

Scenic Rivers Joint Study Committee  
 June 6, 2016  
 10:00 AM  
 Oklahoma Aquarium  
 300 Aquarium Drive  
 Jenks, Oklahoma 74037

**I. Call to Order and Approval of Minutes of April 8, 2016 – Derek Smithee**

SMITHEE welcomed the committee and public and called the meeting to order at 10:05. He thanked the aquarium staff for allowing the committee to hold meeting in their conference room. He also announced that all attendees were invited to go on a behind scene tour as group after the meeting.

SMITHEE asked CHARD-MCCLARY to call the roll.

Members present:

Arkansas Representatives	Oklahoma Representatives
Brian Haggard (HAGGARD)	Shellie Chard-McClary (CHARD-MCCLARY)
Marty Matlock (MATLOCK)	Shanon Phillips (PHILLIPS)
Ryan Benefield (BENEFIELD)	Derek Smithee (SMITHEE)

Contractor Ryan King (KING) present

Jamie Ewing (EWING), Arkansas Assistant Attorney General present

Clayton Eubanks (EUBANKS), Oklahoma Assistant Attorney General present

SMITHEE asked the attendees to introduce themselves.

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

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

Representative		Yes	No	Abstain	Absent
Ryan Benefield	Motion	X			
Shellie Chard-McClary		X			
Brian Haggard	Second	X			
Marty Matlock		X			
Shanon Phillips		X			
Derek Smithee		X			

Approved minutes including KING’s presentation and sign in sheet will be scanned and uploaded to the website by PHILLIPS.

**II. Administrative and Budget Report regarding the SRJSC's Contract with Baylor University Performance of Water Quality Study – Shellie Chard-McClary**

CHARD-MCCLARY stated the billings were occurring according to the contract and payments were being made timely. There was a bill received and paid last month. KING verified the project was on time and on budget.

### **III. Report on Performance of Referenced Contract – Ryan King**

KING stated that he would start off as he has done each meeting with a review of the "Study Framework" which summarized information from the Second Joint Principles document including that the study was "to determine the total phosphorus threshold response level...at which any statistically significant shift occurs in 1) algal species composition or 2) algal biomass production...resulting in undesirable 1) aesthetic or 2) water quality ...conditions in the Designated Scenic Rivers." He stated this is the driver of the study, data collection and committee members have vetted this.

KING presented a slide illustrating the project schedule.

KING presented a slide showing the data status report which indicated that most of the analysis had been completed. The October 2015 and April 2016 soft species analysis is continuing and the April 2016 diatom analysis is in progress. He will be checking with Stephen Porter and Barbara Winsborough to determine when they will complete their work.

KING presented the discharge flow rate in cubic feet per second by date. This is the same as was presented at the last meeting. The stars represent the approximate time the sample was taken and the stream flow at Illinois at Tahlequah. All conditions are at high base flow and meets the conditions agreed upon at beginning of the study. This is shown on a log scale.

KING showed the same data on a normal scale. He pointed out that the levels are dwarfed by one major event that was flooding in late 2015/early 2016. He stated that the team did not have to alter the sampling schedule much. It worked out well with the weather.

KING presented a graph of the benthic chlorophyll-a versus total phosphorus data from February 2016. This shows the recovery of benthic biomass after the storms. This was like hitting a reset button. As the water subsided, this shows the growth rate response. All of the rocks were scoured. The benthic chlorophyll-a increases sharply in response to phosphorus. There are very few organisms available to eat the algae. The snails were very few after the storm event. The other stoneroller fish were widely dispersed and not yet grazing heavily on the rocks.

MATLOCK confirmed that we were seeing log scale for P concentration.

KING said it was very much like what we had seen before.

KING presented a graph of the benthic chlorophyll-a versus total phosphorus data from April 2016. In April there was little rain so there was not much scouring. The levels are a little higher and the algae were starting to bloom.

KING presented a slide that showed each of the 12 sampling events for benthic chlorophyll-a versus total phosphorus. The first row represents the first year of sampling. He said there was a positive response with a strong increase. The December increase is primarily Cladophora. In February there was a high level of Cladophora. There were large scouring events. On the bottom row there is a chlorophyll-a

increase. There was considerable scouring from epic flood. In December the phosphorus was low. The water was slowly receding for the last sampling event in February. The algae were increasing in April with a little grazing and the presence of stone rollers.

KING presented a slide on benthic chlorophyll-a versus total phosphorus that was truncated at 1000 mg/m<sup>2</sup>.

MATLOCK asked what the literature value that was typical for nuisance conditions.

KING stated 150-200 mg/m<sup>2</sup>. The Ozark Highlands may be higher with some sites with low P occasionally exceeding 200 mg/m<sup>2</sup>.

SMITHEE asked if we are we trying to regulate annual mean.

HAGGARD said we may look at geometric mean or exceedance over a longer period of time.

SMITHEE said annual does not seem correct. 200 or 150 mg/m<sup>2</sup> is for “everyday” rivers. In Oklahoma we expect Scenic Rivers to be better.

PUBLIC said that there is not a specific value but we know we don’t want to further degrade the river.

SMITHEE stated that we do have a standard and it is 0.037. We also use geometric mean. The committee has to find number and a time period. We must decide if 0.037 correct and protective.

MATLOCK and HAGGARD agreed that the committee needed to determine frequency, duration and threshold.

MATLOCK added that assessment is also important.

SMITHEE said no that the evaluation period of time that nuisance algae appears. The committee charge is not about assessment, TMDL target or permit limits.

MATLOCK stated that he agrees.

KING presented a slide on the duration of the exposure of total phosphorus versus the instantaneous/cumulative response of chlorophyll-a. He used a 6 month rolling average in the analysis of chlorophyll-a. The question becomes where we see improvement in the data. The longer duration seems to makes more sense. In February there was so much algae activity and the phosphorus was low. This could show a phosphorus level of 0.01 as the threshold if we used only the February TP data.

SMITHEE stated that you don’t get fat on what you eat today but what you were eating last year.

KING said the key is to define biological response. There is definitely biological response to the scouring event. At the last meeting the committee agreed that the right duration to focus on would be 6-12 month rolling averages. This was determined after looking at 2, 4, 6, 8, 10 and 12 month rolling averages.

KING presented a slide illustrating total phosphorus versus time. When you look at the dip that occurred at the Illinois sample sites this is attributed to there being so much algae that the phosphorus dropped. He would look at the analysis without that data point to determine what impact, if any it had.

KING presented a slide on total phosphorus change points using a normal distribution. The dots and lines are the values of total phosphorus corresponding to the chlorophyll-a.

PUBLIC asked what the bottom dotted line represented.

KING replied that on the y-axis is 0.037 is shown in red. The top black line is 0.047 and the bottom black line is 0.027 based on the language described in the Second Statement of Joint Principles. He said the error bars fall in that zone as well.

PUBLIC asked if the black dots represent significant change in algal biomass.

KING replied that was correct.

MATLOCK stated that the change point is critical when evaluating scientific change.

KING stated he is using this method since neither state has a benthic chlorophyll-a standard.

PUBLIC asked what the black dot represents. What is it a change from?

KING said that it is the place (TP value) along the axis where you split the data into two groups. This TP value corresponds to maximum variance (deviance) explained by the analysis.

PUBLIC asked if the dots are statistical differences and if that is that what we are looking for.

KING replied yes. He added that where there is a statistical shift we have to determine if it results in a change in aesthetics.

HAGGARD asked if it was 50% or 90% line or where?.

KING said this technique gives you confidence intervals about the threshold.

PUBLIC asked what the gray represents.

KING said it was the 25-70<sup>th</sup> percentile.

KING presented a slide on total phosphorus change points using a normal distribution. The dots and lines are the values of total phosphorus corresponding to the chlorophyll-a. This slide was prepared with the information from event 5 omitted. The correlation between the 12 month TP data with event 5 omitted vs. the full TP data set was 0.99, although average was about 7% lower for the TP data with event 5 omitted.

HAGGARD said he was interested in how the data changed with that point omitted.

KING said it doesn't really go out of the "zone."

MATLOCK said that clearly the value of the work on this study can benefit other states. We are exploring how this could be used in other places. He asked KING if this is desirable and would he do it again.

KING said he would if there were no biological criteria. This is important. This technique is not appropriate for perfectly linear data but works well for most ecological responses because they typically aren't linear and are very heteroscedastic, two properties that violate assumptions of most linear models..

PUBLIC stated he would like to see the data in graphical form with a difference in the linear form and step wise interpretations.

KING said this goes back to graphs and discussion of the benthic chlorophyll-a versus total phosphorus. He said that it is roughly a log linear relationship.

SMITHEE said the graphs show how important site selection was.

KING said it was a great help to have the historical data from Oklahoma and Arkansas.

KING shared a slide with multiple photographs of the Cladophora biovolume. Nuisance species was important in this study. We see the filamentous algae are the primary nuisance and Cladophora glomerata is the primary species. As we are looking at what level of phosphorus where we see a shift in Cladophora we do have a limitation in that we only have the 1<sup>st</sup> year (4 events) of the data. We are still waiting for the remaining.

KING presented the information to date of Cladophora versus total phosphorus. We need to look at where we see change. The Cladophora shift we see is in the "strike zone." We see an increase in the proportion of Cladophora with increasing concentration.

SMITHEE asked if we did others also.

KING said yes and it will be covered later.

KING discussed a slide on total phosphorus change point using poisson distribution. Cladophora shows change point around 0.037.

KING then discussed a slide on total phosphorus change point using Poisson distribution with event 5 removed. The graph shows there is a little shift up. Event 5 does have an influence but it is only modest.

HAGGARD asked if we will be adding 2 more data points.

MATLOCK asked when we would add the 2 more data points.

KING stated hopefully this summer.

MATLOCK stated we need to wait to get all data to meet again.

PUBLIC asked what happened at event 5.

KING explained that there was a big bloom of Cladophora and that it was pulling down the phosphorus concentrations. Antecedent phosphorus concentrations were driving the bloom, not the observed concentrations during event 5. We were assessing what happened with that data point removed.

MATLOCK stated that the algae were removing the phosphorus from the water. This is part of the cycle.

SMITHEE stated that this was the polar opposite of the December high flood scour. Because of the scouring the Cladophora and chlorophyll-a were low.

KING said they [phosphorus concentrations] weren't abnormally high and this was more of a true representation of the availability of phosphorus.

SMITHEE said he was not suggesting that we cherry pick data but we do need to take the flooding/scouring event into account.

KING said that by removing that data point, the data was still within strike zone.

SMITHEE said we have to be careful because someone in the future could want to discount data when developing criteria. In this case it doesn't have much effect.

PUBLIC asked if there could be an equilibrium and that it could have a phosphorus carrying capacity.

KING said he is not sure he understands what is being said. If there had been no scouring event Cladophora would have eventually been overgrown and decayed and then released additional phosphorus.

PUBLIC said the response could be different.

KING said in looking at the impact he would not necessarily advocate the exclusion of event 5.

MATLOCK said he wants to make sure there is not too much bias.

#### **BREAK 11:05-11:20**

KING presented a slide on the nuisance taxa proportion versus total phosphorus for the time period of June 2014 through April 2015. With the exception of a couple of points, the biovolume was almost all nuisance species dominated by Cladophora except for a little Spirogyra. He used binomial change point method to because it was an appropriate match for this type of data.

KING presented a slide on the total phosphorus duration change point using binomial distribution. He stated that the April 2016 instantaneous value were not significant.

HAGGARD asked if KING had seen a change point further out.

KING stated that he thinks there is and he needs to look at that.

MATLOCK asked if there are literature values.

KING said that he has not seen much.

HAGGARD asked if Biggs said something like more than 50 %.

KING responded yes that was a number he used. He suggested that the committee will have to talk later about fitted models.

KING presented the same information that excludes event 5. He thinks that the change is likely occurring around the strike zone.

KING presented the threshold indicator taxa analysis (TITAN). The method was developed to use a multi-variable approach. This model allows us to look at change in taxa. The graphs on the slide are from a previous study for illustrative purposes only. We have to look for the zone where there is the greatest amount of change, where the values peak, where the strongest point in the table is located. There is some certainty when looking at 95% confidence interval.

KING presented the information derived from the TITAN model for 12 month total phosphorus and mean taxa biovolume from June 2014 through April 2015. The change points occur at 0.0197 mg/L for declining taxa and 0.0249 mg/L for increasing taxa. We see many taxa present, some increasing in numbers and others decreasing. Cladophora and Oedogonium sp. 1 numbers are identified on the slide because they were the only 2 nuisance taxa that showed a significant change point (increase) with increasing TP. Their change points were higher (0.3-0.4 mg/L) than the overall community-level change points.

HAGGARD clarified that this is information from the average of first year of data.

KING replied yes and that the next slide shows what happens when data from February 2015 is excluded.

KING presented the information derived from the TITAN model. It shows the 12 month total phosphorus and mean tax biovolume for the sampling events from June 2014 through April 2015 excluding the February 2015 event. The change point appears at 0.0209 mg/L for the declining taxa and at 0.0263 mg/L for increasing taxa.

KING presented the total phosphorus duration response. This shows the community level response. Also demonstrated is the instantaneous response with the 6 month rolling average phosphorus value. The change occurs at or slightly above strike zone. This is right in strike zone.

KING discussed the next steps for the study including:

- model fitting to response variables: quantile regression and/or GAM
  - Need y-axis targets such as chlorophyll-a
  - Mean of 200 mg/m<sup>2</sup> is supported in literature as a nuisance level, but others levels can be evaluated
- Macroinvertebrate analysis
- Components of final report
- Future meeting

KING acknowledged his core team and the taxonomists who are assisting with this project.

#### **IV. Discussion on the study and fulfillment of the SRJSC change – All**

MATLOCK said we need to be looking at the nuisance species.

HAGGARD agreed that would help to guide the discussion.

MATLOCK said he wants to see 200 mg/m<sup>2</sup> since that is the level contained in the literature or 150 mg/m<sup>2</sup> as the management level and 200 mg/m<sup>2</sup> as a set level.

KING stated that he will graph both.

SMITHEE said we are looking for the statistical shift in nuisance algae and does not think that 200 mg/m<sup>2</sup> are correct.

MATLOCK stated that is the density that others have used. This is a way to manage the river system for a narrative criteria such as nuisance levels of algae. It may not be perfect but it is a way to understand the system; there are multiples ways to grab the elephant.

KING said this analysis was what we agreed to in the statement of work.

MATLOCK said that the committee is looking at the data multiple ways to come to a conclusion.

PUBLIC stated that the analysis should be looked at differently. It should be considered on each side of the state line especially since the WQS are effective at the state line. Also, the land use is completely different.

HAGGARD said the committee used the entire watershed. This is the only way to look at phosphorus and its impacts. This approach or protocol uses all data to see how the algae respond to an increasing gradient of phosphorus.

MATLOCK said that it might be helpful to look at each side of the state line for purposes of highlighting differences.

BENEFIELD stated that the committee isn't talking about standard in Arkansas. The committee is only looking at Oklahoma's phosphorus standard. The Second Statement of Joint Principles is clear.

SMITHEE stated the ecological system is the same. Ecological systems don't recognize the state line.

MATLOCK said that if Arkansas desired to set a phosphorus standard this data could be helpful but that is not part of this committee's charge.

KING said there are sample locations in Arkansas that are on low end of the phosphorus gradient. For example, the Upper Illinois has very low phosphorus values. There are high and low phosphorus levels at sample locations in each state.

SMITHEE asked about the bugs.



KING said he collected and identified macroinvertebrates. He could use TITAN. The grazers are classified and there is great data on snails. In fact some sites have so many snails you cannot walk across without crushing hundreds of them. He can look at snails and chlorophyll-a. This could be useful.

PHILLIPS thought maybe macroinvertebrates could skew the relationship with algal biomass, which is why the committee asked KING to sample macroinvertebrates.

KING agreed that this does contribute to the noise. He said the stone rollers were not quantified well.

MATLOCK asked if KING could do a biomass balance for the nutrient cycle to show where nutrients were being stored in the system.

KING said he might be able to do that.

KING said he needs to start putting things together for the committee to review in terms of a final report.

SMITHEE said he does not have much background in this area. The study design, scope of work, and weight of evidence should be included.

KING said he will generate graphs and have scatter plots and TITAN results in the appendix.

SMITHEE said the report needs the information that the committee used to reach answers to the charge and then have the information available that fed into the decision.

KING said he could provide a combination of the information with a summary followed by specific examples.

HAGGARD said what has been shown to the committee would be helpful in the report.

KING said he could put the information into a table.

PHILLIPS said that would be helpful.

MATLOCK thought the data could be archived electronically.

HAGGARD asked EWING if the data would be considered public.

EWING said she thought that the data would be public record.

MATLOCK thought there could be a "fair use clause" included.

KING stated that he thought that the language was in the contract.

EWING said she thinks the contract covers the issue.

KING said that in his opinion most scientists would work together in such cases.

HAGGARD stated that the final report will have raw data in appendix.

CHARD-MCCLARY stated that we discussed the report at the last meeting and the information is contained in the minutes from the last meeting.

BENEFIELD stated that it was on page 5.

HAGGARD said the report should mirror what has been presented to the committee, following the same format makes sense.

PUBLIC asked what the Oklahoma standard for phosphorus was.

SMITHEE replied that it was 0.037 for scenic rivers.

HAGGARD stated that the other lines located on the graph are the 0.027 and 0.047. If the number falls in that range Oklahoma does not have to make change to its standard.

SMITHEE commented that if the data is outside that range the Oklahoma Water Resources Board can make a change to the standard.

SMITHEE asked what the timeline is for the speciation work.

KING replied that it is in the subcontractor's hands. He will seek an update following this meeting. He thinks that Stephen Porter is "on top of it" and that Barbara Winsborough has it "in the queue." He will request the results as soon as possible.

SMITHEE stated that we don't have a lot of time left.

KING said that if necessary we could have a meeting and he would call in by Skype to present whatever data was available if it was not complete.

CHARD-MCCLARY thought the committee should meet in August.

SMITHEE wants to start having the magnitude and duration discussion today.

MATLOCK questioned if the committee has enough data at this point.

SMITHEE said the magnitude and duration discussion may determine how many more meetings we need to have.

SMITHEE said the 6-12 month period has been discussed to be part of criterion instead of using the 30 day geometric mean. We have also discussed a 6 month arithmetic mean. However, the data showed that we had nuisance algae 1 month after the reset condition of the large storm event. This doesn't make sense to him.

HAGGARD said there were months where there were no threshold response but we did see it when the data was averaged.

SMITHEE states that if in the December timeframe the river never exceeded phosphorus threshold, the nuisance algae would never be there.

HAGGARD said there were sites before with low phosphorus and high phosphorus that had nuisance algae. It had occurred at both extremes.

MATLOCK stated that there were times where there was low phosphorus level and nuisance algae were present.

PHILLIPS said that we are talking about two different things. First is how to overcome variability. We have identified the change point and we are talking about concentration and time period to cause an algal bloom. We are also talking about sampling frequency that we actually implement. We may need a different frequency of sample collection.

SMITHEE said he has to separate assessment peculiarity. The charge is narrow in the Second Statement of Joint Principles.

PUBLIC stated that a better place to start would be eliminating the consideration of high flow events. Base flows are clearly more important.

SMITHEE said that once a number is affirmed samples are taken at base flow.

PUBLIC commented that Oklahoma is taking into account frequency and duration.

HAGGARD stated that we can define a recommendation to the Governors if the committee believes the geometric mean approach is wrong. The committee's charge is to recommend to the Governors what we believe is correct. It will ultimately be up to the Governors to determine.

SMITHEE states that if the phosphorus is in strike zone or not, if the geometric mean is gold or if arithmetic mean should be used, or something else, it will be the 6 committee members that will make the recommendation.

PUBLIC suggested that high flow data should be included in the assessment process since that is what drives what happens at base flow.

HAGGARD stated that when you have high phosphorus at high flow conditions you will have high phosphorus at base flow conditions. The literature shows elevated phosphorus in base flow is correlated to elevated phosphorus in high flow events – we have a recent paper on this topic.

KING said early in the process he had data from Arkansas and Oklahoma. He went out in April 2014 just to grab samples to help choose sites for the study. When regressing that data, when high phosphorus levels are present in storm events you see it later at base flow conditions.

PHILLIPS asked if there was value in monitoring at high flow for data for standards assessment with streams that had both high and low flow there is correlation. This is not necessary for this determination.

KING said there is good correlation between means that include high flow data and means taken only from baseflow samples. That high flow data numbers are just higher.

PUBLIC stated that the committee should not eliminate high flow samples.

HAGGARD said that the committee will make that decision; that is our charge from the governors. All numbers on X axis are done at base flow. He said that was purposeful and the criterion will shift to base flow.

MATLOCK said there needed to be more monitoring in response to an event period not just a single in order to capture antecedent events.

PUBLIC said that it is the role of the committee to recommend criterion and the conversation must be comprehensive to all NPDES program and the Clean Water Act.

BENEFIELD stated that the committee charge is in Second Statement of Joint Principles. The committee is not doing this study to investigate all aspects of the NPDES program. The Joint Principles is clear "to determine the total phosphorus threshold response level...at which any statistically significant shift occurs in 1) algal species composition or 2) algal biomass production...resulting in undesirable 1) aesthetic or 2) water quality ...conditions in the Designated Scenic Rivers."

MATLOCK said we have a charge and we don't want a system where a single high number results in a compliance failure or we will be chase compliance ghosts.

CHARD-MCCLARY echoed that and said this is not about NPDES permits. We have to stay focused on the charge given to the committee by the two Governors.

KING clarified that the 0.037 phosphorus was set based on base flow.

SMITHEE said that all the samples may not be all base flow conditions but most are.

MATLOCK said we would have more phosphorus if we were looking at a lot of high flow conditions. He stated that base flow is how things best manifest and we cannot just be chasing ghosts.

PUBLIC referenced comments made by CHARD-MCCLARY and added that the committee has a specific charge and the committee cannot start to move away from the charge and evaluate implementation, permitting, etc.

MATLOCK said this is really a state line issue and then it will become how to manage the issue on both sides.

HAGGARD reiterated that data is collected at base flow.

CHARD-MCCLARY stated that permitting will continue to implement whatever the WQS is in place, permits will continue to have a public process, etc. At the end of the day, I and my staff have to live with the WQS and figure out how to put in permits.

SMITHEE said he has a problem with the impact that 1 or 2 months can have.

MATLOCK stated that 200 mg/m<sup>2</sup> is OK for argument. He said it is noisy at the 1 or 2 month level of data.

SMITHEE said we want to avoid nuisances. The Oklahoma WQS is set for prevention.

MATLOCK said he wants to look at risk to exceedance in order to determine level. In 1 month you are not likely to see variability. More data points are needed.

SMITHEE said he is struggling because he is having hard time getting to 6 month bandwagon.

PHILLIPS stated that she is having a hard time at what the current 30 day geometric mean actually is because only 1 sample per month is taken so it is already really over a 6 month or 12 month average.

SMITHEE said he is focused on the ecological response. He is sensing there is a primary productivity signal that 0.037 is in strike zone of 0.027 and 0.047. The question for him is related to how long does the phosphorus level has to be in there. He thinks it could be less than 2 months.

HAGGARD said he does not see a lot of variability but there is some.

KING stated that the Barren Fork bounces above and below.

HAGGARD said it could violate every other month, so when you average then you get more of an actual picture.

SMITHEE said that Flint Creek and the Upper Illinois doesn't make sense because it is over the level and there is a reaction but you have to wait 6 months.

HAGGARD said no that historic data would be used so it is a constant rolling 6 months.

SMITHEE wants to find how long the phosphorus level has to be in the strike zone before nuisance algae blooms.

HAGGARD stated that biomass will max out at some time period.

SMITHEE stated that he is in avoidance mode.

HAGGARD joked that all we need is a storm every week.

PUBLIC asked if the discussion was really a risk and amount of risk or is it how long the risk is present.

BENEFIELD said this is not a recommendation for assessment protocols for Oklahoma and this won't impact how AR will assess compliance with WQS.

PUBLIC stated that the committee's recommendation will impact all assessment for all areas of the CWA.

BENEFIELD agreed but stated that the committee needed to focus on its charge.

HAGGARD stated that we have to figure out the change point in the phosphorus level. Basically, how we collected data to establish the x-axis related to the response on the y-axis. He suggested that the committee may have to look at the individual graphs used to identify the change points for the various averaging periods.

SMITHEE said they will change but the question is how we get around it. Averages are never exactly right. Other rivers are over protected and under protected 50/50. However, scenic rivers can't have nuisance algae 50% of the time.

HAGGARD said that each change point is based on data from 35 sites.

BENEFIELD asked if KING had more options.

KING replied that the committee decided 6-12 at the last meeting.

SMITHEE said that he remembers that discussion.

**BREAK 12:44-12:58**

PUBLIC would like to see some sights that are more sensitive than the others.

KING asked if they are referring to the time period after the big bloom.

PUBLIC asked if there were more sites that have more algae.

KING answered that there were. When sites were selected they tried to pick sites as similar as possible. He continued that steep banks vs more slope makes a big difference. The snail population is different. After a big scour event the snails are gone and algae came back quickly. It is hard to model to that level of details since there are more than 100 variables.

PUBLIC asked KING if he thought that this group can come to a number and a timeframe. He asked again what the charge is and said that aesthetic is hard to determine. He wanted to know if KING thought there was enough data.

KING stated that he thinks there is sufficient data. He believes that the committee should have enough information to be able to make a recommendation.

HAGGARD said that it would be nice to graphically see the graphs of data points as it is rolling through the various 6-12 month calculations. He suggested that maybe it would be helpful to see first 6 months, then second rolling 6 months, etc.

KING said that a scatter plot of that data is totally doable.

SMITHEE stated that it was hard for him to get his head around one change point on 35 sites. He commented that for the 6 scenic rivers in Oklahoma the WQS language is avoid algal blooms not to allow limited number.

MATLOCK said that practically you can't do that. Cladophora blooms in very low levels of phosphorus.

SMITHEE said that scenic rivers are to be amongst the best 25% in the ecoregion.

HAGGARD said there is clearly some change but what is the change that is happening.

KING said he could use quantile regression and determine proportion of sites exceeding a certain value of chlorophyll-a for next time.

PHILLIPS asked if the committee needed to discuss the possibility of KING attending the next meeting in person or if he can call in.

SMITHEE stated that it would be better for KING to attend the next meeting in person if all the data is ready and if it is not then KING will call or Skype into the meeting.

HAGGARD stated that it would be helpful to meet before classes start in August.

SMITHEE restated that the next meeting would be August 10, 2016 in the Tulsa, Oklahoma area.

SMITHEE asked KING if there was anything he could do graphically to help the committee understand the information and come to an appropriate conclusion based on the data.

KING stated that he would consider what he could do to assist the committee.

PUBLIC representing Trout Unlimited thanked the committee for its work and stated that it was important to maintain and keep the scenic rivers in as good condition as possible. He stated there was a huge economic benefit to protecting these rivers.

**V. New Business – Derek Smithee**

None

**VI. Adjournment**

**MOTION 2: To adjourn meeting**

Representative		Yes	No	Abstain	Absent
Ryan Benefield	Second	X			
Shellie Chard-McClary		X			
Brian Haggard		X			
Marty Matlock		X			
Shanon Phillips	Motion	X			
Derek Smithee		X			

Meeting adjourned at 1:22