Discussion 1: Toxic update proposals

7:21

James McCarty: (Beaver Water district) looking at the cadmium data only 17 outfalls have active limits. Can you explain why that number is so low, I am sure it has something to do with industrial discharge?

Taylor Cochran: It does have to do with whatever the industry is, but our permitting department determines which facilities get the limits or the monitoring requirements. I am not certain what those requirements are that they look for.

James McCarty: So you don't know if that's because of a measured cadmium level in the outfall or whether that is just because of the nature of the industry?

Joe Martin: I would suspect it's the nature of the industry.

Shon Simpson: I may be able to shed a little light on that. So the way you would get a permit limit is during the permit application you sample your effluent, you submit that data to DEQ and they run a reasonable potential analysis and if that reasonable potential analysis, which is reasonable potential to exceed instream WQC. So it's part of a quad-industrial sector that has to sample (muffled) it shows up (muffled).

James McCarty: And those are reevaluated with each new permit cycle?

Shon Simpson: Yes

9:50

Darcia Routh: (Department of Health) I think too that on the permit limits there are a lot of municipal sources that accept leachate from landfills and are subject to pretreatment requirements so that's one reason you don't see a lot, I worked as a landfill permit person in technical branch for a while here [DEQ], that's one reason you see so few cadmium. I know other programs in the building are all under cadmium as a potential problem. Do you guys collect cadmium data in the nutrient program?

Taylor Cochran: Yes we do. Yes we do collect cadmium data from all our water monitoring stations. And for the past 5 years there were a total of 509 monitoring stations that had a combined 12,718 data points.

Erin Scott: (HOzarks) On this table down at the bottom here, so 2019 there was a threefold increase compared to 2018, I was just wondering if you had any insights as to the nature of that.

Taylor Cochran: I'm not really certain on why they increased so dramatically from 2018 to 2019. Looking at a wide range of the year for the TRI data the numbers for multiple parameters do

seem to swing up and down with not really much to speculate on why without just making guesses.

Discussion 2: Toxic human health addition

16:50

Alan Nye: (watershed groups) A couple of things. A comment and a question. On toluene you say it's more dangerous to children and pregnant women. The exposure values that you all use are representative of an adult and it might be worth some commentary to show those adult criteria used to derive or those adult exposure values, the 2.4 L drinking water per day, that those are representative for adult drinking water intake as well as 80 kilograms is 176 pounds, so you might want to include some narratives that those values are protective of children as well.

Another thing on xylene is that it is actually three isomers: -ortho, -meta, and -para and you should probably know that's the sum of xylenes when you do that. One more thing on xylene, do you all consider taste and odor criteria in the development of these values? Xylene is quite a bit higher than all the others, and it's not very toxic. I think the taste and odor threshold reported by EPA is 1 mg/L that's the high end. And I don't know how it squares with 2.407 taste and odor values in Rule 2. So you might want to go back and just take a look at that and justify. I think because you might be able to smell and taste it at levels that are not necessarily toxic. But those aesthetic qualities are pretty important for drinking quality.

Taylor Cochran: Thank you for that.

Shon Simpson: Out of the universe of pollutants that have human health criteria associated with them. What is your general process you go through to select a given candidate for revision?

Taylor Cochran: So what we did for this round. We looked at TRI data to see what pollutants were discharged into Arkansas. We looked at EPA's IRIS report, which is the Integrated Risk Information System that tells us how the EPA got their values, how confident they are in their values, and what the scientific data is behind the EPA's reports. So we looked at which ones were discharging into the state, how confident EPA was in their values and we chose pollutants that EPA had a high confidence in because we wanted our Rule 2, our criteria in there to have sound scientific backing behind it to make sure we were confident in the numbers that we were going to be protective of our citizens.

20:19

Ellen Carpenter: This might be off topic, but you have some of these parameters you are going to adopt. If they are adopted will they be added to the ambient monitoring program? And secondly speaking of your ambient monitoring program you used to collect that monthly do you still do that?

Joe Martin: Currently we are collecting at ambient stations twice a quarter and that is from a resource issue. We are so short on people that we had to back off a little bit but we wanted to make sure we were meeting assessment goals, collecting data and still assess the sites so that's why we were collecting twice a quarter.

Ellen Carpenter: Yeah it used to be inspectors that collected that.

Joe Martin: It still is.

Ellen Carpenter: (microphone cutting out) …are these parameters… (microphone cutting out)

Joe Martin: I think the first thing we need to do is to ensure that the lab has the capability of running those parameters. If that is the case then I suspect we will.

Ellen Carpenter: Thank you.

21:55

Taylor Cochran: Are there any other questions?

Ellen Carpenter: So are cyanotoxins, does the EPA have criteria for cyanotoxins, and if they do then why has DEQ not elected to adopt them?

Taylor Cochran: If they do then they are very new. I can't remember exactly, but we do have the HAB [harmful algal bloom] program that we are currently using to help monitor for cyanotoxins.

Ellen Carpenter: What sort of monitoring is that?

Joe Martin: It essentially a response based type of system. Once again our resources you can't go out on lakes all the time doing that, but we did put out a HAB management plan back in I think in early 2020. We are looking at revising that right now just to incorporate any kind of latest science that has occurred since them. And of course whenever there is an issue or we hear about an outbreak we've got kits for all our inspectors in our regional offices just so we can have a quick response if something is happening in or around the state and if it is close we will go ourselves, collect the data, we run the toxins here ourselves in the lab. Of course we work with our partners to try to get the word out, put signage, things of that nature. If for whatever reason that didn't happen we would put out the signs ourselves. We have in the past issued press releases, things of that nature just to try to make sure all citizens in that area know what is going on around the waterbody.

James McCarty: I just wanted to point out there are numeric criteria from the EPA for toxins. Although I will acknowledge the difficulty of toxins in that they are not a discharge toxin but one that is created within the environment by cyanobacteria. I do understand that that is difficult but I think that there are standards that are of use.

Taylor Cochran: Any other questions?

24:23

Chance Garrett: Brie [Olsen] (on zoom) commented that we also collect toxins on the routine lake sampling for data gathering purposes and that we are currently using those recreational criteria as action values.

Joe Martin: So we do collect toxin data on our routine lake sampling and that we use those EPA numbers as threshold values.

Ellen Carpenter: How often do you do the routine lake sampling?

Joe Martin: We have quarterly sampling (microphone cutting out) … approximately, I'll probably get this wrong, but I want to say around 23 lakes … (microphone cutting out)

Ellen Carpenter: I understand.

Taylor Cochran: Any other last minute questions?

Erin Scott: This may show my lack of knowledge on this topic but, so these are all the values for effluent discharges and you may be influencing ambient monitoring for these chemicals. Will there be different criteria associated with instream concentrations? Like how would that works?

Joe Martin: No these would be instream concentrations. Permit limits would be developed off of these numbers, but ultimately these will be the water quality standards so these would be instream concentrations that will be compared against the monitoring data for assessment purposes.

Erin Scott: Ok so these are not effluent concentration limits these are instream concentration limits?

Joe Martin: Correct, and the effluent values will be derived off of those

Erin Scott: Ok, I see.

26:20

Darcia Routh: EPA in 2019 released a recreational exposure ambient water quality criterion for two cyanotoxins that could be microcystin to 8 Micrograms/Liter and cylindrospermopsin at 15 Micrograms/Liter and they do have recommendations for ten days screening and we work really closely with you guys and appreciate that partnership and some other people in the room have been in on that but I do think it is time for us to consider the cyanotoxins for pollution, at least those two.

Taylor Cochran: Any questions before we move on?

Discussion 3: DO criteria

34:25

James McCarty: I have a question about your sampling program for DO and it is my understanding and I am not a DO expert but they tend to vary quite a bit with the seasons and I couldn't really tell from your sampling frequency graphs whether there were many samples from summer time which I think when DO levels tend to be lower and so and I couldn't really tell exactly whether they were representative for each one of the rivers there and could you just speak to that comment?

Yinka Iseyemi: Well we sample DO throughout the year so these data are subdivided to critical season and primary season so we are sampling at least minimum monthly through the year. And when we sample we sample a representative portion of the assessment unit.

Ellen Carpenter: I don't really understand graphs I guess but it looks like all the data you have there is that for a critical season or is that for the whole time?

Yinka Iseyemi: The data here is for critical season.

Ellen Carpenter: Ok, so all those dots are above 5 so why are we lowering this?

36:40

Yinka Iseyemi: Sorry, this combination of both critical and primary seasons. Essentially for the critical season we tend to have lower concentration and when we saw that we delved into checking what could be responsible for the lower concentration that we see.

Yinka Iseyemi: What this graph represents, so when we checked the data and saw the lower concentrations during the critical season what we tried to see are those lower concentrations, you know are we getting that over the end is this significant over the years what is causing this and that's what this is showing here. There is no significant trend over the years even though we get some times lower concentration and then sometimes we do not.

Mary Barnett: I see what you are saying and Yinka's graph shows there are very few data points below 5 milligrams per liter, which I think demonstrates that when you lower it from the 6mg/L current critical season criteria you lower it to five that the stream would not show water quality impairment and that lack of water quality impairment is backed up by the support of the biological data both the fish and the macroinvertebrates. So if you imagine a line at six you'd see there are quite a few numbers, quite a few data points that are below a six and there are not many below a five and you are correct if we did lower something at least a five then we would assess out as an impaired at five then we would definitely be concerned about that.

Ellen Carpenter: Are these waterbodies impaired for DO?

Yinka Iseyemi: Currently yes and that is what inspired for the investigation of what could be causing the lower concentrations, so in the list of impairment we see that there is not any, there is no known cause for these lower concentrations and that is why we started investigating what could be causing it and that is the reason for this position.

Ellen Carpenter: Isn't the Saline River an ERW? … Alum Fork…

Mary Barnett: The Saline River mentioned is not, the Saline River is not in the Ouachita watershed, this is in the Red river watershed

(Multiple people start inputting which is not clearly picked up by the microphones.)

Mary Barnett: So while the water quality data, the criteria of 6 [mg/l] might currently show impairment like you said. There is not an indication of a land use factor or a permitted facility factor so are investigation was to show that this 5 critical season is natural within this watersheds and we encourage routinely and as you mentioned there hasn't shown a downward trend so it's not that there is an anthropogenic cause making these lower but that it is a natural condition for the ecoregion for these waters.

40:42

Jason Phillips: I understand the rationale there that these waters are currently impaired and so you investigated what may be causing this you feel like it is natural when they get that low during the critical period therefore the standards should be lower so they become unimpaired. What are your arguments for why it's natural as land use could you bring that graph back up for the land use percentages? I am just curious as they were kind of, Alum fork was like 86% or something forests and one of them was under 50%. It was a lot of pasture land and grassland. What land use characteristic would you consider to be a factor that would affect DO? With such wide variants there I am curious what would trigger you to think well maybe that is a land use issue. It is a lot easier with a discharge to say there is discharge upstream. You know for example the Saline river red river basin you got 50% forest 30% grass and shrubs not sure what that means maybe old cut overs or what not and you have 13% pasture that's markedly different from the Alum fork. What would trigger you to think that land use wasn't a factor?

Yinka Iseyemi: So essentially for the land use land cover we used a combination of both forest and shrubs and we looked at those together we see an 80% in combination and also of this land use yes you are right we have 13% pasture on the Saline River and also south fork but all of these land use are being, it's not recent this has been like this historically so there is nothing triggering that lower concentration.

Jason Phillips: So the combination of forest and shrub, grassland if that is above 80% and it has been that way for a long period of time you would not consider, you indicated that as not factor correct?

Yinka Iseyemi: That's a good natural indication of the watershed.

Jason Phillips: Ok, one other question I couldn't help but notice the difference in collection periods like a couple of these have 25-30 years' worth of data and Alum Fork has like three years of data. What's behind that? Is there something else going on at the Alum Fork that really, is anybody in the need to lower that based on such a short period of record or what's going on there?

Joe Martin: The Saline River had a historical ambient station so there's a lot more data on that. The other two, those had two year studies on them where we collected data on biology, macros, fish, habitat analysis. So I think two of them were probably more akin to what we would see at UAA, two year study for water quality biology etc. and the Saline River I believe had an ambient station on it so we just had a greater data set.

Jason Phillips: You mean Saline do you mean Alum Fork for the Saline or?

Joe Martin: No I mean Saline River from the Red River basin.

Jason Phillips: Ok, the one with all the dots on it, I gotcha. But even the South Fork Ouachita had records from the 95s up until 2018 or whatever it was.

Joe Martin: Yeah they just had more historical data than others.

Jason Phillips: Ok

44:07

Erin Scott: I will try and communicate my question effectively; but. basically so the limit is six now, you're proposing going down to five we see on these charts most of these values are above six, some of them are between five and six so I guess my question is kind of if the limit is lowered to five and then land use changes and NPDES permits come into this area and then we start seeing a greater proportion of those values between five and six it seems like that may influence the biology of the streams so it seems like maybe the biology of the streams kind of rely on a majority of time of higher DO levels over six if we end up shifting something due to those observations between five and six do you see that being potentially a problem for the biology?

Yinka Iseyemi: I believe that at that point when we see an additional anthropogenic factor so what we would need to revise to reflect for what is needed but for now this is what is currently and historically what is going on so the idea is not to change because we are having lower concentration we are trying to understand what is going on historically is this a result of an unknown factor or is that what this material is commenting on and as I said that is what is naturally going on there and if in the future there is a NPDES … then we will revise again.

Mary Barnett: Yinka, could you speak to some of the research you have done on the DO concentrations that are protective of aquatic life?

46:26

Yinka Iseyemi: So in addition to looking at our data we also checked literature and also assessed for the implications of these. So, with research, optimum DO concentrations that would better protect aquatic life use and sensitive of aquatic life is 4 mg/L. So when we move in to 5 mg/L it still very, very much protective for aquatic life use.

Tate Wentz: Just a general comment on I guess it's to, the goal is to evaluate the variability and understand the variability of lower dissolved oxygen in the critical season through time and one way to do it, DEQ's historical approach to ambient monitoring is sampling at the road crossing which are usually pools. If we were to really understand the variability of the dissolved oxygen throughout the system we should be looking at multiple sites through a system like a traditional UAA and have a gradient of upstream to downstream to understand DO variability.

47:36

Tate Wentz: The other question I had, my actual question I had was what was watershed size for these three? Red River's above Dirks, Alum fork is pretty small, Ouachita River at, South Fork Ouachita at Mt. Ida is fairly large and there is a point source discharge immediately downstream.

Yinka Iseyemi: So they all greater than 10 miles square and that's the reason for the initial DO concentrations in this, anything greater than 10 miles is 6 mg/L. So all three sites are greater than 10 miles. And thanks for the recommendation on checking on the varibility.

Tate Wentz: One more comment on that as far as the land use changes, you know, is that the 2019 NLCD federal layer? Ok, so one other comment there was actually to look at land use changes over time to match your data availability so how does the land use change through time. So during that time period where your data is collected has land use changed? So we are looking at static aerial there instead of a continuum.

Yinka Iseyemi: So that was what I mentioned earlier whatever land use that we have is stable throughout the years I think with any changes over the years so it's been like that for a long time. There are no recent updates to land use in this watershed.

49:24

James McCarty: Just a real quick question when you are talking about land use so are we talking about land use of the entire basin or just the land use that drains to that site?

Yinka Iseyemi: It is the basin, the watershed area.

James McCarty: I would recommend in the future that you should be looking at the subcatchment that actually drains to the site and not necessarily the entire basin cause these are big swathes of the state of Arkansas and what's going down in the south end of the Red River basin is not characteristic of what is actually draining to your sampling site.

50:04

Yinka Iseyemi: So let me check with Miss Mary, (to Mary) the land use that we use it's for the HUC 12, that's supposed to be a subbasin isn't it.

Mary Barnett: I think catchment is quite (microphone cutting out)

50:41

Darcia Routh: I would like to point out that there is, historically, a lot of mining activity in the Ouachita Mountains in this area. I am not sure how much beyond the quartz mining is out there right now and there is still barite mining and some other mining and of course bauxite is a huge big deal and the whole Magnet Cove stuff as well so I don't think using the word "no anthropogenic" activity is really quite what you mean to say either.

51:38

Justin Stroman: (AGFC) (microphone cutting out)… Alum Fork the Middle Fork coming together before you get to that area of growth, but that may be something to look at the cumulative impacts of all that new development. I know right now maybe not there but to watch a bunch of stuff get built there just west of town, lowering the standard may affect a quite a few sensitive mussels, Ouachita madtom. It's like you know in this area as well where there are other sensitive rare species. Something to think about before you issue this final decision that downstream there are quite a bit of stuff that is sensitive and you got growth happening.

Yinka Iseyemi: Thank you, Justin, for that comment I was gonna also mention that in addition to this investigation that I did mention that we looked at mussels species and all that and I mentioned that the optimum DO concentration recommended to protect those species is 4 mg/L so we are not going lower than 4 mg/L.

Shawn Hodges: (Buffalo River) Is there any continuous data from these sites to look at the daily swings in DO?

Yinka Iseyemi: We do have, our short-term diurnal data yes, (to someone else: do we have that slide?), we have data there is no any fluctuation or flux below five either. And we have for all three sites. And also in addition to the three we also looked at correlation with DO and also nutrients for all these sites to see if there is anything going on and also there is no any association. So we are confident with what we have proposed.

Yinka Iseyemi: Questions? (none) I will pass it over to Joe.

Discussion 4: Ecoregion Studies

1:05:00

James McCarty: I just wanted to say that I appreciate putting this information together for us and so that we can kind of see progress that we have been asking for and for a while now. It is good to see a timeline but I just wanted to reiterate that I said this last time and I'll say it again this time that there are partners out there who are willing to and more than willing to cooperate with you on this data collection activities. I mean you guys are already using our data I don't think there is any reason to why we couldn't help with some of this ecoregion studies data collection as well and maybe get that timeline moved up a little bit.

Joe Martin: I love it, I appreciate that comment and we spoke a little about this last time I do plan on contacting y'all before we get into the Ozarks in 2023 and we would love to have some partners come out and help us on that project so thank you for that comment.

Shon Simpson: I am just curious about how you allocate your disturbance categories.

Joe Martin: Ok, Lindsey would you like to talk a little about that; she in a much better position to answer that question. I thought that might come up so I'll let Lindsey answer that.

1:06:23

Lindsey Boyle: So we look mostly at the land use, it's by far the (microphone cutting out) populating disturbances and we also look at things like NPDES permit facilities in the area and we look for all sorts of things that might impact water quality. So we looked at watershed level, we have our second points, we have our watersheds and we pull up landuse out as well as road crossings and NPDES permitted facilities when we make those categories. And so each range of categories is tailored to each ecoregion. It's not something you can use across the entire state you have a different one for each ecoregion based on their general landuse characteristics.

Mary Barnett: When you say watershed that is catchment level right?

James McCarty: Just kind of a follow-up with that disturbance gradient question I thought that we usually assess ecoregions based on reference training so looking at pristine kind of environment when did we make the shift from looking at a disturbance gradient across the ecoregion and how is that going to be used to help us inform what our nutrient criteria is being established? And then if I can also add on if the delta is not being done till 2030 does that mean that is the timeline we are waiting for in terms of potentially rolling out new nutrient criteria?

1:08:02

Joe Martin: I don't expect to wait till the delta is completed to start moving on a number of things. I think that the delta will be quite a bit different than all the other ecoregions. I don't necessarily think that we compare the delta with anything else and think they are similar enough

to where we could put those together to increase our sample size and so I suspect once we get through with the interior highlands then we'll start, it want to clean up the data, we will start doing some exploratory analysis on it once we have it all collected but no I don't anticipate waiting for the delta to be completed in order for us to start moving forward with a number of things including IBIs and tiered aquatic life use.

James McCarty: And the disturbance gradient?

Joe Martin: Oh, thank you, thank you. I believe did you talk about assessment because I just wanted to distinguish between assessing versus criteria development.

James McCarty: Yeah you should distinguish between those because I didn't and I would welcome to hear on what you have to say on that.

Joe Martin: So yeah that's what we are doing is towards criteria development right so this is towards you know for example you want to develop and IBI you put in and look at a number of different metrics ok so you need to figure which metrics can differentiate between reference streams and test streams and so in order to do that you need a gradient of land use and disturbance conditions in order to make those determinations. So that's what that is about so we want to see a disturbance gradient and see how that affects the biology. I mean that may determine where we set thresholds at you know when we see break points where your community starts suffering etc. depending on whatever the parameter we are looking at may be and so that is what that is about that we are not changing the way we assess data these are just used for standards revision and development.

1:09:49

Erin Scott: So you had shown on the summary table with sort of your projections for how many additional sites you may add or how many total sites you may do in each ecoregion are those single observations at each site or are you going to do multiple observations at each site?

Joe Martin: Each site will have two, should have well let me take that back. They will have at least one year of monthly water data; they will have if it's periphyton will have one or two, two periphyton collections if its sestonic chlorophyll they will have monthly throughout the growing season which I believe is May through September, they will have one fish collection, two diel deployments, and a macroinvertebrate collection. So that each site will have that level of information, does that answer all your questions Erin?

Erin Scott: Yes, thank you.

1:10:45

Ellen Carpenter: I'm gonna follow onto Erin's question. You're going to be collecting data from one site is that how it was done for the ERWs in the Boston Mountains and Ozarks?

Joe Martin: I believe so.

Ellen Carpenter: Just one site and the data were collected and why?

Mary Barnett: The water chem, the grabs are taken in at a crossing and then the biology assessment reach is at least 100 yards upstream of the bridge so we can make sure we are not getting bridge effects in our biological and our habitat data.

Ellen Carpenter: Other criteria that have been adopted in Arkansas I think you pointed out based on least disturbed reference streams. So are we following the same protocols developing for nutrient criteria that have been historically for other criteria.

Joe Martin: Historically that's the data they had you know if you look back to the 87 ecoregion studies that is all reference stream data but we want to collect over a disturbance gradient like I said and see how the biology changes over that gradient so will the data if we develop any criteria will it be based on the reference systems. I think the reference systems will be taken into consideration I think that will be one line of evidence towards that development but I will also look at that disturbance to see where we are seeing any type of community change in the macroinvertebrates and fish.

1:12:35

Ellen Carpenter: So you said we would not wait till 2030 to start adopting nutrient criteria do you think it could be sooner than that did you say that?

Joe Martin: Well I don't have a timeline on that nutrient criteria but we are gonna wait until the completion of the ecoregion studies to start working on that.

Ellen Carpenter: Do you have any idea when you will start working towards adopting?

Joe Martin: I mean if I am looking at the timeline we can start some exploratory analysis on the Ouachita River that's the complete data set we have now but what I would like to do is finish up the interior highlands and see if, what that data looks like how noisy is it and if those interior highlands can possibly be put together to get some kind of criteria number. It may be that the numbers come out very clean and it's not as noisy as I suspect it may be and we will have criteria different for each ecoregion but I think as we move through this as the data is collected as we get a complete data set we will start an analysis on that but to say a date for adopting this criteria obviously I cannot do that without having collected the data and seen what the data looks like.

Mary Barnett: I was gonna say when Joe says the interior highlands he means the Bostons, Ozarks, and Ouachitas, those three ecoregions.

1:14:04

Ellen Carpenter: Will there be separate criteria to protect ERWs? Separate nutrient criteria protect the ERWs as the original studies were designed to established criteria for ERWs?

Joe Martin: We'll have to, I can't answer those questions right now until we get into the data and see how it looks so I just don't know yet.

1:14:32

Michael Clayton: (North Little Rock Waste Water) There has been a conversation about nutrient removals, but do we have some proposals for nutrient limits? I realize the studies are (microphone cutting out) but do we have some proposals now for nutrient removal?

Joe Martin: Today?

Michael Clayton: As part of this water quality standard revision?

Joe Martin: No we are not, we are not proposing nutrient criteria in this revision. Ammonia technically is a species of nitrogen but that is a toxicity based number not an ecological nutrient type number. And so for the 2023 revision we are not proposing any specific nutrient criteria.

Michael Clayton: I am just confused as I was hearing some discussion on nutrient removal here and I am just gonna make sure that we are talking about ammonia, just wanted to clarify that, what nutrient removal are we talking about?

Joe Martin: We are just talking about moving forward into the future as we collect these large data sets throughout ecoregions will that data be used to ultimately develop nutrient criteria. We are not proposing anything today I was wanting to give a timeline on these studies and once again these studies will apply to a number of things IBIs, tiered aquatic life uses, a wide variety of criteria. You know this will be such a really great data set that we can use it to potentially apply to a number of parameters but so that was just a timeline on where those studies are.

1:16:13

Shawn Hodges: Are you going to include any historic data for use to analyze this set of parameters?

Joe Martin: We do anticipate we would pull in some historic data where we have it at some of our ambient sites the long term data I think it would be good for trend analysis so I do anticipate us really utilizing any data we can to increase that n and have a more robust data set. So while the point of these ecoregion studies is to get paired biology water chem so we have that interaction. We won't have that at the ambient site but I think those long term ambient data sets are very valuable.

Shawn Hodges: I was just thinking USGS just have a lot of periphyton, fish assemblage, community structure kind of surveys specifically in the interior highlands. Does that data have to come from the DEQ?

Joe Martin: I don't think necessarily it has to come from DEQ I think that any information we can get that would give us more or further information on this subject matter we would welcome. Assuming it's somewhat similar to our protocols and doesn't seem too you know out of bounds.

1:17:46

Erin Scott: On this line of comments you mentioned earlier that you had recently updated your habitat SOP so just think about all the partners you have in this room and out there are all your SOPs available on your website?

Joe Martin: That is a great question, thank you for bringing that up. They are not yet I mean if you reached out we can get those but we matter a fact I am reviewing it right now currently I have been spending the last two days reviewing it. We are putting all those SOPs into a procedure manual, wadeable streams procedure manual and it's gonna cover everything from water chem, habitat, sonde deployments, macros, fish, periphyton, the whole works and so as we and we are in the final stage of that I will give credit to Lindsey she has done a great job putting all those together and putting that book together. It is looking fantastic I am really pleased with it; I am really pleased with it so we just need to finish that and review it. Make sure everything is good, make sure we don't have any errors anywhere and we plan on trying to get it out on the web probably in the next few months. Once again we will take a little time we want to get it formatted properly but we want everyone to have a manual that they can go out and collect any type of biological data of course we would prefer to use the same methodology we use so its comparable data so when we send it in for assessment so there's no issues with it and so that is our goal so we are well into that process and I hope to be sending out announcements on the list serve sometime soon.

Erin Scott: Ok, thank you that sounds really robust and thank you for your efforts. I think that is going to go a long way.

Joe Martin: Thanks, any further questions?

1:19:31

Canton Ford: When James was discussing partners cooperating with us so that data is important for conservation planning purposes and that it is a headache chasing it down from multiple sources.

Joe Martin: I am assuming he is saying if it is in one place it would be much easier for them you know there is no doubt about that, ok, thanks. Oh Canton Ford had stated that when multiple entities collect data it is a real pain to try to track it down from multiple sources and that is one

location that would be easier for other folks and agencies to grab that data and use it. Alright any other questions?

Discussion 5: Status of mineral criteria

1:43:20

James McCarty: My question is more in the form of clarification to see if I am following what you are saying. You listed off several EPA methods and why they don't fit for the state of Arkansas for various reasons one of those being data reasons so essentially what we have here is a data set produced by the EPA or a model produced by the EPA?

Lindsey Boyle: A model, not a data set. A model based on many data sets across the United States.

James McCarty: Ok

Lindsey Boyle: Some of the data in there is from Arkansas but we are talking about thousands and thousands of data points from around to create a robust model that can predict a variety of conductivities.

James McCarty: Right, and the model can show you when 5% of the say endemic species whatever is in that stream would be removed from the system due to conductivity impairment.

Lindsey Boyle: Correct

James McCarty: And is that going become our threshold then in terms of criteria development and is that gonna be, is that applied state wide I mean.

Lindsey Boyle: Right, so we are still looking into this method I want to clarify that. But also these are going to help us inform criteria development but they don't necessarily those values those resulting values might not be final values. You can imagine it might be perfectly relevant for some ecoregions but not so relevant for others. Some of these assumptions are based off original land cover not current land use and so places like the delta you might need to tailor those to create more realistic mineral goals, specific to each ecoregion. But this will give us a baseline to actually develop relevant criteria.

1:45:17

Alan Nye: I have a question so the 5% extirpation rate is a statistically based value is that correct?

Lindsey Boyle: That is a value the EPA has always used in the past when they were doing toxicity studies so anytime they use any sort of toxic and they see at what point critters start perishing from that toxic, basically often times they use daphnia they use different study species and that's the p value they have always used in the past so that's what we tailored these models

to. There is a possibility for us to shift that up or down depending on our ecoregion and what is really relevant to our areas.

Alan Nye: So I'm just curious, will there be a confidence interval around that, that 5% extirpation rate or and I will just tell you my background is mainly human health and so EPA often uses the upper confidence limit on a benchmark to be additionally protective and I am just wondering if you will kind of use that approach for that 5% extirpation rate.

Lindsey Boyle: That is a great question and I believe there would be, it's a model and I am envisioning those graphs there would certainly be a confidence interval on them and that is a great idea to think about, looking within that interval to help us make determinations.

1:46:55

Ellen Carpenter: Do the daphnia and fathead minnows, do they correspond well to Arkansas for the purposes of…

Lindsey Boyle: No, that is a toxicity based approach which is one of the reasons we are not, we would have to do more, it would not just be those critters I was just speaking to what EPA had done in the past for its toxicity research. If we were to use a toxicity based approach we would have to perform massive laboratory studies for a wide variety of our native critters is my understanding, but we are busy collecting data in the field right now.

James McCarty: So if I am understanding you we are going to have, we are evaluating this general model but for more sensitive species in certain waterbodies we may take a more detailed approach in evaluating those specific organisms in terms of…

Lindsey Boyle: We're not doing, we won't have any species specific based approach likely but that might be tiered aquatic life use coming into the future as we start developing that.

James McCarty: Did we talk about tiered aquatic life?

Lindsey Boyle: During the ecoregion, once we complete our ecoregion studies that's a hopeful goal.

James McCarty: Could you explain a little more what that means because I am not familiar with that term.

1:48:44

Joe Martin: Tiered aquatic life uses would be, so currently we have one aquatic life use it's just aquatic life so tiered aquatic life use would be something where let's say you might divide it up into four or five categories a number of states have these and that's so you can appropriately tailor your aquatic life uses to the waterbody. So you might, there is a number of different ways you can do it but you can have it for example something that would be exceptional, high,

intermediate, low and it would depend on the type of waterbody and what it is based off of for example it could be something that's an intermittent waterbody that is you know dry half the year or something maybe it is an intermediate aquatic life use. The most protected waterbodies like it's an excellent aquatic life use so you are tailoring those into these different uses. Now just because it is in that certain tier doesn't mean they stay there forever. For example for whatever reason you go back out and sample a waterbody and it shows improvement, the waterbodies maybe should be in the tier above then you conduct a study and move them up a tier, things of that nature. So it really is a classification system by which you can more appropriately tailor aquatic life use to waterbodies. It's really, a number of states have done this and it is kind of a really high mark for your program. I know some people think well what are you doing you have one now why would you create these tiers to potentially lower them but that is not the case at all what you are doing is showing you can use those to show improvement overtime to move those up through the tiers.

1:50:24

Lindsey Boyle: Right, so when we have a stream running through the middle of downtown Little Rock or something it is completely covered in cement or it has some sort of degradation on it. Our current values as they stand would not; we would not be able to detect any incremental improvements in it. If it's in a lower tier then we can assess at a lower tier and then if there are any incremental improvements during restoration during these types of things we can actually detect that it can move up into better tiers. This also means some of our Extraordinary Resource Waters will already be in a high tier and so they could be maintained at a higher tier and not be assessed at a more general value level.

James McCarty: In a tiered approach where do you draw the line on impairment?

Lindsey Boyle: Tier by tier

James McCarty: So you have multiple lines of impairment then in terms of a tier?

Joe Martin: You have criteria for each tier and so whatever I mean I am not saying every parameter would have a different criteria through each tier but we're thinking you might need different DO criteria per tier things of that nature.

James McCarty: And how does that align with the Clean Water Act as far as establishing TMDLs and things of that nature?

Joe Martin: I mean it's not outlined in the Clean Water Act. I think that I don't want to put Russel on the spot but I suspect the EPA supports this. I think generally when you think of programs that have tiered aquatic life use those are some of the more refined more advanced programs. It is not something that you know a poor program so they have tiered aquatic life. It is something that the better programs, the more robust programs, have so that's why I want to work towards that.

1:52:15

James McCarty: Yeah my fear, it doesn't sound like this is the case but my fear is we are going to replace the impaired or non-impaired with some gradient and or tiers of quality that have no regulatory teeth behind it anymore in terms of establishing TMDLs and fixing that impairment.

Joe Martin: I do see what you are saying there I think that by putting the most appropriate tier on the waterbody then you could better detect if you are having an impact on that and show the improvement and as you show improvement overtime you could adjust those tiers to move it up through the tiers instead of just saying ok well this stream here is still impaired we don't know if it is showing improvement at all. We know it is not meeting this generalized threshold there and so I think it is a better way to track waterbodies and how they are performing overtime with restoration activities etc. And on the other end to, we had sites here but we are starting to see them creep down a little so what is going on here we need to go in there and do a little further investigation.

James McCarty: This is really strange too by the way like us standing here staring at each other across the room talking into the microphones but whatever. I see your point and I understand what you are trying to say but you are talking in terms of ok when the stream gets better we can move it up a tier but what is the pressure what is gonna cause that stream to get better in terms of fixing the impairment if there is not some regulatory teeth that's gonna say hey we gotta fix this.

Joe Martin: I guess could you clarify why you think there is no regulatory teeth associated with tiered aquatic life uses.

Lindsey Boyle: He is worried that

James McCarty: I just don't understand it that's it. I am just speaking out of ignorance here so I am not trying to be combative at all I just am seeking to understand.

1:54:18

Joe Martin: So for example each tier would have a different IBI score based. If we go out and collect fish, we put those in our metrics and the IBI spits out a score and so each tier would have a range of scores. And so if it, let's say you think, ok I am not saying we are going to base this off of flow regime, but say we have intermittent streams that we suspect due to its intermittency it is not going to have as a robust community that maybe a perennial stream or a large watershed might have and so we can go in each one will have a score and assess it against that IBI that tier's IBI score and if it doesn't fit then it is impaired. It's not like if it doesn't fit that tier we drop it to the tier below it. Whatever tier applies will be the criteria that will apply to that waterbody and if they don't meet that it will be impaired and then we will do some, as far as see things progress over time, we show an increase in, or better water chem, better biology I mean that can be a restoration activities maybe a TMDL maybe from a 319 program. It's something we

can be better able tailor and track incremental progress on these waterbodies due to whatever restoration activity are going on. Does that clarify it, a little bit?

James McCarty: Yes I believe so but I will just have to read up on it myself.

Joe Martin: Let me know if you have any questions when you are doing your research.

1:55:50

Ellen Carpenter: I have a question, I must have missed the picture but you talk about conductivity correlates well with TDS, and you will be able to use that for ecoregion specific development of criteria for TDS. So what about the other ones chlorides sulfates where did we go with that?

Lindsey Boyle: Conductivity takes into account everything and so a lot of minerals have synergistic effects and so instead of just looking at individual mineral, conductivity, gathers, gives us entire suite of minerals that might be influencing an organism. Now we are not talking, it does not tell us specifically what minerals are in that stream it just tells you how many, but across Arkansas the relative abundance of each mineral to another is very consistent, so which mineral is dominant over another vs the next mineral is consistent across pretty much the entire state. So we should be able to detect any mineral issues pretty well which will take into account all the minerals that might be influencing an organism. Does that answer your question?

1:57:32

Ellen Carpenter: Yeah I guess I just don't understand what's so… (microphone cuts out) … nuances…that conductivity (microphone cuts out) … range and the reason I raise it because I think chlorides sometimes have a different effect on aquatic life so even if it is not … how do you know if there is chlorine? I am not asking about chlorides it's just some of these parameters actually have an effect differently than just overall conductivity.

1:58:06

Joe Martin: I think when EPA was looking at using conductivity the big concerns were synergistic effects. One time you know they have gone through an evolution of what they thought would be appropriate for developing mineral criteria. They looked at a number of approaches but I think one of their biggest concerns with just using a chloride or sulfate that wasn't telling the whole picture. So how are all these ions working together to have a deleterious effect on macroinvertebrates for example and so that is why they thought conductivity was a better approach.

Lindsey Boyle: It is also a consistent value that can be used across the United States for their models vs things like chloride which varies dramatically across the United States.

James McCarty: You made mention that the ratio of TDS, chlorides, sulfates are pretty consistently across the state of Arkansas but I have a hard time believing that is true for

Lindsey Boyle: Not the ratio, which ones are most dominant within a system compared to another. Not the relative ratios between them.

James McCarty: Ok, is that for natural reference areas or does that include waters with permitted discharges?

Lindsey Boyle: That is mostly reference areas I believe. I have specific numbers on that, I would just have to find them.

1:59:25

James McCarty: So then what would be the mechanism you know say we are using conductivity now are any of the other minerals...what am I trying to say here? Certain minerals are going to have certain impacts on aquatic life and you know say we capture conductivity and it's below the standard but it's all chloride like a 100% of it because of a discharge, and this is a purely hypothetical, but how do we capture what? I guess I am going to defer to you and ask do you know of any specific aquatic life index from minerals, TDS, that wouldn't be captured under this approach, just kind of the overall approach? Am I making sense?

Lindsey Boyle: You are absolutely making sense and I am not sure I know the answer. I can find some information and give it to you specific to that. When I was doing this reading I was feeling pretty confident in conductivity and remember this just starting our criteria development. We start looking and find something very specific we're concerned about we still… (microphone cuts out) … to suggest how our minerals should be developed.

2:01:13

Erin Scott: I'm going to step back and go a little bit higher here for a second. So currently there are chloride and sulfate standards, those will continue to exist? Or is this taking those away?

Joe Martin: If this works out the way we think I suspect this would take the place of TDS, chlorides, sulfate and have one conductivity standard applied for all dissolved minerals, maybe not one statewide but one instead of using multiple ions.

Darcia Routh: Right, so then permitting would be impacted would there be no remote requirements for minerals?

Joe Martin: Well they would have conductivity.

2:02:05

Darcia Routh: Right, but there are secondary MCLs for all three of these so our concern will always be not externalizing industrial cost for clean water systems and you have to add minerals

to treat water to make it safe to drink so we don't want anybody, and there are some health impacts at a high level so, and I know this there is not one thing we agree on but I guess that's why we hold stakeholder meetings and you know as a groundwater person we use conductivity all the time it is great with a couple other ambient parameters whether you have contamination in the ground water or if you are going to need to keep a careful eye so I am not on that anti conductivity team but I am on the team for anti-externalizing costs for public waters.

Lindsey Boyle: I do want to point out that the conductivities in our state are incredibly low, they are so low and so no matter what minerals make up that conductivity values if there is any increase it will be easy to detect. It's not like we are working with numbers in the thousands and then there is going to be thousands more loaded into the system, if that makes sense.

2:03:43

Darcia Routh: The conductivities are low but there are areas of the state where we have removed the drinking water designation because of, the domestic supply designation, because of the mineral concentrations.

Joe Martin: Which I think that is a good comment about permitting and that is something we will have to look into and we are in the early stages but that is a great point we will take that comment into consideration and look further into that.

Erin Scott: So it might be interesting to look at, compare TDS to say chloride or sulfate and look at some regions that are impaired to you know mineral specific like sulfate which are not impaired for TDS and that kind of helps get at if using conductivity as an all in one same factor may neglect you know identifying problems associated with individual minerals.

Lindsey Boyle: That is a great idea, we can look into that.

Erin Scott: I also have a question about the model. So the state national model for which there is some data specific for Arkansas, but really we are taking a national model, applying it across Arkansas of course that has trouble so is there any mechanism to validate what this national model is saying to Arkansas and also to each ecoregion?

Lindsey Boyle: Absolutely yeah so we have been in contact with Susan Cormier in the hopes of validating the model with specific Arkansas data and I think once we finish with our ecoregion data collection we will be in a much better position for that validation.

2:06:07

Joe Martin: Ok that is all we are presenting on today are there any final questions before we go? I will open it up one last time I suspect there might be one or two before we get out of here so I will open it up for questions.

Joe Martin: I guess we did such a good job explaining this that no one has any questions, so glad.

Russell Nelson: Joe can you hear me? (trying to contact over zoom)

Darcia Routh: Is there a schedule or?

Joe Martin: I do not believe we will have another meeting this is all we have planned for this revision at this time so we don't have any further meetings planned.

James McCarty: Will the stakeholders get an opportunity to review collectively all of the changes that have been made in one document, Mary I think last time you kind of walked through the process of the triennial or someone else I don't know. What is the next step after this?

Joe Martin: Sure, so the next step is you know we take these proposals we take any comments into consideration and then we put together a draft document or the draft rule. I suspect you know just realistically it is about to be June we've got thirty biological sites to collect this summer and so we have a lot of work to do so I suspect that we probably won't get that. The next steps are ultimately we will put out a draft public comment period that will go to the Commission before that and get approval to move forward for the rule making and once we have approval for the rule making then we will put out a draft for for public comment where we will formally respond to those comments so I suspect that will probably be realistically speaking maybe the first of the year somewhere in the winter time. Mary I don't want to put you on too tight a timeline there.

Mary Barnett: I was just going to say that we have to go to the governor's office before the Commission so we got to make the draft and supporting documentation that goes along with that with analysis included and then go to the governor's office then the commission.

James McCarty: Could we have an opportunity to as stakeholders to see the draft before it goes out for public comment?

Joe Martin: We don't have that planned at this time that's not necessarily in the steps of our process I think the only, the issue with that is it is going to prolong the process because I don't know what you are envisioning maybe a thirty day comment period or some time to review and then of course with that it's not a formal comment period so we don't necessarily have to answer, formally respond to those comments and so our preference would be to just get the process moving cause we really want to stay on a three year revision cycle moving forward so in order to get this done in '23 we need you know, we are pretty slammed this summer in the fall we will be putting together all the supporting documentation Mary talked about getting that to the Governor's office getting it in front of the ecology commission in order to get a draft out in say early '23 of course it takes time to respond to those comments and some of these steps can be very time consuming so in order to stay on our revision cycle that is our plan moving forward. I mean if you have any questions for anything we proposed between now and then and you want

to reach out we would be happy to hear those comments to what you have to say and if you have any questions with that.

James McCarty: Yeah it is not so much what has been proposed or what we have talked about in these meetings but it's what you guys have done with the information that we have kind of done here and the work we have provided and kind of understanding of is anything that we've said going to make it into the draft? I think that's more what it's about you know trying to understand what the stakeholder process has been, what was the value of the work we provided for this and if that has made an impact at all. I mean we can always make it through the public comment draft.

Joe Martin: I mean we value everyone's input, we appreciate you spending the time here with us and you know giving us feedback. We will certainly take all these comments into consideration as we move forward proposing the 2023 revision; absolutely we really appreciate y'all's time.

Joe Martin: Alright anything else before we wrap this up?

Russell Nelson: Joe can you hear me? (on Zoom, he was not heard)

Joe Martin: Ok, thank you all for coming we appreciate

Unknown man: So will you make these slides available like you did last time?

Joe Martin: Yes sir