

**SEWRPC Community Assistance Planning Report No. 316**

**A RESTORATION PLAN FOR THE ROOT RIVER WATERSHED**

**Appendix G**

**SUMMARY OF THE JUNE 13, 2013  
MEETING BETWEEN THE WISCONSIN DEPARTMENT  
OF NATURAL RESOURCES AND SEWRPC STAFFS  
RELATING TO FISH PASSAGE IN STREAMS AND  
RIVERS TRIBUTARY TO LAKE MICHIGAN**

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# **SUMMARY OF THE JUNE 13, 2013, WISCONSIN DEPARTMENT OF NATURAL RESOURCES/SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION STAFF MEETING TO DISCUSS ISSUES RELATED TO FISH PASSAGE IN STREAMS AND RIVERS TRIBUTARY TO LAKE MICHIGAN**

## **INTRODUCTION**

The meeting was held at the request of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff with the intent of gaining a better understanding of Wisconsin Department of Natural Resources (WDNR) criteria for assessing a dam's significance as a barrier to passage of fish and invasive species and to discuss associated issues specifically related to the Horlick dam on the Root River in the City of Racine. The Horlick dam, which is owned by Racine County, is of particular interest because SEWRPC is preparing a restoration plan for the Root River watershed that will address the status of the Horlick dam as it relates to retaining and upgrading or removing the existing dam. The meeting agenda is attached as Exhibit A. Those in attendance at the meeting are listed in Exhibit B.

## **BRIEF OVERVIEW OF ONGOING ROOT RIVER WATERSHED RESTORATION PLANNING PROCESS**

Michael Luba, WDNR Natural Resources Basin Supervisor, opened the discussion by noting that SEWRPC is preparing the Root River watershed restoration plan (WRP), and that plan will address alternatives for the Horlick dam, which is owned by Racine County. Michael Hahn, SEWRPC Chief Environmental Engineer, said that the Root River WRP is a second level plan that builds on the 2007 SEWRPC regional water quality management plan update for the greater Milwaukee watersheds, and focuses on more-specific issues, including the Horlick dam. He added that the focus areas of the WRP are:

- Water quality,
- Habitat,
- Recreational use, and
- Flooding (in Racine County only).

Mr. Hahn said that the SEWRPC staff had developed several conceptual alternatives related to the dam, and that these would be presented to the study Advisory Group in early August 2013 and to the Root River Restoration Planning stakeholder group and other interested parties in late August. He added that the examination of alternatives related to the dam is being conducted at the request of Racine County.

## **ISSUES RELATED TO HORLICK DAM**

Laura Kletti, SEWRPC Principal Engineer, began the discussion of Horlick dam, noting that a dam break analysis submitted by Racine County was under review by WDNR and that it was likely, but not yet certain, that the dam would be placed in the "significant hazard" category. She said that a significant hazard dam would be required to safely pass the 500-year recurrence interval flood, but that her preliminary calculations indicated that the current spillway capacity was equal to about the peak 10-year flood flow. PowerPoint slides reviewed by Ms. Kletti during this meeting are attached as Exhibit C.

Tanya Lourigan, WDNR Water Management Engineer, added that a significant hazard rating meant that failure of the dam could result in damage to structures downstream of the dam, but the maximum rise in the downstream flood stage resulting from failure would be less than two feet. She also said that generally, in a case where a dam

is identified as having inadequate spillway capacity, the owner must increase that capacity within ten years, but that time frame could be shorter if WDNR determines that the condition of the dam justifies a quicker upgrade.

Mr. Hahn said that one challenge faced by the SEWRPC staff was providing Racine County with a sense of the extent of possible modifications to the dam while the WDNR review of the dam failure analysis, and determination of the adequacy of the spillway, has not yet been completed.

Ms. Kletti indicated that, during a 500-year event under current conditions, it would be expected that the tailwater elevation at the dam would be about at the elevation of the spillway crest. Brad Eggold, WDNR Natural Resources Region Team Supervisor, asked if photographs of the 2008 flood were available. Ms. Kletti said it is difficult to discern the tailwater elevation from the photos of that flood, and therefore, hard to determine whether the dam presented a barrier to fish passage under those conditions. Mr. Hahn said that preliminary analyses indicate that during very large floods the dam may not be a barrier, and that during the meeting the SEWRPC staff hoped to get clarification from WDNR on what criteria would be applied in determining whether or not a dam presents a barrier to fish passage.

Ms. Kletti said that field investigation by the SEWRPC staff indicated the existence of an apparent hard “shelf” at about elevation 620 feet above National Geodetic Vertical Datum, 1929 adjustment (NGVD 29) that extends from the upstream side of the dam to a location about 1,000 feet upstream. She noted that about four to five feet of sediment have collected in the impoundment above the top of the shelf. In response to a question from Mr. Hahn, Ms. Kletti indicated that, if the dam were removed, the shelf itself could represent somewhat of a barrier to fish passage. Craig Helker, WDNR Water Resources Management Specialist, said that test data for the sediment in the impoundment indicate slightly elevated levels of polycyclic aromatic hydrocarbons (PAHs). Ms. Kletti mentioned that the sediment sampling depths may not be deep enough to fully characterize the sediment quality, and that this needed more examination.

[Secretary’s Note: The spillway crest is at about elevation 630.0 feet above NGVD 29, or roughly 10 feet above the top of the apparent shelf.]

[Secretary’s Note: In a July 30, 2013, electronic mail message to Mr. Hahn, Mr. Helker indicated that he did not see risk to aquatic organisms since the slightly elevated PAH levels are still quite low.]

Ms. Kletti then proceeded with review of the conceptual alternatives set forth in Exhibit C. She said that the dam would have adequate hydraulic capacity to pass the 500-year flood if the entire spillway crest were lowered by about four feet, and that with such a configuration a preliminary estimate indicates that, for floods greater than a 10-year event, the tailwater elevation would be above the elevation of the lowered spillway crest.

[Secretary’s Note: The implication of that observation is that, with that degree of spillway crest lowering, fish passage might be possible during floods greater than a 10-year event.]

Ms. Lourigan noted that, if the spillway crest were lowered as called for under this alternative, the dam hazard rating might be reduced to low hazard because, if the dam were to fail, the smaller hydraulic head would result in a lower flood wave that would propagate downstream.

[Secretary’s Note: Under such a situation, it might be necessary for the designer of possible spillway modifications to perform several iterations to determine the spillway crest elevation that would both adequately pass the 100-year flood and result in a low hazard rating if the dam were to fail.]

Ms. Kletti described a second conceptual alternative under which the dam would be modified to enable fish passage by lengthening the existing, non-functioning fishway.

[Secretary's Note: This alternative was presented to highlight a possible means of enabling fish passage without removal of all, or a portion, of the dam. It does not directly address other modifications that might be needed to provide the necessary spillway capacity.]

Thomas Slawski, SEWRPC Principal Planner, noted that the need to extend a fishway further into the River arose because the land area on the east bank (left, looking downstream) upstream of the dam is a capped landfill that cannot be disturbed. In reply to a question from Ms. Lourigan, Dr. Slawski said that this alternative shows a passive fishway design.

The next conceptual alternative reviewed by Ms. Kletti calls for a complete notch of the spillway down to the current riverbed with the right (west) abutment left in place to possibly provide support for the riverbank and the adjacent hotel.

Finally, Ms. Kletti, described a conceptual alternative calling for complete removal of the dam, except for relatively small portions of the left and right abutments. With regard to the apparent shelf or ledge in the streambed, Dr. Slawski said that the dam had failed and been rebuilt just downstream several times and the observed ledge may be part of an older dam.

## **FISH PASSAGE ISSUES**

Mr. Hahn then initiated the discussion of fish passage issues, asking the WDNR staff if there was a draft set of guidelines/criteria for evaluating the significance of a dam as a barrier to fish passage and also considering aquatic invasive species (AIS) and viral hemorrhagic septicemia (VHS). Robert Wakeman, WDNR Statewide Aquatic Invasive Species Coordinator, said that development of a WDNR policy on fish passage issues was underway. He noted that what began as a summary of WDNR's legal authority in that area had evolved to the point at which WDNR is now preparing a formal guidance document. There followed a wide-ranging discussion among those in attendance regarding the following issues:

- Identification of "pinch points" which are considered to be complete barriers to passage of aquatic organisms from downstream to upstream;
- Identification of AIS of concern;
- Preliminary identification by WDNR of pertinent criteria under which fish passage possibilities could be evaluated;
- The significance of VHS;
- Examples of how fish passage issues have been addressed by WDNR at other dams;
- The relationship between a dam that poses a threat to public health and safety and the WDNR's ability to maintain barriers to passage of fish, AIS, and VHS;
- The schedule for WDNR review of the Horlick dam failure analysis;
- Whether the WDNR Root River Steelhead Facility is a barrier to passive fish passage;
- The significance of sea lamprey for the Root River; and
- The future significance of the Lake Michigan sport fishery.

The discussion of each of those subtopics is summarized below. During the discussion, WDNR staff made it clear that any comments related to the proposed fish passage guidance and possible guidance content is currently preliminary and definitely subject to change since any guidance must go through a public review process prior to be finalized. Mr. Wakeman said that the public review process was tentatively scheduled to start around October 1, 2013. Mr. Hahn said that he would like to append the summary notes from the meeting to the Root River watershed restoration plan report, and he asked the WDNR whether that would be acceptable to them. Mr. Wakeman indicated that it would, saying that there was no information being discussed that would be considered “earth shaking.”

### **Identification of “Pinch Points”**

Mr. Wakeman characterized “pinch points” as complete barriers to passage of aquatic organisms from downstream to upstream. He noted that the U.S. Army Corps of Engineers Great Lakes and Mississippi River Interbasin Study establishes whether a hydraulic structure functions as a barrier to fish passage by evaluating the structure during a 100-year recurrence interval (one-percent-annual-probability) flood. He said that he had the impression that Horlick dam is not a complete barrier to fish passage.

### **Identification of AIS of Concern**

Mr. Wakeman said that the U.S. Army Corps of Engineers, Chicago District, AIS interbasin transfer evaluation identified eight possible connections between the Lake Michigan and Mississippi River Basins, including one low-potential site along Jerome Creek in the Village of Pleasant Prairie. He noted that, while interbasin transfer is not an issue related to the Horlick dam, the Corps report would be a useful reference regarding AIS of potential concern.

[Secretary’s Note: Mr. Wakeman distributed copies of the following paper at the meeting:

- Francis M Veraldi, Kelly Baerwaldt, Brook Herman, Shawna Herleth-King, Matthew Sanks, Len Kring, and Andrew Hannes (2011): Non-Native Species of Concern and Dispersal Risk for the Great Lakes and Mississippi River Interbasin Study, U.S. Army Corps of Engineers.]

### **Preliminary Identification by WDNR of Pertinent Criteria under Which Fish Passage Possibilities Could be Evaluated for a Dam that is Not Considered to be a Barrier**

Mr. Wakeman cited the following evaluation sequence that would likely be applied to each AIS:

- Make a determination if each individual AIS of concern can:
  - Reach Horlick dam,
  - Become established,
  - Pass over the dam,
  - Become established upstream of the dam, and
  - Assign a high, medium, or low risk to the specific AIS for each of the four preceding criteria.

Mr. Wakeman said that, following this evaluation sequence, WDNR would make its decision by applying a public interest test, considering ecological, economic, aesthetic, and recreational values.

Mr. Wakeman indicated that the outcome of passing native species from the downstream side of a dam to the upstream side would also be evaluated, and he noted that it could be possible that the upstream habitat and water quality would be favorable for native species, but not for AIS. He also said that WDNR supports connecting fish populations.

Mr. Eggold offered the opinion that Chinook salmon might be able to “power through” the approximately two-foot difference between the tailwater at the Horlick dam during a 100-year flood and the spillway crest.

### **The Significance of VHS**

Mr. Wakeman stated that VHS is a major issue in Wisconsin, and that if it was found downstream, but not upstream, of a dam, no passive fish passage would be allowed. Dr. Slawski asked if the fact that the Horlick dam was designed for fish passage (as evidenced by the remains of the former fishway) would affect WDNR’s decision on allowing fish passage from downstream to upstream of the dam. Ms. Lourigan replied that there was no evidence that the fishway was functional for fish passage in the past, and Mr. Wakeman added that the WDNR interest is in keeping VHS from spreading upstream from Lake Michigan.

There was also discussion of active fish passage as it relates to VHS. Mr. Wakeman said that active fish passage can only be allowed if a fish health certificate is obtained from the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP). He noted that WDNR is reevaluating whether this procedure is necessary and will discuss that with DATCP. Lloyd Eagan, WDNR Natural Resources Manager, said that an examination by a veterinarian is required for a fish health certificate to be obtained for stocked fish. Susan Beyler, WDNR Natural Resources Region Team Supervisor, described the procedure as it relates to stocked fish. She said that stocked fish must be isolated, and a veterinarian would take from 50 to 100 individual samples and test for VHS cell lines. She said that procedure takes 30 days, during which time the fish must remain isolated. She noted that WDNR staff has not found VHS except in Lake Michigan and Lake Winnebago.

### **Examples of How Fish Passage Issues Have Been Addressed by WDNR at Other Dams**

In response to a question from Mr. Hahn regarding where active fish passage was being considered, Mr. Wakeman mentioned a trap and sort operation is being considered at Prairie du Sac dam on the Wisconsin River and Mr. Eggold mentioned that active passage of sturgeon is being considered on the Menominee River.

### **The Relationship between a Dam that Poses a Threat to Public Health and Safety and the WDNR’s Ability to Maintain Barriers to Passage of Fish, AIS, and VHS**

Mr. Wakeman said that, when WDNR is considering proposed actions related to dams, public safety is the primary concern. Ms. Eagan asked whether WDNR can stop abandonment in the situation of a dam that is considered to be a pinch point and where there is no identified threat to public safety, but the dam owner no longer wishes to own, operate, and maintain the dam, so the owner makes a request to WDNR for abandonment. Ms. Lourigan replied that, based on case law, WDNR could not stop such an abandonment. Mr. Wakeman agreed, but he said that WDNR could seek a new owner. Dr. Boxhorn said it appeared that it is easier to abandon a dam than to establish fish passage, and Mr. Wakeman agreed. Ms. Lourigan confirmed that public health and safety considerations related to dams would trump fishery issues. She also noted that, if Horlick dam were to be left in place, modifications should be made to the stop log gate to enable drawdown of the impoundment.

### **Schedule for WDNR Review of the Horlick Dam Failure Analysis**

Ms. Lourigan said that WDNR review of the dam failure analysis submitted by Racine County and a WDNR decision on the dam hazard rating could take six more months, and she said she would contact Konstantin Margovsky, WDNR Water Regulation and Zoning Engineer, to verify the status of the review. Ms. Kletti inquired whether it would be appropriate for the SEWRPC staff to discuss preliminary indications regarding the dam hazard rating at the August meetings for the Root River WRP. Ms. Lourigan said she would check on that, and she noted that since preliminary indications are that the existing spillway capacity is about equal to a 10-year flood flow, doing nothing regarding the dam is not an option.

[Secretary’s Note: During a July 11, 2013, telephone conversation with Mr. Hahn, Ms. Lourigan said that Graef (Racine County’s engineering consultant who prepared the dam failure analysis) was working on revisions to the analysis.]

### **Whether the WDNR Root River Steelhead Facility is a Barrier to Passive Fish Passage**

Ms. Beyler said that when the flashboards are fully removed and the facility is not operating, it does not restrict passage of aquatic organisms. Mr. Eggold said that the boards are in at the steelhead facility weir from March 1 through mid- to late-April and from early September through the beginning of November, and that, even with the boards in, the facility is not a barrier to fish passage.

### **The Significance of Sea Lamprey for the Root River**

Dr. Slawski asked whether sea lamprey were considered to be an issue for the Root River. Mr. Eggold said that he did not believe there had been any detected in the Root River, but he would have to check to be sure.

[Secretary's Note: Mr. Eggold provided survey results from young-of-year sampling for sea lamprey in the Root River going back to 1959, 1976, 1977, and 2000. No sea lamprey were detected in those years. He also noted that WDNR has not done any trapping for adults in this system.]

Mr. Helker noted that round goby, smallmouth bass, and redhorse were all found below Horlick dam, but not above the dam. He also said that sea lamprey were not considered an issue related to recent dam removals on the Pike River.

[Secretary's Note: During a July 30, 2013, telephone conversation with Mr. Hahn, Mr. Helker elaborated on the preceding statement, saying that the U.S. Fish and Wildlife Service had indicated that sea lamprey were not considered an issue related to recent dam removals on the Pike River.]

Ms. Lourigan, Mr. Eggold, and Dr. Slawski indicated that sea lamprey are not good jumpers and a 1.5- to two-foot-high barrier height has been set for recent dam modifications to inhibit lamprey passage.

### **The Future Significance of the Lake Michigan Sport Fishery**

Dr. Slawski said that the objectives of preventing invasive species from migrating upstream and promoting native species are incompatible. He cited Eurasian water milfoil, zebra mussels, and quagga mussels as species whose spread has not been successfully prevented. He stated that dams represent a barrier that could slow down, but not prevent passage of AIS. He cited the example of Chinook salmon in Lake Huron, noting that the Chinook salmon fishery in that lake has essentially collapsed, and he posed the question: If what has happened in Lake Huron were to happen in Lake Michigan, how would that affect the WDNR decision support system/guidance regarding fish passage and for what game species would WDNR plan to manage? He concluded by saying that all evidence shows that native species within Lake Michigan would benefit from increased connections to tributary streams which has been demonstrated by removal of the North Avenue dam on the Milwaukee River.

[Secretary's Note: Dr. Slawski distributed copies of the following papers at the meeting:

- Luis A. Velez-Espino, Robert L. McLaughlin, Michael J. Jones, and Thomas C. Pratt (2011): Demographic Analysis of Trade-offs With Deliberate Fragmentation of Streams: Control of Invasive Species Versus Protection of Native Species, *Biological Conservation*, 144, 1068-1080.
- John M. Dettmers, Christopher I. Goddard, and Kelley D. Smith (2012): Management of Alewife Using Pacific Salmon in the Great Lakes: Whether to Manage for Economics or Ecosystem?, *Fisheries*, 37:11, 495-501.
- S. Dale Hanson, Mark E. Holey, Ted J. Treskas, Charles R. Bronte, and Ted H. Eggebraaten (2013): Evidence of Wild Juvenile Trout



Recruitment in Western Lake Michigan, North American Journal of Fisheries Management, 33:1, 186-191.]

Mr. Wakeman replied saying that:

- The proposed WDNR guide was intended to assist managers in reaching justifiable decisions regarding whether or not to approve action on a barrier to passage;
- Such decisions would be made on a case-by-case basis;
- There are situations where dams prevent AIS transfer;
- While the WDNR staff wants to connect systems, they have to be very cognizant of the presence of VHS and AIS; and
- The proposed guidance will provide questions that will enable managers to assess specific cases.

Mr. Helker said it is important that a neutral point be selected that balances native species passage with prevention of AIS passage.

Dr. Slawski said that any design related to Horlick dam should incorporate features to enhance the northern pike and walleye communities and improve connectivity along the River. He posed the question: Do Chinook salmon have a future in Lake Michigan? Mr. Eggold replied that the loss of such non-native sport species would likely cause fishers to rally around northern pike and walleye. He indicated that the WDNR thinking had shifted regarding salmon stocking, and in 2013 WDNR was stocking 50 percent less salmon than in the past. He noted that WDNR is finding that whitefish, alewives, and Chinook salmon are generally smaller and lighter than in the past. He said that WDNR will try to maintain salmon in Lake Michigan, but that effort is at a critical juncture because of low alewife populations.

Dr. Boxhorn stated that production in the Lake may be tied up in quagga mussel and cladophora biomass. He added that if this continues, the river system tributary to the Lake may be a source for export of native fish to the Lake.

## **ADJOURNMENT**

Mr. Luba said that the SEWRPC staff should feel free to contact WDNR staff if questions arise on these issues. In conclusion, Mr. Hahn said that the SEWRPC staff would prepare a meeting summary and distribute a draft to the participants for their review and comment.

Respectfully submitted,

Michael G. Hahn  
SEWRPC Chief Environmental Engineer

SUMMARY OF 6/13/2013 WDNR/SEWRPC FISH PASSAGE MEETING (00212268).DOC  
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## Exhibit A

### Wisconsin Department of Natural Resources and Southeastern Wisconsin Regional Planning Commission Meeting to Discuss Issues Related to Fish Passage in Streams and Rivers Tributary to Lake Michigan

#### Agenda

DATE: June 13, 2013  
TIME: 2:00 p.m.  
PLACE: Wisconsin Department of Natural Resources Southeast Region Office

#### AGENDA:

1. Introductions
2. Brief overview of ongoing Root River watershed restoration planning process (SEWRPC staff)
3. Issues related to Horlick dam
  - a. Ongoing evaluation of hazard classification and spillway adequacy (SEWRPC staff)
  - b. Information related to whether dam is a barrier to fish passage (SEWRPC staff)
  - c. Conceptual alternatives being considered relative to Horlick dam (SEWRPC staff)
4. Fish passage issues (All)
  - a. WDNR criteria for evaluating a dam's significance as a barrier to fish passage, invasive species, VHS (WDNR staff)
  - b. Is the WDNR Root River steelhead facility a barrier? (All)
  - c. Is Horlick dam a barrier? (All)
  - d. What are the aquatic species of interest?
  - e. Future significance of Lake Michigan sport fishery (All)



## Exhibit C

### Alternatives

Baseline Condition - today

Conceptual Alternatives

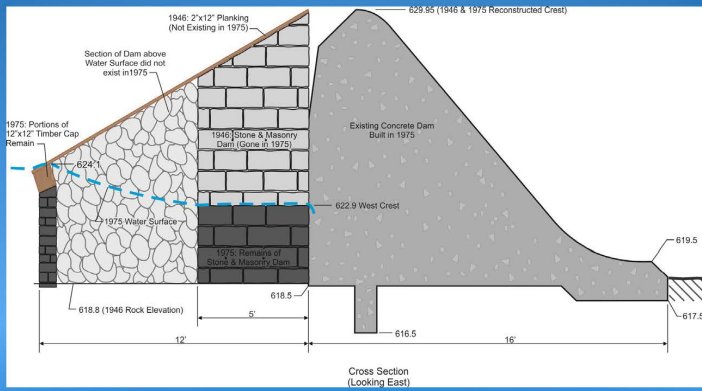
- Modify Dam to Enhance Spillway Capacity
- Modify Dam to Enable Fish Passage
- Remove Dam

### Alternatives

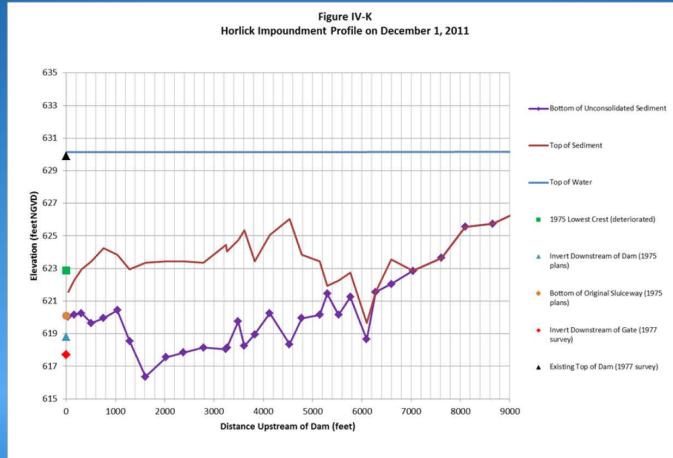
Baseline Condition - today

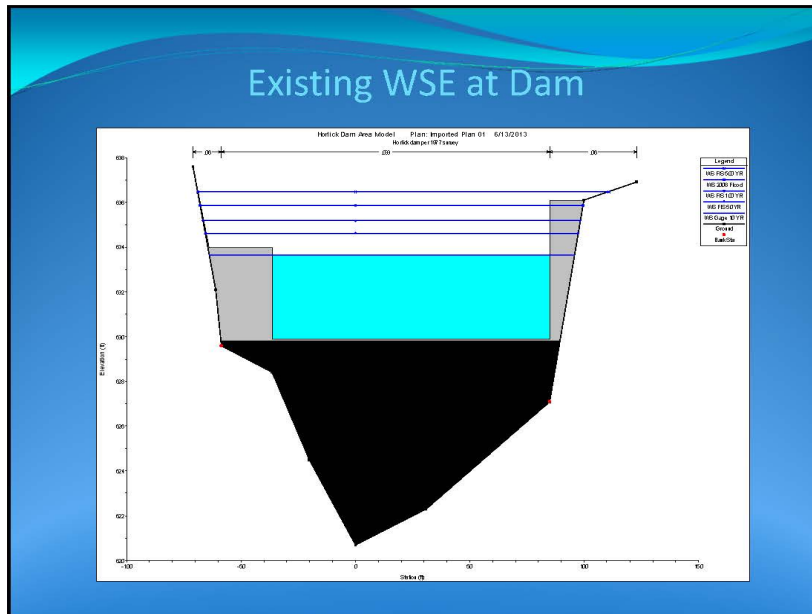
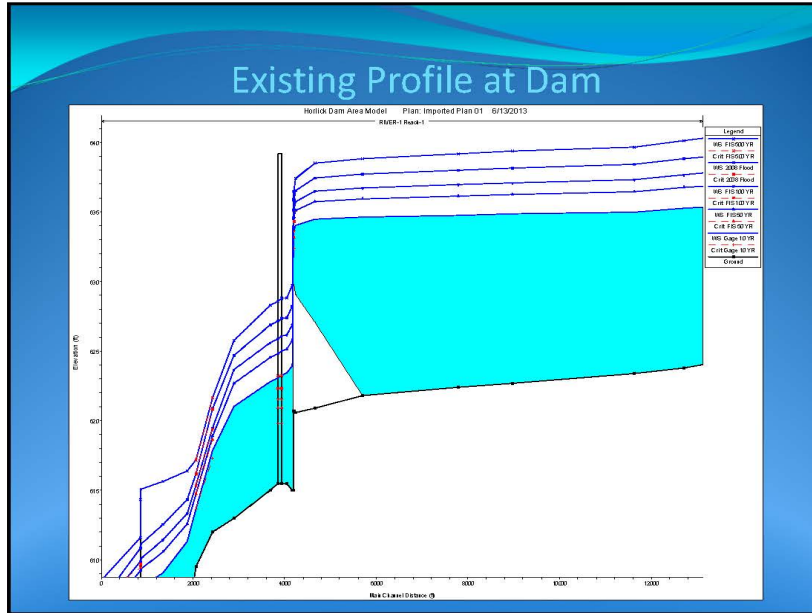


## 1975 Reconstruction

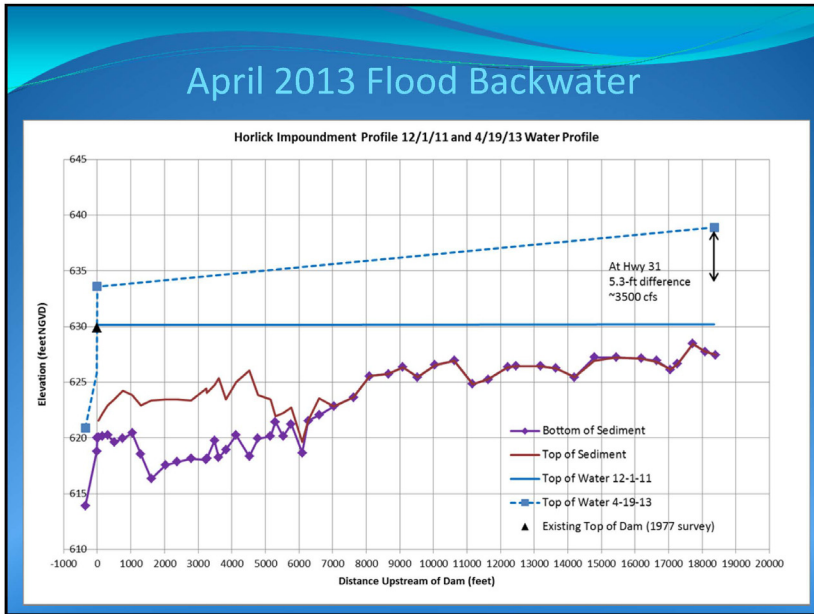
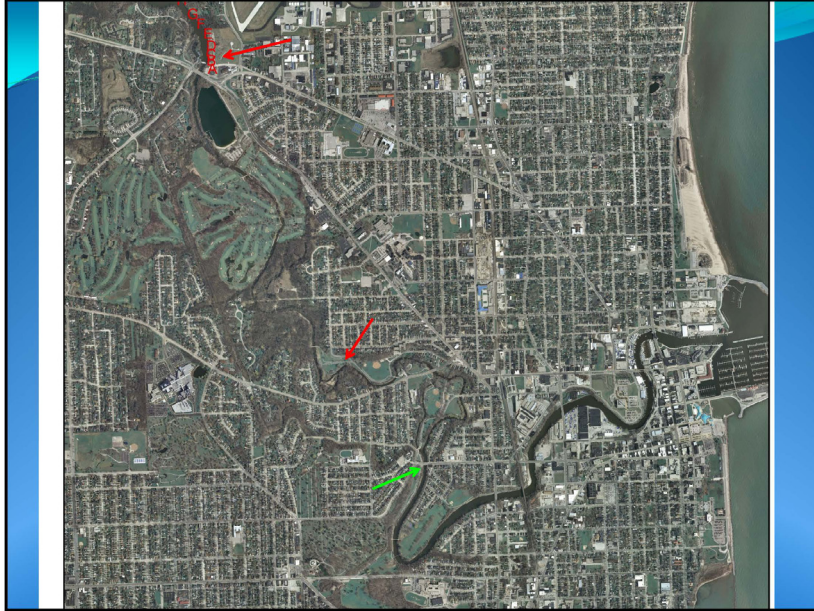


## Sediment Profile - 2011 Field Work





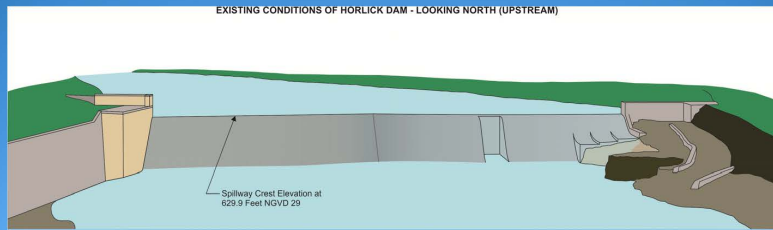






## Alternatives

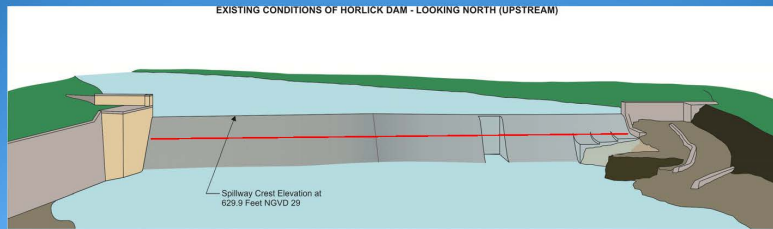
### Baseline Condition - today



## Alternatives

### Modify Dam to Enhance Spillway Capacity

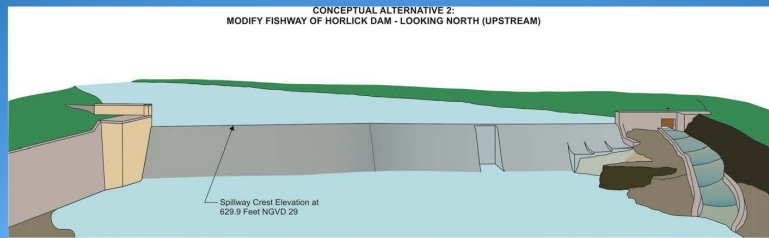
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## Conceptual Alternatives

### Modify Dam to Enable Fish Passage

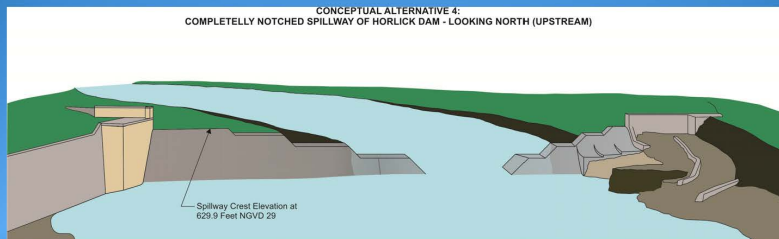
#### 2 - Modify Current Fishway – lengthen into river



## Conceptual Alternatives

### Remove Dam

#### 3 – Complete Notch of Current Dam Spillway



## Conceptual Alternatives

Remove Dam

4 – Full Removal

CONCEPTUAL ALTERNATIVE 5:  
HORLICK DAM REMOVED - LOOKING NORTH (UPSTREAM)

