We believe including the Beneficial Use Monitoring Program (BUMP) into the short term goal of systematically identifying threatened and impaired waters and watersheds is appropriate. Relying solely on BUMP to address assessment monitoring, however, would be a mistake. The Water Quality Monitoring Council (Council) could address NPS pollutant monitoring to ensure that BUMP is used in coordination with OCC's 5-year rotational monitoring program, avoiding duplication of effort. The BUMP's funding is not only recent, but is allocated annually from the state legislature with no guarantee that it can be relied upon into the future. Additionally, discussions at the Council have already identified that the limited funding received by the Oklahoma Water Resources Board to implement BUMP is much less than is needed to get the job done.

This is especially true for the process of designating water bodies with NPS impairments. At a time when many of the agriculture related organizations and the state have discovered a tremendous lack of water quality data to assist in this task, it is counterproductive to weaken the state's ability to collect valuable data. The state needs to generate as much quality information as possible on a statewide basis. The OCC's monitoring program will work in concert with the BUMP in order to achieve this goal. The OCC has established a valuable and high quality water monitoring program that the state relies on for directing its water management programs. With all the current gaps in NPS water quality information, no state agency should stop generating water quality and biological information. This comment to continue data collection also applies to the proposed short-term goals and objectives of monitoring land use trends, continued monitoring of impaired waters, and ground water monitoring.

We also agree with the NPS Management Plan's objectives to proceed with prioritizing watersheds, identifying pollutant sources within watersheds, and drafting TMDLs and Watershed Restoration Action Strategies to address NPS pollutants. These efforts have taken years to implement, and represent a tremendous investment in state and federal funding and resources. The goals and objectives proposed in this NPS document illustrate extremely valuable components of the state of Oklahoma's efforts to make accurate assessments of its water quality, and are crucial to making informed and precise decisions about managing its waters.

Sincerely,

Ron Suttles Natural Resources Coordinator

Oklahoma Farm Bureau

Comments on Oklahoma's Nonpoint Source Management Plan prepared by Marla Peek, Director of Political Education & Regulatory Affairs, Oklahoma Farm Bureau September 20, 1999

On behalf of the state's largest farm organization, we appreciate the opportunity to comment on the Nonpoint Source Management Plan (Plan). We appreciate the efforts of the Oklahoma Conservation Commission (Commission) to work with us to address our interests and concerns.

These comments will be presented in three parts. The first part will consist of general comments about the Plan, as conceived and administered by the Commission. The second part will include comments about specific elements of the Plan. The third part will consist of comments from two Farm Bureau members engaged in production agriculture.

GENERAL COMMENTS

Introduction

A little less than 75% of all the land in Oklahoma is managed by farmers and ranchers. Oklahoma is blessed with more than 23.5 million acres of grazing lands, which are an excellent land use for water quality purposes. Well managed grazing lands reduce flooding, recharge groundwater, filter out sediment, fertilizers, pesticides, and other things, and provide a cleaner, more healthy water supply. Grazing lands protected by adequate vegetation reduce soil erosion from the wind, which means less dust is in the air. Well managed grasses and forbs protect the soil from wind and water erosion.

Crop land can also act as a cleansing mechanism for water quality. One water quality study we're familiar with revealed that annual deposition of total nitrogen from rainfall on a watershed of crop land actually exceeded loads of total nitrogen in runoff. (See Attachment A.)

Misrepresentation of Oklahoma's Water Quality

Oklahoma Farm Bureau (OFB) has been concerned with what we see as the misrepresentation of the water quality in our state to the detriment of agriculture. In an attempt to gain federal funds for conservation projects, it appears we have painted a dark and misleading picture about our state's water quality. This is evidenced by what it says about Oklahoma on the EPA's web site, "....Agriculture is the leading source of pollution in the State's rivers and streams....Agriculture is also the most common source of pollution in lakes...." This information was provided to the EPA from our state's 305(b) Report. (http://epa.gov/OW/resources/9698/ok.html)

Overstatement of NPS Problems

We perceive a similar tone in the Plan, as it appears there is an overstatement of agriculture pollution problems in order to create a sense of urgency and to sell the need for 319 funding.

OFB's Concerns with NPS Water Quality Monitoring

We think the NPS water quality monitoring program needs to be re-examined. Following are some of our thoughts regarding our main concerns about the monitoring program.

• We think monitoring of 303(d) listed waters should be conducted immediately, regardless of their location around the state. We think the five-year time frame is too long for producers who are facing regulations because of inclusion on this list.

The goal of the monitoring program is to assess the status of the state's waters with respect to NPS pollution. This entails monitoring waters that are suspected to be **both** impacted and unimpacted by NPS pollution (based on historical collections and listing in various reports). If we were to bias our monitoring towards 303(d) listed streams, then the NPS assessment report would likely be biased towards impacted streams and paint a less representative picture of the water quality of the state. At least 25% of the streams monitored in the program are currently listed on the 303(d) list, nor is OCC is not the sole agency responsible for listing streams on the 303(d) list, nor is OCC the sole agency responsible for monitoring listed streams. Changing the emphasis of the monitoring program to focus on 303(d) streams would be a poor use of funds. The program as it stands can accomplish multiple tasks (including 319 assessment report, 305(B) report, 303(d) list, development of WQS criteria such as biocriteria and nutrient criteria, reference stream development, TMDL support, etc.), if it were biased towards 303(d) streams, it would be suitable only for that task.

We are trying to accomplish multiple tasks with limited funding. The OCC and other agencies have many responsibilities in addition to 303(d) list updates. OWRB's BUMP program has made a concerted

effort to monitor 303(d) waters as part of their program. If OCC were to change the emphasis of their program to focus on 303(d) streams also, it would constitute duplication of efforts and misuse of state funds.

• There are frequent references in the Plan to the Commission's compiling of reference streams. This program seems to have been on-going for a number of years. When will this program be completed? When will the reference streams listing be made public? If reference streams are to be utilized to make impairment decisions, they should be incorporated into the water quality standards. This will allow for public review and public participation for using reference streams in water quality determinations.

The OCC has been talking about reference streams for a number of years because reference streams play such a large part in the ability to discern between anthropogenic nonpoint source pollution and natural loading. We have only been able to do sporadic (temporally and spatially) data collection concerning reference streams because in the past, our monitoring has been restricted to implementation projects. The compilation of a statewide list of reference streams is an evolving entity, one that will likely never be entirely complete because changes constantly occur in watersheds. Different implementation and monitoring efforts require different types of reference streams. Changes occur in landuse in a watershed that may alter a stream's status from a potential reference site to a potentially impacted site. We are a long way from having a list of reference streams for each ecoregion across the state. The compilation and verification of such a list is one of the purposes of the rotating basin monitoring program. Since that program monitors streams for 2 years every five years, in most parts of the state, it will be at least five years before we have sufficient data to provide a statewide list of streams that could be used as reference streams. We have identified a number of streams that could be considered as reference sites based on past work, but these are not spatially statewide in coverage. In addition, we have a list of streams we are currently or will soon be monitoring which we consider to be likely reference streams for our east and west of I-35 projects. However, until these projects are completed between October 2000 (East of I-35) and October 2002 (West of I-35), we cannot confirm whether these streams should be considered as reference sites or not A specific task of each of those projects is to compile a suggested list of reference streams for the particular part of the state. Reference streams will be used to make impairment decisions following the OWQS and Use Support Assessment Protocols. The OWRB has projects in place to validate data collected on candidate streams in their efforts to develop Biocriteria. We support their efforts along this line.

• There are broad references in the Plan to how impaired and threatened determinations of waterbodies are made, based on 305(b) guidance and Oklahoma water quality standards. We think the Commission will acknowledge that in the past, listing decisions were made primarily using best professional judgement, rather than on objective criteria. We would like assurances that no NPS waters in Oklahoma will be listed as impaired or threatened on the 319 Assessment, the 305 Report, or the 303(d) List, for any pollutants with narrative criteria, until Use Support Assessment Protocols are promulgated for such pollutants into the state's water quality standards.

OCC disagrees that we used merely best professional judgement to make use support determinations. That would imply that we drove to a stream and did a windshield survey to make use support determinations. We have always followed Oklahoma Water Quality Standards in making use support determinations. Unfortunately, Oklahoma Water Quality Standards had only narrative criteria for many key NPS contaminants. Because of this lack of numerical criteria, OCC used the next best thing to state criteria, and followed EPA guidance which recommended the use of Gold Book Values. That

language is still in the federal register as the recommended method unless more appropriate state-level numerical criteria exist. OCC agrees that this is not currently recognized as the most appropriate method, but it was appropriate at the time.

As per future determinations of use support attainment, OCC has agreed as part of the standards development process and in working towards the development of Use Support Assessment Protocols, to use those protocols to make use support decisions. We will continue, as always to use Oklahoma Water Quality Standards to make use support attainment decisions. We are also very encouraged by the new USAP protocols proposed for delineating nutrient threatened streams. We believe these protocols will help us provide a more accurate picture of the streams where high nutrient concentrations threaten attainment of beneficial uses.

• The "Assessment Monitoring" part of the Plan is extremely comprehensive, with regard to the number of monitoring sites in the state. We wonder if our tax dollars would be better spent by using fewer sites, and focusing more 319 dollars on "Diagnostic Monitoring" and TMDL development. We would like to see the NPS monitoring program complement the Beneficial Use Monitoring Program (BUMP). When problem areas are identified through the BUMP, diagnostic monitoring could be conducted to search out NPS concerns, for example.

Efforts were made to tailor the NPS program to complement and avoid duplication with the BUMP program. OCC and OWRB staff have met several times to review sites to avoid duplication. We will confer with the OWRB when additional sites are selected. We should reiterate that the monitoring program attempts to accomplish multiple tasks. Assessment monitoring is the most important initial phase to all of those tasks, and the phase that has been most neglected in the past. In addition, it is this past neglect which supposedly has resulted in the perceived deficiencies with respect to the 303(d), 305(b), and 319 Assessment Reports. Also, please refer to previous responses to similar comments in this section (OSE & OK Corp. Comm.)

- The map on page 33 shows the locations of the USGS HUC 11 Watershed Outlets used by Commission as NPS monitoring sites. These sites are billed as NPS monitoring sites, yet, we have no idea how many of these sites are affected by point source discharges, or nondischarge activities. We believe discharging point source locations should be mapped as well. We are concerned that point source pollutants, such as nutrients, have been attributed to agriculture when the true culprits are really point sources. We believe the Commission needs to take a greater role than it has in the past in identifying waterbodies impacted by point sources. *Please refer to the response to the Oklahoma Corporation Commission's similar comment.*
- We agree there is a need to perform bioassessments on a limited basis. However, we are opposed to using bioassessments in waterbody impairment or threatened listing decisions, until such time as biocriteria are promulgated into the Oklahoma Water Quality Standards (OWQS). *Please refer to the responses to multiple previous comments made by the OSE and Corp. Comm. OWQS and USAP currently contains language with regard to the use of biological data and OCC has followed and will continue to follow the directives of that language in making impairment or threatened listing decisions.*
- There are many references in the Plan to making data available to the public. We have found the opposite to be true. Many times, we've had to request specific data in writing. Once the data is in

our hands, we still have to interpret it. The data we have seen is not user friendly. To truly have public participation in the Commission's programs, this problem must be remedied.

OCC recognizes and agrees that data should be more readily available in a user friendly format. This is a goal of the plan and text has been added to the report to emphasize this need. However, you can't expect a large quantity of data to be available in a user-friendly format overnight. The process is complex and appropriate methods to interpret the data are changing with the development of USAP and related protocols.

With respect to the necessity of requesting data in writing, it helps to more accurately convey exactly what data is being requested as data requests over the phone tend to pass through several people and may lose specifics in the translation from someone who doesn't deal with the data and the data manager. Written requests ensure that the data manager is always privy to the exact nature of the request.

OCC provides interpretation of the data regularly in various project summary reports or (less frequently) in the 319 Assessment Report.

Lack of Oversight and Producer Input into NPS Management Plan

We believe there has not been enough oversight and input into the NPS Management Plan by conservation district directors and by agricultural producers. We would like to see the new Water Quality Division Director review all of the Division's programs, with the assistance of a select group of conservation district directors, agriculture producers, and agriculture organization representatives. The NPS Working Group cannot fulfill this role, as it is too big and too diverse. Agriculture producers are outnumbered on the NPS Working Group by environmentalists and bureaucrats. We must remember that as roughly 75% of the state is operated in farms and ranches, farmers and ranchers need to have greater input into the Plan. We recognize, of course, that urban impacts on NPS are great. But, as many of these areas lie within chartered cities, they need not be the focus of the efforts of the Plan. Oklahoma has 88 conservation districts, with a wide range of concerns particular to their own part of the state. The conservation district concerns are represented by Rick Godfrey with the Oklahoma Association of Conservation Districts, and through the OCC. In addition, the Management Plan will be forwarded to each district for the purposes of review and their comments will be incorporated when possible into the final document. Ag producers are represented by the Ag Department, Cooperative Extension, NRCS, Association of Conservation Districts, Farm Service Agency, Farmers Unions, Oklahoma Farm Bureau, Poultry Growers Association, Cattlemen's Association, and the Broiler Production Council. The NPS Working Group is made up of 42 members, 12 of which are entirely agrelated and 4 of which are environmental groups. The rest of the group is made up of bureaucrats. The bureaucrats responsible for making the decisions and running the programs, so it is entirely appropriate that they be included in the group.

Non-point source pollution affects everyone, both in the ag and urban communities. Therefore, both constituencies need to be involved in reviews of the Water Quality Programs. In addition, although many stream segments impacted by NPS from urban sources are within city limits, they are part of systems that do not recognize political boundaries and thus are appropriately addressed by the state NPS Management Plan.

The OCC believes we have offered multiple opportunities for conservation district directors and ag producers to comment on the Management Plan. However, to date, we have received comments only

from the Farm Bureau and the Broiler Producer Council. We greatly appreciate these comments and have tried to improve the plan to better address the concerns raised in these comments.

Conclusion of General Comments

OFB has always been a strong proponent of soil and water conservation, and of the programs of the Commission. OFB members are the directors of conservation districts all over the state. We would like to see the NPS programs of the Commission refocused and redirected to reflect the concerns of the largest private landowners in the state, Oklahoma's farmers and ranchers.

OCC agrees that agriculture, in general, due to its dependence on soil and water in the state and strong moral fiber, has long made efforts to protect those resources. OCC's programs offer ag producers help in their ongoing efforts to protect natural resources. Through incentives programs and education efforts, OCC and related programs such as those offered through NRCS and FSA are trying to help ag producers decrease their contribution to the NPS problem. Those programs wouldn't exist if there wasn't strong evidence to show that ag-related activities contribute to NPS pollution and that BMPs were available and successful in reducing the impacts of those activities. Many farmers count on the assistance offered by those programs. OCC agrees that agriculture is not the sole source of NPS pollution in the state; however, many studies (not just the EPA document) indicate that agriculturerelated activities are major contributors to NPS pollution in the state. As OFB repeatedly states in their comments, a majority of the private land in the state is devoted to agriculture, and research from multiple sources indicates that many streams in the state whose watersheds contain no point sources and the landuse is mainly ag-related are affected by NPS pollution. The OCC program is directed by Oklahoma framers and ranchers by statute as written in §27A-3-2-101 C. "....Each member of the Oklahoma Conservation Commission shall be a Conservation District Director during the entire term as a Commission member. No fewer than three members of said Board shall be actively engaged in the practice of farming and/or ranching or shall derive at least a majority of their income from farming and/or ranching."

SPECIFIC COMMENTS

Page 4 Mission statement: Conserve and Improve Water Resources through Assessment, Planning, Education, and Implementation

While this is a laudable and positive mission statement, there is no mention of involvement with the conservation districts. We're concerned this reflects a "top-down" mentality.

Yet there is mention of involvement and partnerships with conservation districts and other applicable agencies throughout the remainder of the document. We don't believe that the mission statement is the appropriate venue to describe all the appropriate partnerships in the plan. One of the state's long-term programmatic goals specifies building and sustaining partnerships with various groups including local conservation districts.

Page 5 Reference: Fact Sheet EPA841-F-96-004A

Regurgitating an erroneous EPA Fact Sheet is insulting and harmful, and says nothing about NPS and Oklahoma. The information in the National Water quality Inventory came from states. Farm Bureau has studied and written about the short comings in the states' 303(b) reports. We strongly object to quoting from EPA Fact Sheets, which are based on poorly qualified information, including that from Oklahoma. (See Attachment B, EPA's National Water Quality Inventory, by Don R. Parrish, Environmental Policy Specialist, Public Policy Division, American Farm Bureau Federation.)

Page 6. "...small and medium-sized animal feeding operations,... are major contributors of these pollutants."

We have seen no credible evidence that small and medium-sized animal feeding operations (AFOs) are <u>major</u> contributors of sediment and nutrients to waters all across the state. Other than Beaty Creek in the Lake Eucha watershed, we are unaware of any water quality monitoring that has been done that shows AFOs to be major contributors of sediment and nutrients. We think the above statement is inflammatory and misleading. Many AFOs fall under regulatory programs of the Oklahoma Department of Agriculture. Other AFOs have voluntary conservation measures in place. We object to this characterization of AFOs.

Actually, numerous other studies show that AFO's contribute to sediment and nutrient problems in the state. These include the Tenkiller Clean Lakes Report (and numerous other studies conducted in the Illinois River Basin), the Wister Lake Clean Lakes Report (and associated work), OCC reports on Mark Creek, Southern Oklahoma Multiple Basin Study, Little River Basin, and numerous other studies across the state. In addition, we have data (not yet finalized in reports) to show that animal feeding operations contribute significantly to nutrient and sediment loads in many small watersheds across the state. However, OCC also has studies that show that in some watersheds, the major source of nonpoint source derived sediment and nutrients are from streambank erosion and other sources. In addition, the statement lists several other activities which are major contributors to NPS pollution in different areas of the state; AFOs are not singled out as the major contributor to NPS pollution in the state. We realize this statement could be interpreted to incorrectly imply that AFOs and other ag-related activities were two of only 4 contributors to NPS pollution. The text has been corrected to include other examples of major contributors to sediment and nutrients throughout the state. If you have data to prove that AFOs are not a major contributor to sediment and nutrients in different parts of the state, please share it with us as it could be very valuable to directing our program. It would be very beneficial to have data showing places where AFOs do not contribute to water quality problems. Those AFOs and their successful incorporation of practices to protect the environment could be wonderful educational opportunities, basically demonstration projects already implemented.

Page 6

"Water quality problems in the state have become a tremendous obstacle requiring extremely large investments to remediate their efforts. For the past 10-15 years, Oklahoma has spent thousands to millions of dollars annually to restore and/or protect areas damaged by NPS pollutants."

This statement infers that water quality concerns are a recent phenomena. Actually, Oklahomans became aware of the need for conservation of our resources during the Dust Bowl in the 1930s. Conservation efforts have been ongoing by the state's farmers and ranchers ever since. What is good to reduce soil erosion is good for water quality.

This statement correctly points out that it has only been recently that states, including Oklahoma, have invested significant sums of money with the sole purpose of protecting waters from NPS pollution. Until the late 1980's water pollution protection efforts focussed on point sources.

OCC agrees that farmers have long been advocates of natural resources conservation. In U.S. history, this is strongly evidenced by conservation practices developed following the dust bowl. However, few people who remember the devastation of the dust bowl are still farming and many practices

implemented following the dust bowl are being discontinued (windbreaks are coming down and terraces no longer maintained). This is generally because incentives to maintain those practices may not be readily available. In addition, while dust bowl-induced soil conservation practices benefited water quality substantially across the state, water quality protection was not the main goal of those practices, soil conservation was. Hence the reason the NRCS was formerly called the Soil Conservation Service, rather than the Water Quality Conservation Service. Yes, most practices to reduce soil erosion also protect water quality, but water quality was not the main goal of the program. Indeed, many would argue that the some of the practices such as SCS ponds, in some cases, were not the most appropriate method to protect water quality because of the impacts to upstream biological communities. This is not to imply that SCS knowingly installed practices that had negative impacts, nor that all of those structures were "bad", merely that we have more information now and can make better decisions.

Page 9

The State program also addresses reasonably foreseeable threats to water quality resulting from nonpoint source activities. To identify such foreseeable threats, the State considers the future impacts of new or expanding activities (e.g., impairments to water quality resulting from new construction or new animal feeding operations).

We object to the reference to "new animal feeding operations". Please don't single out agriculture as a threat, or infer that animal feeding operations are not regulated entities. There are laws and regulations which producers must follow regarding the beneficial reuse of animal manures.

We have added examples of additional threats to water quality from nonpoint source activities. We realize that only listing two examples may have implied that only two main sources existed. This has been corrected in the text. However, we must point out that this text came directly from guidance directed at the 9 key elements of a Nonpoint Source Management Plan and was not in any way a summary of the water quality threats in Oklahoma from Nonpoint Source Pollution. The statement, when read in context of the entire section, is directed at making sure that the state's Nonpoint Source Management Plan considers that future changes in a watershed could impact water quality.

Page 9

The State identifies waters impaired by nonpoint source pollution by examining currently available information (e.g., in reports under sections 305(b), 319(a), 303(d), 314(a), and 320). The State identifies important unimpaired waters that are threatened or otherwise at risk from nonpoint source pollution. The State identifies the primary categories and subcategories causing the water quality impairments, threats, and risks. The State periodically revises and updates the identification of impaired or threatened waters. State program implementation plans and activities are directed toward addressing the priority waters that are identified as stated above. (Program activities are driven by the State's prioritization of impaired or threatened waters.) The State links its prioritization and implementation strategies to other programs and efforts as appropriate (e.g., TMDLs, clean lakes programs, comprehensive ground-water protection programs, wetlands protection programs, etc.)

The OCC's nonpoint source program's process of identification of waters impaired or threatened by nonpoint source pollution and process to address these waters is primarily referred to in sections VI and VII of this document.

Our extensive research into the 303(d) List and the 305(b) Report indicate that Oklahoma's federally required water quality reports and lists are not a credible indicator of what waters in the state are impaired or threatened. Until such time as supporting documentation is provided with the 303(d) list, and all state agencies are using Beneficial Use Assessment Protocols from the OWQS, the credibility of federal water quality lists and reports will be questionable.

The Clean Water Act and EPA guidance on interpretation of that act and its programs necessitates the use of and reference to other EPA reports. It is required by the 319 program that those reports are referenced. In addition, please remember that although we recognize limitations of those reports, at the time of their development, the most appropriate methods were used to make decisions and draw conclusions. OCC has always utilized the Water Quality Standards to make use support assessment determinations and will follow USAP protocols now that they have been developed.

Page 19 (2nd paragraph)

"The goals for the State of Oklahoma are to conserve, enhance, and restore the quantity and biological diversity of all wetlands in the state."

.We question, to what point in times' past should the "quantity" of wetlands be restored? With all of the dammed rivers in the state, we doubt if this a realistic goal.

For all comments regarding the Wetlands Management plan, please refer to previous responses to comments. Your comments will be forwarded to the OCC wetlands program.

Page 19 a. Definition of Wetlands

....For a general definition of wetlands, the plan recommends that the definition for wetland developed by the national Academy of Sciences be used as the state's general definition.

We are unsure what that definition is. It would be helpful if references to outside material were cited, allowing for easy review.

Farm Bureau supports the following definition for wetlands. "Wetlands should be defined as a naturally occurring area of predominately hydric soils that presently support hydrophytic vegetation because of existing wetland hydrology. Supporting definitions should be:

(1) A hydric soil is a soil that in its natural state is saturated, flooded or ponded long enough during the active growing season to have predominant anaerobic conditions at the surface;

(2) Hydrophytic vegetation means a predominance of obligate wetland plants and facultative wetland plants; and

(3) Predominance is defined as at least 66.67% of the land having those characteristics.

Page 19 (continued)

The plan also recognizes that there are many reasons to define and categorize wetlands. When wetlands are defined for regulatory purposes by the federal or state government, the plan recommends that the state support the current Environmental Protection Agency (EPA) and the U.S. Corps of Engineers wetland delineation procedures and definition. When wetlands are defined for landscape management such as wetland habitat assessment, a broader interpretation of the definition is appropriate.

We disagree with using EPA and Corps of Engineers delineations and definitions. Farm Bureau advocates authority for wetlands determinations and delineations should be the responsibility of the

Natural Resources Conservation Service. Determinations and delineations should be made only upon the request of the landowner. The agency should obtain the concurrence of the appropriate local conservation district board. We oppose other government agencies having veto power over NRCS determinations and delineations.

Page 20 d. Standards for Beneficial Uses of Wetlands

....However, to date, no enforcement action concerning wetlands has been based on the existing OWQS; therefore it is uncertain if the current standards can adequately protect wetlands. The plan recommends that a technical workgroup be established to review and expand upon the recommendations in the OWRB evaluation. The work needs to be completed in time for inclusion in the 2000 water quality standards revision process.

We are concerned about the Plan advocating the assignment of beneficial uses for wetlands. We believe the need for their creation has not been proven.

Page 21

Objective 5: To adopt a classification system and water quality standards to identify and protect wetland functions and values.

Again, we are concerned about the plan advocating beneficial uses for wetlands. We believe the need for their creation has not been proven.

Page 21 Objective 8: To identify and prioritize unique or scarce wetland types and sites for acquisition or special protection.

Identifying unique or scarce wetlands types to aid private landowners is acceptable. However, we object to regulatory actions on wetlands, or the government acquisition of wetlands.

Page 21 Objective 11: To establish a comprehensive statewide wetlands mapping program.

We wonder if this is necessary. Why not use the NRCS Wetland Inventory completed in 1985 (page 20 of the Plan), and simply update it. We see no need to duplicate work that has already been done.

Page 22 Some key actions items associated with these objectives are:

• Continue state participation in acquisition programs through the North American Waterfowl Management Plan administered by the Oklahoma Department of Wildlife Conservation.

We are not familiar with this Plan. Farm Bureau is against spending tax dollars for the government to acquire more private property.

Pages 23-45

Rather than comment on each aspect of the NPS Water Quality Monitoring Program, please refer back to our general comments about NPS Water Quality Monitoring.

Page 26

d. Implement source Reduction and Wellhead Protection Programs to Reduce Ground Water Pollution. The 319 program will coordinate and supplement source water protection programs to protect ground water....

It is our understanding that the source water protection is under the purview of the Oklahoma Department of Environmental Quality. Do they receive 319 funds for source water protection work?

Yes, source water protection does fall under the jurisdiction of the ODEQ. They receive federal funds specifically for that purpose. However, they have also received 319 monies to help support the program. 319 funds are intended to be directed at the major nonpoint source-related concerns in a watershed. In some cases, education or actual implementation efforts directed at source-water and wellhead protection is a major concern in a watershed. The text has been clarified so as not to imply that the 319 program will be the sole source of funding for the wellhead and source water protection programs.

Page 36 d. Future Monitoring

When technology information and financial resources become available, the monitoring program will be expanded to include other potential NPS pollutants, such as endocrine disrupters.

We are opposed to testing for potential pollutants that are not listed in our water quality standards. Water Quality Standards are an evolving entity and are by no means comprehensive enough to include all NPS pollutants. It would be a dereliction of duty to fail to monitor for a compound simply because Oklahoma had not done enough research to determine the allowable concentration for a compound. The only way to develop the allowable concentration is to monitor for that compound and its effects on the stream. Unfortunately, numerical water quality standards in Oklahoma have not yet been developed for the major NPS pollutants. Lack of criteria is not due to the fact that those pollutants do not impact streams, but due to the fact we have insufficient data in many places to determine the maximum allowable concentrations and loadings at which those pollutants do not impact a stream. Failure to monitor for those compounds would mean that we could never develop criteria, nor could we accurately assess the state's waters for NPS pollution.

Page 44 iii. Dissemination of Information

A complete and updated list of data will also be available on the OCC Water Quality web page.

This is a great idea. When will this be available?

We recognize the lack of data availability given current technology as a major shortcoming of our program. Our goal is to make data available through web access in the year 2000. It is our ultimate goal (and currently under development) to have a link available from the OCC webpage that shows a map of our monitoring stations and the appropriate stream segment associated with those sites. The map will be linked to a database that shows a data summary for each site. By clicking on a station, the user would access information pertinent to all aspects of stream health including water quality, aquatic habitat, biology, and landuse. If you have other suggestions as to how you would like to see the data available, please let us know.

Page 56 (1st paragraph)

....In order to be removed from the list, a TMDL or some other type of reparatory activity must be completed. TMDLs are the most common means by which these problems are addressed.

It should be added, that "waterbody segments may be removed from the 303(d) list if it is determined that the original listing was in error, or if the existing data does not support a listing." *Good point. Additional text has been added to this section to clarify.*

Page 56 (3rd paragraph)

While estimating the portion of the load contributed by point sources is generally straightforward (based on discharge records), estimating the nonpoint source portion of the load is difficult and often requires considerable data.

It is our understanding that no discharge records are required by point sources to determine the amount of nitrates and phosphorus they are discharging, only ammonia. It is our understanding, that TMDLs are calculated on what the permit estimates the point source will be discharging, not on actual monitoring records from the point source. So, the point source loading portion is not that straightforward, from our perspective.

Historically, it has been true (and still is, in many places) that point source dischargers do not monitor for nutrients in their discharge. However, more and more permits have multiple nutrients written in and thus monitoring is necessary. In addition, it has always been relatively simple to collect discharge from a point source to monitor for nutrients, nothing like trying to collect NPS discharge. Also, a significant effort has been devoted to developing a relationship between type of treatment, population contributing to the wasteload, and nutrient concentration in waste such that reasonably accurate literature values exist to estimate the nutrient load and/or concentration given type of treatment, community size, and source of waste (i.e. industrial, municipal, or mixed). Point Source loading portion estimates are infinitely more straightforward than Nonpoint Source Loading estimates.

Page 84 I. SRF FUNDING FOR NPS PROJECTS

Recognizing the success of the State Revolving Fund loan program for point source-related pollution reduction activities and the scarcity of nonpoint source funding, the state opted to develop a policy whereby a portion of the SRF would be available as low interest loans to be used for nonpoint source pollution reduction activities. The language and requirements of the SRF program limit its applicability to organized groups with the capability to pay back the loan (therefore, private individuals are not able to utilize the program). However, this program can be especially useful for municipalities with stormwater runoff concerns and can also be useful to rural water districts with specific nonpoint source concerns.

It is our understanding that this program has not been enacted because statutory authority to implement it has not been properly established, and the proposed funds for it were divided up and used for other programs. Is this correct? *Yes*

Page 86 a. Statewide monitoring — see section VII. Evaluating water quality data: The process of determining the support status of individual waterbodies is outlined in OAC 785:46:15, the Oklahoma Continuing Planning Process (CPP) and in the 305(b)

Requirements and Guidance. A determination that a waterbody is impaired will comply with criteria set forth in these documents.

See our general comments about "Assessment Monitoring" in our comments on NPS Water Quality Monitoring.

Text has been added to this portion of the document to include use of USAP(OAC 785:46:15) in making use assessment determinations.

Page 91

B. CURRENT AND PLANNED NONPOINT SOURCE ACTIVITIES At the end of 1998, the OCCWQ Program had a total of 45 active projects including 40 319(h) and 5 104(b) grants....

We're concerned about the tone in the descriptions of many of these projects, as it appears they are placing agriculture in a negative light. Should the descriptions of these projects be updated yearly? Is there a report on the work done and various findings, when a project is completed? *All 319 projects and their results are documented through semi-annual and annual reports. In addition, a final report is completed detailing the final results and conclusions of the project. These reports are on file with and reviewed by OSE and EPA, in addition to the OCC. Also, pertinent conservation districts and other agencies are asked to review the documents prior to EPA approval and finalization. These reports are available to anyone who requests them. In addition, long-term goals involve making these available through internet technology.*

Page 92 iii. 1993 104(b)(3): Grand Lake Basin Management Program

...In nearby areas of the state, runoff from confined animal feeding operations areas have been shown to contribute significant quantities of nutrients to receiving streams. Nutrient loading in these streams has reduced their quality as well as that of downstream reservoirs.

We object to this generalization. We assume this is referring to the Lake Eucha report. Our own research shows there are few registered CAFOs in the Grand Lake watershed. We're not sure how many registered poultry operations there are in the watershed. While we know the focus of this study is NPS, we feel is negligent not to mention all of the point source discharges to Grand Lake from cities, and from all of the neighborhood developments around the lake. Also, septic tanks are not mentioned. As the project is described, it is misleading as it appeals to the political correctness of the EPA and helps to unnecessarily fuel the fears of environmental groups.

This text merely offers a synopsis of the much more involved workplan for the Grand Lake Basin Management Program. This program was developed long before the Eucha report was even begun. This plan focuses on the entire Grand Lake Basin, which extends into Kansas, Oklahoma, Arkansas, and Missouri. The text and workplans offered as summaries of current NPS efforts in the state are approved workplans. However, since most workplans are 15-30 pages long, complete inclusion would be tedious and thus the main focus of the project has been merely summarized. Septic systems have been considered in the development of the plan as have the PS contributions in phase one of the program where loading was modeled. This will be clarified in the text. Point Sources have been recognized as a significant contribution to the total load to the lake, however, the NPS load was not insignificant. Given that the majority of the land is in agricultural production and monitoring of ag-only subwatersheds shows significant NPS loading, it is safe to assume that agriculture is contributing to the NPS load to

the lake. In addition, the OCC's work on the basin is not the only study to suggest that CAFOs or AFOs contribute to the load, the OWRB/OSU Clean Lakes Report on Grand Lake also lists CAFOs or AFOs as a potential contributor to the problem.

Page 93 vi. 1995 319(h): Little Deep Fork TMDL support and BMP implementation

It is our understanding that the TMDL has been completed for Little Deep Fork, and the ODEQ recommended removal of its segments of Little Deep Fork on the 303(d) list which were listed for organic enrichment/dissolved oxygen. What is left to do on this project? Is OCC going to recommend delisting this waterbody segment for the 2000 303(d) list?

The Little Deep Fork Project is nearing completion; we are waiting on finalization of a model developed by Dan Storm of OSU Biosystems Engineering. INCOG is working on a TMDL for the watershed that will be based upon the OSU model and OCC monitoring data. Because this is a complex TMDL involving linking high flow with low flow conditions, that TMDL will take some time to draft. It is too early to say whether OCC or INCOG will recommend delisting of the segment.

Page 95 xiii. FY 1997 319(h): Twin Cave Water Quality and Pollutant Source Assessment

Is Twin Cave affected by only NPS? Even though this is a NPS project, we feel it is a misrepresentation not to mention possible point source contributions to the Twin Cave area.

Yes, Twin Cave is only affected by NPS. No point sources discharge to the watershed. Please be assured that when a point source discharger exists in the watershed, even if we are talking about total retention facilities, OCC considers their potential impacts, as even total retention facilities have been known to have accidental discharges. However, also realize that this is an OCC project and OCC does not have the jurisdictional authority to monitor point source impacts independent of NPS impacts.

Page 96 xiv. FY 1997 319(h): Turkey Creek Watershed: Implementation of Community Education and Best Management Practices to Reduce NPS at Problem Well Sites Several public water systems in the Turkey Creek Watershed have high levels of nutrient contamination in their supply wells attributable to non-point sources....

Farm Bureau members believe ground water protection is important. Our members live on their land, and many drink from wells on their property. We're concerned with the statement that the contamination, on this project, is "attributable to non-point sources".

There are several areas of the state where the groundwater is high in nitrates. We need to figure out where we historically have had naturally occurring high nitrate groundwater, and where groundwater nitrates have increased because of anthropogenic causes. It is important to remember that elevated fertilizer usage was not a common practice until the 1970s. We're concerned this sends the wrong message to the public about farmers and how they use fertilizer.

The DEQ authored and sponsors this project. We will forward your concerns to the DEQ.

Page 101 xiv. 1995 319(h): Improving Water Quality Through Animal Waste Management

We will forward your comments to the sponsors of the project. If you know of studies linking nutrient contamination in groundwater to sources other than NPS, please let us know.

Page 113 x. Agriculture

Nationally, agriculture is recognized as an extensive source of pollutants....

We object to this broad categorization of agriculture as the big polluter. This statement may be public perception, but we believe it is based on faulty reasoning, and misinformation provided by the states.

Please present the data to show that agriculture is not a significant source of nonpoint source pollution. Extensive data exists to show that it is. We have extensive data to show that agricultural practices contribute to nonpoint source pollution in Oklahoma as well as many other areas of the country. This is why we are trying to offer ways to reduce that pollution, preferably through voluntary programs. BMPs can reduce the impact of agricultural activities significantly. We believe most farmers would rather protect their natural resources if given the opportunity and the means. This has been proven in the past through cooperation in programs developed out of the dust-bowl. Indeed, farmers all over Oklahoma are making great strides towards water quality protection. We would like to help them continue these efforts.

COMMENTS FROM FARM BUREAU MEMBERS

Comments from farmer #1, central Oklahoma

Specific Comments

Page 12 (2nd paragraph regarding beneficial uses)

...All users receive equal protection, for each has its unique environmental and economic importance to Oklahoma.

This paragraph states that all beneficial uses have equal protection. It appears that agriculture <u>may not</u>, simply because it is listed as the biggest source of impairment. Somewhere down the line decisions will have to be made regarding which is more important, simply because water management may not be possible for all of these beneficial uses.

The Clean Water Act states that all beneficial uses must receive equal protection. The standards that apply to protecting waters for use in agriculture pertain mainly to its ability to be used for watering stock and irrigation, not to be used as a conduit to carry pollution away from an agriculturally related activity or as a dilution for such pollution. The reason that agriculture is listed as the biggest source of impairment is because agricultural activities can and do (although not always) impact the water that flows through agricultural land. Over 75% of the land in Oklahoma is agricultural land and indeed, a significant percentage of the total land area in the US is in agricultural use. Numerous studies exist that compare water draining from ag land to water draining from non-ag land that show the ag land is contributing to water degradation. The impacts from agricultural activities can also make the water less suitable to support other beneficial uses. Indeed, the impacts from agricultural activities can also make the water less suitable to support agricultural use. For example, livestock have been lost due to blue-green algae poisoning. Nutrient-enriched farm ponds (where the only source of the nutrients are from ag-related activities) have been responsible for blue-green algae poisoning of at least 30 head of cattle in the past two years in Oklahoma.

General Comments

The local conservation board that I am on will have problems implementing this plan as written. I don't know how much money will be available to do the plan. The OCC does not have money to maintain plans implemented 30 years ago. As of one week ago, I was told the district must be very limited in spending. Our local district has never had great interaction with the Water Quality Division, therefore, how could this be improved?

My own stand at this point is that this plan is mainly about agriculture and will be used to regulate any activity agriculturalists might choose to pursue. It also seems to put the local conservation district as the informant of problems. I believe local people should be involved in solving the problem before the state agencies step in.

...concerns on the monitoring process....I believe that this monitoring may duplicate (BUMP) and I think that we need duplicating only to qualify the testing procedures. I believe that real gains would be seen from doing small concentrated efforts on really pronounced problems, then worked down to problems of lesser degree. This might be accomplished by monitoring those streams on the 303(d) list.

...It seems that agriculture has been singled out and even if there are other sources on nonpoint pollution, agriculture will be the first to comply. I have a hard time believing that we (farmers) can depend on EPA, DEQ, or even the Cooperative Extension Service to help. They either say yes or no farmers can do that (in the case of EPA and DEQ) or are so far behind in research that it will not help (in the case of OSU Extension).

Thanks again for the opportunity to review the NPS Management Plan.

We thank you for your input. We encourage you talk to the OCC WQ division directly about your concerns. I'm not sure about what plans the OCC doesn't have the money to implement that were put in place 30 years ago, but we do have the funding to implement this plan. Please elaborate as to how we will be unable to afford such a plan or please contact us with your concerns. A possible reason why plans that were developed 30 years ago are no longer funded is because they were found to be either ineffective or to no longer be the most appropriate means to accomplish set goals, or perhaps goals of your district have changed over time.

Your local conservation district has been afforded many opportunities to interact with the WQ program, although we realize these do not always have successful outcomes. OCC interviewed every district (onsite) with regard to their perception of WQ impacts in their district. This information will be included in the NPS Assessment Report. OCC also interviews and cooperates with districts to obtain up-to-date landuse information relative to their projects. Conservation districts have been represented on the Nonpoint Source Working Group through the Oklahoma Association of Conservation Districts and we encourage you to communicate your concerns about the plan through that office. In addition, OCC WQ participates in the Leadership 2000 program offering education opportunities to district directors. We offer education programs through our Statewide Blue-Thumb program. In addition, we strongly encourage you to participate in the local watershed advisory group when a project becomes active in your district. OCC WQ would be more than happy to interact with your district, either in support of or cooperation with district programs or in an education-related venture. Please, have your district contact OCC WQ with regard to its particular concerns and needs. OCC would like to complete at least

one small project per year in response to specific district needs. The NPS management plan will formally be sent to each conservation district for review once comments and input from the NPS working group are resolved and incorporated.

As for regulation, OCC has never supported regulation on farmers prior to attempts to implement voluntary programs. This is a voluntary program. Cost-share program participation is voluntary. Our monitoring efforts are an attempt to get a better picture statewide of nonpoint source pollution than we have had in the past. If it is true that agriculture is unfairly singled out as a contributor, this program should help to correct that notion because we will have more data statewide to monitor the impacts of other activities that contribute to NPS pollution like oil and gas related activities, septic tanks, urban development, etc.

OCC also believes local people should make the decisions about what to do about implementing programs to reduce NPS pollution. That is why we have local Watershed Advisory Groups developed to implement our major basin programs. These groups are made up of local people and represent the major concerns of the watershed. This is the group that decides the cost-share rates and which practices should be implemented and approves the farm plans, not the people in OKC who don't live in the watershed. We hold public meetings in conjunction with all of our projects to offer local people the opportunity to comment.

We recognize that the document did not do a good job of explaining the differences between the OWRB's BUMP program and OCC's monitoring program. This has been corrected in the text. The gist of the differences and the reason it is important that we have two programs is:

- 1) OWRB's program focuses on large streams with the intent of determining whether or not beneficial uses are being supported. These monitoring stations are not located to allow for differentiation between NPS and PS pollution. OCC's program monitors smaller streams above PS discharges so that we can differentiate between PS and NPS pollution. In addition, we can come closer to determining the exact source of the pollution by monitoring closer to potential sources. OWRB's watersheds are too big to differentiate between which practice is contributing the bulk of the load, but OCC's watersheds are small enough such that perhaps only one or two potential sources exist.
- 2) OCC's program monitors streams of different known quality, ranging from impaired, threatened, and high quality waters in order to develop reference streams for different areas of the state so we know what the "natural" water quality is. For example, water in the western part of the state naturally has more sediment in it than water in the northeastern part of the state. Developing reference streams will allow us to better account for natural conditions in the water rather than blaming the sediment in western streams on man's activities.
- 3) OCC's program focuses on monitoring all known NPS pollutants and their impacts on water quality. OWRB's program does not because they only monitor chemistry in streams. Their monitoring program does nothing to estimate what kinds of impacts that chemistry might be having on the animals that live in the stream. Because they collect WQ samples 10 times a year, they have snapshots of what the water is like those 10 times a year and they extrapolate that to guess at what the water is like the rest of the time. By collecting WQ samples 10 times a year **and** sampling the animals that live in the water, we have a better picture of what the water is like all year 'round. The biological sampling gives you more of a long-term view of water quality because, in essence, you're monitoring the cumulative impacts of the water in the stream on the other 355 days of the year that you didn't collect samples.

- 4) The BUMP program does not collect flow during its sampling, although it can estimate it at many of its stations through use of USGS flow data. OCC collects flow every time it samples. Flow is essential for calculating loadings (the major component for calculating Total Maximum Daily Loads (TMDLs)). It is very possible to collect the same concentration of a substance at different flows. The loading however, is a factor of flow times concentration. For example, say you sample a stream on two different days, and both days, the concentration of phosphorus is 0.01 mg/l. This is a relatively low concentration. However, on one of those days, it has just rained and the flow is 10,000 cfs, but the other day, it hasn't rained in a long time and the flow is just 10 cfs. The difference in the amount of phosphorus delivered to the downstream waterbodies (eventually a lake in most parts of OK) is phenomenal and very significant biologically. On the rainy day, you're getting 540 pounds of phosphorus and on the other day, only a half pound of phosphorus.
- 5) BUMP conducts statewide monitoring on an annual basis, limiting the detailed information it can collect from each area. RBMP monitors statewide on a 5 year basis, concentrating efforts in smaller portions of the state for two years at a time. This allows the RBMP program to collect more detailed data than the BUMP program. This detailed data such as landuse, biological (fish, aquatic insects, and algae), and habitat data is extremely valuable in identifying sources and effects of NPS pollution. The BUMP program can only collect water chemistry and physical data such as temperature.

While there are several reasons why BUMP will have limited utility to make determinations about NPS pollution in the state, this is not to say that the BUMP program is not important to the state. BUMP monitors larger rivers, it monitors water quality on a greater scale and assesses overall statewide water quality, a task that is required by the Clean Water Act. OCC program funding is not sufficient to do this and monitor NPS nor is it within OCC's statutory authority to monitor for point source impacts. The OCC program was fine-tuned considering the BUMP program to complement it, when possible, and avoid duplication. The two programs follow the same protocols to make determinations about whether or not the water body is meeting its assigned beneficial uses.

Comments from Farmer #2, southwest Oklahoma

Page 5 $(1^{st} paragraph)$

...Monies are specifically available in the Section 319 of the CWA and that state cost-share program to implement these projects.

How much money is available, for what projects, and who qualifies?

The amount of money available varies from year to year, depending on the congressional allocation of 319 funds and whether or not the state of Oklahoma continues to contribute to a cost-share program. The projects currently funded are listed in section VII B of the document. The projects in the future will generally be planned in priority watersheds. Current projects are ongoing in the Lake Eucha Watershed and the Illinois River Watershed. The next major project is scheduled for the Wister Lake Watershed. To qualify for the project, you must be a landowner in the watershed and be willing to participate in the cost-share program. However, NRCS also has cost-share programs ongoing in other watersheds. The best advice I have is to talk to your local conservation district and NRCS representative about what programs they have ongoing in your watershed. If you feel your watershed/conservation district has specific water quality concerns, encourage your conservation

district to solicit help from the OCC WQ program. The plan also includes considering minor programs in cooperation with local conservation districts to address specific needs.

Page 9 (paragraph under Key Element #5)

... The State periodically revises and updates the identification of impaired or threatened waters.

What is the exact timetable for this?

The 303(d) list is the list intended to report only impaired or threatened waters expected to be impaired within two years. This list is generally updated every two years. The NPS assessment report update is now required every five years by state law.

Page 12 (2nd paragraph, regarding beneficial uses)

...All users receive equal protection, for each has its unique environmental and economic importance to Oklahoma....

Swimming is as important as growing food?

According to the Clean Water Act, it is. However, the beneficial use for agriculture appears to be misunderstood, perhaps not in this comment, but as reflected in others. The beneficial use with regard for agriculture is to protect water as a resource to support agriculture, namely for the purposes of watering stock and irrigation. The agricultural beneficial use is not that water function as a means to dilute and/or carry waste away from agricultural areas.

Page 28 (2nd bullet)

• What levels of pollutants are due to natural sources and how much is due to anthropogenic sources;

This is a good question to answer first.

OCC agrees that this is an important question. Hence our efforts to monitor and establish reference streams across the state. Reference streams are the most appropriate means by which to delineate between natural and anthropogenic sources.

Page 34 (all paragraphs regarding monitoring program)

It will take 20 years to accumulate sufficient data. Why? What if a 50 or 100-year-flood event occurs during a basin's two-year monitoring, or what if a multi-year drought occurs? This will affect sediment. *I can't find the part of the document to which this comment refers. The possibility that two-year monitoring will not account for "normal" and "abnormal" conditions is exactly the reason it will take 20 years to accumulate sufficient data to draw conclusions about water quality trends. 20 years from now we should have 80 samples from the rotating basin sites. Simple statistical analysis considering the natural variability of monitoring data suggests that 80 samples are sufficient to be 95% confident that the data is correct.*

Page 46

• River and Stream Monitoring -- The OWRB is currently monitoring almost 200 sites on a monthly basis. These sites are segregated into two discrete types of monitoring activities. The first monitoring activity focuses on fixed station monitoring on rivers and streams. It is primarily based on the 67 U.S. Geological Survey 8-digit hydrologic unit code basins present in Oklahoma. In general, at least one sample station will be located in each of the 67 watersheds. Following

consultation with other appropriate state environmental agencies, the OWRB identified 84 fixed sites.

This sounds like what OCC is doing--duplication--waste of money. Actually, the two programs are very different- please refer to response to previous comments regarding the same question.

Page 54

C. Local Watershed Working Groups (all related paragraphs)

Are these running now? How many statewide? We need Farm Bureau members on these. We currently have at least 4 WAGs developed or nearing development in different watersheds of the state. WAGs have recently been developed in conjunction with the Beaty Creek Watershed (1998 Lake Eucha Implementation Project), 2 WAGs in the Wister Watershed (one in Poteau River Watershed, one in the Fourche Maline Watershed-- these WAGs were the first WAGs developed and their success was the reason we pursued development in conjunction with other projects), and one is being formed for the Illinois River Implementation Project (1999). Farm Bureau members are on the WAGs. Indeed, we have received significant negative criticism about the makeup of the WAG in the Beaty Creek Watershed (currently the most active WAG), asserting that it has too much of an agricultural bias and that non-ag issues in the watershed are not well represented.

Page 55

D. WATERSHED MODELING- (related paragraphs)

Watershed modeling should only be used to prove need for actual testing. It should not be used to determine how to proceed with remedies.

Models are developed using watershed data to simulate the processes in a watershed so that you can then "test"-apply different methods of remediation to estimate which ones might work and which ones probably won't. Sort of a try it before you buy it method. Much better than putting in millions of dollars worth of practices that are likely to be less than effective. Modeling of different watersheds tells us where the "hot" spots are in a watershed, and give us an idea of how much effort has to be invested to be successful.

As far as using models only to determine a need for actual testing, models shouldn't be developed unless actual testing has been done. Otherwise, you have no idea as to whether or not the model is calibrated to the area you're talking about. Models are generally developed based on data from a certain part of the country, or even a specific watershed and calibrated to represent that watershed. You can transfer the representation of the model to your watershed or area of concern, by inputting data and variables that pertain to your watershed (i.e. landuse, geology, water chemistry, geography, climate, etc.). Otherwise, you're just modeling the area the model was developed in.

Page 149

14. Oklahoma Department of Wildlife Conservation

Thousands of birds (waterfowl) and mammals contribute to NPS through fecal deposition. They (ODWC) need to account for wildlife in NPS. Why do they not have any responsibility for NPS?

ODWC is not statutorily given any responsibility to monitor or control NPS pollution. That is a decision of the legislature. OCC attempts to account for wildlife contributions to NPS through monitoring of reference streams. We have not yet been active in any projects where wildlife contribution was a major source of NPS pollution, although we do realize that wildlife have proven to be significant contributors is some parts of the country and potentially are in parts of Oklahoma. When the implementation project efforts shift to a watershed where wildlife contributions are significant, either year-round, or during migration season, efforts will be made to account for it.

:mp

Attachments A & B

Oklahoma State Department of Agriculture- Forestry Services Division

5. Oklahoma Department of Agriculture – Forestry Services Division (ODA-FSD)

a. Agency Responsibility/Authority

ODA-FSD is responsible for instituting a broad program of education and action in the protection, reforestation, harvesting and wise use of forests and their products throughout Oklahoma, which includes the conservation of soil, water, and wildlife (O.S. 2 § 1301-103). ODA-FSD also administers silviculture BMPs and identifies silviculturally related NPS pollution.

b. Agency Goals / Mission with Regard to NPS Control

ODA-FSD's goal is to minimize the impact of forestry activities on water quality, as well as to use forestry practices, such as tree planting, to help solve water related problems.

c. Current / Planned Programs to Control NPS

Currently, ODA-FSD manages a statewide comprehensive program of actions to prevent NPS problems related to forestry activities and to increase the use of forestry practices to help solve water related problems with the cooperation of landowners and forest industry. These programs include forestry BMPs, landowner technical assistance and forest management planning, education and training to raise awareness of NPS, BMP compliance monitoring, demonstrations of water quality management, logger "tailgate" sessions, water quality monitoring, riparian area restoration, logger certification, and cost-share practices.

ODA-FSD plans to place greater emphasis on landowner and logger education and forest industry contacts, as well as participate in special projects such as Eastern State College's Project 2000, the Illinois River Management Plan, the Kiamichi River project of The Nature Conservancy, and State-level planning projects. ODA-FSD will support the Master Woodland Owners program of OSU Cooperative Extension. ODA-FSD will also implement the BMP compliance monitoring protocol adopted by the southern states, and develop the forestry cost-share program. ODA-FSD also intends to complete the fact sheet and videotape series on BMPs and low-cost practices to control or prevent erosion.

d. Resources Available to Control NPS

ODA-FSD has one forester assigned to all aspects of the forest water quality program. There are 15 field foresters available to assist landowners and other agencies with forestry aspects of watershed planning projects. ODA-FSD has access to the USDA Forest Service liaisons with EPA and with specialists in other states to help address local water quality issues. Demonstration road BMPs are also available for workshops, tours, or other educational endeavors. The federal Stewardship Incentives Program received \$85,000 in federal funds for landowner cost-shares. ODA-FSD contributes \$60,000 in State resources directly to the forest water quality program.

ODA-FSD requires additional resources to increase the ability to address NPS problems related to forestry. Logger and landowner education needs to be intensified (\$15,000 per year). ODA-FSD needs to develop the BMP compliance-monitoring program to track BMP implementation trends in a way that is comparable to other southern state forestry agencies (\$20,000 per year). ODA-FSD also needs to complete development of the fact sheets and video series on forestry BMPs and low-cost erosion control practices (\$25,000), and State-appropriated funding is needed for the forestry cost-share program (\$100,000 per year or more).

e. Agency Role in Planning NPS Watershed Projects

ODA-FSD requests to be consulted on watershed projects where forestry practices may be contributing to NPS problems, and where forestry practices can provide part of the solution to other environmental problems.

f. Principle Concerns and Priorities Regarding NPS Sources

ODA-FSD priorities regarding NPS are watersheds in the eastern third of Oklahoma, which offer commercial forestry opportunities, so the impacts of timber harvesting and forest road practices on water quality can be minimized. Interests include managing stream corridors, restoring riparian areas, and controlling erosion. ODA-FSD's principle concern involves making landowners, loggers and the industry more aware of the need to protect water quality while managing their forests so that problems are prevented.

The appropriate corrections have been made to ODA-FSD's section of agency responsibilities and nonpoint source needs.

Oklahoma Water Resources Board

September 27, 1999

Mr. Phil Moershel Oklahoma Conservation Commission 413 NW 12th Oklahoma City, OK 73103

Dear Phil:

The Oklahoma Water Resources Board would like to commend the Oklahoma Conservation Commissions hard work in drafting the Nonpoint Source Management Program 1999 Update and appreciate the opportunity to comment. After thorough review, we have several comments and concerns, both conceptual and specific. We have attached the hard copy, which includes our grammatical concerns.

Below is a list of items we would like to see addressed in the next review process:

• Oklahoma Water Quality Standards need to be predominantly mentioned in Section III, B. (p. 11). We would be happy to help draft language for this section. Also, the term "beneficial use" is used in A. Long Term Goals (p. 22) without any reference to the Water Quality Standards (WQS). Explanation on beneficial uses in relation to Oklahoma's WQS needs to be clarified here.

The hole has been filled in and the language pertaining to OWQS was pulled almost directly from OWRB's website regarding standards. This language has been forwarded to OWRB for review and their recommended changes incorporated. In addition, clarification that beneficial use support attainment determinations are made following USAP protocols and using OWQS has been added throughout the document. However, the text on p. 22 was taken directly from the Wetlands Management Program. This Management Program cannot change the details of the Wetlands Management Program, a document that has already been developed and approved. We recognize that the Wetlands Program is likely due for updates, but until those are made, details of the plan must be included as they stand. However, hopefully, it has been clarified throughout the document that use support attainment determinations cannot be made independently of USAP or OWQS.

• The Short Term Goals (pp. 23 – 26) clearly addresses OCC's programs to address NPS pollution, but do not address all programs in the state. There is concern that what is generally put forth in this document is the OCC's NPS Management Program, and not all inclusive of the state's NPS Management Program needs. In the bullet list it would be helpful to identify the roles and responsibilities of the different agencies, or are these all roles and responsibilities of the OCC only? Also, if OCC is monitoring 20% of 303(d) waterbodies for 5 years to achieve 100%..." Does this include lakes? Lakes should be included in the 319 Management Program, and monitoring performed by the appropriate agency. Monitoring water quality to identify threatened or impaired waters needs to be coordinated with the Beneficial Use Monitoring Program (BUMP), as both these programs ultimately have the same goals. Possibly 319 monies could be saved in these areas and used towards diagnostic and implementation type activities?

In recognition of the lack of clarity in this section with regard to varying jurisdictional responsibilities (further elucidated in section IX of the document), we've attempted to clarify agencies participating in and/or responsible for striving to meet the various goals specified in this section of the plan. Please refer to previous response to comments regarding coordination and differences between BUMP and OCC's monitoring program.

• If citizens monitoring is listed as a short term goal of the NPS Management Program (p. 25 a.), please include Oklahoma Water Watch.

OWW has been added, along with other education-related and volunteer efforts wherever appropriate in the document (not just in the goals section).

• Ensure the comprehensive monitoring program activities support the effectiveness of BMP's and/or to prioritize BMP implementation; not to determine beneficial use support (p. 28), which is the goal of BUMP. Be careful not to use reference sites to determine uses, i.e. "determine attainable aquatic community", "its potential use and attainment status"... (p. 28)- this is criteria development and not

the jurisdiction of the Conservation Commission. During the 1999 Legislative session and discussions between OCC and OWRB staff, criteria development was recognized as solely the responsibility of the OWRB.

Text has been added to this section to clarify the OWRB's sole responsibility as far as criteria development, beneficial use assignment, etc. Text has also been added to clarify the use of USAP to make use support attainment determinations.

Also, in this section, fish and wildlife beneficial uses are the only ones mentioned, whereas later (p. 30, 1. State 1 Assessment Monitoring, i. Beneficial Use Monitoring) all uses are mentioned as reasons for monitoring. Which is correct? Are these two different monitoring programs?

The text has been clarified in this section to apply to all beneficial uses related to NPS pollution, as opposed to just one.

• Page 42, b. Use of the Data; Will data collected through the 319 program be forwarded to the DEQ to be included in the state environmental database? (statutorily mandated, Senate Bill 549)?

Text has been added to this section to clarify that the data will also be forwarded to STORET and the state environmental database at DEQ.

• General Question? What differentiates the "NPS Programs" and "Other State Monitoring Programs for NPS" (Section V, sections B (p. 28) and C (p. 43)). All these programs equally address nonpoint source. More appropriately, these titles should be the Oklahoma Conservation Commission's NPS Programs and Other... or 319 Funded Programs vs. Non 319 Funded Programs. Are the other State Monitoring Programs for NPS capable of receiving 319 funding?

Actually no, not all of these programs equally address NPS. OCC's program is the only program focussed to deal with all forms of NPS (except as otherwise statutorily assigned to other agencies such as DEQ's urban stormwater) and only NPS. Yes, other state programs do incorporate and involve NPS, but they do not focus solely around it, nor do they always incorporate means of distinguishing between NPS and PS or work on a small enough or comprehensive enough level to narrow down to the most significant sources. In addition, OCC's program is the only program comprehensive enough to monitor all NPS pollutants and their impacts because OCC is the only agency to monitor water quality, flow, biological, and physical parameters at the various sites. These differences have been clarified in the text.

• Section G. Best Management Practices for the Control of NPS Pollution (p. 54). Please include inlake NPS reduction activities as BMPs. See attached schedule with associated references. This information was previously discussed with Kevin Wagner to be incorporated to support in-lake activities, and is not currently there

Text has been added to incorporate in-lake BMPs.

Once again, we appreciate the opportunity to work cooperatively with OCC on compiling Oklahoma's Nonpoint Source Management Program. We welcome questions concerning our comments. We look forward to reviewing the final product during the next phase of the review process.

Sincerely,

Derek Smithee Chief Water Quality Programs

Specific Comments from OWRB in reference to OFB comments

• Please incorporate references to OCC's effort to compile reference streams with OWRB's biocriteria development program.

This has been clarified throughout the text to elucidate OWRB's role as the agency solely responsible for development of criteria for WQS and to clarify OCC's role only as a collector of data and technical support in the development process.

- Criteria Development is charged to OWRB. Again, this has been clarified throughout the text.
- How will OCC work w/ the DEQ in the development of their state-mandated database and the OWRB with BUMP? OCC will, of course, provide DEQ with all our data as soon as it has been subjected to quality assurance and quality control testing. We will provide the same information to OWRB for use in their BUMP report. We also coordinated original site selection with OWRB's BUMP sites (and will continue to do so) to avoid duplication but allow for compatibility. In addition, OCC is following closely the BUMP methods of data collection in stream with regard to water quality parameters sampled, number of samples collected per year, etc. so that the information can be comparable. This has been clarified in the text.

Specific OWRB comments handwritten in draft 1 margin

- Page 4, bottom paragraph- WQS driven. *Text has been added to clarify that this process is driven by WQS and USAP*.
- Page 6, top paragraph, first sentence- citation please. *A citation has been added*.
- Page 6, Section B- WQS driven. Text has been added to clarify that this process is driven by WQS and USAP.
- Page 9, Key element #4- are you going to use USAP for this? Is this a threat to beneficial uses (referring to reasonably foreseeable threats)? If so, how will you handle this when USAP doesn't address threats from some constituents. Biocriteria might address threats. *This section is merely a summarization of the 9 key elements and not the appropriate place in the text to answer these questions, however, yes, USAP and OWQS will be used for this- text has been added to USAP that in the case of constituents USAP does not yet cover, a presentation of the data and results can be made to the board to determine whether uses are being met. We agree, Biocriteria might address some of these threats and we will continue to collect biological data and provide it and technical expertise to assist OWRB (at their request) in the development of Biocriteria. Until such a time as it is developed, however, we are limited to OWQS comparison of a biological community to reference stream conditions and to board presentations to make such decisions.*
- Page 9, Key element #5- suggestion of eliminating the words, "and risks", from the end of the third sentence. *This text is paraphrased from EPA's guidance and therefore removal of "and risks" is not appropriate.*
- Page 10, Key element #6- suggestion that more clarification of the use of OWQS and USAP to make the determinations of beneficial use attainment.- *again, this text is paraphrased from EPA guidance and this is not the appropriate section to specify USAP and OWQS- this has been clarified in the remainder of the document, however.*
- Page 22, Section IV A.- Is there OWQS legislation to cite? What is a significant threat? Is beneficial use attainment based on WQS? Is the 15 year deadline based on 15 years from identification of impairment? *The text below the first two bullets explains that the long-term goals*

are based on OWQS and the goals of the clean water act. Determination of "threatened" status is based on 305(b) guidance, USAP, etc. The fifteen years means fifteen years from when the waterbody is identified as a priority watershed and implementation or other pollution control efforts can begin.

- Page 23, Section IV. B. Under each goal/obj., identify who, when, current programs for each. *This is not the appropriate section to identify current programs- that is detailed throughout the remainder of the document- as is who has statutory authority to accomplish these goals. However, text has been added to these goals to delineate the primary agencies responsible for each.*
- Page 23, Section IV B. Bullet 4- Is there an established workgroup for this? Not that I'm aware of.
- Page 24, Section IVB. Fourth bullet on the page- How is this different than the second bullet on the page (Draft TMDL, WRAS, and implementation...)? *TMDL's, WRAS, and implementation plans are documents that are not necessarily specific to NPS efforts. In addition, these examples are all plans as to what should be done, rather than actual on-the-ground efforts. TMDLs and WRAS are strategies as to how to address the entire load to the system, describing both PS and NPS controls. The fourth bullet describes actual implementation of practices dreamed up in the second bullet on the page. These practices address NPS pollution.*
- Page 24, last bullet on the page- Is this (last sentence) different than the normal measures of success which are part of any project? *This goal is referring to steps necessary after the completion of a demonstration project. After you have determined success or failure based on measures of success, you have to determine whether you should implement another practice, or whether the practice was successful and should be broadcast to other similar areas with similar problems.*
- Page 34, Section V. B. 2. Include Lakes Diagnostic Work Here. Actually, this is not the appropriate section for that topic- Lakes Diagnostic Work is listed under Section V.C.1.c. Lakes Diagnostic work conducted by OWRB is not exclusively nonpoint source in nature and therefore not appropriate for inclusion in this section of the document.

Page 44- Comment that text should be included to state that recent federal guidelines recommend that 319 funding be utilized to fund lake diagnostic and restoration projects. *319 is being used to fund lake restoration projects. The efforts in Beaty and the Illinois River Watersheds are projects directed at lakes following the recommendations of the 314 diagnostic and feasibility studies. The Poteau River and Fourche Maline projects will follow the same guidelines and implement the recommendations of the Phase I study. The 319 program is systematically going down the list of priority watersheds and funding the next phases necessary to restore beneficial uses in those watersheds. Maybe some time down the line we will reach a watershed where Diagnostic Feasibility work is necessary before implementation can be accomplished but we aren't to that point yet. We need to play catch up on the former Phase I efforts. We finally have the ability to fund large-scale implementation efforts, so we need to do that. We only have so much money to spend and so many tasks to accomplish. First, we have to assess the state's waters for NPS pollution. BUMP helps, but can't satisfy this requirement. Second, we have to implement in priority watersheds to reduce BMPs.*

U.S. Environmental Protection Agency

Mr. Phillip Moershel Oklahoma Conservation Commission Water Quality Division 413 Northwest 12th Street Oklahoma City, OK 73103-3706

Mr. J.D. Strong Office of the Secretary of Environment 3800 N. Classen Blvd. Oklahoma City, OK. 73118

Our review of Oklahoma's draft upgraded Nonpoint Source (NPS) Management Program dated August 9, 1999 is complete. We commend the State for its efforts to upgrade its program to meet the nine key elements specified in the National NPS Program guidance of May 1996. Particularly, we are encouraged that the State has specifically committed in the plan to restoring beneficial uses of waters within 15 years, and that prioritization will be based on the State's Unified Watershed Assessment and 303(d) list. Oklahoma has developed a number of commendable shorter-term goals as well.

There are, however, some areas of the program that should be strengthened. While the State has clearly made an effort to integrate specific short-term goals into its program plans, it remains unclear how these shorter-term activities will lead to the ultimate attainment of its overall long-term goal of restoring beneficial uses of all waters within 15 years. Oklahoma should directly link its shorter-term goals to the overall number of watersheds in need of restoration and clarify whether these shorter-term goals will be adequate to address all of the impaired watersheds within 15 years.

We have enclosed additional comments and suggestions that are provided to assist you in revising the draft program plan. We appreciate your hard work in developing and submitting the draft NPS Management Program upgrade for Oklahoma. If you have any questions regarding our comments, please call me at (214) 665-6683.

Sincerely yours,

Brad Lamb Nonpoint Source Program Coordinator Water Quality Protection Division

cc: Mr. Jim Leach, Oklahoma Conservation Commission Mr. Dov Weitman, EPA (4503-F)

Enclosure

Review and Comment of:

Oklahoma's draft NPS Management Program Upgrade dated August 9, 1999

GENERAL COMMENTS:

1. Goals and Objectives

The May 1996 Guidance calls for the State program to include long-term goals that are consistent with the national program vision that all States implement dynamic and effective NPS programs designed to achieve and maintain beneficial uses of water. The program should also include shorter-term objectives, with activity milestones, that are designed to demonstrate reasonable further progress that leads to accomplishment of the long-term goals as expeditiously as possible. (See 1996 Guidance, p. 6). The long-term goals and shorter-term objectives should be linked to provide an overall, coherent understanding of the program.

The State is commended for developing a specific, measurable long-term goal to restore beneficial uses of waters within 15 years (p. 22) as well as a number of specific short-term goals to achieve on both a State-wide and watershed level basis. However, it remains unclear how these shorterterm activities will lead to the ultimate attainment of its overall long-term goal. For example, on page 24, a short-term goal is to implement two large scale and two small scale watershed projects per year. It does not, however, provide an overall context for these efforts up front, and does not directly link these efforts to the overall number of watersheds in need of restoration and whether Oklahoma's stated rate of implementation will be adequate to address all impaired watersheds within 15 years. In other words, does the level of implementation match that of the goal of achieving fishable and swimmable beneficial uses of waters within 15 years? (Oklahoma does state elsewhere in the program that there are 150 Unified Watershed Assessment (UWA) category I watersheds in need of restoration, and that Oklahoma has refined the list to target the top 5 watersheds that meet stated criteria (p. 83), however, it is not clear that this prioritization process is linked to the State's short- and long-term goals presented in section IV.B.)

We realize that our linkage between short-term goals and activities was too loose and we have tried to tighten up the connections by relating activities to goals more concretely. In addition, we have altered the long-term goals to reflect something that is more realistic, given the projected resources available within the next fifteen to twenty years.

Additionally, while Oklahoma states its intention to implement two large-scale and two smallscale watershed projects per year, it also recognizes that "implementation resources for large-scale watershed NPS controls are foreseen to be adequate for only one watershed per year" (p. 24). Oklahoma should avoid conflicting goals and reconcile these differences, but also clarify the basis for its projections (e.g., whether these projections are based on FY 1998 or FY 1999 levels of funding). *We have cleared up the inconsistencies related to goals and activities that were present in the original document*.

2. Partnerships

The States and EPA staff that jointly developed the nine key elements in 1995 and 1996 generally agreed that this key element is critical, perhaps the most critical, to nonpoint source program success. The reason is the program's strong reliance on education, technical assistance, and voluntary participation, coupled with the multiplier effect that can be achieved by engaging broad-based involvement and cooperation.

Oklahoma is promoting inter-agency partnerships and cooperation within the State through its new statutory requirement for each State environmental agency to develop a Water Quality Standards Implementation Plan. The State has also established a statewide NPS Working Group consisting of a

diverse cross-section of agencies and entities, including State, Federal, local, environmental, and special interest groups (p. 49). While the statewide NPS Working Group has an active role in preliminary planning activities relating to the selection process for priority watersheds or revising the NPS Management Plan, Oklahoma does not set forth a specific role for the Working Group beyond this, for example, in coordinating actual program implementation (p.84, "only 7 of 35 members had responded", only...NRCS responded..). Oklahoma should re-evaluate the role of the NPS Working Group and consider developing a more active role for this group to work with each stakeholder group (e.g., the local watershed working groups) in every phase of program implementation.

The working group is a relatively new group and one of its first major tasks has been to develop this document. As in most groups of this nature, the representatives have many other commitments and areas of interest. The amount of time that the other agencies and groups have to focus on the NPS working group efforts is limited (especially with the emphasis on the 303(d) list, etc.). However, we recognize that the participation of these groups is essential for future success of the NPS program. The issue keeping other agencies from giving the NPS working group full attention is mainly time and limited resources. The OCC is aggressively offering those groups an opportunity to participate in the NPS working group, by following emails and letters with phone calls and meetings.

We do recognize that the role of the working group was sporadically spelled out in the document and have made attempts to make that more consistent. Language has been added to the workplan which will further explain the role the Working Group should play throughout the process, rather than merely in the planning phases.

The size of the group and the fact that members have many other interests and responsibilities means that the group could be less effective than a smaller group run by fewer agencies. However, a concerted effort was made to represent not only the primary decision-makers with respect to state policy, but also the more independent groups such as nonprofit organizations and producer groups. We feel that this representation will more effectively represent NPS-related interests in the state. The group is relatively new and the kinks are still being worked out in the system, in terms of facilitating communication and involvement in the group. The OCC is committed to incorporating as many of the group's concerns as possible into the state's NPS program, but involvement in meetings and document review is not always comprehensive among the group members (certain groups are more involved than others). The OCC will continue to strive to improve communication and involvement of and between the various entities represented in the group by following emails and letters with phone calls and meeting. We will provide our partners with the opportunity to contribute to the program and encourage involvement in the working group.

The NPS Working Group's current main function is to focus on the planning phase of projects, with less emphasis in the implementation and follow-up phases. It should be noted that the NPS working group will also play an important role in evaluating success and failures of implementation and education efforts and use this information to direct future projects.

For watershed-based projects, Oklahoma uses a "Watershed Advisory Group" (WAG) of private citizens, producers, and local authorities, to help provide direction from the local level. The WAG is responsible for making recommendations relating to BMP implementation, financial assistance/cost-share, and technical assistance. However, it is unclear whether its membership represents the breadth of interested groups and individuals within each watershed, since members are "recruited" by local Conservation District Boards. For example, it is our understanding that the Beaty Creek WAG operates

independently from the Eucha/Spavinaw Watershed Technical Working Groups that were established in June 1997. As such, Oklahoma should clarify the selection process and the actual participation of its members in practice, and develop a more coordinated approach with watershed groups already in existence.

The WAG is intended to be representative of all NPS-related interests in a watershed. However, they are not perfect. The WAG can only effectively represent all the NPS-related activities in the watershed if representatives of all these activities participate. In addition, because the WAGs are recruited by the local conservation district boards, they may have a stronger agricultural slant than if they were recruited by another body such as a local civic group. WAGs are still a new thing and the 4 WAGs that have been (or are soon to be) developed are strongly agriculturally biased, but agriculture is also the main NPS concern in those watersheds. WAG meetings are open to the public and are advertised and occur at regular intervals. Other interests are welcome to participate. The Beaty Creek WAG doesn't necessarily operate independently from the Eucha/Spavinaw Watershed Technical Working Group. The larger watershed working group was developed to address all the pollution concerns in the watershed, many of which are separate from the concerns of the Beaty Creek WAG.

In terms of responsibilities of various agencies outlined on p.113, it was not clear how these roles were being carried out through the participation in the statewide NPS Working Group, and the individual watershed committees. For instance, it is noted on p.27 that "The Commission shall be responsible for all identified NPS categories except silviculture, urban storm water runoff and industrial runoff..". But these "exceptions" are never clearly defined in the document to the same degree of discussion as that of OCC's responsibility. Please clarify how the other categories will be coordinated. *The main means by which other categories not directly under the jurisdiction of OCC will be incorporated is through participation of agencies that are responsible for those categories on the NPS working group. These agencies will be integral in directing the efforts of OCC and the overall implementation and education efforts that focus on those types of pollution in different priority watersheds. This has been clarified in the document.*

3. Balance State-wide and Watershed Approaches

Oklahoma presents both State-wide and watershed-level goals for its program (p. 23-26). Oklahoma's State-wide strategies involve a combination of: 1) State-wide monitoring; 2) State-wide education through the State's Blue Thumb education programs (an education program with the goal of teaching people about NPS pollution, its causes, consequences, and what they can do to reduce its effects); 3) Water Quality Standards Implementation Plans (promulgated by each State environmental agency); and 4) State-wide watershed prioritization (p. 81-83). Please clarify where "planning" implementation activities falls within the "four stages of a dynamic program (p.27). *The dynamic program referred to in this section of the text was really a monitoring program, and this has been specified in the text. However, the implementation planning comes between step 2 and 3, diagnostic and implementation monitoring. This has been clarified in the text.*

While Oklahoma seems to have a good framework for its State-wide activities, because Oklahoma has identified sediment as the primary source of NPS pollution, Oklahoma should more specifically focus its State-wide program (including State-wide educational framework) towards addressing this widespread problem. Although Oklahoma does recognize that "State-wide strategies for NPS control are intended to address ubiquitous pollutants such as sediments, which seem to be
universally impacting the State waters" (p. 81), Oklahoma should provide more detail regarding how its State-wide strategy will specifically address sediment.

Sediment is addressed specifically in the goals of the overall program numerous times through goals to address criteria development, education, implementation, and monitoring efforts. Sediment is also specifically addressed in the monitoring programs of numerous agencies (OWRB, OCC, USGS, etc.). Sediment is also specifically addressed as part of current activities in several projects including Illinois River Riparian Corridor Restoration, Poteau River Comprehensive Basin Management Program, Little Deep Fork TMDL support and BMP Implementation, Phase 2 of TMDL for Dog Creek and Cat Creek Watersheds, Fourche Maline Watershed Education Project: Education through Demonstration of Best Management Practices to Reduce Sediment Loading to the Fourche Maline Creek and Lake Wister, Clearview Creek Demonstration Project, Bank Stabilization through Stream Restoration, and Implementation of Nonpoint Source BMPs in Fourche Maline arm of Lake Wister, Bank Stabilization through Riparian Restoration. Thus, sediment is specifically addressed in the monitoring and implementation programs of the NPS Management Program. In addition, though not specifically addressed in the implementation efforts wherever it has been identified as a threat. Text has been added to clarify this.

On a watershed basis, Oklahoma intends to implement watershed NPS control projects (two large-scale and two small-scale) each year, specifically targeting 5 watersheds (from 150 UWA category I watersheds) for restoration activities. While Oklahoma should be commended for focusing their efforts on impaired waters, as described above, Oklahoma should clarify its plan of action (presented in its shorter-term goals) in terms of its overall prioritization process and whether its rate of implementation will be adequate to address all of the impaired watersheds within 15 years. *This timeline was optimistic to address all of Oklahoma can hope to accomplish within 15 – 20 years given expected resources and current programs to evaluate and support the establishment of watersheds through implementation of this program within the next fifteen to thirty years. Should available resources increase, Oklahoma will alter the program and attempt to address more than the top thirty watersheds.*

4. Abate Known Water-quality Impairments and Prevent Significant Threats

Since Oklahoma uses targeting tools such as the UWA to address high priority waterbodies, the State should be able to adequately address presently known water quality impairments. Oklahoma also recognizes the importance of preventing significant threats to water quality, and specifically integrates these concerns into its goals and objectives (e.g., in relation to monitoring changing land uses and using data to identify where waterbodies have been threatened, p. 23). Additionally, Oklahoma cites several State regulations that require BMPs to protect particular waterbodies (e.g., water supplies or designated high-quality waterbodies,

p. 55). The State should elaborate on the extent to which these regulations have been successfully used to protect water quality.

These regulations are likely not solely responsible for successful efforts to protect water quality. Due to lack of resources, they are not always completely enforced. However, they are very important in

furthering voluntary efforts and agency programs toward their directed ends. Examples have been added to the text to clarify how these regulations are effective.

In addition, Oklahoma's new statutory requirement for each State environmental agency to develop a Water Quality Standards Implementation Plan will help to ensure that State environmental agency programs will: comply with anti-degradation standards; maintain water quality where beneficial uses are supported; remove threats to water quality where beneficial uses are in danger of not being supported; and restore water quality where beneficial uses are not being supported (p. 114).

As described above (under key element #3), because Oklahoma has identified sediment as the primary source of NPS pollution, it is important for Oklahoma to develop a clear strategy to address this widespread problem. In relation to this key element, Oklahoma should likewise provide more detail on p.102 regarding how it plans to initiate a strategy to prevent significant threats to water quality from sediment. The State should also show how the use of Watershed Restoration Action Strategy (WRAS) will be coordinated with each watershed's coordinating team (either WAG or other watershed groups). Oklahoma has a clear strategy to address specific types of NPS pollution. This strategy, as spelled out section I of the document involves : Assessment, Planning, Education, and Implementation. The process is specifically spelled out in section VII by which the state will address whatever pollutants are identified as threatening or impairing attainment of beneficial uses in the particular priority watershed of interest. Text has been added to the first paragraph of this section to further clarify this process.

5. Identify and Progressively Address Impaired and Threatened Waters

Once the State identifies impaired and threatened waters, it should direct its program implementation plans and activities towards progressively addressing the priority waters. This allows the State to focus its efforts on the worst waters first, also making for a more efficient allocation of resources.

Oklahoma's prioritization process is based on the UWA ranking, with additional consideration given to: a) the amount of work necessary before implementation work can begin; and b) the extent of the watershed within State boundaries. Oklahoma ranks UWA priority watersheds based upon the number of 303(d) listed streams within a watershed; we strongly encourage this approach. With further clarification (as described above in key element #1) of how this prioritization process relates to Oklahoma's short-term goals for watershed restoration, Oklahoma should meet this key element. *We have added/altered text to further clarify how Oklahoma hopes to accomplish this goal.*

6. <u>Establish Flexible, Targeted, Iterative Approaches to Achieve and Maintain Beneficial Uses of Water</u> <u>as Expeditiously as Practicable</u>

Pursuant to this key element, the State should: (1) identify the approach that it will use to control nonpoint sources of pollution (which may include a mix of water-quality based and/or technology based measures); and (2) identify the specific programs that it will use to achieve implementation of the measures (which may include a mix of regulatory or non-regulatory programs) (1996 Guidance, p. 9). This key element is important because it provides a framework for the State's measures and programs that it will use to achieve its short- and long-term goals.

Oklahoma's approach to achieving successful implementation of BMPs on both a watershed and State-wide basis is primarily through "voluntary cooperation from landowners" (p. 54), and through promoting cost-share funding (through the local WAG). Oklahoma also cites several legal authorities that may require BMP implementation under certain circumstances (p. 55), yet intends to promote an aggressive State-wide education program to encourage the implementation of its NPS Management program.

Oklahoma's new statutory requirement for each State environmental agency to develop a Water Quality Standards Implementation Plan (by July 1, 2001) should also help to promote implementation of its program. However, the State should better clarify and define the commitments of these agency partners in terms of the specific roles they will play in implementing the State's short- and long-term goals.

We have added text to further clarify which agencies should be responsible for addressing the goals of this program.

Securing other possible funding sources is also key to ensure program implementation, particularly so that States can progressively decrease their current reliance on government funds to support implementation of BMPs. Oklahoma recognizes the Clean Water State Revolving Fund (SRF) as a source of funding, but acknowledges that this section is still "under construction" (p. 80). We would like to emphasize the significance of SRF as an excellent source of funding, and we look forward to seeing this discussion in the next draft.

We encourage the State to look beyond using 319(h) funds as a cost share tool (when other programs are already so structured), but rather, use these funds to identify where existing cost share programs can be better targeted (specific landowners) to show water quality improvements in streams more expeditiously. Section 319(h)(12) specifically request reporting on reductions in NPS pollutant loadings and improvements in water quality for those navigable waters. *Oklahoma agrees whole-heartedly with this approach.* 319 funds are intended primarily as *demonstration funds, rather than to be used completely as implementation funds. It is our hope that we*

can use these funds to demonstrate effective BMPs in certain portions of specific watersheds and then use other funds (such as EQIP or state cost-share funds) to spread around to other watersheds. However, this is a new direction for the program and the state has only given two years of cost-share monies for priority watersheds. In addition, the amount directed by the state was substantially less in the second year. The extent to which state funds can be used may be substantially less in the future. However, we are committed towards developing a better partnership with the EQIP program and hope to further the use of those funds (and others) to broadcast the results of 319 demonstration efforts throughout priority watersheds.

7. Federal Consistency

Not only is it important for States to identify Federal lands and activities which are not managed consistently with State NPS programs, but once identified, the State should have a process for working with such Federal agencies to resolve the potential inconsistencies with the State's NPS management program.

Oklahoma recognizes the significance of Federal consistency in the State, and has developed a two-level review process for which it will identify any inconsistencies with the Management Program (see pages 110-112). Oklahoma has developed a list of specific criteria to evaluate the Federal program in the first level of review. Factors such as whether the Federal program meets State water quality standards or whether the Federal program identifies BMPs are evaluated during this level of review. Oklahoma presents a detailed checklist, to be used by the appropriate State agency, during the second level of review to address individual development projects for consistency purposes. Factors such as whether State approved BMPs are included or whether the project is consistent with the prioritization of watersheds (as identified in the NPS Pollution Management Plan) are evaluated during this level of review. Additionally, Oklahoma identifies specific Federal assistance programs and projects for which it intends to conduct consistency reviews. It is suggested that the State provide some examples of where this outlined process has been effective.

The outlined process in the management plan formally upgrades the Oklahoma NPS program to meet guidance. OCC has commented on federal programs with the US Forest Service programs in the Ouachita mountains and the Black Kettle National Grass Land. OCC will aggressively pursue the federal consistency measures outlined in the future.

8. Efficient and Effective Program Management and Implementation

We recommend that the State place a higher degree of priority and emphasis on reporting the State's overall effort to address polluted runoff by incorporating all agencies and entities programs activities. As we move to a more statewide, diverse and cooperative approach to addressing NPSs, it is imperative that all program activities be reported, as well as documenting progress in addressing water quality impacts. In particular, we have worked with several States and other EPA Regions in developing new approaches to reporting program implementation that is more useful to all stakeholders involved in the program, as well as those that may come into the program in the future. We suggest providing a commitment in the plan to submit a more comprehensive Annual Report which incorporates this "industry standard" approach to reporting implementation of the plan. As you know, the State's Annual NPS Report is required no later than the end of January (reporting on implementation efforts of the previous year).

The Annual NPS Program Report is not to be confused with the Section 319(h) Project activity "Semi-Annual" report which replaced the previous quarterly reporting format.

In terms of "effective program management", we suggest expanding on the statement on p.27 which narrowly identifies how "EPA charged each states' NPS agency" with two tasks: identify impacted waters and develop a plan to correct the problems. This is not entirely true, Section 319 goes beyond that. Section 319(b) specifically requests an identification of all programs (including enforcement) to achieve implementation, Section 319(c) expresses cooperation with local, regional and interstate entities which are actively planning for NPS controls, and, Section 319(h)(8)&(11) requires states to report on program status of addressing NPS impacts and improving water quality. *Text has been added to expand the statement to more accurately reflect the requirements of the 319 program. Staff will be assigned to draft the required report by the end of January*.

Regarding p.113-132, it is unclear what the differences are between Section A, "Statutory Responsibilities" and Section B, Agency Authorities. These may possibly be modified by combining the two sections.

It is important to clarify how each agency interprets its statutes to reflect their areas of responsibility. Statutes and individual's interpretation of them are not necessarily the same thing. The need for the two separate sections has been clarified in the text. We believe the agency responses further clarify what everyone's role actually is, in addition to explaining the roles of non-agency groups in the program.

9. Feedback Loop

It is important for the State to establish a plan to monitor and periodically (e.g., every 3-5 years) evaluate its program to determine whether the State is having success in achieving its short- and long-term goals. The feedback loop provides a timely opportunity for the State to consider and make program adjustments, where necessary and appropriate, in order to ensure that the State in fact accomplishes its goals and objectives.

Oklahoma commits to conducting a review/revision of its NPS management program every five years (p. 160). Oklahoma also describes how it conducts annual reviews of the NPS program to assess the progress made on achieving milestones outlined in the NPS program

(p. 161). However, the purpose of the feedback loop is for States to step back every few years (e.g., 3-5 years) to assess whether they are: a) achieving their shorter-term objectives; and, b) on track towards achieving their longer-term goals. Oklahoma's program, therefore, is lacking a feedback loop that will assess its overall progress towards achieving its long-term goals and objectives.

Oklahoma Conservation Commission is statutorily required to: "Prepare, revise and review Oklahoma's Nonpoint Source Management Program and Nonpoint Source Assessment Report in coordination with other state environmental agencies and compile a comprehensive assessment for the state every five (5) years" This comprehensive assessment should considered be part of the feedback loop. The intent of the management plan as a whole was to describe a continuing process of assessing and evaluating the states waters, formulating and implementing remedial programs, and to evaluate if water quality goals were met. Text will specially added to outline a feedback loop as you have described.

Because one of Oklahoma's goals is to monitor water quality in each watershed throughout the State in a rotating program over 5 years (p. 24), Oklahoma should consider integrating this review into its overall assessment of its program process, and thereafter make appropriate program adjustments in light of these results. In doing so, Oklahoma can establish an appropriate basis for which both short-and long-term progress can be measured.

The data from the monitoring program will be presented to the NPS working group and used to update the UWA to prioritize efforts. It is possible that the UWA list will change over time given data collected from both the OCC's rotating plan and the OWRB's BUMP program. This has been spelled out in the document.

10. Comments from Carl Young, EPA Pesticides

As called for in the MOU between our Divisions, we encourage Oklahoma to include monitoring of atrazine in ambient water and bottom sediments in agriculturally influenced watersheds. In particular, drinking water supply lakes and reservoirs should be targeted.

OCC does monitor for pesticides wherever biological and habitat data indicate a potential threat. Atrazine is one of the pesticides for which we tested. In addition, the BUMP program also monitors for pesticides, including atrazine. In addition, OCC works with local conservation districts to collect available information on pesticide use, which can be helpful in directing monitoring, education, and implementation phases of a project.

The plan states that *there are also state regulations that often require BMPs, (page 55). It would be useful to identify these BMPs or reference a document that identifies these BMPs. References to these BMPs are included in section VI G.

APPENDIX E

COMMENTS AND OCC RESPONSES ON DRAFT TWO

OF THE NPS MANAGEMENT PROGRAM

DRAFT 2- Comments and Suggestions

OCC responses in bold italics, comments and suggestions in standard print or underlined and in red.

FOUNDATION FOR ORGANIC RESOURCES MANAGEMENT

November 22, 1999

Scott Stoodley Director- Water Quality Program Oklahoma Conservation Commission 413 NW 12th Street Oklahoma City, OK 73103-3706

Ref: Oklahoma Nonpoint Source Management Program

Dear Mr. Stoodley:

Further to my comments at the meeting in Oklahoma City on November 2nd, I would like to offer the following comments/suggestions regarding the NPS Management Program document:

1. There is increasing recognition in the United States that, in certain areas of concentrated animal agriculture, efforts to comprehensively address manure-derived nutrient management issues should entail off-farm or "export" activities. Such off-farm/export activities are necessary to address the imbalances that commonly exist when much/most of the nutrients imported in the feed grains pass through the animals and are accumulated on the production farms through land application of the manure/litter. And, of course, off-farm/export activities should be complementary to on-farm nutrient management practices.

It is apparent that the Oklahoma Conservation Commission (OCC) and other state and federal agencies involved in nonpoint source pollution and animal waste management activities in Oklahoma have already recognized the need for nutrient export activities, since such activities have previously been funded by and/or incorporated within some 319 activities. Accordingly, I would suggest that OCC's NPS Management Plan specifically acknowledge and reflect the need for export activities as part of the overall, comprehensive approach to nonpoint source mitigation efforts regarding manure-derived nutrients in areas of Oklahoma having concentrated animal production.

2. Building on the general acknowledgement of the need for off-farm/export activities discussed above, I would urge OCC to increase the emphasis placed on such activities within specific NPS projects in areas of concentrated animal agriculture. While it is important to continue to support various on-farm *best management practices*, off-farm BMPs are also needed to avoid accumulation of manure-derived phosphorus in manure/litter application fields. Inclusion and support of off- farm options is becoming increasingly critical as producers experience increasing restrictions on traditional on-farm management practices.

In particular, I would recommend that export efforts receive greater emphasis in the current NPS activities within the Eucha and Illinois River watersheds and in the forthcoming NPS activities in the Wister watershed. Perhaps funds could be pooled from projects in each of these areas to support an activity focused specifically on stimulating and supporting the export of excess manure-derived nutrients. Such a consolidated activity might include:

- *Purchase of litter spreaders to be provided to conservation districts in target usage areas* (i.e., *outside* of the areas of concentrated animal production): This proved to be a significant component of our success in developing new markets in the Arkansas Delta region for litter produced in the Arkansas River Valley (under a USDA-funded project implemented during 1992-1995). Moreover, helping ensure the availability of litter spreaders in target use areas has been identified as a *priority* need by the Eucha/Spavinaw Watershed Nutrient Export/Marketing Working Group.
- Demonstration projects of manure/litter use for crop production in target use areas: I encourage OCC, the Oklahoma Department of Agriculture, and the Oklahoma State University to continue efforts to demonstrate the agronomic benefits of manure/litter use in the target use areas. Past efforts have provided positive empirical data. Additional demonstrations (along with quantified production impacts and associated economics) would likely help stimulate demand for—and, in turn, the export of —manure/litter produced in areas of concentrated animal production within the new market areas.
- *Development of new markets:* Several states have started developing new markets for raw/processed manure/litter. For example, Minnesota and Texas are implementing new programs in which their Departments of Transportation are purchasing manure/litter-derived compost for roadway maintenance (primarily to enhance erosion control). Perhaps 319 funds could be used to help the Oklahoma Department of Transportation assess the feasibility of developing such a program in Oklahoma.
- *Value-added processing:* Numerous technologies are emerging which can convert manure/litter into value-added products. Such products can be sold into new and distant markets, resulting in the export of excess manure-derived nutrients out of the areas of concentrated production. Deployment of value-added conversion facilities would not only provide off-farm management options for poultry/livestock producers but lead to new investments and jobs and economic development in rural areas. Perhaps 319 funds could be used to assist efforts underway (e.g., by the Oklahoma Department of Agriculture and through the Eucha/Spavinaw Watershed Nutrient Export/Marketing Working Group) to evaluate and deploy such technologies.
- *Export incentive/cost-share payments:* In concert with other state/federal programs (e.g., EQIP), it may be desirable for 319 funds to be used to provide direct support for export of material off of production farms with excessive nutrient production (as has been the case with the Beaty Creek project). In my opinion, it is essential that such support efforts also ensure that the material is transported out of the entire area(s) of concentrated poultry/livestock production. It is also my opinion that incentive/cost-share payments are more effective when targeted at consumers/end-users and at producers/haulers than at producers of manure/litter.

The foregoing are some examples of how the NPS program could support manure/nutrient export activities, thereby reducing nutrient loading rates and associated potential nonpoint source pollution concerns in areas of concentrated poultry/livestock production. Please let me know if you have any questions or would like clarification regarding these comments/suggestions.

Sincerely,

Jim Wimberly President

OCC agrees that nutrient export programs should receive continued support along with other best management practices and that efforts should be made to ensure that the nutrients are exported to nonsensitive watersheds. We have clarified these goals in the document and have added some of your suggested methods to the source-control activities section.

OKLAHOMA COOPERATIVE EXTENSION SERVICE

H. EDUCATION PLANNING AND RESOURCE SECTION

INTRODUCTION

Through educational efforts on watershed- and statewide-levels, OCC and OCES will promote public awareness of nonpoint source pollution and its impacts and engage the public in implementation of Nonpoint Source Management programs. Direct communication and discussions of water quality issues with the public can help to reconnect people and communities with the resources of the state and with the watershed in which they live. Building that connection necessitates providing information about threatened resources, as well as empowering and inspiring action at all levels, from locally led citizen efforts to state agency programs. The underlying message relayed through these efforts is that an informed and involved public provides the greatest and longest lasting environmental protection

The environmental education programs of OCC and OCES provide learners with an appreciation of the world around them and with the knowledge, attitudes, skills and motivation to make informed decisions when human activities threaten natural resources. An informed citizenry can bring about change through both personal practices and their influence on public policy decisions. Applying the principles and philosophy of environmental education to 319/NPS projects will ultimately enable OCC and OCES to enlist the support of local citizens in accomplishing and sustaining 319 priority projects.

If NPS educational programs are to succeed in achieving lasting impacts, they must focus on issues that simultaneously address citizens' concerns and environmental protection needs. Programs will only be effective if there is general support of the people affected, such that personal interests coincide with watershed and statewide implementation plans of OCC. This section outlines a framework for planning educational efforts for NPS Management Programs, and provides guidelines for tailoring efforts to the watershed level or for a statewide educational campaign. Evaluating educational efforts is essential. Suggested evaluating techniques are also included.

2. FRAMEWORK FOR EDUCATIONAL PROGRAM DEVELOPMENT AND PLANNING

Issue Identification by target audiences

Appendix E- Comments and OCC Responses on Draft Two

A good understanding of the concerns and limitations of the target audience is needed as the foundation for effective educational programs. This can be achieved in a number of ways including focus groups, active observation and interactions with individuals representative of the larger group, and surveys. It is vital that the contacts made be with a true cross section of the target community and not be based on convenience.

It is only after a true picture of the multitude of concerns of the audience is developed that specific programs and strategies should be selected. For instance, in an impoverished community, retaining land ownership and creating sufficient income are likely to be leading issues – environmental concerns must not be seen as being in conflict with these goals. The full range of motivations must be examined and used appropriately, including economic interest, human health concerns, environmental and conservation ethics, and even the broader societal good.

Educational Program Planning

This section outlines a framework for tailoring educational efforts to the needs and concerns of the people who live, and make their living, in targeted watersheds. The framework is also adaptable to a statewide educational thrust. The approach, based on The North American Association for Environmental Education (NAAEE) framework for environmental education, is designed to develop target audience-specific educational programs that guide a learner from awareness to action. In this framework, we identify educational "subjects," then specific audiences to be targeted. Each target audience is then addressed at five levels: (a) awareness, (b) knowledge, (c) attitudes, (d) skills and (e) action. These levels are defined below.

a. Awareness -- Enhance visibility of the overall issue of water pollution, related societal issues, and potential problem-solving strategies. At this level, education seeks to identify audience needs and goals of the community in the context of 319 capabilities

b. Knowledge -- Increase fundamental understanding of the processes as well as likely social, political and economic, and environmental impact of the desired actions. Develop a firm grasp of potential solutions to water quality problems and analyze their impact.

c. Attitudes -- Audience members' attitudes should change as they develop a deeper appreciation of and respect for the potential quality of their water resources. Raising awareness and increasing knowledge helps to change attitudes. While this may be the most difficult step to achieve, it is essential to bringing about change. Attitudinal change may be reflected by the desire for skills and ultimately changes in behavior. Although many in the public may not go on to develop skills or exhibit the behavior that will restore or protect water quality, development of a favorable attitude is valuable in itself. A favorable attitude is essential for support of appropriate public policy and a climate that is conducive to improving and protecting water quality.

d. Skills -- Target audience will acquire the skills needed to bring about change in practice. Examples include riparian area management, integrated pest management, stream restoration, recycling, and public participation.

e. Action/Participation -- The target audience and stakeholders will apply their knowledge and skills and demonstrate commitment to conserve, protect and improve water quality by taking action as individuals or collectively. Examples include implementing BMP's, completing "service projects" such as stream monitoring or influencing public policy.

The framework is presented below with examples showing many of the subjects that will be encountered in educational programs for watershed-specific or statewide 319 educational programs. Each educational program will address specific subjects for specific target audiences, using specific tools to address awareness, knowledge, skills, attitudes, skills, and actions.

I. The Framework
Subject:
Audience:
Audience acquires (the goal):
Awareness: Specific awareness goals on the designated subject in the designated
audience.
Tools: Identifies the tools available to develop awareness in the target
audience.
Knowledge: Specific knowledge goals on the designated subject in the designated
audience.
Tools: Identifies the tools available to instill knowledge in the target
audience.
Attitude: Specific attitudinal goals on the designated subject in the designated
audience <u>.</u>
<u>Tools</u> : Identifies the tools available to address attitude.
Skills: Specific skill goals on the designated subject in the designated audience.
<u>Tools</u> : Identifies the tools available to address attitude.
Action/participation: Specific action or participation goals on the designated
subject in the designated audience.
Tools: Identifies the tools available to motivate the target audience to
action, behavior or participation.

The following are examples of educational programs that will be undertaken with designated targeted audiences after the issue identification process has determined which subjects are needed. Tools such as existing curricula, appropriate delivery methods, and ideas for evaluating accomplishments (results) are also presented. Note that very specific audiences are sometimes targeted in an effort to better educate. Additional subjects and-target audiences may be identified as planning proceeds.

Subject: Soil conservation, erosion control

Audience: New Rural Landowners

Audience acquires:

Awareness:	Recognize erosion signs and understand importance of soil loss
	Tools: NRCS photo series, conservation posters, PSAs

- Knowledge: Soil conservation BMPs and how to choose between them; environmental impact of sediment; cost of erosion in soil quality and productivity, management alternatives that reduce erosion; how to employ soil conservation practices without raising costs or losing productivity. Tools: Conservation District/OSU"Welcome to the County" Meeting, Ag field
 - days; rainfall simulator demonstrations, forage, grazing and crop demonstration plots, pond protection demo's.

Appendix E- Comments and OCC Responses on Draft Two

Attitude:	Improved confidence in ability to control soil erosion; interest in promoting
Skills:	Conservation in community. Use of common farm equipment to install and maintain BMPs; attention to details such as location of turn rows: forage planning
Action:	Implementation and maintenance of soil conservation BMPs by a given percentage of those attending trainings. Promotion of conservation among others in the community.
	As a spin-off benefit, significant numbers of other new rural landowners in the county will become aware of the benefits of soil conservation BMPs and request
	Tools: cost-share, technical assistance, incentive payments.
Subject: Soil conserve	ation erosion and sediment control
<u>Audience</u> : Developers	s, contractors, public officials
Audience acquires:	
Awareness:	Recognize that removal of cover causes erosion and damage to water resources and aquatic communities
Knowledge: Identif	Tools: NRCS photo series, conservation posters, PSAs, media articles Eving soil conservation BMPs and choosing between them; environmental impact of
1	
sediment; use	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control field trips
sediment; use	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control
sediment; use Attitude: Skills:	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites.
sediment; use Attitude: Skills: Action:	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites. Adherence to the spirit and letter of storm water regulations and local ordinances for erosion and sediment control. Avoidance of nuisance.
sediment; use Attitude: Skills: Action:	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites. Adherence to the spirit and letter of storm water regulations and local ordinances for erosion and sediment control. Avoidance of nuisance. Tools: model ordinances and examples of successful erosion-sediment control programs.
sediment; use Attitude: Skills: Action:	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites. Adherence to the spirit and letter of storm water regulations and local ordinances for erosion and sediment control. Avoidance of nuisance. Tools: model ordinances and examples of successful erosion-sediment control programs.
sediment; use Attitude: Skills: Action: <u>Subjec</u> t: Animal Wast	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites. Adherence to the spirit and letter of storm water regulations and local ordinances for erosion and sediment control. Avoidance of nuisance. Tools: model ordinances and examples of successful erosion-sediment control programs.
sediment; use Attitude: Skills: Action: <u>Subjec</u> t: Animal Wast <u>Audience</u> : Landowner	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites. Adherence to the spirit and letter of storm water regulations and local ordinances for erosion and sediment control. Avoidance of nuisance. Tools: model ordinances and examples of successful erosion-sediment control programs.
sediment; use Attitude: Skills: Action: <u>Subjec</u> t: Animal Wast <u>Audience</u> : Landowner <u>Audience acqu</u>	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites. Adherence to the spirit and letter of storm water regulations and local ordinances for erosion and sediment control. Avoidance of nuisance. Tools: model ordinances and examples of successful erosion-sediment control programs. te Management rs Using Poultry Litter <u>uires</u> :
sediment; use Attitude: Skills: Action: <u>Subjec</u> t: Animal Wast <u>Audience</u> : Landowner <u>Audience acqu</u> Awareness:	of mulch, timing, and need for storm water management. Tools: Blue Thumb, OSU and other short courses on erosion and sediment control, field trips. Recognition of need for erosion and sediment control. Design and installation of erosion control plans and BMPs. Planning for good housekeeping on construction sites. Adherence to the spirit and letter of storm water regulations and local ordinances for erosion and sediment control. Avoidance of nuisance. Tools: model ordinances and examples of successful erosion-sediment control programs. te Management rs Using Poultry Litter <u>nires:</u> Bad things can happen if poultry litter is applied the wrong way – both legal and environmental.

poultry integrators, poultry companies, ODA

- Knowledge: Understanding soil phosphorus buildup, eutrophication and their undesirable effects Tools: photos, slides, field tours to lakes and streams and farms, secchi disk demonstrations, displays, Extension Educators, NRCS, Poultry Education program, ODA inspections
 - Attitude:Willingness to alter fertilization/waste management practices.Skills:Soil sampling, spreader calibration, record keeping, litter nutrient valuation, use

of buffers widths to protect surface waters Tools: seminars, field meetings, tours, free record books, , Extension Educators, NRCS, Poultry Education program, ODA inspections

Action:	Improvements in poultry litter application practices as measured by surveys and
	spot checks; improvements in compliance by regulated producers.
	Tools: Incentives; technical assistance, industry and farm organization backing.

Subject: Pesticide Management

Audience: Urban and Suburban Residents

Audience acquires:

Awareness: Rainfall and sprinkler water can transport misapplied yard pesticides to surface and groundwater.

Tools: PSAs, media, groundwater model, posters, 4-H mall days, websites

Knowledge: Effects of pesticides in streams and groundwater;Importance of label instructions, who to ask for advice, how to calibrate applications, importance of avoiding impending rainfall. Understanding of risk with shallow groundwater, nearby surface water and sandy soils. Ways pesticides can be kept off driveways and streets. Use of IPM techniques and biological alternatives.

	Tools: Blue Thumb volunteer educators, OCES Master Gardeners, Brochures,
	fact sheets, newspaper columns, sewer in a suitcase, IPM short courses.
Attitude:	Appreciation of need, and desire to use greater care with yard and garden
~	pesticides
Skills:	Calibration, mixing and cleanup proceedures; conservative purchasing habits; proper disposal of unwanted products, scouting for pests and recognition of
	beneficial organisms
Action:	Adoption of IPM, selection of IPM lawn maintenance companies

<u>Subject</u>: Pesticide Management (2)

Audience: Farmers and Ranchers

Audience acquires:

Awareness: Carelessness can contaminate drinking water supplies, and damage stream life. Tools: websites, posters, District and OCES county agriculture newsletters,

Knowledge: Effects of pesticides on groundwater and streams; understanding toxicity, persistence, runoff and infiltration indices; need for backflow prevention, importance of following labels, chemical mixing pads for mixing and loading applications, and triple washing of pesticide containers; proper scouting and use of threshold numbers; timing of applications and weather considerations.

	Tools: IPM publications, "50 Ways Farmers Can Protect Groundwater", farm organization bulletins, OCES fact sheets, OCES newsletter "Pesticide Reports"
Attitude:	Concern for personal health, legal liability and economic self-interest
	motivators for improved pesticide practices
Skills:	Hands-on work with planning and implementation of pesticide use BMPs such as
	scouting, spill pads, air gap devices, container rinsing etc.
Action:	Pesticide container recycling events, farm tours, demonstrations of mixing pad
	installation.

<u>Subjec</u>t: Nutrient Management – Agriculture; cropland <u>Audience</u>: Crop consultants <u>Audience acquires</u>:

	Tools: posters, flyers, personal contacts, OSU, OCC, DOA newsletters
Knowledge:	Conservative soil testing and fertilizer recommendations, effectiveness of subsoil testing
for nitr	ate; effect of soil pH, preferred variety selection
	Tools: short courses for CCA credit; fact sheets; soil testing program with
	reliable laboratory results
Attitud	e: Willingness to recommend practices for environmental protection
Skills:	Standard skills of the profession
Action	: Offer environmentally sensitive producer management recommendations.

Excess nitrogen or phosphorus can be damaging to water quality.

Subject: Nutrient Management – Agriculture; cropland (2)

Audience: Crop producers

Audience acquires:

Awareness:

Awareness: Excess nitrogen or phosphorus can result in unappealing pond and lake appearance, fish kills, bad tasting drinking water from lakes and human health effects (nitrogen) in groundwater.

Tools: posters, flyers, personal contacts, public service announcements, public meetings, ag media.

Knowledge: Pollution prevention planning for the farm; effectiveness of soil testing and conservative fertilizer recommendations that produce crops at lower cost; effectiveness of subsoil testing for nitrate; effect of soil pH, preferred variety selection; buffer strip effectiveness

	Tools: OSU Fact sheets and CTIC materials; reliable, rapid soil testing laboratory with effective, conservative recommendations, demonstration plots, tours, short
	courses.
•	Willingness to try practices that differ from the traditional

- Attitude: Willingness to try practices that differ from the traditional.
- Skills: Recordkeeping, soil testing, analysis of cropping records to minimize fertilizer input, buffer strip design and management.

Tools: Workbooks for recordkeeping; software for recordkeeping; seminars and classes for farm management.

Action: Selection of crop and fertilizer practices to protect the environment. Tools: Incentive payment; leadership from industry and crop consultants

<u>Subject</u>: Nutrient Management – Agriculture; animal production

Audience: Animal producers -- grazing

Audience acquires:

Awareness: Excess Nitrogen or Phosphorus can be damaging to the environment; animal manure can damage water quality; trampling of riparian areas degrades water quality; watershed awareness.

Tools: posters, flyers, personal contacts, public service announcements, public meetings, agricultural media.

Knowledge: Pollution prevention planning for the farm; nutrient management recommendations, soil testing, riparian management

Tools: OSU Fact sheets; reliable, rapid soil testing laboratory with effective, conservative recommendations, tours, short courses.

- Attitude: Pollution prevention can be economically beneficial; willingness to try practices that differ from the traditional
- Skills: Grazing and forage management, recognition of grass height riparian condition factors.

Appendix E- Comments and OCC Responses on Draft Two

Action:	Improved manure application, forage management and grazing distribution
	practices, forage and riparian condition monitoring
	Tools: Incentive payment, industry (Cattlemen's Association, Farm Bureau, etc.),
	watershed leadership.
	watershed leadership.

Subject: Riparian Management Audience: Farmers and Ranchers Audience acquires

Awareness:	What riparian areas and flood plains are, how they help water quality; watershed awareness.
	Tools: County and District newsletters farm media, flyers, OCES Stream model, watershed leadership
Knowledge:	Riparian areas are important to productivity and land value. Grazing and crop production systems that are economical can also enhance functioning of riparian area.
Tools: Riparia	an Area Management Handbook and related curricula; seminars/tours
Attitude:	Appreciation of brush and tall vegetation as protective of streams; recognition of streambank clearing and overgrazing as harmful practices; willingness to change practices.
	Tools: Stream models; ag industry leadership
Skills:	Recognize when riparian areas/floodplains are functioning properly; management of crops and grazing to improve condition.
Action	Participate in stewardship incentive and other programs that improve riparian and
neuon.	floodplain management; manage grazing in riparian pastures through fencing, rotation, alternate water supplies, etc.
	Tools: incentives, industry and watershed leadership.

<u>Subjec</u>t: Ground Water protection <u>Audience</u>: Rural residents, youth <u>Audience acquires</u>

lee uequites	
Awareness:	There are links between activities on land surface, quality of groundwater and safety of well water.
	Tools: PSAs, flyers, news media, school environment fairs
Knowledge:	How wells and septic systems function; how groundwater becomes polluted;
	which contaminants are likely to be health risks; proper waste management and
	spill prevention.
Tools: Oklah	om*A*Syst seminars; classroom enrichment; groundwater models
Attitude:	Well and septic system maintenance and proper waste management are protective
	of family and environmental health; willingness to take protective actions.
	Tools: Oklahom*A*Syst seminars, free water testing
Skills:	Drawing good water samples; finding assistance with maintenance; assessment of
	home- and farmsteads for groundwater safety.
	Tools: One-on-one home visits in targeted communities
Action:	Performing private wellhead assessments; correcting problems found.

Subject: Stream Ha	bitat
Audience: Youth	
Audience acquires	
Awareness:	Streams are fun places; stream habitat affects our ability to use and enjoy the
	resource; watershed awareness. Tools: Field trips, camps, videos, Caring
	For Planet Earth
Knowledge	What's in a stream? Stream life depends on good habitat and water quality. Health
	of riparian area affects stream habitat; Landuse affects stream habitat.
Tools: 4-H	Aquatic Stewardship Projects; Lifestyles of the Wet 'n Wild; Project WET activities;
camps; Scor	uting activities, outdoor classrooms and streamwalk field trips
Attitude:	Desire to spend time exploring streams; willingness to participate in stream
	improvement activities.
	Tools: same as above; activities <u>must be fun.</u>
Skills:	Collecting invertebrates; seining a stream for fish; angling; habitat assessment;
	water quality monitoring.
Tools: Same as above; plus: Oklahoma Blue Thumb; Oklahoma Water Watch; Scouting; 4-H Wildlife	
Habitat Eva	luation Program and Competition; ODWC fishing clinics.

Action: Participate in above activities; also: help local watershed organizations and cleanups; volunteer duty in Caring for Planet Earth, constructing outdoor classrooms.

Subject: Stream Habitat (2)

Audience: Streamside landowners

Audience acquires

Awareness:	Stream health affects our ability to enjoy the resource and maintain land values; watershed awareness		
	Tools: PSAs, flyers, news media, Caring for Planet Earth, community and watershed leadership; websites.		
Knowledge:	What's in a stream? How stream life depends on good habitat and water quality.		
	How riparian areas affect stream habitat and land value and protect against land		
	loss during flood events; how landuse patterns affect streams.		
Tools: Public meetings and watershed fairs; OCES Trailer-mounted Stream model and related			
curricula; fact sheets; demonstration sites on Partners for Wildlife areas; Blue Thumb and Water			
Watch programs; web sites			
Attitude:	Willingness to adopt management practices protective of streams		
	Skills: Evaluating stream health; finding technical assistance.		
	Tools: See above		
Action:	Participation in Blue Thumb, Stream Team and watershed organizations; adoption of management practices on private land; participation in stream cleanups.		

Subject: Watershed management

<u>Audience</u>: Resource management personnel

Audience acquires :

Awareness: A water resource includes more than the creek, river, or lake after which it is named

Tools: flyers, fact sheets, displays and speakers at resource-related technical conferences

Knowledge: Effective management of a water resource includes planning on a scale that includes the whole watershed

	Tools: workshops, annual training modules
Attitude:	Look beyond localized situations and consider watershed-level solutions.
	Tools: agency leadership
Skills:	Communication of watershed management concepts one-on-one and in group
	situations
Action:	Management thrusts directed toward particular basins and/or drainages rather
	man-made boundaries.

Subject: Watershed management (2)

Audience: Agricultural producers

Audience acquires :

Awareness: Protecting a water resource involves more than just the boundary of a creek, river, or lake itself. Everyone lives in a watershed.

Tools: flyers, brochures, newsletters, newspaper columns, agricultural media. Runoff and infiltration carry potential pollutants; nature does not always "purify"

Knowledge: Runoff and infiltration carry potential pollutants; nature does not alw pollutants before they reach surface water resources.

Tools: workshops, , maps, groundwater model, time series aerial photos, water treatment plant visits
 Attitude: Appreciation of the "big picture" and an open mind: If we all do a little, together we can do a lot to improve surface water quality.
 Skills: Evaluation of landuse practices in light of watershed health.
 Action: Annual cleanup or management days; evening cookouts at watershed lake or stream sites; formation of watershed management partnerships across boundary lines (i.e., riparian buffer initiatives, farm management training programs)

Tools: incentives, cost-shares, agency grant programs

<u>Subject</u>: Watershed management (3)

Audience: County commissioners and other decision-makers

Audience acquires :

Awareness: A water resource includes more than the creek, river, or lake after which it is named.

Tools: flyers, brochures, community meetings, agency and association newsletters.

Knowledge: Land-use decisions and practices affect larger areas than where the immediate activity takes place.

Tools: workshops, inserts in handbooks, presentations and displays at agency conferences.

- Attitude: Consider watershed effect in the decision-making process
- Skills: Assessment of landuse plans and practices in light of watershed health.
- Action: Watershed impacts of activities are assessed during planning.

Tools: technical assistance, agency leadership, community/watershed association pressure.

Subject: Watershed m Audience: Youth	nanagement (4)
Audience acquires:	
Awareness:	A water resource includes more than the creek, river, or lake after which it is named
	Tools: Scouting and 4-H programs, environmental camps, Caring for Planet Earth fair display
Knowledge Anyth	ing that affects one portion of a watershed affects everything downstream of that
point.	Table. Charge and and the set of a set
A 44:40 Jan	mounted stream model, volunteer programs (Blue Thumb, 4-H projects), internet.
Attitude:	My actions affect everyone's water; sense of wonder and curiosity
Skills: Action:	Exploring watersheds; interviewing and surveying, using information resources. Participate in volunteer projects to improve water quality ; become active in
	community affairs.
	associations
Subject: Watershed m	nanagement (5)
Audience: All resider	its
<u>Audience acquires :</u>	
Awareness:	A water resource includes more than the creek, river, or lake after which it is named
	Tools: flyers, brochures, PSAs mass media, community meetings
Knowledge: Anythi point	ing that affects one portion of a watershed affects everything downstream of that
I	Tools: Home*A*Syst, Blue Thumb education programs, Caring For Planet Earth display, local watershed association programs; environmental fairs
Attitude:	My actions affect everyone's water
Skills:	few needed
Action:	Changing the routine to include good stewardship of resources - including lawns, gardens, fields, streambanks, waste management
	Tools: recycling, composting, xeriscaping, pesticide collection days
<u>Subjec</u> t: Household H Audience: All resider	Iazardous Wastes
Audience acquires:	
Δ wareness:	Household hazardous wastes can damage the environment
Awareness.	Tools: posters flyers public service encoursements DEO programs
Knowledge: Identif	Tools. posters, hypers, public service announcements, DEQ programs fication of household hazardous products and how to properly use and dispose of and location of community collection events.
uncini. Dates a	Tools: modio onvironmental foirs "mall days" Eamily Community Education
Attitudo	meetings, Blue Thumb programs, Home*A*Syst, , DEQ programs Willingness to: road labels, evoid spilling oil on the ground, use collection events
	and recycle; concern for environmental impact.
SKIIIS:	iew needed

Action:	Organize collection events; use hazardous products according to label or save for				
	proper disposal, or recycling.				
Subject Domestic Wastes					
Audience: Rural and	suburban homeowners				
Audience acquires:					
Awareness:	Failing septic tank/drainfield can damage the environment				
	Tools: posters, flyers, public service announcements, , DEQ programs,				
	Oklahom*A*Syst programs.				
Knowledge: Proper	r siting of septic system; maintenance of septic system; how to find access points to				
your septic sy	/stem.				
	Tools: Oklahom*A*Syst, DEQ programs.				
Attitude:	Willingness to maintain septic system.				
Skills:	few needed				
Action:	Pump septic tank at regular intervals as recommended; install septic systems that				
	match soil, community, and environmental constraints.				
Subject: Lake and po	nd management				
Audience: Urban, sul	burban, and rural residents				
Audience acquires:					
Awareness: Lakes	are influenced by their watersheds; fertilizer, household chemicals, and erosion				
impacts.	······································				
	Tools: posters, flyers, public service announcements, mass media.				
Knowledge: Lawn	and garden recommendations: identification of household hazardous products and				
how to proper	rly dispose how to test soil and obtain fertilizer recommendations. IPM				
	Tools: OSU and Blue Thumb publications: soil testing program county extension				
	office: master gardener groups: community/watershed groups: Blue Thumb and				
	Oklahom*A*Syst programs:				
Attitude	Willingness to avoid over-use of chemicals on lawns and gardens, to try IPM				
Autuue.	methods, to dispose of bezerdous westes properly				
Claillan	Soil testing: plant selection IDM techniques				
SKIIIS.	Son testing, plant selection, iPW techniques.				
Action:	Reduce fertilizer use; apply fertilizers at the proper times to minimize				
	environmental impact, use non-chemical pest control when possible; select plants				
	that require few inputs; join Master Gardeners or Blue Thumb.				
Subject: Lake and po	and management				
<u>Audience</u> : Youth					
Audience acquires:					
Awareness: Lakes are valuable lakes are influenced by their watersheds; fertilizer, household					
chemicals, and erosion impact lakes					
Tools: posters, games; environmental fairs; environmental day camps					
Knowledge: Everything we do in the watershed affects lake quality; fish and other organisms live in					
lakes and are affected by their habitat quality					
Tools: Aqua Times, Project WET; sewer in a suitcase; Blue Thumb; OCES					
Environmental Stewardship projects; EcoCamp, Outdoor classrooms; Fishing					
	Clinics; scouting				

Appendix E- Comments and OCC Responses on Draft Two

Action	Attitude: Comm monitoring. Tools: Blue Tl	Respect for lakes, water quality, and lake habitat; willingness to participate in volunteer lake/pond improvement projects, such as Lake Sweep or monitoring Skills: Assessment techniques; observational skills Tools: 4-H club meetings and projects; volunteer monitoring, class projects unity service projects, teaching younger students, leadership activities, volunteer humb program, 4-H.
Subject Audien	t: Solid Waste	dents
Audien	Awareness:	Illegal dumps can pollute drinking water supplies and degrade aesthetics. Landfill space is expensive and limited Tools: posters, PSAs, media items, classroom materials, displays.
Knowle	edge: Learn a water supplies household haz	about the numbers of illegal dumps in the county and how they threaten specific . Train trash cops. Learn how to recycle / dispose of household trash and ardous wastes.
		photos, topographic maps, groundwater maps; OCES and DEQ fact sheets, county solid waste authorities; websites
	Attitude:	Appreciate importance of preventing and cleaning up illegal dumps; develop personal responsibility for the environment; support community trash disposal systems or commercial systems.
	Skills: Action:	Effectively working with local law enforcement and solid waste officials. Increased number of tickets issued for illegal dumping as a result of citizen cooperation. Promote community action and community support for cleanup and enforcement of anti-litter laws.
Subject Audien	t: Solid Waste	(2)
Knowle	Awareness: edge: Water expensive and	Illegal dumps can pollute drinking water supplies and degrade land. Tools: 4-H projects, displays and public speaking; 4-H Mall Days, and can carry pollutants from trash dumps to water sources . Proper landfills are space is limited. Tools: School enrichment; outdoor classrooms, and Blue Thumb programs; use of groundwater models, AWRA posters, DEQ materials, and Project WET activities
	Attitude: Skills:	Appreciate importance of recycling and preventing and cleaning up illegal dumps How to handle unwanted substances in the home and on the farm; recycling; composting
	Action:	Household and farm hazardous waste cleanup days; collection events; school recycling programs; composting

3. WATERSHED-SPECIFIC EDUCATION

Every watershed is unique, not only in terms of hydrologic and technical factors but also in terms of local people's beliefs, customs and concerns. Localize the educational effort by getting to know the watershed, its people and resources. Before setting educational goals and objectives, compile relevant demographic data and talk to local leaders and decision-makers to form a general profile of the watershed community. Determine the existing level of environmental literacy, or how much the people know about water quality, and identify any controversial issues. A series of focus group sessions is useful here. Understanding the historical and current culture of the watershed community and its economic base will open communications and may help overcome obstacles or prevent misconceptions about the watershed program. Enlisting the support and assistance of citizens, community organizations, and businesses in the watershed is a critical first step. It often will require more time than initially thought to achieve such support. Local people may need to see results on issues of importance to them before they commit to a new issue. Local OCC, OSU Extension and other local level agency professionals should take the lead to plan strategies for gaining support since they already have an established network of relationships in the area. Agency professionals at higher levels will need to both respect the insights of their local level co-workers and be willing to modify objectives to reflect local realities.

Local leaders, decision-makers, and opinion leaders constitute some of the local resources that must be utilized for success of the education program. By simply seeking the advice of conservation districts, OSU extension offices, educational institutions, tribal offices, civic clubs, business leaders, environmental and conservation groups, landowners, chambers of commerce and other organizations or agencies it is possible to transform negative or neutral attitudes into positive ones. These contacts will help identify community resources and sensitivities that will determine the success or failure of the program. Take the necessary steps to insure that all entities know each other and are prepared to work together. Do not "reinvent the wheel" by producing new educational materials: use or adapt existing materials whenever they are available. Be prepared to share credit by discussing factors like which logos to use on mailings and how to handle interviews with the press to insure fair billing.

Consult local resource people to determine the most effective and efficient method to deliver educational messages. Certain landowners may require personal visits. Active civic groups may prefer a presentation at one of their meetings. Perhaps classroom presentations to elementary and middle schools will be the best way to reach students and their parents with the NPS message. Don't limit the number of formats or distribution methods employed. If for example, a watershed program presentation were to be made at a town meeting, direct mail would notify area residents, flyers posted at community centers would provide additional notification and media contacts would invite accurate newspaper or television coverage. In all forms of communication, make a strong effort to avoid jargon, which the public will not understand. For example, terms such and BMP or NPS or even infiltration or runoff are likely to be unknown or murky for the majority of the public. Develop good listening skills and be flexible in how you communicate. Always strive to understand the motivations of your audience.

People respond to a variety of incentives to participate in activities. Give-aways may help improve attendance, but be certain that the event itself offers information that both addresses the audience concerns and is presented in an interesting manner. Children love to receive T-shirts, coloring books, magnets, buttons or pencils. Adults enjoy free stuff, too. Providing food is helpful with some audiences, baby-sitting service might help with other audiences. Enjoyable learning experiences are useful with children, and a social experience can be very attractive for older youth.

The educational goals and objectives of an event should inform and inspire the watershed audience to participate in the NPS program. Confer with local leaders and decision-makers during your planning to ensure that realistic goals are set and that objectives are manageable. Tailor the goals and objectives to meet the most important educational needs of the target audience

Use the framework of Awareness, Knowledge, Attitude, Skills, Action in your planning. to Evaluate each item in terms of the change it is expected to produce. For example, an awareness program should aim to make a certain number of people or fraction of the community aware of the project and its objectives. The desired action might be a certain number of farmers signing-up for conservation plans or following through on implementation of BMPs.

4. STATEWIDE EDUCATION

Water does not respect political boundaries and people do not isolate themselves within watersheds. There is no reason to expect people on one side of a watershed boundary to have significantly more knowledge than those on the other side of the boundary. For this reason, its is both reasonable and desirable to support a watershed effort by improvements in the general level of knowledge of the substate or statewide area. A riparian management project may be an priority in a specific watershed, but it is much less likely to be successful without a general understanding in the region of what "riparian" means and some of the management alternatives available to landowners. A general educational foundation resulting from statewide programs will facilitate successful watershed-specific programs

To distribute the water quality message statewide the same basic framework (awareness, knowledge, attitude, skills and action) is important. The difference is primarily in the extent to which the educational program can be effective in achieving the latter framework items. For example, awareness and knowledge are reasonable goals for a statewide program. Going beyond this to developing skills and fostering action, however, is likely to take more concentrated effort using approaches such as "train-the-trainer" to reach farther. Ultimately change is a local, community by community process.

Statewide programs to reach deeply into communities can be achieved by working with such groups as Conservation Districts, teachers, environmental organizations, farm organizations, farm coops, Votechs, libraries, and community action groups. Valuable assistance and cadres of trainers may also be found through 4-H, FFA, and community organizations as well as the Oklahoma Association of Conservation Districts, the Sierra Club, the Nature Conservancy, Farm Bureau, Farmers Union and other agencies such as the Scenic Rivers Commission, Oklahoma Water Watch, OSU Cooperative Extension Service or any other education program with an environmental emphasis.

The educational messages for statewide programs will be more general, at least at first. Programs addressing recycling, soils conservation, solid waste, pesticide use and disposal, and riparian management are suitable for statewide application. Greater depth can be achieved in watershed programs for each of these, and trainer groups can be fostered where there is available expertise. Once the audience is identified, let leaders within that group help identify resources and appropriate delivery methods. Then, set goals and objectives to move specific target audiences from awareness to action.

5. EVALUATION

Assessing the effectiveness of any educational program is essential. Evaluation reveals successes – "what works", and failures – "what doesn't work". It means answering questions: Have the people in

the watershed become involved in improving the area's water quality? Did participants learn the major points of the workshop? Has the statewide educational effort increased awareness about NPS? These sorts of questions allow educators to improve the quality of their planning, strategizing, communications and other skills.

NPS educational efforts should be evaluated during implementation as well as after program conclusion. During implementation step evaluations should ask if the right audience is being reached with the right message in the most efficient way. Are all available resources being used effectively to communicate the most important messages? Are the chosen goals and objectives appropriate for a specific watershed or better suited for the statewide strategy? Answers to these questions will either affirm the direction of the educational program or provide guidance on how to adjust or improve the program. Schedule step evaluations at times appropriate for the course of the educational effort.

When the educational plan has reached completion, an overall program evaluation is required. This evaluation will assess the entire plan's successes and failures and should provide quantitative information on audience changes in awareness, knowledge and skill level as well as participation rates in the NPS program. Potential evaluation tools include mail questionnaires, telephone surveys and focus group interviews.

Moreover, the education plan should be considered an ongoing, continual process. Groups should be revisited with new information and to obtain feedback from the group as to how the education program impacted their views, their lives, or their watershed. In this manner, an educational program serves to educate not only the public and watershed residents, but also the people implementing the water quality education program.

Just as educational programs should be planned with specific target audiences in mind, each of these audiences will require their own program evaluation plan. A sample evaluation approach is presented below.

Sample Evaluation Plan:			
Subject: Nutrient Management – Agriculture; animal production			
Audience: Animal producers grazing			
Audience acquires:			
Awareness: Excess Nitrogen or Phosphorus can be damaging to the environment; animal manure can damage			
water quality; trampling of riparian areas degrades water quality			
Evaluation: General observation from conversation with farmers and educators. (a higher level of evaluation			
using surveys is also possible, if warranted)			
Knowledge: Pollution prevention planning for the farm; Nutrient management recommendations, soil testing,			
riparian management			
Evaluation: Pre-post testing at educational meetings and short courses; observation of professionals and			
paraprofessionals who assist client.			
Attitude: Willingness to try practices that differ from the traditional.			
Evaluation: Telephone surveys; focus group meetings, or general observation one month post training			
Skills: Grazing management, recognition of grass height and condition factors.			
Evaluation: Ability of participants to correctly assess pasture condition using either direct observation or			
photographs of pastures or As a part of training session			
Action: Improved manure application practices; forage condition monitoring			
Evaluation: Assessment of participant's pastures one year following training			

6. CONCLUSION

Effective NPS education programs aim to reconnect people with the resources upon which they depend. Making the connection between healthy drinking water and healthy streams and lakes is an excellent starting point. Awareness leads to understanding of the threats to those resources, e.g., what are common NPS pollutants and how dodo they affect drinking water? And how do they affect fish and other species in aquatic or terrestrial environments. The more that people can see a connection between their lives and the condition of their watershed, the more likely they are to see themselves as having a role in safeguarding and improving water quality. At the same time NPS educators must take care not to overwhelm people with negative news about the decline or degradation of the resource. The predominant tone must be a positive one about what can be done by individuals, communities and governmental agencies. People are empowered to act when they have the proper skills and confidence that their actions will results in positive change.

This document lists numerous resources which are available to guide people in their efforts to be involved in environmental protection, specifically protection related to watersheds. Many of these are detailed in section VIII (written resources).

Much of the above text suggested by Oklahoma Cooperative Extension Service was added to the NPS Management Program.

OKLAHOMA CORPORATION COMMISSION

Suggested changes – deletions are shown as strikeout, additions as <u>underlined and red</u>. OCC Responses in italics.

Page 5 II. A.

Any pollutant, regardless of the concentration, released in a watershed can contribute to NPS pollution. Rain and other precipitation, wash pollutants from the air and land into our streams <u>and</u>, lakes, and <u>or</u> <u>into</u> ground water <u>which can then flow into streams and lakes</u>.

Page 8 2. Key Element #2

List some of the interagency groups and their members, such as the Oklahoma Water Quality Monitoring Council, the NPS working group, the UWA committee, and the 303(d)/TMDL work group. *This is not the appropriate section to mention those groups. This section of the text defines what EPA expects to be covered in the NPS Management Plan and gives references to the location in the plan where those key elements are discussed.*

Page 50 C.

These <u>Some agencies have</u> programs <u>which primarily monitor surface or ground water for the effects of</u> <u>pollution related to known or suspected spills or other pollution problems, recent or historical- also</u> monitor for effects of NPS pollution, but were not developed with solely that focus. In effect, they do not holistically monitor for NPS pollution, nor can they always separate the impacts of PS from those of

NPS pollution. However, these monitoring programs are essential to the NPS management program and the states water quality management program in general by fulfilling the following functions:

To ensure good quality, staff from different agencies should receive the same training and follow the same QA/QC procedures. There is currently no funding or coordination for this. *Excellent point. This should be the responsibility of the water quality monitoring council. We have added a section that offers suggestions on this subject.*

Page 56 e. Oklahoma Corporation Commission

The OK Corp. Comm. also monitors surface and groundwater in relation to the potential current or <u>historical</u> petroleum industry and retail (underground and above ground) storage tank pollution sites. In the past 4 years, <u>Corp. Comm. staff they</u> have sampled over <u>100 streams and</u> 1000 wells, groundwater springs, and groundwater seeps, and <u>have</u> compiled this information into a databases. In addition, under <u>Corp. Comm.'s direction responsible parties have taken tens of thousands of ground water (mainly monitoring well) and surface water samples in the immediate area of suspected and confirmed pollution sites.</u>

Page 60 A third paragraph

In addition, the NPS Working Group will help incorporate types of NPS pollution not under the jurisdiction of OCC (silviculture, runoff from CAFOs and AFOs, <u>oilfield or retail storage tank related</u>, urban stormwater runoff, etc.) in the NPS program.

Page 65-67 F.

Mention some specific examples of projects planned and undertaken.

Page 68 fifth bullet, Corporation Commission rule 165:10-7-6

Unfortunately, the Commission has received almost NO applications. Could the DEQ or OCC help publicize this, or act as intermediaries?

Page 81 5500 Experts

Add Kenneth Risenhoover NRCS for Leflore County (918-647-2992) and Lori Hammon NRCS for Latimer County (405-522-2763)

Pages 104-123

When you mention a stream name, PLEASE give the location (county). For example, there are several Turkey Creeks, Dog creeks, etc. in the state, and more than one of the same name in different counties can be on the 303(d) list (for example, my nominating Turkey Creek in Seminole county to the 2000 list).

Page 113 x.

x. 1995 319(h): Erosion Control and Abatement Practices for County Road Systems County roads are low-cost, low-volume roads; however, they are not insignificant since they are the primary means of transportation in the rural areas. The problems associated with county roads in Oklahoma are numerous, including, sheet and gully erosion, lack of vegetation due to overgrazing and field crops, and rutting of road surfaces.

This project was designed to provide assessment procedures for identifying the problems and their severity and provide possible solutions, as options, for minimizing the severity of the problems. The erosion control measures to be implemented include: establishment of grass waterways, terracing of the side slopes (shoulders), and vegetation of the side slopes as well as other appropriate best management practices. <u>The Corporation Commission's practice of allowing oily soils from production and pollution sites to be applied to county roads to help control dust and erosion was not evaluated.</u>

Page 114 xii

The Commission would be interested in a future project evaluating how best to utilize organic material at salt brine damaged sites. While we do want to improve the soils, we do not want to just mobilize the salt so it then impairs groundwater or streams.

Page 118 xxii; page 119 xxvii

We are finding a number of streams in western Oklahoma with oilfield brine impacts (also Pottawatomie and Seminole Counties, and around Lake Texoma). When you next assess watersheds in these areas, please contact me for a copy of our database, and perhaps we can help design a HUC 11 monitoring project that will evaluate this as well as your other concerns.

Page 126

 Sources Of Urban Runoff Pollutants Erosion Atmospheric Deposition Service Stations and Other Storage Tank Site Locations <u>Careless Handling of Automobile Fluids</u> Construction Materials Manufactured Products Plants and Animals Non-Stormwater Connections

Page 126

ii. Oilfield Related

With over 200,000 active or abandoned oilfield sites in Oklahoma, the potential for NPS pollution from these areas is high. Current control practices greatly reduce the potential for NPS pollution from current activities; however, the large area to be covered and the limited personnel available means that some

<u>problems may be missed.</u> enforcement of pollution control measures is often inadequate. In addition, a large number of sites were established before the advent of controls, and in these areas contaminated soils <u>and large ground water pollution plumes</u> continually contribute salt and petroleum compounds plus solids from de-stabilized soils to receiving waters. <u>Problems related to oilfield brines are much more significant and longer lasting than those from oil.</u>

Jurisdictional responsibility for oilfield related NPS pollution rests with the Oklahoma Corporation Commission. <u>Since oilfield production wastes are exempt from RCRA and CERCLA and their liability</u> rules, and many of the largest problems are related to historic practices, the Corporation Commission often cannot locate a responsible party to effect cleanup of abandoned, sites.

- Sources Of Oilfield Runoff Pollutants
 Erosion <u>Resulting From Current Practices and Historic Sites With Poor Vegetative Cover</u> In-place <u>Soil Contaminants, Both Surface and Subsurface (In Old Buried Pits)</u> In-Place and Migrating Groundwater Pollution Plumes Manufactured Products
- Primary Substances Found In Oilfield Runoff Solids (drilling muds, cuttings) Salts, from oilfield brines Metals Oil and gas condensate sSediment
- Activities To Address Oilfield Related NPS Pollution (<u>Currently Un-funded</u>) Oilfield-Damaged area inventory <u>– old brine pits and surface sites</u> <u>location of ground waters and streams impaired and threatened</u> Reclamation of abandoned oilfield site (<u>Note – The OERB voluntary cleanup fund can address</u> <u>only a portion of the surface sites</u>) Remediation of <u>subsurface soils and</u> contaminated groundwater <u>plumes</u>

Page 162

Oklahoma Corporation Commission (OCCCorp. Comm)

a. Agency Responsibility/Authority

OCCCorp. Comm. regulates oil and gas exploration and production, related activities, and pipelines. OCCCorp. Comm. also regulates retail underground <u>and above ground</u> storage tanks (OAC 165:25, part 15, subchapter I).

Page 163

c. Current / Planned Programs to Control NPS

OCCCorp. Comm.'s current NPS program is regulatory, with which states rules about how oil and gas related material should be properly handled and disposed of. The program also includes guidelines for responsible party (RP) leak and spill cleanup for oil and gas products and brine, when an RP can be located.

<u>If funding becomes available, OCCCorp. Comm.</u> plans to locate all petroleum and brine impacted water bodies in the state and initiate <u>soil and water</u> remediation as <u>necessary feasible</u>.

d. Resources Available to Control NPS

The resources and personnel available for NPS control at OCCCorp. Comm. are limited. . <u>There is state</u> funding to plug a portion of the known problem wells, and for enforcement of current rules, but there are no funds for location or cleanup of sites with no responsible parties Any NPS control program must be implemented into current <u>regulatory</u> activities, using the present personnel, <u>unless additional funds</u> become available. Some federal funds from the OPA 90 fund are being made available for plugging and cleanup activities near Lake Oolagah. Otherwise, for the rest of the state, Corp. Comm has no federal or state funds, and the OERB voluntary clean up fund has sufficient monies to clean up only part of the many surface sites. Activities at other abandoned and historical sites will have to wait until funding and personnel become available.

e. Agency Role in Planning NPS Watershed Projects

OCCCorp. Comm. requests that they be consulted for all NPS watershed projects in oil and gas producing areas, when pollution from underground retail storage tanks is suspected, and when sources are related to their regulatory activities.

f. Principle Concerns and Priorities Regarding NPS Sources

OCCCorp. Comm.'s priorities regarding NPS are watersheds in oilfield areas.

The suggested changes and corrections underlined(red) have been made in the document, unless otherwise noted.

OKLAHOMA DEPARTMENT OF AGRICULTURE

ODA made significant comments, handwritten on the draft, and therefore not included in this appendix. These comments were largely grammatical rather than content-based. These comments were incorporated into the plan and very much appreciated.

OKLAHOMA FARM BUREAU

Via facsimile

December 27, 1999

Mr. Mike Thralls, Director

Oklahoma Conservation Commission 2800 N. Lincoln Oklahoma City, OK 73105

Dear Mike,

Here are our follow-up comments to the *OCC's Responses to the Draft Nonpoint Source Management Plan* (Plan). I apologize for the tardiness of these comments. Agency rulemaking and the holidays have made this a busy time of the year.

We found OCC staff's comments to be thorough and well considered. We are appreciative of the time staff took to assess and answer our comments, and we found that many of our suggestions were incorporated into the Plan. However, we still have a few concerns about the proposed Plan, including: the focus of the NPS monitoring program; the development of reference streams; the tone of the Plan; wetlands; future monitoring; and SRF funding for NPS projects.

Focus of the NPS Monitoring Program

We have visited with you about our specific concerns regarding this issue. It appears that OCC has one view of what the NPS monitoring focus should be, and some agencies and organizations have a different view. We're concerned the state NPS monitoring program has been very OCC staff driven, not allowing for other agency or organizational input. We suggest this would be a good time to reconsider the program design, and ask for input from other agencies, organizations, and the conservation districts. *OCC is the technical lead agency for NPS pollution charged with monitoring, assessing, and evaluating the impacts of NPS pollution in the state. No other agency has that specific charge.*

The monitoring program has been presented to various agencies and organizations, including the conservation districts, on numerous occasions and as many as possible of their concerns have been answered or incorporated. The Data Gaps workplan (East and West of I-35 projects) was originally developed with OWRB for biocriteria development and NPS monitoring. Data Gaps workplans and QA plans with monitoring design have been distributed for review several times. Please note that the FY96 initial Data Gaps Program for the eastern half of the state was planned and initiated prior to the time the BUMP program was conceived. At that time, no comprehensive state monitoring program was in place. In addition, at the time the program was planned, pleas to reestablish a comprehensive state monitoring program were falling on deaf ears.

The OCC monitoring program was planned prior to forming the OWQMC. However, the program design has been presented to the OWQMC and was published in the first draft of the NPS Management Plan. Comments regarding monitoring design were received and answered from the OWRB, and OSE concerning jurisdiction and allowable use of the data. Please refer to the response to comments on draft one and then compare them with the second round of comments to ascertain whether other agencies feel that the monitoring program still needs to be revised. In addition, please consider that OCC has received favorable commentary on their monitoring program from many different organizations and agencies. The ODWC's comment on draft one of the management plan is a good example of the favorable comments OCC has received on their monitoring program.

Development of Reference Streams

We would like to see the OCC be more forthcoming about this program. If reference streams are to be used for assessing beneficial uses, we believe this program should be coordinated with the Oklahoma Water Resources Board, and reference streams should be promulgated into the Oklahoma Water Quality Standards.

Once again, this program has been coordinated with OWRB, as described above. OCC is providing data on many streams that may be potentially considered as reference streams. OWRB has several workplans in place that build upon OCC and university data to validate reverence streams and to evaluate metrics for habitat and the aquatic community. If the OWRB decides to promulgate reference streams into the standards, OCC will provide supporting data.

Tone of the Document

We feel the NPS management Plan in many areas highlights and is unnecessarily focused on agriculture's contribution to NPS pollution. We know agriculture is a contributor to NPS pollution, but its contribution does not need to be exaggerated. We have expressed concerns about using clean lakes studies, and the EPA's State Water Quality Inventory as fact, when in fact, their reliability can be questioned. We feel the OCC has not been responsive enough to our concerns on this issue. Please elaborate specifically to the sections where this plan exaggerates agriculture's contribution to NPS pollution, and the evidence you have to show this is an exaggeration. If you will consider the priority watersheds listed in the UWA and on the 303(d), you will see that agriculture is the common source amongst nearly all of them. In addition, as agriculture is the major industry in the state, and the majority of our past research indicates that agriculture often contributes significantly to NPS pollution, we cannot ignore it in the plan. The data currently available on the water quality of the state, much of which has been collected in agriculture- intensive watersheds, suggests agriculture as the major source of NPS pollution in the state. We recognize that past monitoring has been limited and may have painted an inaccurate picture which is why we have designed an improved monitoring program to more accurately assess water quality related specifically to NPS pollution across the state. However, until that data proves past conclusions to be inaccurate, we have to give credence to those conclusions. We have made attempts to list other potential sources more consistently throughout the plan; in almost every instance where agriculture is discussed as a source of NPS pollution, non-ag sources are also discussed. In addition, we have added a section to clarify that care must be given when interpreting and using historical data and reports, but we cannot ignore them entirely.

Wetlands

We have made several comments about our concerns on this issue. Are there plans pending to revise the Wetlands Management Program?

The OCC Wetlands Coordinator position is currently open, although the selection process is underway. Once that position has been filled, the plan may be revised in the form of an addendum.

Future Monitoring

The response to our comment on this issue causes us concern. We would like to know which contaminants the OCC is monitoring for that are not included in the Oklahoma Water Quality Standards.

The table below lists parameters OCC is currently monitoring for and whether or not those parameters are directly referred to in OWQS. These parameters are also listed in the Management Plan under the monitoring section.

Parameter	OWQS
Dissolved Oxygen	Y
Conductance	Indirect to TDS, salinity
pH	Y
Temperature	Y
Instantaneous Discharge	An explanatory variable
Alkalinity	N; an explanatory variable
Turbidity	Y
Ammonia	Under toxics and nutrient narrative
Total Kjeldahl Nitrogen	Nutrient narrative
Nitrate / Nitrite	Nutrient narrative
Total Phosphorous	Nutrient narrative
Phosphate	Nutrient narrative
Total Suspended Solids	Sediment narrative
Sulfate	Y
Chloride	Y
Hardness	Explanatory variable
Metals	Y
Priority organics	Y
pesticides	Y
Stream width and depth	N
Stream bank erosion rates	N
Periphyton density	Nutrient narrative
Fish collection: seine/electrofish	Biocriteria narrative
	See OWRB biocriteria assessment protocol
Benthic macroinvertebrate	Biocriteria narrative
collection	
Habitat assessment:	Biocriteria narrative

The only contaminants OCC is currently monitoring for that are not specifically included in OWQS are those samples collected in the National Air Deposition Site in the Beaty Creek Watershed where we are measuring nutrients contributed in rainwater. OWQS, of course, refers to those particular contaminants with reference to allowable concentrations in surface and groundwater. OCC is not monitoring for those to suggest some regulatory action, but merely to better estimate the contributions of various sources to the overall nutrient load in the watershed. However, examples of contaminants that may some day be monitored for include specific strains of bacteria that evidence suggests are becoming resistant to antibiotics; bacteria-typing to more accurately identify the source, be it wildlife, human, or otherwise; and presence, absence, or effect of exotic species related to some negative impact of that species on the "natural" community. No projects are currently planned to monitor for any of these parameters. In addition, parameters cannot be added to OWQS until we know they have an effect and what the appropriate criteria should be. We can only learn what criteria are appropriate for different types of waterbodies through monitoring. Please refer to response to similar comments on Draft One from OSE.

SRF Funding for NPS Projects

It appears this is not a viable program according to OCC's response to our question. Therefore, why is it included in the plan?

SRF funding is not currently a viable option to fund NPS projects. However, it is still recommended as a source of funds by EPA and at some time in the future. Once enabling statutes are adopted, communities may choose to use SRF funds for purposes such as nutrient trading to do upstream nutrient controls rather than WWTF improvements. Recent guidance suggests SRF funds as an avenue for communities to complete Clean Lakes Studies or sourcewater protection efforts. It remains an option, just not one currently available in this state.

Thank you for your consideration of these comments. If I can answer any questions, please don't hesitate to let me know.

Sincerely,

Marla R. Peek Director of Political Education and Regulatory Affairs

cc: J.D. Strong, Office of the Secretary of the Environment

OKLAHOMA WATER RESOURCES BOARD

December 13, 1999

Dr. Scott Stoodley Oklahoma Conservation Commission 2800 N. Lincoln Blvd. Suite 160 Oklahoma City, OK 73105-4201

Dear Mr. Stoodley:

Once again, the Oklahoma Water Resources Board would like to commend the Oklahoma Conservation Commission's efforts with the State's Non-point Source Management Plan. The document appears to address the state's streams and watersheds nonpoint source potential impact concerns. However, the Oklahoma Water Resources Board is concerned that lakes are not being adequately protected. Lack of assessment and diagnostic studies under the current plan is a serious void in the overall plan.

It has been called to our attention that traditional lakes studies, following §314 Clean Lakes Program Guidance, are eligible for funding under 319 to protect lakes from nonpoint source impacts. Currently, the Senate Appropriations Committee included in its Report #106-161 on the Environmental Protection Agency budget, the following: "The Committee's recommendations includes: \$885,000,000, the budget request, for performance partnerships/categorical grants associated program support. Clean Lakes program activities are to be funded through the section 319 nonpoint source program. The committee suggests that 5 percent of the section 319 funds be allocated to Clean Lakes and that the EPA better integrate Clean Lakes Section 319 programs by incorporating the section 314 guidance into the 319 guidance."

In order to address the issue of incorporating section 314 guidance into the State's Nonpoint Source Management Plan, we would like to add the following items. These comments have been pasted into the attached copy of the document.

OCC agrees that lakes must be protected as part of the State's Nonpoint Source Management Plan. In addition, OCC agrees that more specific information should be included regarding 314 guidance and the OWRB lake monitoring framework. We have added much of the suggested text to the plan. Most contextual changes have been added in the section that describes the OWRB's monitoring efforts and general water quality program. The fact remains that lakes work is an end of pipe effort that often does little to separate the impacts of point source from nonpoint source pollution or the impacts of natural background loading from anthropogenic nonpoint sources. For these reasons, it is not appropriate to include this lake monitoring in the strictly nonpoint source monitoring section.

Also, although the committee recommended \$885,000,000 allocation, the amount Oklahoma received was considerably less, where half was for the basic 319 program and the other half was to focus on priority watersheds. A further requirement of this is that no more than 20% of the total 319 budget can go towards monitoring. Lakes Assessment and Diagnostic/Feasibility Studies are almost entirely monitoring. Five percent of the monitoring allotment of 319 funds is an even less significant sum.

• P.35 paragraph 2

The Oklahoma Water Resources Board will assist in assessment of Beneficial Use Support by monitoring Oklahoma's major lakes. A minimum of 3 sites will be monitored on each lake to represent the riverine, transition, and lacustrine zones. All lake's monitoring will follow procedures in §314 Clean Lakes Program Guidance Manual.

Text has been added to Section VC to more accurately portray OWRB's lakes monitoring program.

- P. 37 paragraph 4
 - v. Lake Water Quality Assessment

Information will be gathered on Oklahoma's major lakes on a rotating schedule of every two years; major lakes are sampled every other year. Data collection will follow §314 Clean Lakes Program Guidance and Regulations as described in 40 C.F.R., Subpart H. to classify Oklahoma lake's trophic state using Carlson's Trophic Status Index. This information can be used by the public, universities, and state and federal agencies, to determine water quality impacts. Lakes identified as having a potential impairment will be further investigated through traditional §314 Phase I Diagnostics and Feasibility Studies also described in follow §314 Clean Lakes Program Guidance and Regulations. All monitoring for Phase 1 activities can be used to determine non-point source impacts to Oklahoma lakes, and to recommend restoration measures. *Text has been added to Section V C to more accurately portray OWRB's lakes monitoring program*.

• P. 37 b. Monitoring Design- change to Stream Monitoring Design

It is not necessary to make this distinction. NPS monitoring is most effective closest to the actual source because monitoring close to the source better allows separation of NPS from PS and anthropogenic from natural background. Again, this section focuses on monitoring that can separate anthropogenic NPS pollution from point source and natural background loading. Further flagged comments written in the margin of this plan suggest that when watersheds are referred to, lakes should also be referred to. Lakes are included in the

definition that OCC uses for the term watershed. For instance, when OCC refers to the Grand Lake Watershed, Grand Lake is included. However, in-lake monitoring is generally not the most effective place to monitor for NPS pollution, rather it can be a place to monitor for the effects of NPS pollution.

• Insert c. Lakes Monitoring Design

The monitoring effort is designed to evaluate the quality of lakes throughout the state. Monitoring will occur on a rotating basis so that all major lakes are quarterly sampled every other year. A comprehensive program involving chemical, physical, and in some cases, biological parameters, has been developed so that causes and sources of Non-point source can be identified.

Vertical profiles at one meter intervals for dissolved oxygen (mg/l) and % saturation), temperature, pH, salinity, conductivity, total dissolved solids, and oxidation-reduction potential will be taken at 3 sites within each lake. Water quality samples will be collected at both surface and bottom in the lacustrine zone, while surface samples only will be collected at transition and riverine zones. General lake water quality parameters (sampled quarterly) include, but not limited to; alkalinity, total hardness, chloride, turbidity, sulfate, total suspended solids, total settable solids, secchi disk depth, and chlorophyll-<u>a</u>. Nutrients include, but not limited to; nitrate nitrogen, nitrite nitrogen, ammonia nitrogen, kjeldahl nitrogen, ortho-phosphorus, and total phosphorus. Algal identification and sediment samples may be collected as needed. Motor boats are used to reach all in-lake sites, which reduces lake bottom disturbance.

Text has been added in Section V C. to more accurately describe OWRB's lakes program.

• Page 42, middle paragraph 2

Diagnosis of lake water quality impact and development of feasible restoration alternatives can also be made following §314 Clean Lakes Program Guidance procedures. Further discussion on exact procedures can be found on page 52, c. Lake Diagnostic and Feasibility Studies section of this report.

Text has been added in Section V C. to more accurately describe OWRB's lakes program.

• Page 51, middle of paragraph 3, OWRB, WQMP's

According to the Senate Appropriations's Committee, Report #106-161 on the EPA budget, 5% of the §319 funds are to be allocated to do §314 Clean Lakes Program, including lake assessment and diagnostic/feasibility studies.

Actually, this was a suggestion, not a mandate as to the use of 319 funds for 314 programs. Although assessment and diagnostic/feasibility studies were suggested as potential projects, Lake Restoration (Phase 2) projects were also suggested. As a further caveat, the guidance specified that in-lake activities should only take place when watershed restoration had already been implemented, or when it was shown to be the most economically feasible method to improve the water resource.

Phase 2 watershed restoration is where we currently are in most of our highest priority watersheds. We have already done intensive monitoring in the watershed to show what the problems and sources are; now we must focus on implementing practices to reduce the problems.

In addition, only 20% of the 319 allocation can go towards monitoring, which would include the lakes assessment and diagnostic/feasibility studies. With this same monitoring money, we must monitor in conjunction with implementation of WRASs, monitor for the 319 Assessment, monitor to support TMDL development, and monitor to evaluate the success of BMP implementation projects. Past monitoring for NPS implementation project effectiveness has shown that success of implementation is better measured closer to the source of the implementation. Indeed, the vastness of many of our priority watersheds, coupled with the limited resources, means most implementation projects focus originally in subwatersheds. Upon success of those practices, programs such as EQIP and CRP take over and expand the practices throughout the watershed. It may take decades to show noticeable improvement in a downstream reservoir due to sediment recycling and other processes, even though areas immediately downstream of the implementation area could show significant improvement within a 2 to 5 year period. If we based our successes on the response of the reservoir, we would never expand practices throughout the watershed, because we would have difficulty showing immediate success.

EPA is under significant pressure from congress to show results. Indeed, one of the perceived problems with the 314 program was that there was a significant amount of research done, but little improvement was shown. We need to focus funds, while we have them, in the most appropriate areas. There will be priority watersheds where more lakes assessment and maybe even diagnostic/feasibility-type work are required. Text has been added to the priority watershed discussion in section VII. A. to specify that in certain priority watersheds, diagnostic/feasibility work may be necessary to determine allowable endpoint loadings, or what the reservoir can withstand.

We did not specify all the limitations and intricacies of 319 guidance in the Management Program because the State's NPS Management Program includes more than the 319 program. Therefore, it is not necessary to specify all of the 319 guidance in the document, nor is it necessary to spell out suggested expenditures for the budget. If we are going to specify how congress suggests we spend federal funds, then we should also specify that congress recommended using Statewide Revolving Fund Monies to do Clean Lakes Work and add all the Source Protection Program Guidance and guidance from any other program with NPS components.

Thank you for considering these insertions into the State's Nonpoint Source Management Plan. It is our intent to include the section 314 Clean Lakes Guidance as recommended by the United State's Senate. Please note the Guidance is referenced and not reiterated to save space and redundancy. If you have any questions please call me or Juli Ridgway at 405-530-8800.

Sincerely,

Derek Smithee, Chief Water Quality Programs Director

The above responses are not intended to imply that OCC does not believe lake monitoring to be an integral part of water quality management in the State. Indeed, the collective water quality agencies
in the state are charged with assessment of the quality of waters in the state and charged with maintaining the beneficial uses of waters in the state. Given the vast extent of lacustrine resources, we cannot complete either of those charges without monitoring lakes. Now that 319 funding has expanded to a level that allows some significant implementation work to be done, we would not be ready to do that work effectively had it not been for 314 projects which pinpointed problems lower in the watershed that may not have been evident in headwater tributaries. Those types of projects will have to continue in the future in order for us to formulate goals that will adequately address the concerns of the State's reservoirs. The Management Program states that those types of activities will have to be pursued in some of our priority watersheds.

USDA NRCS

December 8, 1999

Phillip Moershel, Aquatic Biologist Water Quality Program Oklahoma Conservation Commission 413 NW 12th Oklahoma City, OK 73103-3706

Subject: NPS Draft Management Program

Dear Phil:

Based on our review of the 1999 Non-Point Source Management Program draft plan, the NRCS does not have any substantive comments. Thank you for the opportunity to comment.

Sincerely,

Bill R. Porter Assistant State Conservationist Environmental Resources/Information Technology

APPENDIX F

COMMENTS AND RESPONSES ON MARCH 9, 2000 DRAFT FOUR OF THE NPS MANAGEMENT PROGRAM

Review of Oklahoma's revised NPS Management Program dated March 9, 2000

Region 6 Comments

General:

As you might understand, due to the amount of information that was deleted and moved around in the document, it was difficult to compare the March 9th version with the version dated January 10 on which EPA provided comments. Our comments below are based on the March 9th version. Our intent is not to provide new comments but to ask questions so that we can understand the State's program, the overall scope of the program direction, and how the State will measure it's success in achieving long and short term goals.

Executive Summary

1. We suggest revisiting the Executive Summary to ensure that it clearly defines how the State of Oklahoma will address nonpoint source pollution over the next 5-10 years. Please discuss the legislative support, the will of the people, and more specifically, highlight the primary goals/objectives of involving all people to address this main water quality problem, nonpoint source pollution.

We feel the executive summary does define how the state will approach NPS pollution in the next 5-10 years. Although that time frame was not specifically identified, that is how the State plans to address NPS concerns as long as we are able or until we have new guidance from EPA to suggest otherwise. The state plans to address NPS pollution by developing watershed restoration action strategies for the 24 priority watersheds defined by the NPS working Group. These WRASs may and likely will include TMDLs and implementation plans for those TMDLs. The State will monitor during and after the implementation and demonstration projects to evaluate success by comparing those results to the preimplementation information that helped define the watershed as a priority. In addition, the state will continue to monitor and develop better methods for assessing threats and impairments by NPS to the waters of the State. This has all been defined in a stepwise manner in the exec. summ.

Legislative support is a new suggestion. This is a difficult item to address. Perhaps we can get some input from Thralls or Brian Griffin to give us a paragraph each on legislative support. We can discuss legislative support with regard to water quality standards implementation plans.

We have goals and objective to involve as many people as possible through the NPS Working Group and watershed advisory groups. A general goal to do outreach to the whole state doesn't seem very possible unless Region Six has changed its perspective on public awareness vs. education as eligible 319 activities.

Agencies Roles and Responsibilities

2. Please make sure that any statement regarding roles and responsibilities are clear. For example, on page vi of 192, it states that "The OCC is responsible for assessment of all identified non-point source

categories except silviculture, urban storm water runoff and industrial runoff." It is our understanding that the OCC is responsible for agriculture, but it is not clear who is responsible for other categories such as construction, including highway/road/bridge, land development, resource extraction, etc. Please explain more clearly. We will add a table by source code of who is responsible. We already have done this by agency as to what statutes say they are responsible for and what they say they are responsible for.

Goals

Comments below are directed at the Long and Short Term goals. In addition to coordinating the State NPS Program with all agencies responsible for addressing various NPS impacts, we rely on the State to clearly outline both long and short term goals from which to base decisions about the State's progress in addressing water quality impacts. Our comments reflect our general concern as to how the current goals, as stated, can be measured and tracked.

3. Page 3, 192. Long-Term goals. It is not clear how these goals can be measured. Please explain how one would measure "Attain beneficial Uses: To abate known water quality impairments resulting from NPS pollution." In addition, explain the goal regarding maintaining beneficial uses. We can use the miles of waterbodies or percent of water bodies listed as threatened, etc. as a measure, if that is what is needed to make this measurable. This clarification has been added to the report. As far as a target percentage we would be writing fiction and would rather not commit to that. The State has just begun to address NPS problems in the manner described and does not yet know how successful it will be. Hopefully, by the next round of the NPS Management Plan, the state can draw some more conclusions about what kind of targets are really possible.

4. Page 6, Short-Term goals. In what way can these stated short term goals be measured to determine whether the State is progressing in addressing water quality impairments? For example, in the first bullet, it is stated that waters and watersheds threatened or impaired by NPS pollution based on OWQS will be identified every 5 years through 2020. This commitment is not clear as to how it will be measured. In addition, it is not clear as to how the other Oklahoma agencies will work together to achieve this goal. As stated in the plan, OCC is statutorily required to do an assessment report every five years that defines the status of the State's waters with respect to NPS pollution. The measure for the goal is completion of the activity. The plan also has an extensive section discussing all the different monitoring programs that are involved in determining the support status of the states waters. We are attempting to add some more text about interagency cooperation and how all the programs fit together on this.

Another example relates to the goal of planning no more than 2 large scale, and 2 small scale watershed projects per year. Please explain how success will be measured and explain how these large and small scale watershed projects relate to those waterbodies listed on pages 56-57. It would be logical to explain that a certain number of these 24 waterbodies would be considered large scale, and others would be considered small scale. This way, there could be a relationship made regarding how and when these 24 watersheds may have projects underway to address NPS impacts. As part of this goal, a statement is made "This is generally the responsibility of the OCC and NRCS." Please describe NRCS's responsibilities for implementing large scale projects and how success will be measured. All of those 24 waterbodies are considered large scale projects. This will be clarified in the report. Small scale projects represent projects that certain districts feel are important and are willing to cooperate in pursuing. These

projects would not necessarily fall into the watershed of one of the large scale projects but would further the short-term statewide goals towards maintaining and attaining beneficial uses. The successes and failures of those projects is determined by comparing results of pre- and post-implementation monitoring and looking at other measures of success defined in the workplans. Those workplans are reviewed by the NPS working Group and the NPS Working Group plays a significant role in assessing the overall successes and failures of the project. NRCS responsibilities are outlined in the agency roles section. We see them as partners for technical support in planning implementation in watershed and as responsible for EQIP programs.

Milestones

We were not clear as to the specific milestones and actions that the State proposes to implement over the next few years to expeditiously address know NPS impacts. Please explain these, and indicate where these are outlined in the plan. This is a new comment! We will be pleased to specifically identify milestones currently in the plan as milestones or to add additional milestones as needed, however, we will need some help with the as needed part.

EPA Headquarter's Comments

The revised Oklahoma NPS Program document provides some generalized descriptions of the existing program, butt does not present any specific information about what Oklahoma plans to do, where it will do it, and when it will get done (i.e. the program does not provide short- and long-term goals as envisioned in Key Element #1). Page 5 has a limited discussion about real goals, stating that the State will "implement programs" in the "top 20 to 30" watersheds to "work towards" restoring beneficial uses in the next 20 to 30 years. The Management Program should include which watersheds, where they are located and what percentage of State land area or impaired state waters they represent.

As a result of the general nature of the program description, the program does not contain clear commitment to achieve either long-term water quality goals or long-term implementation goals. Nor does the program have any short-term goals that provide any more detail.

EPA Region Six originally made this comment regarding goals in Draft One of the NPS management plan:

"The State is commended for developing a specific, measurable long-term goal to restore beneficial uses of waters within 15 years (p. 22) as well as a number of specific short-term goals to achieve on both a State-wide and watershed level basis" but also asked for a stronger linkage between short term goals or objectives with the long term goals and consistency between goals. We made substantial revision to the document to make the goals consistent and link directly to the long term goals. We also were careful to make sure the goals were possible, based on the resources available and the knowledge we had of the problem.

Perhaps we have lost some of the link between the long term goals and the short term goals by placing the UWA discussion immediately after the long term goals. We have added a discussion following the long term goals about how our objectives are to systematically assess water quality in the state and identify threats and impairments, systematically identify sources and develop remedial strategies, systematically implement and educate in the watersheds and finally follow up with monitoring. For ubiquitous pollutants the state objective is to pursue education and support the current permitting programs for things like AFO's and construction.

The programs that EPA has approved generally have considerably more direction and detail than the draft Oklahoma program. Many states have submitted management programs with well defined frontend goals and objectives; identified programs and activities; supported with short-term numerical goals and/or discussion of what will be implemented and how.

EPA recognizes that most waterbodies require more than just a few years to be restored. Where appropriate, we have encouraged states to distinguish between, on one hand, the very long-term set of expensive and extensive activities that may be required to effect complete physical, chemical, and biological restoration of an impaired waterbody, and, on the other hand, those activities that would ameliorate on-going pollution (e.g., prevent pollution from new development new AFOs and new forestry activities, and abate existing and on-going pollution from agriculture and forestry). If Oklahoma feels it would take many decades to bring back their waterbodies to meet standards, then they should focus their activities and programs on achieving near-term implementation of technology-based management measures rather than water quality based measures.

EPA must understand that Oklahoma's UWA, and thus the priority this plan will follow, was based largely upon the Oklahoma 303 d list. This list, in turn, was mostly drawn from Oklahoma's original 319 assessment report where most of the streams Region 6 required the State to list were considered fully supporting but threatened. In the case of nutrients and sediment those water bodies were listed as threatened because they were above the 75th percentile of a regional distribution. No water quality standards were violated in a large number of the 303(d) list streams. Now then if this information is coupled with the moving target concerning the future of the TMDL program and 303d listing and state efforts to de list streams, it is absurd to spend too much time on specific watershed plans until the UWA is revised after the 303 d guidance is finalized and the 303 d list is revised with appropriate data. Oklahoma also desperately needs to update its 319 Assessment document following the new protocols the State has developed.

Oklahoma is making significant progress towards revising its 303(d) list with the development of USAP and expansion of statewide monitoring programs. However, the most recent review of the 303(d) list revealed some problems and that the State still has a lot of work to do before the 303(d) list truly reflects the impaired waters of the state and follows whatever guidance is finally approved. The State must also continue to develop and agree upon methods by which waters can be determined to be impaired by nutrients and sediments. Right now, the state has only defined a method by which waters can be assumed to be threatened by nutrients. Impairment decisions require a much more involved process that the state has yet to adequately define. The result is that nutrient impairment listings and verification require a substantial amount of data. Sediment listings are not much better off, in fact, we may be listing streams too easily for turbidity violations. These shortcomings are mainly the result of rapidly changing guidance and a lack of data, both of which are being addressed by EPA and the State. However, the State expects its list of top priorities to change as we focus on developing a more accurate 303(d) list and better definitions of waters threatened or impaired by NPS pollution. We could outline a protocol for each of the top 24 watersheds based on current information on what the cause and source codes are. However, not only would this require a substantial amount of time, but we would be writing fiction in many cases as the appropriate courses of action will likely shift over time.

Oklahoma should be able and willing to make medium-term and short-term commitments on highpriority implementation activities (like erosion control at new developments, using good storage and nutrient management practices at AFOs, etc.) that will generally abate and prevent NPS pollution. That does not take 20-30 years, much less "between 50 and 150 years" (p. 5). These sorts of implementation goals are achievable, measurable, and obviously needed in the State of Oklahoma. <u>Oklahoma has</u> <u>embraced a watershed based planning approach in the management plan. This has been a persistent</u> theme for EPA for the last few years. This is also the theme of the CWAP, UWA and incremental funds. We agree that erosion control at new developments is imperative and good storage and nutrient management practices should be implemented at AFO's. Both the erosion control for developments and AFO's have permitting and enforcement programs backing them state wide. We have concentrated our efforts at the watershed level for demonstration and education.

One final comment: Apart from some very generic discussion that an SRF program exists, there is no specific discussion of using SRF for NPS pollution control. The SRF program provides a lot of dollars; if Oklahoma is committed to achieving its program goals largely through voluntary approaches, they will need those dollars. If one looks at the leading remaining causes of water pollution in the State of Oklahoma, it is apparent that some shift from point sources to NPS is needed. There are two issues here: (1) getting a real commitment to put significant funds into NPS projects, and (2) breaking through the barriers that are preventing the use of SRF for assistance to individuals. A number of States have created various mechanisms to enable the use of SRF to fund, e.g., septic system repair or replacement and AFO storage/treatment. If Oklahoma needs some guidance on how to do this, I can put them in touch with some national experts. Let me know if I can help here.

This comment would be better directed to Mike Thralls and Brian Griffin. We need to be able to explain more accurately that although EPA recommends SRF as a potential funding source, statutes currently impede this and to describe what progress is being made to remedy that problem here.

APPENDIX G

<u>Comments and Responses to Final Draft from Public Participation</u> <u>Period</u>

(Comments are in regular text, OCC responses are *italicized*)

Oklahoma Corporation Commission

The revised format and language in the Final Draft of the Oklahoma NPS Management Program and NPS Assessment Report being submitted to EPA look good! This is a much better document than the first draft, significantly more representative of the diverse state programs and inclusive of the activities of the many agencies and organizations involved in the OK NPS picture.

Thank you for incorporating many of Corp Comm's suggestions, additions, and language changes into the Final Draft. You both have made this process much less painful than it could have been.

Oklahoma Farm Bureau

May 26, 2000

Ms. Jennifer Lee Myers Office of the Secretary of the Environment 3800 North Classen Blvd. Oklahoma City, OK 73118

Re: Comments on Oklahoma's Nonpoint Source Management Plan and Assessment Report

Dear Ms. Myers,

Thank you for the opportunity to comment on Oklahoma's Nonpoint Source Management Program and Nonpoint Source Assessment Report. I will refer to the document hereafter as "Program."

Following our some of our specific comments:

Page 3. Shouldn't wastewater and atmospheric deposition be listed under General Sources for Lake Eucha?

These general sources came directly from the1998 303(d) list. However, we have added wastewater as a source, based on the results of the Clean Lakes Study. We do not currently have enough data to cite atmospheric deposition as a source of impairment in the Lake Eucha Watershed. Thank you for helping us make the source codes more complete.

Page 9. *Extent of Nonpoint Source Water Quality Problem* Great efforts were made to point out that agriculture is a major contributor to nonpoint source pollution. If the Oklahoma Conservation Commission (OCC) insists on quoting outdated and questionable EPA Fact Sheets and National Water Quality Inventory Information, we insist that OCC clarify how it conducted earlier 303(d) listings. We have heard from a number of conservation district people who said they were encouraged to say they had impaired waterbodies in an effort to get federal funding. We supplied a paper from the American Farm Bureau Federation which questions the validity of the National Water Quality Inventory. It

appears that information was disregarded. The OCC has been very quiet about acknowledging that many, if not most, of the waters they submitted for prior 303(d) lists they had listed as "fully supporting but threatened." We do not know how the OCC can support quoting these EPA sources when it knows first-hand what flimsy ground these reports stand upon. Again, we ask that these references be removed from the Program.

Please refer once again to the response to this comment from previous drafts. These documents are appropriate to cite in this document for the following reasons:

- This is an EPA report, an EPA program. It must be consistent with other EPA Clean Water Act programs and must refer to appropriate EPA reports including the 303(d) List, and the 305(b) Report. Until such time as those reports and summaries are redrafted with new information (and the previous report proven wrong), it is appropriate to cite those reports.
- 2) Although many accusations have been thrown around as to the inaccuracies of those EPA reports and summaries, no data summaries have been provided to prove the inaccuracy.
- 3) Those fact sheets are not the only source of information suggesting agriculture is a major source of NPS pollution across the country; many other studies, EPA-related and otherwise, suggest agriculture to be a major contributor to NPS pollution across the country and a few of these have been cited in the report. OCC could cite numerous reports that support agriculture as the major contributor to NPS pollution across the country. The Farm Bureau Report you mentioned was never put before OCC, nor is a single report sufficient to refute the reports and studies that support the conclusions of those EPA summary documents.

As far as historical Oklahoma 303(d) lists including fully supporting but threatened streams, OCC originally listed those streams as fully supporting but threatened in the 1989 NPS Assessment Report. We did not recommend them for listing on the initial 303(d) list. At that time, Oklahoma submitted a 303(d) list of 11 impaired waterbodies. In September 1992, EPA required Oklahoma to include threatened and not just impaired waterbodies on the 303(d) list. So, the State included streams listed as threatened in the NPS Assessment Report, 305(b) report, and other sources on the 303(d) list. In the 319 Assessment Report, streams were listed as threatened only if their median value was greater than the 75th percentile of all the values for whichever of the four regions of the state the stream was located in. This decision criterion was developed and used with approval from other pertinent state agencies. Therefore if greater than half of the values collected from any given stream were among the highest 25% collected from that entire region, it was considered threatened by whatever that parameter was, generally, suspended solids, turbidity, total phosphorus, and total Kjeldahl nitrogen. Nitrate criteria were based on the 75th percentile of the entire state because there were no significant differences between geographical regions. We used the procedures that were appropriate at the time. In addition, please remember that the 319 Assessment went through a public review process. Farm Bureau had access to the 1989 NPS Assessment Report during its period of public review.

OCC has not remained quiet about this listing of threatened streams in the 303(d) list. Particularly with reference to our opposition to EPA's proposed usage of the 303(d) list with regard to the recent CAFO permit issue.

Conservation districts frequently contact the NPS program in attempt to access 319 funding. EPA guidance only allows 319 funds to be directed to waterbodies identified in the NPS Assessment Report.

As far as OCC encouraging districts to find impairments in their watersheds, district personnel were surveyed three or four years ago, before we had a more extensive monitoring network, about the natural resources in their district. We asked them to characterize the water resources of their districts for the purposes of directing the program. We asked them, specifically, to identify streams with "good" water quality and streams with "bad" water quality and to identify sources and potential sources of NPS pollution in their districts. We explained we were compiling this information to help us pinpoint candidate streams that would later be monitored to establish our network of positive and negative reference streams and that the information they provided us would be used in the NPS Assessment Report to characterize their district. Districts were interested in obtaining 319 and EQIP monies to implement programs and we explained that these programs were implemented in problem areas as identified by the 319 Assessment and 303(d) list. However, because we were concerned that districts might do just as you suggested and cite impairments simply to obtain 319 money, we have used the information districts provided us only as a means to direct monitoring. We have not and will not list streams on the 319 assessment or 303(d) list as impaired without data to back up that impairment and in any future NPS assessments, streams will only be listed following protocols established in USAP and through a process of public review.

This report does not say that agriculture is **the** main contributor to NPS pollution in Oklahoma, merely that studies have suggested it to be the main contributor across the U.S. The report only cites agriculture as **one o**f the main sources of NPS pollution in Oklahoma. Which makes sense, given that NPS pollution is widespread across the State, and agriculture is the main landuse across the State. In some areas of the State where waterbodies show impacts of NPS pollution, agriculture is the only landuse, other than farmer's homesteads.

For future reference, we would like to see Clean Lakes Studies go through a public review process. We're concerned the right questions may not have been asked or answered in many of these studies.

All Clean Lakes Studies, funded under Section 314 of the Clean Water Act, go through a public review process, culminating in a public meeting to present the results of the report to the citizens of the watershed and to go over potential solutions to the problem. Comments received during the public meeting are addressed, and modifications are made to the report, if necessary.

It should be recognized, however, that studies done under Section 314 of the Clean Water Act (or other funding sources utilizing Section 314 Clean Lakes Study Guidance), are typically not funded under the 319 Program. Clean Lake Studies are specialized, intensive studies that must answer very specific questions and complete detailed and extensive monitoring, along with a number of other required elements. The primary type of Clean Lakes Project completed in Oklahoma has been Diagnostic and Feasibility Reports where the lake is intensively monitored(physical, chemical, and biological monitoring of water column and sediments) for at least a year to define what, if any problems exist, what are the sources of those problems, and then identify as many as possible solutions to the problem, with the idea that the local community can decide which, if any, of the options should be put into motion.

Very few Clean Lakes activities have been funded under section 319 (and thus are relevant to this document) and all of those answer specific questions that are clearly defined in the workplan. Any future Clean Lakes activities funded under the NPS program will go through some public review,

initially, during development of the workplan and its review by the NPS Working Group, and in their final stages with a public meeting.

Page 15. SB 549 clarified that the Oklahoma Department of Agriculture has regulatory authority over all agricultural nonpoint source pollution, unless otherwise noted in statute.

Text has been added to page 15 in response to this comment.

Page 17 NPS Monitoring Program

To our knowledge, all of our written suggestions for the NPS monitoring program have been discounted or rejected. The NPS monitoring program should go through a public review process. Inclusion in the NPS Management Program is not sufficient a public review process, as to date all of our comments have been disregarded.

A second point on the NPS Monitoring Program: Why isn't monitoring for atmospheric deposition included in the overall NPS monitoring program? This seems to be critical to achieving a true NPS picture, and would certainly fall under the area of NPS monitoring. We are concerned that nutrients could be contributed to agricultural runoff when the true source is atmospheric deposition. We won't know this unless atmospheric deposition is measured.

With regard to your suggestions for the NPS monitoring program being discounted or rejected, I suggest you revisit OCC's responses and changes in the Plan through the various drafts to clarify concepts regarding monitoring. Some of your comments have been based on a lack of understanding about the monitoring program and its consistency with other state and federal programs. We have made significant changes to the document and responded with detailed explanations in the appendices. As far any suggestions that have been discounted or rejected, your suggestions were never ignored, however, as many of them sought to change the entire focus of the monitoring program, we felt they were impractical or inappropriate. The monitoring program has been presented to and reviewed by the entire NPS Working Group, Water Quality Monitoring Council, and Conservation Districts (at the annual OACD meeting). Quality Assurance Project Plans and the monitoring designs have been approved by OSE and EPA. OSE requires peer review from State environmental agencies for Quality Assurance Plans.

OCC agrees that atmospheric deposition monitoring should be incorporated into the NPS monitoring program. We have installed a station in the Beaty Creek Watershed and will likely seek to install one in each of our major implementation watersheds. Air deposition monitoring is still relatively new to our program and not yet practical on as wide of a scale as water quality monitoring due to the expense of buying and maintaining the stations. Text already existed in the future monitoring section to suggest this, but more has been added to clarify that we would like to see a broader distribution of air deposition monitoring.

Page 91. Implement groundwater protection education and demonstration programs. The Oklahoma Department of Agriculture should be listed here as an agency the OCC will coordinate with.

ODA has been added to the list.

Page 93. Implement Blue Thumb Education Programs. While we think Blue Thumb is a good program, we're concerned about the lengthy education time requirement for volunteers. It is our understanding that volunteer education requires three days of training. With that kind of time requirement, it is our opinion that most of the volunteers who could fulfill this requirement would be only young students or retired people. If it's the OCC's goal to involve more people in volunteer monitoring, the education requirements for this program should be reviewed and possibly revised.

Actually, Blue Thumb tailors the level of involvement and type of volunteering to the amount of time people have to give. Some volunteers who are unable to give up the amount of free time necessary to adequately train to monitor a site work more with education programs and county fairs and the like. These people are able to be involved without the full training. However, in order for us to send volunteers out with kits and equipment to monitor a site, we have to train them. They need to learn the basics of stream ecology and why healthy streams are important. They need to learn how to perform the chemical tests and correctly take physical measurements. They need to learn where on a stream is appropriate for them to monitor to most accurately convey the water quality of the stream (as in taking measurements from a riffle instead of a deep pool). They need to learn how to collect and rudimentarily identify fish and aquatic macroinvertebrates. They need to learn how to collect habitat information and to see examples of good and poor streams. For the purposes of ensuring volunteer's safety and giving them appropriate tools to monitor their sites, it really takes at least 3 days. The interesting thing is, most of the volunteers would like more training. Our volunteer coordinators try to consider the people who are interested in volunteering in setting up the trainings. Usually what happens is that volunteers meet on several concurrent Saturdays to go through the training. In fact, most of our volunteer training is really five days. They generally split it up and meet once a week for 4 hours for 8 weeks. Teacher training is shorter, only 3 days because they assume science teachers already have some of the basic knowledge. As to the type of people who participate in the program, that varies widely from group to group. Some groups are high school environmental science clubs that consist of a teacher and students. However, the Oklahoma City Blue Thumb volunteer program consists mainly of adult professionals. The Tulsa County Program is about 50% professional people, and about 50% retired people and students. If you have further suggestions for the Blue Thumb programs, please send them to one of our volunteer coordinators. In addition, Blue Thumb is only one of the volunteer programs available in the State. Other programs exist that require less training. However, if you can't give up 4 hours a week, it is unlikely that you can give up the time to monitor water quality at a stream site at least once a month, and sometimes during storm events.

Pages 133-135. Wetland Management Plan

It was mentioned in a response to an earlier comment of ours that this plan would be revised when a person is hired to fill a position to oversee this program. As we found many objectionable items in the Wetlands Management Plan, that response should be included at the beginning of the narrative for this section.

The Wetlands Management Plan is as it stands, for the time being. We cannot change the plan until it has been rewritten and gone through public review. The response to comments about the plan are included in the appendices. It is inappropriate to denounce the Plan, a plan that has gone through a process of public review and been approved, in the body of this document.

Thank you for your consideration in this matter.

Sincerely,

Marla R. Peek Director of Political Education and Regulatory Affairs

Cc: OFB Board of Directors

Oklahoma State University- Agricultural Engineering

Jennifer and Phil,

Mike Smolen passed the memo on to me about the plan draft. I would like to add something about proper solid waste management and the clean up of open and/or illegal dumps. I'm not sure if you want information as to what has been done, what programs have addressed this issue, or what could/should be done in the future. I'll just give you some information and you can tell me what you think.

I have been working in this area for 3 years now and feel that many water pollution problems are due to improper waste management collection, storage, and disposal systems.

The document is enormous and I have not read all of it. Are these issues addressed?

There are monies from the state tipping fees which return 10% back to local programs, and on Indian lands the national program of the Tribal Open Dump Cleanup Project (Cleanup Project) The purpose of the Cleanup Project is to assist tribes with closure or upgrade of open dump sites. The Project is part of a Tribal Solid Waste Interagency Workgroup which is working to coordinate federal assistance for tribal solid waste management programs. The Cleanup Project's specific goals include assisting tribes with 1) completing and implementing comprehensive, integrated waste management plans; 2) developing realistic solid waste management alternatives; 3) closing or upgrading existing open dumps; and 4) developing post-closure programs.

In FY99, approximately \$1.6 million was made available by participating agencies to fund cleanup projects. Individual project selections were made by the project workgroup, which is comprised of representatives from participating agencies. The workgroup plans to award grants for additional projects in future years as funding becomes available. Two projects were funded in region 6 but no projects were funded in Oklahoma, however. The tipping fee tax monies funded the Trash Cop program. In this 2 year program, over 4,600 illegal open dumps have been located and about 3,000 clean up. Fines levied totaled \$290,024. This program covered less than half of the counties in OK. As most illegal dumps occur in low lining areas which serve as water conduits such as stream beds, ditches, and gullies, the impact on water quality can be considerable.

Several Oklahoma communities have implemented household hazardous waste collections. These events collect tons of hazardous materials which would otherwise be landfilled or dumped illegally and could find their way into water bodies. Materials collected include used motor oil, antifreeze, batteries, tires, paint, solvents, cleaning and hobby supplies, and explosives. Cooperative Extension has many services and programs which address these issues.

Let me know if you want more info and what type. I'll be happy to write something up if I know the format.

Sarah

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Text has been added to the Management Plan to more effectively reflect the importance of these sourcespecific programs.