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ILLINOIS POLLUTION CONTROL BOARD

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| IN THE MATTER OF: | ) | |
| WATER QUALITY STANDARDS AND | ) | R08-09 |
| EFFLUENT LIMITATIONS FOR THE | ) | (Rulemaking- |
| CHICAGO AREA WATERWAY SYSTEM | ) | Water |
| AND THE LOWER DES PLAINES | ) | |
| RIVER: PROPOSED AMENDMENTS | ) | |
| TO 35 Ill. Adm. Code Parts 301, | ) | |
| 302, 303 and 304 | ) | |



REPORT OF THE PROCEEDINGS held in the above entitled cause before Hearing Officer Marie Tipsord, called by the Illinois Pollution Control Board, taken by Steven Brickey, CSR, for the State of Illinois, 100 West Randolph Street, Chicago, Illinois, on the 15th day of August, 2011, commencing at the hour of 1:00 a.m.

A P P E A R A N C E S

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MR. TANNER GIRARD, Acting Chairman
MS. ALISA LIU
MR. THOMAS JOHNSON
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MS. KIMBERLY RICE
MS. JESSICA DEXTER

REPORTED BY:

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# I N D E X

THE WITNESS: KIMBERLY RICE

No questions asked of Kimberly Rice.

THE WITNESS: ROY SMOGOR



# E X H I B I T S

MS. TIPSORD: Good afternoon. My name is Marie Tipsord and I've been appointed by the Board to serve as Hearing Officer in this proceeding entitled Water Quality Standards and Effluent Limitations for the Chicago Area Waterway System and Lower Des Plaines River. Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303 and 304. The Docket Number is R08-9 and this is Subdocket C.

With me today to my immediate right is acting Chairman G. Tanner Girard. To his right, Board Member Carrie Zalewski. To her right, Board Member Andrea Moore and to Member Moore's right, Board Member Gary Blankenship. To my far left is Board Member Thomas Johnson and to my immediate left is Alisa Liu from our technical unit. Also here today is Ethan Pressly who is an extern with the Board from Vermont Law School and is here with us at the back of the room.

Today's hearing is the ninth day of hearings in Subdocket C, but it is the 52nd overall in this proceeding. Today, we'll hear the testimony of Kimberly Rice with Friends of the Chicago River and if Mr. Botts gets here in time

we'll go with Paul Botts with Wetlands Initiative. We have no pre-filed questions for these witnesses so we will take their testimony and allow for any questions that might have come up.

Then, I will go onto Roy Smogor with the IEPA and questions from Mr. Smogor by the Metropolitan Water Reclamation District. We will conclude the set of hearings with the testimony of Dave Thomas on behalf of the Environmental Groups and questions filed by the District. The testimony will be marked as an exhibit and entered as if read. Anyone may ask questions. I do ask that you raise your hand, wait for me to acknowledge you. After I have acknowledged you, please state your name and whom you represent before you begin your questions. Please speak one at a time. If you're speaking over each other, the court reporter will not be able to get your questions on the record. Please note that any questions asked by a Board Member or staff are intended to help build a complete record for the Board's decision and not to express any preconceived notion or bias. Dr. Girard?

MR. GIRARD: Good afternoon.

Welcome to another hearing in this rulemaking No. 52. The Board is extremely grateful for the time and effort that everyone has put into this proceeding. It will help us build a good record for making a decision in this rulemaking proposal. So thank you very much and let's get to work.

MS. TIPSORD: And we'll start with Kimberly Rice on behalf of the -- I'm sorry. I just lost it.

MS. DEXTER: Friends of the Chicago River.

MS. TIPSORD: I am so sorry.

MS. DEXTER: That's okay.

MS. TIPSORD: Can we have the witness sworn in, please?

WHEREUPON:

KIMBERLY RICE

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

MS. TIPSORD: If there's no objection, we will mark the pre-filed testimony of Kimberly Rice as Exhibit 465. Seeing none, it's Exhibit 465.

(Document marked as IEPA Exhibit No. 465 for identification.)

MS. TIPSORD: Are there any questions for Ms. Rice? Thank you very much.

THE WITNESS: Thank you.

MS. TIPSORD: Has Mr. Botts joined us? I don't believe so. Let's go ahead and start then with the IEPA and Roy Smogor and the Metropolitan Water Reclamation District's pre-filed questions. Could we have Mr. Smogor sworn in then?

WHEREUPON:

ROY SMOGER

called as a witness herein, having been first duly sworn, deposeth and saith as follows:

MS. TIPSORD: And then, Ms. Williams, you indicated you wanted to do his testimony and then a couple of the exhibits with a couple of his attachments as separate exhibit numbers?

MS. WILLIAMS: Yes. Do you want me to enter the testimony?

MS. TIPSORD: Yes, let's do his testimony first. The pre-filed testimony of Roy

Smogor filed 6/28/2011 will be admitted as Exhibit 466 if there's no objection. Seeing none, it's Exhibit 466.

(Document marked as IEPA Exhibit No. 466 for identification.)

MS. WILLIAMS: Mr. Smogor, I'm showing you a document entitled CAWS Habitat Index Potential Score After Habitat Improvement. Can you identify that document?

THE WITNESS: Yes, this was Attachment A to my pre-filed testimony.

MS. WILLIAMS: I'd like to move to have that entered.

MS. TIPSORD: I need a copy of his testimony. I just need one for me to mark. And then you were getting ready to have this moved.

MS. WILLIAMS: Yes, I'd like to move to have Attachment A entered as --

MS. TIPSORD: 467.

MS. WILLIAMS: -- Exhibit 467.

MS. TIPSORD: Is there any objection? Seeing none, it's Exhibit 467.

(Document marked as IEPA Exhibit No. 467 for identification.)

MS. WILLIAMS: Mr. Smogor, I'll show you a second document entitled CAWS Habitat Index Current Conditions. Can you identify that for us?

THE WITNESS: Yes, this was Attachment B to my pre-filed testimony.

MS. WILLIAMS: At this time, I'd like to move to have this exhibit entered as 468.

MS. TIPSORD: If there's no objection, we will admit Exhibit -- Attachment B as Exhibit 468. Seeing none, it's Exhibit 468.

(Document marked as IEPA Exhibit No. 468 for identification.)

MS. WILLIAMS: That's all I have.

MS. TIPSORD: With that, I think we're ready to begin with you, Mr. Andes.

D I R E C T E X A M I N A T I O N

BY MR. ANDES:

Q. Good afternoon. We'll start at the very beginning. On page three of your testimony, Mr. Smogor, you state that the habitat reports contained no analysis to show how each variable in the habitat index and the fish metric related to a

relative degree of naturalness. Do all biotic and habitat indices have to show how each variable in the index is related to a gradient of human impact?

A. No.

Q. In the development of the QHEI, was it shown that each variable in the index was related to a gradient of human impact?

MS. WILLIAMS: Is this 1C?

MR. ANDES: Yes.

BY THE WITNESS:

A. Yes, I would say indirectly it was because the QHEI -- the Ohio Qualitative Habitat Evaluation Index, the QHEI, that was developed by relating some of its components to the Ohio fish IBI and the Ohio fish IBI was in itself a measure of human impact. So, indirectly, the QHEI was related to a gradient of human impact.

BY MR. ANDES:

Q. So was each variable in the QHEI related to a gradient of human impact?

A. In developing the QHEI, it's my understanding that, yes, the individual variables of the QHEI were related to the fish IBI.

Q. Each individual variable was related back to the fish IBI?

A. Yes.

Q. Was the fish IBI -- was each variable in the fish IBI related to the gradient of human impact?

A. I believe it was although I have to say the documentation doesn't show that explicitly, but I believe it was. I believe it was developed with -- by choosing metrics that would work. In other words, they'd be useful signals of a human impact.

Q. You don't have any documentation to show that?

A. I've looked back into the Ohio documentation and for some of the metrics, some of the individual measures they do mention their basis for choosing those, but I'd have to say there's no formal, like, statistical analysis of that being done back in that original documentation. I might add, though, over the last 20 years or so since that Ohio IBI has been developed, I have come across numerous published documents in the literature that have used the

Ohio IBI and its component metrics and show how those metrics reflect various aspects of human impact.

So, basically, I'm saying I think it has stood the test of time in being a legitimate measure of human impact.

Q. And the CAWS index could certainly stand the test of time as well, correct?

A. In the future, if we're speculating, that's a possibility. I would say it hasn't stood the test of time yet, though.

Q. But the critique you had was the habitat reports had no analysis to show how each variable in the habitat incident and the fish metric related to a relative degree of naturalness, what you're saying is you don't have that same analysis for each variable in the Ohio fish index metric and habitat index, correct?

A. I think I said it's my understanding that there is a measure and analysis in the development of the Ohio habitat index that relates each of the measures to the Ohio IBI.

So I would say that the Ohio habitat index does meet that criterion. The Ohio

fish index there is not an explicit statistical relationship developed for each metric in the Ohio fish index.

Q. Thank you.

A. Mm-hmm.

Q. Given that the CAWS is entirely manmade or altered effluent dominated and flow controlled by the District, what degree of naturalness would you expect?

A. If I'm interpreting this question directly, I agree. The CAWS is a highly impacted stream system. It's not natural and I'd say based on the available information we believe that its biological potential falls short of the Clean Water Act aquatic life goal. I don't know what else you're asking here. Maybe I didn't understand the question.

Q. I think this goes towards question 1G. If the waterways are all not natural, manmade or altered effluent dominated flow control by the District, wasn't this, in fact, the reason Limnotech felt it was necessary to create a CAWS specific habitat index since the QHEI based on natural systems would not show enough of a

gradient between various reaches?

A. I guess I take issue with the premise of the QHEI not showing enough of a gradient because the information that we had -- that had on the record for Rankin 2004 report, which I believe was Attachment R to our original statement of reasons, that showed a range of QHEI scores from about 22 to 54 and we believe that that was sufficient range to use the QHEI scores. That doesn't seem to me like a very narrow range of QHEI scores.

Q. Aren't there key elements of the CAWS features such as lack of sinuosity, ripples, et cetera that have been highlighted in the Limnotech report that showed no gradients across the system, correct?

A. I agree there are individual measures in the QHEI that show relatively little variability across the CAWS, but, to me, that's a signal that these particular measures are all scoring kind of uniformly low on the index and I don't think that necessarily makes the index not useable because the purpose of the index, at least the way we were using it, is a measure of human

impact and so an index can read uniformly low at a lot of sites, but it's still serving its purpose. It's telling you that this is uniformly impacted.

That being said, I would still have to come back to there were some metrics within the QHEI that did score uniformly low and there wasn't much variability, but the final QHEI score differed from 22 to 54 at the CAWS sites where we had it measured and, to me, on an index that scores from 0 to 60 that's sufficient variability to say that that index is telling you something about the system.

Q. And we'll talk a little bit further later about the QHEI. Let me move onto question two. On page four, you state that the habitat reports did not analyze relations between water quality and physical habitat throughout the CAWS. Do you mean the study should have examined the cause-effect relationship between habitat variables and water quality variables?

A. No, not necessarily cause-effect. I was referring to statistical relation and variables can be related to each other without being related in a cause-effect way.

Q. But then if you find them statistically related, but there's no cause-effect you can't use them to really form the basis for a regulation, can you, if ones not causing the other?

A. I guess I'm not sure what you're asking. In the context that I was talking about, examining how habitat relates to water chemistry and water quality I think was the term I used, I think it's important in a statistical sense that if you saw physical habitat being related to a measure of fish throughout the CAWS, if you didn't consider how at the same time that pattern of physical habitat being related to fish could possibly be explained by factors that weren't due to physical habitat, but just happened to be something like water chemistry that varied or was statistically correlated or covaried with the physical habitat, you can't necessarily tease apart then the effect of water chemistry from the potential effect of physical habitat and that's what I was referring to.

Q. If the water quality factors just happened to covary with the habitat factor, then

by looking at the habitat factor you're understanding what is going on. If the water quality factors is not a causal factor and you said you are not identifying cause-effect relationships, why would you need to worry about it if changing the water quality is not going to cause any change in habitat then -- and if, in fact, it simply covaries with habitat as an explainer of fish quality, why not just go with the habitat?

A. I guess I'm not following your question why not just go with the habitat. I'm not sure what you're asking me.

Q. We're trying to understand your critique and this goes towards the last question as well. Your critique of the habitat reports was that they didn't analyze this relationship between water quality and physical habitat. We're trying to understand why it would even be important to examine that relationship if there's no -- are you looking at whether it's cause-effect because if it's simply a covariance, that wouldn't be that important to examine. Why is it a problem that they didn't analyze this relationship in the

habitat reports?

A. I think it is important because a major conclusion -- at least my interpretation that a major conclusion of that report was we found a relationship between physical habitat and fish and if -- that relationship was so strong that we believe physical habitat is the limiting stressor in the system. More so than water quality. But what I'm saying is you have to look at that interpretation as being potentially confounded by the differences how water quality covaries with physical habitat. Here's a simple example. I think I may have used this.

I think the Limnotech study found that maximum channel depth was strongly -- relatively strongly related to fish throughout the CAWS. My question is, what if it just so happens that where the CAWS has the most or the deepest maximum channel depth that there was poorer water quality at those locations? That poorer water quality covarying could be just as reasonable an explanation for the lower fish score as the depth was.

Q. But if they looked at water quality

and looked at a variety of parameters of the water quality and found that that -- looking at that and how changes in water quality correlated with changes in fish quality did not explain very much then, in fact, it's not likely that the water quality would have been covarying accidentally with habitat and explaining anything, right?

A. Are you saying that that's what you believe Limnotech looked at in the report?

Q. Don't you believe they looked at a variety of water quality parameters and how they correlated with fish quality?

A. I believe they looked at some and I believe it was -- I believe they insufficiently looked at the possibility that quality could be confounding the interpretations of what they attributed to habitat effects on fish. That's what I believe because if you didn't look at how quality varied with those physical habitat measures, you have that potential for that confoundment and I believe that that possibility that water quality could be explaining some of the pattern that they attributed to physical habitat, I believe that that wasn't looked at sufficiently

in those reports.

Q. Do you have any reason for believing that some particular water quality variable would covary accidentally with a habitat variable?

A. I'm not going to speculate about that. It's possible. I haven't looked at that. My main point is when you're doing this kind of regression analysis and you're making interpretations from pretty simple relationships, a simple correlation of multiple linear regression, I would say it's worthwhile. It's beneficial to consider, okay, I'm seeing this pattern on paper between physical habitat and a fish measure, but I have to consider what else could be a potential explanation for that pattern. What factors other than physical habitat that weren't addressed as much as physical habitat could possibly be causing or could possibly be contributing to this pattern that I'm seeing on paper and that's my concern.

Q. Would you have to do that type of analysis for every combination of habitat and water quality variable?

A. I think it would help. I think a

good starting point -- I think one of the questions you have and maybe you're getting to it if I recall is how would I take a look at it. I think I would start by looking at the simple correlation between each water quality parameter that I had available and each of the habitat measures that I thought was important and I would see if there were these correlations I would take a look. Did the deeper areas also happen to have certain water quality parameters that were different and deeper than in shallower areas. That's a potential explanation for the pattern that I'm seeing in the fish.

Q. Are you familiar with the Classification And Regression Tree, or CART, analysis that Limnotech performed?

A. Yes, I am.

Q. Do you agree that a CART analysis is a valid method for evaluating environmental data to identify limiting factors to biota?

A. I'm going to be picky here and say, no, not limiting factors because to me a limiting factor has a pretty specific definition and the limiting factor is the one factor that if you

change it your response variable changes correspondingly.

So if I've identified the one factor that's keeping my corn from growing and it's not getting enough nitrogen, that's the limiting factor. I can vary all the other factors in my field, but my corn is going to pretty much be -- the growth of my corn is going to be dependant on the amount of nitrogen and if I raise nitrogen, the corn is going to grow more. If I lower nitrogen, the corn is going to grow less. Regardless of all the other factors, that is my limiting factor.

So I don't believe a regression correlational analysis without some kind of experimental manipulation or controlled experiment, or a controlled manipulation as they're sometimes called in the field, I don't think without doing something to that extent you're going to be able to identify a limiting factor.

MS. FRANZETTI: I'm sorry, Fred. Can I ask a follow up? Mr. Smogor, just to make sure I understand your testimony. Am I correct

that you don't think that the CART analysis is capable of identifying true limiting factors?

THE WITNESS: Correct.

MS. TIPSORD: Excuse me, Ms. Franzetti. You need to identify yourself.

MS. FRANZETTI: Sorry. Susan Franzetti. Counsel for Midwest Generation. Thank you.

BY MR. ANDES:

Q. In the real world, Mr. Smogor, there are a variety of factors that affect any particular fish condition, correct? It would be pretty rare that you have one factor that was relevant and no other factors mattered at all?

A. Yeah, I believe that.

Q. Are you saying that for a situation where some factors are much more important than others, isn't CART a valid technique for assessing the degree to which particular factors are limiting?

A. No. Because it's correlational. I still think you need some type of experimental manipulation to show that one factor is truly limiting another. I do agree -- I should finish

that. I agree the CART analysis is useful for identifying factors that are potentially more important than other factors and I'll put that qualifier in there. I do believe it's a useful analysis for exploring that issue.

Q. Thank you. And in the Limnotech analysis, am I correct that when this method was applied to 40 habitat variables and six metrics of dissolved oxygen and temperature, that the analysis showed that habitat variables were more limiting to fish in the CAWS than dissolved oxygen and temperature?

MS. WILLIAMS: Are you on 2L, Fred?

MR. ANDES: Yes. I modified it a little bit.

BY THE WITNESS:

A. Yes, you've thrown me off.

BY MR. ANDES:

Q. Sorry.

A. 2L. Yeah, I wasn't sure about this question because it's my understanding that I think the way the question was formed said dissolved oxygen temperature were originally put into the model. I thought from the record it was

only dissolved oxygen to begin with and dissolved oxygen is the only variable covered in Mr. Bell's attachment memo to his pre-filed testimony and then when I think he testified it's my understanding that he mentioned that in between the pre-filed question and our questions he then ran the model with temperature and some other water quality parameters and those parameters were ammonia and chloride and, I think, PH, but I don't recall him also mentioning specific conductivity was part of that.

So there's some details here that I don't necessarily agree with the premise of, but if you want to ask that again without attention to the details, that would be helpful.

Q. I think I can ask the question generally. It is correct that the CART analysis found after reviewing 40 habitat variables at numerous metrics of water quality, including dissolved oxygen and others, that, in fact, habitat variables are more limiting than the water quality variables?

A. I think I'm not going to agree -- I can't agree that he found some variables were more

limiting than others. What I do agree is that the CART analysis found that the habitat variables maximum depth and percent overhanging cover were the two variables that split the data more than any of the other variables that were involved. So they were more correlated -- based on the CART, they were more correlated to the fish than the other variables.

Q. Okay. Let's go back for a moment to 2F. In developing a habitat index, is it always necessary to determine whether each habitat variable covaries with each water quality parameter?

A. No.

Q. Was that done with the QHEI?

A. No, not that I'm aware of.

Q. Do you know of any other habitat indices where this was done where each -- they checked whether each habitat variable covaried with each water quality parameter?

A. No, I don't know of any.

Q. Let me skip down to 2P. Did IEPA do this kind of analysis in its UAA work?

MS. WILLIAMS: Where did you skip

down to?

MR. ANDES: I'm sorry. 2P and I'm just rephrasing.

BY MR. ANDES:

Q. Did IEPA do a similar analysis when it was performing the UAA or did a contractor do that analysis?

A. Did we analyze the relationship between water quality and physical habitat?

Q. Yes.

MS. WILLIAMS: This jumping around I think is getting -- because the context of 2P is not quite the same as when you went back up to 2F so I just want to make sure he understands what you're asking about. Go ahead.

BY THE WITNESS:

A. My answer is no. I would like to add about the QHEI even though it didn't do an analysis of individual physical measurements -- the QHEI measures physical habitat against water quality. One of the main objectives of the QHEI wasn't the same as the objective of the Limnotech analysis. The QHEI didn't set out to answer the question what is more important, physical habitat

or water chemistry to Ohio fish. That's a much different objective. The QHEI actually did control for potential confoundment of water chemistry effect because they used physical habitat sites. They used the physical habitat from sites that were free from point source influences. They realized that water quality can potentially cloud relationships that you're seeing between physical habitat and fish and they tried to control for that by using sites in the development of QHEI and in the correlation versus the IBI they used only sites that were free from point source influences.

BY MR. ANDES:

Q. So the Ohio system is based on looking at data from sites that are free from any pollutants from point sources?

A. That was their attempt to control for that influence of water chemistry.

Q. Okay. Let's move onto question number three. On pages four and five, you raise questions regarding direct cause-effect relationships between specific habitat variables and fish. Can you give an example of a habitat

index that was developed by identifying direct cause-effect relationships between specific habitat variables and fish, rather than using statistical analysis on a group of data?

A. Again, I'm going to be picky, but I don't believe I used those terms cause-effect relationships in my testimony, but I do know -- I don't know of any example that established cause-effect relationships like you're asking, but I'd have to say that wasn't the point I was trying to make in my testimony.

Q. Question number four. You stated on pages four and five the habitat evaluation interpreted that the statistical correlation between the combined fish metric and the CAWS habitat index was attributable entirely to differences in physical habitat, but that the evaluation did not account for how correlation between water quality or other non-habitat factors and the selected physical habitat measures could confound such interpretation. Did the developers of the QHEI account for how correlation between water quality or other non-habitat factors and selected physical habitat measures could confound

interpretation of the relationship of habitat and fish?

A. Yes, and that's what I just tried to say a couple minutes ago.

Q. So they did that by simply using data from reaches that were not affected by human activity?

A. Not affected by point source impact.

Q. And, in fact, that wouldn't be possible to do with the CAWS, correct?

A. Not that I'm aware of.

Q. Okay. Can you identify any other habitat index that accounted for this confounding factor?

A. Other than the Ohio QHEI, no, and I don't really recall the details of a lot of other habitat indexes, how they were developed. Again, like I said earlier, I think when you're doing these kinds of studies to say how does physical habitat relate to fish I think it's kind of recommended or common practice to be aware that if you're trying to isolate the relationship between physical habitat and fish you want to do what you can to control for how water quality impacts may

confound that relationship. So you do what you can with the data that you have available.

MS. WILLIAMS: Mr. Smogor, can you explain a little bit for the Board -- I think you testified about what Ohio did in comparing a QHEI to its IBI. Can you just explain why they didn't need to look at these confounding factors in the same way you're suggesting Limnotech should have? Do you understand the question?

THE WITNESS: Yeah. I think their objective differed. I think -- my impression is that one of the main objectives in the Limnotech study was not to develop a habitat index that measures biological potential in a Clean Water Act context, but it was much more focused on finding how fish -- certain measures of fish relate to habitat relative to how they may relate to water chemistry and, to me, that doesn't really have the focus of addressing biological potential in the Clean Water Act context that we're interested in in this rulemaking. Does that help?

MS. WILLIAMS: Yes.

MS. FRANZETTI: If I could ask a follow up to the same thing. Mr. Smogor, would

you say that you could use the QHEI to make a determination as to which segments achieve the Clean Water Act fishable goals, correct? I'm going to take this in part.

THE WITNESS: Not the QHEI for achieving the goal. I wouldn't say that because I think that's where you'd like to depend on the actual biological measures since it is a biological goal.

MS. FRANZETTI: So the QHEI scores are not telling you enough about the biological potential of the CAWS segments, is that your testimony?

THE WITNESS: Now that you mention potential, yes, I agree. There's biological condition existing or current biological condition and then there's biological potential. I think the QHEI is a good measure of biological potential.

MS. FRANZETTI: That's what I meant to ask you. I forgot that we have to use potential. So can you use the QHEI to determine the biological potential of a segment so kind of a thumbs up, thumbs down on whether it has the

potential to attain the Clean Water Act fishable goals?

THE WITNESS: Yes, I think it can be used as part of that process to do that.

MS. FRANZETTI: Can then the District's habitat index for the CAWS be used to further distinguish between the appropriate aquatic use designations for those various CAWS segments?

THE WITNESS: I don't believe it's been well enough focused and well enough supported to use it for that because as I've tried to say in my testimony I don't believe that the CAWS habitat index has been shown to be a valid measure of biological condition which also is the same as human impact, relative human impact in a Clean Water Act context.

BY MR. ANDES:

Q. Mr. Smogor, the Agency has determined, has it not, that none of the waters in -- I'm talking about in the CAWS. I'm not talking about Dresden Island or the lower portion, but in terms of the CAWS, the portion that's covered by the District's habitat studies, the

Agency has already determined that none of those can meet the Clean Water Act goals, correct?

A. That was our -- yeah, that was our determination.

Q. So now let's look at the purposes cited in the habitat reports and I think you cited what had you thought the purposes were and you indicated that -- I won't try to recharacterize your statement. Let me read to you from the executive summary of -- this is Public Comment 284 page ES-1 study objectives addressed in this report are as follows.

The first one is determine physical habitat characteristics for all reaches of the CAWS using applicable physical habitat metrics and data collected from the CAWS. Second, use a multimetric habitat index to evaluate physical habitat conditions in the CAWS. Third, use physical habitat data and the above multimetric index to assess the relative importance of physical habitat to fish in the CAWS and the final one is determine to the extent possible with the data and analysis developed in this study a system of classifying or

characterizing reaches within the CAWS according to the physical habitat. So the point you made about the purpose being to determine the importance of habitat and fish in the CAWS is one of the four purposes of the CAWS, am I right?

A. Yes.

Q. And is it your understanding that the District was trying to determine whether any of these waters will meet the Clean Water Act goals?

A. No, I didn't see that in the studies.

Q. That hasn't really been contested in this proceeding that none of these waters can meet the Clean Water Act goals, correct?

A. Correct.

Q. So the fourth purpose here was to try to develop a system for characterizing the reaches according to their physical habitat, correct?

A. Correct.

Q. And is it your understanding that that information was then used by the District in developing its proposal for uses and criteria?

A. Yes, my understanding is the information in the habitat evaluation and improvement reports were considered and used.

Q. Okay. Let's go back to the questions and I guess I'm sort of at 4E. You talked about non-habitat factors, other non-habitat factors besides water quality. What would be other non-habitat factors besides water quality that could be affecting fish?

A. Again, as I said earlier, I wasn't trying -- I'm kind of hesitant to speculate. My main point was that possibility wasn't sufficiently addressed.

Q. Like what? If it's not habitat factors and it's not water quality, what else is there?

A. I think to other factors like flow regime or biological interactions.

Q. Flow regime, in fact, is one of the issues addressed in the Limnotech report, correct?

A. I think it was addressed somewhat. I wouldn't agree it was comprehensively addressed. I know there were some flow variables that were looked at.

MR. ETTINGER: Excuse me. When you say you looked at water quality factors, we're just talking about DO and sometimes temperature, that's what you mean by water quality factors? So when you're asking him what other possibilities, do you mean to exclude other possible water quality factors or not?

MR. ANDES: I was citing his statement which talked about correlation between water quality or other non-habitat factors. So I'm asking the other non-habitat factors term seems to relate to non-water quality, non-habitat factors and I'm trying to find out what those might be. Flow, I believe -- am I correct the Limnotech report identified the flow basically doesn't vary very much, it doesn't have a strong gradient across the system? In general, they did discuss that issue, though?

MS. FRANZETTI: I'm sorry. Can I jump in?

MS. TIPSORD: Before we do that, Albert, you didn't identify yourself for the record.

MR. ETTINGER: Albert Ettinger. I

represent various environmental organizations.

MS. TIPSORD: Ms. Franzetti?

MS. FRANZETTI: Susan Franzetti. Can you just clarify how you're using water quality because I was not understanding it the same way that Mr. Ettinger was to be limited to only DO and testimony?

MR. ANDES: I'm quoting from Mr. Smogor's testimony where he said -- I quote "The evaluation did not account for how correlation between water quality or other non-habitat factors and the selected physical habitat measures could confound such an interpretation, period, end quote. I'm assuming -- I don't know what water quality means there, but I'm assuming other non-habitat factors means non-water quality because other generally means not that which preceded it.

MS. FRANZETTI: Mr. Smogor, can you tell me what the meaning of water quality was as used in that part of your testimony?

THE WITNESS: Yes, I tried unsuccessfully it appears earlier in my testimony and I'm sorry to define that. I used the term

water quality as a general catchall for water conditions.

So the properties of the water that a lot of us -- typically are loosely called water chemistry. I'm using water quality in that general meaning.

MR. ANDES: That's what I thought.

THE WITNESS: So we're all on the same page.

MS. FRANZETTI: That's what I thought, too.

MR. ETTINGER: We'll go back on that.

MR. ANDES: I'll ask another question.

BY MR. ANDES:

Q. So to come back to the question on hand, I was trying to understand what other non-habitat factors might mean?

A. Again, I said this is just -- I'm hesitant to speculate. That wasn't my point to try to name other factors that might be influencing fish. My main point was that if you're going to say there's this relationship

between physical habitat and fish, it's helpful to say, well, what other factors other than the physical habitat that you looked at -- what other factors could possibly be confounding or contributing to that type of relationship that you're seeing.

And, again, this would just be speculation. Flow regime, aspects of flow, biological interactions, the way critters eat each other, compete for resources with each other. That impacts them one way or the other. I'm going actually to the literature James Carr who developed the IBI. This is commonly called Carr's five factors, the five factors that impact biological condition out in the stream. There's obviously water chemistry. What we call water quality. There's obviously what we've been talking about here physical habitat.

There's biological interactions is the third. Flow regime is the fourth and the fifth one is called sometimes energy flow. It's like where is the main energy from -- coming into the stream and how the organisms are using that energy. So I'm trying to point out flow regime,

biological interactions are a couple of those factors other than water chemistry and physical habitat that could affect.

There's also the issue of -- I'm talking about measurements that we take on the fish. What can affect our measurements on the fish and one thing that can obviously affect our measurements on the fish is how we tried to catch them. Sampling efficiency issues, sampling variability issues. Those aren't necessarily related to physical habitat or water chemistry, but that's another component of this measurement of the fish that we're talking.

Q. And we'll get to those issues later.

A. Okay.

Q. When I asked earlier if there were other indices that actually looked at these factors other than Ohio, you said no?

A. All these other potential factors?

Q. Yes.

A. I think it depends on what habitat index you're talking about. I think my recollection from the US geological survey, their habitat index did address measures of flow. It's

very atypical. I would agree that for a measure of physical habitat to include measures of chemistry or water chemistry that is very atypical.

Q. Here, it was concluded, was it not, in the Limnotech report that flow, in fact, because of the highly managed nature of the flow here and the fact that it doesn't vary a tremendous amount across the system except perhaps during wet weather events that, in fact, that wasn't a useful metric to use to assess variability between reaches?

A. I can't speak to Limnotech's interpretation on that. I know they mentioned in their report that with the flow measures that they included as part of their analysis they didn't see much of a relationship between the combined fish metric and those measures of flow except they did find an opposite or an unexpected relationship between their fish measure and a measure of flashiness, I think, which is a characteristic of flow.

Q. Okay.

MS. WILLIAMS: What do you mean by

unexpected?

THE WITNESS: I think they found their combined fish metric varied with flashiness. It increased as flashiness increased and it decreased as flashiness decreased. So it's opposite to expectations.

MS. WILLIAMS: Thank you.

BY MR. ANDES:

Q. So they felt as a result of the flashiness, a metric simply wasn't going to be useful?

A. They called it an artifact of the data and then I didn't see much further discussion on that. So I can't really say what's going on.

Q. And you've certainly seen other artifacts of data before?

A. Yeah. I don't really know what that means, but I'll give them the benefit of the doubt on that issue.

Q. You sometimes find unexpected correlations?

A. You find unexpected correlations and if you have the time and information and the inclination to look further, you look further.

Sometimes you essentially blow it off and move on so --

Q. And you've done that?

A. Sure, I've done that.

MS. WILLIAMS: No, you'd never do that.

MR. ETTINGER: Too late.

BY THE WITNESS:

A. I haven't done that in this report.

BY MR. ANDES:

Q. Let's move onto the next question.

A. Fair enough.

Q. On pages six and seven, you stated that fish samples collected in deeper reaches may have lower scores simply because deeper sampling is not as accurate. Have you reviewed the literature references given by Mr. Bell in his testimony that state the effective depth to be approximately four meters?

MS. WILLIAMS: I'm going to object at this point and ask you to explain where in the testimony this references that you're referring to here? We looked -- and just so the Hearing Officer is aware, we looked for references in the

testimony. We couldn't find it. We did call Mr. Andes and asked him to explain where in the testimony he wanted us to look and we didn't get a response to that.

MR. ETTINGER: On a second note, we couldn't find them either so if he could get them to both of us it might be helpful.

MR. ANDES: I provided those on Friday.

MS. WILLIAMS: What time on Friday?

MR. ANDES: I don't recall.

MS. WILLIAMS: You could tell us now where in the testimony --

MR. ANDES: We'd be glad to provide that.

MS. WILLIAMS: Then, you should be able to tell us where in the testimony you want us to look and we can look there.

MR. ANDES: We can come back to that one so we don't waste time looking for it right now. We did provide those earlier. The two references by Mr. Bell. I believe one was a study by Flotemersch, which I think has been used elsewhere in this docket.

MS. WILLIAMS: Can I ask Mr. Smogor to testify as to what he did find in the testimony on this, at this point?

THE WITNESS: I did find in hearing testimony of May 16th, 2011 on page 76 Mr. Bell testified, quote, I've read that it's effective to depths of three or four meters, end quote. And I believe he was referring to electrofishing when he said "it's."

BY MR. ANDES:

Q. The two studies, one was by Emory and another one was by Flotemersch we can certainly provide those. I do believe they are somewhere in the record and I did provide them to Agency counsel late last week. Both the references as well as copies of the documents.

MR. ETTINGER: We have the same issue. We couldn't find your references either.

MR. ANDES: We can provide that.

MR. ETTINGER: If you could send us the same thing you sent them.

MR. ANDES: We'll do that. I'll look at it tonight.

BY MR. ANDES:

Q. Let's move on and we'll come back to that question later. In 5B, would you say if more fish were caught in shallower waters of the CAWS, there should be a correlation between catch per unit effort and depth?

A. I'm not exactly sure what you're asking here because the way I read the question it kind of already answers itself. Yeah, if you go in shallower water and you catch fewer fish or more fish if you go in deeper water and catch fewer fish, then there's going to be a correlation there. In the shallower water, you catch more fish. In the deeper water, you catch fewer fish. So the question seemed to answer itself the way I read it. Maybe I misunderstood you.

Q. You were arguing that fish samples collected in deeper reaches may have lower scores simply because they're not catching as many fish. So that would say then if you try to correlate catch per unit effort and depth, that there would be a correlation and you'd find it harder to catch fish in lower depths, correct?

A. My testimony didn't say more or

fewer fish. I think it -- there's potential if you're fishing in deeper water relative to shallower water, that in the deeper water you're going to get a less accurate picture of the fish community that's living there. That's not necessarily equal to getting more and fewer fish because sometimes you can get a more accurate picture by catching fewer fish. It's not necessarily one and one.

Q. When would you get a more accurate picture by catching fewer fish?

A. It sometimes happens. One example from fishing out there is if I go to one area and there's a big school of fish and they're all gizzard shad and I'm netting like crazy gizzard shad I may catch a lot of fish in that run, but I may have been focusing on trying to net so many fish that I just didn't get all the types of fish that I could have gotten had I not been focusing on that many fish popping up on me.

Q. But your point here was about electrofishing and you were questioning the effective depth of electrofishing and the clear implication there is by using electrofishing we're

not going deep enough and, therefore, not catching enough fish at lower depths. So you would then think if that's true, if the electrofishing means we're not catching enough fish at lower depths, then there would be a correlation between catch per unit and depth you could find it harder to catch fish at lower depths, correct?

A. I guess what I'm trying to say there's -- and I wasn't clear in my testimony obviously. In deeper water, I was trying to say the fish probably have more escape routes and you may not get a better picture of what is actually living there. You may get a lot of fish, but certain species might be escaping from you. In general -- I mean, maybe this will solve it. In general, I agree if you're catching more fish in a reach chances are you're going to get a better picture of what is going on.

Q. And back to my question. As you see in the chart that we provided in the questions --

MS. WILLIAMS: I'm going to object to this part, too. I could not find this chart in the report. Where is this chart from?

MR. ANDES: We can --

MS. WILLIAMS: We couldn't even find catch per unit effort in that document, correct?

THE WITNESS: Not this particular graph.

MS. WILLIAMS: This information. We couldn't even recreate this chart.

MR. ANDES: We'll go back and check in terms of where this information is contained in the report.

BY MR. ANDES:

Q. Am I correct that this chart seems to indicate no correlation?

A. Again, with the caveat that I really don't know the data that went into this chart just taking it kind of hypothetically at face value what it tells me is there is no clear pattern there other than in the middle of the chart it looks like at individual sites there's a lot of variability in the fish that are caught if that's what it is telling me, but there's no easy pattern to discern from this chart.

MS. WILLIAMS: Mr. Smogor, did you prepare your own chart to help address this question?

THE WITNESS: Yes, I did.

MS. TIPSORD: Ms. Williams, before we get there, for the purpose of the record, we're referring to a chart that has pre-filed questions of the District at question 5B. Because there's some question about where this chart came from, I don't want to put it in as an exhibit, but I do want to be clear for the transcript, that that's where this came from when we're referring to the chart.

MS. WILLIAMS: Thank you.

Mr. Smogor, I've handed you a chart called count of fish individuals caught per sample versus maximum depth at CAWS sites 2001 to 2007. Can you identify that for us, where it came from?

THE WITNESS: Yes, I created this chart.

MS. WILLIAMS: What did you create it from?

THE WITNESS: I created it from the fish data that are available and the maximum depth data that are available from the CAWS Habitat Evaluation Report.

MS. WILLIAMS: At this point, I'd

like to move to enter this as an exhibit.

MS. TIPSORD: If there's no objection, we'll admit this as Exhibit 469. Seeing none, it's Exhibit 469.

(Document marked as IEPA Exhibit No. 469 for identification.)

MS. WILLIAMS: Can you explain what this chart shows, Mr. Smogor?

THE WITNESS: Yes. For each sampling site that I could find a maximum channel depth value available for and that I could find the fish samples available for in the Habitat Evaluation Report, I plotted the maximum channel depth at each sampling site versus a central tendency of the count of fish individuals that are captured per each fish sample which is a 400 meter sample.

At each CAWS site, there's more than one fish sample in the data because the fish represent data from 2001 through 2007. These are the data that I used. So some of those sites were collected for two years in 2001 through 2007, so you have two fish samples available per site and some of those sites had as many as seven fish

samples per site.

There was a fish sample collected every year, 2001 through 2007. What I did was I took the median which is the statistical measure of central tendency, the median count of fish individuals captured per sample at each site and plotted it versus channel depth and this is the pattern that I got from that with an emphasis on if we assume that electrofishing is less effective at about four meters depth, deeper than four meters, I looked at the sites that are four meters and greater in depth and ran a regression for just those sites and I did find there was a decreasing trend. As you get deeper than four meters to up to about 26 feet deep, which is what these points represent, you tend to catch fewer and fewer number of individuals in your samples.

MS. TIPSORD: And, again, just so that we're clear, you've gathered this information from the Habitat Evaluation Report which is Public Comment 284, correct?

THE WITNESS: Correct.

MS. TIPSORD: Which is also the Limnotech report that they put together, correct?

THE WITNESS: Correct.

BY MR. ANDES:

Q. So you looked at only --

THE WITNESS: Can I interrupt? I can give you the page numbers and the figure.

MS. TIPSORD: That's okay. For purpose of the record, I'm finding as I'm reading old transcripts that I don't remember as well going back two years as I thought I would. So I'm trying to keep the record as clear as possible.

THE WITNESS: Okay. Thank you.

MS. FRANZETTI: Could I just ask a basis question? Mr. Smogor, why did you use the median and not the actual number of fish caught at each location?

THE WITNESS: I wanted to focus on site by site because of the measure on the X axis, the maximum channel depth. There's only one measurement of maximum channel depth per site. So your focus is on what is going on site to site to site in terms of differences in depth. So I took what is the central tendency or what is the typical number of species you get at a site when you go there and sample it and that's what these

points represent. That would be my typical expectation for the number of fish individuals that I got that I gathered at each of these sites of differing depths.

MS. FRANZETTI: I think I need to ask you what the median is.

THE WITNESS: Sorry.

MS. FRANZETTI: I'm thinking it's as many above as below value.

THE WITNESS: The median is a measure of central tendency like an average is a measure of central tendency. I could have used the average here, but averages are prone to certain statistical artifacts, statistical problems that the median isn't prone to. So the median is like an average for all practical purposes. It's a little less prone to certain mathematical difficulties I'd say than an average is prone to.

MR. JOHNSON: What is it?

THE WITNESS: The median is the average that half of your observations are above and half of your observations are below. Is that --

MR. JOHNSON: Yes.

THE WITNESS: I'm sorry I wasn't following that.

BY MR. ANDES:

Q. You only looked here at sites where the maximum channel depth was more than four meters?

A. No. The other sites are plotted from about -- it includes sites that are six feet deep through sites that are about 26 feet deep.

MS. WILLIAMS: Just for the record your chart is in feet, correct? We're not in meters, right?

THE WITNESS: Right.

MS. WILLIAMS: Could you translate for purposes --

THE WITNESS: Yes. I'm sorry. Again, it's 13 feet was the cutoff. The testimony said electrofishing is -- the testimony said I believe electrofishing is effective to about three or four meters. So I used that four meter cutoff and four meters is a little more than thirteen feet. I'm sorry I didn't clarify that.

MR. ETTINGER: I just want to be a

little more clear on what we've got here. When you see electrofishing results in waters that are as deep as 24 feet, the fish weren't shocked at 24 feet? They could have been anywhere within the water column in that water that was 26 feet -- or 24 feet?

THE WITNESS: Are you asking -- yeah, if you're asking your electrical current is going 24 feet deep?

MR. ETTINGER: Right.

THE WITNESS: My understanding is it's probably not going that deep.

MR. ETTINGER: So for all we know all the fish that were caught -- it would be unlikely, but for all we know all the fish that were caught at the 26 foot deep channel were at one foot?

THE WITNESS: It's possible. It's possible.

MR. ETTINGER: Okay. I think I understand this.

BY MR. ANDES:

Q. Mr. Smogor, the R squared of 0.25 is actually not a very high correlation, am I right?

A. Relative term R squared runs from zero to one. That's the possible range of R squared. So a 0.25 is on the low side of that scale.

MS. WILLIAMS: Do you recall, Roy, what the R squared of the highest variable that the Limnotech report looked at, the highest R squared they found of an individual?

THE WITNESS: Individually?

MS. WILLIAMS: Of an individual variable, yes.

THE WITNESS: Off the top of my head, I think it was maximum depth. I can look real quickly here if you want. I don't recall off the top of my head, but I think I have it.

BY MR. ANDES:

Q. Do you recall while you're looking Mr. Bell testifying that it was inappropriate to compare individual habitat variables to the fish metrics?

A. I recall his testimony that he thought it was, yes.

Q. I'm just asking in general about whether this is a high correlation or low

correlation. Not comparing it to other correlations as to other metrics.

A. Like I said, 0.25 is low on the scale from zero to one. And to mention Ms. Williams' questions it looks like the highest R squared, adjusted R squared, was 0.24 for maximum depth when it was related to the CAWS combined fish metric.

Q. The correlation to the fish metric. Here, we're trying to maximum channel depth and the median count of fish caught?

A. Yes.

MS. TIPSORD: Mr. Smogor, could you explain the difference of why some of the circles are light versus darker? I mean, this is a black and white chart. So there's some lighter and some darker, is there some significance to that?

THE WITNESS: Yes, I should have explained it in the caption, which I didn't. The dark circles are all of the sampling sites that have a depth greater than 13 feet and those are the points through which the regression -- that's the point -- those are the points to which the regression applies.

BY MR. ANDES:

Q. So, in fact, you have some data points like there's one that -- is it about eight feet and had, in fact, a very low number of fish caught? About 50, correct?

A. Correct.

Q. Do you have an explanation for that?

A. No, I don't.

Q. I can see you're shaking your head.

A. No, I don't.

MR. ETTINGER: I have one more question as it relates to this. Is it your understanding as to where they were electroshocking -- were they trying to shock down the middle of the channel or the sides of the channel?

THE WITNESS: It's my understanding they shock more towards the edges.

BY MR. ANDES:

Q. Isn't that where the water is shallower?

A. Yes.

Q. Okay.

MS. WILLIAMS: So there's only two

colors of circles on this chart, a dark and a light?

THE WITNESS: Yes.

MS. FRANZETTI: I'm sorry. Mr. Smogor, not to beat the dark and light colored circles to death, but I don't understand why to the right of a dark circle that's at the 75 fish count there's a lighter circle.

THE WITNESS: Neither do I. I just saw that. You're right. That's a mess up on my part because that looks like it's a site deeper than 14 feet. That's what I attempted to do was make the dark circles the -- darken the sites that were greater than 13 and leave the sites that were shallower than 13 lighter, but evidentially I messed that up.

MS. FRANZETTI: Not to belabor you messing up.

THE WITNESS: That's okay.

MS. FRANZETTI: Do you mean that should be a dark circle?

THE WITNESS: I'm guessing it should be, but I don't know for sure.

MS. FRANZETTI: Okay.

BY MR. ANDES:

Q. Let's move onto -- we'll skip question six because I think we've touched on these issues. Question seven. On page seven, you state that extent of overhanging vegetation may not be related to the quality of the fish community. Do you doubt that overhanging vegetation is good for fish?

A. Again, I don't think my testimony said the way this question poses, quote, the extent of overhanging vegetation may not be related to the quality of the fish community, end quote. Aside from that, I do acknowledge in general that overhanging vegetation is good for fish and -- but it's likely less influential in larger rivers than it is in smaller streams.

Q. What water quality -- okay. So, in general, overhanging vegetation is a good thing for fish?

A. In general, especially smaller streams relative to larger streams.

Q. In fact, some of the reaches of the CAWS would amount to smaller streams, correct?

A. Some are smaller than others, yes.

There's a size range of streams in the CAWS.

Q. What water quality parameters are you concerned might be related to overhanging vegetation?

A. Again, like I mentioned earlier, I'm hesitant to speculate about a particular, but actually any -- the possibility of any water quality parameter being related to physical habitat measurement is what I was trying to stress. That would be important to look at that possibility.

Q. Let's move onto number eight. On page nine, you raise questions about the designation of Bubbly Creek in the MWRD proposal. Did the UAA report or IEPA contractor Ed Rankin assess physical habitat at all on the South Branch of the Chicago River or in Bubbly Creek?

A. No, not to my knowledge.

Q. Does the IEPA feel that no assessment -- the lack of assessment done there is superior to the assessment that was made by the District and Limnotech?

A. No, I don't think that's what I was trying to say.

Q. How did IEPA's designation for Bubbly Creek address -- and I quote from the UAA report "The South Fork is a stagnant waterbody that receives no flow unless the Racine Avenue Pump Station storm sewers or other CSO's are discharging, period, end quote?

A. Illinois EPA interpreted those conditions as not irreversible or I should say we interpreted them as reversible conditions. So our assessment of the potential for Bubbly Creek took into consideration a management -- management that would include flow augmentation and supplemental aeration to meet a potential condition.

MS. TIPSORD: For the record, the UAA report is Attachment B to the proposal.

MR. ANDES: Thank you.

BY MR. ANDES:

Q. Well, let's back up a second. The south -- Bubbly Creek is currently a stagnant waterbody that receives no flow except during these wet weather events. Are you foreseeing a significant change in the characteristics of Bubbly Creek and, if so, how would that be accomplished?

A. I think with our proposal we proposed a particular biological condition, a use for Bubbly Creek that assumed there could be supplemental aeration and flow augmentation that would change it from these current conditions. That would be an improvement for fish over current conditions.

Q. So can you show me where in the IEPA documents that is an assumption of the designation for Bubbly Creek that flow augmentation and aeration will fundamentally change the nature of the waterbody and the fish community that can survive there because you didn't do any habitat assessment there, correct?

A. Rankin didn't measure QHEI in those waters. Ed Rankin's report did not address those waters.

Q. So if you didn't assess habitat -- either the UAA reporter, Ed Rankin, didn't assess habitat at Bubbly Creek -- so I guess I have two questions. One is, what is the basis for your conclusion that simply improving the dissolved oxygen conditions would change the habitat which is also, am I correct, a limiting factor in Bubbly

Creek?

A. I don't accept the premise that habitat is the limiting factors in Bubbly Creek. All I can say is the Agency was proposing uses that are consistent with biological potential, not necessarily with existing biological conditions. And part of that potential the Agency assumed that if Bubbly Creek were managed with flow augmentation and supplemental aeration that would help its biological potential and that's the extent -- I can't point to a specific place in our proposal where that is mentioned. Sorry. I don't know that off the top of my head.

Q. If we continue, it would be helpful to see a citation for where that's documented and part of the question also relates to -- my next question was how does that designation account for sediment toxicity and contamination in Bubbly Creek? Did the Agency consider that factor in determining the proper use for Bubbly Creek, the biological potential for Bubbly Creek?

A. Again, my understanding is that the Illinois EPA through work with the contractor came to the decision, came to the judgment that there

wasn't sufficient information on actual sediment toxicity effects on aquatic life to invoke sediment toxicity as one of the factors in the UAA process.

Q. So specifically as to Bubbly Creek, is the Agency taking the position that there's no significant sediment toxicity in Bubbly Creek?

MS. WILLIAMS: Objection. I don't think his answer was specific to Bubbly Creek.

MR. ANDES: I'm asking specifically to Bubbly Creek now.

BY MR. ANDES:

Q. As to this designation for this particular waterbody, is the Agency saying there's no specific sediment contamination in Bubbly Creek?

A. No, I think what I was trying to say is in our proposal we talked about there being insufficient information available to assess or to justify why sediment toxicity, the presence of sediment hurting biological quality in Bubbly Creek is a strong enough factor to say you have to lower the use for that water. We pretty much said there wasn't enough information to use sediment

toxicities.

Q. Did the Agency review the sediment chemistry information that's provided and has been provided on the District's website?

A. Personally, I did not.

Q. Do you know if anyone at the Agency has reviewed that information?

A. I don't know for sure offhand.

Q. For the record, we provide later where it's been provided as part of the record here. I know with Ms. Wasik's initial testimony I believe we provided data, but that also has been publically available for years. So the Agency has not, to your knowledge, reviewed the sediment data provided on the District's website, am I correct?

A. I don't know if someone from our Agency has reviewed that data.

Q. So then the sediment chemistry data that's been provided in Ms. Wasik's testimony and on the District's website played no role in the Agency's proposed designated use of Bubbly Creek, is that correct?

MS. WILLIAMS: Are you asking if Ms. Wasik's testimony was taken into account in

our proposal that was filed two years before this, is that your question?

MR. ANDES: No. Let me rephrase that.

BY MR. ANDES:

Q. Is the data that were contained in her testimony, but also publically available before then -- I'm trying to find out whether any sediment chemistry data was considered in proposing the designated use for Bubbly Creek by the Agency?

A. I think sediment data were considered. I can't say who looked at how much of what in particular. That wasn't really my role so I don't know the details. I think the overall conclusion was with at least the sediment information that they reviewed and I don't know exactly what that was, the people at the Agency who were working on that, to my understanding, they came to the conclusion that there was some data, but it was bulk chemistry data and it wasn't necessarily data on actual toxic effects being measured on organisms. So there was an interpretation issue, a difficulty with saying is

this sufficient.

Q. That's a more specific statement than you made before. So I'm going to need to see where that came from and who the Agency person would be who was responsible for making that decision.

A. I think I'm pretty much echoing earlier testimony if I remember that correctly, but I don't know for sure. I don't know the details of that analysis.

MS. TIPSORD: Excuse me. Again, for the record, the previous testimony you're speaking about I assume is Exhibit 187 and not Ms. Wasik's most recent testimony?

MR. ANDES: Yes.

MS. TIPSORD: That would be Exhibit 187 and we do have Exhibit 188, development and evaluation of consensus based sediment quality guidelines for freshwater ecosystems. That's Exhibit 188.

MR. ETTINGER: I realize that the evidentiary rules here aren't very tight, but when we start asking him for the details of something which he says he didn't see and doesn't know about

it strikes me as we are really going over the limits of what can be expected.

If you want to ask the Agency to try to come up with the information, that makes sense, but to ask Mr. Smogor to come up with something that he says he didn't work on strikes me as going over the top.

MR. ANDES: Since the Agency think's Mr. Smogor's testimony specifically concerns the alternative proposal from the District as to Bubbly Creek, I think it's fair to ask about the Agency's designation of Bubbly Creek and what the basis was.

MR. ETTINGER: I agree with you asking the Agency to do that, but not Mr. Smogor trying to do something he didn't do before today. That's my problem.

MR. ANDES: If Mr. Smogor is not the right individual, then I'd ask for a written answer from the right individual.

MS. WILLIAMS: What is the pending question? It seemed to me he did his best job to answer his question. What is the pending question?

MR. ANDES: I asked about the Agency's evaluation of sediment chemistry data in proposing the designation of Bubbly Creek and I believe Mr. Smogor said he didn't do that.

MS. WILLIAMS: And I think we questioned Mr. Sulski extensively about what he looked at when he was here testifying that was his role and if that -- does that address what you're getting at?

MR. ANDES: I don't know. I'm asking the Agency to point specifically to where in its documentation this issue was addressed.

MS. WILLIAMS: Where what was addressed?

MR. ANDES: The analysis of sediment data in designating Bubbly Creek. If you want to point to some page on Mr. Sulski's testimony --

MS. WILLIAMS: He said we didn't have enough data. I don't understand. What more do you want?

MR. ANDES: He is paraphrasing his understanding of what someone else decided.

MR. ETTINGER: Precisely.

MS. WILLIAMS: What else can you do?

Then he is done. What else do you want him to do?

MR. ANDES: As a representative of the Agency, I was asking the question of what the Agency's position was because I understand this wasn't Mr. Smogor's testimony, rather he was speaking for the Agency and I was asking since the Agency was critiquing the District's proposal that the Agency provided some basis for how it evaluated this sediment toxicity data and Mr. Smogor can't do that.

MS. TIPSORD: I think we can move on. I think that Mr. Sulski's testimony, if Mr. Sulski is, in fact, a member of the Agency has spoke to the sediment three years ago, 48 hearings ago, speaks for itself and you're free to, of course, question that in final comments.

MR. ANDES: Okay.

BY MR. ANDES:

Q. Let's move onto question number nine. On page nine, you make several arguments based on the scores in the habitat improvement report, which reflect possible habitat improvements. Did the District state that the theoretical scores after extensive improvements

were used to classify aquatic life use categories?

A. I'd say yes, especially from pre-filed written testimony. That's what I believe.

Q. Wasn't it actually the current CAWS habitat index scores in the Habitat Evaluation Report that provided the basis for the classifications?

A. Again, from the testimony, I believe it was more than just the current scores.

Q. So can you point me to where that's the case that the improved scores in the Habitat Improvement Report were used as the basis for the District's classifications?

A. I can point to some examples in the pre-filed testimony if you'd want me to. I'm referring now to page three of the pre-filed testimony.

MS. WILLIAMS: Of who?

BY THE WITNESS:

A. Of Ms. Wasik submitted February 2011. Page three states, quote, in determining the uses that should be designated for various segments of the CAWS, the District relied

principally on the findings of the habitat evaluation and Habitat Improvement Reports, end quote.

BY MR. ANDES:

Q. So that statement is fairly general. Can you provide -- what my question was, was can you show me where the habitat improvement scores, the scores in the Habitat Improvement Report were used by the District in putting forward its proposal? Not generally that the Habitat Improvement Report was relevant, but where were the improved habitat scores because I think that was your point in your testimony.

A. Yes. I'm sorry to interrupt. Another quote from page four of that same pre-filed testimony --

MS. TIPSORD: Mr. Smogor, for the record, that's Exhibit 461?

THE WITNESS: Yes.

BY THE WITNESS:

A. On page four of Exhibit 461, states, quote, the Habitat Improvement Report estimated habitat index scores based on potential habitat improvements in various reaches of the CAWS. The

District believes that those index scores should be considered in determining the appropriate designated uses for each segment, end quote.

BY MR. ANDES:

Q. Now, if we go back a couple of sentences, doesn't that paragraph also refer to the habitat evaluation index? Is it logical to surmise that it refers to both sets of scores?

A. It could refer to both sets, but you're asking if there is any evidence -- my understanding is you're asking is there evidence that the District used the scores in the Habitat Improvement Report to help them formulate their proposed uses and my reading of this is, yeah, that's what that is telling me.

Q. So that tells you, am I correct, that they were relevant? Can you tell me where the specific habitat improvement index scores were used in determining the classifications for particular waterbodies?

A. I can give one example for the Chicago River. Page seven of Exhibit 461 states, quote, potential index scores after physical habitat improvements listed on page 57 of the

Habitat Improvement Report indicate that unlike the other waterway reaches the Chicago River demonstrates no potential for habitat improvement.

So to me, again, I interpreted that the scores were being used to show how the Chicago River had no -- if its potential score wasn't that different, that's using that potential score in a way to say it can't get any better. That's how I interpreted that.

Q. Was the Chicago River considered in the paragraph above that borderline?

A. I don't know. I don't know.

Q. Please look at the paragraph immediately above it on page seven.

MS. WILLIAMS: Can you -- do you have it?

THE WITNESS: Yes, I have it.

BY MR. ANDES:

Q. What is the first sentence of the paragraph above it?

A. Yes, you're right. The Chicago River -- it says the Chicago River Main Stem and the Lower North Branch of the Chicago River both of these segments are borderline.

Q. Does it then say, however, available information concerning habitat improvement potential, the physical nature of these segments and/or sediment toxicity, indicate that they belong in category two rather than category one?

A. Correct, but then that's --

Q. So then is this the only waterbody you identified where the habitat improvement potential was specifically laid out as a relevant factor?

A. Such specificity. I don't have any other specifics, but it's an interpretation issue here.

Q. Okay. Let's go to question 9C. Are you aware that the potential habitat scores from the improvement report assume, for example, that half the vertical walls in the North Branch Chicago River could be removed?

A. Yes.

Q. To your knowledge, is anyone planning on removing any of the vertical walls in the North Branch let alone half the length in the near future?

A. I don't know.

Q. Would that in your mind potentially be inconsistent with the current functions of drainage and navigation?

A. I do not know.

Q. Okay.

MS. TIPSORD: Before we go on, if you're done with question nine, let's take a short break. Ten minutes.

(Whereupon, a break was taken after which the following proceedings were had.)

MS. TIPSORD: Let's go back on the record. I think we're ready to start with question number ten unless you need to go back, Mr. Andes.

MR. ANDES: Nope.

BY MR. ANDES:

Q. Question ten. On page ten, you criticize the use of other variables in the CAWS habitat index that were not identified using the multiple linear regression process, including overhanging vegetation, bank pocket areas, large substrate and organic sludge. Do you believe that pockets of bank refuge as quantified by the

variable bank pocket areas are important to fish?

A. I believe that cover and refugia are important to stream fish.

Q. Do you agree they should be included in an index of habitat quality?

A. Not necessarily. If your main objective is to create a habitat index from the habitat variables that are most related to your fish measure, then include those habitat variables that are most related to your fish metric if that is your main objective. If there is a habitat variable that doesn't appear as closely related to the fish variable, leave it out.

Q. But isn't it possible that you could based on knowledge, experience, professional judgment know qualitatively -- and you answered in my previous question that general refugia are important to fish. So if you knew that factor was generally important, but you didn't have the particular correlation here, why would it be improper to include it knowing that in general this is an important factor?

A. It wouldn't necessarily be improper, but if you're setting up -- if you're setting

yourself up to say I'm going to analyze these data in kind of a formal statistical analysis and I have all these physical habitat variables to choose from, but I'm going to try to focus in on that subset that are most related to the fish, then that was one of my main criticisms of the index. They seemed to do that and they identified six key habitat variables that were related to the fish and of all the ones they threw out they went back and said I'm going to grab this one, this one, this one, this one and there didn't seem to be sufficient -- a sufficient argument for why grab those five from all the others that were thrown out. Why not grab another five or a different set of five? That's what I didn't see. I didn't see the justification for just grabbing those five off the ones that were already thrown out so to speak.

Q. Wasn't -- well, as to those five or at least to the ones we're talking about here which include overhanging vegetation, bank pocket areas, large substrate and organic sludge you agree that each one of those is an important habitat quality for fish in general?

A. In general, each of those could be important to some fish in general, right.

Q. So, in general, including them in the habitat quality would not be improper?

A. In general, if your index of habitat quality didn't necessarily have that objective to identify those aspects of habitat that were most important to fish, then, fine, include them. It's a different objective.

Q. Isn't it possible that knowing qualitatively that these factors are important you would say I shouldn't exclude them because logic tells me that they are usually relevant so it should be relevant here and I should consider them?

A. I think that's one possible interpretation. It can be reasonable if it also includes -- and I think it's a stronger argument if it includes additional information to say, well, I had all these others that I threw out, but I'm going to choose these five to put back in. I guess what I'm saying is I didn't necessarily see a lot of information on why they picked those particular five to choose to put back in the index

from a lot of others that were available to pick from.

Q. So you don't recall the explanation from the Bell testimony?

A. Not specifics about why they chose those five over all the others that were thrown out, no, I don't recall specifically.

Q. Okay. Let's move on to question 11. On page ten, you discuss existence of commercial navigation and sediment toxicity in the Lower North Branch Chicago River and the Little Calumet River. Did Ms. Wasik's testimony indicate that the habitat index scores were only one of the factors used to classify the waterways?

A. Yes.

Q. Did she state other factors were used if the scores were borderline?

A. Yes.

Q. According to her testimony, was the Little Cal and was the Little North Branch both borderline?

A. You said Little North Branch.

Q. I'm sorry.

A. Little -- can you ask that again?

Q. The Little Calumet River and the Lower North Branch.

A. As far as what I could see and get from the testimony, I think she testified that the Little Calumet River was not borderline and from what I could see in the testimony she testified that the Lower North Branch Chicago River was borderline.

Q. As to the Lower North Branch she testified, am I correct, that the sediment toxicity data were a factor in putting that into category two instead of category one?

A. Yes.

Q. As well as the presence of commercial navigation?

A. Yes.

Q. So as to the Little Calumet, in fact, the District classified that as category one, am I correct?

A. Correct. I believe that's correct.

Q. Okay. So since the score was high, not borderline, it was put in category one?

A. I think that's -- yeah, I think that's how I understood it.

Q. So the other factors were considered for the Lower North Branch since it was borderline, but they were not considered for the Little Cal because it was not borderline?

A. That's my understanding. I guess my criticism or my issue with it was the Little Calumet River and the Lower North Branch were -- had what I would say my interpretation fairly similar habitat scores and the part of the justification for saying, well, even though they have similar habitat scores -- this is my interpretation -- of a 52 versus a 47, I considered similar -- even though they had similar habitat scores, the argument or the -- what Ms. Wasik said I'm going to put the lower -- MWRD is going to put the Lower North Branch Chicago River in a lower use or less natural use because it has sediment toxicity evidence and because it has evidence of navigation, my argument was those two things also occur in the Little Calumet River. So they didn't really seem, to me, to be a good logical argument on why to split the two because both of those things also occurred in Little Calumet River.

Q. The Little Calumet River had the higher score?

A. It did have a higher score of a 52 versus a 47. So I guess that's where our interpretations differed on that issue.

Q. Okay. On page 11, the next question you claim that Bubbly Creek was not properly classified given its habitat score. Is it your feeling that physical habitat alone should be used to classify Bubbly Creek despite the other information that has been provided by the IEPA contractors and the District including stagnancy, sediment contamination, et cetera?

A. No, but I guess, again, the point I was trying to make was there seemed, to me, to be a lot of emphasis in these reports and in testimony saying physical habitat is the limiting stressor. So that is -- as your physical habitat goes up, your fish goes up. As your physical habitat goes down, your fish goes down. Given that emphasis on physical habitat being the limiting stressor, it would seem that the uses should have been proposed much more consistently with those measures -- that direct measure of

physical habitat. If physical habitat is what is limiting, that's kind of the key part of your process for identifying how to propose the appropriate uses. That's how I looked at it.

Q. But -- okay. So let's go to page nine of Ms. Wasik's testimony where she discusses Bubbly Creek and it --

MS. WILLIAMS: Why don't you let him get it. Page nine.

MR. ANDES: Yes.

THE WITNESS: Okay.

BY MR. ANDES:

Q. I'll just read the first paragraph. The habitat index scores in the South Fork of the South Branch of the Chicago River of Bubbly Creek is in the range of other CAWS category two waters, but other factors indicate that attainable aquatic uses are considerably more limited than other segments in the CAWS. In addition to significant sediment contamination, Bubbly Creek also exhibits a unique flow regime, is stagnant during dry weather and it is dominated by high velocity CSO flows from the Racine Avenue Pump Stations during the wet weather periods. So that would indicate

that this recognized the habitat score was similar, but there were other factors that were unique for Bubbly Creek, is that correct?

A. I see that interpretation. Yes.

Q. Okay. Number 13. On page 12, you expressed a concern that the habitat report did not address how the fish metric scores relate to Clean Water Act goals. Did IEPA relate the range of Ohio IBI scores to aquatic life use potential in the CAWS?

A. We did use the existing IBI scores to help justify why all of the CAWS could not attain the Clean Water Act goal for aquatic life use.

Q. But they weren't used directly for specific reaches, correct, in terms --

A. The current IBI scores, no.

Q. Okay. In fact, the ultimate conclusion that the Agency had was that none of these waters could attain the Clean Water Act goals, correct?

A. Correct.

Q. Question 14. On page 12, you state that the CAWS habitat evaluation lacks an analysis

that shows that higher scores of the CAWS combined fish metric represent a less impacted biological condition than do the lower scores and vice versa. If the CAWS combined fish metric is the sum of positive metrics that represent desirable fisheries attributes and negative metrics that represent undesirable fisheries attributes, wouldn't a higher value of that sum represent a more desirable fisheries condition than a lower value?

A. I'm struggling a little with the question because I didn't see in the CAWS report where positive and negative were really defined. I mean, what were the criteria for saying of the metrics I had these are positive, these are negative. I didn't really see what explained those differences between positive and a negative metric. I didn't see that explanation in the report.

Q. Okay. I believe Mr. Bell did testify about that, but --

A. Okay. I'm speaking to the report.

Q. Okay. Do you agree that the following fish metrics that are included in the

CAWS combined fish metric are positive indicators of fisheries conditions; Illinois ratio of non-tolerant coarse-substrate spawners, number of Illinois native minnow species, number of Illinois native sunfish species, and the Illinois ratio of generalist feeders?

A. I recognize these metrics.

Q. Are they generally positive indicators of fish condition?

A. The last one isn't. The last one works the other way. The generalist feeders as you get -- when I think of a positive metric, my interpretation is as the metric goes up that's indicating better conditions, better water quality, better habitat.

The last one, generalist feeders, that works in the opposite way. As you get more generalist feeders, that's an indication of more human impact.

Q. But all these four metrics are included in the Illinois fish IBI that you've been working on?

A. They're in the Illinois fish IBI and I have to add I don't necessarily -- I don't

necessarily agree that they're going to be as useful in the CAWS as they are in the -- tend to be in the smaller streams in which they were developed for the rest of the state.

Q. Because?

A. The Illinois IBI's don't really apply as well to these larger waters which are what most of the CAWS waters in this rulemaking are wider, larger streams than the dataset of streams that we focus the Illinois IBI's on.

Q. And why would you say they wouldn't apply here?

A. They may or may not. I just don't think it has been shown.

MS. WILLIAMS: Mr. Smogor, does the Agency use the Illinois IBI in any large rivers?

THE WITNESS: If by large, if you mean greater than about a hundred feet wide, then no.

BY MR. ANDES:

Q. Is there a documentation of why that is?

A. I think there may be in some of the IBI information that I've written. We were

careful to say we used a certain size range of stream in each region and I think I give a cautionary statement in there to the users of the IBI if we're going to use the measures of fish in the streams beyond the range of sizes for which they were developed, do so with caution, do so with knowledge of what is going on in the system. I'm not saying they're automatically bad, but I am saying use them with caution. We have to give that type of statement for their use.

MS. WILLIAMS: Is that why the Ohio index was used by the contractors here?

THE WITNESS: It's my understanding that the Ohio boatable IBI seemed better tuned to larger waters than the existing Illinois IBI's.

BY MR. ANDES:

Q. Is that documented in the UAA reports anywhere?

A. I couldn't point to a specific place where I know that it is.

Q. And Mr. Rankin and Mr. Yoder who worked on the UAA report or reports, in fact, were the ones who created the Ohio IBI, am I right?

A. I don't think Mr. Yoder worked on

the UAA report for the CAWS. I'm not aware of that. I know that some of Mr. Rankin's report was used in the UAA report for the CAWS. They were both -- yes, they were both involved in developing the fish IBI's in the State of Ohio.

MS. WILLIAMS: Were either of them the contractor for the CAWS? When I say contractors for the CAWS, was Yoder or Rankin -- can you identify for the record who the contractors were for the two UAA reports, Attachment A and Attachment B?

THE WITNESS: For the UAA report for the CAWS, I believe it was CDM, a company called CDM was the contractor and for the UAA report for the Lower Des Plaines River, it was Dr. Novotny. I don't recall the company.

Q. Both Mr. Rankin and Mr. Yoder provided an analyses that played a significant role in the Agency's decisions, correct?

A. Yes, they provided data and information or they supplied data and information that were used as part of this process.

Q. I think we've discussed number 15. Number 16. On page 13, you state that the fish

metrics should have been tested for how they respond to gradients of human impact. Is it necessary to show this for each waterbody in which the metric is used?

A. Again, I'm unclear what you mean by each waterbody. What scale are you talking about there?

Q. I guess each reach.

A. No. If you're talking about each individual stream reach, I'd say no.

Q. Okay. And so am I correct that also in developing the Ohio IBI, did they show that each fish metric they selected responds in a sensible way of gradients to human impact?

MS. WILLIAMS: Fred, I think this is the same as 1D, am I wrong?

MR. ANDES: I think it has something in common.

MS. WILLIAMS: I think it was actually the exact same question as 1D so I was going to object as asked and answered, but if there's something in here that you don't feel was already asked and answered, I have no problem.

MR. ANDES: No, I think it's similar

enough that we can move on.

BY MR. ANDES:

Q. Number 17. On page 14, you raise a concern that the fish metrics are not examined over a large enough range of human influence. What do you mean by large enough?

A. I tried to refer to that earlier on page three of my pre-filed testimony. What I meant by large enough is a range that covers biological conditions from something that's balanced that would meet the Clean Water Act down to something less balanced than that.

Q. And how do you do that with a system that's been designed, constructed and highly modified for effluent conveyance and navigation?

A. It's very difficult.

Q. In developing the Illinois IBI, were there waters of lower biological potential that were considered so you could reflect this range of human influence?

MS. WILLIAMS: This quote, Fred, when you use lower biological potential in here you have it in quotes. I just want to clarify if you're trying to quote from the testimony.

MR. ANDES: I believe I was.

MS. FRANZETTI: While Mr. Andes is looking for that --

MS. TIPSORD: Sure.

MS. FRANZETTI: Susan Franzetti. Mr. Smogor, can you elaborate a little bit on your last answer that it is very difficult to apply this human influence factor in a waterway like the CAWS that is highly modified?

THE WITNESS: If I'm understanding your question correctly, I was responding to if you're going to try to develop an index and all you have are impaired waters and you want an index that's going to be useful in a Clean Water Act context, this use attainability analysis, you need a broader frame of reference.

If all you have are impaired waters and you're just taking a small bit of real estate on the map, saying I'm going to look in this region and all the streams are impaired in this region you don't really have a frame of reference to what is a balanced community.

So, yes, it's difficult if you've started by saying I'm going to devise an

index that says it will work here and only here, sure. That doesn't rule out other possibilities. You can take a broader view of things and you can use an index or devise an index that somehow captures a broader frame of reference. My index has to be able to capture what it means to be balanced, meeting the Clean Water Act goal, down to a less balanced condition. Like I said, it provides that frame of reference.

So what we did was we realized that much of the CAWS is already impaired, but we went to an index, the Ohio boatable index, which in its development it's already been established we know what a higher score means relative to the Clean Water Act goal even though we're not necessarily going to see a high score in the waters we're looking at.

If I just developed an index for impaired waters and I asked what score will my index be that's consistent with the Clean Water Act goal, I have to say I don't know. I don't have that frame of reference. I can't interpret my index in that regard. So does that help?

MS. FRANZETTI: Yes, it does help

explain what your rationale is. It's just that it seems that both the District and the Agency agree that all of these segments in the CAWS aren't capable of attaining the Clean Water Act fishable loads, right?

THE WITNESS: Correct.

MS. FRANZETTI: And the Agency when it proposed its use designation, I believe stressed that it did think that these waters were unique within the state, would you agree with that?

THE WITNESS: I don't know if we stressed it. I think we agreed they were unique to the extent, yeah, they can't attain the Clean Water Act goal. That's pretty unique to a lot of other waters in the State of Illinois. That was our focus is our first task, at least the way I see it in the use attainability analysis, is justify why you can't attain a balanced biological community.

MS. FRANZETTI: I was harping back to in the statement of reasons that part of why the use designation language was derived was that it was intended solely to apply to the CAWS waters

not anywhere else in the state because they were considered relatively unique, is that consistent with your recollection of the Agency's finding?

THE WITNESS: I guess I don't see where we use the word unique in our definitions. So I guess I don't recall that aspect.

MS. FRANZETTI: Do you think that the District's habitat index has some value in differentiating between certain of upper reaches within the CAWS?

THE WITNESS: I believe their habitat index does vary from reach to reach in the CAWS. It has some variability. What I'm struggling with is what is varying? Okay. The individual habitat measures are varying. Obviously, they contribute to the index, but is it really biological condition in the Clean Water Act context, that concept we're dealing with, the measure of human impact, is that what it is really measuring is what I'm questioning.

MS. TIPSORD: Mr. Andes, whenever you're ready.

MS. WILLIAMS: Would you like to rephrase the other question or did you find the

quote?

MR. ANDES: I could not find the quote, but we can move on.

BY MR. ANDES:

Q. Let's move to number 18. On page 15, you raise the concern that the habitat reports can not adequately assess other IBI's. Are you aware that Limnotech has looked at the relationships of the CAWS habitat index as to some of those other IBI's?

A. Not from what was presented in the habitat evaluation or improvement reports.

Q. Based on the charts below, do those comparisons show weaker correlations for those IBI's than the CAWS habitat index?

MS. WILLIAMS: Fred, can you lay some foundation for where these charts come from? There's no references either.

MR. ANDES: They're based on information in the Habitat Evaluation Report, which did assess all those various habitat protocols.

MS. TIPSORD: For the record, these are charts that appear in 18B of the District's

pre-filed questions.

MS. WILLIAMS: So you're saying these are based on what from the Habitat Improvement Report? What part of these charts is taken from the Habitat Evaluation Report?

MR. ANDES: I believe, and we can follow up with this, I believe that all the information here was included in the information developed by Limnotech for the purposes of its Habitat Evaluation Report. The tables themselves appear to not be in the report.

MS. WILLIAMS: Can you tell what the X axis label should say?

MR. ANDES: We can come back to that and clarify that later.

MS. WILLIAMS: I'm sorry. Is there a question pending?

BY MR. ANDES:

Q. Let me address a related issue. If we -- because the question at hand here was the use of the CAWS habitat report relative to other indices and, Mr. Smogor, in the Habitat Evaluation Report Public Comment 284 on page 26 there's a statement that Limnotech says "All of the habitat

protocols reviewed for this study were developed for rivers using data from natural rivers. Although the documentation for some of the protocols discusses the fact that some of the systems used were modified by human activity, no reference was found to the inclusion of completely manmade channels such as those that comprise approximately 75 percent of the CAWS. Rankin 1995 stated that indices need to be regionally calibrated, suggesting the importance of including local conditions in the selection and development of index protocols." Do you disagree with anything if that statement?

A. No, not offhand.

Q. Okay.

MR. ANDES: Okay. The answer on the X axis is these are the non-normalized values of the habitat index.

BY THE WITNESS:

A. I'm sorry. The X axis is --

BY MR. ANDES:

Q. The raw values of the habitat index.

A. Of the CAWS habitat index. Okay. Thanks.

BY MR. ANDES:

Q. Also --

MS. WILLIAMS: Can you repeat that one more time?

BY MR. ANDES:

Q. Why don't we have Ms. Wasik repeat that.

MS. WASIK: So these are the raw values of habitat index scores. The scores you see in most of the tables are normalized in the zero to one hundred range and the ones shown in this chart were the raw values.

MS. WILLIAMS: Did you prepare it?

MS. WASIK: No, it was prepared by Limnotech.

MS. WILLIAMS: Okay. Thanks.

BY MR. ANDES:

Q. The Limnotech report also on page 26 states that "Many of the variables used in the existing protocols including some of those listed in Table 2-3 are simply not applicable to a system like the CAWS which was constructed for effluent conveyance and navigation, will continue to be operated for those purposes. So do you disagree

with that statement?

A. No, some of these variables I agree just aren't necessarily variables in the CAWS. I think we address that earlier, too.

Q. And on the next page it states "That all the protocols reviewed including more than one key variable is not useful in measuring habitat variation in the CAWS because of a complete absence of those variables" and you would not disagree with that either, am I correct?

A. No, I would like to point out this is a key issue for my criticism I guess is not useful for measuring habitat variation. If your objective is just to see how much variation is out there, to me, that doesn't have the focus on trying to measure what the potential biological condition is. Like I said, you can have little variability in a habitat measure across a lot of different sites, but if that habitat measure is a measure of biological condition, it scores uniformly low, that habitat index is still giving you useful information in the context of Clean Water Act goals. It's basically saying all the habitat pretty much shows uniformly impacted

conditions. To me, that's useful information in this hearing.

Q. The question at hand here is Limnotech's decision to construct a CAWS specific habitat index that they felt would be more useful for really focusing on -- for one of their four purposes was -- not the only one was to determine to what extent habitat variation affected the condition of fish and putting together an index that focused on those factors would not be improper, correct?

A. No, I don't think so. I should also add that in my hypothetical or what I just said earlier, I also have to add that I believe there was sufficient variability in existing QHEI measurements that were available for the CAWS. I think it ranged from about 22 to 54.

So even though we're kind of arguing off the point maybe the main issue with us is we believe that there was an existing index for the Ohio QHEI, it had relevance and applicability to this Clean Water Act context of use attainability analysis and there was variability in that index throughout the CAWS. In fact, we

used that as some of our basis.

Q. In fact, as to at least some waters -- so while the Agency preferred to use QHEI, Limnotech used reasons why they preferred to use the CAWS specific index?

A. Mm-hmm.

Q. And that index was then used with other information by the District to construct its use classification proposal and am I correct at least to some waters the -- if you consider the top two of the District's classes relative to the two classes proposed by the Agency, some waters were common and had a similar classification, others had a different classification by the District and those were explained by the District in Ms. Wasik's testimony?

A. Are you asking if --

Q. Is that your understanding?

A. Yes, that's my understanding.

Q. Okay. Let's go to question 19. On page 15, you state that state specific specifications must be applied to each IBI metric. Weren't the fish characterization assignments such as pollution tolerance ratings to the Illinois IBI

derived from a number of sources including those outside of Illinois such as fish -- fishes of Wisconsin, fishes of Virginia and Ohio IEPA?

A. Yes, those were starting points that I used for rating Illinois fish for tolerance.

Q. How does IEPA treat species and assign characteristics of populations in communities that interact with Lake Michigan?

A. I'm not quite understanding the question here. Sorry. Can you maybe rephrase it?

Q. It's a little indirect. We can move on.

A. Okay.

Q. On question 20, you raise a concern about scoring adjustments for samples of certain sizes. Isn't it true that IEPA or its contractor also failed to use the adjusted value for a number of individuals collected when they calculated Ohio IBI?

A. Yes.

Q. Isn't it also true that IEPA has never calculated or provided to the Board the corrected IBI values?

A. We did not receive recalculated IBI

scores from the contractor.

Q. Okay. In paragraph 21 -- question 21. On page 18, you express a concern that only two water quality variables, DO and temperature, were examined for statistical relations with fish. Are you aware of the screening process that the UAA contractor -- the IEPA's UAA contractor used to assess overall water quality in the CAWS?

A. I'm aware that a screening process was used. I don't know the details of that process.

Q. Would it surprise you to learn that according to the UAA report, DO and temperature were the only constituents that most waterways in the CAWS were found not to meet general use criteria more than ten percent of the time?

A. No.

Q. It would not surprise you?

A. Correct.

Q. And general use criteria generally for waters which meet the Clean Water Act goals, correct?

A. Here, I'll be a little picky. I would say general use criteria are waters that can

attain the Clean Water Act goals.

Q. It is safe to say that other constituents besides DO and temperature in the CAWS are not likely to impact fish communities since they are generally meeting the general use standards?

A. I guess I can't necessarily agree with that with the words generally meeting in the question.

Q. Let's say they are meeting general use standards more than 90 percent of the time?

A. I don't know. I don't know what the cutoff is. All I have to say is I know that the UAA report did find that there were things like some heavy metals ammonia and PH that were in violation. I didn't look at the details. I know they did find some violations of those water quality parameters as well. So I can't say it was only DO and temperature were the only two that were in violation in the CAWS.

Q. You don't recall how many times --

A. I don't know the specifics to that.

MR. ETTINGER: May I ask? Have you reviewed the Illinois water quality standards to

determine whether each of the existing water quality standards is protected aquatic life?

THE WITNESS: Personally, no.

MR. ETTINGER: Do you believe they are?

THE WITNESS: Are the chemical water quality standards perfect? No.

MR. ETTINGER: Okay. Do you believe there might be water quality standards designed for some of the chemicals that are in the CAWS, but do not currently exist?

MS. TIPSORD: I'm sorry. I didn't hear all that.

THE WITNESS: In other words, there are some chemicals in the CAWS for which there is no existing water quality standard?

MR. ETTINGER: Correct.

THE WITNESS: Yes, I believe that.

MR. ETTINGER: Do you believe those chemicals in the CAWS for which there is not an existing water quality standard might be toxic?

THE WITNESS: It's possible.

MR. ETTINGER: Thank you.

BY MR. ANDES:

Q. Question 22. On page 19, you state no analysis was done as to how fish varied with other water quality variables such as specific conductivity, PH and ammonia. Did the screening process -- and you may not know this. Did the screening process used by your UAA contractor indicate the conductivity and PH were meeting general use standards in the CAWS?

A. I'd have to say no because I don't think we have a standard for conductivity. You mentioned conductivity there. At least to my knowledge, I don't know, but I don't know the details. I'm not aware of a standard for conductivity.

Q. We can provide a reference to the UAA report later. The next question. To your recollection, did Scott Bell describe in his testimony why Limnotech focused on DO and temperature?

A. I recall it was addressed. Again, I don't recall the details.

Q. Are DO and temperature measured hourly in the District's continuous monitoring

program?

A. This one I looked up. I don't know for sure. I'm aware that Appendix C in the CAWS habitat evaluation mentions hourly measurements for dissolved oxygen and I don't know the frequency that temperature and PH are measured as part of that program.

MR. ETTINGER: May I ask another question? Have you personally ever seen hourly measurements for dissolved oxygen produced by the Water Reclamation District?

THE WITNESS: No.

BY MR. ANDES:

Q. Have you ever reviewed the District's reports on continuous monitoring for dissolved oxygen?

A. I've never looked at specific dissolved oxygen data from MWRD reports.

Q. Okay. Let's go to question number 23. On page 20, you make statements regarding how lower DO might correlate with better fish communities even if a strong linear relation is not readily apparent. Do you disagree with the UAA which states on page 5-3 improvements in water

quality -- improvements to water quality through various technologies like reiteration may not improve the fish communities through the lack of suitable habitat to support the fish population. Unless habitat improvements are made in areas like the Chicago Sanitary and Ship Canal, additional aeration may not result in the attainment of higher aquatic life use?

A. I went to the UAA report and looked at this and, to me, I don't disagree with these statements in the context that -- I interpreted they were being posed -- they were being made in the context of the inability of the CAWS to attain the Clean Water Act aquatic life goal.

Q. But it says improvements to water quality may not improve the fish communities?

A. My interpretation was they were talking about may not improve the fish communities to the aquatic life goal of the Clean Water Act because it was presented in that context. That's how I interpreted it.

Q. Okay. But there's no reference in this statement to the aquatic life goals or the act?

A. Not in this particular statement, but I believe in the context there was. I'd also point out may not improve and may not result, those actually -- words taken literally are not very definitive either. So my impression here was they were speaking about not being able to attain that Clean Water Act goal.

Q. May or may not result in improving the fish communities, but it will result in substantial costs. I guess the question is how confident the Agency is of its conclusion that tightening the DO standards -- there are other places and I'm sure we can cite to where it's stated --

MS. WILLIAMS: Tightening what DO standards?

MR. ANDES: Making the DO standards for the CAWS more stringent. My understanding is it's being done here to improve the aquatic life use and yet you have this statement in the UAA that says that may not happen, may not improve the fish communities due to lack of suitable habitat which seems to correlate pretty well with what Mr. Bell said so I'm trying to understand the

Agency's position in light of that statement.

MS. WILLIAMS: In the Use B waters -- I'm objecting to the premise of your question. We're talking about Use B water here, right? I guess I'm going to ask a clarification. Is the Agency proposing more stringent dissolved oxygen criteria for the Use B waters than currently exists with the exception of the Cal-Sag?

THE WITNESS: For Use B, I don't think -- no, I don't think they're necessarily more stringent.

BY MR. ANDES:

Q. I'm talking generally about this statement relative to the Agency's proposal which in general makes the DO standard more stringent. I'm not trying to subdivide A versus B. I'm trying to understand how this is consistent with the Agency's position that attaining the -- that new DO standards are needed and will result in improvements in the fish community?

MS. WILLIAMS: You are talking about the Sanitary and Ship Canal in your question, right, or no?

MR. ANDES: It says areas like the Sanitary and Ship Canal. The statement is pretty general.

THE WITNESS: I guess that's how I interpreted it in the context in this report there were several paragraphs. This was part of one paragraph that says why can't the CAWS attain the Clean Water Act goal. So I was interpreting these comments as being applicable to the Clean Water Act goals.

BY MR. ANDES:

Q. But it doesn't actually say that?

A. Exactly -- in this quoted passage, it does not say Clean Water Act goal. You're right.

Q. Let's move on to the next question. 24. On Page 21, you explain why you believe that Ohio IBI and QHEI are the proper tools to use to evaluate the CAWS waterways. Is it true that the QHEI scores for the CAWS are measured one time in March 2004 by a consultant not including certain segments like Bubbly Creek and the South Branch and were those scores the entire basis for the proposal?

A. Yes, to the first question. It's true that QHEI scores were measured one time and was that the entire basis for our proposal, these QHEI scores? No.

Q. But the QHEI scores were the primary basis for the use classifications, correct?

A. They were used. Primary I don't really know because we also use knowledge and experience of -- not my knowledge and experience in the CAWS, but knowledge and experience in the CAWS. There was -- I wasn't part of the stakeholder input process. It's my understanding from the record that stakeholder input was also used. So I don't know if it was primary, but it was one of the factors -- one of the sets of criteria that was used.

Q. There was no other index used to develop the use classifications, correct?

A. Another quantitative habitat index or something like that, not that I'm aware of.

Q. And the QHEI specifically was developed for wadable streams, correct?

A. No, I don't think it was. I think it applies -- I think it was developed for

boatable streams as well.

Q. Were modifications made to it to include an impoundment adjustment?

A. Yes, I believe so.

Q. But those were not reflected in the scores reported by the Agency, correct?

MS. WILLIAMS: Be careful. He reworded this a little bit. A yes and a no would be a different answer based on --

BY MR. ANDES:

Q. Were those adjustments reflected in the scores you reported?

A. If you're asking if the QHEI scores reported in Rankin 2004, which is Attachment R to our statement of reasons, it's my understanding that those scores don't reflect this impoundment adjustment.

Q. During IEPA testimony -- and if you can't address this because someone else knows the answer just tell me that although I think the three of you all answered questions together last time. During IEPA's testimony, Mr. Sulski stated Sheridan Road and the North Shore Channel was used as a reference site for the CAWS and Mr. Essig's

testimony later stated that the QHEI scores for Sheridan Road were transposed with the QHEI scores from Route 83 on the Cal-Sag Channel. The District asked for corrected scores or field data for which to calculate the scores which we never received. Can you explain how these errors impact the comparisons that were made for the aquatic life use classification?

A. I don't think these mistakes significantly impact our big picture comparisons. Overall, I think we came to two main conclusions. The first conclusion was that these waters in the CAWS cannot attain the Clean Water Act aquatic life goal and then the second conclusion we came to is that based on the information we have available about biological potential, we think there's two classes of waters in the CAWS in terms of their differences in biological potential. So we proposed Use A and Use B to match those impressions.

Q. North Shore Channel in general had the best biological condition in the system, am I right, or at least best habitat condition?

A. I don't think it had the best

habitat condition.

MS. WILLIAMS: Why don't we enter a couple exhibits here that may help the Board follow on these questions if that's okay.

MR. ANDES: I believe we actually discussed this issue before, but it was quite a while ago.

MS. WILLIAMS: Right. I brought in two exhibits to help with this question. One is just a page from the CDM report and it's entitled -- it's Figure 5-2.

MS. TIPSORD: And the CDM report is Attachment B to the proposal to the UAA report. If there's no objection, we'll mark this as Exhibit 470. Seeing none, it's Exhibit 470.

(Document marked as IEPA Exhibit No. 470 for identification.)

MS. WILLIAMS: The second is entitled rescaled version update Figure 5-2.

MS. TIPSORD: If there's no objection, we'll mark the rescaled version of Figure 5-2 from the CDM's UAA report 2007 as Exhibit 471. Seeing none, it's Exhibit 471.

(Document marked as IEPA Exhibit No. 471 for identification.)

MS. WILLIAMS: Mr. Smogor, would you mind explaining for the record these two charts what they show? In particular, the second chart, but why did you develop the second chart?

THE WITNESS: There seemed to be some conclusion, myself included, with figure -- original Figure 5-2 from the CDM UAA report and that is now -- that Figure 5-2 is now shown here again as Exhibit 470. Relative to how the fish IBI scores in that graph related to the QHEI, the habitat scores in that graph, and it appeared, to me, that if I could rescale the X and the Y axis on Figure 5-2 to match them up to some kind of logical relationship between that IBI and QHEI this picture might make a little more sense or gain a little more clarity.

MS. WILLIAMS: What do you mean logical relationship?

THE WITNESS: A logical relationship in aligning the scores on one axis with the scores on the other Y axis.

MR. ANDES: Before you go on, can I

ask we did ask for corrected scores and field data and those still have not been provided, correct? That was a couple years ago.

THE WITNESS: It was my impression that table -- it was established from the record that Table 3 in the Rankin report, the original Rankin report, did have the correct scores that the flip-flop in scores for the few sites was reflected in Table 2 so I went to Table 3 of the original Rankin 2004 report and used those scores from Table 3.

BY MR. ANDES:

Q. But we don't know from the field data. We don't know which one is right without the field data which we never got.

A. I don't think you ever got the actual field data from the Rankin QHEI.

Q. This seems a little odd and I'm just looking at this rescaled version, that Sheridan Road was the reference site, but you have the Cal-Sag Channel or Route 83 being higher than the reference site?

A. I guess by reference site I'm struggling with what you mean. My impression is

that the North Shore Channel and if we refer to the rescaled version I think this shows it maybe even more clearly compared to the rest of the site so I'm looking at the rescaled version of this graph, which is now Exhibit 471, I believe.

Q. Explain again how is this rescaled.

A. Yes. The rescaling is I went to the Rankin QHEI report which is Exhibit 175 in the record and in that there is a regression equation that links QHEI with fish IBI scores. So if you have a certain score on your QHEI, what your best expectation of what your IBI score should be -- and that's what this regression equation provides.

So if we looked at this graph and I looked at a score of 40 on the left Y axis which is now the QHEI axis on the left, if I score a QHEI habitat score of 40, I would expect to get a fish IBI score of halfway between 25 and 30. So let's say 27.5 roughly. That's what the regression provides. It provides you with that link between interpreting your QHEI scores in terms of was your best estimate of what the fish score would be and we're keeping in mind that Rankin developed these outside of the influence as

much as they could control for outside of the influence and confoundment of water quality issues because they used their data from non-point source impacted streams throughout the State of Ohio.

So in looking at this plot, the North Shore Channel sites seem to be the few sites throughout the CAWS where your current habitat score, which is the dark circle, seemed to coincide with what you would expect the fish to be in the absence of water quality impact because your fish scores are represented by your long rectangles in this plot. That's the 25th to the 75th percentile of the fish IBI scores.

So relative to the rest of the sites in the CAWS, it's my understanding that the biologists who were part of the UAA stakeholder process said we're looking at the North Shore Channel, we're looking at current habitat and we're looking at current fish and yet it looks like the current fish are kind of living up to their expectation here given what we see in terms of habitat when at the same time they look up through the rest of the CAWS and said we're seeing some habitat differences, but it's our general

impression that the fish aren't so to speak living up to it at those other sites.

We'd expect better from the fish here given the habitat that we're seeing. So that's my interpretation of what went on in creating this figure and using it in the use attainability analysis.

MS. WILLIAMS: Is there one exception to that general premise you were saying about the fish? Would there be one example where the fish were exceeding their habitat expectation?

THE WITNESS: Yes, there's one very obvious example in that it's about the eighth site or -- the seventh site from the left which is the Chicago River inner harbor. You'll see where that box or rectangle that's representing fish IBI scores up around 30 is much higher than the dark circle which is the QHEI habitat score which is down around 22 to 25.

BY MR. ANDES:

Q. Let me go back to the question. Sheridan Road was used as a reference site. Mr. Sulski testified to that. Mr. Essig later said were later transposed with scores for Route

83 and Sheridan Road. I'm asking is there any place where the Agency has done an analysis to document that, in fact, that error did not affect the comparisons or if correcting the error how would that affect the comparisons here?

I'm asking is there any document that other than what we just got here today that shows -- and I'm not sure it does that it shows that, that correcting that error using the right data for the reference site instead of the wrong data for the reference site doesn't affect the analysis in any way?

A. I understand that error was made and I think it was mentioned as being corrected on the record. You say reference site. I'm not sure Mr. Sulski was using that terminology especially in the way it's used for IBI's. The way I see that is more generically he said it was a point of reference or reference point was the North Shore Channel and that point of reference was that the fish in the habitat seemed to be linked together in a logical way. The fish are living up to what the habitat are and what the habitat is providing.

Q. We can go back to points a long time

ago, but the issue I'm still trying to get is a yes or no, is there a document that explains why correcting that error doesn't change anything about the Agency's proposed use classification?

A. I don't know of any specific document that does that, but that's what we were trying to clarify with this figure.

Q. Can we get -- I'll ask once more the field data for both sites so we can confirm what exactly was done and run the numbers ourselves?

MS. WILLIAMS: The Agency does not have that information.

MR. ANDES: Can it be gotten from the contractor? I hope the answer is yes because otherwise it can't be relied on. We can't see it.

MR. ETTINGER: All the other back up data has been put in for the record. By the way, I'm requesting that the Water Reclamation District --

THE COURT REPORTER: I'm sorry. I can't hear you.

MR. ETTINGER: I was just saying we're not asking that the Agency in this proceeding put in all of the dissolved oxygen data

that Scott Bell relied on and at the same time I didn't expect today in this type of preceding was going to put forth every --

MR. ANDES: We're not asking for everything. We're only asking for where an admitted error was made that we received field data so we can assess the impact of that error.

MR. ETTINGER: Okay.

MR. ANDES: All the District's dissolved oxygen data is publically available on the District's website.

MR. ETTINGER: I don't believe that's true, but we'll talk about that in this proceeding or another one.

MS. TIPSORD: Did you have --

THE WITNESS: Yeah. To my understanding, we have. We asked Mr. Rankin for copies of the actual field sheets. We did not get them. We did get computer output of the field sheets. So it's a field sheet not with the handwritten data in it, but it was generated by their computer database. It has typed values on the field sheet and he said these are the field sheets. So I can't vouch that they were the

actual sheets that someone wrote something down on, but they are the field sheets that have the data for these sites. Overall, the scores that are reflected on this graph are correct. As far as I know, they are from the original Table 3 in Rankin's report which I don't think are in error at this point. We can provide you with those computer QHEI sheets.

MR. ANDES: We'd like to see those sheets and I'd like that Mr. Rankin be requested to provide the other information that was used by the Agency to develop the basis for the rulemaking.

MS. WILLIAMS: Mr. Rankin didn't work for the Agency. I mean, whether it was available data that we used, we can ask, but that's all we can do. He is not an employee of the Agency.

MR. ANDES: I have a hard time --

MS. WILLIAMS: He is not even a contractor. We didn't contract with him. He did work for US EPA so we'll do the best that we can.

MR. ANDES: If the Agency is using this data, it ought to be able to document the

data.

MS. TIPSORD: I believe what we've been told is they can give you what they have in documentation and you can certainly argue whatever you want to argue about the quality of the data, but I would also note that the record is full of lots of information including some stuff from Mr. Yoder and so I think we need to move on from this point.

MR. ETTINGER: I just want to clarify what's being requested and what is not being requested. I mean, Mr. Bell didn't give us each data point for each individual fish reading that they found over these ten years and -- each daily and hourly DO data point and I'm not certain in this type of proceeding that anybody wants that and I'm just asking if that's what you're asking of the Agency then that's a new request and it's a little more than we asked for.

MR. ANDES: We asked for this information.

MS. WILLIAMS: I interpreted the request that I provided to Fred not necessarily if you want, Marie, that we enter it in the record,

that's okay. But my interpretation is that he wanted to see a copy and that's how I was going to go about doing this, but I'd be happy if we had a different plan.

MR. ETTINGER: Do you just want it as to the place where there was this confusion as to these two points or are you now asking them for all of their original data sheets and all of their original points?

MR. ANDES: I never suggested that. I asked for the data as to those two particular sites which we asked for two and a half years ago. I'm renewing the request.

THE WITNESS: So that would be just for clarification the four sites, the two that got mix matched?

MR. ANDES: Yes. Thank you. I'll correct the statement about the DO data. There's a lot of DO information on the District's website. Maybe not the hourly numbers. If there are any particular issue as to any particular day, we can certainly provide that here. We have an error that is being investigated and that's all we're asking about.

MR. ETTINGER: That was my confusion. It sounded like you were asking for a vast volume of backup data to be put up into this proceeding and I wanted to see whether we really wanted to go there.

MR. ANDES: I would never do that.

MR. ETTINGER: Thank you.

BY MR. ANDES:

Q. Let's go to 24F.

MS. FRANZETTI: I'm sorry, Fred. Can I ask a couple of questions on Exhibit 470 and 471?

MR. ANDES: Sure.

MS. FRANZETTI: I am not grasping, Mr. Smogor, what the difference is between 470 and 471 in that very basic -- from a very basic perspective, Exhibit 470 more of the dots seem to be within the fish IBI score boxes, is that right?

THE WITNESS: Yes, in general. In 470, the dots are closer to the rectangles than they are in 471.

MS. FRANZETTI: Okay. Why are they further away from the rectangles in Exhibit 471 than they are in 470?

THE WITNESS: In 470, the original figure I'm not aware of the basis for how the numbers that are on the left vertical axis were aligned with the numbers that are on the right vertical axis. So if you're just creating two vertical measurement scales and putting them together, it's not clear what the relationship is. For instance, if we look on Exhibit 470, the score of 24 on the fish IBI and we follow that across someone might get the impression that that's telling me something that the QHEI should be 43 or vice versa. If I have a QHEI of 43, it's telling me that that lines up with a score of 24 on the fish IBI. That's potentially misleading.

MS. FRANZETTI: Why is it misleading?

THE WITNESS: At least to my understanding, there is no basis for saying that a 43 on the QHEI somehow equals or is equivalent to the 24 on the fish IBI. So what we did is we said is there anything that tells us that this score of the QHEI should be this score on the fish IBI and we said, yes, there is. There's actually a regression in the Rankin QHEI document that allows

you to align those two scales in a more logical or at least a clearer way.

BY MR. ANDES:

Q. You're saying your original table was misleading? 5-2 was the Agency's -- was provided by the Agency as part of their basis for the rule?

A. I don't think it's necessarily misleading. I would say it lacks clarity in this regard. I think the Agency said for the most part it's our final conclusion that a lot of these sites in the CAWS the fish are not quite meeting their potential in terms of what the habitat is telling us.

Q. I was just using your word. You said it was misleading. I was trying to understand that.

A. I'm sorry. That's a poor choice of words. I would say it lacks clarity. That's what I meant by that. I think I said potentially misleading. Maybe not. I'm sorry.

Q. So this is clearer?

A. That was my point or at least my attempted point with Exhibit 471 was to help

clarify.

MS. FRANZETTI: Exhibit 470 was the IEPA contractors CDM effort to show -- they show the use designation category using Ohio's use designation classification of limited, modified and general warm water, correct?

THE WITNESS: Yes, I think that's correct. That's what they are trying to do, yes.

MS. FRANZETTI: That's what is meant by the use of the line -- label limited for the line below the line across from the IBI value of 24 that you were just using as an example, right?

THE WITNESS: I'm not sure of that. I'm not sure that everything below the line at 24 was at least I didn't -- was supposed to be called limited. I guess I'm not seeing that. I see what you're saying by the way it's labeled in 470 that the word limited is down there in the lower corner. I'd have to reread the --

MS. FRANZETTI: Okay. Let's go back to what you did in 471. You took the same data that is shown in Exhibit 470 and you applied what is referred to as the Rankin regression equation to it?

THE WITNESS: I took the -- sorry. This gets complicated.

MS. FRANZETTI: You're making me feel better by saying that.

THE WITNESS: I took not the numbers -- the dots and the rectangles. Those are the same quantitative value other than the errors that we talked about for those four sites. Those are flip-flopped. Those are the same exact quantitative values as they are -- they're the same across both plots. What I did was when you're plotting a dot versus plotting a rectangle, effectively I change the scaling of the IBI in Exhibit 470 to a new scale, to a different scale, and it's the right-hand side of 471.

So how the dot graphs relative to the box or the long rectangle has changed, but the value of the dot and the values represented by the rectangles have not changed.

MS. FRANZETTI: Does this in any way -- excuse me. Does the results in Exhibit 471 do they in any way raise a possible doubt as to the suitability of the QHEI index to the CAWS given these differences now between where the

circles are and the fish data boxes are?

THE WITNESS: It didn't strike me after rescaling this and taking a look at it I guess I didn't get that impression that something was standing out as telling me the QHEI is like a red flag went up with the QHEI as far as its applicability.

MS. FRANZETTI: And the reason I'm asking is am I wrong that one would normally expect even after what you did in Exhibit 471 for the circles to mostly be at least in or closer to the fish data boxes?

THE WITNESS: I guess I didn't have that expectation. Again, I'm just going from a preestablished relationship between these two indicators, the habitat indicator and the fish indicator. And I'm just letting the data tell me what it will. I didn't have any preconceived -- I guess no strong preconceived ideas of how far apart they may be or not.

MS. FRANZETTI: I did not mean to imply that you would have.

THE WITNESS: Okay.

MS. FRANZETTI: It's more I'm

asking -- let me see if I can rephrase it. I thought that generally QHEI values and IBI values would be more consistent with each other for a given waterway segment than these appear to be, is that right?

THE WITNESS: Yes, there's a third prong here. Do you have a question to finish that or do you want me to --

MS. FRANZETTI: That's where I was coming from is that given these are not very consistent with each other, is it reasonable to raise the question as to how suitable the QHEI index for waters of this type that the CAWS are heavily modified manmade -- basically what the District's concern was that made it go to trying to develop a more suitable index?

THE WITNESS: And that's where I'm seeing things differently with that. What I'm seeing here is if there were no water quality impacts or relative lack of water quality impacts, I'd expect those boxes to be up in the circles and this was part of our proposal. I think this was realized, but maybe not as clearly as this figure now shows. I think it was realized that these

fish just don't seem to be doing as well as what the habitat shows they can do and, to me, the circles represent the potential for what the fish can be and a likely reason -- I'm not saying this is definitive. The likely reason in that regard is those -- the fish aren't up to their habitat because of other things keeping them down.

BY MR. ANDES:

Q. Let me follow up on that, though. If that were true -- let's look at the North Shore Channel. Some of the lower DO levels we see in the system are upstream of Sheridan Road and I don't know if you're aware of all the data and yet even with very low DO values upstream of Sheridan Road -- if DO were a limiting factor, then you'd say we're going to show low IBI scores, but high habitat potential and, in fact, that's not what you see here?

Here, they are very closely correlated which tends to say maybe DO isn't a significant factor there because if it were, the circle would be way above the box so how do we explain that?

A. I don't know. I'd have to say I'm

not familiar with the DO data.

Q. But you just made conclusions? You said this table led you to some conclusion about using the QHEI --

MS. WILLIAMS: That's not what he said. He said one possibility.

BY MR. ANDES:

Q. The statements just made as I understand them reflect that your sense seeing the circles, the attainable numbers, well above the fish numbers tended to confirm for you that the Agency's conclusion is that these waters can be more than they are and the Agency's determination was that DO standards would help get there.

I'm asking how that squares with the numbers with the data and the demonstration here for the North Shore Channel where we have low DO data upstream, which would seem to indicate if DO were the limiting factor then your attainable would be way higher than your actual and it's not?

A. All I can say -- yes, our interpretation is -- and I think it's a reasonable interpretation is if your fish are much lower -- that rectangle is much lower than the dot which is

your habitat potential something is going on there or at least it's a potential indication of that. I can't say anything definitively from this, but it is an indication, possible indication, put the qualifier on it, that there is something going on keeping the fish down to where they could be.

Q. Here, in the North Shore Channel where you're not seeing that something going on you would not be able to make that conclusion, correct?

A. Correct. That is a difference here in the North Shore Channel relative to these others and I was just saying that based on my understanding from what was decided in the UAA process that was also consistent with some of the biologist's perceptions. Now, as far as how DO matters in this general pictures, I don't know because I haven't looked specifically at the dissolved oxygen data.

Q. Okay.

MR. ETTINGER: And the two sites here, the North Shore Channel below the Touhy Avenue and the North Shore Channel below Peterson Avenue, those are the two sites directly below the

North Side Sewerage Treatment Plant?

THE WITNESS: Yeah, I don't know the exact location of the site.

MR. ETTINGER: I do.

BY MR. ANDES:

Q. Let's move on. 24F. Can you state in prior testimony -- well, I'm quoting your prior testimony. That QHEI alone was not being used to make the final decision about attainable biological conditions. There was no single QHEI cutoff to define that in and of itself. If so, what other factors were used to make those decisions?

A. In the context here from what I recall is questions about the Cal-Sag Channel which is a big difference between the two proposals or at least an obvious difference between the two proposals MWRD suggested a less natural use for Cal-Sag Channel than the Agency proposed and in that context of the differences for Cal-Sag Channel with the other factors that were used besides the QHEI scores were direct observations of the waterways and I think the presence of certain what we'll call positive

habitat attributes, components of the QHEI in the Cal-Sag Channel. I think one of them being coarser substrates.

Q. Okay. So the Agency was not -- is it the only instance you can think of or are there others where the Agency wasn't totally driven by the QHEI numbers, but instead used other factors?

A. I think in the record and what I tried to probably not clearly say earlier is there were other things used besides QHEI scores.

Q. So it was okay with the Agency to use some qualitative assessments to make some borderline decisions?

A. Yes, the Agency used direct observations based on people who had a lot of experience working in those waters.

Q. But the QHEI scores themselves are based on just one set of data from one day, correct?

A. The Rankin scores were -- QHEI scores were a one-time measurement at the site.

Q. I think that the next statement is about the same issue. So I think the other things in the next statement are the same ones we just

talked about. So I'll skip that.

A. The sky battling on about levels one, level two, what was that -- never mind.

Q. We'll go on. Question 25, our last question. On pages 21 and 22, you state the Ohio metric should be used as a model to classify CAWS waters. Are you familiar with the Cuyahoga River Ship Canal in Ohio?

A. I'm not familiar with the Cuyahoga. And, again, to be picky I don't think my testimony intended to say we're using, quote, the Ohio metrics should be used as a model to classify CAWS waters, unquote.

To clarify, I was trying to say we should use the Ohio QHEI and the Ohio fish IBI to help inform the uses for the CAWS waters. I didn't necessarily intend to say we use the Ohio classification system.

Q. Are you aware of any extent to which the Agency has considered a comparison between the Cuyahoga River Ship Canal and the CAWS?

A. I'm not aware that was used in any explicit way. There is -- I will -- I do have to qualify that in the original Figure 5-2 Exhibit

470 versus 471 there are four waters that are not part of the CAWS that are depicted in 470 and not in 471 and one of those is the Cuyahoga Ship Canal.

Q. Are you aware of why that was?

A. My understanding is they were kind of just using that for some perspective on plotting the data like this. Let's see how these data plots for water outside the CAWS. That's my understanding for some perspective.

Q. Okay. So my question to you and you may not know the answer is, given the similarity between the Cuyahoga River Ship Canal and reaches of the CAWS, which I think were described in Ms. Nemura's testimony, do you have any knowledge of the Agency's analysis in terms of why it didn't put segments of the CAWS in a similar category as the Cuyahoga River Ship Canal?

A. I'm not aware of any specific comparisons and I'm not necessarily aware that the Agency's proposed Use B how that differs or is similar to the Cuyahoga's current use designation is. I'm not sure.

Q. We've had other testimony on it, but

you're not aware of it?

A. I'm not aware of any direct comparison that the Agency used to generate its initial proposal in that regard.

Q. Okay.

MR. ANDES: Those are all my questions.

MS. TIPSORD: Anything else for Mr. Smogor?

MS. FRANZETTI: I had a couple. Mr. Smogor, I understand you feel that the Agency should have considered other assist -- I'm sorry. Let me start again. I understand that you believe that the District's contractor, Limnotech, should have considered other factors beyond what they did in their creation of the habitat index, is that a fair, general statement about one of your opinions?

THE WITNESS: In general, yes.

MS. FRANZETTI: With respect, though, to the factor that they did consider and how -- and their conclusions as to the relative contributions to biological conditions of those factors, did you feel that for the most part the

way they ranked the contributing factors within the factors they considered was relatively reliable?

THE WITNESS: I'd have to say I don't agree with the definitiveness of their interpretations of the patterns that they saw. They seem to be -- or -- there seem to be some fairly definitive statements saying that physical habitat is more important to fish in these waters than is water quality. I can't agree with that. I don't think the data necessarily supports that definitive conclusion because aspects of water quality that potentially could have correlated with their measurements of physical habitat that appeared most related to the fish, that kind of potential confoundment wasn't sufficiently covered is my interpretation.

MR. ANDES: When --

MS. FRANZETTI: Fred, if I can ask one more.

MR. ANDES: Go ahead.

MS. FRANZETTI: So you don't agree with their general ranking that habitat was a more important factor, significantly more important

factor than dissolved oxygen?

THE WITNESS: Dissolved oxygen -- no, I don't think the overall analysis looked at enough things to make that definitive argument. I think there are some possible confounding factors that would kind of -- that would call into question being that definitive about what the analysis showed.

MS. FRANZETTI: And as you've testified, though, today other than I think you mentioned the five factors by Carr, one of which I think they didn't consider, you can't identify the other factors?

THE WITNESS: No, I didn't go and do further analysis. No, I didn't other than some of the pictures that we've presented here. I didn't do much.

MS. FRANZETTI: I'll just ask you one more thing. You keep using the term that you don't think they can be as definitive as they are and, by that, do you mean they can't based on their work determine that even in a relative way that habitat at these various sites was the most limiting factor?

THE WITNESS: I don't think so and I also have to focus on limiting what. What I tried to present in my testimony is a criticism. Another one of my criticisms is they did measure aspects of fish and from those aspects of fish they developed a habitat index. In fact, directly from those measures of fish, but what I tried to point out is those aspects of fish that they looked at aren't necessarily in my opinion a strong defensible measure of biological condition as we're talking about in this specific context of the Clean Water Act goal and use attainability analysis.

So they did show some relationships between some fish variables and some habitat variables, but, to me, the fish variables may not be -- their fish index may not be a very good measure of biological condition and that's what we're talking about here, what we have to do first is justify why the biological condition, the attainable or potential condition of these waters can't be as high as a balanced Clean Water Act goal.

MR. ANDES: But that's not --

THE WITNESS: That's how I'm looking at this.

BY MR. ANDES:

Q. But that issue hasn't really been contested? Even the Agency said none of these waters can meet the Clean Water Act goals, correct? So if we're trying and if the Limnotech report was trying to -- again, we have four different purposes in the report, but if one of them was to say we're trying to look at fish metrics and as you said many of these were ones that you used yourself and determine where differences in habitat or other factors made a difference in the fish and, therefore, they were more or less limiting factors and then you have conclusions indicating that 48 percent of the variability in the fish data collected in the seven year period can be explained by the key habitat variables, only two to twenty-seven percent for the DO variables and mostly down to around eight percent doesn't that give you a sense that -- at least a qualitative sense that habitat is a more limiting factor than DO is?

THE WITNESS: A couple corrections

there in the premise. You mentioned I used a lot of fish metrics in my own index. There were maybe four of the twelve that you mentioned that I agree were used in the Illinois IBI, but aside from that --

Q. You agree others were relative fish metrics, though?

A. They are other fish metrics that have been used other places. To get to your point, I'm sorry, I don't believe that those numbers of comparison are the full story that two percent or eight percent that you quoted for the dissolved oxygen.

There's something called shared variance. If I go out there and I measure physical habitat and I find out that my physical habitat relates to my fish at some measure 48, 48 percent, I also have to ask what about those sites where I collected that physical habitat could be related to the fish. Maybe dissolved oxygen or other water chemistry differences that covary went right along with that variability, with the physical habitat are just as reasonable explanations for that 48 percent relationship to

the fish.

Q. If they covary and I know we covered this issue before, but you can't find a cause-effect relationship, why does it even matter? Two questions. First of all, why does it even matter if it's purely incidental? The other aspect is you're aware in the report they looked at habitat and then said let's put DO on top of this and only explained another few percent in terms of fish data?

A. I don't see it that way. When they took out the 48 percent and said this is all due to habitat that could have been due to water quality. It just wasn't looked at.

Q. But when they looked at water quality by itself, it was mostly down to two to eight percent?

A. They looked at water quality by itself after they removed the 48 percent and part of that 48 percent could have been due to water quality.

Q. Let me clarify two separate issues. One was -- looking at a quote. DO alone can only explain basically between two to eight, up to 27

percent of the variability. That's not taking out all the variability from --

A. Up to 27 percent.

Q. -- 27 with one measure. The other four DO measures tested, page ES 2, one measure had R squared of 0.27. The other four measures tested R squared value ranged from 0.02 to 0.08 whereas we're talking 48 percent on the habitat. So, again, while one could quarrel with specifics making a quantitative judgment we're talking about a pretty significant difference between something mainly down to two to eight percent, one at four to eight percent looked at in comparable ways.

A. I guess I'm not seeing it that way. I keep coming back to kind of a bigger picture argument and I know there was testimony about, well, you have to look at all the habitat together. If you're going to look at water quality separate, you can look at physical habitat as separate components --

Q. Are you aware of studies --

MS. WILLIAMS: Let him finish, Fred.

BY THE WITNESS:

A. And I keep coming back to saying

what do my measures of habitat represent? What do my measures of fish represent? To me, that's the bottom. That's the bigger picture here. I keep coming back to at least my impressions of the CDM -- sorry. I'm sorry. The Limnotech reports. They certainly had some measures of habitat and some measures of fish, but, to me, they just weren't focused on you need a measure of fish that is a measure of biological condition that can tell you something from balance to imbalance in terms of the Clean Water Act context and you also need a measure of habitat that is right in there in that same context and what I was trying to argue is those two tools that we chose I think are much more relevant than creating these two tools for the CAWS.

BY MR. ANDES:

Q. But if you were trying to determine and as you say in looking at the Ohio system really wasn't designed to be able to -- although some IBI's have been used this way, you didn't look at it to determine which were the more limiting factors? If the analysis is relevant as to what is the more limiting factor because part

of the discussion in this rulemaking is will DO -- will tighter standards for DO, temperature or anything else make a difference to the fish -- will it make a difference to the use? Therefore, it would seem it's an interesting and relevant point to say what is the more limiting factor? Is habitat such a limiting factor that changing the DO won't make much difference and if you're doing a study with that purpose and other purposes, but including that purpose, you would agree that certainly the habitat -- the analysis that Limnotech did is relevant to that purpose?

A. I would say it's relevant, but I don't think it's sufficiently relevant. I think you have to look at some other things going on. You have to look at more information. It is relevant to look at relationships among these variables, but it's also relevant and I think, if not necessary, to look deeper than just a few -- some simple multiple linear regressions especially when certain factors can covary and kind of confuse the issue. There's the potential of that and that's all I'm trying to say.

MS. WILLIAMS: Did you have any

conclusions yourself, Mr. Smogor, when you looked at the habitat variables that Limnotech found to have the greatest impact on their fish metric?

THE WITNESS: Yes, I looked at those closer a little bit and maximum depth came out as the most important of the habitat variables. At least it came out as being most correlated to the measure of fish that they used and when I dug a little bit more into that regression tree analysis if I looked at a memo that Mr. Bell attached to some of his testimony and I looked at that a little closer and saw, well, okay, it's the first split that this analysis chose, but I looked and it only took ten fish samples from one hundred samples it only split off ten fish samples and said these ten samples are different from the 90 other samples and, to me, that's all it was doing and I looked at those ten samples and it looks like they're all from only a couple sites in the North Shore Channel.

So, effectively, what the first rung of the CART analysis told me was, well, there's a couple of sites up in the North Shore Channel which are the shallowest, narrowest sites

in this rulemaking, they happen to have a higher fish score than the rest of the sites in the CAWS. That's where maximum depth came in.

Q. In fact, they don't?

A. But that's what the CART analysis told me. I could point to Mr. Bell's memo. So -- okay. Maximum depth came out on top of this regression tree analysis, but what it is actually doing in terms of practical meaning to interpreting what is going on at the sites, what is going on among the sites, and with the fish data it was a small component of what might be going on throughout the rest of the CAWS, that difference.

Q. The CART analysis -- and I thought you said earlier you weren't familiar with it.

A. I said I was familiar with him presenting that and talking about it.

Q. Is it your understanding that was not part of the original analysis done in the Habitat Evaluation Report, it was something done later recommended by the peer reviewers to do a double check on what factors came out in the report as the key factors and simply confirmed the

initial conclusions in the report that maximum channel depth and overhanging vegetation and other factors were more significant than anything else, right? That was not part of the initial Habitat Evaluation Report?

A. Correct. I agree that was not part of the initial Habitat Evaluation Report.

Q. It was simply a double check requested by the peer reviewers which, in fact, confirmed the initial conclusions?

A. I don't necessarily agree it confirmed all the initial conclusions, but it was done after the focus of the first analysis. Yes, I do agree to that.

MS. TIPSORD: Anything further?

MS. WILLIAMS: I'd like to ask one of Fred's questions that he skipped if that's okay. I'd like to ask question 25E. Do you recall testimony from Limnotech as well as statements in the Habitat Evaluation Report stating that the QHEI did not relate well to the biological conditions in the CAWS? Do you have evidence or analyses to contradict those findings?

THE WITNESS: I did find what I

believe is some evidence that contradicts that.

MS. WILLIAMS: I'm showing you a table entitled number of fish species as simple measure of biological conditions at CAWS sampling sites. Can you identify this document for the record?

THE WITNESS: Yes, I created this document.

MS. WILLIAMS: If there's no objection, I'd like to enter into the record this exhibit and have Mr. Smogor explain how it was created.

MS. TIPSORD: If there is no objection, we'll mark the several pages beginning with number of fish species as simple measure of biological conditions at CAWS sampling sites as Exhibit No. 472. Seeing none, it's Exhibit 472.

(Document marked as IEPA Exhibit No. 472 for identification.)

MS. WILLIAMS: Can you just explain how it was created and what you think it shows?

THE WITNESS: Yes. The criticisms was that the QHEI does not relate well to biological condition in the CAWS and so I just

took a simple step back and said, well, we've had our arguments about what is a good measure of biological condition and what isn't and I said a real simple way of looking at biological condition is just what -- how many fish species are at each site because it is common for warm water fish indices of biological condition to be -- one of those common measures in fish IBI's is just how many species do you have living at the site where more species is usually a measure of a better condition or a less impacted condition than fewer species.

So these comparisons -- there's four sets of comparisons, one per page, looked at that top Y axis. The maximum number -- if I'm on the first page, the maximum number of fish species caught in the sample at a site for the 2001 through 2007 fish samples that are available on the record. And on the X axis is the CAWS combined fish metric versus the Rankin QHEI value that are available on the record and when I looked at what is a better measure of fish condition if I'm going to look at fish condition or biological condition at the site in terms of just number of

species it appears that the QHEI is actually doing a better job here than the combined fish metric.

BY MR. ANDES:

Q. Let me ask you this. If you assume for a moment that we have two situations, one of them you have two or three fish species and, in fact, we've seen testimony here that the CAWS is dominated by a few species so you might have 500 fish of each of three different species. Okay?

A. Okay.

Q. Very tolerant ones that are present throughout. That's one situation and then you have another where you have two of this, two of that, two of this, two of that, two of this, ten different species and you have two fish at each ones that's going to come up to a ten because you have ten different species with two fish, the other one with the 1,500 fish is going to come up with a three. So it's going to look like the one with the 20 fish is much healthier than the one with 1,500 fish under this measure, correct?

A. Correct.

Q. Okay. Did you look at the number of sheer fish as a metric to determine how that

correlated to either situation?

A. No. The number of individuals?

Q. Yes.

A. No, and I'd have to qualify that by saying that in typical measures of biological condition, fish IBI's, it's very common to have a metric or even more than one metric or component that makes up the final index that says how many fish species live here. So I didn't think it's too unusual to look at number of fish species. Your example of having 10 species in two each is very hypothetical.

Q. In fact, in this set of waterbodies, we've had testimony before that a overwhelming number of fish come from a few species, right? So the number of species here and, again, we've had testimony where we've seen a lot of fish from three or four different species and tiny little numbers coming from a bunch of other species. In fact, isn't the number of fish in those main dominant species the best indicator for this unique system of how healthy a particular reach is in terms of -- whether it has one or two of some unique species would seem less relevant whether it

has 150 gizzard shad or some other very tolerant, very dominant number of fish?

A. From my experience, I'm not seeing it that way at all because when the tolerant fish get in very high numbers, they're effectively swamping the system. To me, that's a more human impact. So the actual number of fish is not necessarily a good measure of human impact.

Q. So if we have two different areas, one of them has two, two, two at 50, 50, 50 and the other one has two, two, two, ten, ten, ten, aren't we -- isn't one healthier than the other, it has a better fish population than the other one? Are you saying it's better if we have fewer fish? Isn't it better if we have more fish?

A. This is very hypothetical.

Q. I'm trying to figure out what these numbers mean and just counting the number of species seems to be not telling the whole picture.

A. Counting the number of species at a site is often a strong primary component of these measures of biological condition. People hear the concept of species diversity or species richness, effectively that's related to how much different

types of organisms can this habitat support and the more types that a habitat can support, in general, that means the habitat is in a less impacted condition.

Q. But you're not looking at any detailed way at which fish are there, whether they're tolerant or intolerant, you're simply counting the number of species?

A. Counting the number of species, which is a common metric in a fish IBI. That's all I'm saying. I'll admit it is a simple measure and that's why I put it at the top. It's a very simple measure.

Q. The other question I had one of these scales you're comparing the number of fish species to the QHEI score, which is a habitat score. The other one you're comparing the number of fish species to a fish metric. So how are those not apples and oranges?

A. The combined fish metric is a measure of biological condition, is it not, or at least that's what has been proposed?

Q. One is a fish and one is a habitat.

A. Right. But the original question I

think said do you have evidence that the QHEI does not relate well to biological conditions in the CAWS and I'm saying I have evidence that it's a better reflection of biological conditions than the measure that was being used as the measure of biological condition in the MWRD proposal.

Q. You used QHEI to relate them to the IBI. All I'm saying is we don't know what the standard correlation is in one situation versus the other? You're not really comparing fish to fish? You're comparing a fish measure to a habitat measure. So it's hard for us to assess whether you might expect a different correlation in one versus the other. We just don't know that. If you were comparing IBI's to fish metrics, then it would be more relevant because fish metrics are an actual thing, QHEI are a potential thing, they're two different kinds of measurements?

A. I'm saying we use QHEI as a measure of biological potential because of its established relationship with the fish IBI and I'll just let the pictures speak for themselves. For instance, as you get higher QHEI scores -- I'm referring to the first graph at the bottom of the first page.

As you get higher QHEI scores, you tend to get more types of fish caught in your sample and that trend is seen in all four pages here as you get higher QHEI scores you tend to get more types of fish in your samples.

Q. But you haven't looked at that relative to number of fish?

A. The counts of fish, no.

Q. I guess the other issue would be --

MR. ETTINGER: Can I just say one thing on the record?

MS. TIPSORD: Actually, I think Fred has another question.

BY MR. ANDES:

Q. It's not unusual to compare one fish metric to a combined fish metric, am I right? You just take one piece of the fish metric on the left in comparing it to the combined fish metric. So I'm not sure what necessarily the relationship is going to be between those two.

A. It's common to do that if you want to see how each of your metrics is behaving, so to speak, in your index. This was not a part. This one measure of the simple measure of biological

condition that I chose for these graphs are not one of the metrics in the CAWS combined fish metric.

Q. And it's not one of the ones that Limnotech selected as most relevant and appropriate?

A. It's not one that Limnotech selected to include in the CAWS combined fish metric.

MR. ANDES: Thank you. I'm done.

MS. TIPSORD: Mr. Ettinger, you had something?

MR. ETTINGER: I do. Mr. Andes said it is not contended that any portion of this system should be classified as general use. I am correct he is -- he is correct that that is not the Agency's proposal nor the Water Reclamation District proposal. I just want to let you know it might be someone else's proposal.

MS. TIPSORD: Is there anything else today? All right. Let's adjourn for the day. We'll see you all tomorrow.

STATE OF ILLINOIS )
) SS.
COUNTY OF COOK )

I, Steven Brickey, Certified Shorthand Reporter, do hereby certify that I reported in shorthand the proceedings had at the trial aforesaid, and that the foregoing is a true, complete and correct transcript of the proceedings of said trial as appears from my stenographic notes so taken and transcribed under my personal direction.

Witness my official signature in and for Cook County, Illinois, on this _____ day of _____, A.D., 2010.

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