

ILLINOIS POLLUTION CONTROL BOARD

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

R08-09

(Rulemaking-
Water)

RECEIVED
CLERK'S OFFICE

NOV 23 2009

STATE OF ILLINOIS
Pollution Control Board

REPORT OF PROCEEDINGS held in the
 above-entitled cause before Hearing Officer Marie
 Tipsord, called by the Illinois Pollution Control
 Board, taken before Laura Mukahirn, CSR, a notary
 public within and for the County of Cook and State
 of Illinois, at 160 North LaSalle Street, Room
 N-502, Chicago, Illinois, on the 9th day of
 November, 2009, commencing at the hour of 12:30 p.m.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

A P P E A R A N C E S

MS. MARIE TIPSORD, Hearing Officer
MR. GIRARD TANNER, Chairman
MR. THOMAS JOHNSON, Member
MR. ANAND RAO, Member
MS. ALISA LIU, Member
MS. ANDREA MOORE, Member
DR. SHUNDAR LIN, Member
 Appearing on behalf of the Illinois
 Pollution Control Board

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217)782-5544

BY: MS. DEBORAH WILLIAMS
 MS. STEPHANIE DIERS
 MR. ROBERT SULSKI
 MR. SCOTT TWAIT
 MR. HOWARD ESSIG
 MR. ROY SMOGOR

FRANZETTI LAW FIRM
10 South LaSalle Street
Suite 3600
Chicago, Illinois 60603
(312)251-5590
BY: MS. SUSAN FRANZETTI
 Appearing on behalf of Midwest Generation

1 HEARING OFFICER TIPSORD: It's 12:44.
2 Good afternoon, everyone. Welcome back.
3 We're ready to start the afternoon with the
4 testimony of Greg Seegert; is that correct?

5 MR. SEEGERT: Seegert.

6 MS. FRANZETTI: Can we also have
7 Mr. VonDruska sworn. He may not wind up
8 adding anything, but in the event he does,
9 this way he's already sworn in.

10 (Witnesses sworn.)

11 HEARING OFFICER TIPSORD: Thank you.
12 And with that, we'll mark the prefiled
13 testimony of Greg Seegert. If there's no
14 objection, we'll mark prefiled testimony as
15 Exhibit 366.

16 Seeing none, it's Exhibit 366.
17 And I believe we'll start with the IEPA.

18 Examination

19 By Ms. Diers

20 Q. Good afternoon, Mr. Seegert. My name
21 is Stephanie Diers, and I will be asking questions
22 on behalf of Illinois EPA. And I'm going to begin
23 with our prefiled question 1. Please explain your
24 experience with the waters that are part of the

1 Illinois EPA's proposal.

2 MS. FRANZETTI: And you did mean to
3 include extensive experience?

4 MS. DIERS: Yes. Sorry.

5 MR. ETTINGER: But not with
6 Commonwealth Edison.

7 MR. SEEGERT: I've been studying the
8 Dresden, Brandon, and Lockport pools almost
9 annually since I came to EA, which was in
10 early 1982. I also studied the south branch
11 of the Chicago River near the Mid General
12 Fisk Station, and although I've been involved
13 with those studies for 27 years, my role has
14 changed over time. When I first came I was
15 younger and stronger and I used to go out and
16 do field work fairly regularly. And so as
17 part of that I was involved directly in the
18 fish collections, the electrofishing, the
19 seining, the gillnetting, all the things that
20 field biologists do. Then when I became
21 project manager, which was about 1985, at
22 that point I didn't go out in the field
23 nearly as much, but I was still involved in
24 preparing the final reports and overseeing

1 all of the data collection and analyzing the
2 data. Then my associate, Mr. Vondruska,
3 became project manager in 1990. And after
4 that point I functioned in what EA calls the
5 senior reviewer, which means I sort of watch
6 over the project manager's shoulder. And in
7 that capacity I reviewed the final report and
8 verified that all the data presented therein
9 was accurately provided. And then during the
10 mid 1990s I, again, went out in the field,
11 but this time in an audit function. And so I
12 got to see, again, all of our adult fish
13 collecting, our larval work which we did in
14 the mid '90s, and the habitat evaluation.

15 Another study which is
16 relevant but was not done for Midwest
17 Generation, but was done for a different
18 client was in conjunction with an application
19 for an adjusted temperature standard. I
20 studied habitat in the Calumet River and the
21 Little Calumet River in the early '90s, and
22 then as part of that same study, EA prepared
23 a thermal model for that section of the
24 river. And besides my direct involvement at

1 the five Midwest Generation plants, I kept
2 abreast of what's been going on in the CAWS
3 and the Lower Des Plaines in several ways:
4 First of all, I regularly attended the
5 Illinois American Fisheries Society meetings
6 where I often presented papers on the studies
7 that we were doing in the subject waterways.
8 I've also, pretty much on an annual basis,
9 attended the EPA-sponsored surface water
10 monitoring and standards meeting, the acronym
11 for that is SWiMS where other researchers
12 give presentations. I know Dr. Dennison with
13 the district a number of years ago gave a
14 paper on the District's work in that area.
15 So I've been keeping abreast of what the
16 district has been doing. We heard earlier
17 testimony from Ms. Wozniak about the
18 biological advisory group that was formed for
19 the Lower Des Plaines. I was an active
20 member of that work group, and we had many
21 meetings to discuss the various topics. Also
22 reviewed the literature pertaining to these
23 and other Illinois rivers and reviewed
24 numerous habitat evaluation techniques, not

1 just the one we've heard about here, the
2 QHEI, but others.

3 And then, lastly, in my role,
4 one of the other hats I wear is chief
5 ichthyologist for EA. So that means I end up
6 looking at fish specimens that our crew
7 brings back to the lab. And basically if
8 they get stumped, they give it to me and
9 basically say, Seegert, what is this fish?
10 And that's what I try do is identify those
11 fish. Thus, I'm very familiar with the
12 species composition throughout the area, and
13 actually one of the outcomes then of this was
14 we rediscovered a species called the greater
15 redhorse, which had not been collected in
16 over a hundred years in Illinois. And as a
17 result, our studies ended up going on the
18 Illinois endangered species list. And then
19 I've also studied the areas that basically
20 flank this area. So I've worked in the Fox
21 River, the Kankakee River, and the Rock
22 River. And in those systems I've done
23 studies specifically for the State of
24 Illinois looking for threatened and

1 endangered species; some of those are western
2 sand darter, the pallid shiner, greater
3 redhorse, and Ozark minnow. And then,
4 lastly, you'll hear more about the intensive
5 habitat work that we did last year in the
6 Upper Des Plaines Pool.

7 BY MS. DIERS:

8 Q. And did you say EA prepared a thermal
9 model for the Calumet River?

10 A. For a portion of it, yes.

11 Q. And who was that study prepared for?

12 A. That was done for Acme Steel.

13 Q. Prefiled Question 2: Please explain
14 how you're defining the CAWS waters and the Lower
15 Des Plaines?

16 A. Well, short answer is I'm defining it
17 the same way you are.

18 MS. FRANZETTI: Meaning in the
19 proposed regulations that they filed in this
20 rulemaking?

21 MR. SEEGERT: That is correct,
22 Counselor.

23 MS. FRANZETTI: Said with such
24 disdain.

1 BY MS. DIERS:

2 Q. Three, how long has EA been employed
3 by Midwest Generation?

4 A. EA has worked for Mid Gen since
5 shortly after it purchased the electric generating
6 stations from Com Ed, which I believe was in late
7 1999. So basically ten years.

8 Q. And did EA work for Com Ed before
9 that?

10 A. Yes, we did.

11 Q. When were you hired by Midwest
12 Generation to specifically review Illinois EPA'S
13 regulatory proposal?

14 A. We were hired shortly after the
15 regulatory proposal was filed, which was October of
16 2007.

17 HEARING OFFICER TIPSORD: It seems
18 like only yesterday.

19 BY MS. DIERS:

20 Q. Prefiled Question 5: What do you mean
21 when you say that you have been engaged by Midwest
22 Generation to review and analyze information and
23 data to assess the use designation issues relating
24 to aquatic life goals for the CAWS and Lower Des

1 Plaines? And I think this is with respect to Page 1
2 of your prefiled testimony.

3 A. Yes. Midwest Generation asked EA to
4 review and analyze relevant information and data to
5 assess whether or not one or more of the UAA factors
6 was satisfied, and what would be appropriate aquatic
7 life use designations for the subject waterways.

8 Q. Prefiled Question 6. This is with
9 respect to Page 2 of your prefiled testimony.

10 In your opinion, how has the
11 Illinois EPA failed to adequately consider and
12 assess the unique aspects of the Chicago Sanitary
13 and Ship Canal and Upper Dresden Island Pool in
14 determining whether these water bodies are capable
15 of obtaining Clean Water Act Aquatic Life Goals?

16 A. First of all, I think Illinois EPA
17 failed to adequately assess habitat in the area.
18 They failed to adequately affect -- adequately
19 assess the effect of the barge traffic. They also
20 failed to adequately consider the effects of flow
21 and water level fluctuations. They failed to
22 account for the highly significant effects that dams
23 have on this system. They did not appear to take --
24 or make use of the large biological data set that EA

1 has collected over the years. They also, on the
2 other hand, they relied, I think, far too much on
3 what I consider to be a poorly designed and executed
4 biological and habitat survey for much of the data.
5 So basically they ignored a much larger and better
6 data set and used a smaller and not as good a data
7 set. They also failed to properly consider the
8 effects of sedimentation, both sediment just as
9 sediment, but also sediment in terms of being
10 contaminated sediment. They've also failed to
11 realistically account for the magnitude or the cost
12 associated with remediation and restoration within
13 the system. And they, themselves, did not collect
14 any new data.

15 MR. ETTINGER: I'm sorry. In your
16 answer you refer to this system. I just want
17 to make sure what this system is. Are you
18 talking about the Lower Des Plaines or --

19 MR. SEEGERT: I'm talking, in this
20 case, about the Lower Des Plaines and the
21 CAWS.

22 MR. ETTINGER: Okay. So your answer
23 would apply to all of that area?

24 MR. SEEGERT: Yes. Some parts more

1 than others. But yes, that answer applies
2 throughout the system.

3 MS. FRANZETTI: If I could just have a
4 moment.

5 (Off the record.)

6 MS. FRANZETTI: If the witness can
7 clarify or modify his answer.

8 MR. SEEGERT: Well, I mean there are
9 parts of the CAWS which we haven't really
10 talked very much about, but where there isn't
11 barge traffic going on. So obviously the
12 answer would not apply to there. When I'm
13 talking about the system, I guess I should
14 clarify, I'm primarily talking about the ship
15 canal which begins at the south fork, but I'm
16 also including the south fork, since
17 functionally it's the same system as the ship
18 canal and then the Lower Des Plaines River.
19 So those are the areas that I'm talking
20 about.

21 BY MS. DIERS:

22 Q. Where does Brandon Pool fit in the
23 areas that you're talking about?

24 A. Well, according to the rulemaking,

1 there's actually two parts of that. There's Brandon
2 Pool upstream where the Upper Des Plaines comes in,
3 and that's part of the CAWS. And then there's the
4 section, which I believe is four miles long, which
5 goes from where the Upper Des Plaines comes in and
6 goes as far as Brandon Road Lock and Dam. I
7 understand that it's been divided that way for
8 regulatory purposes. In the fish's perspective, it
9 isn't really any different where the fish is in the
10 Brandon Pool.

11 MS. FRANZETTI: Counsel, did you want
12 him to tell you whether his answer to your
13 question says -- included that he would apply
14 all of those items that he testified about
15 with respect to your Question 6. Is he
16 including Brandon Pool in that answer? Was
17 that what you wanted to know as part of your
18 follow-up question?

19 MS. DIERS: I think what we're trying
20 to understand is if it's part of the Chicago
21 Sanitary and Ship Canal or the Upper Dresden
22 Island Pool.

23 MS. FRANZETTI: When he uses those two
24 terms, is it dropping through the cracks or

1 is it in one of them? Can you clarify, Greg?

2 MR. SEEGERT: Could you repeat the
3 question, please.

4 MS. FRANZETTI: Do you mind if I jump
5 in? You're trying to get clarity there. You
6 tend to use two terms: Chicago Sanitary and
7 Ship Canal and the ship canal. And then you
8 refer to either Lower Des Plaines, or
9 sometimes I think you say -- you use the
10 regulatory term Upper Dresden Island Pool.
11 Their question is Brandon Pool in one of
12 those categories or are you leaving it out?

13 MR. SEEGERT: It's in both of those
14 categories.

15 MS. FRANZETTI: Okay.

16 MR. SEEGERT: Part of Brandon Pool is
17 in the ship canal and part of it is in the
18 Lower Des Plaines.

19 MS. FRANZETTI: Based on what's been
20 proposed in this rule?

21 MR. SEEGERT: What's been proposed.

22 MS. FRANZETTI: Counsel, does that do
23 it?

24 MR. ETTINGER: I have a clarifying

1 question as to from your fish perspective. I
2 like to speak for them, too. From the fish's
3 perspective, is the Upper Brandon Pool
4 connected to the Upper Des Plaines?

5 MR. SEEGERT: Is Brandon Pool
6 connected to the Upper Des Plaines?

7 MR. ETTINGER: Yes.

8 MR. SEEGERT: Well, there's a
9 hydraulic connection. I don't think there's
10 much in the way of an interchange between the
11 fish that are in Brandon Pool and the Upper
12 Des Plaines. So they are hydraulically
13 connected.

14 MR. ETTINGER: What would stop a fish
15 from moving?

16 MR. SEEGERT: What would stop a fish
17 from moving, we're not now talking about a
18 physical barrier, but we're talking about
19 differences in what fish prefer. So because
20 of the Brandon Pool being part of a larger
21 water body, you tend to get fish that like
22 larger water bodies. Some fish like certain
23 water bodies, and then there are going to be
24 other fish that are basically going to prefer

1 the Upper Des Plaines which is a smaller
2 water body, sort of like the distinction
3 between some people like to live in big
4 cities, some people like to live in small
5 towns. There's nothing physically preventing
6 them from moving from one place to another,
7 but they tend to like one area over the
8 other.

9 MR. ETTINGER: What if a fish had a
10 job in the lower just north of the damn, it
11 might have to commute.

12 MR. SEEGERT: I'm not aware of any
13 fish that have jobs.

14 MR. ETTINGER: Thank you.

15 BY MS. DIERS:

16 Q. Mr. Seegert, in the line of questions
17 I was asking you before where you thought Illinois
18 EPA failed, and you talked about some of the habitat
19 data. Could you be more specific about what data
20 was available but ignored by Illinois EPA?

21 A. I don't think I said it was -- I
22 didn't say ignored by Illinois EPA. Based on my
23 reading of everything that was provided, it looked
24 to me like you relied primarily on the data, the

1 habitat data that was collected by Mr. Yoder's
2 group, MBI, for your final decision making. And I
3 know there was an exhibit that was prepared by
4 Mr. Essig who did plot QHEIs and did include data
5 from EA engineering. But I don't think that's what
6 you primarily relied on for your decision making
7 process.

8 MR. ETTINGER: I'm sorry. I want to
9 follow up. I'm going to jump a little bit.
10 But getting back to the fish in little waters
11 and big waters, are there some fish that for
12 some stages of their life prefer smaller
13 streams and for other stages prefer larger
14 waters?

15 MR. SEEGERT: There would be or could
16 be a few species of fish which might utilize
17 a smaller stream for part of their life
18 cycle, but it would be a fairly -- or not --
19 it would be a very small subset of fishes.
20 We really don't -- the kind of fishes you're
21 talking about would be species that are
22 highly migratory, and we really don't have
23 any representation by those kinds of fish in
24 this system.

1 BY MS. DIERS:

2 Q. Question 7: What would you have done
3 differently from the agency when looking at the
4 Chicago Sanitary and Ship Canal and the Upper
5 Dresden Island Pool? And then the second question
6 was is this reflected in the report attached to your
7 prefiled testimony marked as Exhibit 2?

8 A. Okay. Well, let me answer your second
9 question first. And, yes, all of the differences
10 that I'm going to be listing are included in the
11 various report that we've provided. In terms of
12 what we would do differently, we look much more
13 closely at habitat. So basically getting a better
14 level of spatial resolution. We heard a number of
15 witnesses, I believe associated with the District,
16 who had testified to the fact that one of the
17 shortcomings of Mr. Yoder's approach was that there
18 wasn't enough of it; that they -- sometimes there
19 was a 10 or 15 mile gap in between the various
20 stations. So we would have looked more closely at
21 the habitat and got much better spatial resolution.
22 We also researched the effect of barges to see what
23 effect they might have on the system, and we
24 considered how not only high, but low flow

1 conditions in the system and water level
2 fluctuations. We had two different things: We've
3 got flow, we've got velocity of water, we've also
4 got water going up and down. So we looked closely
5 at that. I had mentioned that it didn't look that
6 extensively at the effects of impounding. So we
7 went to the literature, and, for example, and looked
8 at the extensive study that was done on the nearby
9 Fox River, because I think those results are very
10 relevant here. So we look more closely at what the
11 effects of impoundment are. We also studied the
12 area, and now I'm talking about the fish work, not
13 just the habitat work, at a much finer final level
14 of resolution so we get much more fish sampling.
15 The studies that I think the State relied on in
16 Upper Dresden Island Pool, they made six
17 collections, and for the whole area combined it was
18 on the order of about 20 or 30. We have data over
19 the years for over 3,000 collections. So you're
20 talking literally a two order magnitude difference
21 between the level of effort the database we had
22 available and utilized versus what the State was
23 looking at. Also I believe that the studies we've
24 done over the years have been, on average, better

1 performed and better designed. And when we looked
2 at the studies done by MBI, they had a number of, I
3 guess I called them, methodological problems,
4 various errors that came up. And it didn't appear
5 that they provided the appropriate oversight. They
6 had prepared a document called QAPP, the Quality
7 Assurance Procedures Plan. But based on my
8 recollection of Mr. Yoder's testimony, there are
9 quite a few times when questions of well, this is
10 what you said in your plan. Did you do this? Well,
11 they don't it. And one of the consequences then of
12 not doing those things was that -- what I call bad
13 data, inaccurate data got into the database because
14 they didn't do the proper job of oversight.

15 Also, I mentioned sediment issue.
16 So with regard to at least contaminated sediment, EA
17 went out and collected sediment from a number of
18 locations. The interpretation of those data are
19 being handled by Dr. Burton who I believe will be
20 the next witness to testify. Also, I think we
21 realistically accounted for the magnitude and the
22 cost for any restoration and remediation. We've had
23 a number of people testify -- in fact, well, you can
24 put in some more structure, you can do this, you can

1 do that. Well, you can do those things, but to do
2 it in a meaningful manner where you're actually
3 going to make a difference in the biological
4 community, you have to do a lot of it. When you do
5 a lot of something, it costs a lot of money. And
6 there aren't any plans for this level of remediation
7 or restoration that we're not aware of. And, as I
8 said, we've collected data on the fish, on the
9 habitat, sediment quality. Another --

10 MR. ETTINGER: Excuse me. I hate to
11 interrupt, but is this remediation study part
12 of your testimony somewhere? Is it in the
13 exhibit?

14 MR. SEEGERT: I'm not going to testify
15 with regard to remediation, no.

16 MR. ETTINGER: But you just did.

17 MR. SEEGERT: Well --

18 MS. FRANZETTI: He wants you to
19 explain further what you're referring to on
20 remediation and restoration systems.

21 MR. SEEGERT: Right. I guess in this
22 case, the way I was using it was in a limited
23 sense. Remediation would be -- the example
24 I'm thinking of would be removal of the

1 contaminated sediment. So that's not
2 restoration. That's, in my mind,
3 remediation.

4 MR. ETTINGER: I'm sorry. I thought
5 you were talking about habitat structures, and
6 I didn't see any study of the cost of
7 including habitat structures. But you aren't
8 referring to that when you were testifying?

9 MR. SEEGERT: Well, I'm saying that if
10 you needed to do restoration in a system like
11 this, the cost would, and I don't have an
12 exact amount, but I know what restoration
13 costs in other systems of roughly similar
14 magnitude. And so I'm estimating that in
15 this case for -- even for Upper Dresden
16 Island Pool, which is only eight miles long,
17 you're probably talking about tens or
18 hundreds of millions of dollars.

19 MR. ETTINGER: I thought you were
20 talking real money. Let's go on. I won't
21 interrupt anymore.

22 MR. SEEGERT: Okay. And then the last
23 point that I wanted to make was that the
24 study that was done by MBI, for reasons that

1 escape me, did quite a bit of work. I think
2 they had about six or eight stations in the
3 Illinois River, not the area that's not part
4 of this rulemaking. They also had a couple
5 or three stations in Lower Dresden Pool; in
6 other words, the area downstream of I-55. If
7 you go back and read the QAPP and the study
8 plan, it says we're going to do "X" number of
9 stations. I think round numbers it was 30.
10 We're going to do "X" number of stations in
11 the Des Plaines River. There's no mention
12 about the Upper Des Plaines, there's no
13 mention about the Illinois. So what they
14 ended up doing was getting only a few
15 stations in the ship canal, a few stations in
16 Upper Dresden Island Pool, and then almost as
17 many in these other water bodies that are
18 even part of the rulemaking. And it still
19 doesn't make any sense to me. Why would you
20 want to take what effort you are -- which is
21 small to begin with, and then dilute it by
22 taking half of your effort in areas that
23 aren't even part of the rulemaking. So we
24 concentrated all our efforts on water body

1 segments at our part of the rulemaking.

2 MR. ETTINGER: I'm sorry. On
3 Attachment 1, Page 5 of your testimony, you
4 do data downstream Dresden Lock and Dam. Is
5 that part of the body in the rulemaking?

6 MR. SEEGERT: No. But that's
7 historical data that we're just summarizing.
8 We had already collected all that data, so
9 we're not going to ignore it. But all of the
10 work that we did as part of these proceedings
11 all was concentrated.

12 MR. ETTINGER: But you do agree that
13 that data might be relevant to this
14 proceeding?

15 MS. FRANZETTI: You're talking about
16 the data he referenced in his report?

17 MR. ETTINGER: Exactly.

18 MS. FRANZETTI: Not the Illinois River
19 data?

20 MR. ETTINGER: Well, this is Illinois
21 River data, isn't it, downstream? Dresden
22 Lock and Dam.

23 MS. FRANZETTI: I meant the MBI's data
24 in the Illinois River.

1 MR. ETTINGER: No. I'm asking about
2 his --

3 MS. FRANZETTI: That's the distinction
4 I'm trying to draw.

5 MR. ETTINGER: Actually, my question
6 is do you believe that this information that
7 you put in your testimony regarding the river
8 is relevant?

9 MR. SEEGERT: Yes.

10 MR. ETTINGER: Thank you.

11 MS. FRANZETTI: Counsel, if I can just
12 ask one follow-up for clarity. You referred
13 to a study down in the Fox River on the
14 effects of impoundment, but I don't think you
15 mentioned who that study was done by so that
16 in the record we can tell what study you're
17 referring to. Can you be a little more
18 specific?

19 MR. SEEGERT: My recollection was that
20 the study was sponsored by U.S. EPA. There
21 was a paper published, and the author -- lead
22 author on that was Vick Santucci, 2007. I
23 think the work was 2007. The paper might
24 have been published the next year in 2008,

1 but I'm not 100 percent positive on the date.
2 It is -- that is cited somewhere in my
3 testimony.

4 MS. FRANZETTI: Thank you.

5 BY MS. DIERS:

6 Q. Prefiled Question 8: What do you mean
7 when you say balanced population?

8 A. Well, to me balanced means it's not
9 going to be dominated by one or a few tolerant
10 species. It means there's going to be all
11 represent -- good representations at all the trophic
12 levels. It means that it's going to have a variety
13 of fish which is consistent with that expected for a
14 good warm water fish community in this echo region,
15 and my definition of a balanced population has the
16 same meaning as the term BIP, balance indigenous
17 population, or balanced indigenous community as it's
18 used in the federal regulations, 40 CFR 125.71(C).

19 MR. ETTINGER: Can I follow up for a
20 second? What would be the fish that you
21 would expect to see in this system that you
22 don't see?

23 MR. SEEGERT: Well, there's two
24 answers to the question. One is there are

1 some species we don't see at all. I think
2 they're totally absent. And then there are a
3 number of others which are poorly
4 represented. And both are important.
5 There's some darter species that we would
6 expect to see and which we don't see at all.
7 Examples of things that we expect to see in
8 much better numbers, I believe the board --
9 I'm not sure if this was testified to by
10 Mr. Yoder, but there's a group, it's part of
11 the IBI and one of the metrics is percent
12 round-bodied suckers that includes mostly
13 redhorse, but it also includes white sucker
14 and a couple of other sucker species. And so
15 the round-bodied suckers, although they are
16 present in this system, are present in much
17 reduced numbers. So I would expect much
18 better numbers of those if this was a
19 balanced system. And there's also some
20 minnow species that I would expect to be much
21 better represented than actually are
22 represented.

23 MR. ETTINGER: Would you expect
24 walleye in the system?

1 MR. SEEGERT: No.

2 MR. ETTINGER: Why not?

3 MR. SEEGERT: Because walleye, they
4 could live in the system, but their habitat
5 requirements are such that I don't think that
6 there's enough hard substrate rock and cobble
7 that's going to support them either as
8 adults, but particularly for spawning
9 purposes, okay? The best thing I can -- or
10 most appropriate thing to say is there's not
11 adequate spawning habitat for walleye in the
12 system.

13 MR. ETTINGER: Do you know anything
14 about the Kankakee River?

15 MR. SEEGERT: I know some things about
16 the Kankakee River System.

17 MR. ETTINGER: Is there adequate
18 spawning habitat for walleye in the Kankakee
19 River?

20 MR. SEEGERT: Yes.

21 MR. ETTINGER: Thank you.

22 HEARING OFFICER TIPSORD: Miss Diers?

23 BY MS. DIERS:

24 Q. I'm going to jump around just a little

1 bit for sake of topic and hopefully speed up time
2 wise. Since we're talking about --

3 MS. FRANZETTI: We're all yours for
4 this afternoon and tomorrow.

5 BY MS. DIERS:

6 Q. We're talking about the topic of
7 balanced population. If you look at our prefiled
8 Question 100 with respect to Exhibit 2. We ask on
9 Page 2 of Exhibit 2 of --

10 MS. FRANZETTI: Give us just a second
11 to catch up.

12 MS. DIERS: I'm sorry to make you jump
13 around. It shows up as 24 on my questions.
14 I don't know if that helps.

15 MS. FRANZETTI: We're there. Now I'm
16 just trying to get to Page 2 of Exhibit 2.
17 Okay.

18 BY MS. DIERS:

19 Q. On Page 2 of Exhibit 2 of your
20 prefiled testimony you state that the present fish
21 community in the Lower Des Plaines does not
22 represent a balanced population. Do you include the
23 Des Plaines River downstream of the interstate 55
24 bridge in this opinion?

1 A. In this case my answer is directed
2 only to a portion of the Des Plaines River upstream
3 of the I-55 bridge.

4 MS. FRANZETTI: I think, Counsel,
5 again, just for clarity. You just referred
6 to your answer. Did you mean to refer to
7 your report that is the subject of counsel's
8 question?

9 MR. SEEGERT: Yes.

10 BY MS. DIERS:

11 Q. Does that include parts of Brandon
12 Pool also?

13 A. Yes.

14 Q. Prefiled Question 101. With respect
15 to balance, what is, and I'm going to strike future
16 and just ask, what is the attainable condition of
17 the fish community in the Lower Des Plaines River?
18 And then it's also asking in the Upper Dresden
19 Island Pool and Lower Des Plaines downstream of
20 interstate 55 bridge.

21 MS. FRANZETTI: Actually, Counsel, the
22 first part of the question is the Lower Des
23 Plaines. Would -- Do you want -- Wouldn't
24 that include parts of what follows after

1 that? So I just -- Just so it's clear what
2 he's responding to. You tell us, do you want
3 him to break it down into first answer with
4 respect to upper Dresden --

5 MS. DIERS: Let's just go to Upper
6 Dresden Island Pool. Can you answer with
7 respect to that?

8 MR. SEEGERT: For Upper Dresden Island
9 Pool, I would say that a use equivalent to
10 what Mr. Rankin in his report referred to as
11 modified warm water, I'd say that's a
12 reasonable attainable use for Upper Dresden
13 Island Pool.

14 BY MS. DIERS:

15 Q. I'm going to strike where I reference
16 in Lower Des Plaines downstream of interstate 55
17 bridge and just ask what about Brandon Pool with
18 respect to this question?

19 A. Brandon Pool would, because the
20 habitat there is even poorer, I would say that would
21 be something equivalent to, again, what Mr. Rankin
22 referred to as limited resource water.

23 Q. I'm going to go back to Question 9.
24 What are the limiting physical and biological

1 conditions of -- when we say these waters, I'll
2 break it down first and say what are the limiting
3 physical and biological conditions of Upper Dresden
4 Island Pool?

5 MS. FRANZETTI: You know what, why
6 don't we do this? Are you planning to also
7 ask the question separately for Brandon Pool?

8 MS. DIERS: Yes.

9 MS. FRANZETTI: Okay. Just so he has
10 that in mind, because maybe he can assimilate
11 a little bit where they might apply to both;
12 if you can, Greg. I don't know what's easier
13 for to you do. First take it with respect to
14 Upper Dresden Island Pool and then switch to
15 Brandon.

16 MR. SEEGERT: I think my answer is
17 going to be that they apply in both areas.
18 It's just that they're even more severe in
19 Brandon, but it's the same suite of factors.
20 And those factors include very little fast
21 water, no riffles; in this case I will say
22 except in the Brandon tail water. So
23 there -- in Brandon there are no riffles,
24 Brandon Pool there are no riffles at all. In

1 both areas there's minimal clean hard
2 substrates. In this case by hard substrates
3 I'm talking about gravel, cobble, rubble,
4 boulder. I'm not talking about sand, which
5 technically speaking is a hard substrate, but
6 I'm not referring to sand here.

7 Sparse cover, this applies in
8 both areas. It's even more sparse in Brandon
9 than it is in the Upper Dresden Island Pool.
10 Both areas have contaminated sediments, so
11 now I'm making the distinction between
12 sediments which are contaminated as opposed
13 to just excessive siltation. There's minimal
14 spawning areas for a variety of species with
15 that being -- with that limitation being even
16 more severe in the Brandon Pool than it is in
17 Upper Dresden Pool. And also we have
18 considerable and rapid fluctuation in water
19 levels and stream flows; and, again, that's
20 probably a little bit more pronounced than
21 Brandon Pool, but certainly it also occurs in
22 Upper Dresden Island Pool.

23 And then the -- I mean the biggest
24 single factor in terms of the physical is the

1 presence of the locks and dams. And so many
2 of the factors that I just mentioned are a
3 direct result of that. So that when you have
4 a dam, one of the things that happens is that
5 it obviously slows water down, results in
6 considerable siltation, it covers up the
7 riffles. So many of these things, not only
8 are they a result of lock and dams, but
9 unless you literally remove the lock and
10 dams, those physical limitations are not
11 going to go away.

12 Another factor that I think fall
13 into this category of physical factors are
14 barge traffic and just the overall urban
15 nature of this system, that that in and of
16 itself causes a variety of problems.

17 MS. FRANZETTI: Counsel, you asked
18 about the biological conditions as well,
19 right?

20 MS. DIERS: Yes.

21 MR. SEEGERT: Okay. In biological
22 limitations, some of those that I could
23 mention would be -- This is the opposite of
24 the balanced community. So here we have

1 dominance by a few highly tolerant fish, we
2 have reduced numbers of what I call quality
3 prey items, fish obviously need something to
4 eat, and a lot of the better macro
5 invertebrates are either reduced or
6 eliminated because of the kind of system that
7 we have here. There's also poor
8 representation by several key groups. This
9 addresses a question that Mr. Ettinger raised
10 about what's missing. So here we have groups
11 like round-bodied suckers being poorly
12 represented, and then also we have low
13 numbers of intolerant species. One of the
14 things that the agency said that upper
15 Dresden Island Pool should have was
16 intolerant species. We don't have intolerant
17 species. They're essentially absent. So one
18 of the things that they said by their own
19 definition should occur in Upper Dresden
20 Island Pool are not there. And then, lastly,
21 I think Mr. Yoder might have referred to a
22 biological metric called DELT. DELT refers
23 to deformities, erosions, lesions, and
24 tumors. These are things that are on the

1 outside of the fish. And we have extremely
2 elevated levels of DELT throughout the
3 system. There's an example where it's higher
4 in Brandon Pool than it is in Upper Dresden
5 Island Pool, but it's still considerably
6 elevated in Upper Dresden Island Pool.

7 MR. ETTINGER: Can I just follow up on
8 that question a little bit? Again, you say
9 we're missing intolerant species. Which
10 would those be that you would be wanting to
11 find there?

12 MR. SEEGERT: Black redhorse would be
13 one example, roseyface shiner would be
14 another example, hornyhead chub, now there
15 we've collected a few, but not enough to be
16 really -- basically to make a difference.
17 There's, you know, one here, one there, and
18 every other year, but there's obviously not
19 an established population, as opposed to the
20 nonhornyhead chub.

21 MR. SULSKI: Rosyface and hornyhead.

22 MR. SEEGERT: They kind of go hand in
23 hand, yeah.

24 MR. ETTINGER: Be glad we're not using

1 their Latin names.

2 MS. FRANZETTI: Anything else?

3 MR. SEEGERT: Those are just a couple
4 off the top my head. And, of course, it all
5 depends on what your definition of an
6 intolerant species is.

7 MR. ETTINGER: Does the rosyface
8 shiner operate in both small streams and
9 large water bodies?

10 MR. SEEGERT: It's not a small -- It's
11 more of a medium-sized stream fish. It's
12 definitely not a head water fish. It's not a
13 big river fish. It's basically kind of a
14 medium river fish.

15 MR. ETTINGER: Okay. You also, I just
16 wanted to clarify on this. You said there's
17 not enough hard surface?

18 MR. SEEGERT: Hard substrate.

19 MR. ETTINGER: What has to be hard and
20 how big?

21 MR. SEEGERT: Okay. I thought I had
22 covered that. But technically speaking, hard
23 substrates include moving up in size from
24 small to large with sand, gravel, cobble,

1 rubble, and boulder. Now, for -- sand is a
2 very poor substrate for spawning purposes for
3 most fish, but I'm including those other
4 categories. So we're talking about anything
5 from basically pea gravel, gravel the size of
6 a pea on up to boulders. And those would be
7 the hard substrates that I'm talking about.

8 MR. ETTINGER: And where do these
9 substrates have to be in relationship to the
10 water?

11 MS. FRANZETTI: Counsel, you mean
12 shoreline versus --

13 MR. ETTINGER: Yeah. Like too deep,
14 too high? Where do you want your substrates?

15 MR. SEEGERT: That's not -- I can't
16 think of a real short answer to this
17 question. It very much depends on the
18 species. So I'll just use a couple of
19 examples. Something like small mouth bass or
20 rock bass like boulder and large material,
21 that could be along the edges, along the
22 shore line of a water body. But the big
23 limitation here is that you, for many of
24 these species of fish, they need hard

1 substrates in fast water. That's where they
2 live, that's where they spawn. So just going
3 out and throwing a bunch of rocks out in the
4 channel of the river or even along the edge
5 of the river doesn't do you any good. You
6 have to have a functioning riffle. So a
7 riffle is defined as fast water flowing over
8 hard substrates. So you have to have both of
9 those things going on for a whole variety of
10 riffle-dwelling fish, fish that like riffles.
11 That's what they need as part of their life
12 cycle.

13 MR. ETTINGER: So looking at your
14 pictures here of the Upper Dresden Pool.

15 HEARING OFFICER TIPSORD: Where are
16 those at in his testimony?

17 MR. ETTINGER: It's on Page 7 of --
18 Well, there's a bunch of them here. Page 7
19 of Attachment 2B. I'm sorry. It says river
20 mile 24 -- 284.4. Looking at the middle
21 picture on the left, those look like rocks to
22 me. Is that what those are?

23 MR. SEEGERT: You've nailed it.

24 MR. ETTINGER: I guess I'm better at

1 geology. So that would be a hard surface,
2 would it?

3 MR. SEEGERT: Right. But I should --

4 MR. ETTINGER: I'm sorry. Go ahead.

5 MR. SEEGERT: No, it is. But you
6 need, when you're doing evaluation, you asked
7 where these need to be, and I was going to
8 smartly say in the water. But that answer
9 actually applies here. If you look and see
10 rocks up on the shore line, if they only go a
11 foot down from the shore, extend only out a
12 foot, they're not going to be of any use. So
13 it's a combination. That's one of the things
14 as part of the QHEI, you're looking at the
15 hard substrates that are in the water and how
16 much of the zone, the area, are they
17 comprising.

18 MR. ETTINGER: But if we stood on that
19 rock and looked down and saw other rocks,
20 we'd be okay.

21 MR. SEEGERT: We would be okay --
22 Well, first of all, the rocks have to not be
23 imbedded. There are a lot of places where
24 you can have rocks, but there's so much

1 siltation that it fills in the spaces between
2 the rocks. So they stop functioning for
3 their intended purpose. Also then we get the
4 question this area, and I don't have all the
5 areas memorized, but just in looking at it,
6 this looks like it's a slow water area. So
7 this is an area that, assuming the rocks do
8 extend down into the water column, might be
9 okay for some of the species I mentioned like
10 rock bass or small mouth bass. It would not
11 be preferred habitat for a number of the
12 redhorse or for darters.

13 MR. ETTINGER: Okay. I won't take you
14 through all the pictures now. But I
15 appreciate you putting them in the package.

16 BY MS. DIERS:

17 Q. Is a white sucker an intolerant
18 species? This is follow-up based on what we've been
19 talking about.

20 A. No. That's a very good question. In
21 fact, it's a highly tolerant species, but it does
22 happen to be a round-bodied sucker, so it counts as
23 part of that metric. But it's a -- as defined by
24 Ohio EPA, and I think most other folks, it's a

1 highly tolerant species.

2 Q. What about the small mouth bass?

3 A. Small mouth bass would be moderately
4 intolerant. So it's not an intolerant, but it's
5 towards the intolerant end of the spectrum.

6 Q. What about redhorse suckers?

7 A. That depends on which of the redhorse
8 suckers you mean. There are six species of redhorse
9 suckers in the system.

10 Q. What about a black redhorse sucker?

11 A. Yeah. Black redhorse is generally
12 considered to be an intolerant.

13 Q. Are there any others that are
14 intolerant?

15 MS. FRANZETTI: That are present that
16 have been found in the system?

17 MS. DIERS: Yes.

18 MS. FRANZETTI: Something that's been
19 found at least once.

20 MR. SEEGERT: Yeah. River redhorse
21 may be classified as an intolerant. I'm
22 frankly not positive. It might be a
23 moderately intolerant. And in short redhorse
24 is another moderately intolerant. I think

1 the only intolerant in that, in the group of
2 redhorse that's found here is black redhorse.

3 BY MS. DIERS:

4 Q. Prefiled Question 10: How did you go
5 about assessing the potential applicability of the
6 UA factors excluding factor six to the Chicago
7 Sanitary Ship Canal and the Lower Des Plaines with
8 respect to aquatic life uses?

9 A. Well, that's a pretty broad question
10 covering a lot of work that I've been involved with,
11 but also the assistance of other people at EA. And
12 it covers a multi-year time frame. In this case, as
13 it applies to this rulemaking, one of the things I
14 did was participate in the UAA stakeholder process,
15 both in general, but particularly as a member of the
16 biological advisory group. And we had a number of
17 meetings and talked about many of the same issues
18 that are the subject of these hearings. In much of
19 how we assess the potential applicability of the
20 various UAA factors is described in the report
21 that's attached to my prefiled testimony.
22 Generally, we reviewed and determined whether any of
23 the UA factors, that's factors 1 through 5, were or
24 were not present in either the ship canal, the Lower

1 Des Plaines, or the south branch of the Chicago
2 River. So we went through the list and said does
3 this apply or does this apply. And then as part of
4 that process, we reviewed the various regulatory UAA
5 factors. We reviewed relevant materials regarding
6 interpretation and application of the UAA factors as
7 they've been published in various guidance manuals
8 provided by primarily U.S. EPA, but also some other
9 agency. We've reviewed the available data on the
10 physical and biological conditions in the ship canal
11 and the Lower Des Plaines River. And we also
12 reviewed the available data on aquatic life in the
13 system as part of that. We looked, of course, at
14 our large data set. We looked at the data set that
15 was collected by MBI and we looked at some of the
16 data that was collected from the district. And then
17 we conducted various surveys and studies in the
18 waterway. I've already mentioned the sediment
19 collections that we've made, the habitat reviews
20 that we've done. We also reviewed studies and
21 surveys done by others in this waterway. So we've
22 reviewed the report prepared by Mr. Rankin, the
23 various reports prepared by Mr. Yoder, many UAA
24 reports, and looked not just at this water body, but

1 other water bodies that we thought would be relevant
2 in this situation. And then drawing upon the
3 knowledge, skill, and experience of the people at
4 EA. And so it's not just myself, but other people
5 like Mr. Vondruska being involved in the process,
6 determine how this information applied and could be
7 integrated into the process of determining whether
8 or not one or more of the UAA factors were applied.
9 And then, lastly, then based on putting everything
10 together, evaluating whether and why the ship canal,
11 the south branch of the Chicago River and the Lower
12 Des Plaines did or did not satisfy any of the five
13 UAA factors that we looked at.

14 Q. What you just described, that work was
15 done when you were hired by Midwest Generation in
16 2007 which led to Exhibit 2 which is dated, I
17 believe, October 2008; is that correct?

18 A. Yes. Now, we drew on some biological
19 data earlier than that, but the process of
20 evaluating the UAA factors, all that was subsequent
21 to being hired by Midwest Generation in 2007.

22 Q. I think you stated you looked at other
23 water bodies when you were doing this analysis.
24 What water bodies were you referring to?

1 A. Well, water bodies that we
2 specifically looked at in this area were the Fox
3 River and the Kankakee River. Now, as part of the
4 biological advisory group, the general consensus was
5 those areas weren't exactly the same because they
6 didn't have as many or severe limitations, but
7 nonetheless, they would provide some useful
8 information, and they certainly would be good -- a
9 good frame of reference for looking at the kind of
10 species we should be expecting since they're in the
11 same geographic area. So those were the other water
12 bodies that we looked at in some detail in arriving
13 at our conclusions.

14 Q. When you looked at the Fox and
15 Kankakee river, were you looking at those when you
16 were doing the analysis or when you were with the
17 biological subcommittee, or were those waters you
18 looked at in preparing Exhibit 2? I'm getting kind
19 of confused.

20 A. Well, the -- In my capacity as one of
21 the members of the biological advisory committee,
22 that would have predated my being hired for Midwest
23 Generation to look at this -- as the issues as
24 they've now been identified. But then I drew upon

1 that information.

2 Q. Okay. Thank you. Question 11, and
3 this is going with respect to Exhibit 2: Did you,
4 in essence, attempt to redo the UAAs done for these
5 waters?

6 A. I would say no. We looked at -- we
7 certainly looked at the UAAs that had been already
8 done. We didn't want to reinvent the wheel.

9 Q. Have you performed or participated in
10 other UAAs?

11 A. Personally I've done a UAA for Brush
12 Wellman which is a company in Northwest Ohio. I
13 also did one for the Coeur d'Alene Mining
14 Corporation. That was done at a site in the upper
15 peninsula of Michigan. And then we did I call them
16 portions of UAAs for two other sites in Ohio: One
17 for BP Chemical and one for Malcolm Pirnie, which is
18 a consulting company. And then EA staff from other
19 offices have done UAAs on a variety of sites along
20 the mid-Atlantic coastal area, Maryland, Virginia,
21 that neck of the woods.

22 MS. FRANZETTI: Counsel, if I can just
23 do a follow-up and clarifying the earlier
24 part of your prior question. When counsel

1 asked did you, in essence, attempt to redo
2 the UAAs, you're referring to reinvent the
3 wheel. But do you think that there were
4 parts of this UAA that you did, in fact,
5 conduct a separate review akin to what the
6 UAA consultant did? Were there aspects where
7 maybe you got close to reinventing the wheel?

8 MR. SEEGERT: Well, certainly I would
9 say we looked, I would call it independently,
10 at each one of the UAA factors sort of
11 without regard to what the UAA had concluded
12 and said do the data justify the conclusions
13 that were reached? But we reached our own
14 conclusions for each of the various factors.

15 BY MS. DIERS:

16 Q. Question 12: You testify on Page 2 of
17 your prefiled testimony that one of your tasks for
18 Midwest Generation was to conduct a review of the
19 aquatic habitat suitability for the Chicago Sanitary
20 Ship Canal and Upper Dresden Island Pool directly
21 relevant to Illinois EPA's proposed UAA rules. You
22 also title Exhibit 2 to your testimony, Report on
23 the Aquatic Life Use Attainability Analysis For the
24 South Branch of the Chicago River, the Chicago

1 Sanitary Ship Canal, and the Upper Dresden Island
2 Pool. Why did you not mention the Brandon Pool as a
3 part of this analysis?

4 A. Well, most of our analysis and
5 discussion has been focussed on the south branch of
6 the Chicago River, the Sanitary and Ship Canal, and
7 Upper Dresden Pool with a more limited discussion of
8 Brandon Pool. And so because we didn't spend a lot
9 of time talking about Brandon Pool, it wasn't
10 highlighted in the title or included in the title
11 for that report. However, the analysis does include
12 Brandon Pool.

13 Q. I'm going to skip 13. I think you
14 just answered it.

15 Question 14: Based on your
16 understanding of the Agency's proposal, is the south
17 branch of the Chicago River expected to meet the
18 Clean Water Act Aquatic Life Goals?

19 A. No.

20 Q. Is the sanitary -- Chicago Sanitary
21 and Ship Canal expected to meet the Clean Water Act
22 Aquatic Life Goals?

23 A. No.

24 Q. Is Brandon Pool expected to meet the

1 Clean Water Act Aquatic Life Goals?

2 A. No.

3 Q. And is Upper Dresden Island Pool
4 expected meet the Clean Water Act Aquatic Life
5 Goals?

6 A. According to what you -- in the
7 statement of reasons it says it's going to
8 marginally be able to attain those goals.

9 Q. Fifteen: What is a limiting
10 biological condition as you use the term on Page 2
11 of your prefiled testimony?

12 A. Well, by this I mean biological
13 factors or components that are going to limit how
14 good the fish community can be. I think I probably
15 mentioned all or most of these before, but some of
16 the ones in this particular system that are
17 currently limitations, and, in my opinion, will
18 continue to be limitations are dominance by a few
19 highly tolerant fishes, reduced numbers of quality
20 prey items, poor representation by several key
21 groups of species, low numbers of intolerant
22 species, and a high percentage of fish with DELT
23 anomalies.

24 Q. Sixteen: Why do you conclude that the

1 limiting physical and biological conditions of these
2 waters are only unrelated to thermal discharges?
3 See Page 2 of the prefiled testimony.

4 A. Because the physical conditions are
5 limiting regardless of the thermal discharges.

6 Q. What about the biological conditions?
7 I believe you just answered to the physical. And
8 the question asked --

9 A. No. I just answered biological.

10 MS. FRANZETTI: I think you just
11 answered physical.

12 MS. DIERS: I thought it was physical.

13 MS. WILLIAMS: Can we have the court
14 reporter read it back.

15 (Record read as
16 requested.)

17 MR. SEEGERT: Yes. In terms of the
18 biological conditions, any of the biological
19 responses that we've seen like dominance by
20 highly tolerant fish, high levels of DELT
21 anomalies, and all the other ones I've
22 mentioned, they all are completely consistent
23 with habitat limitations. And if you have
24 poor habitat, or, in the case for the DELT

1 anomalies, contaminated habitat, contaminated
2 sediment, those factors just by themselves
3 will produce all the responses that we saw
4 and regardless of what thermal discharge is
5 doing.

6 BY MS. DIERS:

7 Q. How did you rule out temperatures and
8 impact?

9 A. I mean it seems to me that's what I
10 just explained of all these other -- that everything
11 that we've observed is consistent with the physical
12 and biological limitations that are going in there.
13 We don't need to try to invoke another factor when
14 the weight of the evidence points directly in a
15 different direction.

16 MR. ETTINGER: Would you consider
17 entrainment as a factor?

18 MR. SEEGERT: I don't see how that
19 would be relevant here.

20 MR. ETTINGER: You have fish that
21 aren't there. One of the things that could
22 have happened to them is they could have been
23 entrained.

24 MR. SEEGERT: Well, that presupposes

1 some level of entrainment, and there's been
2 no evidence introduced as to what, if any,
3 level of entrainment is going on in the
4 system. And even if fish are entrained, the
5 fact that some number may be lost since
6 you're dealing with early life history
7 stages, typically there's actually no effect
8 at the population level.

9 MR. ETTINGER: But you believe that
10 the barge propellers are having an effect of
11 the population?

12 MR. SEEGERT: I didn't say that.

13 MR. ETTINGER: Oh, okay. We'll go on.

14 HEARING OFFICER TIPSORD: Miss Diers?

15 MS. DIERS: Just a moment, please.

16 BY MS. DIERS:

17 Q. Question 17: On Page 2 of your
18 prefiled testimony you state under U.S. EPA's rules
19 the existence of any one of the six UAA factors
20 alone is sufficient to demonstrate that a water body
21 is not capable of meeting Clean Water Act aquatic
22 life uses.

23 Question A: Is it correct that
24 you analyzed five of the six UAA factors and found

1 four of them applicable to the Chicago Sanitary Ship
2 Canal, south branch Chicago River, and Upper Dresden
3 Island Pool?

4 A. Yes. And the same four factors also
5 applied throughout Brandon Pool.

6 Q. Do you agree that there's no
7 requirement in U.S. EPA's rules to examine all six
8 factors?

9 A. I don't know.

10 Q. Do you know if Midwest Generation has
11 asked someone else to perform a factor six analysis?

12 A. I don't know.

13 Q. D, explain why factor one was found
14 not to be applicable.

15 A. Although various pollutants are
16 present in the system, as far as I know, none of
17 them are naturally occurring. So that's why we
18 discounted factor one. They're not -- There are
19 pollutants, but they're not naturally occurring.

20 Q. E, explain in more detail how you
21 think the natural, ephemeral, intermittent or low
22 flow conditions or water levels prevent attainment
23 of the use? And I believe that's with respect to
24 factor two.

1 A. Well, factor two talks about water
2 levels. And, to me, that means rapid fluctuations
3 in water levels. It would also encompass abnormally
4 high water levels or abnormally low water levels.
5 We heard testimony earlier today about the rapid
6 changes in water levels that take place within the
7 system, so that's what I was talking about. And it
8 could either be problems because of the high or the
9 low water levels. Now, to the extent that these
10 water level fluctuations are the result of
11 human-caused conditions, I think you could also
12 include water levels under factor three. Similarly,
13 if the dams or other hydrologic modifications in the
14 subject waterways cause or contribute to the water
15 levels and the fluctuations of those levels, then
16 it's also a relevant issue under UAA factor four.
17 So you could include it in all -- in two, three, and
18 four. However, I do disagree that water levels are
19 more appropriate in three or four. I think they're
20 equally appropriate based on the EPA language to be
21 covered under UAA factor two, and that's where I
22 covered them.

23 HEARING OFFICER TIPSORD: For the
24 record, before you move on, Miss Diers, we've

1 been talking about the UAA factors, and I
2 sometimes forget that we're all very familiar
3 with this, but someone reading the transcript
4 may not be. The UAA factors are the factors
5 listed in 40 CFR, 131.10, Subpart G.

6 MS. DIERS: Correct.

7 MS. FRANZETTI: And, Counsel, I think
8 Mr. Seegert's answer wound up answering some
9 additional subparts of E.

10 MS. DIERS: That's what I was looking
11 at. Thanks.

12 MS. FRANZETTI: Of 17E.

13 BY MS. DIERS:

14 Q. G, you state on Page 3 of your
15 prefiled testimony that similarly low flow
16 regulation, which is controlled by U.S. Army Corps
17 of Engineers, in anticipation of flooding, can also
18 adversely affect fish by exposing fish nest and eggs
19 to ambient air and causing stranding in shallow
20 areas which leads to increased predation on fish.
21 Please provide an example of this phenomenon on the
22 CAWS or Lower Des Plaines River.

23 A. I'm sorry. Are you on G?

24 Q. Yes.

1 A. G. Well, based on available data,
2 some of that Ms. Wozniak referred to earlier, and
3 then we know that water levels and flows
4 occasionally drop precipitously. And the EA field
5 crews have personally observed that one of these
6 examples is described in my testimony and one of the
7 ramifications of the water levels dropping rapidly
8 is that small fish, especially more than big fish,
9 could get stranded in the areas that quickly became
10 confined. In other words, they couldn't find their
11 way back out of these areas. Also it's reasonable
12 to conclude based on the amount of fluctuation that
13 nest areas that would be in the same shallow areas
14 would be -- might become desiccated or subject to
15 predation.

16 Q. I'm going to strike Question H.

17 HEARING OFFICER TIPSORD: And before
18 you move on to Question 18, why don't we take
19 a ten-minute break.

20 (Short break taken.)

21 HEARING OFFICER TIPSORD: Are we ready
22 to go ahead? Question No. 18 I believe is
23 where we are, Miss Diers.

24

1 BY MS. DIERS:

2 Q. In describing the applicability of
3 Factor 2, you only reference conditions in the CAWS.
4 Is it your testimony that Factor 2 is applicable to
5 the Lower Des Plaines also?

6 A. I don't think that what you stated is
7 a correct characterization of my testimony in the
8 associated report on Pages 5 to 6 of my report which
9 is Exhibit 22 to the prefiled testimony. I do
10 describe conditions in the lower Des Plaines River
11 that apply to Factor 2. So, yes, Factor 2 is
12 applicable to the Lower Des Plaines River because
13 fluctuations in both flow and water levels do affect
14 the Lower Des Plaines.

15 Q. I'm going to strike 19 and go to 20.
16 Do you have data from the waters addressed in this
17 rulemaking showing that these flows adversely affect
18 fish by causing nest abandonment and displacement of
19 recently hatched fish and by causing sediment
20 deposition that buries and suffocate eggs?

21 A. Well, as I previously mentioned, we
22 know that the water levels do change precipitously
23 in the system, and myself and other members of the
24 EA have personally seen these effects take place in

1 the waterway. So from our knowledge and experience
2 we can reasonably conclude that given the
3 fluctuations that are documented and that do occur,
4 we would expect these effects to occur. Now, we
5 have not gone out into the waterway specifically to
6 try to document these effects, and we don't have
7 photographs. However, as an aquatic biologist,
8 we've worked in many different systems, we know that
9 the kinds of effects that I'm talking about can
10 reasonably expect -- be expected to occur. For
11 example, I worked a lot on the Wabash River in
12 Indiana, and one of the main factors that effects
13 reproductive success of fishes there are high water
14 events, that when you have high water fishes that
15 are nest builders and some other species, the high
16 water comes up and basically just flushes everything
17 away. So we know that those things go on, and that
18 there's no reason to believe that somehow the, I
19 guess they call it the hydraulics that are going on
20 at this system are somehow different than other
21 systems. It's basic physical principles.
22 Similarly, the adverse effects associated with
23 sediment deposition is a widely-accepted fact. And,
24 again, in this case, the species that are going to

1 be most affected are those that fill the nest
2 because the eggs are going to be on the bottom. And
3 then the group that we call simple lithophils. When
4 Mr. Ettinger was asking some questions before,
5 something about why the rocks are important. Well,
6 the group of fish that's most affected or needs
7 clean rocks the most are the group we caught simple
8 lithophiles which these are fish that when they
9 spawn, the eggs get deposited in these open spaces
10 in the rocks. And for the eggs to hatch
11 successfully, you have to have good aeration, you
12 have to have circulation going on, and if the silt
13 and sediment clogs up the rocks, then you're not
14 going to get adequate hatching. And species which
15 then Mr. Ettinger referred to before, to walleye,
16 that -- walleye is a simple lithophil. So that's a
17 species that's going to be affected very severely by
18 excess sedimentation.

19 So all these effects are widely
20 known and accepted. And water level fluctuations,
21 it's more -- it's been investigated more of
22 hydrosites, because hydro power sites operate as
23 peaking operations. So they cause major
24 fluctuations. And so because of that, there's been

1 a lot of research in that area showing what the
2 effects of water level fluctuation. So, again,
3 these are all just standard responses to changes in
4 water levels.

5 Lastly, I'd note that the
6 difference here is that as opposed to hydrosite
7 where you can work with the hydro operator and
8 design a study to go on and say, okay, I want you
9 guys to raise the pool or lower the pool or do
10 something, here we have no control over the core,
11 how the core operates the dam. So, you know, they
12 do what they want to do primarily in response to
13 rainfall events. So we can't schedule high or low
14 flow events which is what you'd really need to
15 document, fully document the effects that I've been
16 describing. And also I would -- lastly I'd say that
17 because there are so many stressors in the system,
18 it's very hard to say, okay, the water level
19 fluctuation, that contributes 17.3 percent of the
20 stress in the system and all these things act
21 collectively and synergistically together. But,
22 again, just based on the physical changes that are
23 going on, there's no reason to expect that the
24 effects that have been seen in other water bodies

1 would not occur here.

2 Q. And did you say you saw these effects
3 in the Wabash River?

4 A. In this case I was referring to high
5 flow events.

6 Q. And the Wabash is general use waters;
7 is that correct?

8 A. Well, they don't use that
9 classification system in Indiana.

10 Q. Oh, okay.

11 A. I think Mr. Vondruska wanted to --

12 MR. VONDRUSKA: Another site we have
13 been out in the field in numerous occasions
14 in the Brandon tail water where they've got
15 the sanding and stuff, and we've seen these
16 fluctuations that have been talked about
17 here. Ms. Wozniak said that the core report
18 sees flow levels every like two hours. Well,
19 we've been out there in literally 15 or 20
20 minutes and see water go from about thigh
21 deep to ankle deep. You have to be careful
22 where our -- we tie up our boat. But on the
23 same lines, we've seen actually small fish
24 isolated that get stuck in these isolated

1 pools along the edges of the Brandon tail
2 water because of these severe rapid
3 fluctuations.

4 BY MS. DIERS:

5 Q. So Question 22, how high does the flow
6 need to be to cause these problems?

7 HEARING OFFICER TIPSORD: Excuse me.
8 Just for the record, 21 is how high and 22 is
9 how low.

10 MS. DIERS: Yes, thank you.

11 MS. FRANZETTI: And we're taking how
12 high first?

13 MS. DIERS: Yes.

14 MR. SEEGERT: Well, I mean, again, I
15 don't think I can give you an exact number in
16 terms of either level or flow. That's not
17 how the literature frames this particular
18 question. And it also has to do not just
19 with the absolute number, but how rapid the
20 change is. So if there's a gradual build-up
21 in flow or a gradual decline in flow, you
22 might end up at the same place. You might
23 not end up as high as you would or as low as
24 you would, but it's going to be much worse if

1 the change occurs over a few minutes or a
2 couple hours versus over a few days.
3 Basically if the water level goes up slowly,
4 fish are able to move and take refuge.
5 Conversely, if it drops slowly, then they can
6 say, hey, it's getting really low in here.
7 I've got to get the hell out of here. That's
8 what they do. But if all of a sudden it
9 drops like a rock, and, as Mr. Vondruska
10 mentioned, they can get stranded. In this
11 case, the little fish are going to be even
12 more at risk because they don't have as much
13 swimming ability as the larger fish would.

14 And seasonality also has a --
15 is a factor. The high flows like in the
16 Wabash, if that happened during the winter,
17 it obviously wouldn't affect nest building
18 because the fish breed during the spring and
19 summer. So you have to consider when the
20 high or low flow events take place.

21 MR. ETTINGER: You have to be careful
22 year to year, because sometimes the whole
23 year reproduction can be wiped out by a
24 flood, can't it?

1 MR. SEEGERT: I'm sorry? Is that a
2 question?

3 MR. ETTINGER: Yes.

4 MS. DEXTER: He said can't it.

5 MR. ETTINGER: Can't it?

6 MR. SEEGERT: I don't think that all
7 the -- I mean 100 percent of the individuals
8 would be wiped out. It might be a fairly
9 high percentage. If you look at your class
10 strength in fish is one of the things that
11 you see is it's not constant. It is highly
12 variable. The other factor would be what
13 species. Some species are -- mainly because
14 of their reproductive -- or their strategy,
15 they're going to be affected much more. So
16 some fish would be able to handle high flow
17 events much easier than other species would.
18 So it would depend on the species.

19 BY MS. DIERS:

20 Q. Twenty three: Do you have any data
21 from the waters addressed in this rulemaking showing
22 that barges produce wakes or waves that push water
23 into the back water channels causing rapid changes
24 in the water levels and stirring up harmful

1 sediment?

2 A. Well, the EA field crews working on
3 the waterway, and we've been working on this
4 waterway for a long time, have personally observed
5 and experienced the effects of these barge-caused
6 waves. We've actually seen it happen, and I've seen
7 it happen. And if you just think about the volume
8 of water that's being pushed by these barges, it's
9 not hard to envision that this would also stir up
10 the sediment. Again, it's just you push a whole
11 bunch of water. You expect that things are going to
12 get churned up.

13 Q. Twenty four: What extensive studies
14 are you referring to on Page 4 of your prefiled
15 testimony with respect to sediments?

16 A. I had mentioned early on in my
17 testimony that EA has been doing studies in the ship
18 canal and the Lower Des Plaines for more than 25
19 years. So over that entire period we've observed
20 sediment conditions, and, in addition, we did QHEI
21 studies, specific habitat studies where part of that
22 is looking at the sediment. We did studies of that
23 nature in '93, '94, 2003, and the most recent one in
24 2008. That specifically includes a component or a

1 metric where we look at sediment amount and sediment
2 quality. And all of that information has been
3 included in our submittals. And then also as far as
4 contaminated sediment, that information is attached
5 to Dr. Burton's prefiled testimony as Appendix C of
6 Attachment 1.

7 MR. ETTINGER: Can I just break in
8 here to ask whether you're aware of any
9 studies of the effect of barge traffic on
10 waterways and fisheries?

11 MS. FRANZETTI: Generally, any waters?

12 MR. ETTINGER: Any waters.

13 MR. SEEGERT: Well, I cited in my
14 prefiled testimony studies that were done on
15 the Mississippi River where they were able to
16 show that barges, there's actually a physical
17 thing with the propellers on the barges
18 strike a certain number of fish. It doesn't
19 happen very often, but if you have many, many
20 barges, I don't -- I can't remember the
21 number, but I think of thousands of barges,
22 it stands to reason that every once in a
23 while besides the water being pushed around
24 and sediment being stirred up, that these

1 props are periodically going to hit and
2 either then kill or injure fish in the
3 waterway. But studies were done on the
4 Mississippi River that actually based on,
5 I'll call it a hit rate, that extrapolated
6 based on a number of barges how many fish
7 were going to be killed over the course of
8 one barge season.

9 MR. ETTINGER: Are you aware of any
10 studies done by the Corps of Engineers of the
11 barge companies of the Illinois River and the
12 effect or lack of effect of barges there?

13 MR. SEEGERT: I'm not aware of any
14 studies.

15 BY MS. DIERS:

16 Q. Question 25: What higher quality
17 fish, that's in quotes, are you referring to on
18 Page 4 of your prefilled testimony?

19 A. Well, when I say higher quality, I'm
20 generally talking about species that would either be
21 intolerant species or moderately intolerant species.
22 Some of those would be groups that I've already
23 mentioned; pretty much all the darters, redhorse,
24 smallmouth bass, madtons, and certain minnows.

1 Q. Question 26: How did you come to the
2 conclusion reached on Page 4 of your prefiled
3 testimony that the removal of one limiting factor
4 such as sediments would not improve aquatic habitat?

5 A. Because if you remove the sediment
6 factor, there's going to still be other limiting
7 factors on the aquatic life that are going to be
8 sufficient to satisfy one or more of the UAA
9 factors, aquatic habitat, not aquatic life.

10 Q. I'm going to ask Question 41 of our
11 prefiled questions here. I think it fits in better
12 here. And 41 is on Page 12, so I'll give you time
13 to get there. You testified that fine silty and
14 organic nature of sediments in the Chicago Sanitary
15 and Ship Canal and the Lower Des Plaines are not
16 suitable for many higher quality fish species which
17 require hard, clean substrate for spawning and
18 reproduction. Isn't it true that -- I'm going to
19 change many to, I'll just say some, natural water
20 bodies have the same condition of silty sediments
21 not suitable for certain species of fish?

22 A. First of all, I'd say that silty
23 sediments are not the natural condition in most
24 streams. It's a result of excess inputs of

1 sediments. So that's the first point that I would
2 make. And that whenever this condition is
3 encountered, in other words, deposition of silt,
4 you're going to have a negative effect on the
5 overall fish community. Yes, there might be some
6 fishes that wouldn't be affected, but, again, those
7 would be ones that would be in this highly tolerant
8 group. So when you have excess siltation,
9 regardless of what caused it, that is going to --
10 that is going to negatively effect the fish fauna.
11 And the fact that you have an excess amount of silt
12 indicates, one, a lot is coming in; and, two,
13 there's not sufficient scouring to move it out.
14 That's one of the real problems that we have here.
15 I haven't done studies to determine the actual
16 loading of sediment into this system, but what
17 happens is whatever does come in, it drops out
18 because it runs into the dam. The dam caused the
19 water to slow down, and then the water slows down,
20 this material settles out and causes the problem.
21 And, lastly, I'd say that, you know, what you're
22 referring to as natural water body that has the same
23 amount of siltation, sedimentation that we're seeing
24 here, that we see here, would experience the same

1 kind of problems and result in poor fish community.

2 MR. ETTINGER: Have you studied the
3 level of siltation in the Kankakee River?

4 MR. SEEGERT: Define study.

5 MR. ETTINGER: All right. Do you know
6 the level of siltation in the Kankakee River?

7 MR. SEEGERT: The Kankakee, this
8 directly addresses what I was just saying
9 about it's not just a mouth that comes in;
10 it's not just the loading, but what happens
11 to the loading. I have sampled the Kankakee
12 quite a bit. The riffle areas and the fast
13 water areas in the Kankakee are quite clean.
14 So you have -- the Kankakee has an absolutely
15 wonderful fish community. Without a doubt
16 it's far and away the best fish community in
17 northeast Illinois, and one of the big
18 reasons for that is you get -- not get -- you
19 have the things that the CAWS and the ship
20 canal and the Lower Des Plaines don't which
21 is clean riffles, riffles without a lot of
22 sedimentation. This allows the Kankakee to
23 have a very diverse darter community, have
24 redhorse number s that are at least in order

1 of magnitude higher than we see in this
2 system.

3 MR. ETTINGER: Is the Kankakee
4 impounded?

5 MR. SEEGERT: The Kankakee has -- I
6 believe only one dam, and there's definitely
7 a dam at Wilmington.

8 MR. ETTINGER: Yes.

9 MR. SEEGERT: I thought there was one
10 up at Kankakee, but I was looking at a map
11 and I couldn't find it. So maybe it
12 doesn't -- maybe my memory is foggy on that.

13 MR. ETTINGER: I think we were trying
14 to get rid of it years ago.

15 MR. SEEGERT: I've sampled both above
16 and below that dam. It's relatively low, so
17 it's not a high dam. So it doesn't impound
18 very much of the waterway. So it's really
19 not having much of an effect. I mean there
20 would be a small negative effect immediately
21 upstream in the dam, but if you look at how
22 long the Kankakee is from when it enters,
23 just talking about the Illinois portion from
24 when it enters from Indiana and joins the

1 Illinois River, I don't know, 40, 50 river
2 miles, you have one dam, and it's a fairly
3 small dam.

4 MR. ETTINGER: Isn't the same dam
5 impounding the Kankakee, the lower Kankakee
6 that's impounding the Upper Dresden Pool or
7 the Lower Dresden Pool?

8 MR. SEEGERT: No.

9 MR. ETTINGER: Isn't the Dresden Dam
10 below the Kankakee?

11 MR. SEEGERT: The -- I think what
12 you're asking is -- Is what you're asking is
13 does Dresden Dam impound a portion of the
14 Kankakee River? Is that your question?

15 MR. ETTINGER: Yes. Well, that would
16 be part of an answer.

17 MR. SEEGERT: Yes. Because the level
18 of Dresden Pool has been artificially raised.
19 There is a few miles of the lower Kankakee
20 that are impounded as a result of the Dresden
21 Island Lock and Dam.

22 MR. ETTINGER: So the Dresden Island
23 Lock and Dam is the same dam impounding the
24 Upper Dresden Pool up to Brandon, isn't it?

1 MR. SEEGERT: Yes. But there's a big
2 difference that the Kankakee, the amount that
3 the Dresden Dam impounds of the Kankakee is a
4 small percentage. I haven't done
5 calculations, but just off the top of my
6 head, I guess that's less than 10 percent of
7 the lower Kankakee. Dresden Island Lock and
8 Dam impounds 93 percent of Dresden Pool. So
9 it's -- Any time you're talking about dams,
10 you've got to think about three things: One
11 is how many dams are there, how high are
12 they, and what's the grading? Because
13 ultimately -- And then ultimately what you
14 then want to know is how much of the water
15 body in question is impounded. Is it
16 5 percent? If it's 5 percent, it's probably
17 not a big deal. But if it's 90 percent, or,
18 in this case, 93 percent, that's a big deal.

19 MR. ETTINGER: Okay. There's a dam at
20 Wilmington and there's a dam at Dresden. How
21 much of the Kankakee is impounded?

22 MR. SEEGERT: Again, I would guess
23 that the Illinois portion may be 10 percent
24 or less. I'd say 10 percent or less.

1 MR. ETTINGER: Thank you.

2 BY MS. DIERS:

3 Q. I think we're on 27.

4 MS. FRANZETTI: I'm sorry?

5 MS. DIERS: I think we're going to 27,
6 but just a moment, please.

7 MR. ETTINGER: I'm sorry. I have one
8 more follow-up. How do you measure how far
9 upstream from a dam that a water is
10 impounding?

11 MR. SEEGERT: Well, you could look at
12 elevation maps and see where the normal level
13 of the dam is and basically how far it backs
14 the water up. And so that would be more
15 of an analytical way of doing it. In our
16 case, we relied -- or I relied on the
17 observation of my field crews and basically
18 said or asked the question of them as when
19 does a transition from a tail water area with
20 some reasonable velocity to where the
21 impounding starts. And the answer was one
22 mile. And I believe Mr. Yoder also addressed
23 this question. My recollection is he said
24 about a mile also.

1 MR. ETTINGER: I'm sorry. A mile --

2 MR. SEEGERT: So it was about a mile
3 is free flowing. The tail water area
4 encompasses roughly one mile of Dresden Pool,
5 and that -- which means there's 13 miles that
6 are impounded.

7 MS. WILLIAMS: Can I ask a quick
8 follow-up? You said there was a third -- you
9 listed three things you have to look at, and
10 the third one was gradient?

11 MR. SEEGERT: Yes.

12 MS. WILLIAMS: Do the Kankakee River
13 and the Des Plaines River have similar
14 characteristics with regard to grading?

15 MR. SEEGERT: Based -- I haven't
16 looked at a topo map for elevations, but just
17 based on my observations, I would say that
18 the Kankakee has a higher gradient.

19 MS. WILLIAMS: And in the absence of
20 the dam that's impounding Upper Dresden
21 Island Pool, do you have any evidence that
22 the -- a natural flowing Des Plaines River
23 would have riffles?

24 MS. FRANZETTI: I'm just going to

1 object to the hypothetical nature of the
2 question, but.

3 MR. SEEGERT: Well, the short answer
4 is why wouldn't it? I mean think -- if the
5 Kankakee has riffles, and even though it
6 might have a little bit higher gradient,
7 basically all water bodies are going to have
8 riffle areas. The question is how far apart
9 are they spaced? If they look on the other
10 side, we look at the Fox River, which I think
11 there probably the gradient is probably even
12 closer to what it is in the Des Plaines, the
13 Fox River also has well-defined riffle areas.
14 So basically all the systems I'm familiar
15 with, including the Rock River, all the big
16 rivers in Northern Illinois have riffles.
17 So --

18 MS. WILLIAMS: I intended to limit my
19 question to the Upper Dresden Island Pool
20 portion. That's geographically speaking.

21 MS. FRANZETTI: You mean north of
22 I-55, upstream of I-55 bridge as defined in
23 this proceeding? Is that what you want him
24 to limit his answer to?

1 MS. WILLIAMS: Yes, I think so. I'm
2 not talking about the -- what I want to get
3 at is I'm not talking about the entire Des
4 Plaines River. I'm just looking at this
5 portion to see if you would agree that the
6 gradient is very flat, and in its natural
7 state would not have riffles either.

8 MR. SEEGERT: I don't know that.

9 MS. WILLIAMS: Okay.

10 BY MS. DIERS:

11 Q. Twenty-seven: What areas were salable
12 in 2003 to help you come to the conclusion that
13 sedimentation was moderate to severe in 70 percent
14 of the areas where QHEI scores were assessed?

15 A. In 2003 we sampled 30 main channel
16 border and four off-channel location -- off-channel
17 locations in Dresden Pool. Based on those 34
18 locations, then 70 percent had moderate to severe
19 sedimentation.

20 Q. Did that include the upper and lower
21 Dresden Island Pool?

22 A. Yes.

23 Q. Twenty-eight, what was the percentage
24 of sedimentation that was moderate or severe for

1 2008?

2 A. Well, in this case I should -- and
3 I'll start off by saying in 2008 we only did Upper
4 Dresden Island Pool, and it turned out just
5 coincidentally that it was also 70 percent, exactly
6 the same number. I actually had to go back because
7 when I first saw that and I had one of my guys
8 calculate it and said are you sure this is right?
9 I'm not talking about 2003. And it turned out in
10 2008 it was the identical number, 70 percent.

11 Q. Twenty-nine: What extensive studies
12 are you referring to on Page 5 of your prefiled
13 testimony with respect to contaminated sediments?

14 A. These would be the various studies
15 that have been done by Dr. Burton.

16 Q. And are all those studies done by
17 Dr. Burton, are they in the record or are they
18 attached to Dr. Burton's testimony?

19 MS. FRANZETTI: Well, at least the
20 2008 is the subject of the data, on the
21 reporting the data, is in the EA report that
22 is attached to Burton's prefiled testimony
23 and on which then in his testimony in his
24 report he relies and draws conclusions based

1 on. Then Dr. Burton's earlier study -- he
2 supervised the EA study, and I know it gets a
3 little confusing, so I'll just add this in
4 anticipation of Dr. Burton's appearance here
5 maybe and lend some clarification.

6 Dr. Burton oversaw that EA study.
7 In other words, he decided what should be
8 included, number of locations sampled, that
9 sort of thing. They then physically went out
10 and collected the samples and had them
11 analyzed. Dr. Burton then did an earlier
12 study with respect to sediment back in, I'm
13 going to blank, was it 1990 --

14 MR. ETTINGER: He testified in the
15 '80s.

16 MS. FRANZETTI: In the '80s. I'm
17 blanking off the top of my head when his
18 prior studies are. They are all at least
19 referenced in his prefiled testimony and
20 attached report. I do not believe that
21 you're asking is a separate copy of any study
22 report also attached to those earlier ones,
23 no. I believe just that the data from them
24 is summarized in what was filed with the

1 board.

2 MR. SEEGERT: If I may answer the
3 question about where we had sampled in 2003.
4 I did want to add on that when we did the
5 work in 2003, I believe both Mr. Smogor and
6 Mr. Essig did accompany EA during all or a
7 good portion of our field effort. We always
8 try to, wherever we can, engage the Agency,
9 and basically make our studies as transparent
10 as possible. And, as far as I know, they
11 both were satisfied with the locations that
12 we chose to sample and how we did the
13 sampling.

14 BY MS. DIERS:

15 Q. Thirty: Do you know why contaminated
16 sediments are predominantly found in the side
17 channels in back water areas?

18 A. Yes. Most contaminants are found out
19 with small grain sediment. This would be clays and
20 silt. These materials stay in suspension when the
21 current speed is moderate to high, but drop out in
22 areas where there's little or no current. And, in
23 this system, that's going to be areas in the side
24 channel, especially in the back waters to the extent

1 that back waters exist, and then to some extent as
2 we talked about earlier, in the areas just fairly
3 close to the dam because that's where the current
4 velocity is going to be the least. So anywhere
5 where there's little or no current, these fine
6 materials settle out, and that's what these
7 materials are bound up with.

8 Q. Question 31: Is it your professional
9 opinion that the sediments will not improve in these
10 waters? And when I say "these waters," I'm
11 referring to Chicago Sanitary Ship Canal and the
12 Upper Dresden Island Pool.

13 MS. FRANZETTI: And, Counsel, just a
14 clarification: Do you intend to include both
15 in terms of quantity and quality, cover both
16 potential areas on that question?

17 MS. DIERS: Yes, cover both, please.

18 MR. SEEGERT: I'll break my answer
19 into two parts. As far as just the volume of
20 sediment, not dealing with whether it might
21 or might not be toxic. I don't think things
22 are going to change appreciably. I think
23 relatively the same volume of material will
24 come in. I know TARP is going to go online

1 and presumably will result in some -- There's
2 going to be fewer CSO events, but I'm still
3 expecting that overall about the same amount
4 of sediment is going to come into the system.
5 In terms just about sediment quantity, I
6 don't think that's going to change
7 appreciably over the next, say, five to ten
8 years. As far as the quality, their problem
9 is the amount of -- that some people term
10 legacy pollutants. This isn't necessarily
11 material in the sediment that was deposited
12 in the last days or weeks or even last couple
13 years. There's material from way back when
14 when the rules and regulations weren't nearly
15 as strict. And that material is still there.
16 Now, we had testimony from the State
17 basically eons ago, something to the effect
18 that this material would essentially be
19 capped, that clean new material would fall on
20 top of the old contaminated material. I
21 don't see how this is going to happen,
22 because the barges keep resuspending this.
23 So the nasty stuff might temporarily get
24 capped off by new material, but it's going to

1 be constantly resuspended within the channel
2 due to prop wash and all these waves sloshing
3 back and forth are going to keep stirring up
4 the sediment. So I think the contaminated
5 sediment are going to continuously be
6 reexposed. So given that, I don't see that
7 the quality, that sediment quality, is going
8 to improve appreciably in the future.

9 BY MS. DIERS:

10 Q. And would that answer change if we
11 looked at the Brandon Pool?

12 A. Pardon?

13 Q. Would the answer change if we looked
14 at Brandon Pool?

15 A. It would be the same answer.

16 Q. Okay.

17 MR. ETTINGER: Would the answer change
18 if you looked at the Illinois River?

19 MS. FRANZETTI: You mean are there
20 sediments improving in the Illinois River?

21 MR. ETTINGER: Is there not a ton of
22 sediment coming from agriculture in the
23 Illinois River?

24 MR. SEEGERT: Well, remember, there's

1 two answers: One has to do with sediment
2 quality and one has to do with sediment
3 quantity. And I can't -- There's, coming
4 into the Illinois River, I would expect that
5 the quality of the sediment is better.
6 Whether the sediment load is going to change
7 in the next five or ten or 20 years, I have
8 no opinion.

9 MR. ETTINGER: Have you looked at the
10 efforts of the Metropolitan Water Reclamation
11 District to establish storm water control in
12 systems for Cook County?

13 MR. SEEGERT: No, I have not.

14 BY MS. DIERS:

15 Q. Would the more severely contaminated
16 sediments that are resuspended eventually move
17 downstream through the system?

18 A. I'm sorry?

19 Q. Would the more severely contaminated
20 sediments that we've talked about that are
21 resuspended eventually moved downstream through the
22 system?

23 A. Not being a hydrologist, I don't think
24 I can answer that question.

1 Q. I'm going to strike 32 and 33 and go
2 to 34. How are you defining viable population as
3 used on Page 12 of the prefiled testimony?

4 A. Viable populations are those that are
5 self-sustaining and of a size expected for the water
6 body in question. For a population to be
7 self-sustaining, the water body in which the
8 population lives about must provide habitat for all
9 the needed life history functions. In other words,
10 it needs places to spawn successfully, places to
11 feed, places to hide so it isn't predated upon. And
12 for various species and groups, the Upper Des
13 Plaines -- Upper Dresden Island Pool does not have
14 these attributes.

15 Q. Thirty-five: Please explain your
16 conclusion that the Upper Dresden Island Pool has
17 far more in common with Ohio's modified warm water
18 use designation than with Ohio's warm water use
19 designation?

20 A. Well, it has more of the
21 characteristics of a modified stream. And
22 Mr. Rankin's report, he had a table where he put
23 checkmarks in boxes whether it had certain --
24 whether it had the characteristics of modified

1 stream or warm water stream. In this system there
2 are a lot more boxes checked in the modified side of
3 that table than there were in the warm water side.
4 So it has -- It has the characteristics of a
5 modified stream.

6 MR. ETTINGER: Do you know of any
7 streams in Ohio --

8 MS. FRANZETTI: Just a second, Albert.

9 MR. SEEGERT: Well, right, the
10 characteristics of modified streams are
11 things like impounded, channelized, lack of
12 sinuosity, excessive siltation, lack of
13 riffles, lack of -- a lack of riffles and
14 fast water, and basically all of the things
15 that this system lacks are the things that
16 he's talking about. I mean he basically
17 describes his attributes of a warm water
18 stream describe this system to a tee for the
19 modified. They describe what this system is.
20 It has all of these things. It's impounded,
21 it's channelized, it has no -- except for the
22 Brandon tail waters, no riffles. It has a
23 lot of siltation, it has a lack of gradient.
24 It's got the characteristic of modified

1 stream, not a warm water stream.

2 MR. ETTINGER: I was going to ask
3 whether you're familiar with any waters in
4 Ohio that have this classification.

5 MR. SEEGERT: Of which classification?

6 MR. ETTINGER: Modified.

7 MR. SEEGERT: Yes.

8 MR. ETTINGER: Which ones would those
9 be?

10 MR. SEEGERT: Parts of the Great Miami
11 used to. I think they've done an upgrade.
12 There's some of the stream up in the
13 Akron/Canton area, Tuscarawas River. Part of
14 it is modified, and then there are some small
15 tributaries up in that area that I've worked
16 on. There's a place called Pырford Run where
17 you have a stream that's only three miles
18 long and it has three different uses. It
19 goes -- Basically the upper mile is limited
20 resource water, then it goes into modified
21 for another mile, and the last mile is warm
22 water. So it's just in a roughly three-mile
23 long head water stream, Ohio EPA divided it
24 into three different uses based on how

1 habitat changes over three miles.

2 MS. WILLIAMS: And does Ohio
3 distinguish temperature criteria between
4 modified warm water and warm water use
5 designations?

6 MR. SEEGERT: I believe -- I don't
7 believe so, that they -- Well, yes and no.

8 MS. WILLIAMS: So by yes or by no, you
9 would mean they have the same criteria for
10 warm water and modified warm water?

11 MR. SEEGERT: No. What they do is for
12 setting temperature, they look at basins, and
13 then they say for this particular basin, what
14 is the species assemblage that needs to be
15 protected. And then based on the species
16 assemblage that needs to be protected, then
17 they set their temperature limits
18 accordingly. So it's really not use driven,
19 it's species composition driven.

20 And then the reason I said yes and
21 no -- so that's the no. But then the yes
22 part is that because modified and limited
23 resource streams often have different species
24 assemblage then depending on how much of a

1 percentage of the basin streams in that
2 classification make up, that could result in
3 different thermal levels.

4 BY MS. DIERS:

5 Q. Do you know how many sites Rankin
6 visited in the Upper Dresden Pool?

7 A. Pardon?

8 Q. Do you know how many sites Rankin
9 visited when he was in the Upper Dresden Island
10 Pool?

11 A. I believe two, either two or three. I
12 think it was two.

13 Q. I think we did 35. I'm going to
14 strike 36, I'm going to strike 37, and go to 38.

15 You testify on Page 4 about heavy
16 barge traffic. Are you testifying that barge
17 traffic is a protected use or a limiting factor to
18 aquatic life or both?

19 A. Both. It's my understanding that
20 navigation is a protected use. And so if you're
21 going to have as a protected use -- I'm sorry.
22 That's -- it's both, again, because my understanding
23 is that navigation is a protected use.

24 Q. A, if barge traffic is a protected

1 use, what standards are necessary to protect that
2 use?

3 A. I haven't been asked to review that
4 issue, so I can't speak to what standards might be
5 necessary to protect barge traffic.

6 Q. B, if it's a limiting factor, are you
7 saying it is a human cause condition or source of
8 pollution pursuant to UA Factor 3? And, if so,
9 would it cause greater environmental harm to remove
10 this factor or leave it in place?

11 A. Okay. For the first part I would say
12 yes, I consider it to be a human cause condition.
13 The -- For the second part I'd say the relevant
14 question is not whether it would cause greater harm
15 to remove the barge traffic, but whether barge
16 traffic can or should be removed. The UAA factor
17 three asked whether human cause conditions cannot be
18 remedied. My understanding is that barge traffic as
19 a longstanding navigational use in this waterway is
20 a protected use. Therefore, I don't believe it
21 could be eliminated in order to improve the
22 waterways' potential for obtaining the Clean Water
23 Act goals, supporting full aquatic use. Also,
24 eliminating the barge traffic would probably have

1 significant economic ramifications to the barge
2 industry and the companies that depend on the
3 materials they provide, which then could become an
4 issue under UAA Factor 6, but that was beyond the
5 scope of my inquiry.

6 Q. Thirty-nine: Why do you consider
7 sedimentation in the CAWS, particularly in the Upper
8 Dresden Island Pool unpreventable and irreversible?
9 And do you have data to support this conclusion?

10 A. Well, my conclusion is based generally
11 on the fact that this is a highly urbanized
12 environment in which this water body is located.
13 And in highly urbanized industrial areas; riparian
14 zones are typically very small but they're
15 nonexistent. You also have a large amount of
16 impervious area, and also where there's going to be
17 significant contributions from CSOs and from
18 nonpoint source runoff into the waterway. And at
19 this juncture, I'm not aware of anyone who has a
20 solution or means of preventing input of sediments
21 into the waterways. Now grant it that TARP is
22 certainly moving in the right direction, but I don't
23 think it's going to solve all the problems. And I
24 know from the results of the various EA studies that

1 we've done over the years in this system, and I'm
2 not talking about sediment contamination, I'm just
3 talking about sediment in general. I'm talking
4 about the extent of the sediment is extensive, and
5 I'm not aware of any sedimentation removal projects
6 of the size necessary to take sediment out of this
7 waterway, but I haven't done specific studies.
8 Again, it's just looking at the volume of material
9 that are out there. And I think also Dr. Burton
10 will probably address some of the issues related to
11 sediment quality, but just as far as the quantity is
12 concerned, we haven't seen any evidence in the 20
13 plus years that we've been working that
14 sedimentation is getting any better.

15 Q. Question 40: You mentioned that
16 contaminated sediments exist in all three
17 navigational pools. Do you have evidence that more
18 recent sediment that is being deposited is more or
19 less contaminated?

20 A. Well, I think this question should be
21 addressed to Dr. Burton.

22 MS. FRANZETTI: Counsel, if you don't
23 mind, Dr. Burton specifically looked at those
24 issues. Mr. Seegert really did not.

1 MS. DIERS: So Dr. Burton would be the
2 more appropriate witness to ask how the
3 samples were collected and --

4 MS. FRANZETTI: Yes.

5 MS. DIERS: Thanks.

6 MS. FRANZETTI: Now, Mr. Vondruska
7 could have still been here, but he did have
8 to pick up his children from school. He
9 might have been able to handle that part
10 because he was, I believe -- wasn't he a
11 member of the field team?

12 MR. SEEGERT: Yes, he was part.

13 MS. FRANZETTI: But we'll cover it.
14 We'll make sure he is at least here when
15 Dr. Burton testifies, okay?

16 MS. DIERS: All right. Thank you.

17 BY MS. DIERS:

18 Q. I think we've already addressed 41, so
19 42. Please define excess sediment as you use the
20 term near the bottom of Page 4 of your testimony.

21 A. Okay. Excess means more than you
22 expect in a healthy stream. What I'll do is try to
23 provide a frame of reference; that the QHEI talks
24 about the amount of sediment, and it

1 characterizes -- I think it has five classes:
2 Severe, moderate, normal, minimal. Maybe it's four
3 classes. And it asks the people doing the
4 evaluation basically -- to say is the amount of
5 sediment that's in a particular stream about what
6 you'd expect. Is it normal? Which means the people
7 doing it have to be experienced, they have to, in
8 their mind, have an idea of how much silt you would
9 normally expect. The other -- but they do give some
10 additional guidance. They say when you expect silt
11 to be normal, the fast water areas, the riffle areas
12 are going to be essentially silt free. So a normal
13 stream would not have any silt and riffles. And
14 then what you'd see along the edges would be, the
15 word they use is a fine coating. So there's a
16 little bit of silt in these shallow depositional
17 areas, but not anything more. And if you see either
18 sediments in appreciable amounts in the riffles or
19 along the shore, that would be more than normal, and
20 then they make some differentiations between
21 moderate and severe.

22 Q. I'm going to strike 43, 44. With
23 respect to 45, I'm just going to ask the question at
24 the end. Are you saying that no streams in urban

1 areas are capable of meeting Clean Water Act Aquatic
2 Life Goals?

3 MS. SEEGERT: You're on the very
4 last --

5 MS. DIERS: Yes. On 45.

6 THE WITNESS: No. There could be
7 streams in urban areas that could achieve
8 aquatic life goals, but as a general
9 proposition, they don't. That's not to say
10 there isn't -- There aren't some streams
11 somewhere that could. But based on the
12 studies that have been done, it's basically
13 you've got two strikes against you if you're
14 in a highly urbanized area as far as Clean
15 Water Act goal attainment.

16 BY MS. DIERS:

17 Q. Would that be true looking at large
18 streams?

19 A. I'm sorry. What was the question?

20 Q. When we were talking about streams
21 when I asked you do you mean that no streams in
22 urban areas are capable of meeting Clean Water Act
23 Aquatic Life Goals, you said there's a possibility
24 where that could happen. Could it happen on large

1 streams?

2 A. Yes.

3 MS. FRANZETTI: Counsel, if I can,
4 just for clarity, do you consider this a
5 large stream?

6 HEARING OFFICER TIPSORD: Which
7 "this"?

8 MS. FRANZETTI: Let's say Upper
9 Dresden Island Pool.

10 MR. SEEGERT: I don't consider it a
11 large river, no.

12 MS. FRANZETTI: Same answer for the
13 ship canal?

14 MR. SEEGERT: Yes. From there on up
15 it gets progressively smaller, so.

16 MS. DIERS: Forty-six. And I guess
17 first is this question for Greg or should
18 we --

19 MS. FRANZETTI: I'm sorry. I'm not
20 looking down. 46?

21 MS. DIERS: We're still talking about
22 sediment.

23 MS. FRANZETTI: He can respond to
24 this. Thank you for asking.

1 MS. DIERS: Forty-six, explain your
2 statement on Page 5 of your prefiled
3 testimony where you state that deleterious
4 sedimentation in the CAWS is both
5 unpreventable and irreversible and will
6 remain a major impediment to biological
7 improvements. What makes it unpreventable?
8 I guess we can start there. I can break it
9 down.

10 THE WITNESS: Okay. To answer those
11 first two questions --

12 MS. DIERS: Unpreventable and
13 irreversible?

14 MR. SEEGERT: Right. Well, no, and --
15 yeah, unpreventable and -- much of the
16 sediment comes from nonpoint sources. And we
17 witnessed a good example of that during our
18 recent habitat survey.

19 MS. FRANZETTI: What year, Greg?
20 Recent?

21 MR. SEEGERT: The 2008. So in
22 attachment 2B for river mile 82.5 right bank,
23 that's how it's labeled in Attachment 2B,
24 that photograph shows an area, a big pile of

1 bare dirt right along the edge of the river.
2 And we wondered what was going on, so we
3 stopped the boat, got out, walked up above,
4 up the side of the bank, and there was an
5 area that was being graded. And I don't know
6 if they're -- they're doing some sort of
7 development. I don't know if it's commercial
8 or what, but some kind of development. And
9 it had an area, I'm guessing, of 50 acres or
10 so completely scoured, no vegetation, and
11 they had attempted to put some silt fences in
12 the area, but the silt fences were all gone.
13 So anything from that 50 acre site was going
14 to get funneled right through that about 100
15 foot wide section, and that's just one
16 example of what goes on in a system like this
17 on a regular basis. And the reason then this
18 is essentially unpreventable is that
19 unfortunately Illinois EPA has very little
20 control over this sort of thing, so it just
21 keeps going on. They don't have the rules to
22 handle nonpoint source.

23 MR. ETTINGER: Well --

24 MS. FRANZETTI: Excuse me. Let him

1 finish his answer.

2 MR. ETTINGER: Go on. I'm sorry. Are
3 you finished?

4 MS. FRANZETTI: No. He's not.

5 MR. SEEGERT: So and also in an urban
6 area there's a very high percentage of
7 impervious surface area. So, again, whatever
8 sediment comes into the system gets washed
9 off and finds its way to the waterway. So,
10 again, the actual loading might not be --
11 well, probably are not as much as they are in
12 the downstate agricultural areas. But in
13 this case whatever sediment does come in gets
14 washed off and finds its way into the
15 waterway.

16 HEARING OFFICER TIPSORD: Mr. Seegert,
17 for the record, Attachment 2B to your
18 testimony, correct?

19 MR. SEEGERT: Yes.

20 HEARING OFFICER TIPSORD: And the area
21 that you were talking about, the construction
22 area, is that on Page 19?

23 MR. SEEGERT: Well, it's river -- I
24 don't have the --

1 HEARING OFFICER TIPSORD: What's the
2 river mile?

3 MR. SEEGERT: 282.5 right bank.

4 HEARING OFFICER TIPSORD: Yes. That
5 is, in fact, Page 19 as I'm looking at it.

6 MS. FRANZETTI: We'll double-check.
7 We have a copy right here.

8 HEARING OFFICER TIPSORD: And it's
9 labeled construction activities adjacent to
10 this location.

11 MS. FRANZETTI: Yes.

12 HEARING OFFICER TIPSORD: Thank you.

13 MS. WILLIAMS: Do you know who was
14 doing this construction that you're
15 describing in this picture?

16 MR. SEEGERT: I'm sorry?

17 MS. WILLIAMS: Do you know who was
18 doing this construction in this picture?

19 MR. SEEGERT: No, I do not.

20 MS. WILLIAMS: Did you call the EPA
21 when you saw this?

22 MR. SEEGERT: No, we did not.

23 MR. ETTINGER: Are you aware of the
24 Phase 1 or Phase 2 storm water?

1 MR. SEEGERT: No, I'm not.

2 MR. ETTINGER: Thank you.

3 MS. FRANZETTI: For clarification,
4 when you were talking about in your answer
5 the nonpoint source pollution due to the
6 amount of impervious area, that was a
7 separate factor that we're talking in terms
8 of the source of the sedimentation or
9 sediments entering this waterway from this
10 factor where construction activities go on
11 because of development in the area of this
12 waterway; is that correct?

13 MR. SEEGERT: That's correct. So
14 there's going to be run-off that's nonpoint
15 source. I'm not familiar with the
16 regulations as to know how this is regulated.
17 I look at this and say water coming from --
18 not from a -- not in the way I think of it as
19 not a point source, whether it is regulated
20 or not regulated, whether they have to get a
21 permit to do this or not. I'm not familiar
22 with that.

23 MR. ETTINGER: I think we can go on,
24 but you're not testifying here today as an

1 expert in the Clean Water Act or its controls
2 over any form?

3 MS. FRANZETTI: I think for the most
4 part that's right, Counsel, except that I
5 would say that from his work on the UAA
6 factors, that I think he could qualify as an
7 expert in terms of review and application of
8 the UAA factors to this waterway.

9 MR. SEEGERT: And I mean I should,
10 since you brought up the question, there are
11 parts of the Clean Water Act that -- like
12 Sections 316A and 316B that I would consider
13 myself an expert in.

14 MR. ETTINGER: Okay.

15 BY MS. DIERS:

16 Q. I think we did the unpreventable,
17 irreversible. I'm not sure if we got to where I
18 left off. Where is the deleterious sedimentation
19 coming from?

20 A. Well, I mean I believe I've answered
21 that. My response would be from various impervious
22 areas, it's coming from CSOs, it's coming from the
23 kind of thing referred to in the photographs. So
24 it's kind of from a variety of sources, all of which

1 I think come under the general category
2 urbanization. It's what you see in an urban area.
3 You have a lot of run-off.

4 Q. I'm going strike the rest of the
5 question and go to 47.

6 HEARING OFFICER TIPSORD: Let's take
7 about five minutes here and we can come back
8 and we'll shoot for going until
9 5:00 o'clock.

10 (Short break taken.)

11 BY MS. DIERS:

12 Q. I'm going to strike 47, 48, and 49 and
13 go to 50.

14 MS. FRANZETTI: I'm sorry. I'm going
15 to be a bugaboo here just on one. I think it
16 would be helpful to have it as part of
17 Mr. Seegert's testimony. So if you don't
18 mind, I am going to just ask one part of your
19 Question 46 that you did not ask. And that
20 is do you agree, Mr. Seegert, that the
21 deposition of new sediments has decreased
22 over time?

23 MR. SEEGERT: Well, we partly
24 addressed that. And when I said I didn't

1 think there was any change that we've
2 observed over time, and one specific piece of
3 evidence that I could point to was something
4 I also mentioned earlier which was in both
5 2008, 2003, the percentage of sites that we
6 looked at and classified using the QHEI and
7 the sites that we called moderate or severe
8 was 70 percent. The identical percentage
9 both times, both time periods. So in that
10 case, there's a five-year period, 2003 to
11 2008 where at least just looking at sediment
12 quantity there was absolutely no change
13 whatsoever in the amount of sediment between
14 2003 and 2008. So based on that plus our own
15 anecdotal observations, I would say no, it's
16 not decreasing.

17 BY MS. DIERS:

18 Q. Question 50: On Page 6 you state that
19 extensive studies of the nearby Fox River funded in
20 part by U.S. EPA documented significant and
21 wide-spread adverse impacts on the aquatic
22 communities due to the effects of impounding. Is it
23 your testimony that these extensive studies
24 concluded these impoundments are irreversible and

1 should Illinois be promoting dam removal as you
2 point out on Page 12 of Exhibit 2 which is occurring
3 in Wisconsin and Michigan?

4 A. I think there are three separate
5 questions there. It's been a while since I've
6 looked at it, but I don't believe the Fox River
7 studies address the question of or included any
8 findings regarding whether the impacts from
9 impoundments were or were not reversible. In other
10 words, they documented what they saw, but they
11 didn't reach any conclusions as to whether or not
12 they were reversible. As far as the second question
13 is concerned, I would say from a biological
14 integrity standpoint, just from that standpoint, dam
15 removal would generally be a good thing, but there
16 are other factors that someone would need to
17 consider before they recommend a dam be removed or
18 not be removed. And then as far as the question, I
19 think the last one was about should -- I'm sorry.
20 Was Illinois -- should they be promoting? I'm not
21 sure what Illinois should or shouldn't be doing. I
22 think, again, you would have to look on the broad
23 context. I tend to look at things in an ecological
24 perspective, and I think generally that dam and

1 removing dams is probably a pretty good thing. But
2 I think you'd have to look at each situation
3 individually. There are a number of dams that no
4 longer serve an effective function. They might have
5 been an old mill dam from 100 years ago. They could
6 probably be removed and it really wouldn't affect
7 anyone. On the other hand, there are places
8 where -- There's development all the way around, and
9 if you take it back just the natural course of the
10 river, people used to have waterfront property, now
11 don't have waterfront property. So there are other
12 factors that would need to be considered.

13 Q. I'm going to go to 52 right here.
14 Explain why you conclude on Page 7 that the impacts
15 on the Chicago Sanitary and Ship Canal and Upper
16 Dresden Island Pool from dams is irreversible?

17 A. Well, this is fairly easy. I mean
18 unless you remove the dam, the reach is going to
19 continue to be impounded. And all the attendant
20 effects that I talked about before are still going
21 to be present. And I'm not aware of any plans to
22 move the dams in the system. And given the fact
23 that navigation is, as I understand it, a protected
24 use, I don't think that they would be able to

1 remove -- move the dam. So as far as I'm concerned,
2 those dams are going to have to stay.

3 Q. Just jumping back a second. When we
4 were talking about the Fox River, do you know how
5 many dams are on the Fox River?

6 A. No, I don't.

7 Q. I'm going to go back to 51. You
8 testified that the Brandon Pool is 100 percent
9 impounded and the Dresden Pool is 93 percent
10 impounded. Are the upper and lower Dresden included
11 in these figures, and where did the figures come
12 from?

13 A. Okay. For Dresden Pool, the
14 93 percent, we talked about this a little bit
15 before. Based on our estimates, the upper -- only
16 the upper one mile of Dresden Pool, and I'm
17 including both upper and lower, that the pool is 14
18 miles long. Only the upper part is free-flowing,
19 which means 13 miles free-flowing, divide 13 by 14
20 and you get 93 percent.

21 With regard to Brandon Pool, there
22 is no tail water below the Lockport Lock and Dam, so
23 that's 100 percent. The Brandon Pool is only about
24 five miles long, and it's all impounded.

1 Q. I'm going to strike 53 and go to 54.
2 Have you concluded that factor 5 applies throughout
3 the CAWS and Lower Des Plaines?

4 MS. FRANZETTI: And now for this
5 question, Lower Des Plaines --

6 MS. DIERS: I had -- I was going to
7 ask him to clarify the Lower Des Plaines
8 area.

9 MS. FRANZETTI: All right. I think
10 when you were applying factor 5, weren't you
11 looking at 55? So first clarify that.

12 MR. SEEGERT: Well, for factor 5, the
13 areas that we looked at, we talked about this
14 at the very, very beginning of this
15 afternoon's session was I'm talking about the
16 south branch, the Chicago River, all of
17 the -- all of the ship canal and all of the
18 Lower Des Plaines River which includes four
19 miles of Brandon Pool and eight miles of
20 Upper Dresden Island Pool. So within the
21 areas I've just mentioned, factor 5 applies.

22 BY MS. DIERS:

23 Q. I'm going to skip 55.

24 A. They would all apply to Brandon Pool

1 because it has the same limitations as the rest of
2 the ship canal.

3 Q. And 56, did you rely on any data to
4 conclude that factor 5 is applicable?

5 A. As I believe was mentioned earlier, we
6 collected QHEI data in previous years. I think '93,
7 '94, 2003, and then most recently in 2008. So all
8 of that information is information that we relied
9 upon.

10 Q. And then did you compare this data to
11 other impounded rivers?

12 MS. FRANZETTI: Counsel, I'm not sure.
13 Did he compare the QHEI data from Upper
14 Dresden Island Pool and Ship Canal to other
15 rivers for what purpose?

16 MS. DIERS: I'm sorry. Can you say
17 that again? I lost my train of thought.

18 MS. FRANZETTI: I'm not following the
19 question. Because he talked about relying on
20 QHEI data from three separate efforts, I'll
21 call them, '93, '94, 2003, 2008. And then
22 you said did you compare that QHEI data to
23 other rivers. And I'm not sure where that
24 goes.

1 MS. DIERS: I meant other impounded
2 rivers. I don't know if that helps clarify
3 my question.

4 MS. FRANZETTI: For what purpose? To
5 see if the QHEI values were comparable as
6 between ship canal, Upper Dresden Island
7 Pool, and some other impounded river?

8 MS. DIERS: Yes. I think that's --

9 MS. FRANZETTI: The answer may be no,
10 he didn't do any comparison, but I'm just not
11 sure.

12 MR. SEEGERT: Well, the question
13 isn't -- or looking at other impounded rivers
14 isn't relevant. It's not what the question
15 is. The question is relative to habitat in
16 rivers, free-flowing rivers, how does this
17 stack up? If you would do what you're
18 implying is you'd say, how does the crappy
19 habitat in this system compare to crappy
20 habitat in other systems? That's not what
21 the QHEI is designed to do. It's designed to
22 establish basically a reference condition and
23 say in a reference condition you have a
24 variety of physical constraints, and you want

1 to know whether this system or the Rock River
2 or any other river, regardless of whether it
3 has impounded, has barges, doesn't have
4 barges, how it stacks up against what a river
5 should be; because it's those characteristics
6 that make the river good. And you just want
7 to know how good can this particular series
8 of segments be relative to rivers in general,
9 not other impounded rivers.

10 MS. WILLIAMS: I think that -- Can I
11 do a follow-up? I think that's fine as an
12 explanation of what QHEI does. But this
13 question, you said the QHEI data was part of
14 what you used to conclude that factor five,
15 which is physical conditions related to the
16 natural features of the water body such as
17 lack of proper substrate cover, flow, depth,
18 pools, riffles and the like unrelated to
19 water quality preclude attainment of aquatic
20 life types of uses. So I think it's fair
21 then to ask are the QHEI scores in the Upper
22 Dresden Island Pool significantly different
23 than another impounded river that would be
24 capable of attaining Clean Water Act goals

1 such as general use water bodies in Illinois.

2 MR. SEEGERT: Well, you have at least
3 two errors in that question. The fact --
4 There's the general presumption that other
5 impounded rivers in Illinois attain Clean
6 Water Act goals. The rivers in Illinois were
7 assigned general use basically by default.
8 No one went in and did a structured study,
9 looking to see whether or not they're good,
10 bad, or indifferent. Somebody, I don't know
11 whom, probably some bureaucrat waved a magic
12 wand and said --

13 MS. FRANZETTI: Easy, easy.

14 MEMBER MOORE: There's a lot of
15 bureaucrats in this room.

16 MS. FRANZETTI: Danger.

17 MS. WILLIAMS: Let him answer, Susan.

18 MR. SEEGERT: No. But somebody
19 somewhere decided they were general use.
20 They didn't go through the structured
21 assessment that we have that we're trying to
22 make here. So we don't know how any of those
23 other systems, we don't know if there are any
24 other impounded water bodies in Illinois

1 which do or do not attain Clean Water Act
2 goals because nobody has looked.

3 MS. WILLIAMS: Nobody has looked?

4 MR. SEEGERT: Nobody has looked.

5 MS. WILLIAMS: Do you believe that all
6 impounded rivers are unable to attain Clean
7 Water Act water life use goals?

8 MS. FRANZETTI: I don't think that's
9 what he said.

10 MS. WILLIAMS: No. That's my
11 question.

12 MR. SEEGERT: I didn't say that. But
13 I said in Illinois no one has looked. I'm
14 not aware of a UAA that's been done on
15 another medium to large river in Illinois.

16 HEARING OFFICER TIPSORD: Mr. Seegert,
17 isn't it true you would only do a UAA
18 analysis if you were demonstrating that it's
19 not a fishable stream? Isn't that correct?
20 I mean isn't that when you do a UAA is to try
21 and -- you can't meet fishable swim rule, so
22 you do a UAA to see what you can meet? Isn't
23 that correct? So if it's already
24 fishable/swimmable, then nobody would do a

1 UAA. So nobody would do QHEI scores?

2 MR. SEEGERT: Right. But in this case
3 it's the chicken and the egg. You're
4 assuming that it's fishable/swimmable because
5 somebody wrote down on a piece of paper that
6 it was general use. And I'm saying nobody
7 had a basis, an objective scientific basis
8 for concluding that the Rock or Iroquois or
9 any other river was fishable/swimmable as
10 defined in part of Clean Water Act goals.
11 Illinois just hasn't gone through that
12 process. Most states are not -- having
13 indictment against Illinois. Most states
14 haven't. Most states said, jeez, we want to
15 show that our rivers are great. And so we're
16 going to call them general use or some other
17 category. EPA, U.S. EPA has basically come
18 back to the states and said prove it. Prove
19 this to us. And now we're going to have to
20 go through and look at a lot of individual
21 water bodies, and I'm sure you will find some
22 in Illinois -- I mean I'll offer up the
23 Kankakee. The Kankakee is partly impounded,
24 but given the small amount of impoundment, I

1 would expect that it meets Clean Water Act
2 goals. But I don't know that for certain
3 because no one has done a UAA type assessment
4 of the Kankakee River.

5 MR. ETTINGER: Have you looked at the
6 portion of the Kankakee that was impounded?

7 MR. SEEGERT: Yes.

8 MR. ETTINGER: Does that portion of
9 the Kankakee have a balanced fishery?

10 MR. SEEGERT: The area immediately
11 upstream of the dam in Wilmington, I would
12 say, probably does not, but that's a very
13 limited area.

14 MR. ETTINGER: What about the area
15 upstream of the Dresden Island --

16 MS. FRANZETTI: I couldn't hear you.
17 What about the area?

18 MR. ETTINGER: What about the area
19 upstream of the Dresden Island Lock and Dam
20 in the Kankakee?

21 MR. SEEGERT: We haven't looked at the
22 entire part that's impounded. The part that
23 we have looked at I would say probably does
24 not meet Clean Water Act goals.

1 MR. ETTINGER: And where did you look
2 at that?

3 MR. SEEGERT: It's within roughly the
4 lower one mile. Unfortunately, Mr. Vondruska
5 is not here. He could give you chapter and
6 verse, but I know we have two locations in
7 the extreme lower part of the Kankakee. But
8 sitting here today, I can't say exactly where
9 they are.

10 MS. WILLIAMS: I need to get back to
11 this idea that no one has looked at the other
12 impounded rivers. Is that okay?

13 MR. SEEGERT: Sure.

14 MS. WILLIAMS: Are you familiar with
15 the 305(b) report and the 303(d) list?

16 MS. FRANZETTI: Which year.

17 MS. WILLIAMS: The concept of such a
18 report.

19 MS. FRANZETTI: And also referred to
20 at times as the impaired water study.

21 MR. SEEGERT: I guess the answer --
22 the answer is I'm aware of them. I wouldn't
23 say I'm familiar with them.

24 MS. WILLIAMS: Is it your

1 understanding that as part of that process,
2 the Agency assesses the waters of the State
3 for attainment of the Clean Water Act goals?

4 MR. SEEGERT: My --

5 MS. FRANZETTI: If you have an
6 understanding of what they do.

7 MR. SEEGERT: Again, my -- as I
8 understand it, they go through a process, but
9 it's not very detailed. It's kind of high
10 altitude. They're not going to it to the
11 level that you would do for a real use
12 attainability study.

13 MS. WILLIAMS: Do you know if any
14 impounded rivers in Illinois are assessed as
15 attaining Clean Water Act goals?

16 MR. SEEGERT: I don't.

17 MS. FRANZETTI: Wait, Counsel.
18 Clarification. Are you asking whether the
19 Agency has assessed those waters using the
20 UAA factors or no?

21 MS. WILLIAMS: No, I'm not. No. I'm
22 not asking about that.

23 MS. FRANZETTI: Just separate and
24 apart from that?

1 MS. WILLIAMS: I think he's implied
2 that unless you've done a UAA you couldn't
3 possibly know if Clean Water Act goals are
4 attainable. And I'm asking him whether there
5 are impounded rivers in Illinois that are
6 currently attaining those goals because they
7 are studied through that process, otherwise
8 they would have to be put on the 303(d) list.

9 MS. FRANZETTI: And by that process,
10 the -- what process are -- that's what I'm
11 asking. What process are you referring to?
12 Something other than the UAA process?

13 MS. WILLIAMS: The use assessment
14 process, aquatic life use assessment process.

15 MS. FRANZETTI: That the Agency is
16 saying it conducted when it is doing its
17 305(b) 303(d) list?

18 MS. WILLIAMS: Correct.

19 MS. FRANZETTI: I'm not sure you can
20 establish that with this witness because of
21 his lack of any familiarity -- detailed
22 familiarity with what you all do to prepare
23 that list.

24 MS. WILLIAMS: But if he can try to

1 answer it.

2 MR. SEEGERT: Based on what admittedly
3 is a limited understanding in that process, I
4 don't think that process is rigorous enough
5 to lead to an accurate determination as to
6 whether or not there's true attainment.

7 MS. WILLIAMS: So you think that
8 waters in Illinois that are not placed on the
9 303(b) list may actually be impaired for the
10 Clean Water Act?

11 MR. SEEGERT: I would be very
12 surprised if they're not. And I mean let me
13 say one other thing kind of related. I know
14 that the State doesn't have -- they don't
15 have a -- we're talking about impounded
16 waterways, so presumably talking about at
17 least some larger water bodies. The State
18 doesn't even have a fish IBI to assess those
19 large water bodies. If they don't have a
20 tool, how could they possibly accurately
21 assess it, assess such water bodies?

22 MS. WILLIAMS: I think I'm finished
23 with this line. We can move on.

24 BY MS. DIERS:

1 Q. Fifty-seven: Do all natural large
2 rivers have riffle run segments in each sampling
3 reach or are some rivers predominated by pool and
4 other nonriffle habitats? And I'll just break it up
5 there. I'll just stop there and ask the remaining
6 questions.

7 A. Okay. First, as I mentioned before, I
8 wouldn't characterize the Des Plaines River as a
9 large river. And -- But in -- then as a follow-up,
10 rivers the size of Des Plaines and ones that are
11 even considerably larger have some amount of riffle
12 run habitat. I've already mentioned the Fox, the
13 Kankakee, even rivers the size of the Wabash River
14 in Indiana have riffle pool run sequences. They
15 differ not in not having them, but how far apart
16 they are, but they have them.

17 Q. What about the following question:
18 Are these pool and other nonriffle habitats and
19 factors such as cover then the determining factors
20 for fish species diversity?

21 A. Well, as I said, these -- all of the
22 water bodies you're referring to will have riffle
23 run segments, so, you know, the premise of that
24 question is will something else be the determining

1 factor? And I'm saying no, that it's going to be
2 the -- it's the collective habitat of which riffle
3 run is part of it, but pools and other areas are
4 also part of it.

5 MR. ETTINGER: How close do the riffle
6 run segments have to be to each other?

7 MR. SEEGERT: Well, as rivers get
8 larger, you have more -- a higher and higher
9 percentage of fishes that are not necessarily
10 highly migratory, but which kind of, I'll
11 say, wander around. That's not very
12 scientific, but basically do wander around a
13 lot. So what happens is they end up in these
14 areas. I'll give you an example. On the
15 Wabash River, there's a decent riffle in the
16 middle Wabash roughly every 20 miles, and
17 then when you get into that riffle habitat,
18 you have this really, really diverse fish
19 community. Then you have this intervening
20 15, 18 miles which is kind of ho-hum. It's
21 got bass and blue gills and a lot of other
22 things, but it doesn't have the thing that
23 depend on the riffle. So one way or the
24 other, the fishes that depend on the riffles

1 are able to find them even when they're
2 spread out like in that example roughly 20
3 miles apart. And another example is I've
4 worked on the lower Missouri. The Missouri
5 River is obviously one of the largest rivers
6 in the country. There's a place called
7 Pelican Island that's basically on the
8 outskirts of St. Louis. There's a big riffle
9 shole complex there, it's more of a shole
10 than a riffle, but the water flows rapidly
11 over these hard substrates, and that thing is
12 just jammed with fish that are otherwise
13 unusual in most of the Missouri River. Some
14 people think that the Missouri River is very
15 turbid and not supporting smaller fishes that
16 require this kind of habitat, but even on a
17 river the size of the Mississippi, you still
18 have that component. It's still there.

19 HEARING OFFICER TIPSORD: Missouri.

20 MR. SEEGERT: I'm sorry, in the
21 Missouri.

22 MR. ETTINGER: So the Big Mighty has a
23 few good spots and that's enough to enable it
24 to overcome its sediment over the rest?

1 MR. SEEGERT: I didn't say that at
2 all.

3 MS. FRANZETTI: Albert said that.

4 MR. SEEGERT: And what happens, again,
5 you're dealing with -- you have to -- you
6 have to think about what are the
7 expectations. The expectations for the
8 Missouri River are very different because now
9 we're talking about a very large -- by
10 definition a lot of people now call those
11 great rivers. They say the Ohio, the
12 Mississippi, and the Missouri are great
13 rivers. And now you have to look at the box
14 for your expectation in that kind of system.
15 And so in that kind of system, one of the
16 things you want to see are what we call big
17 river chubs. The mackerel hypoxis chub we
18 like to see. We like to see them. And they
19 hang out in those areas and -- but they can
20 hone in on a few areas so that overall the
21 Missouri River gets its quota of what I would
22 call the big river chubs. But most of the
23 rest of it has a different set of
24 expectations. But you collectively they all

1 go in to assessing what should be there.
2 That's really what you're trying to do.
3 You're saying, well, what should be there and
4 how far does the system deviate from what
5 should be there and what's preventing it from
6 going from where it is to where it should be?
7 And I'm saying in this system, it's the
8 habitat that is -- and all these things that
9 are part of it that's preventing it from
10 going where it is to where we would all like
11 it to be.

12 CHAIRMAN GIRARD: Could I ask a
13 question then? How do you decide what should
14 be in a system that's 70 percent manmade?

15 MR. SEEGERT: Well, you basically have
16 to lower the bar. And actually the Agency, I
17 think, is -- they're on the right track in
18 the sense that they came up with three
19 categories: An A, a B, and an Upper Dresden
20 Island Pool use. And then you said Upper
21 Dresden Island Pool use should include all
22 the kinds of fishes that represent a
23 balanced -- they didn't use that word, but
24 you have tolerance, moderately tolerance, and

1 intolerance. They're saying it's got this
2 whole gamut. And then as you get further and
3 further away from that, then eventually when
4 you get to Class B that's dominated by
5 tolerance. And so you look at what the
6 expectations are and say, well, what could
7 live here. And if the answer is because of
8 habitat or other limitations, only tolerant
9 species or predominantly tolerant, then
10 that's how you would set up the use,
11 basically as they did for Class B. I'm not
12 saying that it's a perfect class, but
13 conceptually that makes perfect sense. You
14 basically say where do I need to set the bar,
15 and then you set the bar accordingly.

16 MS. FRANZETTI: Does that answer your
17 question?

18 CHAIRMAN GIRARD: Thank you. That was
19 a general question.

20 HEARING OFFICER TIPSORD: Miss Diers?

21 BY MS. DIERS:

22 Q. I think we're on Question 58. Do you
23 foresee some limited restoration short of removing
24 the locks and dams that could enhance the Upper

1 Dresden Island Pool? For example, could restoration
2 of littoral areas increase habitat heterogeneity and
3 create habitat that could support some of the
4 species associated with waters that attain the Clean
5 Water Act aquatic-life goal?

6 MS. FRANZETTI: Did you purposely drop
7 the minimally attained?

8 MS. DIERS: I don't like that word,
9 but --

10 MS. FRANZETTI: No. That's why I'm
11 asking, because the witness has some issues,
12 too, with what the heck does that mean.

13 MS. DIERS: I don't like that word,
14 so.

15 MS. FRANZETTI: Okay. Fine. So
16 you're not asking it with the minimally, just
17 water that has attained the Clean Water Act
18 goals.

19 MS. WILLIAMS: I like it better than
20 marginally.

21 MR. SEEGERT: Okay. Well, first of
22 all, what would limited restoration consist
23 of? Give me some examples.

24 MS. DIERS: I thought the second part

1 of the question I did ask. For example,
2 could restoration of the littoral areas. Did
3 that help with the first part?

4 MR. SEEGERT: Okay. We've heard some
5 testimony to the -- for example, from
6 Dr. Thomas to the effect that, yeah, we could
7 increase cover, we could do some other things
8 and that would lead towards obtainment of
9 aquatic-life goals. I don't see it that way.
10 Again, the problem is that the littoral
11 zones, and by that I take it you're talking
12 about the near shore areas along river?
13 Okay. That's not where the limitation is.
14 The limitation is in these fast water shallow
15 areas; i.e., riffles. Think of this as --
16 the limitation is the lack of riffles. And
17 think of the analogy of the chain is only as
18 strong as its weakest link. Our weak link
19 here is riffle. You can improve those other
20 areas just like you could strengthen the
21 other links in the chain, but the chain still
22 breaks unless you fix the weakest link. This
23 is not going to affect the weakest link. So
24 why is that? Well, that's because you've

1 indicated that in Upper Dresden Pool,
2 according to your definition, you want to see
3 all the species, you want to see not only
4 tolerant, not only moderately tolerant, you
5 want to see intolerant species. Those
6 intolerant species, most of them, a
7 disproportionate number of them, need and
8 inhabit riffle areas. If you don't have
9 riffle areas, you're not going to bring in
10 that part of the fish community. So
11 enhancing things along the shore line, yes,
12 you might have more bass and you might have
13 more blue gills, but you're not going to get
14 the balanced fish community that you're
15 saying is part of your definition.

16 MR. ETTINGER: Only God can make a
17 riffle?

18 MS. FRANZETTI: Objection to form,
19 Counsel.

20 MR. ETTINGER: Is it possible to make
21 a riffle?

22 MR. SEEGERT: In a system that's --
23 with the lack of gradient, I don't know. I
24 assume engineers could do it if you gave them

1 enough money, infinite time and money they
2 probably could construct a riffle.

3 MR. ETTINGER: But you've never been
4 involved in the construction of a riffle and
5 you don't know how much it would cost?

6 MR. SEEGERT: I've been involved in
7 small stream restoration, have in idea what
8 they cost, and given the size of this system,
9 again, you're talking about major, major
10 dollars here.

11 MR. ETTINGER: Well, what do you mean
12 by major, major dollars?

13 MR. SEEGERT: Pardon?

14 MR. ETTINGER: What do you mean by
15 major, major dollars?

16 MR. SEEGERT: I think we're talking at
17 least in the tens of millions, probably the
18 hundreds of millions, and that's even if it
19 could be done. Again, given -- you only have
20 so much gradient to work from. Basically you
21 have to raise the water up, shoot it down
22 through a riffle. I don't know that this
23 even could be done. Maybe there's some
24 massive engineering project that could be,

1 but even if it is because of the scale, all
2 the restoration studies that I've been aware
3 of on relatively small, relatively small
4 systems, right now the city of San Antonio
5 wants to restore eight miles of the Colorado
6 River. The price tag that they've assigned
7 to restore eight miles of the Colorado river
8 is \$240 million.

9 MR. ETTINGER: What town?

10 MR. SEEGERT: San Antonio.

11 MR. ETTINGER: California River goes
12 through San Antonio?

13 MR. SEEGERT: Yes, it does.

14 MR. ETTINGER: Texas?

15 MR. SEEGERT: Texas.

16 MR. ETTINGER: Okay.

17 MR. SEEGERT: And that's a system
18 that's in the size ballpark, actually, I mean
19 having collected fish in it, if anything it's
20 larger. The drainage area is certainly
21 larger. We're talking about here not a heck
22 of a lot larger, but it's in the ballpark.
23 So when you get into talking about systems of
24 this size, talking about tens or hundreds of

1 millions of dollars, if it can be done at
2 all.

3 MS. WILLIAMS: I'm trying to
4 understand, Mr. Seegert, didn't you testify
5 earlier that you don't know whether the Lower
6 Des Plaines River would have riffles in the
7 absence of the impoundments? Is that what
8 you testified earlier, Greg? If the dams
9 were gone, do you know if there would have
10 been riffles or not?

11 HEARING OFFICER TIPSORD: I believe he
12 you compared it with the Kankakee.

13 MR. SEEGERT: Well, what I said was I
14 would expect that if a 14-mile section that
15 you probably would have a riffle based on the
16 riffle distant sequence that I've seen in
17 other areas. And then one of you followed up
18 and said, well, what about in Upper Dresden
19 Pool. And at that point I said, well, I'm
20 not sure within upper, just in Upper Dresden
21 Pool whether there would or would not be.

22 MS. WILLIAMS: Because it's very low
23 grading, correct?

24 MR. SEEGERT: Well, again, I'm not

1 sure of the exact -- it's low grading. I
2 don't know if it's very low grading.

3 MS. WILLIAMS: Would you expect that a
4 low gradient river of the size of Upper
5 Dresden Island, you know, size meaning not
6 the length Upper Dresden Island Pool, but
7 that size of a river, would have different
8 fish assemblages than a high gradient river?

9 MR. SEEGERT: Well, you'd have to
10 be -- Again, now, we're talking about low
11 versus high, and I don't know what you mean
12 by low or high.

13 MS. WILLIAMS: I want to understand if
14 it's necessary to have high gradient and lots
15 of riffles to attain Clean Water Act goals in
16 your opinion.

17 MR. SEEGERT: Well, let me try to
18 answer it a different way. Because that --

19 MS. FRANZETTI: I would say, Counsel,
20 that he has answered that question.

21 MS. WILLIAMS: Well, I don't
22 understand.

23 MS. FRANZETTI: In his prior testimony
24 with respect to the Missouri, for example.

1 But I'm, you know --

2 MS. WILLIAMS: Was it yes or no? I
3 don't know.

4 MR. SEEGERT: Okay. Well, let's use
5 Ohio as our example, because they've done
6 more of this assessment than any of the other
7 midwestern states. So we're not talking
8 about the Rocky Mountains that have really
9 high gradient. And Ohio doesn't make a
10 distinction. They don't -- they don't say,
11 okay, this river is low gradient, therefore,
12 it's not going to attain. They look at an --
13 the overall condition within that ecoregion,
14 said this is what rivers, and this ecoregion
15 of Ohio should attain. They don't say low
16 gradient and high gradient, they say just
17 rivers. And they break in their class
18 boatable. We talked about -- We heard
19 testimony months ago on boatable. And the
20 only place they make an exception is in the
21 Erie Lake Plane where they say there's been
22 so much channelization that basically they've
23 discounted everything and made almost
24 everything up there modified. But everywhere

1 else in the state, regardless of what the
2 gradient is, they say this is the expectation
3 for rivers. I don't see where this system
4 falls outside that general bounds of the
5 rivers that comprise 95 percent of Ohio.

6 MS. WILLIAMS: I think that makes
7 sense. But what's troubling me is your
8 answer to the previous question that
9 Ms. Diers presented was that riffles are the
10 key to the problem in the Upper Dresden
11 Island Pool.

12 MR. SEEGERT: They are. They are the
13 key to the problem. That's why you don't
14 have the intolerant fish -- your problem is
15 you've got a definition what the system won't
16 support. If you want, you can change the
17 definition. You can say moderately tolerant
18 and tolerant, but then you have to go down to
19 a lower use classification. This system is
20 not going to attain Clean Water Act goals by
21 any definition that I can think of.

22 MS. WILLIAMS: Because it --

23 MS. FRANZETTI: Counsel, I'm going to
24 now object to the tag-teaming. One of you

1 should be asking the questions, and
2 particularly given the hour. I let it go a
3 little bit, but now I'm going to object.

4 MS. WILLIAMS: That's fine.

5 MR. ETTINGER: So can I just ask would
6 you modify the Ohio habitat method that we're
7 talking about so that if there was no riffle
8 there should be a zero habitat score?

9 MR. SEEGERT: I'm sorry? Did EA
10 change that?

11 MR. ETTINGER: I'm just asking would
12 you --

13 MS. FRANZETTI: He's asking you
14 hypothetically.

15 MR. ETTINGER: Hypothetically if you
16 were going to use the Ohio model and you
17 found -- you were going to look at this
18 system and you found that there was no riffle
19 in a system, you would then automatically
20 assign it a subfishable swimmable category?

21 MS. FRANZETTI: Objection to the
22 extent if you are characterizing his
23 testimony. So I don't think you are proper
24 when you're characterizing it.

1 MR. ETTINGER: I wasn't. I asked a
2 question, Counsel.

3 MS. FRANZETTI: Is the question would
4 he modify Ohio systems?

5 MR. ETTINGER: Ohio has a system here,
6 it counts riffles as one of the factors. Do
7 we agree on that?

8 MR. SEEGERT: Yes.

9 MR. ETTINGER: Okay. Would you, if
10 you were free to change the system, change
11 the system such that, one, it did not have
12 riffles it would automatically have a
13 subfishable/swimmable rating?

14 MR. SEEGERT: No.

15 MR. ETTINGER: Why not?

16 MR. SEEGERT: Because riffle, although
17 it's an important component, it's not
18 necessarily going to be the only component.
19 And also if -- so you do have to look at the
20 habitat overall and have an understanding of
21 what the requirements of different fishes
22 are. There are some areas that although they
23 might not be a riffle, which is defined as
24 kind of a high grading area where the surface

1 is broken as opposed to a run is also high
2 gradient, but you don't have the kind of the
3 white water on top. If you have enough run
4 areas, decent run areas, they can, for some
5 species, mainly the redhorse, can function as
6 riffles.

7 MR. ETTINGER: Go on.

8 BY MS. DIERS:

9 Q. I'm going to strike 59 and go to 60.

10 On Page 8 states in 1993 and 1994,
11 QHEI scores were derived at 169 locations in the
12 Lockport, Brandon Road, and Dresden Pools and were
13 on average found to be low (mean scores in the 40s),
14 demonstrating that habitat generally was of poor
15 quality.

16 A, why did you, and I'm going to
17 say group the data from these four stretches to be
18 included in the average?

19 A. Because I wanted to know on average
20 what was the habitat like.

21 Q. B, what was the average highest and
22 lowest values of the different segments at Lockport,
23 Brandon Road, and Dresden Pools (above and below
24 I-55)?

1 Tech. Also in Lockport Pool, but now we're
2 talking about 1994, we have three
3 contractors: The two that I mentioned and
4 another one, LMS. I do know what LMS:
5 Lawler, Matusky & Skelly. And they don't
6 exist anymore. They were bought up by
7 somebody else. And there the average score
8 that we reported was 45 with the range of 32
9 to 56. So very similar to what we reported
10 in '93. ESE in '94 reported a little bit
11 lower scores than reported in '93, an average
12 of 41 with the range from 29 to 53.5. And
13 then the third contractor, LMS, reported an
14 average of 46 with the range of 33 to 56. So
15 to summarize, in all -- or in both years and
16 all three contractors, we had averages in the
17 low 40s with ranges from basically in the 30s
18 to the lower 50s. Okay. Brandon Pool in
19 '93, again, there's two companies. We
20 reported an average of 54 with a range
21 basically from 50 to 65. The other company,
22 ESE, an average of 51 and range of 37 to 79.
23 Oh, and I should mention, this is important.
24 When this was done it was, of course, using

1 the version of the QHEI that was available to
2 use at that point in time. That QHEI has
3 been modified both by Ohio EPA and also
4 Mr. Yoder's group, and the result of those
5 modifications would result in a general
6 lowering of the scores compared to what they
7 were. But this was done back in 1993, so we
8 use the QHEI version that was available in
9 1993. And then for Brandon Pool in '94,
10 again, it was the same two companies. We had
11 an average of about 49 with the range of 27
12 to 66. The other company had a -- I guess
13 they only did one location, because I see
14 that they had a score, an average of 35.5,
15 and there's no range. It was just 35.5. So
16 apparently they only did one location. And
17 Brandon Pool. And then in Dresden Pool, and
18 in this case Dresden Pool includes both upper
19 and lower Dresden Pool, 1993 we reported an
20 average of 53 with the range of 40 to 69.5.
21 ESE reported an average of 48 in a range of
22 39.5 to 68, and -- I'm sorry. Strike that.
23 The -- I read the values from ESNE from 1994.
24 Their 1993 average was 51 with the range of

1 42 to 68. And then still in Dresden Pool,
2 but now in 1994, we have four companies. EA
3 reported an average of 55 with the range of
4 40 to 69; ESE, those numbers I erroneously
5 gave, 40 now for 1994, it's 48 with the range
6 of 39 to 68; and the other company LMS in
7 1994 for Dresden Pool had an average of 49
8 with a range of 42 to 56. So everyone in
9 Dresden Pool using the QHEI that prevailed at
10 that time was scoring right around 50, a
11 little plus, a little minus, but right around
12 50. And the occasional higher scores,
13 meaning 60 or above, were consistently
14 associated with either the Brandon tail
15 waters or the tributary mouth locations.

16 BY MS. DIERS:

17 Q. Sixty-one: Are the habitat data
18 collected by the EPA Engineering in 1993-1994 part
19 of the Lower Des Plaines UAA report and the record
20 of this proceeding? And then what about the data
21 collected in 2003?

22 MR. SEEGERT: Those, according to
23 what -- Mr. Vondruska looked this up. And
24 according to what he told me, those data were

1 provided as part of Exhibit 36.

2 MS. FRANZETTI: Nope. I don't think
3 so.

4 MR. SEEGERT: I guess --

5 MS. FRANZETTI: Give us a second,
6 Counsel.

7 MS. WILLIAMS: Do you want to come
8 back to this one tomorrow?

9 MS. FRANZETTI: Unless this is wrong,
10 but the exhibit list for this -- I think 36
11 is meeting minutes from the Lower Des Plaines
12 work.

13 MR. SULSKI: Would it be Exhibit 30,
14 this?

15 HEARING OFFICER TIPSORD: No. That's
16 the Army Corps of Engineers map.

17 MR. SULSKI: All the scores were on
18 here.

19 MS. FRANZETTI: We believe, now I'm
20 not sure about these other two companies, but
21 at least the EA in '93/'94 sampling QHEI
22 scores, I think that was included in
23 Exhibit 32. That's entitled Qualitative
24 Habitat Evaluation Index Scores in the Upper

1 Dresden Island Pool and Des Plaines River.
2 Remember that -- I've got a piece of it here.

3 MR. SEEGERT: I believe Mr. Essig
4 prepared that.

5 MS. FRANZETTI: Do you remember? It's
6 hard for us to say what's included with
7 things you did, but it does reference some EA
8 QHEI information from the '93 and '94 time
9 period. It may not cover each one of these
10 pools: Lockport, Brandon, and Dresden in
11 that exhibit. We're not sure just what was
12 used.

13 MS. DIERS: Do you know if the '93/'94
14 is it in Attachment A?

15 MS. FRANZETTI: Excuse me?

16 MS. DIERS: The '93/'94 data I'm
17 asking about, do you know is it in Attachment
18 A, the UAA report?

19 MS. FRANZETTI: Oh, is it in -- I
20 don't know off the top of my head. That's
21 what you're referencing here in your
22 Exhibit 32.

23 MS. DIERS: That's what we're
24 thinking. We're just trying to --

1 MS. FRANZETTI: I don't think either
2 Greg or I could say off the top of our heads.
3 It's been too long to look at the UAA report
4 attachments.

5 HEARING OFFICER TIPSORD: I read it
6 every night before I go to bed.

7 MS. DIERS: And we talk about 2003.
8 Is it in the record?

9 MS. FRANZETTI: I'm sorry?

10 MS. DIERS: Is 2003, that data, is
11 that in the record?

12 MS. FRANZETTI: It is referenced in
13 Mr. Seegert's report, and to some extent in
14 his actual testimony, Exhibit 366, and his
15 report that is attached to the Exhibit 366.
16 If your question is asking are the actual,
17 you know, scoring sheets.

18 MS. DIERS: Right.

19 MS. FRANZETTI: No. I don't believe
20 the scoring sheets themselves are in the
21 record.

22 MS. DIERS: Okay.

23

24 BY MS. DIERS:

1 Q. I'm going to strike Question 62. I'm
2 going to go to 65, and I might back up. But I think
3 if I start with 65 it'll help put it all in content.
4 Sixty-five: You testify on Pages 8 through 9 that
5 these low scores are a strong indication that a
6 majority of the habitat in the Upper Dresden Pool is
7 not sufficient to support Clean Water Act
8 aquatic-life goals. I'm going to jump back up to 63
9 and first start with what do we mean by low?

10 MS. FRANZETTI: First answer 63.

11 MR. SEEGERT: Low scores are those
12 below a 60.

13 BY MS. DIERS:

14 Q. And then 64, you testify on Page 8
15 that the QHEI scores were below 60 in most of the
16 Dresden Pool. Were there any above 60? And, if so,
17 where?

18 A. Yes. The Brandon tail water area
19 score was greater than 60.

20 Q. I'm going to go to 66. You call
21 habitat in the Upper Dresden Pool less poor, but
22 aren't the scores you generated generally considered
23 fair in a narrative sense as stated in the QHEI
24 manual?

1 A. In this case I was using the phrase
2 less poor for comparison purposes between Upper
3 Dresden Pool and the Brandon Pool and the Sanitary
4 and Ship Canal areas. The habitat in upper Dresden
5 Pool is somewhat better than those areas, and I'd
6 say fair is a -- I was going to say fair is a
7 fair -- fair is an appropriate characterization of
8 that habitat, but I would note that fair does not
9 equate to Clean Water Act attainment.

10 Q. So going back to 65, that part of the
11 question, how much good quality habitat is required
12 to support a balance aquatic-life population in the
13 Upper Dresden Islands Pool?

14 A. Well, I'm not aware that anyone has
15 established a precise cutoff. I would say that in
16 general you would need something like 50 percent or
17 more to be in good habitat. I base that on the fact
18 that Mr. Rankin in his publication talking about how
19 to do QHEI scoring says that fish respond sort of in
20 general to what's going on. So that means that one
21 bad area doesn't make the whole area bad and one
22 good -- conversely, one good area doesn't make the
23 area good. It's -- That's kind of why I wanted to
24 look at average to begin with. But so I would say

1 you'd need to have about 50 percent or more be good
2 habitat, and, in this case, we're talking about less
3 than 10 percent being good habitat. So we're well
4 below what I believe is an appropriate cut-off.

5 Q. I'll strike 67. What cover scores
6 average in the Upper Dresden Pool? This is 68, the
7 second part of it.

8 MS. FRANZETTI: You're asking the
9 second question in 68?

10 MS. DIERS: Yes. What do cover scores
11 average in the Upper Dresden Pool.

12 MR. SEEGERT: The cover scores in
13 Upper Dresden Pool in 2008 range from 4 to
14 15, but most sites scored between 8 and 12.
15 So, you know, probably the overall average
16 would be around 10.

17 BY MS. DIERS:

18 Q. So is cover a limiting factor in the
19 Upper Dresden Pool, getting back to the first part
20 of the question?

21 A. I would say that cover is one of the
22 contributing factors to lower QHEI scores in Upper
23 Dresden Pool.

24 Q. I'm going to go on to 69. Do you have

1 a citation for your statement on Page 10 regarding
2 the 45-point cutoff that, under Ohio EPA's use
3 classification protocol, would automatically qualify
4 the Upper Dresden Pool as a limited or modified use
5 category? And what do you mean by automatically
6 qualified?

7 A. This statement was based on
8 information provided in Mr. Rankin's 1989 paper
9 where he sets forth the rationale for doing the QHEI,
10 and he provides a series of flow charts and
11 associated rationale. And if you follow those flow
12 charts, you see that when streams have a QHEI below
13 45, they're always classified either as limited
14 resource water or modified warm water habitat,
15 unless the biological scores for such a stream
16 already show it to be an attainment.

17 Q. I'm going to strike 70, I'm going to
18 strike 71.

19 MS. FRANZETTI: Are you striking 70?

20 HEARING OFFICER TIPSORD: Yes.

21 MS. FRANZETTI: And 71?

22 MS. DIERS: 70 and 71, yes. I think
23 I'm going to skip 72. I think we've talked
24 about it.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

MEMBER RAO: You thought you'd save 100 for tomorrow?

HEARING OFFICER TIPSORD: You know what, why don't we go ahead and call it a day. It's ten to 5:00, and you're obviously looking at striking some more questions.

MS. DIERS: Thank you.

HEARING OFFICER TIPSORD: It might be more comfortable to do that in your hotel room tonight. 9:00 o'clock tomorrow morning, same room.


(At which time the hearing was continued to November 10, 2009, at 9:00 a.m.)

* * * * *

1 STATE OF ILLINOIS)
2 COUNTY OF COOK) SS.

3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

I, LAURA MUKAHIRN, being a Certified Shorthand Reporter doing business in the City of Chicago, Illinois, County of Cook, certify that I reported in shorthand the proceedings had at the foregoing hearing of the above-entitled cause. And I certify that the foregoing is a true and correct transcript of all my shorthand notes so taken as aforesaid and contains all the proceedings had at the said meeting of the above-entitled cause.



LAURA MUKAHIRN, CSR
CSR NO. 084-003592

A	102:4 104:7	according	30:21 40:9	107:6	137:7
abandonm...	106:19	12:24 50:6	53:7 62:23	128:23	agricultural
58:18	107:20	129:2	66:6 67:16	affected 60:1	100:12
ability 64:13	108:4,14,23	142:22,24	68:4 79:6	60:6,17	agriculture
able 50:8	109:13,15	accordingly	120:9	65:15 70:6	84:22
64:4 65:16	110:19	89:18	125:16	aforesaid	ahead 40:4
67:15 94:9	116:14,17	126:15	131:18	151:11	57:22 150:4
107:24	116:18	account	add 80:3 81:4	after 5:3 9:5	air 56:19
123:1	118:22	10:22 11:11	adding 3:8	9:14 30:24	akin 48:5
abnormally	120:15,16	accounted	addition	afternoon	Akron/Can...
55:3,4	121:17	20:21	66:20	3:2,3,20	88:13
about 4:21	124:6,9	accurate	additional	29:4	Albert 87:8
6:17 7:1 8:4	128:12	120:5	56:9 95:10	afternoon's	124:3
11:18,20	130:9	accurately	address	109:15	ALISA 2:4
12:10,13,14	131:21,23	5:9 120:20	93:10 106:7	again 5:10,12	allows 71:22
12:20,23	131:24	achieve 96:7	addressed	30:5 31:21	almost 4:8
13:14 15:17	132:18	Acme 8:12	58:16 65:21	33:19 36:8	23:16
15:18 16:18	133:10	acre 99:13	75:22 93:21	59:24 61:2	134:23
16:19 17:21	134:8,18	acres 99:9	94:18	61:22 63:14	alone 53:20
19:12,18	136:7 140:2	acronym	104:24	66:10 70:6	along 38:21
22:5,17	141:11	6:10 139:22	addresses	74:22 90:22	38:21 39:4
23:2,12,13	142:20	act 10:15	35:9 71:8	93:8 100:7	47:19 63:1
24:15 25:1	143:20	49:18,21	adequate	100:10	95:14,19
28:14,15	144:17	50:1,4	28:11,17	106:22	99:1 128:12
29:2,6	145:7	53:21 61:20	60:14	110:17	129:11
31:17 33:3	147:18	91:23 96:1	adequately	118:7 124:4	already 3:9
33:4 34:18	148:1,2	96:15,22	10:11,17,18	128:10	24:8 44:18
35:10 38:4	149:24	103:1,11	10:18,20	130:9,19	47:7 68:22
38:7 41:19	above 72:15	112:24	adjacent	132:24	94:18
42:2,6,10	99:3 138:23	113:6 114:1	101:9	133:10	114:23
43:5,17	142:13	114:7	adjusted	140:19	121:12
49:9 51:6	146:16	115:10	5:19	141:10	149:16
55:1,5,7	above-entit...	116:1,24	Adm 1:5	against 96:13	although
56:1 59:9	1:8 151:8	118:3,15	admittedly	112:4	4:12 27:15
60:5 62:16	151:12	119:3	120:2	115:13	54:15
62:20 66:7	abreast 6:2	120:10	adult 5:12	agency 2:7	137:16,22
68:20 71:9	6:15	127:5,17	adults 28:8	18:3 35:14	altitude
72:23 74:9	absence	133:15	adverse	44:9 81:8	118:10
74:10 75:24	76:19 132:7	135:20	59:22	118:2,19	always 81:7
76:2 78:2,3	absent 27:2	146:7 147:9	105:21	119:15	149:13
79:9 81:3	35:17	active 6:19	adversely	125:16	ambient
82:2 83:3,5	absolute	activities	56:18 58:17	Agency's	56:19
85:20 86:8	63:19	101:9	advisory	49:16	AMENDM...
87:16 90:15	absolutely	102:10	6:18 43:16	ago 6:13	1:5
93:2,3,4	71:14	actual 70:15	46:4,21	72:14 83:17	American
94:24 95:5	105:12	100:10	aeration	107:5	6:5
96:20 97:21	accepted	145:14,16	60:11	134:19	amount
99:14	60:20	actually 7:13	affect 10:18	agree 24:12	22:12 57:12
100:21	accompany	13:1 21:2	56:18 58:13	54:6 78:5	67:1 70:11
	81:6	25:5 27:21	58:17 64:17	104:20	70:23 74:2

83:3,9	73:16 75:21	Appearing	90:18 91:23	96:1,7,22	133:8
92:15 94:24	77:3,24	2:5,16	96:1,8,23	100:12	assess 9:23
95:4 102:6	81:2 82:18	Appendix	105:21	103:22	10:5,12,17
105:13	84:10,13,15	67:5	112:19	109:13,21	10:19 43:19
115:24	84:17 85:24	applicability	119:14	122:3,14	120:18,21
121:11	97:12 98:10	43:5,19	aquatic-life	124:19,20	120:21
amounts	100:1 102:4	58:2	127:5 128:9	127:2 128:2	assessed
95:18	111:9	applicable	146:8	128:12,15	78:14
analogy	113:17	54:1,14	147:12	128:20	118:14,19
128:17	117:21,22	58:4,12	area 1:4 6:14	129:8,9	assesses
analysis	120:1 126:7	110:4	7:12,20	132:17	118:2
45:23 46:16	126:16	application	10:17 11:23	137:22	assessing
48:23 49:3	133:18	5:18 44:6	16:7 19:12	138:4,4	43:5 125:1
49:4,11	135:8	103:7	19:17 23:3	147:4,5	assessment
54:11	146:10	applied 45:6	23:6 40:16	Army 56:16	113:21
114:18	answered	45:8 54:5	41:4,6,7	143:16	116:3
analytical	49:14 51:7	applies 12:1	46:2,11	around 28:24	119:13,14
75:15	51:9,11	33:7 40:9	47:20 61:1	29:13 67:23	134:6
analyze 9:22	103:20	43:13 109:2	75:19 76:3	107:8	assign 136:20
10:4	133:20	109:21	88:13,15	122:11,12	assigned
analyzed	answering	apply 11:23	92:16 96:14	142:10,11	113:7 131:6
53:24 80:11	56:8	12:12 13:13	98:24 99:5	148:16	assimilate
analyzing 5:1	answers	32:11,17	99:9,12	arriving	32:10
ANAND 2:3	26:24 85:1	44:3,3	100:6,7,20	46:12	assistance
ANDREA	anticipation	58:11	100:22	artificially	43:11
2:4	56:17 80:4	109:24	102:6,11	73:18	associate 5:2
anecdotal	Antonio	applying	104:2 109:8	asked 10:3	associated
105:15	131:4,10,12	109:10	116:10,13	34:17 40:6	11:12 18:15
ankle 62:21	anymore	appreciable	116:14,17	48:1 51:8	58:8 59:22
annual 6:8	22:21 140:6	95:18	116:18	54:11 75:18	127:4
annually 4:9	anyone 92:19	appreciably	131:20	91:3,17	142:14
anomalies	107:7	82:22 83:7	137:24	96:21 137:1	149:11
50:23 51:21	147:14	84:8	146:18	asking 3:21	assume
52:1	anything 3:8	appreciate	147:21,21	16:17 25:1	129:24
another 5:15	28:13 37:2	41:15	147:22,23	30:18 60:4	assuming
16:6 21:9	38:4 95:17	approach	areas 7:19	73:12,12	41:7 115:4
34:12 36:14	99:13	18:17	12:19,23	80:21 97:24	Assurance
42:24 52:13	131:19	appropriate	23:22 32:17	118:18,22	20:7
62:12 88:21	anywhere	10:6 20:5	33:1,8,10	119:4,11	attached 18:6
112:23	82:4	28:10 55:19	33:14 41:5	127:11,16	43:21 67:4
114:15	apart 77:8	55:20 94:2	46:5 56:20	136:1,11,13	79:18,22
123:3 140:4	118:24	147:7 148:4	57:9,11,13	144:17	80:20,22
answer 8:16	121:15	aquatic 9:24	57:13 71:12	145:16	145:15
11:16,22	123:3	10:6,15	71:13 77:8	148:8	attachment
12:1,7,12	apparently	43:8 44:12	77:13 78:11	asks 95:3	24:3 39:19
13:12,16	141:16	48:19,23	78:14 81:17	aspects 10:12	67:6 98:22
18:8 30:1,6	appear 10:23	49:18,22	81:22,23	48:6	98:23
31:3,6	20:4	50:1,4	82:2,16	assemblage	100:17
32:16 38:16	appearance	53:21 59:7	92:13 95:11	89:14,16,24	144:14,17
40:8 56:8	80:4	69:4,7,9,9	95:11,17	assemblages	attachments

145:4	138:13,18	backs 75:13	105:14	106:17	besides 5:24
attain 50:8	138:19,21	bad 20:12	108:15	107:20	67:23
113:5 114:1	139:5,10,15	113:10	120:2	108:15	best 28:9
114:6 127:4	139:16	147:21,21	132:15	121:7 145:6	71:16
133:15	140:7,11,14	balance	149:7	begin 3:22	better 11:5
134:12,15	140:20,22	26:16 30:15	basic 59:21	23:21	18:13,21
135:20	141:11,14	147:12	basically 7:7	147:24	19:24 20:1
attainability	141:20,21	balanced	7:9,19 9:7	beginning	27:8,18,21
48:23	141:24	26:7,8,15	11:5 15:24	109:14	35:4 39:24
118:12	142:3,7	26:17 27:19	18:13 36:16	begins 12:15	69:11 85:5
attainable	147:24	29:7,22	37:13 38:5	behalf 2:5,16	93:14
30:16 31:12	148:6,11,15	34:24 116:9	59:16 64:3	3:22	127:19
119:4	averages	125:23	75:13,17	being 11:9	147:5
attained	140:16	129:14	77:7,14	15:20 20:19	between
127:7,17	aware 16:12	ballpark	81:9 83:17	33:15,15	15:10 16:3
attaining	21:7 67:8	131:18,22	87:14,16	35:11 45:5	18:19 19:21
112:24	68:9,13	bank 98:22	88:19 95:4	45:21 46:22	33:11 41:1
118:15	92:19 93:5	99:4 101:3	96:12	66:8 67:23	89:3 95:20
119:6	101:23	bar 125:16	111:22	67:24 85:23	105:13
attainment	107:21	126:14,15	113:7	93:18 99:5	111:6 147:2
54:22 96:15	114:14	bare 99:1	115:17	148:3 151:4	148:14
112:19	117:22	barge 10:19	122:12	believe 3:17	beyond 92:4
118:3 120:6	131:2	12:11 34:14	123:7	9:6 13:4	big 16:3
147:9	147:14	53:10 67:9	125:15	18:15 19:23	17:11 37:13
149:16	away 34:11	68:8,11	126:11,14	20:19 25:6	37:20 38:22
attempt 47:4	59:17 71:16	90:16,16,24	130:20	27:8 45:17	57:8 71:17
48:1	126:3	91:5,15,15	134:22	51:7 53:9	74:1,17,18
attempted	a.m 150:15	91:18,24	140:17,21	54:23 57:22	77:15 98:24
99:11		92:1	basin 89:13	59:18 72:6	123:8,22
attendant	B	barges 18:22	90:1	75:22 80:20	124:16,22
107:19	B 91:6	65:22 66:8	basins 89:12	80:23 81:5	biggest 33:23
attended 6:4	125:19	67:16,17,20	basis 6:8	89:6,7	biological
6:9	126:4,11	67:21 68:6	99:17 115:7	90:11 91:20	6:18 10:24
attributes	138:21	68:12 83:22	115:7	94:10	11:4 21:3
86:14 87:17	back 3:2 7:7	112:3,4	bass 38:19,20	103:20	31:24 32:3
audit 5:11	17:10 23:7	barge-caus...	41:10,10	106:6 110:5	34:18,21
author 25:21	31:23 51:14	66:5	42:2,3	114:5	35:22 43:16
25:22	57:11 65:23	barrier 15:18	68:24	132:11	44:10 45:18
automatica...	79:6 80:12	base 147:17	122:21	139:24	46:4,17,21
136:19	81:17,24	based 14:19	129:12	143:19	50:10,12
137:12	82:1 83:13	16:22 20:7	became 4:20	144:3	51:1,6,9,18
149:3,5	84:3 104:7	41:18 45:9	5:3 57:9	145:19	51:18 52:12
available	107:9 108:3	49:15 55:20	become	148:4	98:6 106:13
16:20 19:22	108:7	57:1,12	57:14 92:3	below 72:16	149:15
44:9,12	115:18	61:22 68:4	bed 145:6	73:10	biologist 59:7
57:1 141:1	117:10	68:6 76:15	before 1:8,10	108:22	biologists
141:8	141:7 143:8	76:17 78:17	9:8 16:17	138:23	4:20
Avenue 2:7	146:2,8	79:24 88:24	50:15 55:24	146:12,15	BIP 26:16
average	147:10	89:15 92:10	57:17 60:4	148:4	bit 17:9 23:1
19:24	148:19	96:11	60:15	149:12	29:1 32:11

33:20 36:8	81:11 82:14	146:18	C	46:20	certainly
71:12 77:6	82:15,17	147:3	C 2:1 67:5	capped 83:19	33:21 46:8
95:16	90:18,19,22	break 31:3	calculate	83:24	47:7 48:8
108:14	98:4 105:4	32:2 57:19	79:8	careful 62:21	92:22
136:3 139:4	105:9,9	57:20 67:7	calculations	64:21	131:20
139:19	108:17	82:18 98:8	74:5	case 11:20	Certified
140:10	140:15	104:10	California	21:22 22:15	151:4
black 36:12	141:3,18	121:4	131:11	30:1 32:21	certify 151:6
42:10,11	bottom 60:2	134:17	call 20:12	33:2 43:12	151:9
43:2	94:20	breaks	35:2 47:15	51:24 59:24	CFR 26:18
blank 80:13	bought 140:6	128:22	48:9 59:19	62:4 64:11	56:5
blanking	boulder 33:4	breed 64:18	60:3 68:5	74:18 75:16	chain 128:17
80:17	38:1,20	bridge 29:24	101:20	79:2 100:13	128:21,21
blue 122:21	boulders	30:3,20	110:21	105:10	Chairman
129:13	38:6	31:17 77:22	115:16	115:2	2:2 125:12
board 1:1,10	bound 82:7	bring 129:9	124:10,16	141:18	126:18
2:6 27:8	bounds 135:4	brings 7:7	124:22	147:1 148:2	change 58:22
81:1	box 2:8	broad 43:9	146:20	catch 29:11	63:20 64:1
boat 62:22	124:13	106:22	150:4	categories	69:19 82:22
99:3	boxes 86:23	broken 138:1	called 1:9	14:12,14	83:6 84:10
boatable	87:2	brought	7:14 20:3,6	38:4 125:19	84:13,17
134:18,19	BP 47:17	103:10	35:22 88:16	category	85:6 105:1
bodies 10:14	branch 4:10	Brush 47:11	105:7 123:6	34:13 104:1	105:12
15:22,23	44:1 45:11	bugaboo	calls 5:4	115:17	135:16
23:17 37:9	48:24 49:5	104:15	Calumet 5:20	136:20	136:10
45:1,23,24	49:17 54:2	builders	5:21 8:9	149:5	137:10,10
46:1,12	109:16	59:15	came 4:9,14	caught 60:7	changed 4:14
61:24 69:20	Brandon 4:8	building	20:4 125:18	cause 1:8	changes 55:6
77:7 113:1	12:22 13:1	64:17	canal 10:13	55:14 60:23	61:3,22
113:24	13:6,10,16	build-up	12:15,18	63:6 91:7,9	65:23 89:1
115:21	14:11,16	63:20	13:21 14:7	91:12,14,17	channel 39:4
120:17,19	15:3,5,11	bunch 39:3	14:7,17	151:8,12	78:15 81:24
120:21	15:20 30:11	39:18 66:11	18:4 23:15	caused 70:9	84:1
121:22	31:17,19	bureaucrat	43:7,24	70:18	channeliza...
body 15:21	32:7,15,19	113:11	44:10 45:10	causes 34:16	134:22
16:2 23:24	32:22,23,24	bureaucrats	48:20 49:1	70:20	channeled
24:5 38:22	33:8,16,21	113:15	49:6,21	causing	87:11,21
44:24 53:20	36:4 49:2,8	buries 58:20	54:2 66:18	56:19 58:18	channels
70:22 74:15	49:9,12,24	Burton 20:19	69:15 71:20	58:19 65:23	65:23 81:17
86:6,7	54:5 62:14	79:15,17	82:11 97:13	CAWS 6:2	chapter
92:12	63:1 73:24	80:6,11	107:15	8:14 9:24	117:5
112:16	84:11,14	93:9,21,23	109:17	11:21 12:9	characteris...
border 78:16	87:22 108:8	94:1,15	110:2,14	13:3 56:22	87:24
both 11:8	108:21,23	Burton's	111:6 147:4	58:3 71:19	characteris...
14:13 27:4	109:19,24	67:5 79:18	capable	92:7 98:4	76:14 86:21
32:11,17	138:12,23	79:22 80:1	10:14 53:21	109:3	86:24 87:4
33:1,8,10	140:18	80:4	96:1,22	certain 15:22	87:10 112:5
37:8 39:8	141:9,17	business	112:24	67:18 68:24	characteriz...
43:15 58:13	142:14	151:5	capacity 5:7	69:21 86:23	58:7 147:7
72:15 81:5	144:10			116:2	characterize

121:8	clarify 12:7	19:10	comfortable	111:19	48:14 79:24
characteriz...	12:14 14:1	closer 77:12	150:9	compared	106:11
95:1	37:16 109:7	coastal 47:20	coming 70:12	132:12	condition
characteriz...	109:11	coating 95:15	84:22 85:3	141:6	30:16 50:10
136:22,24	111:2	cobble 28:6	102:17	comparison	69:20,23
charts 149:10	clarifying	33:3 37:24	103:19,22	111:10	70:2 91:7
149:12	14:24 47:23	Code 1:5	103:22	147:2	91:12
checked 87:2	clarity 14:5	Coeur 47:13	commencing	completely	111:22,23
checkmarks	25:12 30:5	coincident...	1:14	51:22 99:10	134:13
86:23	97:4	79:5	commercial	complex	conditions
Chemical	class 65:9	collect 11:13	99:7	123:9	19:1 32:1,3
47:17	126:4,11,12	collected	committee	component	34:18 44:10
Chicago 1:4	134:17	7:15 11:1	46:21	66:24	51:1,4,6,18
1:13 2:14	classes 95:1,3	17:1 20:17	common	123:18	54:22 55:11
4:11 10:12	classification	21:8 24:8	86:17	137:17,18	58:3,10
13:20 14:6	62:9 88:4,5	36:15 44:15	Commonw...	components	66:20 91:17
18:4 43:6	90:2 135:19	44:16 80:10	4:6	50:13	112:15
44:1 45:11	149:3	94:3 110:6	communities	composition	conduct 48:5
48:19,24,24	classified	131:19	105:22	7:12 89:19	48:18
49:6,17,20	42:21 105:6	142:18,21	community	comprise	conducted
54:1,2	149:13	collecting	21:4 26:14	135:5	44:17
69:14 82:11	clays 81:19	5:13	26:17 29:21	comprising	119:16
107:15	clean 10:15	collection 5:1	30:17 34:24	40:17	confined
109:16	33:1 49:18	collections	50:14 70:5	concentrated	57:10
151:6	49:21 50:1	4:18 19:17	71:1,15,16	23:24 24:11	confused
chicken	50:4 53:21	19:19 44:19	71:23	concept	46:19
115:3	60:7 69:17	collective	122:19	117:17	confusing
chief 7:4	71:13,21	122:2	129:10,14	conceptually	80:3
children 94:8	83:19 91:22	collectively	commute	126:13	conjunction
chose 81:12	96:1,14,22	61:21	16:11	concerned	5:18
chub 36:14	103:1,11	124:24	companies	93:12	connected
36:20	112:24	Colorado	68:11 92:2	106:13	15:4,6,13
124:17	113:5 114:1	131:5,7	139:13	108:1	connection
chubs 124:17	114:6	column 41:8	140:19	conclude	15:9
124:22	115:10	Com 9:6,8	141:10	50:24 57:12	consensus
churned	116:1,24	combination	142:2	59:2 107:14	46:4
66:12	118:3,15	40:13	143:20	110:4	consequen...
circulation	119:3	combined	company	112:14	20:11
60:12	120:10	19:17	47:12,18	concluded	consider
citation	127:4,17	come 69:1	139:6,6,14	48:11	10:11,20
149:1	133:15	70:17 78:12	139:16,19	105:24	11:3,7
cited 26:2	135:20	82:24 83:4	139:20	109:2	52:16 64:19
67:13	146:7 147:9	100:13	140:21	concluding	91:12 92:6
cities 16:4	clear 31:1	104:1,7	141:12	115:8	97:4,10
city 131:4	client 5:18	108:11	142:6	conclusion	103:12
151:5	logs 60:13	115:17	comparable	69:2 78:12	106:17
clarification	close 48:7	143:7	111:5	86:16 92:9	considerable
80:5 82:14	82:3 122:5	comes 13:2,5	compare	92:10	33:18 34:6
102:3	closely 18:13	59:16 71:9	110:10,13	conclusions	considerably
118:18	18:20 19:4	98:16 100:8	110:22	46:13 48:12	36:5 121:11

18:24 42:12	continuously	22:13	43:12	107:3,16,22	122:15
107:12	84:5	counsel	cracks 13:24	108:2,5	138:4
146:22	contractor	13:11 14:22	crappy	126:24	decide
consist	140:13	25:11 30:4	111:18,19	132:8	125:13
127:22	contractors	30:21 34:17	create 127:3	Danger	decided 80:7
consistent	140:3,16	38:11 47:22	crew 7:6	113:16	113:19
26:13 51:22	contribute	47:24 56:7	crews 57:5	darter 8:2	decision 17:2
52:11	55:14	82:13 93:22	66:2 75:17	27:5 71:23	17:6
consistently	contributes	97:3 103:4	criteria 89:3	darters 41:12	decline 63:21
142:13	61:19	110:12	89:9	68:23	decreased
constant	contributing	118:17	CSO 83:2	data 5:1,2,8	104:21
65:11	148:22	129:19	CSOs 92:17	9:23 10:4	decreasing
constantly	contributio...	133:19	103:22	10:24 11:4	105:16
84:1	92:17	135:23	CSR 1:10	11:6,6,14	deep 38:13
constraints	control 1:1,9	137:2 139:2	151:16,16	16:19,19,24	62:21,21
111:24	2:6 61:10	143:6	current	17:1,4	default 113:7
construct	85:11 99:20	Counselor	81:21,22	19:18 20:13	define 71:4
130:2	controlled	8:22	82:3,5	20:13,18	94:19
construction	56:16	counsel's	currently	21:8 24:4,7	defined 39:7
100:21	controls	30:7	50:17 119:6	24:8,13,16	41:23 77:22
101:9,14,18	103:1	country	cutoff 147:15	24:19,21,23	115:10
102:10	conversely	123:6	149:2	44:9,12,14	137:23
130:4	64:5 147:22	counts 41:22	cut-off 148:4	44:14,16	defining 8:14
consultant	Cook 1:11	137:6	cycle 17:18	45:19 48:12	8:16 86:2
48:6	85:12 151:2	County 1:11	39:12	57:1 58:16	definitely
consulting	151:6	85:12 151:2		65:20 79:20	37:12 72:6
47:18	copy 80:21	151:6	D	79:21 80:23	definition
contains	101:7	couple 23:4	D 54:13	92:9 110:3	26:15 35:19
151:11	core 61:10,11	27:14 37:3	dam 13:6	110:6,10,13	37:5 124:10
contamina...	62:17	38:18 64:2	24:4,22	110:20,22	129:2,15
81:18	Corporation	83:12	34:4 61:11	112:13	135:15,17
contaminat...	47:14	course 37:4	70:18,18	138:17	135:21
11:10 20:16	Corps 56:16	44:13 68:7	72:6,7,16	142:17,20	deformities
22:1 33:10	68:10	107:9	72:17,21	142:24	35:23
33:12 52:1	143:16	140:24	73:2,3,4,9	144:16	deleterious
52:1 67:4	correct 3:4	court 51:13	73:13,21,23	145:10	98:3 103:18
79:13 81:15	8:21 45:17	cover 33:7	73:23 74:3	database	DELTA 35:22
83:20 84:4	53:23 56:6	82:15,17	74:8,19,20	19:21 20:13	35:22 36:2
85:15,19	58:7 62:7	94:13	75:9,13	date 26:1	50:22 51:20
93:16,19	100:18	112:17	76:20 82:3	dated 45:16	51:24
contaminat...	102:12,13	121:19	106:1,14,17	day 1:13	demonstrate
93:2	114:19,23	128:7 144:9	106:24	150:5	53:20
content 146:3	119:18	148:5,10,12	107:5,18	days 64:2	demonstrat...
context	132:23	148:18,21	108:1,22	83:12	114:18
106:23	151:9	covered	116:11,19	deal 74:17,18	138:14
continue	cost 11:11	37:22 55:21	damn 16:10	dealing 53:6	Dennison
50:18	20:22 22:6	55:22	dams 10:22	82:20 124:5	6:12
107:19	22:11 130:5	covering	34:1,8,10	DEBORAH	depend 65:18
continued	130:8	43:10	55:13 74:9	2:9	92:2 122:23
150:13	costs 21:5	covers 34:6	74:11 107:1	decent	122:24

89:24	101:15	56:10,13	138:22	divide 108:19	doubt 71:15
depends 37:5	desiccated	57:23 58:1	139:24	divided 13:7	down 19:4
38:17 42:7	57:14	63:4,10,13	differentiat...	88:23	25:13 31:3
deposited	design 61:8	65:19 68:15	95:20	document	32:2 34:5
60:9 83:11	designation	75:2,5	differently	20:6 59:6	40:11,19
93:18	9:23 86:18	78:10 81:14	18:3,12	61:15,15	41:8 70:19
deposition	86:19	82:17 84:9	dilute 23:21	documented	70:19 97:20
58:20 59:23	designations	85:14 90:4	direct 5:24	59:3 105:20	98:9 115:5
70:3 104:21	10:7 89:5	94:1,5,16	34:3	106:10	130:21
depositional	designed	94:17 96:5	directed 30:1	doing 6:7,16	135:18
95:16	11:3 20:1	96:16 97:16	direction	20:12 23:14	downstate
depth 112:17	111:21,21	97:21 98:1	52:15 92:22	40:6 45:23	100:12
derived	detail 46:12	98:12	directly 4:17	46:16 52:5	downstream
138:11	54:20 139:4	103:15	48:20 52:14	66:17 75:15	23:6 24:4
Des 1:4 6:3	139:9	104:11	71:8	95:3,7 99:6	24:21 29:23
6:19 8:6,15	detailed	105:17	dirt 99:1	101:14,18	30:19 31:16
9:24 11:18	118:9	109:6,22	disagree	106:21	85:17,21
11:20 12:18	119:21	110:16	55:18	119:16	Dr 2:5 6:12
13:2,5 14:8	determinat...	111:1,8	discharge	149:9 151:5	20:19 67:5
14:18 15:4	120:5	120:24	52:4	dollars 22:18	79:15,17,18
15:6,12	determine	126:20,21	discharges	130:10,12	80:1,4,6,11
16:1 23:11	45:6 70:15	127:8,13,24	51:2,5	130:15	93:9,21,23
23:12 29:21	determined	135:9 138:8	discounted	132:1	94:1,15
29:23 30:2	43:22	139:7	54:18	dominance	128:6
30:17,19,22	determining	142:16	134:23	35:1 50:18	drainage
31:16 43:7	10:14 45:7	144:13,16	discuss 6:21	51:19	131:20
44:1,11	121:19,24	144:23	discussion	dominated	draw 25:4
45:12 56:22	development	145:7,10,18	49:5,7	26:9 126:4	drawing 45:2
58:5,10,12	99:7,8	145:22,24	disdain 8:24	done 5:16,17	draws 79:24
58:14 66:18	102:11	146:13	displacement	7:22 8:12	Dresden 4:8
69:15 71:20	107:8	148:10,17	58:18	18:2 19:8	10:13 13:21
76:13,22	deviate 125:4	149:22	disproporti...	19:24 20:2	14:10 18:5
77:12 78:3	DEXTER	150:7	129:7	22:24 25:15	19:16 22:15
86:12 109:3	65:4	differ 121:15	distant	44:20,21	23:5,16
109:5,7,18	Diers 2:10	difference	132:16	45:15 47:4	24:4,21
121:8,10	3:19,21 4:4	19:20 21:3	distinction	47:8,11,14	30:18 31:4
132:6	8:7 9:1,19	36:16 61:6	16:2 25:3	47:19 67:14	31:6,8,12
142:19	12:21 13:19	74:2	33:11	68:3,10	32:3,14
143:11	16:15 18:1	differences	134:10	70:15 74:4	33:9,17,22
144:1	26:5 28:22	15:19 18:9	distinguish	79:15,16	35:15,19
describe	28:23 29:5	different	89:3	88:11 93:1	36:4,6
58:10 87:18	29:12,18	5:17 13:9	district 6:13	93:7 96:12	39:14 48:20
87:19	30:10 31:5	19:2 52:15	6:16 18:15	114:14	49:1,7 50:3
described	31:14 32:8	59:8,20	44:16 85:11	116:3 119:2	54:2 73:6,7
43:20 45:14	34:20 41:16	88:18,24	District's	130:19,23	73:9,13,18
57:6	42:17 43:3	89:23 90:3	6:14	132:1 134:5	73:20,22,24
describes	48:15 51:12	112:22	diverse 71:23	140:24	74:3,7,8,20
87:17	52:6 53:14	124:8,23	122:18	141:7	76:4,20
describing	53:15,16	133:7,18	diversity	double-che...	77:19 78:17
58:2 61:16	55:24 56:6	137:21	121:20	101:6	78:21 79:4

82:12 86:13	9:2,4,8 10:3	68:12 70:4	35:6 91:21	53:3	Essig 2:11
86:16 90:6	10:24 17:5	70:10 72:19	eliminating	environment	17:4 81:6
90:9 92:8	20:16 43:11	72:20 83:17	91:24	92:12	144:3
97:9 107:16	45:4 47:18	128:6	employed 9:2	environme...	establish
108:9,10,13	57:4 58:24	effective	enable	2:7 91:9	85:11
108:16	66:2,17	107:4	123:23	envision 66:9	111:22
109:20	79:21 80:2	effects 10:20	encompass	eons 83:17	119:20
110:14	80:6 81:6	10:22 11:8	55:3	EPA 3:22	established
111:6	92:24 136:9	19:6,11	encompasses	10:11,16	36:19
112:22	139:14,17	25:14 58:24	76:4	16:18,20,22	147:15
116:15,19	142:2	59:4,6,9,12	encountered	25:20 41:24	estimates
125:19,21	143:21	59:22 60:19	70:3	44:8 55:20	108:15
127:1 129:1	144:7	61:2,15,24	end 7:5 42:5	88:23 99:19	estimating
132:18,20	each 48:10	62:2 66:5	63:22,23	101:20	22:14
133:5,6	48:14 107:2	105:22	95:24	105:20	Ettinger 4:5
135:10	121:2 122:6	107:20	122:13	115:17,17	11:15,22
138:12,23	144:9	EFFLUENT	endangered	141:3	14:24 15:7
141:17,18	earlier 6:16	1:3	7:18 8:1	142:18	15:14 16:9
141:19	45:19 47:23	effort 19:21	ended 7:17	EPA's 4:1	16:14 17:8
142:1,7,9	55:5 57:2	23:20,22	23:14	9:12 48:21	21:10,16
144:1,10	80:1,11,22	81:7	engage 81:8	53:18 54:7	22:4,19
146:6,16,21	82:2 105:4	efforts 23:24	engaged 9:21	149:2	24:2,12,17
147:3,4,13	110:5 132:5	85:10	engineering	EPA-spons...	24:20 25:1
148:6,11,13	132:8	110:20	17:5 130:24	6:9	25:5,10
148:19,23	early 4:10	egg 115:3	142:18	ephemeral	26:19 27:23
149:4	5:21 53:6	eggs 56:18	engineers	54:21	28:2,13,17
drew 45:18	66:16	58:20 60:2	56:17 68:10	equally 55:20	28:21 35:9
46:24	easier 32:12	60:9,10	129:24	equate 147:9	36:7,24
driven 89:18	65:17	eight 22:16	143:16	equivalent	37:7,15,19
89:19	East 2:7	23:2 109:19	enhance	31:9,21	38:8,13
drop 57:4	easy 107:17	131:5,7	126:24	Erie 134:21	39:13,17,24
81:21 127:6	113:13,13	either 14:8	enhancing	erosions	40:4,18
dropping	eat 35:4	28:7 35:5	129:11	35:23	41:13 52:16
13:24 57:7	echo 26:14	43:24 55:8	enough 18:18	erroneously	52:20 53:9
drops 64:5,9	ecological	63:16 68:2	28:6 36:15	142:4	53:13 60:4
70:17	106:23	68:20 78:7	37:17 120:4	errors 20:4	60:15 64:21
due 84:2	economic	90:11 95:17	123:23	113:3	65:3,5 67:7
102:5	92:1	142:14	130:1 138:3	escape 23:1	67:12 68:9
105:22	ecoregion	145:1	entering	ESE 139:21	71:2,5 72:3
during 5:9	134:13,14	149:13	102:9	140:10,22	72:8,13
64:16,18	Ed 9:6,8	electric 9:5	enters 72:22	141:21	73:4,9,15
81:6 98:17	edge 39:4	electrofishi...	72:24	142:4	73:22 74:19
d'Alene	99:1	4:18	entire 66:19	ESNE 141:23	75:1,7 76:1
47:13	edges 38:21	elevated 36:2	78:3 116:22	especially	80:14 84:17
	63:1 95:14	36:6	entitled	57:8 81:24	84:21 85:9
E	Edison 4:6	elevation	143:23	essence 47:4	87:6 88:2,6
E 2:1,1 54:20	effect 10:19	75:12	entrained	48:1	88:8 99:23
56:9	18:22,23	elevations	52:23 53:4	essentially	100:2
EA 4:9 5:4	53:7,10	76:16	entrainment	35:17 83:18	101:23
5:22 7:5 8:8	67:9 68:12	eliminated	52:17 53:1	95:12 99:18	102:2,23

103:14	everywhere	46:18 47:3	explanation	148:18	93:11 96:14
116:5,8,14	134:24	48:22 58:9	112:12	factors 10:5	106:12,18
116:18	evidence	106:2 143:1	exposing	32:19,20	108:1
117:1 122:5	52:14 53:2	143:10,13	56:18	34:2,13	121:15
123:22	76:21 93:12	143:23	extend 40:11	43:6,20,23	125:4
129:16,20	93:17 105:3	144:11,22	41:8	43:23 44:5	fast 32:20
130:3,11,14	exact 22:12	145:14,15	extensive 4:3	44:6 45:8	39:1,7
131:9,11,14	63:15 133:1	exist 82:1	19:8 66:13	45:13,20	71:12 87:14
131:16	exactly 24:17	93:16 140:6	79:11 93:4	48:10,14	95:11
136:5,11,15	46:5 79:5	existence	105:19,23	50:13 52:2	128:14
137:1,5,9	117:8	53:19	extensively	53:19,24	fauna 70:10
137:15	Examination	expect 26:21	19:6	54:4,8 56:1	features
138:7	3:18	27:6,7,17	extent 55:9	56:4,4	112:16
evaluating	examine 54:7	27:20,23	81:24 82:1	59:12 69:7	federal 26:18
45:10,20	example 19:7	59:4,10	93:4 136:22	69:9 103:6	feed 86:11
evaluation	21:23 36:3	61:23 66:11	145:13	103:8	fences 99:11
5:14 6:24	36:13,14	85:4 94:22	extrapolated	106:16	99:12
40:6 95:4	56:21 59:11	95:6,9,10	68:5	107:12	few 17:16
143:24	98:17 99:16	116:1	extreme	118:20	20:9 23:14
even 22:15	122:14	132:14	117:7	121:19,19	23:15 26:9
23:18,23	123:2,3	133:3	extremely	137:6	35:1 36:15
31:20 32:18	127:1 128:1	expectation	36:1	148:22	50:18 64:1
33:8,15	128:5	124:14	<hr/>	failed 10:11	64:2 73:19
39:4 53:4	133:24	135:2	F	10:17,18,20	123:23
64:11 77:5	134:5	expectations	fact 18:16	10:21 11:7	124:20
77:11 83:12	examples	124:7,7,24	20:23 41:21	11:10 16:18	fewer 83:2
120:18	27:7 38:19	126:6	48:4 53:5	fair 112:20	field 4:16,20
121:11,13	57:6 127:23	expected	59:23 70:11	146:23	4:22 5:10
123:1,16	except 32:22	26:13 49:17	92:11 101:5	147:6,6,7,7	57:4 62:13
130:18,23	87:21 103:4	49:21,24	107:22	147:8	66:2 75:17
131:1	exception	50:4 59:10	113:3	fairly 4:16	81:7 94:11
139:22	134:20	86:5	147:17	17:18 65:8	Fifteen 50:9
event 3:8	excess 60:18	expecting	factor 33:24	73:2 82:2	Fifty-seven
events 59:14	69:24 70:8	46:10 83:3	34:12 43:6	107:17	121:1
61:13,14	70:11 94:19	experience	52:13,17	fall 34:12	figures
62:5 64:20	94:21	3:24 4:3	54:11,13,18	83:19	108:11,11
65:17 83:2	excessive	45:3 59:1	54:24 55:1	falls 135:4	filed 8:19
eventually	33:13 87:12	70:24	55:12,16,21	familiar 7:11	9:15 80:24
85:16,21	excluding	experienced	58:3,4,11	56:2 77:14	fill 60:1
126:3	43:6	66:5 95:7	58:11 64:15	88:3 102:15	fills 41:1
every 36:18	Excuse 21:10	expert 103:1	65:12 69:3	102:21	final 4:24 5:7
62:18 67:22	63:7 99:24	103:7,13	69:6 90:17	117:14,23	17:2 19:13
122:16	144:15	explain 3:23	91:6,8,10	familiarity	find 36:11
145:6	executed	8:13 21:19	91:16 92:4	119:21,22	57:10 72:11
everyone 3:2	11:3	54:13,20	102:7,10	far 11:2 13:6	115:21
142:8	exhibit 3:15	86:15 98:1	109:2,10,12	54:16 67:3	123:1
everything	3:16 17:3	107:14	109:21	71:16 75:8	findings
16:23 45:9	18:7 21:13	139:4,9	110:4	75:13 77:8	106:8
52:10 59:16	29:8,9,16	explained	112:14	81:10 82:19	finds 100:9
134:23,24	29:19 45:16	52:10	122:1	83:8 86:17	100:14

fine 69:13	65:10,16	flow 10:20	forget 56:2	42:18 47:22	16:6,6 17:5
82:5 95:15	67:18 68:2	18:24 19:3	fork 12:15,16	51:10 56:7	18:3 20:17
112:11	68:6,17	54:22 56:15	form 103:2	56:12 63:11	37:23 38:5
127:15	69:16,21	58:13 61:14	129:18	67:11 75:4	40:11 44:16
136:4	70:5,10	62:5,18	formed 6:18	76:24 77:21	47:18 58:16
finer 19:13	71:1,15,16	63:5,16,21	forth 84:3	79:19 80:16	59:1 62:20
finish 100:1	120:18	63:21 64:20	149:9	82:13 84:19	65:21 72:22
finished	121:20	65:16	Forty-six	87:8 93:22	72:23,24
100:3	122:18	112:17	97:16 98:1	94:4,6,13	75:9,19
120:22	123:12	149:10,11	found 42:16	97:3,8,12	80:23 83:13
FIRM 2:13	129:10,14	flowing 39:7	42:19 43:2	97:19,23	83:16 84:22
first 4:14 6:4	131:19	76:3,22	53:24 54:13	98:19 99:24	92:17,17,24
10:16 18:9	133:8	flows 33:19	81:16,18	100:4 101:6	94:8 97:14
30:22 31:3	135:14	57:3 58:17	136:17,18	101:11	98:16 99:13
32:2,13	147:19	64:15	138:13	102:3 103:3	102:9,17,18
40:22 63:12	fishable	123:10	four 13:4	104:14	103:5,19,21
69:22 70:1	114:19,21	fluctuation	54:1,4	109:4,9	103:22,22
79:7 91:11	fishable/sw...	33:18 57:12	55:16,18,19	110:12,18	103:24
97:17 98:11	114:24	61:2,19	66:13 78:16	111:4,9	106:8,13,14
109:11	115:4,9	fluctuations	95:2 109:18	113:13,16	107:5,16
121:7	fisheries 6:5	10:21 19:2	138:17	114:8	108:12
127:21	67:10	55:2,10,15	142:2	116:16	110:13,20
128:3 146:9	fishery 116:9	58:13 59:3	Fox 7:20 19:9	117:16,19	118:24
146:10	fishes 17:19	60:20,24	25:13 46:2	118:5,17,23	125:4,5,6,9
148:19	17:20 50:19	62:16 63:3	46:14 77:10	119:9,15,19	126:3 128:5
fish 4:18 5:12	59:13,14	flushes 59:16	77:13	124:3	130:20
7:6,9,11	70:6 122:9	focussed 49:5	105:19	126:16	138:17
13:9 15:1	122:24	foggy 72:12	106:6 108:4	127:6,10,15	139:5,18,20
15:11,14,16	123:15	folks 41:24	108:5	129:18	140:12,17
15:19,21,22	125:22	follow 17:9	121:12	133:19,23	140:21
15:24 16:9	137:21	26:19 36:7	frame 43:12	135:23	141:23,23
16:13 17:10	fish's 13:8	149:11	46:9 94:23	136:13,21	143:11
17:11,16,23	15:2	followed	frames 63:17	137:3 139:2	144:8
19:12,14	Fisk 4:12	132:17	frankly	139:8 143:2	148:13
21:8 26:13	fit 12:22	following	42:22	143:5,9,19	full 91:23
26:14,20	fits 69:11	110:18	FRANZET...	144:5,15,19	fully 61:15
29:20 30:17	five 6:1 45:12	121:17	2:13,15 3:6	145:1,9,12	function 5:11
35:1,3 36:1	53:24 83:7	follows 30:24	4:2 8:18,23	145:19	107:4 138:5
37:11,12,13	85:7 95:1	follow-up	12:3,6	146:10	functionally
37:14 38:3	104:7	13:18 25:12	13:11,23	148:8	12:17
38:24 39:10	108:24	41:18 47:23	14:4,15,19	149:19,21	functioned
39:10 50:14	112:14	75:8 76:8	14:22 21:18	free 76:3	5:4
50:22 51:20	five-year	112:11	24:15,18,23	95:12	functioning
52:20 53:4	105:10	121:9	25:3,11	137:10	39:6 41:2
56:18,18,20	fix 128:22	foot 40:11,12	26:4 29:3	free-flowing	functions
57:8,8	flank 7:20	99:15	29:10,15	108:18,19	86:9
58:18,19	flat 78:6	foregoing	30:4,21	111:16	funded
60:6,8	flood 64:24	151:8,9	32:5,9	from 6:17 9:6	105:19
62:23 64:4	flooding	foresee	34:17 37:2	13:5 15:1,2	funneled
64:11,13,18	56:17	126:23	38:11 42:15	15:15,17	99:14

further 21:19 126:2,3	124:21	148:24	64:11 65:15	60:11 81:7	groups 35:8
future 30:15 84:8	getting 17:10 18:13 23:14 46:18 64:6 93:14 148:19	150:4	66:11 68:1	98:17	35:10 50:21
<hr/> G <hr/>	gillnetting 4:19	goal 96:15 127:5	68:7 69:6,7	106:15	68:22 86:12
G 56:5,14,23 57:1	gills 122:21 129:13	goals 9:24 10:15 49:18 49:22 50:1 50:5,8 91:23 96:2	69:10,18	107:1 112:6	guess 12:13
gamut 126:2	GIRARD 2:2 125:12 126:18	112:24	70:4,9,10	112:7 113:9	20:3 21:21
gap 18:19	give 6:12 7:8 29:10 63:15 69:12 95:9 117:5 122:14 127:23 143:5	113:6 114:2 114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	75:5 76:24	123:23	39:24 59:19
gave 6:13 129:24 142:5	given 59:2 84:6 107:22 115:24 130:8,19 136:2	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	77:7 80:13	147:11,17	74:6,22
Gen 9:4	giving 139:10 139:10	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	81:23 82:4	147:22,22	97:16 98:8
general 4:11 43:15 46:4 62:6 93:3 96:8 104:1 112:8 113:1 113:4,7,19 115:6,16 126:19 135:4 141:5 147:16,20	glad 36:24 go 4:15,22 22:20 23:7 31:5,23 34:11 36:22 40:4,10 43:4 53:13 57:22 58:15 59:17 61:8 62:20 79:6 82:24 86:1 90:14 100:2 102:10,23 104:5,13 107:13 108:7 109:1 113:20 115:20 118:8 125:1 135:18 136:2 138:7 138:9 145:6 146:2,20	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	82:22,24	147:23	117:21
generally 42:11 43:22 67:11 68:20 92:10 106:15,24 138:14 146:22	God 129:16 goes 13:5,6 64:3 88:19 88:20 99:16 110:24 131:11	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	83:2,4,6,21	148:1,3	141:12
generated 146:22	going 3:22 6:2 7:17 12:11 15:23 15:24 17:9 18:10 19:4 21:3,14 23:8,10 24:9 26:9 26:10,12 28:7,24 30:15 31:15 31:23 32:17 34:11 39:2 39:9 40:7 40:12 47:3 49:13 50:7 50:13 52:12 53:3 57:16 58:15 59:19 59:24 60:2 60:12,14,17 61:23 63:24	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	83:24 84:3	graded 99:5	143:4
generating 9:5	Grand 2:7	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	84:5,7 85:6	gradient 76:10,18 77:6,11 78:6 87:23 129:23 130:20 133:4,8,14 134:9,11,16 134:16 135:2 138:2	guessing 99:9
Generation 2:16 5:17 6:1 9:3,12 9:22 10:3 45:15,21 46:23 48:18 54:10	grain 81:19	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	86:1 88:2	gradual 63:20,21	guidance 44:7 95:10
geographic 46:11	grant 92:21	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	90:13,14,21	grading 74:12 76:14 132:23 133:1,2 137:24	guys 61:9 79:7
geographic... 77:20	gravel 37:24 38:5,5	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	92:16,23	gradual 63:20,21	<hr/> H <hr/>
geology 40:1	great 88:10 115:15 124:11,12	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	95:12,22,23	Grand 2:7	H 57:16
gets 80:2 97:15 100:8 100:13	greater 7:14 8:2 91:9,14 146:19	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	99:2,13,21	grant 92:21	habitat 5:14
	Greg 3:4,13 14:1 32:12 97:17 98:19 132:8 145:2	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	102:14	gravel 37:24 38:5,5	5:20 6:24
	group 6:18 6:20 17:2 27:10 43:1 43:16 46:4 60:3,6,7 70:8 138:17 141:4	114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	104:4,8,12	great 88:10 115:15 124:11,12	8:5 10:17
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	104:14,18	greater 7:14 8:2 91:9,14 146:19	11:4 16:18
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	107:13,18	Greg 3:4,13 14:1 32:12 97:17 98:19 132:8 145:2	17:1 18:13
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	107:20	group 6:18 6:20 17:2 27:10 43:1 43:16 46:4 60:3,6,7 70:8 138:17 141:4	18:21 19:13
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	108:2,7		21:9 22:5,7
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	109:1,6,23		28:4,11,18
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	115:16,19		31:20 41:11
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	118:10		44:19 48:19
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	122:1 125:6		51:23,24
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	125:10		52:1 66:21
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	128:23		69:4,9 86:8
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	129:9,13		89:1 98:18
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	134:12		111:15,19
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	135:20,23		111:20
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	136:3,16,17		121:12
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	137:18		122:2,17
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	138:9,16		123:16
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	139:3 146:1		125:8 126:8
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	146:2,8,20		127:2,3
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	147:6,10,20		136:6,8
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	148:24		137:20
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	149:17,17		138:14,20
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	149:23		142:17
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	gone 59:5 99:12 115:11 132:9		143:24
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8	good 3:2,20 11:6 26:11 26:14 39:5 41:20 46:8 46:9 50:14		146:6,21
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8			147:4,8,11
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8			147:17
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8			148:2,3
		114:7 115:10 116:2,24 118:3,15 119:3,6 127:18 128:9 133:15 135:20 146:8			149:14

habitats 121:4,18	144:20	55:8 59:13	36:14,21	130:7	impediment 98:6
half 23:22	heads 145:2	59:14,15	hotel 150:9	identical 79:10 105:8	impervious 92:16 100:7
hand 11:2	94:22	61:13 62:4	hour 1:14	identified 46:24	102:6
36:22,23	hear 8:4	63:5,8,12	136:2	identify 7:10	103:21
107:7	116:16	63:23 64:15	hours 62:18	IEPA 3:17	implied 119:1
handle 65:16	heard 6:16	64:20 65:9	64:2	ignore 24:9	implying 111:18
94:9 99:22	7:1 18:14	65:16 72:17	HOWARD	ignored 11:5	important 27:4 60:5
handled	55:5 128:4	74:11 81:21	2:11	16:20,22	137:17
20:19	134:18	100:6 118:9	ho-hum	Ill 1:5	140:23
hang 124:19	hearing 1:8	133:8,11,12	122:20	Illinois 1:1,9	impound 72:17 73:13
happen	2:2 3:1,11	133:14	human 91:7	1:12,13 2:5	impounded 72:4 73:20
41:22 66:6	9:17 28:22	134:9,16	91:12,17	2:7,8,14	74:15,21
66:7 67:19	39:15 53:14	137:24	human-cau...	3:22 4:1 6:5	76:6 87:11
83:21 96:24	55:23 57:17	138:1	55:11	6:23 7:16	87:20
96:24	57:21 63:7	139:11	hundred	7:18,24	107:19
happened	97:6 100:16	higher 36:3	7:16	9:12 10:11	108:9,10,24
52:22 64:16	100:20	68:16,19	hundreds	10:16 16:17	110:11
happens 34:4	101:1,4,8	69:16 72:1	22:18	16:20,22	111:1,7,13
70:17 71:10	101:12	76:18 77:6	130:18	23:3,13	112:3,9,23
122:13	104:6	122:8,8	131:24	24:18,20,24	113:5,24
124:4	114:16	142:12	hydraulic	48:21 68:11	114:6
hard 28:6	123:19	highest	15:9	71:17 72:23	115:23
33:1,2,5	126:20	138:21	hydraulica...	73:1 74:23	116:6,22
37:17,18,19	132:11	highlighted	15:12	77:16 84:18	117:12
37:22 38:7	143:15	49:10	hydraulics	84:20,23	118:14
38:24 39:8	145:5	highly 10:22	59:19	85:4 99:19	119:5
40:1,15	149:20	17:22 35:1	hydro 60:22	106:1,20,21	120:15
61:18 66:9	150:3,8,13	41:21 42:1	61:7	113:1,5,6	impounding 19:6 73:5,6
69:17	151:8	50:19 51:20	hydrologic	113:24	73:23 75:10
123:11	hearings	65:11 70:7	55:13	114:13,15	75:21 76:20
144:6	43:18	92:11,13	hydrologist	115:11,13	105:22
harm 91:9,14	heavy 90:15	96:14	85:23	115:22	impoundm... 19:11 25:14
harmful	heck 127:12	122:10	hydrosite	118:14	115:24
65:24	131:21	him 13:12	61:6	119:5 120:8	impoundm... 105:24
hatch 60:10	held 1:7	31:3 77:23	hydrosites	151:1,6	106:9 132:7
hatched	64:7	99:24 109:7	60:22	imbedded	impounds 74:3,8
58:19	hell 64:7	113:17	hypothetical	40:23	improve 69:4
hatching	help 78:12	119:4	77:1	immediately	82:9 84:8
60:14	128:3 146:3	hired 9:11,14	hypothetic...	72:20	91:21
hate 21:10	helpful	45:15,21	136:14,15	116:10	
hats 7:4	104:16	46:22	hypoxia	impact 52:8	
having 53:10	helps 29:14	historical	124:17	105:21	
72:19	111:2	24:7	<hr/>	106:8	
115:12	heterogene...	history 53:6	I	107:14	
121:15	127:2	86:9	IBI 27:11	impaired	
131:19	hey 64:6	hit 68:1,5	120:18	117:20	
head 37:4,12	hide 86:11	hone 124:20	ichthyologist	120:9	
74:6 80:17	high 18:24	hopefully	7:5		
88:23	38:14 50:22	29:1	idea 95:8		
	51:20 55:4	hornyhead	117:11		

128:19	indictment	126:1	90:9 92:8	just 7:1 11:8	136:5,11
improveme...	115:13	intolerant	97:9 107:16	11:16 12:3	139:2
98:7	indifferent	35:13,16,16	109:20	16:10 19:13	141:15
improving	113:10	36:9 37:6	110:14	21:16 24:7	144:11,24
84:20	indigenous	41:17 42:4	111:6	25:11 28:24	justify 48:12
inaccurate	26:16,17	42:4,5,12	112:22	29:10,16	
20:13	individual	42:14,21,23	116:15,19	30:5,5,16	K
include 4:3	115:20	42:24 43:1	123:7	31:1,1,5,17	Kankakee
17:4 29:22	individually	50:21 68:21	125:20,21	32:9,18	7:21 28:14
30:11,24	107:3	68:21 129:5	127:1 133:5	33:13 34:2	28:16,18
32:20 37:23	individuals	129:6	133:6	34:14 36:7	46:3,15
49:11 55:12	65:7	135:14	135:11	37:3,15	71:3,6,7,11
55:17 78:20	industrial	introduced	144:1	38:18 39:2	71:13,14,22
82:14	92:13	53:2	Islands	41:5 44:24	72:3,5,10
125:21	industry 92:2	invertebrat...	147:13	45:4,14	72:22 73:5
included	infinite 130:1	35:5	isolated	47:22 49:14	73:5,10,14
13:13 18:10	information	investigated	62:24,24	51:7,9,10	73:19 74:2
49:10 67:3	9:22 10:4	60:21	issue 20:15	52:2,10	74:3,7,21
80:8 106:7	25:6 45:6	invoke 52:13	55:16 91:4	53:15 59:16	76:12,18
108:10	46:8 47:1	involved 4:12	92:4	61:3,22	77:5 115:23
138:18	67:2,4	4:17,23	issues 9:23	63:8,18	115:23
143:22	110:8,8	43:10 45:5	43:17 46:23	66:7,10	116:4,6,9
144:6	144:8 149:8	130:4,6	93:10,24	67:7 69:19	116:20
includes	inhabit 129:8	involvement	127:11	71:8,9,10	117:7
27:12,13	injure 68:2	5:24	items 13:14	72:23 74:5	121:13
66:24	input 92:20	Iroquois	35:3 50:20	75:6 76:16	132:12
109:18	inputs 69:24	115:8	it'll 146:3	76:24 78:4	keep 83:22
141:18	inquiry 92:5	irreversible	I-55 23:6	79:4 80:3	84:3
including	integrated	92:8 98:5	30:3 77:22	80:23 82:2	keeping 6:15
12:16 13:16	45:7	98:13	77:22	82:13,19	keeps 99:21
22:7 38:3	integrity	103:17	138:24	83:5 87:8	kept 6:1
77:15	106:14	105:24	i.e 128:15	88:22 93:2	key 35:8
108:17	intend 82:14	107:16		93:8,11	50:20
increase	intended	Island 10:13	J	95:23 97:4	135:10,13
127:2 128:7	41:3 77:18	13:22 14:10	jammed	99:15,20	kill 68:2
increased	intensive 8:4	18:5 19:16	123:12	104:15,18	killed 68:7
56:20	interchange	22:16 23:16	jeez 115:14	105:11	kind 17:20
independe...	15:10	30:19 31:6	job 16:10	106:14	35:6 36:22
48:9	intermittent	31:8,13	20:14	107:9 108:3	37:13 46:9
Index 143:24	54:21	32:4,14	jobs 16:13	109:21	46:18 71:1
Indiana	interpretat...	33:9,22	JOHNSON	111:10	99:8 103:23
59:12 62:9	20:18 44:6	35:15,20	2:3	112:6	103:24
72:24	interrupt	36:5,6	joins 72:24	115:11	118:9
121:14	21:11 22:21	48:20 49:1	jump 14:4	118:23	120:13
indicated	interstate	50:3 54:3	17:9 28:24	121:4,5	122:10,20
129:1	29:23 30:20	73:21,22	29:12 146:8	123:12	123:16
indicates	31:16	74:7 76:21	jumping	127:16	124:14,15
70:12	intervening	77:19 78:21	108:3	128:20	137:24
indication	122:19	79:4 82:12	juncture	132:20	138:2
146:5	intolerance	86:13,16	92:19	134:16	147:23

kinds 17:23 59:9 125:22	lack 68:12 87:11,12,13 87:13,23 112:17 119:21 128:16 129:23	least 20:16 42:19 71:24 79:19 80:18 82:4 94:14 105:11 113:2 120:17 130:17 143:21	65:24 90:3 life 9:24 10:7 10:15 17:12 17:17 39:11 43:8 44:12 48:23 49:18 49:22 50:1 50:4 53:6 53:22 69:7 69:9 86:9 90:18 96:2 96:8,23 112:20 114:7 119:14 like 9:18 15:2 15:21,22 16:2,3,4,7 16:24 22:10 35:11 38:13 38:19,20 39:10,21 41:6,9 45:5 51:19 62:18 64:9,15 87:11 99:16 103:11 112:18 123:2 124:18,18 125:10 127:8,13,19 128:20 138:20 147:16 limit 50:13 77:18,24 limitation 33:15 38:23 128:13,14 128:16 limitations 1:3 34:10 34:22 46:6 50:17,18 51:23 52:12 110:1 126:8 limited 21:22 31:22 49:7 88:19 89:22	116:13 120:3 126:23 127:22 149:4,13 limiting 31:24 32:2 50:9 51:1,5 69:3,6 90:17 91:6 148:18 limits 89:17 LIN 2:5 line 16:16 38:22 40:10 120:23 129:11 lines 62:23 link 128:18 128:18,22 128:23 links 128:21 list 7:18 44:2 117:15 119:8,17,23 120:9 143:10 listed 56:5 76:9 listing 18:10 literally 19:20 34:9 62:19 literature 6:22 19:7 63:17 lithophil 60:16 lithophiles 60:8 lithophils 60:3 little 5:21 17:9,10 25:17 28:24 32:11,20 33:20 36:8 64:11 77:6 80:3 81:22 82:5 95:16	99:19 108:14 136:3 139:9 139:19 140:10 142:11,11 littoral 127:2 128:2,10 LIU 2:4 live 16:3,4 28:4 39:2 126:7 lives 86:8 LMS 140:4,4 140:13 142:6 load 85:6 loading 70:16 71:10 71:11 100:10 located 92:12 location 78:16 101:10 141:13,16 locations 20:18 78:17 78:18 80:8 81:11 117:6 138:11 142:15 lock 13:6 24:4,22 34:8,9 73:21,23 74:7 108:22 116:19 Lockport 4:8 108:22 138:12,22 139:12,15 140:1 144:10 locks 34:1 126:24 long 9:2 13:4 22:16 66:4 72:22 88:18 88:23
know 6:12 13:17 17:3 22:12 28:13 28:15 29:14 32:5,12 36:17 54:9 54:10,12,16 57:3 58:22 59:8,17 61:11 70:21 71:5 73:1 74:14 78:8 80:2 81:10 81:15 82:24 87:6 90:5,8 92:24 99:5 99:7 101:13 101:17 102:16 108:4 111:2 112:1,7 113:10,22 113:23 116:2 117:6 118:13 119:3 120:13 121:23 129:23 130:5,22 132:5,9 133:2,5,11 134:1,3 138:19 140:4 144:13,17 144:20 145:17 148:15 150:3 knowledge 45:3 59:1 known 60:20	Lake 134:21 language 55:20 large 10:24 37:9,24 38:20 44:14 92:15 96:17 96:24 97:5 97:11 114:15 120:19 121:1,9 124:9 larger 11:5 15:20,22 17:13 64:13 120:17 121:11 122:8 131:20,21 131:22 largest 123:5 larval 5:13 LaSalle 1:12 2:13 last 8:5 22:22 83:12,12 88:21 96:4 106:19 lastly 7:3 8:4 35:20 45:9 61:5,16 70:21 late 9:6 Latin 37:1 Laura 1:10 151:4,16 LAW 2:13 Lawler 140:5 lead 25:21 120:5 128:8 leads 56:20	leave 91:10 leaving 14:12 led 45:16 left 39:21 103:18 legacy 83:10 lend 80:5 length 133:6 lesions 35:23 less 74:6,24 74:24 93:19 146:21 147:2 148:2 let 18:8 99:24 113:17 120:12 133:17 136:2 let's 22:20 31:5 97:8 104:6 134:4 139:1 level 10:21 18:14 19:1 19:13,21 21:6 53:1,3 53:8 55:10 60:20 61:2 61:18 63:16 64:3 71:3,6 73:17 75:12 118:11 levels 26:12 33:19 36:2 51:20 54:22 55:2,3,4,4,6 55:9,12,15 55:15,18 57:3,7 58:13,22 61:4 62:18	L	lab 7:7 labeled 98:23 101:9	

108:18,24	66:22 72:10	43:24 44:11	146:6	massive	26:16 133:5
145:3	78:4 93:8	45:11 56:22	make 10:24	130:24	142:13
longer 107:4	96:17 97:20	58:5,10,12	11:17 21:3	material	meaningful
longstanding	101:5	58:14 61:9	22:23 23:19	38:20 70:20	21:2
91:19	105:11	66:18 69:15	29:12 36:16	82:23 83:11	means 5:5
look 18:12	109:11	71:20 73:5	70:2 81:9	83:13,15,18	7:5 26:8,10
19:5,10	111:13	73:7,19	90:2 94:14	83:19,20,24	26:12 55:2
29:7 39:21	113:9 150:6	74:7 78:20	95:20 112:6	93:8	76:5 92:20
40:9 46:23	looks 41:6	108:10,17	113:22	materials	94:21 95:6
65:9 67:1	lost 53:5	109:3,5,7	129:16,20	44:5 81:20	108:19
72:21 75:11	110:17	109:18	134:9,20	82:6,7 92:3	147:20
76:9 77:9	lot 21:4,5,5	117:4,7	147:21,22	MATTER	meant 24:23
77:10 89:12	35:4 40:23	123:4	makes 98:7	1:2	111:1
102:17	43:10 49:8	125:16	126:13	Matusky	measure 75:8
106:22,23	59:11 61:1	132:5	135:6	140:5	medium
107:2	70:12 71:21	135:19	making 17:2	may 3:7	37:14
115:20	87:2,23	140:11,18	17:6 33:11	42:21 53:5	114:15
117:1	104:3	141:19	Malcolm	56:4 74:23	medium-si...
124:13	113:14	142:19	47:17	81:2 111:9	37:11
126:5	115:20	143:11	manager	120:9 144:9	meet 49:17
134:12	122:13,21	148:22	4:21 5:3	maybe 32:10	49:21,24
136:17	124:10	lowering	manager's	48:7 72:11	50:4 114:21
137:19	131:22	141:6	5:6	72:12 80:5	114:22
145:3	lots 133:14	lowest	manmade	95:2 130:23	116:24
147:24	Louis 123:8	138:22	125:14	MBI 17:2	meeting 6:10
looked 16:23	139:23		manner 21:2	20:2 22:24	53:21 96:1
18:20 19:4	low 18:24	M	manual	44:15	96:22
19:7 20:1	35:12 50:21	Mach 139:24	146:24	MBI's 24:23	143:11
40:19 44:13	54:21 55:4	mackerel	manuals 44:7	mean 4:2	151:12
44:14,15,24	55:9 56:15	124:17	many 6:20	9:20 12:8	meetings 6:5
45:13,22	61:13 63:9	macro 35:4	23:17 34:1	26:6 30:6	6:21 43:17
46:2,12,14	63:23 64:6	made 19:16	34:7 38:23	33:23 38:11	meets 116:1
46:18 47:6	64:20 72:16	44:19	43:17 44:23	42:8 50:12	member 2:3
47:7 48:9	132:22	134:23	46:6 59:8	52:9 63:14	2:3,4,4,5
76:16 84:11	133:1,2,4	madtons	61:17 67:19	65:7 72:19	6:20 43:15
84:13,18	133:10,12	68:24	67:19 68:6	77:4,21	94:11
85:9 93:23	134:11,15	magic 113:11	69:16,19	84:19 87:16	113:14
105:6 106:6	138:13	magnitude	74:11 90:5	89:9 96:21	150:1
109:13	139:11	11:11 19:20	90:8 108:5	103:9,20	members
114:2,3,4	140:17	20:21 22:14	map 72:10	107:17	46:21 58:23
114:13	146:5,9,11	72:1	76:16	114:20	memorized
116:5,21,23	lower 1:4 6:3	main 59:12	143:16	115:22	41:5
117:11	6:19 8:14	78:15	maps 75:12	120:12	memory
142:23	9:24 11:18	mainly 65:13	marginally	127:12	72:12
looking 7:6	11:20 12:18	138:5	50:8 127:20	130:11,14	mention
7:24 18:3	14:8,18	major 60:23	Marie 1:8 2:2	131:18	23:11,13
19:23 39:13	16:10 23:5	98:6 130:9	mark 3:12,14	133:11	34:23 49:2
39:20 40:14	29:21 30:17	130:9,12,12	marked 18:7	138:13	140:23
41:5 46:9	30:19,22	130:15,15	Maryland	146:9 149:5	mentioned
46:15 56:10	31:16 43:7	majority	47:20	meaning 8:18	19:5 20:15

25:15 34:2	137:23	53:14 55:24	MOORE 2:4	42:3 71:9	natural
41:9 44:18	146:2 150:8	57:23	113:14	142:15	54:21 69:19
50:15 51:22	Mighty	126:20	more 8:4	move 55:24	69:23 70:22
58:21 64:10	123:22	missing	10:5 11:24	57:18 64:4	76:22 78:6
66:16 68:23	migratory	35:10 36:9	16:19 18:12	70:13 85:16	107:9
93:15 105:4	17:22	Mississippi	18:20 19:10	107:22	112:16
109:21	122:10	67:15 68:4	19:14 20:24	108:1	121:1
110:5 121:7	mile 18:19	123:17	25:17 32:18	120:23	naturally
121:12	39:20 75:22	124:12	33:8,16,20	moved 85:21	54:17,19
140:3	75:24 76:1	Missouri	37:11 45:8	moving 15:15	nature 34:15
method	76:2,4	123:4,4,13	49:7 54:20	15:17 16:6	66:23 69:14
136:6	88:19,21,21	123:14,19	55:19 57:8	37:23 92:22	77:1
methodolo...	98:22 101:2	123:21	60:21,21	much 4:23	navigation
20:3	108:16	124:8,12,21	64:12 65:15	6:8 11:2,4,5	90:20,23
metric 35:22	117:4	133:24	66:18 69:8	12:10 15:10	107:23
41:23 67:1	miles 13:4	model 5:23	75:8,14	18:12,21	navigational
metrics 27:11	22:16 73:2	8:9 136:16	85:15,19	19:13,14	91:19 93:17
Metropolit...	73:19 76:5	moderate	86:17,20	27:8,16,17	near 4:11
85:10	88:17 89:1	78:13,18,24	87:2 93:17	27:20 38:17	94:20
Miami 88:10	108:18,19	81:21 95:2	93:18 94:2	40:16,24	128:12
Michigan	108:24	95:21 105:7	94:21 95:17	43:18 63:24	nearby 19:8
47:15 106:3	109:19,19	moderately	95:19 122:8	64:12 65:15	105:19
mid 4:11	122:16,20	42:3,23,24	123:9	65:17 68:23	nearly 4:23
5:10,14 9:4	123:3 131:5	68:21	129:12,13	72:18,19	83:14
middle 39:20	131:7	125:24	134:6 139:4	74:14,21	necessarily
122:16	mill 107:5	129:4	139:9	89:24 95:8	83:10 122:9
Midwest	million 131:8	135:17	147:17	98:15	137:18
2:16 5:16	millions	modificatio...	148:1 150:6	100:11	necessary
6:1 9:3,11	22:18	55:13 141:5	150:9	130:5,20	91:1,5 93:6
9:21 10:3	130:17,18	modified	morning	134:22	133:14
45:15,21	132:1	31:11 86:17	150:10	147:11	neck 47:21
46:22 48:18	mind 14:4	86:21,24	most 28:10	Mukahirn	need 35:3
54:10	22:2 32:10	87:2,5,10	38:3 41:24	1:10 151:4	38:24 39:11
midwestern	93:23 95:8	87:19,24	49:4 50:15	151:16	40:6,7
134:7	104:18	88:6,14,20	60:1,6,7	multi-year	52:13 61:14
mid-Atlantic	minimal 33:1	89:4,10,22	66:23 69:23	43:12	63:6 106:16
47:20	33:13 95:2	134:24	81:18 103:3	must 86:8	107:12
might 16:11	minimally	141:3 149:4	110:7	myself 45:4	117:10
17:16 18:23	127:7,16	149:14	115:12,13	58:23	126:14
24:13 25:23	Mining 47:13	modify 12:7	115:14	103:13	129:7
32:11 35:21	minnow 8:3	136:6 137:4	123:13		147:16
41:8 42:22	27:20	moment 12:4	124:22	N	148:1
57:14 63:22	minnows	53:15 75:6	129:6	N 2:1	needed 22:10
63:22 65:8	68:24	money 21:5	146:15	nailed 39:23	86:9
70:5 77:6	minus 142:11	22:20 130:1	148:14	name 3:20	needs 60:6
82:20,21	minutes	130:1	mostly 27:12	139:24	86:10 89:14
83:23 91:4	62:20 64:1	monitoring	Mountains	names 37:1	89:16
94:9 100:10	104:7	6:10	134:8	narrative	negative 70:4
107:4	143:11	months	mouth 38:19	146:23	72:20
129:12,12	Miss 28:22	134:19	41:10 42:2	nasty 83:23	negatively

70:10	nothing 16:5	64:17 123:5	Oh 53:13	20:11 25:12	only 9:18
nest 56:18	November	150:5	62:10	26:9,24	18:24 22:16
57:13 58:18	1:14 150:14	occasional	140:23	27:11 34:4	23:14 30:2
59:15 60:1	number 6:13	142:12	144:19	35:13,17	34:7 40:10
64:17	18:14 20:2	occasionally	Ohio 41:24	36:13,17,17	40:11 43:1
never 130:3	20:17,23	57:4	47:12,16	40:13 43:13	51:2 58:3
new 11:14	23:8,10	occasions	87:7 88:4	45:8 46:20	72:6 79:3
83:19,24	27:3 41:11	62:13	88:23 89:2	47:13,16,17	88:17
104:21	43:16 53:5	occur 35:19	124:11	48:10,17	108:15,18
next 20:20	63:15,19	59:3,4,10	134:5,9,15	52:21 53:19	108:23
25:24 83:7	67:18,21	62:1	135:5 136:6	54:13,18	114:17
85:7	68:6 71:24	occurring	136:16	57:5,6	126:8
night 145:6	79:6,10	54:17,19	137:4,5	59:12 65:10	128:17
nobody	80:8 107:3	106:2	141:3 149:2	66:23 68:8	129:3,4,16
114:2,3,4	129:7	occurs 33:21	Ohio's 86:17	69:3,8	130:19
114:24	numbers	64:1	86:18	70:12,14	134:20
115:1,6	23:9 27:8	October 9:15	okay 11:22	71:17 72:6	137:18
none 3:16	27:17,18	45:17	14:15 18:8	72:9 73:2	141:13,16
54:16	35:2,13	off 12:5 37:4	22:22 28:9	74:10 75:7	open 60:9
nonetheless	50:19,21	74:5 79:3	29:17 32:9	75:21 76:4	operate 37:8
46:7	142:4	80:17 83:24	34:21 37:15	76:10 79:7	60:22
nonexistent	numerous	100:9,14	37:21 40:20	85:1,2	operates
92:15	6:24 62:13	103:18	40:21 41:9	99:15	61:11
nonhornyh...	N-502 1:13	144:20	41:13 47:2	104:15,18	operations
36:20		145:2	53:13 61:8	105:2	60:23
nonpoint	O	offer 115:22	61:18 62:10	106:19	operator
92:18 98:16	object 77:1	Officer 1:8	74:19 78:9	108:16	61:7
99:22 102:5	135:24	2:2 3:1,11	84:16 91:11	113:8	opinion
102:14	136:3	9:17 28:22	94:15,21	114:13	10:10 29:24
nonriffle	objection	39:15 53:14	98:10	116:3 117:4	50:17 82:9
121:4,18	3:14 129:18	55:23 57:17	103:14	117:11	85:8 133:16
Nope 143:2	136:21	57:21 63:7	108:13	120:13	opposed
normal 75:12	objective	97:6 100:16	117:12	122:23	33:12 36:19
95:2,6,11	115:7	100:20	121:7	123:5	61:6 138:1
95:12,19	observation	101:1,4,8	127:15,21	124:15	opposite
normally	75:17	101:12	128:4,13	132:17	34:23
95:9	observations	104:6	131:16	135:24	order 19:18
north 1:12	76:17	114:16	134:4,11	137:6,11	19:20 71:24
2:7 16:10	105:15	123:19	137:9 139:1	139:14	91:21
77:21	observed	126:20	139:7,12	140:4	organic
northeast	52:11 57:5	132:11	140:18	141:13,16	69:14
71:17	66:4,19	143:15	145:22	143:8 144:9	other 6:11,23
Northern	105:2	145:5	old 83:20	147:20,21	7:4 11:2
77:16	obtaining	149:20	107:5	147:22	15:24 16:8
Northwest	10:15 91:22	150:3,8	once 42:19	148:21	17:13 22:13
47:12	obtainment	offices 47:19	67:22	ones 50:16	23:6,17
notary 1:10	128:8	off-channel	one 7:1,4,13	51:21 70:7	27:14 36:18
note 61:5	obviously	78:16,16	10:5 14:1	80:22 88:8	38:3 40:19
147:8	12:11 34:5	often 6:6	14:11 16:6	121:10	41:24 43:11
notes 151:10	35:3 36:18	67:19 89:23	16:7 18:16	online 82:24	44:8 45:1,4

47:10,16,18	81:18,21	24:3 29:9	116:22,22	105:8 108:8	51:4,7,11
51:21 52:10	82:6 93:6,9	29:16,19	117:7 118:1	108:9,14,20	51:12 52:11
55:13 57:10	99:3 106:2	39:17,18	122:3,4	108:23	59:21 61:22
58:23 59:15	123:2	48:16 50:10	125:9	125:14	67:16
59:20 61:24	124:19	51:3 53:17	127:24	135:5	111:24
65:12,17	139:23	56:14 66:14	128:3	147:16	112:15
69:6 70:3	outcomes	68:18 69:2	129:10,15	148:1,3	physically
77:9 80:7	7:13	69:12 79:12	142:18	percentage	16:5 80:9
86:9 95:9	outside 36:1	86:3 90:15	143:1	50:22 65:9	pick 94:8
106:9,16	135:4	94:20 98:2	147:10	74:4 78:23	picture 39:21
107:7,11	outskirts	100:22	148:7,19	90:1 100:6	101:15,18
110:11,14	123:8	101:5	participate	105:5,8	pictures
110:23	over 4:14 5:6	105:18	43:14	122:9	39:14 41:14
111:1,7,13	7:16 11:1	106:2	participated	perfect	piece 105:2
111:20	16:7 19:18	107:14	47:9	126:12,13	115:5 144:2
112:2,9	19:19,24	138:10	particular	perform	pile 98:24
113:4,23,24	39:7 61:10	146:14	50:16 63:17	54:11	Pirnie 47:17
115:9,16	64:1,2	149:1	89:13 95:5	performed	place 16:6
117:11	66:19 68:7	Pages 58:8	112:7	20:1 47:9	55:6 58:24
119:12	83:7 89:1	146:4	particularly	period 66:19	63:22 64:20
120:13	93:1 99:20	pallid 8:2	28:8 43:15	105:10	88:16 91:10
121:4,18	103:2	paper 6:14	92:7 136:2	144:9	123:6
122:3,6,21	104:22	25:21,23	partly 104:23	periodically	134:20
122:24	105:2	115:5 149:8	115:23	68:1	placed 120:8
126:8 128:7	123:11,24	papers 6:6	parts 1:5	periods	places 40:23
128:19,21	overall 34:14	Pardon 84:12	11:24 12:9	105:9	86:10,10,11
132:17	70:5 83:3	90:7 130:13	13:1 30:11	permit	107:7
134:6	124:20	part 3:24	30:24 48:4	102:21	Plaines 1:4
139:16,18	134:13	4:17 5:22	82:19 88:10	personally	6:3,19 8:6
139:20	137:20	13:3,17,20	103:11	47:11 57:5	8:15 10:1
140:21	148:15	14:16,17	pea 38:5,6	58:24 66:4	11:18,20
141:12	overcome	15:20 17:17	peaking	perspective	12:18 13:2
142:6	123:24	21:11 23:3	60:23	13:8 15:1,3	13:5 14:8
143:20	oversaw 80:6	23:18,23	Pelican 123:7	106:24	14:18 15:4
others 7:2	overseeing	24:1,5,10	peninsula	pertaining	15:6,12
12:1 27:3	4:24	27:10 30:22	47:15	6:22	16:1 23:11
42:13 44:21	oversight	39:11 40:14	people 16:3,4	Phase 101:24	23:12 29:21
otherwise	20:5,14	41:23 44:3	20:23 43:11	101:24	29:23 30:2
119:7	own 35:18	44:13 46:3	45:3,4 83:9	phenomenon	30:17,19,23
123:12	48:13	47:24 49:3	95:3,6	56:21	31:16 43:7
out 4:15,22	105:14	66:21 73:16	107:10	photograph	44:1,11
5:10 14:12	Ozark 8:3	88:13 89:22	123:14	98:24	45:12 56:22
20:17 39:3	o'clock 104:9	91:11,13	124:10	photographs	58:5,10,12
39:3 40:11	150:10	94:9,12	percent 26:1	59:7 103:23	58:14 66:18
52:7 57:11		103:4	27:11 61:19	phrase 147:1	69:15 71:20
59:5 62:13		104:16,18	65:7 74:6,8	physical	76:13,22
62:19 64:7	P	105:20	74:16,16,17	15:18 31:24	77:12 78:4
64:23 65:8	Package	108:18	74:18,23,24	32:3 33:24	86:13 109:3
70:13,17,20	41:15	112:13	78:13,18	34:10,13	109:5,7,18
79:4,9 80:9	Page 10:1,9	115:10	79:5,10	44:10 51:1	121:8,10

132:6	35:20 36:4	38:2 50:20	81:16 126:9	presupposes	Procedures
142:19	36:5,6	51:24 71:1	predomina...	52:24	20:7
143:11	39:14 48:20	138:14	121:3	pretty 6:8	proceeding
144:1	49:2,2,7,8,9	146:21	prefer 15:19	43:9 68:23	24:14 77:23
plan 20:7,10	49:12,24	147:2	15:24 17:12	107:1	142:20
23:8	50:3 54:3,5	poorer 31:20	17:13	prevailed	proceedings
Plane 134:21	61:9,9 73:6	poorly 11:3	preferred	142:9	1:7 24:10
planning	73:7,18,24	27:3 35:11	41:11	prevent	151:7,11
32:6	74:8 76:4	population	prefiled 3:12	54:22	process 17:7
plans 21:6	76:21 77:19	26:7,15,17	3:14,23	preventing	43:14 44:4
107:21	78:17,21	29:7,22	8:13 9:20	16:5 92:20	45:5,7,19
plants 6:1	79:4 82:12	36:19 53:8	10:2,8,9	125:5,9	115:12
please 3:23	84:11,14	53:11 86:2	18:7 26:6	previous	118:1,8
8:13 14:3	86:13,16	86:6,8	29:7,20	110:6 135:8	119:7,9,10
53:15 56:21	90:6,10	147:12	30:14 43:4	previously	119:11,12
75:6 82:17	92:8 97:9	populations	43:21 48:17	58:21	119:14,14
86:15 94:19	107:16	86:4	50:11 51:3	prey 35:3	120:3,4
plot 17:4	108:8,9,13	portion 8:10	53:18 56:15	50:20	produce 52:3
plus 93:13	108:16,17	30:2 72:23	58:9 66:14	price 131:6	65:22
105:14	108:21,23	73:13 74:23	67:5,14	primarily	professional
142:11	109:19,20	77:20 78:5	68:18 69:2	12:14 16:24	82:8
point 4:22	109:24	81:7 116:6	69:11 79:12	17:6 44:8	progressiv...
5:4 22:23	110:14	116:8	79:22 80:19	61:12	97:15
70:1 102:19	111:7	portions	86:3 98:2	principles	project 4:21
105:3 106:2	112:22	47:16	premise	59:21	5:3,6
132:19	121:3,14,18	positive 26:1	121:23	prior 47:24	130:24
141:2	125:20,21	42:22	prepare	80:18	projects 93:5
points 52:14	127:1 129:1	possibility	119:22	133:23	promoting
pollutants	132:19,21	96:23	prepared	probably	106:1,20
54:15,19	133:6	possible	5:22 8:8,11	22:17 33:20	pronounced
83:10	135:11	81:10	17:3 20:6	50:14 74:16	33:20
pollution 1:1	139:12,15	129:20	44:22,23	77:11,11	prop 84:2
1:9 2:6 91:8	140:1,18	possibly	144:4	91:24 93:10	propellers
102:5	141:9,17,17	119:3	preparing	100:11	53:10 67:17
pool 8:6	141:18,19	120:20	4:24 46:18	107:1,6	proper 20:14
10:13 12:22	142:1,7,9	potential	presence	113:11	112:17
13:2,10,16	144:1 146:6	43:5,19	34:1	116:12,23	136:23
13:22 14:10	146:16,21	82:16 91:22	present 27:16	130:2,17	properly
14:11,16	147:3,3,5	power 60:22	27:16 29:20	132:15	11:7
15:3,5,11	147:13	precipitously	42:15 43:24	148:15	property
15:20 18:5	148:6,11,13	57:4 58:22	54:16	problem	107:10,11
19:16 22:16	148:19,23	precise	107:21	70:20 83:8	proposal 4:1
23:5,16	149:4	147:15	presentatio...	128:10	9:13,15
30:12,19	pools 4:8	preclude	6:12	135:10,13	49:16
31:6,9,13	63:1 93:17	112:19	presented 5:8	135:14	proposed 1:5
31:17,19	112:18	predated	6:6 135:9	problems	8:19 14:20
32:4,7,14	122:3	46:22 86:11	presumably	20:3 34:16	14:21 48:21
32:24 33:9	138:12,23	predation	83:1 120:16	55:8 63:6	proposition
33:16,17,21	144:10	56:20 57:15	presumption	70:14 71:1	96:9
33:22 35:15	poor 35:7	predomina...	113:4	92:23	props 68:1

protect 91:1 91:5	45:9 Pyrford	105:12	137:3	55:2,5 63:2	98:20	
protected 89:15,16 90:17,20,21 90:23,24 91:20 107:23	88:16 p.m 1:14 P.O 2:8	question 3:23 8:13 9:20 10:8 13:13 13:15,18 14:3,11 15:1 18:2,5 18:9 25:5 26:6,24 29:8 30:8 30:14,22 31:18,23 32:7 35:9 36:8 38:17 41:4,20 43:4,9 47:2 47:24 48:16 49:15 51:8 53:17,23 57:16,18,22 63:5,18 65:2 68:16 69:1,10 73:14 74:15 75:18,23 77:2,8,19 81:3 82:8 82:16 85:24 86:6 91:14 93:15,20 95:23 96:19 97:17 103:10 104:5,19 105:18 106:7,12,18 109:5 110:19 111:3,12,14 111:15 112:13 113:3 114:11 121:17,24 125:13 126:17,19 126:22 128:1 133:20 135:8 137:2	145:16 146:1 147:11 148:9,20	questions 3:21 16:16 20:9 29:13 60:4 69:11 98:11 106:5 121:6 136:1 150:6	rapidly 57:7 123:10 rate 68:5 rating 137:13 rational 149:9 rationale 149:11 reach 106:11 107:18 121:3 reached 48:13,13 69:2 read 23:7 51:14,15 141:23 145:5 reading 16:23 56:3 ready 3:3 57:21 real 22:20 38:16 70:14 118:11 realistically 11:11 20:21 really 12:9 13:9 17:20 17:22 36:16 61:14 64:6 72:18 89:18 93:24 107:6 122:18,18 125:2 134:8 reason 59:18 61:23 67:22 89:20 99:17 reasonable 31:12 57:11 75:20 reasonably 59:2,10 reasons 22:24 50:7 71:18 recent 66:23 93:18 98:18	recently 58:19 110:7 Reclamation 85:10 recollection 20:8 25:19 75:23 recommend 106:17 record 12:5 25:16 51:15 55:24 63:8 79:17 100:17 139:3 142:19 145:8,11,21 redhorse 7:15 8:3 27:13 36:12 41:12 42:6 42:7,8,10 42:11,20,23 43:2,2 68:23 71:24 138:5 rediscovered 7:14 redo 47:4 48:1 reduced 27:17 35:2 35:5 50:19 reexposed 84:6 refer 11:16 14:8 30:6 reference 31:15 46:9 58:3 94:23 111:22,23 144:7 referenced 24:16 80:19 145:12 referencing 144:21 referred 25:12 30:5
PROTECT... 2:7	Q QAPP 20:6 23:7 QHEI 7:2 40:14 66:20 78:14 94:23 105:6 110:6 110:13,20 110:22 111:5,21 112:12,13 112:21 115:1 138:11 139:6,13 141:1,2,8 142:9 143:21 144:8 146:15,23 147:19 148:22 149:9,12		quick 76:7 quickly 57:9 quite 20:9 23:1 71:12 71:13 quota 124:21 quotes 68:17			
protocol 149:3			R R 2:1 rainfall 61:13 raise 61:9 130:21 raised 35:9 73:18 ramificatio... 57:7 92:1 range 139:17 139:19 140:8,12,14 140:20,22 141:11,15 141:20,21 141:24 142:3,5,8 148:13 ranges 140:17 Rankin 31:10,21 44:22 90:5 90:8 147:18 Rankin's 86:22 149:8 RAO 2:3 150:1 rapid 33:18			
prove 115:18 115:18						
provide 46:7 56:21 86:8 92:3 94:23						
provided 5:9 16:23 18:11 20:5 44:8 143:1 149:8						
provides 149:10						
public 1:11						
publication 147:18						
published 25:21,24 44:7						
purchased 9:5	QHEIs 17:4					
purpose 41:3 110:15 111:4	qualified 149:6 qualify 103:6 149:3					
purposely 127:6	Qualitative 143:23					
purposes 13:8 28:9 38:2 147:2	quality 1:3 20:6 21:9 35:2 50:19 67:2 68:16 68:19 69:16 82:15 83:8 84:7,7 85:2 85:5 93:11 112:19 138:15 147:11					
pursuant 91:8	quantity 82:15 83:5 85:3 93:11					
push 65:22 66:10						
pushed 66:8 67:23						
put 20:24 25:7 86:22 99:11 119:8 146:3						
putting 41:15						

31:10,22	related 93:10	removed	59:13 65:14	22:2,10,12	riffles 32:21
35:21 57:2	112:15	91:16	requested	126:23	32:23,24
60:15	120:13	106:17,18	51:16	127:1,22	34:7 39:10
103:23	relating 9:23	107:6	require 69:17	128:2 130:7	71:21,21
117:19	relationship	removing	123:16	131:2	76:23 77:5
referring	38:9	107:1	required	restore 131:5	77:16 78:7
21:19 22:8	relative	126:23	147:11	131:7	87:13,13,22
25:17 33:6	111:15	repeat 14:2	requirement	result 7:17	95:13,18
45:24 48:2	112:8	report 1:7	54:7	34:3,8	112:18
62:4 66:14	relatively	5:7 18:6,11	requireme...	55:10 69:24	122:24
68:17 70:22	72:16 82:23	24:16 30:7	28:5 137:21	71:1 73:20	128:15,16
79:12 82:11	131:3,3	31:10 43:20	research 61:1	83:1 90:2	132:6,10
119:11	relevant 5:16	44:22 48:22	researched	141:4,5	133:15
121:22	10:4 19:10	49:11 58:8	18:22	results 19:9	135:9 137:6
refers 35:22	24:13 25:8	58:8 62:17	researchers	34:5 92:24	137:12
reflected	44:5 45:1	79:21,24	6:11	resuspended	138:6
18:6	48:21 52:19	80:20,22	resolution	84:1 85:16	rifle-dwell...
refuge 64:4	55:16 91:13	86:22	18:14,21	85:21	39:10
regard 20:16	111:14	117:15,18	19:14	resuspendi...	right 21:21
21:15 48:11	relied 11:2	142:19	resource	83:22	34:19 40:3
76:14	16:24 17:6	144:18	31:22 88:20	reversible	71:5 79:8
108:21	19:15 75:16	145:3,13,15	89:23	106:9,12	87:9 92:22
regarding	75:16 110:8	reported	149:14	review 9:12	94:16 98:14
25:7 44:5	relies 79:24	139:18	respect 10:1	9:22 10:4	98:22 99:1
106:8 149:1	rely 110:3	140:8,9,10	10:9 13:15	48:5,18	99:14 101:3
regardless	relying	140:11,13	29:8 30:14	91:3 103:7	101:7 103:4
51:5 52:4	110:19	140:20	31:4,7,18	reviewed 5:7	107:13
70:9 112:2	remain 98:6	141:19,21	32:13 43:8	6:22,23	109:9 115:2
135:1	remaining	142:3 151:7	47:3 54:23	43:22 44:4	125:17
region 26:14	121:5	reporter	66:15 79:13	44:5,9,12	131:4
regular 99:17	remediation	51:14 151:5	80:12 95:23	44:20,22	142:10,11
regularly	11:12 20:22	reporting	133:24	reviewer 5:5	145:18
4:16 6:4	21:6,11,15	79:21	respond	reviews	rigorous
regulated	21:20,23	reports 4:24	97:23	44:19	120:4
102:16,19	22:3	44:23,24	147:19	rid 72:14	riparian
102:20	remedied	represent	responding	rifle 39:6,7	92:13
regulation	91:18	26:11 29:22	31:2	71:12 77:8	risk 64:12
56:16	remember	125:22	response	77:13 95:11	river 1:5 4:11
regulations	67:20 84:24	139:14	61:12	121:2,11,14	5:20,21,24
8:19 26:18	139:22	representat...	103:21	121:22	7:21,21,22
83:14	144:2,5	17:23 35:8	responses	122:2,5,15	8:9 12:18
102:16	removal	50:20	51:19 52:3	122:17,23	19:9 23:3
regulatory	21:24 69:3	representat...	61:3	123:8,10	23:11 24:18
9:13,15	93:5 106:1	26:11	rest 104:4	128:19	24:21,24
13:8 14:10	106:15	represented	110:1	129:8,9,17	25:7,13
44:4	remove 34:9	27:4,21,22	123:24	129:21	28:14,16,19
reinvent 47:8	69:5 91:9	35:12	124:23	130:2,4,22	29:23 30:2
48:2	91:15	reproduction	restoration	132:15,16	30:17 37:13
reinventing	107:18	64:23 69:18	11:12 20:22	136:7,18	37:14 39:4
48:7	108:1	reproductive	21:7,20	137:16,23	39:5,19

42:20 44:2	115:15	24:1,5	sand 8:2 33:4	scored	66:10,20,22
44:11 45:11	117:12	43:13 58:17	33:6 37:24	139:13	67:1,1,4,24
46:3,3,15	118:14	65:21	38:1	148:14	69:5 70:16
48:24 49:6	119:5 121:2	rules 48:21	sanding	scores 78:14	80:12 81:19
49:17 54:2	121:3,10,13	53:18 54:7	62:15	112:21	82:20 83:4
56:22 58:10	122:7 123:5	83:14 99:21	sanitary	115:1	83:5,11
58:12 59:11	124:11,13	run 88:16	10:12 13:21	138:11,13	84:4,5,7,22
62:3 67:15	134:14,17	121:2,12,14	14:6 18:4	139:17	85:1,2,5,6
68:4,11	135:3,5	121:23	43:7 48:19	140:11	93:2,3,4,6
71:3,6 73:1	Road 13:6	122:3,6	49:1,6,20	141:6	93:11,18
73:1,14	138:12,23	138:1,3,4	49:20 54:1	142:12	94:19,24
76:12,13,22	ROBERT	runoff 92:18	69:14 82:11	143:17,22	95:5 97:22
77:10,13,15	2:10	runs 70:18	107:15	143:24	98:16 100:8
78:4 84:18	rock 7:21	run-off	147:3	146:5,11,15	100:13
84:20,23	28:6 38:20	102:14	Santucci	146:22	105:11,13
85:4 88:13	40:19 41:10	104:3	25:22	148:5,10,12	123:24
97:11 98:22	64:9 77:15	R08-09 1:3	satisfied 10:6	148:22	sedimentat...
99:1 100:23	112:1 115:8		81:11	149:15	11:8 60:18
101:2	rocks 39:3,21	S	satisfy 45:12	scoring	70:23 71:22
105:19	40:10,19,22	s 2:1 71:24	69:8	142:10	78:13,19,24
106:6	40:24 41:2	sake 29:1	save 150:1	145:17,20	92:7 93:5
107:10	41:7 60:5,7	salable 78:11	saw 40:19	147:19	93:14 98:4
108:4,5	60:10,13	same 5:22	52:3 62:2	SCOTT 2:11	102:8
109:16,18	Rocky 134:8	8:17 12:17	79:7 101:21	scoured	103:18
111:7 112:1	role 4:13 7:3	26:16 32:19	106:10	99:10	sediments
112:2,4,6	room 1:12	43:17 46:5	saying 22:9	scouring	33:10,12
112:23	113:15	46:11 54:4	71:8 79:3	70:13	66:15 69:4
114:15	150:10,11	57:13 62:23	91:7 95:24	season 68:8	69:14,20,23
115:9 116:4	roseface	63:22 69:20	115:6	seasonality	70:1 79:13
121:8,9,13	36:13	70:22,24	119:16	64:14	81:16 82:9
122:15	rosyface	73:4,23	122:1 125:3	second 18:5,8	84:20 85:16
123:5,13,14	36:21 37:7	79:6 82:23	125:7 126:1	26:20 29:10	85:20 92:20
123:17	roughly	83:3 84:15	126:12	87:8 91:13	93:16 95:18
124:8,17,21	22:13 76:4	89:9 97:12	129:15	106:12	102:9
124:22	88:22 117:3	110:1	says 13:13	108:3	104:21
128:12	122:16	141:10	23:8 39:19	127:24	see 5:12
131:6,7,11	123:2	150:11	50:7 147:19	143:5 148:7	18:22 22:6
132:6 133:4	round 23:9	sample 81:12	scale 131:1	148:9	26:21,22
133:7,8	round-bodi...	sampled	schedule	section 5:23	27:1,6,6,7
134:11	27:12,15	71:11 72:15	61:13	13:4 99:15	40:9 51:3
144:1	35:11 41:22	78:15 80:8	school 94:8	132:14	52:18 62:20
rivers 6:23	ROY 2:12	81:3	scientific	Sections	65:11 70:24
77:16	rubble 33:3	samples	115:7	103:12	72:1 75:12
110:11,15	38:1	80:10 94:3	122:12	sediment	78:5 83:21
110:23	rule 14:20	sampling	scope 92:5	11:8,9,9,10	84:6 95:14
111:2,13,16	52:7 114:21	19:14 81:13	score 136:8	20:15,16,17	95:17 104:2
111:16	rulemaking	121:2	139:15,16	21:9 22:1	111:5 113:9
112:8,9	1:3 8:20	143:21	140:7	44:18 52:2	114:22
113:5,6	12:24 23:4	San 131:4,10	141:14	58:19 59:23	124:16,18
114:6	23:18,23	131:12	146:19	60:13 66:1	124:18

128:9 129:2	101:22	121:2,23	85:19	showing	105:7
129:3,5	102:1,13	122:6	shallow	58:17 61:1	148:14
135:3	103:9	138:22	56:19 57:13	65:21	sitting 117:8
141:13	104:20,23	seining 4:19	95:16	shows 29:13	situation
149:12	109:12	self-sustain...	128:14	98:24	45:2 107:2
Seegert 3:4,5	111:12	86:5,7	sheets 145:17	SHUNDAR	six 19:16
3:5,13,20	113:2,18	senior 5:5	145:20	2:5	23:2 42:8
4:7 7:9 8:21	114:4,12,16	sense 21:23	shiner 8:2	side 77:10	43:6 53:19
11:19,24	115:2 116:7	23:19	36:13 37:8	81:16,23	53:24 54:7
12:8 14:2	116:10,21	125:18	ship 10:13	87:2,3 99:4	54:11
14:13,16,21	117:3,13,21	126:13	12:14,17	significant	Sixteen 50:24
15:5,8,16	118:4,7,16	135:7	13:21 14:7	10:22 92:1	Sixty-five
16:12,16	120:2,11	146:23	14:7,17	92:17	146:4
17:15 21:14	122:7	separate 48:5	18:4 23:15	105:20	Sixty-one
21:17,21	123:20	80:21 102:7	43:7,24	significantly	142:17
22:9,22	124:1,4	106:4	44:10 45:10	112:22	size 37:23
24:6 25:9	125:15	110:20	48:20 49:1	silt 60:12	38:5 86:5
25:19 26:23	127:21	118:23	49:6,21	70:3,11	93:6 121:10
28:1,3,15	128:4	separately	54:1 66:17	81:20 95:8	121:13
28:20 30:9	129:22	32:7	69:15 71:19	95:10,12,13	123:17
31:8 32:16	130:6,13,16	sequence	82:11 97:13	95:16 99:11	130:8
34:21 36:12	131:10,13	132:16	107:15	99:12	131:18,24
36:22 37:3	131:15,17	sequences	109:17	siltation	133:4,5,7
37:10,18,21	132:4,13,24	121:14	110:2,14	33:13 34:6	Skelly 140:5
38:15 39:23	133:9,17	series 112:7	111:6 147:4	41:1 70:8	skill 45:3
40:3,5,21	134:4	149:10	shole 123:9,9	70:23 71:3	skip 49:13
42:20 48:8	135:12	serve 107:4	shoot 104:8	71:6 87:12	109:23
51:17 52:18	136:9 137:8	session	130:21	87:23	149:23
52:24 53:12	137:14,16	109:15	shore 38:22	silty 69:13,20	sloshing 84:2
63:14 65:1	139:12	set 10:24	40:10,11	69:22	slow 41:6
65:6 67:13	142:22	11:6,7	95:19	similar 22:13	70:19
68:13 71:4	143:4 144:3	44:14,14	128:12	76:13 140:9	slowly 64:3,5
71:7 72:5,9	146:11	89:17	129:11	similarly	slows 34:5
72:15 73:8	148:12	124:23	shoreline	55:12 56:15	70:19
73:11,17	Seegert's	126:10,14	38:12	59:22	small 16:4
74:1,22	56:8 104:17	126:15	short 8:16	simple 60:3,7	17:19 23:21
75:11 76:2	145:13	sets 149:9	38:16 42:23	60:16	37:8,10,24
76:11,15	seeing 3:16	setting 89:12	57:20 77:3	since 4:9 9:4	38:19 41:10
77:3 78:8	70:23	settle 82:6	104:10	12:16 29:2	42:2,3 57:8
81:2 82:18	seems 9:17	settles 70:20	126:23	46:10 53:5	62:23 72:20
84:24 85:13	52:9	several 6:3	shortcomin...	103:10	73:3 74:4
87:9 88:5,7	seen 51:19	35:8 50:20	18:17	106:5	81:19 88:14
88:10 89:6	58:24 61:24	severe 32:18	shorthand	single 33:24	92:14
89:11 93:24	62:15,23	33:16 46:6	151:5,7,10	sinuosity	115:24
94:12 96:3	66:6,6	63:2 78:13	shortly 9:5	87:12	130:7 131:3
97:10,14	93:12	78:18,24	9:14	site 47:14	131:3
98:14,21	132:16	95:2,21	shoulder 5:6	62:12 99:13	smaller 11:6
100:5,16,19	sees 62:18	105:7	show 67:16	sites 47:16,19	16:1 17:12
100:23	segments	severely	115:15	60:22 90:5	17:17 97:15
101:3,16,19	24:1 112:8	60:17 85:15	149:16	90:8 105:5	123:15

smallmouth 68:24	someone 54:11 56:3	4:10 12:15	specifically 7:23 9:12	stated 45:22 58:6 146:23	88:17,23 94:22 95:5
smartly 40:8	106:16	12:16 44:1	46:2 59:5	statement 50:7 98:2	95:13 97:5
Smogor 2:12	something 21:5 31:21	49:5,16	66:24 93:23	149:1,7	114:19
81:5	35:3 38:19	54:2 109:16	specimens 7:6	states 115:12	130:7
Society 6:5	42:18 60:5	spaced 77:9	spectrum 42:5	115:13,14	149:15
solution 92:20	61:10 83:17	spaces 41:1 60:9	speed 29:1	115:18	streams 17:13 37:8
solve 92:23	105:3	sparse 33:7,8	81:21	134:7	69:24 87:7
some 8:1	119:12	spatial 18:14 18:21	spend 49:8	138:10	87:10 89:23
11:24 15:22	121:24	spawn 39:2 60:9 86:10	sponsored 25:20	Station 4:12	90:1 95:24
16:3,4,18	147:16	spawning 28:8,11,18	spots 123:23	stations 9:6	96:7,10,18
17:11,12	sometimes 14:9 18:18	33:14 38:2	spread 123:2	18:20 23:2	96:20,21
20:24 27:1	56:2 64:22	69:17	spring 64:18	23:5,9,10	97:1 149:12
27:5,19	somewhat 139:5 147:5	speak 15:2 91:4	Springfield 2:8	23:15,15	Street 1:12 2:13
28:15 34:22	somewhere 21:12 26:2	speaking 33:5 37:22	SS 151:1	stay 81:20	strength 65:10
41:9 44:8	96:11	77:20	St 123:8	108:2	strengthen 128:20
44:15 45:18	113:19	species 7:12 7:14,18 8:1	139:23	Steel 8:12	stress 61:20
46:7,12	sorry 4:4 11:15 17:8	17:16,21	stack 111:17	Stephanie 2:10 3:21	stressors 61:17
50:15 53:1	22:4 24:2	26:10 27:1	stacks 112:4	still 4:23	stretches 138:17
53:5 56:8	29:12 39:19	27:5,14,20	staff 47:18	23:18 36:5	strict 83:15
57:2 59:15	40:4 56:23	33:14 35:13	stages 17:12 17:13 53:7	69:6 83:2	strike 30:15
60:4 65:13	65:1 75:4,7	35:16,17	stakeholder 43:14	83:15 94:7	31:15 57:16
65:16 68:22	76:1 85:18	36:9 37:6	standard 5:19 61:3	97:21	58:15 67:18
69:19 70:5	90:21 96:19	38:18,24	standards 1:3 6:10	107:20	86:1 90:14
75:20 80:5	97:19 100:2	41:9,18,21	91:1,4	123:17,18	90:14 95:22
82:1 83:1,9	101:16	42:1,8	standpoint 106:14,14	128:21	104:4,12
88:12,14	104:14	46:10 50:21	stands 67:22 139:22	142:1	109:1 138:9
93:10 95:9	106:19	50:22 59:15	standards 1:3 6:10	stir 66:9	141:22
95:20 96:10	110:16	59:24 60:14	91:1,4	stirred 67:24	146:1 148:5
99:6,8,11	123:20	60:17 65:13	standard 5:19 61:3	stirring 65:24 84:3	149:17,18
111:7	126:23	65:13,17,18	standards 1:3 6:10	stood 40:18	strikes 96:13
113:11	127:3,11,23	68:20,21,21	91:1,4	stop 15:14,16 41:2 121:5	81:15 57:16
115:16,21	128:4,7	69:16,21	standard 5:19 61:3	stopped 99:3	58:15 67:18
120:17	130:23	86:12 89:14	standards 1:3 6:10	storm 85:11 101:24	86:1 90:14
121:3,11	137:22	89:15,19,23	91:1,4	stranded 57:9 64:10	90:14 95:22
123:13	138:4 144:7	91:15,19,23	standpoint 106:14,14	stirring 65:24 84:3	104:4,12
126:23	145:9	121:20	stands 67:22 139:22	stood 40:18	109:1 138:9
127:3,11,23	147:19	126:9 127:4	start 3:3,17 79:3 98:8	stop 15:14,16 41:2 121:5	141:22
128:4,7	sort 5:5 16:2 48:10 80:9	129:3,5,6	146:3,9	stopped 99:3	146:1 148:5
130:23	99:6,20	138:5	starts 75:21	storm 85:11 101:24	149:17,18
137:22	147:19	specific 16:19 25:18	state 1:11 7:23 19:15	stranded 57:9 64:10	striking 149:19
138:4 144:7	source 91:7 92:18 99:22	66:21 93:7	19:22 29:20	stranding 56:19	150:6
145:13	102:5,8,15	105:2	53:18 56:14	strategy 65:14	strong 128:18
150:6	102:19		78:7 83:16	stream 17:17	146:5
somebody 113:10,18	sources 98:16		98:3 105:18	stream 17:17 33:19 37:11	stronger 4:15
115:5 140:7	103:24		118:2	86:21 87:1	structure 20:24
somehow 59:18,20	south 2:13		120:14,17	87:1,5,18	structured 113:8,20
			135:1 151:1	88:1,1,12	structures 22:5,7

stuck 62:24	56:9	80:2	11:16,17	87:22	120:15,16
studied 4:10	subsequent	support 28:7	12:2,13,17	108:22	124:9
5:20 7:19	45:20	92:9 127:3	17:24 18:23	142:14	128:11
19:11 71:2	subset 17:19	135:16	19:1 22:10	146:18	130:9,16
119:7	substrate	146:7	26:21 27:16	take 10:23	131:21,23
studies 4:13	28:6 33:5	147:12	27:19,24	23:20 32:13	131:24
6:6 7:17,23	37:18 38:2	supporting	28:4,12,16	41:13 55:6	133:10
19:15,23	69:17	91:23	34:15 35:6	57:18 58:24	134:7 136:7
20:2 44:17	112:17	123:15	36:3 42:9	64:4,20	140:2
44:20 66:13	substrates	sure 11:17	42:16 44:13	93:6 104:6	147:18
66:17,21,21	33:2,2	27:9 79:8	50:16 53:4	107:9	148:2
66:22 67:9	37:23 38:7	94:14	54:16 55:7	128:11	talks 55:1
67:14 68:3	38:9,14	103:17	58:23 59:20	taken 1:10	94:23
68:10,14	39:1,8	106:21	61:17,20	57:20	TANNER
70:15 79:11	40:15	110:12,23	62:9 70:16	104:10	2:2
79:14,16	123:11	111:11	72:2 81:23	151:10	TARP 82:24
80:18 81:9	success 59:13	115:21	83:4 85:17	taking 22:5	92:21
92:24 93:7	successfully	117:13	85:22 87:1	23:22 63:11	tasks 48:17
96:12	60:11 86:10	119:19	87:15,18,19	talk 145:7	team 94:11
105:19,23	sucker 27:13	132:20	93:1 99:16	talked 12:10	Tech 140:1
106:7 131:2	27:14 41:17	133:1	100:8	16:18 43:17	technically
study 5:15,22	41:22 42:10	143:20	107:22	62:16 82:2	33:5 37:22
8:11 19:8	suckers	144:11	111:19	85:20	techniques
21:11 22:6	27:12,15	surface 6:9	112:1	107:20	6:24
22:24 23:7	35:11 42:6	37:17 40:1	124:14,15	108:14	tee 87:18
25:13,15,16	42:8,9	100:7	125:4,7,14	109:13	tell 13:12
25:20 61:8	sudden 64:8	137:24	129:22	110:19	25:16 31:2
71:4 80:1,2	sufficient	surprised	130:8	134:18	temperature
80:6,12,21	53:20 69:8	120:12	131:17	149:23	5:19 89:3
113:8	70:13 146:7	survey 11:4	135:3,15,19	talking 11:18	89:12,17
117:20	suffocate	98:18	136:18,19	11:19 12:13	temperatur...
118:12	58:20	surveys	137:5,10,11	12:14,19,23	52:7
studying 4:7	suitability	44:17,21	systems 7:22	15:17,18	temporarily
stuff 62:15	48:19	Susan 2:15	21:20 22:13	17:21 19:12	83:23
83:23	suitable	113:17	59:8,21	19:20 22:17	ten 9:7 83:7
stumped 7:8	69:16,21	suspension	77:14 85:12	22:20 24:15	85:7 150:5
subcommit...	suite 2:14	81:20	111:20	29:2,6 33:3	tend 14:6
46:17	32:19	swim 114:21	113:23	33:4 38:4,7	15:21 16:7
subfishable	SULSKI	swimmable	131:4,23	41:19 49:9	106:23
136:20	2:10 36:21	136:20	137:4	55:7 56:1	tens 22:17
subfishable...	143:13,17	swimming		59:9 68:20	130:17
137:13	summarize	64:13	T	72:23 74:9	131:24
subject 6:7	140:15	SWiMS 6:11	table 86:22	78:2,3 79:9	ten-minute
10:7 30:7	summarized	switch 32:14	87:3	87:16 93:2	57:19
43:18 55:14	80:24	sworn 3:7,9	tag 131:6	93:3,3	term 14:10
57:14 79:20	summarizing	3:10	tag-teaming	96:20 97:21	26:16 50:10
submittals	24:7	synergistic...	135:24	100:21	83:9 94:20
67:3	summer	61:21	tail 32:22	102:4,7	terms 11:9
Subpart 56:5	64:19	system 1:4	62:14 63:1	108:4	13:24 14:6
subparts	supervised	10:23 11:13	75:19 76:3	109:15	18:11 33:24

51:17 63:16	47:2 63:10	122:22	124:6	13:24 41:14	145:5
82:15 83:5	75:1 94:16	124:16	125:17	43:23 44:2	149:20
102:7 103:7	97:24	125:8 128:7	126:22	85:17,21	150:3,8
testified	101:12	129:11	128:15,17	99:14	title 48:22
13:14 18:16	102:2	144:7	130:16	113:20	49:10,10
27:9 69:13	126:18	think 10:1,16	135:6,21	115:11,20	today 55:5
80:14 108:8	150:7	11:2 13:19	136:23	118:8 119:7	102:24
132:8	Thanks	14:9 15:9	139:3,8	130:22	117:8
testifies	56:11 94:5	16:21 17:5	143:2,10,22	131:12	together
94:15	their 14:11	19:9,15	145:1 146:2	146:4	45:10 61:21
testify 20:20	17:12,17	20:20 23:1	149:22,23	throughout	told 142:24
20:23 21:14	28:4 35:18	23:9 25:14	thinking	7:12 12:2	tolerance
48:16 90:15	37:1 39:11	25:23 27:1	21:24	36:2 54:5	125:24,24
132:4 146:4	41:3 57:10	28:5 30:4	144:24	109:2	126:5
146:14	65:14,14	32:16 34:12	third 76:8,10	throwing	tolerant 26:9
testifying	83:8 89:17	35:21 38:16	140:13	39:3	35:1 41:21
22:8 90:16	95:8 134:17	41:24 42:24	Thirty 81:15	tie 62:22	42:1 50:19
102:24	139:16	45:22 48:3	Thirty-five	tighter	51:20 70:7
testimony 3:4	141:24	49:13 50:14	86:15	139:19	126:8,9
3:13,14	themselves	51:10 54:21	Thirty-nine	time 4:14	129:4,4
6:17 10:2,9	11:13 52:2	55:11,19	92:6	5:11 29:1	135:17,18
18:7 20:8	145:20	56:7 58:6	Thomas 2:3	43:12 49:9	tomorrow
21:12 24:3	thermal 5:23	62:11 63:15	128:6	66:4 69:12	29:4 143:8
25:7 26:3	8:8 51:2,5	65:6 66:7	though 77:5	74:9 104:22	150:2,10
29:20 39:16	52:4 90:3	67:21 69:11	thought	105:2,9	ton 84:21
43:21 48:17	thigh 62:20	72:13 73:11	16:17 22:4	130:1	tonight
48:22 50:11	thing 28:9,10	74:10 75:3	22:19 37:21	139:21	150:10
51:3 53:18	67:17 80:9	75:5 77:4	45:1 51:12	141:2	tool 120:20
55:5 56:15	99:20	77:10 78:1	72:9 110:17	142:10	top 37:4 74:5
57:6 58:4,7	103:23	82:21,22	127:24	144:8	80:17 83:20
58:9 66:15	106:15	83:6 84:4	150:1	150:12	138:3
66:17 67:5	107:1	85:23 88:11	thousands	times 20:9	144:20
67:14 68:18	120:13	90:12,13	67:21	105:9	145:2
69:3 79:13	122:22	92:23 93:9	threatened	117:20	topic 29:1,6
79:18,22,23	123:11	93:20 94:18	7:24	Tipsord 1:9	topics 6:21
80:19 83:16	things 4:19	95:1 102:18	three 9:2	2:2 3:1,11	topo 76:16
86:3 94:20	19:2 20:12	102:23	23:5 55:12	9:17 28:22	totally 27:2
98:3 100:18	21:1 27:7	103:3,6,16	55:17,19	39:15 53:14	towards 42:5
104:17	28:15 34:4	104:1,15	65:20 74:10	55:23 57:17	128:8
105:23	34:7 35:14	105:1 106:4	76:9 88:17	57:21 63:7	town 131:9
128:5	35:18,24	106:19,22	88:18,24	97:6 100:16	towns 16:5
133:23	39:9 40:13	106:24	89:1 90:11	100:20	toxic 82:21
134:19	43:13 52:21	107:2,24	91:17 93:16	101:1,4,8	track 125:17
136:23	59:17 61:20	109:9 110:6	106:4	101:12	traffic 10:19
145:14	65:10 66:11	111:8	110:20	104:6	12:11 34:14
Texas 131:14	71:19 74:10	112:10,11	125:18	114:16	67:9 90:16
131:15	76:9 82:21	112:20	140:2,16	123:19	90:17,24
thank 3:11	87:11,14,15	114:8 119:1	three-mile	126:20	91:5,15,16
16:14 25:10	87:20	120:4,7,22	88:22	132:11	91:18,24
26:4 28:21	106:23	123:14	through	143:15	train 110:17

transcript	55:1,17,21	107:23	79:3 82:12	90:17,20,21	variety 26:12
56:3 151:10	62:18 70:12	118:8 132:4	86:12,13,16	90:23 91:1	33:14 34:16
transition	82:19 85:1	133:13,22	88:19 90:6	91:2,19,20	39:9 47:19
75:19	90:11,11,12	understan...	90:9 92:7	91:23 94:19	103:24
transparent	96:13 98:11	49:16 90:19	97:8 107:15	95:15	111:24
81:9	113:3 117:6	90:22 91:18	108:10,15	107:24	various 6:21
travel 33:3	139:13	118:1,6	108:16,17	113:1,7,19	18:11,19
tributaries	140:3,19	120:3	108:18	114:7 115:6	20:4 43:20
88:15	141:10	137:20	109:20	115:16	44:4,7,17
tributary	143:20	unfortunat...	110:13	118:11	44:23 48:14
142:15	type 116:3	99:19 117:4	111:6	119:13,14	54:15 79:14
trophic 26:11	types 112:20	unique 10:12	112:21	125:20,21	86:12 92:24
troubling	typically	unless 34:9	125:19,20	125:23	103:21
135:7	53:7 92:14	107:18	126:24	126:10	vary 139:5
true 69:18		119:2	129:1	134:4	vegetation
96:17	U	128:22	132:18,20	135:19	99:10
114:17	UA 43:6,23	143:9	132:20	136:16	velocity 19:3
120:6 151:9	91:8	149:15	133:4,6	141:2,8	75:20 82:4
try 7:10	UAA 10:5	unprevent...	135:10	149:2,4	verified 5:8
52:13 59:6	43:14,20	92:8 98:5,7	141:18	used 4:15	verse 117:6
81:8 94:22	44:4,6,23	98:12,15	143:24	11:6 26:18	version 141:1
114:20	45:8,13,20	99:18	146:6,21	86:3 88:11	141:8
119:24	47:11 48:4	103:16	147:2,4,13	107:10	versus 19:22
133:17	48:6,10,11	unrelated	148:6,11,13	112:14	38:12 64:2
139:3,8	48:21 53:19	51:2 112:18	148:19,22	144:12	133:11
trying 13:19	53:24 55:16	until 104:8	149:4	useful 46:7	very 7:11
14:5 25:4	55:21 56:1	unusual	upstream	uses 13:23	12:10 17:19
29:16 72:13	56:4 69:8	123:13	13:2 30:2	43:8 53:22	19:9 32:20
113:21	91:16 92:4	upgrade	72:21 75:9	88:18,24	38:2,17
125:2 132:3	103:5,8	88:11	77:22	112:20	41:20 56:2
144:24	114:14,17	upper 8:6	116:11,15	using 21:22	60:17 61:18
tumors 35:24	114:20,22	10:13 13:2	116:19	36:24 105:6	67:19 71:23
turbid	115:1 116:3	13:5,21	urban 34:14	118:19	72:18 78:6
123:15	118:20	14:10 15:3	95:24 96:7	140:24	92:14 96:3
turned 79:4,9	119:2,12	15:4,6,11	96:22 100:5	142:9 147:1	99:19 100:6
Tuscarawas	142:19	16:1 18:4	104:2	utilize 17:16	109:14,14
88:13	144:18	19:16 22:15	urbanization	utilized	116:12
TWAIT 2:11	145:3	23:12,16	104:2	19:22	118:9
Twenty	UAAs 47:4,7	30:18 31:4	urbanized	U.S 25:20	120:11
65:20 66:13	47:10,16,19	31:5,8,12	92:11,13	44:8 53:18	122:11
Twenty-eig...	48:2	32:3,14	96:14	54:7 56:16	123:14
78:23	ultimately	33:9,17,22	use 9:23 10:7	105:20	124:8,9
Twenty-nine	74:13,13	35:14,19	10:24 14:6	115:17	132:22
79:11	unable 114:6	36:4,6	14:9 31:9		133:2 140:9
Twenty-se...	under 53:18	39:14 47:14	31:12 38:18	V	viable 86:2,4
78:11	55:12,16,21	48:20 49:1	40:12 48:23	values 111:5	Vick 25:22
two 13:1,23	92:4 104:1	49:7 50:3	50:10 54:23	138:22	Virginia
14:6 19:2	149:2	54:2 73:6	62:6,8	141:23	47:20
19:20 26:23	understand	73:24 76:20	86:18,18	variable	visited 90:6,9
47:16 54:24	13:7,20	77:19 78:20	89:4,18	65:12	volume 66:7

82:19,23	31:11 86:17	75:9,14,19	118:2,19	46:1,20	46:16,16,17
93:8	86:18 87:1	76:3 77:7	120:8 127:4	48:8 49:4	48:3,6,13
VonDruska	87:3,17	81:17 85:10	142:15	50:12 52:24	67:14,15
3:7 5:2 45:5	88:1,21	85:11 86:5	waterway	55:1 57:1	68:3,7
62:11,12	89:4,4,10	86:7,17,18	1:4 44:18	58:21 60:5	72:13 78:11
64:9 94:6	89:10	87:1,3,14	44:21 59:1	62:8,18	78:14 81:11
117:4	149:14	87:17 88:1	59:5 66:3,4	63:14 66:2	87:3 94:3
142:23	wash 84:2	88:20,22,23	68:3 72:18	67:13 68:19	96:20 99:12
	washed	89:4,4,10	91:19 92:18	73:15 75:11	100:21
W	100:8,14	89:10 91:22	93:7 100:9	77:3 79:2	102:4 106:9
Wabash	wasn't 18:18	92:12 95:11	100:15	79:19 84:24	106:9,12
59:11 62:3	49:9 94:10	96:1,15,22	102:9,12	86:20 87:9	108:4
62:6 64:16	137:1	101:24	103:8	89:7 92:10	109:10
121:13	watch 5:5	102:17	waterways	93:20 98:14	111:5 113:6
122:15,16	water 1:3,4	103:1,11	6:7 10:7	99:23	113:19
Wait 118:17	6:9 10:14	108:22	55:14 67:10	100:11,23	114:18
wakes 65:22	10:15,21	112:16,19	91:22 92:21	103:20	132:9
walked 99:3	15:21,22,23	112:24	120:16	104:23	136:16,17
walleye	16:2 19:1,3	113:1,6,24	waved	107:17	137:10
27:24 28:3	19:4 23:17	114:1,7,7	113:11	109:12	138:11,12
28:11,18	23:24 26:14	115:10,21	waves 65:22	111:12	140:6 141:7
60:15,16	31:11,22	116:1,24	66:6 84:2	113:2	142:13,24
wand 113:12	32:21,22	117:20	way 3:9 8:17	121:21	143:17
wander	33:18 34:5	118:3,15	13:7 15:10	122:7 125:3	146:15,16
122:11,12	37:9,12	119:3	21:22 57:11	125:15	weren't 46:5
want 11:16	38:10,22	120:10,17	75:15 83:13	126:6	83:14
13:11 17:8	39:1,7 40:8	120:19,21	100:9,14	127:21	109:10
23:20 30:23	40:15 41:6	121:22	102:18	128:24	western 8:1
31:2 38:14	41:8 44:24	123:10	107:8	130:11	we'll 3:12,14
47:8 61:8	45:1,23,24	127:5,17,17	122:23	132:13,18	3:17 53:13
61:12 74:14	46:1,11	128:14	128:9	132:19,24	94:13,14
77:23 78:2	49:18,21	130:21	133:18	133:9,17,21	101:6 104:8
81:4 111:24	50:1,4	133:15	ways 6:3	134:4	we're 3:3
112:6	53:20,21	135:20	weak 128:18	147:14	13:19 15:17
115:14	54:22 55:1	138:3 146:7	weakest	148:3	15:18 21:7
124:16	55:3,4,4,6,9	146:18	128:18,22	Wellman	23:8,10
129:2,3,5	55:10,12,14	147:9	128:23	47:12	24:7,9 29:2
133:13	55:18 57:3	149:14,14	wear 7:4	well-defined	29:3,6,15
135:16	57:7 58:13	waterfront	weeks 83:12	77:13	36:9,24
143:7	58:22 59:13	107:10,11	weight 52:14	went 5:10	38:4 56:2
wanted 13:17	59:14,16	waters 3:24	Welcome 3:2	19:7 20:17	63:11 70:23
22:23 37:16	60:20 61:2	8:14 17:10	well 8:16	44:2 80:9	75:3,5
62:11	61:4,18,24	17:11,14	12:8,24	113:8	97:21 102:7
138:19	62:14,20	32:1 46:17	15:8 18:8	139:20	113:21
147:23	63:2 64:3	47:5 51:2	20:9,10,23	were 6:7 9:11	115:15,19
wanting	65:22,23,24	58:16 62:6	21:1,17	9:14 22:5,8	120:15
36:10	66:8,11	65:21 67:11	22:9 24:20	22:19 43:23	124:9
wants 21:18	67:23 69:19	67:12 81:24	26:8,23	43:24 45:8	126:22
131:5	70:19,19,22	82:1,10,10	34:18 39:18	45:15,23,24	130:16
warm 26:14	71:13 74:14	87:22 88:3	40:22 43:9	46:2,11,15	131:21

133:10	117:17,24	130:20	18:17 20:8	15 18:19	58:15 62:19
134:7 136:6	118:13,21	143:12	141:4	62:19	85:7 93:12
140:1	119:1,13,18	worked 7:20	younger 4:15	122:20	122:16
144:11,23	119:24	9:4 59:8,11		148:14	123:2
144:24	120:7,22	88:15 123:4	Z	160 1:12	2003 66:23
148:2,3	127:19	working 66:2	zero 136:8	169 138:11	78:12,15
we've 7:1	132:3,22	66:3 93:13	zone 40:16	17 53:17	79:9 81:3,5
18:11 19:2	133:3,13,21	worse 63:24	zones 92:14	17E 56:12	105:5,10,14
19:3,3,23	134:2 135:6	wouldn't	128:11	17.3 61:19	110:7,21
20:22 21:8	135:22	30:23 64:17	\$	18 57:18,22	142:21
36:15 41:18	136:4 143:7	70:6 77:4	\$240 131:8	122:20	145:7,10
44:9,19,20	Wilmington	107:6		19 58:15	2007 9:16
44:21 51:19	72:7 74:20	117:22	0	100:22	25:22,23
52:11 55:24	116:11	121:8	084-003592	101:5	45:16,21
59:8 62:15	wind 3:7	wound 56:8	151:16	19276 2:8	2008 25:24
62:19,23	winter 64:16	Wozniak		1982 4:10	45:17 66:24
66:3,6,19	wiped 64:23	6:17 57:2	1	1985 4:21	79:1,3,10
85:20 93:1	65:8	62:17	1 3:23 10:1	1989 149:8	79:20 98:21
93:13 94:18	Wisconsin	wrong 143:9	24:3 43:23	1990 5:3	105:5,11,14
105:1 128:4	106:3	wrote 115:5	67:6 101:24	80:13	110:7,21
149:23	wise 29:2		10 2:13 18:19	1990s 5:10	148:13
whatsoever	witness 12:6	X	43:4 74:6	1993 138:10	2009 1:14
105:13	20:20 94:2	X 23:8,10	74:23,24	139:13	150:14
wheel 47:8	96:6 98:10		148:3,16	141:7,9,19	21 63:8
48:3,7	119:20	Y	149:1	141:24	217)782-55...
while 67:23	127:11	yeah 36:23	150:14	1993-1994	2:9
106:5	witnessed	38:13 42:11	100 26:1 29:8	142:18	22 58:9 63:5
white 27:13	98:17	42:20 98:15	65:7 99:14	1994 138:10	63:8
41:17 138:3	witnesses	128:6	107:5 108:8	140:2	24 29:13
whole 19:17	3:10 18:15	year 8:5	108:23	141:23	39:20
39:9 64:22	wondered	25:24 36:18	150:2	142:2,5,7	25 66:18
66:10 126:2	99:2	64:22,22,23	101 30:14	1999 9:7	68:16
147:21	wonderful	98:19	1021 2:7		26 69:1
wide 99:15	71:15	117:16	11 47:2	2	27 4:13 75:3
widely 60:19	woods 47:21	years 4:13	12 48:16	2 8:13 10:9	75:5 141:11
widely-acc...	word 95:15	6:13 7:16	69:12 86:3	18:7 29:8,9	282.5 101:3
59:23	125:23	9:7 11:1	106:2	29:9,16,16	284.4 39:20
wide-spread	127:8,13	19:19,24	148:14	29:19,19	29 140:12
105:21	words 23:6	66:19 72:14	12:30 1:14	45:16 46:18	
WILLIAMS	57:10 70:3	83:8,13	12:44 3:1	47:3 48:16	3
2:9 51:13	80:7 86:9	85:7 93:1	125.71(C)	48:22 50:10	3 56:14 91:8
76:7,12,19	106:10	93:13 107:5	26:18	51:3 53:17	3,000 19:19
77:18 78:1	work 4:16	110:6	13 49:13 76:5	58:3,4,11	30 19:18 23:9
78:9 89:2,8	5:13 6:14	140:15	108:19,19	58:11	78:15
101:13,17	6:20 8:5 9:8	yesterday	131.10 56:5	101:24	143:13
101:20	19:12,13	9:18	14 49:15	106:2	30s 140:17
112:10	23:1 24:10	Yoder 27:10	108:17,19	2B 39:19	301 1:6
113:17	25:23 43:10	35:21 44:23	14-mile	98:22,23	302 1:6
114:3,5,10	45:14 61:7	75:22	132:14	100:17	303 1:6
117:10,14	81:5 103:5	Yoder's 17:1		20 19:18	303(b) 120:9

303(d)	142:1,8	30:20 31:16	79 140:22		
117:15	43 95:22	109:11,23			
119:8,17	44 95:22	142:3	<hr/> 8 <hr/>		
304 1:6	139:15	56 110:3	8 26:6 138:10		
305(b)	45 95:23 96:5	140:9,14	146:4,14		
117:15	140:8	142:8	148:14		
119:17	149:13	57.5 139:18	80s 80:15,16		
31 82:8	45-point	58 126:22	82.5 98:22		
31.5 139:18	149:2	59 138:9			
312)251-55...	46 97:20		<hr/> 9 <hr/>		
2:15	104:19	<hr/> 6 <hr/>	9 31:23 146:4		
316A 103:12	140:14	6 10:8 13:15	9th 1:13		
316B 103:12	47 104:5,12	58:8 92:4	9:00 150:10		
32 86:1 140:8	48 104:12	105:18	150:15		
143:23	141:21	60 138:9	90 74:17		
144:22	142:5	142:13	90s 5:14,21		
33 86:1	49 104:12	146:12,15	93 66:23 74:8		
140:14	139:20	146:16,19	74:18 108:9		
34 78:17 86:2	141:11	60603 2:14	108:14,20		
35 1:5 90:13	142:7	62 146:1	110:6,21		
139:20		62794-9276	140:10,11		
35.5 141:14	<hr/> 5 <hr/>	2:8	140:19		
141:15	5 9:20 24:3	63 146:8,10	143:21		
36 90:14	43:23 58:8	64 146:14	144:8,13,16		
143:1,10	74:16,16	65 140:21	94 66:23		
3600 2:14	79:12 98:2	146:2,3	110:7,21		
366 3:15,16	109:2,10,12	147:10	140:10		
145:14,15	109:21	66 141:12	141:9		
37 90:14	110:4	146:20	143:21		
140:22	5:00 104:9	67 148:5	144:8,13,16		
38 90:14	150:5	68 141:22	95 135:5		
39 142:6	50 73:1 99:9	142:1,6			
39.5 141:22	99:13	148:6,9			
	104:13	69 142:4			
<hr/> 4 <hr/>	105:18	148:24			
4 66:14 68:18	140:21	69.5 141:20			
69:2 90:15	142:10,12				
94:20	147:16	<hr/> 7 <hr/>			
148:13	148:1	7 18:2 39:17			
40 26:18 56:5	50s 140:18	39:18			
73:1 93:15	51 108:7	107:14			
141:20	140:22	70 78:13,18			
142:4,5	141:24	79:5,10			
40s 138:13	52 107:13	105:8			
140:17	53 109:1	125:14			
41 69:10,12	141:20	149:17,19			
94:18	53.5 140:12	149:22			
140:12	54 109:1	71 149:18,21			
42 94:19	140:20	149:22			
139:17	55 29:23	72 149:23			