

Scenic Rivers Joint Study Committee
 March 6, 2014
 10:00 AM
 Boardroom of Tulsa Community College West Campus
 7505 W. 41st South
 Tulsa, OK 74107

I. Call to Order and Approval of Minutes

TIME: 10:04
 SMITHEE called to order and roll call

Members Present:

Arkansas Representatives	Oklahoma Representatives
Brian Haggard (HAGGARD)	Shellie Chard-McClary (CHARD-MCCLARY)
Marty Matlock (MATLOCK)	Shannon Phillips (PHILLIPS)
Thad Scott (SCOTT)	Derek Smithee (SMITHEE)

See sign-in sheet for public members present which is attached to the minutes.

SMITHEE stated that Kendra Jones (JONES) with the Arkansas Attorney General's Office will be calling in via-conference line. However, Clayton Eubanks (EUBANKS) with the Oklahoma Attorney General's Office will not be participating in the meeting today.

SMITHEE stated that we had a "long way to go and short time to get there." He thinks it may be necessary to schedule a continuation of the meeting for some time in April. The purpose of this meeting is to work toward a final work plan with Dr. Ryan King (KING) and Baylor University.

CHARD-MCCLARY stated that the minutes had been circulated to the committee prior to the meeting and that changes suggested by committee members had been made and the minutes were sent again by email for review. Committee members described the minutes as "voluminous."

• **MOTION 1: To approve minutes as presented.**

Representative		Yes	No	Abstain	Absent
Shellie Chard-McClary		X			
Brian Haggard		X			
Marty Matlock		X			
Shannon Phillips	Second	X			
Thad Scott	Motion	X			
Derek Smithee		X			

Approved minutes and sign in sheet will be scanned and uploaded to the website by PHILLIPS.

II. Consideration of and Possible Action on Agreement with Baylor University acting through Ryan King for Conduct and Performance of Water Quality Study Referenced in Second Statement of Joint Principles and Actions

SMITHEE stated that EUBANKS and JONES were working with Baylor University to get contact ironed out

JONES said that she and EUBANKS talked to Lisa McKeithen and office of general counsel at Baylor and they will redraft and send out the updated contract to the AGs. She stated that they had agreed that the Agency Directors that signed the Second Joint Principles document will sign the contract and that the committee will provide the Appendix (workplan). The decision that the agency signers would be the correct individuals to sign was made to ensure that the Compact Commission was represented.

AUDIENCE asked when the contract will be signed.

JONES replied that they are all are working on a quick turn-around. However, Baylor on Spring Break next week so it could take more than a week but all parties were interested in getting it signed as soon as possible.

MATLOCK asked JONES about the possibilities of KING to back billing for things like his travel to this meeting, etc.

JONES replied that she thought it should be OK but she would have to verify with EUBANKS. She would send him an email and try to get an answer before the end of the meeting.

SCOTT asked if the start date could be February 5 or at least March 1 so KING could get his travel expenses reimbursed.

JONES thought that should be OK but will talk to EUBANKS.

SMITHEE commented that we needed to make sure KING gets paid.

AUDIENCE stated that the committee has to be careful and wants some assurance that it isn't a waste of tax money.

COMMITTEE agreed that it was up to AGs

KING stated that he talked to Lisa and Kit about the project timeline question.

JONES agreed that was something that needed to be addressed.

KING stated that we need to figure out how to extend dates to make it work so that needed work to collect data in the summer of 2016 could occur with the final report by the end of 2016.

JONES agrees that the 2016 date was important and she would need to talk with EUBANKS. She stated that the Arkansas AG is OK with that scheduled but EUBANKS would need to answer for the Oklahoma AG.

SMITHEE asked if the committee will be allowed to weigh in on the decision.

JONES said that the committee would be able to weigh in.

MATLOCK stated that we should have a process that would allow for the report to come in later in 2016. We should use a no cost time extension to allow for graduate student to help write final report.

JONES agreed but said that EUBANKS would have to weigh in on the matter.

SCOTT stated that the slow-down in the project was due to the determination that all meetings were open to the public. Now, the AG from Oklahoma is not present which is causing another slow-down. The need is real for summer 2016 data collection. It would definitely be helpful to extend the agreement in the 2nd Joint Principles to end of 2016.

JONES will talk to EUBANKS in hopes that the Oklahoma AG will be willing to extend the deadline to late 2016.

III. Consideration of and Possible Action on Workplan for Referenced Water Quality Study

SMITHEE said the committee and KING need to work on the meet of the Workplan. We need to have the opportunity to talk about concepts, etc.

HAGGARD stated that in an email and in the December 2013 meeting, the committee covered the 4 questions:

- 1) What is statistically acceptable and significant?
- 2) What constitutes a shift in algal species composition?
- 3) What is the definition of shift in algal biomass production?
- 4) What are undesirable aesthetic or water quality conditions?

HAGGARD stated that the committee discussed during the December 2 meeting what was undesirable. The committee stated that it is a shift to the fuzzy/filamentous algae. He wants to bring that issue back to the committee. We need to acknowledge that the taxonomic shift is one thing but the filamentous alga makes the waterbody look bad.

SCOTT echoed HAGGARDs sentiment. One way to address the issue is to look at how we account for relative abundance of species. Is it through counting or quantifying their size? What about using biomass? We need to know how to select sites on the main stems of the rivers. We need to utilize tributaries of appropriate sizes and with the comparable concentrations compared to the main stems where routine water quality monitoring will actually occur. We will have to consider different flow conditions because that will be really important.

PHILLIPS stated that the Water Quality Standards (WQS) apply to the main stems but we have to evaluate impacts we will have to look at the smaller tributaries. This will be a challenge. We have to look at the main stems and see how they apply to the tributaries that aren't scenic rivers.

CHARD-MCCLARY stated that in lieu of repeating other comments, she agrees with what has been said. There are many challenges for this project. We will need to utilize the historic data to inform the study. Also, if the budget will allow the experimental pieces should be included because they give additional credibility to the study.

MATLOCK said that he is confident that KING will be able to collect the data necessary data and that we will be able to develop a good stressor response study. We can develop the study but the answers to "so what" and "how much is too much" are going to key. If we determine those answers upfront or toward the beginning of the study, we aren't guilty of perception based on what the data are. We need to establish how much is too much sooner rather than later. Both are articulated in the Second Joint Principles document. There is structure and function. We have to work with KING to develop. By the end of the next meeting we need an agreed upon set of criteria to answer that.

SMITHEE commented from a historical perspective. He said that we are constrained by the baggage of the past. Our purpose is not to work with KING to establish when impairment occurs. We have to find the right level. We have to find the point where we can avoid the impact. We need to avoid going over the cliff.

SCOTT asked if we are already past that point since the Illinois River is already impaired. How wondered if we move the river back? In this case, we are not talking about avoidance because the river is already there.

SMITHEE stated that for the Illinois River and Flint Creek that is correct. Talking from a CWA philosophy perspective, for other scenic rivers the criteria may be to avoid impairment but for the Illinois River the criteria is to restore. He said that is really the implementation piece. He said the committee is not saddled with the implementation piece and that we are looking at success at the end of the day. What is success? It is 0.037 today but what is it at the end of the study.

MATLOCK stated that is part of the issue we need to work out to make sure we agree and know where we are. The potential to fail is not failure; it is only the actual failure. We need to see where we are and the inflection point is past for the Illinois River and maybe Flint Creek. He said that philosophical discussion would have to determine the goal.

SMITHEE commented that we tried to make decision in the Second Joint Principles. He said we need to make decision soon. The signatories on the Second Joint Principles punted to us, the technical people.

SCOTT stated that the committee punted to answer the question later with input from the contractor. We can't punt anymore.

SMITHEE said that we now have someone to help us navigate through the process. He hopes that KING will be able to step up and help us.

SCOTT said that what we are trying to do today is to come up with the scope of the study so that even if we don't make that decision, the study will get us to the point of the decision.

SMITHEE said that he viewed the success at end of the day as a skeleton workplan that may have to change over time based on specific information unknown today.

MATLOCK stated that this is a model of how conflict resolution can be found. This is clearly the right way. There is great scholarship involved. There is great opportunity for collaborative management on this project.

SMITHEE said that the past says Oklahoma is unreasonable and that we want to go to pre-statehood times and it was unachievable. Oklahoma has actually said that scenic rivers don't have to be the best of best but should be top 25% or be a reference stream. He thinks it is possible.

MATLOCK said that the committee has done a good job to improve the system we have to work in.

HAGGARD stated that we need to look at natural assemblages and then nuisance triggers. These basins are no longer reference conditions. The Illinois River is about 50% developed and the Barron Fork is about 30% developed. The forest stream condition is not realist. Perhaps the realistic evaluation is what the public perception is of undesirable conditions due to nutrients.

SMITHEE said that it is conceivable that at the end of this study we determine that we find for Mountain Fork, Flint Creek, and Lee Creek the level is 0.025 mg/L P but for the Illinois River the value is 0.05 mg/L. Are we committed to one size fits all or are we willing to have multiple levels based on site specific.

MATLOCK asked if we were to have a single standard how that would be picked. Would it be the higher or lower value?

SMITHEE said we might be able in this case to be site specific. However, in the past it has always been one size fits all which is really one size fits none.

MATLOCK said that we should be able to replicate the condition but you really can't.

SMITHEE said that OWRB will entertain site specific criteria. It has been done for other pollutants. He said the Illinois River has about 90% of the attention on the Phosphorus (P) issue and it is really a different animal for the other scenic rivers.

HAGGARD reminded everyone that the data previously collected for the Illinois River and other scenic rivers is available for review and inclusion in the study but the old interpretation can't be used if it was included in the lawsuit. It is acceptable if it is reanalyzed.

SMITHEE agreed that the data could be bled in but the previous interpretations must stay out. This group can reanalyze the data and use it as part of the study.

JONES stated that she talked to EUBANKS and he said he didn't see a problem with cost recovery by KING for expenses since March 1. He had no concerns there. He committed to double checking with his contract folks. He agreed that the contract date start date is 3/1/14.

KING commented on SMITHEE talking about different numbers for different water bodies. He said that is a big shift in what was done in the past. Does the committee think we can make decisions for different numbers for different water bodies or do we need to focus on just one number or a range?

SCOTT said that the Joint Principles says that the committee will make a recommendation. It does not say what that recommendation has to be.

SMITHEE asked that we put the concept on the back burner. Once we are looking at the results of the study which is better science than we have now, we can look at the change point analysis. The numbers may show it is really close.

MATLOCK stated that we are bound through the Joint Principles that there will be implementation, and rulemaking. There are legal and political issues we will need to sort out. He likes the concept of starting broad and likes from science point of view looking at them separately. We may have to narrow later in the process.

SCOTT said that as a group we are open to a single number or multiple numbers. The question becomes how does this impact scope of work? How do we sample to ensure we get a gradient?

KING said that this will be a huge difference in developing gradient for each waterbody. He thinks he needs to use other water bodies. He thinks he can use all or most scenic rivers to get the needed gradient. The number of samples per waterbody would have to go way up but the number of samples at same site would go down. Lee Creek and Little Lee Creek are systems that could work to get the gradient for the Illinois River. The pasture land and what is happening on that pasture is part of the evaluation. This includes pesticides, fertilizers, etc. It is hard to come up with multiple numbers. The achievability for the Illinois River seems to be a problem. It may or may not ever get there.

SMITHEE said that it is. If you only look at the Illinois River and the average number goes up and you lower quality of others. If the others are used then maybe Illinois River can't achieve the use. The most attention is clearly focused on the Illinois River due to recreation activities. We need to focus on the Illinois River and Baron Fork and acknowledge Lee Creek, Little Lee Creek and the Mountain Fork.

KING said that for a study like this you can't do a little here and a little there. You have to identify catchments over the study area. You need to look at stream flows and sediments. He said that sediment is a problem for light and for P storage. You need to study streams that are well defined and similar so that basic water chemistry is similar. If you use that approach you will get a large number of temporal data. You will be able to see big nuisance algal blooms if it only happens only 1 time but it happened all over the area. If there is a massive event that didn't happen below number a certain number but did above, then it is "easy." The study by Biggs in New

Zealand for biomass found that there was something going on and over time the average starts to come together. Once you hit the upper limit you will always have the Cladophora and it will always be a problem. Statistical significance is something that we have to get. What is the level of the departure of the natural condition is the undesirable? We will have to look at prediction interval. For example, streams less than 20 P determine mean and max chlorophyll-a; then set at 95 confidence interval or so and then outside that there is something different going on.

SMITHEE said that is how he reviewed and interpreted...set a number based on a 95th percentile confidence interval.

KING what we are looking for is where we see the overall level over time. Individual sites should not bump way outside those levels predicted by the 95th percentile. You have to look at other endpoints including environmental bottle necks like dissolved oxygen (DO). Using minimum DO is very defensible. Targeted sampling during low flow due to the relationship with the P concentration, flow, and algal levels is important. This is the relationship that will inform the study.

HAGGARD asked how the disturbance factors kick in such as large storm events. He would like information on how those events will be addressed.

KING said that is why you sample for a long period of time so that you can pick up the variability. DO is a clear indicator of what is happening in the waterbody.

SMITHEE stated that you also have to look at super saturation.

MATLOCK stated that Arkansas uses the 6 mg/L DO increase as the threshold. That is a violation and they use that to indicate alga problems. It is tied to pH. He has seen 21 mg/L DO in Texas which illustrates that high heat will impact it.

KING stated that with low re-aeration and you will get over night. In a study using only streams below a wastewater treatment plant (WWTP), he has found that low volume streams with high DO and had violations.

SCOTT said he thought that the discussion had gone full circle. If you take maximum values over time and take average you can get long term mean of algal biomass. If you can get back to the point that we may stick on assumptions, once you are at the saturation point more P doesn't make it worse. But below that level you will see a decrease. We need to define the number. In your proposal you alluded to the fact that you would not set a signal point to define threshold.

KING said that based on the Joint Principles narrative which is based on nuisance level, statistics cannot determine a single number. Therefore, you have to determine one and use biocriteria to state the cutoff to determine when an undesirable outcome occurs. When you don't have qualitative standards you are seeking, the TITAN analysis is a change point analysis of a lot of changes for a lot of variables.

AUDIINECE asked if we wanted to use qualitative approach to determine quantitative changes.

KING answered “no.” He will use qualitative approach and use the other conditions to look at statistical analysis change point.

SMITHEE said that the change in species is not necessarily bad. However, you cannot change to the point that the impact is impairment. We are here to avoid change which is why he likes the change point analysis approach.

AUDIENCE wanted to clarify that we do want positive change.

SMITHEE stated that we have seen lower P in the Illinois River and in some others. It is harder to quantify but some are at the criterion level now.

MATLOCK wanted more discussion on how and where you manage the process. If the values are low does that mean no change? Challenge is to the systems are noisy and moving due to seasonality. The taxa are moving; they bounce until they have a threshold that results in a change. Dealing with the constant rate of change is problematic.

SMITHEE said that the Joint Principles document addresses statistically significant change but not exactly what change and what magnitude of statistical change.

HAGGARD said that TITAN deals with assemblage and changes. This is where we can get a fundamental disagreement as it relates to the impacts but not necessarily the shift in diatoms. He referenced the TITAN papers that are looking at change in species compensation. He would like to know if TITAN can be used to exclude species or identify the species.

KING said that TITAN can but we need to be careful.

SMITHEE said this is not just about impairment. We have to address the Cladophora like we address heart attacks. We get cholesterol checked and we diet and exercise to prevent the heart attacked. We have to minimize the risk of heart attacks just like we have to minimize the risk of high concentrations of Cladophora.

KING said that TITAN can include or exclude various variables.

HAGGARD asked if we can have a number for streams that will result in a threshold where you have to go out and measure what’s going on in the stream to know if it is impaired. We have to be careful when we set the standards. You need to go out and see what is growing so we know what is happening and changing.

KING said that this will not predict what data will have in this case. Other studies have shown biomass change in greens and cyanos around the same point the number was pretty similar when all changes occurred. There were changes to the Cladophora, blue green algae, dissolved oxygen, etc.

MATLOCK stated that it takes a lot of money to look at individual taxa as opposed to functional groups. We should be careful to not bias our data.

11:23-11:33 BREAK

SMITHEE –commented that in this case we are talking about TITAN and the change point analysis.

SCOTT said he had some questions that he needed to address. If TITAN is used, would it look across a spatial gradient at how species react, when they appear, disappear, etc. Will z scores be based on count data?

KING said there will be a count for cell densities which works on indicator value score, the relative score of taxa and frequency of each group. Everything is weighted and it is a frequency analysis. In this case we may not want to do that. It is very robust and there are not assumptions on distributions.

AUDIENCE it seems that every one has an idea about how to do this study but he doesn't know what KING's position is. The committee has to make the judgment. KING should present the nuts and bolts to see what will tell the most. KING should put together a plan and then move forward.

KING said that he has a draft workplan and that he has provided it to committee for a review and discussion.

SMITHEE said he is not sure about the experimental designs and that part of the proposal. He said the inoculation of stream with P experiment is problematic and it makes him really uncomfortable.

KING said that he moved those to year two or three and only if there is available funding for them.

SCOTT said that he thinks there are things we will struggle with and will need to make difficult decisions. This is a good opportunity to do whatever is helpful in the advancement of science. The issue he was asking about earlier, analysis by abundance or cell density agrees that KING should collect from streams and rivers and mix then mix and analyze. Are there issues of some of the species that will fit in the container vs the larger ones that may not fit? How does the study need to be designed so that TITAN can do it? What about biovolume? What about the dimensions, etc.?

KING said that biovolumes is a whole additional level of work for a taxonomist and cost. The soft fraction is fixed in Lugol's solution that will keep flagella intact. There would be a sample count for total diatoms and then we use a separate count for each type of diatoms. Soft algae are OK. Right now Winsborough is going to do diatoms and another person retired from USGS could also work on the second set of samples. For the soft algae sample, rather than puree everything they just pulse to loosely break up the filaments.. They can use larger sample and larger pipets to get the larger samples. Once the taxonomy is aliquot is removed, then they totally blend the sample to make it as homogeneous as possible.. TITAN analysis can be used because it is comparing the various species. TITAN looks species by species.

HAGGARD asked about a comparison of the thresholds vs the P gradient and Cladophora.

KING said that TITAN compares species to species; compares the same species; looks at the difference and where there is change. It does it for each species and then compares the various species; usually most change in the same range with some sooner and others lagging.

SMITHEE said he finds this really appealing since we have a range based on the confidence interval.

KING said that work in Texas has shown the range and the overlap is where we would change standard or not.

MATLOCK said the Joint Principles change in P is based on significant change or shift for undesirable conditions. Predicting DO change is not compelling. How are changes to aesthetics predicted? He is not convinced yet. He is struggling to determine the scope of work. Can we scale in or out? We must be mindful of the budget. We need to be on same page.

KING to address HAGGARD and SCOTT comments: we could look at individual species or all or both and compare. That way we have to do several comparisons to get the results and then make decision. He cannot say comfortably that one thing does or doesn't impact. Comfortable is looking at the assemblage. He is not sure that everyone will agree that the only the fuzzies are bad.

SMITHEE asked if you have growth in Cladophora is there a problem. This isn't the only thinking on the radar.

PHILLIPS indicated that she agrees.

MATLOCK commented that it grows this time of year everywhere.

SCOTT said we are differing on true analysis of community's vs diatoms. There is a large body of literature on the trophic state. We can't say indicator of diatom is related to aesthetic outcomes in Water Quality Standards.

KING said that he is not looking at diatoms on their own. The whole assemblage analysis can occur; data analysis of the counts tell the density of the diatoms and can get abundance. Many things are changing; there are coupling going on; there are reasons that diatoms are changing.

MATLOCK asked how grazing effect this.

KING said this will be looked at by the repeating samples, quantitative macro invertebrates and looking at stone rolling/grazers.

SMITHEE said we talk about undesirable then we decide fuzzies are undesirable. Change in Cladophora is undesirable maybe that is too narrow.

SCOTT said that he is feeling better as conversation goes on. TITAN looking at species change point, chlorophyll-a, visual or quantitative samples to look at mass of

filamentous content. All of these added together get the weight of evidence needed. We need to look at cost and see what tradeoffs will be necessary.

KING said that he will look at cost of all the items discussed today and that should help us make an informed decision.

SMITHEE said that he liked the TITAN model that shows the bands of change and at the end of the day, we could say "here is the band of our charge 0.027-0.047 and the band of our target is the range, then we are done.

KING said that looking at all the bands of change and comparing them all and then we will look at the zone where there is overlap.

MATLOCK asked at what point is it undesirable and what would happen if the band of change is huge.

SCOTT said we may be dealing with this in a year. When we lay the bands over each other there is an area that will be really dark. Hopefully it will be obvious and manageable.

MATLOCK said we need to look at where we are. We need to re-evaluate so that we don't spend all the money and discover we need more of something to make an informed decision.

MATLOCK stated that there is significant history about the various sample points and now we are talking about sampling 72 hours. Details will start to emerge and we need to focus on the end result.

LUNCH BREAK 12:08-12:58

SMITHEE reconvened the meeting and stated that the meeting will go until about 3 or 3:30 today and we need to reserve time at the end to talk about next steps.

SCOTT said that the conclusion he has reached is that he is pleased with the study. He would like to know the cost of biovolume measurements and would like that explored. He is pleased overall with how TITAN will work.

SMITHEE asked KING based on what he has heard so far if he has things he has re-thought.

KING said that there has been more convergence on where we are. The study design and site selection are most on his mind. He needs the gradient of sites and may need to include the Mountain Fork and Little Lee Creek. He thinks the sites should come from same ecoregion and wonders how flexible the committee is related to site selection.

HAGGARD said he didn't see why more than 1 or 2 sites from Lee Creek and Little Lee Creek would be needed. He said these are larger but with low Nitrogen and P. He said the rest of sites need to be from Oklahoma and well into Arkansas. There is a natural gradient above Osage Creek and Goose Creek in the Illinois River. The same

thing is true with Flint Creek. The Baron Fork and Caney Creek are also similar. Maybe the study can look at the main stems and then fill in the rest. There should be some overlap in the sites being measures/monitored weekly in order to get the most data.

KING stated that what HAGGARD described is what he would like to do. He will have to look at substrate, etc. to see if they are similar enough. He thinks Lee Creek and Little Lee Creek may be a little different but should be close enough.

SMITHEE said that the Upper Mountain Fork is a different ecoregion but it isn't that different. We do have to say something about it. We cannot ignore it.

MATLOCK asked if it was impacted by P.

SMITHEE replied not really.

MATLOCK stated that if it is a different ecoregion and is not a good reference site. What are we going to do?

HAGGARD asked if the Mountain Fork is only Scenic River not in Arkansas.

AUDIENCE stated that it does flow into Arkansas and then back into Oklahoma.

SCOTT stated that we can use historic data and do an analysis of that and include it in our report and recommendations.

COMMITTEE discussed that it is isolated and is hard to sample.

SMITHEE stated that we can't just leave it out. We need to be able to make sure that we can account for it in the final recommendations.

HAGGARD asked if this wasn't a little outside the Joint Principles. He thought we could collect information later to verify.

SCOTT/KING discussed the cost for the 5 sites to sample this one area that is removed from the other locations.

SMITHEE thought that we could include Smithville samples.

MATLOCK said we could review data and make a determination for our recommendation.

COMMITTEE agreed that we could not treat all of the Scenic Rivers exactly the same way. We need to anticipate the responses from public if we don't sample all scenic rivers. We should not spend our time, energy, and effort on Mountain Fork. However, really 90 % of the issues are driven by the Illinois River and Flint Creek because that is where the development is. The Mountain Fork is very different.

AUDIENCE stated that the committee must pay attention to Lee Creek and Little Lee Creek due to the Arkansas politics and the economic development in that area. Water is becoming a big deal.

COMMITTEEE discussed the various ecoregions and agreed that using Lee Creek and Little Lee Creek was reasonable and acceptable especially since they are in adjacent ecoregions.

SMITHEE asked if the committee had a consensus.

COMMIITTEE agreed that there was consensus.

KING said that since Lee Creek and Little Lee Creek are adjacent to the Illinois River they should be included and that makes sense. This is similar to a less developed Illinois River.

HAGGARD stated that this allows some sampling at catchment areas that are larger and it makes sense.

KING/MATLOCK/SCOTT all agree that it is appropriate.

SMITHEE asked how we would capture this in the plan.

MATLOCK/KING discussed that the sampling in the 2 or 3 samples in 2 or 3 reaches with at least 25 total

SMITHEE stated that when you go to the Upper Mountain Fork, it is going to be tough to get good sampling locations, to get in and out, and to make the best use of time.

COMMITTEE discussed that it will be difficult to do much meaningful work on the Mountain Fork due to its location. It will take a lot of resources to include it. There is data and an analysis could be done. The added expense for limited additional data for this one waterbody may not really be beneficial enough to take resources away from other areas.

- **MOTION 2: For reasons of budget and geographic and ecological dissimilarity, the Upper Mountain Fork River will not be included in this stressor response study.**

Representative		Yes	No	Abstain	Absent
Shellie Chard-McClary		X			
Brian Haggard	Second	X			
Marty Matlock		X			
Shannon Phillips	Motion	X			
Thad Scott		X			
Derek Smithee		X			

COMMITTEE agreed that we will include all the historic study materials and data related to the Upper Mountain Fork River and we will include old data and do an analysis of that data. This will be included in the final report recommendations.

SMITHEE commented that once you have been battered and bruised it isn't hard to get battered again so we should be mindful when we prepare the report.

SMITTHEE stated that we needed to determine the site selection and monitoring frequency.

KING thought that maybe this would be a discussion for the next meeting? Once the contract is finalized and the money was available he would start working. He will go around and tour sites with Ed Fite in Oklahoma and whoever the Arkansas guys suggested and spend a week looking at sites to see what makes most sense. He will go back and do some GIS work on the potential sites and request all the various data relevant to those sites. Also, he will try to build a geodatabase map to start looking for best possible sites. He may start thinking about sites and do some reconnaissance sampling. They would pick 40 or so sites (based on past projects) and then narrowed to 25 or so. That work would happen in April, May or maybe June and by July the full team should be ready to go. He anticipates the first trip lasting around 10 days and sampling at 25 sample sites. That is the time that the team would get locked in and get to work.

SMITHEE questioned how far should they range to find acceptable sample sites... Spring Creek, Sycamore Creek, Spavinaw, Saline and Little Saline.

MATLOCK said that proximal variable and geographics, same ecoregion, and stream water make up are important.

HAGGARD/PHILLIPS discussed that Spavinaw is unique in that there is one small tributary with effluent discharge and the nutrients differ greatly upstream and down, the land use is similar and has the same degree of forested and pasture land.

ALL had significant discussion on the need to the sampling to be done in the same ecoregion or maybe even adjacent ecoregions or watersheds. All agreed that the study area cannot go beyond the adjacent ecoregion or watersheds. It may be necessary to base the sampling activities out of one or two locations such as Fayetteville and Tahlequah, Siloam Springs, etc. Basically within 20 miles of each side of state line

KING asked if the committee anticipated sampling done in a cluster or random.

SCOTT asked based on experience how many can be realistically done in one day.

KING replied that 4 or 5 per day if they are about 20 minutes apart from each other. However, flow and weather conditions can impact that.

SCOTT asked how it will be determined when to continue with sampling events or when to start over due to rain or other conditions.

KING said that sometime you do have to go back and resample. That would show some of what was happening in the waterbody. You do try to have a window of when you can reasonably get the groups of samples done as quickly as possible.

AUDIENCE asked once there was a designated sample spot and once you get to the spot, how long would it take to sample that location.

KING said that this protocol that is being discussed doesn't involve everything he always does. He said that with a crew of 3 they could sample in 1 to 1.5 hours. But it could take longer. The first time he will be present the entire time. Overtime they may just have the technicians collect the samples.

SMITHEE asked if there was anything else that needed to be talk about. Specifically, what about experiment design, the dosing project and the Baby Bear project.

KING said that since we have added macro invertebrate grazing, historical data analysis, etc. that would cost money not in his original budget. He said that if we can do the smaller study he will. He also may try to get additional money for doctoral or master thesis for graduate students for the experiment(s).

HAGGARD asked how the biomass analysis will occur. There appear to be about 4 taxonomic studies.

KING said the samples will be preserved so more could be done but at least 2 spring and 2 summer will be done.

HAGGARD said there is a need to look at critical and non-critical periods. In Arkansas that is mid-May to Mid-September. One sample should be outside the critical period and one inside. He will also need to check on the period for Oklahoma.

SMITHEE said the critical period in Oklahoma is March 15 – June 30 and it applies only to DO.

HAGGARD/SMITHEE discussed the 12 samples and how to make sure the 4 events look at DO at the same time and look at the Oklahoma and Arkansas critical periods.

HAGGARD asked for an explanation of what the grazing component will be.

KING said that all 12 events. The focus will be on the grazers known to reduce algal mass. He wants to look at sites in order to determine the best way to do that.

SCOTT asked if KING would take some data on the geomorphology of each stream reach.

KING said that typically will and that the stream geomorphology is not usually that useful. He would like to keep it to width, flow, etc. of the main stem of the Illinois River. He asked if the committee wants his team to measure.

HAGGARD replied that he should use his best professional judgment because in some areas it will be very hard.

SMITHEE said that there are some areas you can't wade but you can use the rule curve, etc.

KING said he will do what we can and use the gauges where appropriate and will measure and calculate where appropriate.

SMITHEE read for the Oklahoma Water Quality Standards regarding DO.

KING said that if we use a 72 hour period that might have to be a separate sampling event. It is possible that it could overlap but he will think about how to best do it.

SCOTT thought that perhaps Ed Fite could help with sample selection sites to protect samplers to limit impact from other people. There will clearly be more risk in the high recreation areas.

SMITHEE agreed that KING should definitely work with Ed Fite.

HAGGARD also said that it might be prudent to be mindful of hunting seasons.

SMITHEE commented that he is against the dosing study but would like to explore the others.

PHILLIPS said she thought we were going to collect data and then make decision.

MATLOCK said that you if you can't do it in a natural setting then use mesocosms. These are not stream size and it will not replicate it completely but it is small scale. It will not drive what we need. He has done it before but was not successful. He is concerned about doing that in this study but acknowledges that it can be useful.

KING said that it would really be microcosm. These are really about adding weight of evidence to the study to validate what you have found. If you see the same thing in the study as you did in the field data it is real cherry on top. When you don't see the same effect then you have to add the caveat as to why. You have to look at what it is. He is agreeable to not do at all. He thinks the greatest influence on the science from an experimental perspective is the stream enrichment. It is amazing how to look at response time. When you are able to look at the algae at the right time of year, under the right conditions, you get to watch what happens. It is a short lived study. After a few weeks you wouldn't be able to see any effects. This has been very successful in past projects.

CHARD-MCCLARY said that she acknowledges that she may have a dissenting opinion but she is very much in favor of the experimental aspects of the original proposed workplan. The stream enrichment makes her a little nervous but she is really in favor of the experiments in order to add additional credibility to the study outcome. She hopes that there is funding left over or a graduate student is successful in getting some funding to pressure this aspect of the study.

SCOTT said he agrees scientifically. However, we must determine how we will apply it or exactly what we will do here. If we do it the right way we need full scale experimental not just one or two concentrations.

KING asked what the committee thought the upper limit of what we are seeing and use P to dose and assume that is an average of the total P. In working with some states doing nutrient criteria, Montana has done a lot of work and has really defensible nutrient numeric criteria. They did full stream enrichment and it was really compelling. There is value and he is taking middle ground. He thinks it will add compelling data if it is part of the study.

MATLOCK agreed that it is good science but the question remains if will it address the challenge before us. Would the experiment occur in the lower gradient? Would the experiments really give us more credibility?

HAGGARD asked what about taking a stream with high P and then chemically decreasing it.

KING thought that different controls would be needed.

HAGGARD asked that the cost of 4 taxonomic identifications be added to the workplan. He thinks we need to be closer to 30 to 40 sites. We could use Spavinaw, build gradient for the Illinois River. He thinks KING should put a pencil to the budget and see what the costs are let the committee know what they are.

KING said he would do all of the required elements and if there is extra money by the end then do the experimental part.

PHILLIPS said her community really cares about what is real in nature and that will go a long way to convince them of what is really needed.

HAGGARD acknowledged that if we go up in the number of P experiments then we have to go down also.

ALL/SMITHEE agreed that KING will go back and see where in the budget and then we will decide what to do with any remaining amount. KING should be able to revise the workplan based on what he has heard today.

BREAK - 2:20 - 2:28

SMITHEE said we need to spend some time talking about next meeting.

KING will revise the workplan to reflect what happened today. It will be a moderate revision and he will flesh it out. He will look at the budget and he will likely have to exclude the experiments and he will look at biovolume pricing.

SMITHEE asked KING if he was comfortable with where things stood.

KING said yes generally. It seems like we have resolved some issues and adding Lee and Little Lee Creek and excluding the Mountain Fork would make the when and

where take care of a lot. He will work with Ed Fite for a tour on the Oklahoma watersheds.

SMITHEE asked if KING would want to coordinate field trip with meeting.

KING replied that he would need to think about it and work on that.

MATLOCK said he would arrange for tour of relevant watershed in Arkansas.

SMITHEE said that he thought we should meet around April 10. Perhaps the 9th seems like the best.

- **MOTION 3: The next meeting will be a Special Meeting on April 9, 2014 with the time and location TBD. If the schedule to complete preliminary reconnaissance does not work, the committee agrees to adjust the date of the meeting to accommodate those field trips.**

Representative		Yes	No	Abstain	Absent
Shellie Chard-McClary		X			
Brian Haggard		X			
Marty Matlock	Motion	X			
Shannon Phillips	Second	X			
Thad Scott		X			
Derek Smithee		X			

KING agreed with that timing.

MATLOCK asked about the stressor response work. What kind of P will be used on the x axis?

King replied that the only P variable in the Joint Principles document is total P so that will be what he plans to use.

MATLOCK asked what the expected highest correlation would be.

KING said in this system he didn't know. However, in other studies, sunny days clearly impact the study. Dodds has made this case previously. He said biologically it is measuring what is happening. If you have a dissolved particle, algae can use it. Total P and all the others will be included such as nitrite, etc. He will use ethanol extraction and will measure chlorophyll a in the lab.

HAGGARD stated that turbid streams can be a problem and it will be important for KING to will use the method that he prefers and thinks will be successful in the particular case.

SCOTT said that as long as methods are consistent in the study and it is specified it should be fine.

MATLOCK said that we need to make sure the data will compare to historical data.

SMITHEE said that he and PHILLIPS need to send data to KING and that CHARD-MCCLARY needs to look at what Oklahoma DEQ data is available and to get it to King.

HAGGARD agreed to give KING access to 2009 to present data.

PHILLIPS asked if KING wanted data before 2008 or 2009 or if there was any real value in the old data. There does not seem to be a tremendous amount of land use that would change the impact.

HAGGARD asked if the work in Texas if he used the initial 40 samples to do reconnaissance.

KING said that it was used to identify good sites. He took samples and made judgment calls on the best sites. He didn't need to go back much before 5 years.

MATLOCK stated that the Spring Creek data collection could help to inform KING on sample sites, etc.

PHILLIPS asked if the committee could get KING the land use data.

MATLOCK said that someone would get him the land use maps which will save him a lot of time creating those from the data.

JONES stated that she would get the ADEQ data for KING.

SMITHEE asked KING if there was anything else he needed at this point.

SCOTT stated that Jan found a statistically significant spring impact but not a significant summer impact. Will you have the ability to look at the data by season?

KING said that based on the approach this will be rolled in, but he can analyze the information by seasons, etc. He can control the model runs to different information based on the specific data and associated conditions.

MATLOCK said that in regard to the nuisance alga biomass; Stevenson findings were one thing; British Columbia researchers recommended something else. The question becomes "if the level is above 5 and we definitely see the nuisance conditions at 10 where is the magic number?"

SCOTT said that he agrees that we can draw a bar across the range, intersect it with regression line and 95% confidence limits. He thinks that this will overlap and eventually we will get convergence.

HAGGARD stated that we will have to deal with this issue depending on what the data shows.

SMITHEE asked if there were any issues or "wallowing" left that needed to be done.

PHILLIPS stated that we have danced around the issue. We need to talk about the frequency and duration of the standard. That is an important question that we will have to answer. We need to know what the number is and how you evaluate the data to determine if you are meeting it or not. We will have to make the recommendation at the end of this process.

MATLOCK wondered what the trigger would be. Would it be 1 out of 10? What is the trigger to do something else?

SMITHEE thought it might be good to rethink the geometric mean and use long term average.

HAGGARD thought that we needed to talk about this in terms of the water chemistry.

SCOTT questioned if it would matter what the weather conditions were at that point.

SMITHEE commented that you learn after you build a car and drive it for a while what you are going to have to do to fix it.

HAGGARD asked how the total P will be derived because this will be important.

SCOTT stated that using the 12 samples and including the other monitoring events at comparable sites will be necessary.

KING stated that we can compare the number we get to what the numbers are where the sampling is more intensive and compare the values. The sites with higher P will likely vary more than sites with low P.

HAGGARD as a final comment, if we have a number based on 6 base flow samples we will have to include information in our recommendation to differentiate between base flow and storm events.

SMITHEE asked if we needed to clarify communication between the committee and KING. If information needs to go to the full committee and KING, the information should be sent to CHARD-MCCLARY and all should be copied on emails. Also, any data or reference documents go to KING then it needs to go to website. Finally, all technical questions will go through the two co-chairs.

SMITHEE stated that KING should look at his calendar, begin working on some of the action items and let us know what dates so that the committee could find a place for the next meeting.

IV. New Business

SMITHEE asked if there was any new business. No committee member or member of the public had any new business to discuss.

V. Adjournment

- **MOTION 4: To adjourn**

Representative	Yes	No	Abstain	Absent
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Shellie Chard-McClary	Second	X			
Brian Haggard	Motion	X			
Marty Matlock		X			
Shannon Phillips		X			
Thad Scott		X			
Derek Smithee		X			

Meeting adjourned

TIME 2:49