DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

CECW-LRD

JUL 20 2017

MEMORANDUM FOR RECORD

SUBJECT: Mohawk Dam, Coshocton County, Ohio Dam Safety Modification Report, Type 1 Independent External Peer Review Agency Responses

1. Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resource Development Act (WRDA) of 2007, EC 1165-2-209 (superseded by EC 1165-2-214, 15 Dec 2012), and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).

2. Battelle Memorial Institute, a non-profit science and technology organization, was engaged to conduct the IEPR for the Mohawk Dam Draft Dam Safety Modification Study and its supporting documentation. The IEPR consisted of four members with expertise in geotechnical engineering, economics and planning, environmental/National Environmental Policy Act and engineering geology.

3. The final written agency responses to the IEPR are hereby certified. The enclosed document contains the final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR report. The IEPR report and the USACE responses have been coordinated with the vertical team, endorsed by the Risk Management Center and approved by the Great Lakes and Ohio River Division, and will be posted on the Internet, as required in EC 1165-2-214.

4. If you have any questions on this matter, please contact me or have a member of your staff contact Yvonne Prettyman-Beck, Deputy Chief, Great Lakes and Ohio River Division Regional Integration Team, at 202-761-4670.

Encl

JAMES C. DALTON, P.E.
Director of Civil Works

Mohawk Dam, Ohio
Draft Dam Safety Modification Report

U.S. Army Corps of Engineers Response to
Independent External Peer Review
25 June 2017

Independent External Peer Review (IEPR) was conducted for the subject study in accordance with Section 2034 of WRDA 2007, EC 1165-2-214, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review* (2004). The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to always provide scientifically sound, sustainable water resources solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of the products USACE provides to the American people.

Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for the USACE, was engaged to conduct the IEPR for the *Mohawk Dam Draft Dam Safety Modification Study,* and its supporting documentation. The IEPR consisted of four members with expertise in geotechnical engineering, economics and planning, environment/National Environmental Policy Act, and engineering geology.

Battelle issued its Final Independent External Peer Review Report on November 22, 2016. The review resulted in 14 Final Panel Comments. Of these, three were identified with High Significance, two with Medium/High Significance, four with Medium Significance, two with Medium/Low Significance, and three with Low Significance.

Initially, the USACE concurred with six comments and non-concurred with the other eight comments. The Panel Backcheck resolved with concurrence on 13 comments, leaving only one comment in a non-concur status. As a result of the comments, 44 suggestions were made by the Panel. Of these 44 comments, 19 were not adopted and 25 were adopted.

The following discussion presents a summary of the USACE final responses to the comments.

1. **High Significance - The presence of a continuous, uniformly graded, fine to medium sand or silt layer directly beneath the confining layer, the most important requirement for PFMs 5K or 5E to initiate, has not been documented.**

Two specific recommendations were made with this comment. Neither were adopted.

1. Revise Appendix A to relate PFMs 5K and 5E to boiling and unfiltered exits, caused by vertical gradients exceeding the critical hydraulic gradients, not to conventional BEP requiring the presence of a continuous sand/silt layer beneath a confining layer and extending upstream to downstream.

USACE Response: Not Adopted.
Boiling and unfiltered exits caused by high vertical gradients are already identified as a part of the failure sequence for Potential Failure Modes (PFMs) 5E and 5K. The most likely path to failure following the initial movement of material from the foundation is Backward Erosion Piping (BEP) progressing upstream to the reservoir, leading to gross enlargement of the pipe, crest collapse and downcutting. Although the likelihood is low that a continuous layer of erodible fine to medium sand or silt layer susceptible to BEP exists (which is reflected in the risk estimate), when uncertainty is considered there is enough societal risk to warrant action.

2. Modify the objective of the RMP to reduce uplift pressure in order to minimize the potential for boiling and unfiltered exits, not to prevent BEP, as hypothesized in the review documents.

   USACE Response: Not Adopted.
   The stated objective of the relief wells, which are a component of the selected Risk Management Plan (RMP), is to reduce uplift pressure from seepage flowing under the dam. This is intended to minimize the potential for uplift and the initial movement of foundation sands through boils. These processes (uplift/boiling at unfiltered exits) alone, however, were not judged to lead to failure. They are only the beginning of the potential failure sequence. Following uplift/boiling, the most likely failure sequence includes BEP progressing upstream to the reservoir, leading to gross enlargement of the pipe, crest collapse and downcutting.

2. High Significance - A significant amount of uncertainty about modeling, analyses, assumptions, and geologic conditions used for evaluating spillway channel erodibility remains at the project site.

This comment includes three recommendations and two of the three recommendations were adopted.

1. Re-evaluate the applicability of the WinDamB program for modeling spillway erodibility.

   USACE Response: Not Adopted.
   The risk elicitation team recognized the limitations with the WinDamB analysis and opted to give very little weight to the results in the risk elicitation, as documented in the report. Other one-dimensional spillway analysis tools have similar limitations. The team utilized alternate methods to assess spillway erodibility, including empirical analyses and review of applicable case studies.

2. Examine other case histories of open-channel spillways with similar geologic conditions.

   USACE Response: Adopted.

Action Taken: Relevant open channel spillway case studies were noted within the discussion of PFM 9. Additional text will be added to the report to describe how these case studies were utilized to evaluate the risk of spillway erosion and their applicability to these geologic conditions.

3. Collect and evaluate additional data regarding discontinuity orientations, spacing, and aperture for the bedrock underlying the spillway channel to reduce the modeling uncertainty associated with geologic conditions.

   USACE Response: Adopted.
   Action Taken: As part of the Dam Safety Modification Study, seventeen borings were drilled at the spillway sill and channel to determine soil and rock properties. Data obtained significantly increased the team's understanding of the site geology and reduced uncertainty in the current risk estimate. Optical logging, pressure testing and visual description of the fracture condition consistently showed a "tight" foundation. There is a significant amount of rock data relative to similar spillway studies.

3. High Significance - The risk of left abutment failure due to fractured rock instability has either not been evaluated or not considered in sufficient detail.

This comment included two recommendations. Neither were adopted.

1. Evaluate the risk that high pore pressures may pose to rock slope instability of the left abutment and the potential risk to the dam as part of RMP and TSP.

   USACE Response: Not Adopted.
   The open fractures in the left abutment rock appear to freely drain, which makes it unlikely that high pore pressures would develop. Also, the nature of the nearly horizontal layering of the siltstones and shales with a slight slope away from the stilling basin and outlet channel make it very unlikely that a slope failure would occur at the left abutment. Even if a significant amount of rock were to fall and completely block the outlet conduits, it has been determined that there is adequate spillway capacity to prevent overtopping of the dam. This potential risk was evaluated in a previous study (the Issue Evaluation Study, or IES). Therefore, no measures are warranted to address this mechanism with the recommended RMP.

2. Revise the IES to include this risk factor.

   USACE Response: Not Adopted.
   The IES included an evaluation of a similar potential failure mode (PFM 18, "Rockslide blocks the conduits and leads to overtopping") which was determined to be non-credible. There would not be additional benefit in re-opening the IES phase to evaluate the high pore pressures leading to rock slope instability.

4. Medium/High Significance - The right bank downstream of the stilling basin does not appear to be in a condition to prevent scour under certain flows and significant flood events, which could result in damage to dam components and utilities.

This comment included one recommendation. The recommendation was adopted.

1. Add riprap so that the entire right bank is uniformly covered with armor rock meeting USACE specifications EM 1110-2-1601. Clarify the risk of bank failure on the right bank, downstream of the stilling basin, in the ECRA and FWAC risk assessment in Appendix A.

   USACE Response: Adopted.
   Action Taken: Project personnel recently (November 2016) placed 300 tons of stone in this area in an attempt to remedy the inadequate stone slope protection per the recommendation in the 2015 Periodic Inspection. While the placement of stone enhanced the protection of the bank it is still not entirely uniform. There are plans to supplement the stone slope protection and fill in the areas which are only partially covered. However, because bedrock is just beneath the stilling basin and behind the right stilling basin training wall, if scour were to occur downstream and then progress in an upstream direction behind the wall, it is unlikely the scour would be significant enough to cause considerable damage to the toe of the dam.

5. Medium/High Significance - Without a fully functional piezometer system representative of uplift pressures in the critical areas of the project, the future performance of the TSP cannot be adequately evaluated.

Four recommendations were included in this comment. Three of the four recommendations were adopted.

1. Replace all abandoned and unreliable piezometers with new state-of-the-art piezometers.

   USACE Response: Not Adopted.
   Currently there is only one existing non-responsive piezometer in the vicinity of the PFM 5E/5K critical area. There are plans to replace this piezometer. All other non-responsive piezometers at the project will be evaluated for the need of replacement or abandonment during periodic inspections of the project. For any replacements, consideration will be given to using state-of-the-art piezometers.

2. Install additional piezometers in the vicinity of new relief wells.

   USACE Response: Adopted.

Action Taken: Although a fairly comprehensive system of piezometers in and downstream of the filter blanket already exist, up to three piezometers will be added to the recommended RMP to aid in assessment of future performance of the new wells.

3. Monitor piezometers more frequently during high pool events (daily or sooner, if needed).

   USACE Response: Adopted.
   Action Taken: Based on the instrumentation observation schedule for the project downstream piezometers are monitored daily at pools exceeding El. 850 ft NGVD29, which is well below the elevation at which any seepage issues are expected. This schedule is reviewed annually and following high pools when new data is available.

4. Evaluate relief well performance (discharge) in light of piezometric data.

   USACE Response: Adopted.
   Action Taken: Whenever the new relief wells are installed as part of the Recommended RMP, the piezometer data will be closely monitored when the relief wells start to flow. This data will be compared to the piezometer data currently being collected.

6. Medium Significance - RMP 10 relies entirely on relief wells and effective performance of the seepage collection system to address PFMs 5K and 5E, and, without a backup, offers only moderate redundancy and low to moderate resiliency.

This comment included six recommendations and three of the six recommendations were adopted.

1. Increase the thickness of the downstream seepage berm.

   USACE Response: Not Adopted.
   The existing relief wells are expected to function as they have during past events (even with some water flow backup due to the undersized outlets), therefore, calculations would show adequate factors of safety in the location of the existing seepage berm. The selective upsizing of the collection system in the recommended RMP will reduce the probability of backup occurring. Therefore, increasing the thickness of the berm was not a measure included in the recommended RMP.

2. Increase the thickness of the filters/rock-covers in the outfall areas.

   USACE Response: Not Adopted.
   With the recommended RMP, the discharge pipes from the existing seepage collection system will be extended through the outfall areas and backfilled with seepage berm

material. The thickness of this material will be determined so that the factor of safety for uplift will match that of the rest of the existing seepage berm.

3. Increase the length of the seepage berm to the extent possible, without adversely impacting the wetland area.

   USACE Response: Not Adopted.
   Extending the seepage berm would be effective at reducing risk for PFM 5E. However, based on the existing geometry of the seepage berm it is currently as close as practicable without impacting the wetland. Generally, the toe of the seepage berm and the edge of the wetland are within 15 to 30 feet.

4. Increase the depth of the relief wells, extending close to the bedrock.

   USACE Response: Adopted.
   Action Taken: The proposed relief wells in the recommended RMP are already designed to extend to bedrock.

5. Consider whether relocation of headwalls or extension of gabion stone blankets may be required to minimize relief well discharge scour of wetlands, potential scour under stone blankets, or potential for undercutting of concrete headwalls.

   USACE Response: Adopted.
   Action to be Taken: The final design of the scour pads at the discharge locations will include measures to adequately resist scour.

6. Use backflow preventers on the new as well as the existing relief well discharge pipes.

   USACE Response: Adopted.
   Action to be Taken: Backflow preventers will be installed on existing and new relief wells as part of the recommended RMP.

7. Medium Significance - The use of coefficient of uniformity (C_u) values to evaluate the piping potential of broadly graded glacial outwash at the project site is not reliable.

This comment included two recommendations. Neither of the recommendations was adopted.

1. Use the C_u values of only sand and silt fractions to evaluate their susceptibility to piping.

   USACE Response: Not Adopted.
   Following the current state of practice, C_u was one of several factors used to evaluate the susceptibility of foundation soils to piping (BEP). C_u was determined in accordance with

ASTM D2487, which requires use of gravel, sand, and silt fractions. Including the gravel content is appropriate because it does affect the susceptibility of a soil to piping.

2. Use a combination of C_u and C_c to determine if sand or silt samples are uniformly graded.

   USACE Response: Not Adopted.
   The current state of practice involves the use of C_u, but not the coefficient of curvature (C_c) for evaluation of the susceptibility of foundation soils to piping (BEP).

8. Medium Significance - The wind direction, wave height, wave run-up, and wave reflection, at various pool elevations, have not been sufficiently considered with respect to the operation of the intake structure, the potential for scour, and instability of the upstream slope of the dam.

This comment included six recommendations and one was adopted.

1. Research specifications, from the 1986 upstream face reconstruction, to determine fill types placed during construction for material described as "random fill."

   USACE Response: Adopted.
   Action Taken: A review was recently performed of the 1986 reconstruction specifications for the upstream stability berm. The specification for "Random Rock Fill" required the material to be reasonably well graded with a maximum rock dimension of 12 inches. At the surface this material has since deteriorated to clayey soil. Observations from test pits performed in this material in 2013 and 2014 were also reviewed, which show the upstream stability berm is predominantly silty and sandy clay with rock fragments, cobbles, and boulders.

2. Consider performing additional geotechnical work to assess the upstream slope geotechnical properties if sufficient information is not available for scour and stability evaluation.

   USACE Response: Not Adopted.
   The two test pits excavated in the stability berm on the main embankment in 2013 and 2014 each revealed similar material properties (silty clay and sandy clay with gravels, cobbles, and small boulders). From these investigations and the review of the 1986 specifications, no additional geotechnical investigations are necessary to assess the geotechnical properties of the upstream slope and assure adequate resistance to scour and instability.

3. Perform additional wind, wave run-up, and wave studies to evaluate the potential scour for lower pool levels on the dam face where the toe berm/blanket may impact wave height and wave run-up.

USACE Response: Not Adopted.
Scour of the upstream dam face for low pool levels has not been a significant issue during the last 30 years of operations (since 1986 upstream stability berm placement). The area of concern is well maintained and observed by project personnel; therefore, should this become a problem in the future, identification and remediation can be addressed.

4. Consider performing additional scour assessment and evaluate the potential slope instability risk for the dam face along with impacts on flow path under the dam. If analyses show risk for scour of upstream slope, consider using riprap, the standard measure against wave action.

   USACE Response: Not Adopted.
   Potential slope instability risk for the dam face due to scour has been considered during a previous risk assessment, but dismissed due to relatively erosion-resistant soils and flat upstream slope (1V:4H) up to the spillway crest elevation. There is no previous record of slope instability at the project which was constructed in the 1930s. Should slope instability be deemed an issue in the future, riprap will be considered for remediation.

5. Evaluate variable pool elevations and assess wave reflection from the upstream rock berm near Station 13+00. Determine whether wave reflection may cause increased wave height and run-up that could result in localized higher scour potential for the toe of dam and potential risk to instability and shorter flow paths beneath the dam.

   USACE Response: Not Adopted.
   Predominant wind direction is from the southwest, parallel and away from the dam, making reflection less likely. Wave reflection that would result in increased wave height and run-up leading to scour near the toe of the dam has not been observed nor documented by project personnel during relatively frequent events. For less frequent events, such as those exceeding the pool of record, the upstream rock berm is covered and the concern is not applicable.

6. Evaluate and document the risk of potential blocking of the intake structure from tree and root ball loss during high winds, at various pool levels, for the area between the spillway and outlet works as shown in photo above.

   USACE Response: Not Adopted.
   Debris (including numerous trees) accumulating on the upstream side of the intake structure is common at Mohawk whenever there is a high pool. This condition has been considered in the previous Issue Evaluation Study as PFM 22, "Debris blockage of service gates leading to overtopping erosion", where it was excluded from further consideration due to the remote possibility of leading to dam failure. When complete blockage of the service gates (conduits) was evaluated it was determined that overtopping would not occur.

9. **Medium Significance - The rationale for why the DSMR does not identify the NED, the NER, or the combined NED/NER plan, as required by ER 1105-2-100, has not been presented in sufficient detail.**

Two specific recommendations were made with this comment. Both were adopted.

1. Revise the DSMR and Appendix C to identify and briefly describe the NED, the NER, or the combined NED/NER plan.

   USACE Response: Adopted.
   Action Taken: As stated in the Planning Guidance Notebook (ER 1105-2-100) the National Environmental Restoration (NER) Plan and combined National Economic Development (NED)/NER plan must only be identified in ecosystem restoration studies. As this is a dam safety study, there is no requirement to identify the NER or combined NED/NER plan. However, it is still necessary to identify the NED plan (the plan with the highest net benefits) for dam safety and flood risk management studies. Risk Management Plan (RMP) 10 is the NED Plan and selected RMP. Language has been added to the report to describe it as such.

2. Explain the rationale as to why the NED, the NER, or the combined NED/NER plan was not selected as the TSP.

   USACE Response: Adopted.
   Action Taken: The NER or combined NED/NER plan must only be identified in ecosystem restoration studies. For this Dam Safety Modification Study (DSMS), it is only necessary to identify the NED plan. Despite the fact that it was not labeled as such in the report, RMP 10 is the NED Plan and recommended RMP. Language has been added to the report to describe it as such.

10. **Medium/Low Significance - The DMSR and Appendices B and C do not present any HEC-FDA modeling results, making it difficult to assert that all impacts associated with the FWAC, RMPs, and the TSP have been adequately addressed.**

Three specific recommendations were made with this comment. None were adopted.

1. Perform, if even at the reconnaissance level, a run of HEC-FDA for the communities downstream of, and protected by, Mohawk Dam.

   USACE Response: Not Adopted.
   This recommendation was not adopted because the HEC-FIA software, which was utilized for this study, has all of the capabilities of the HEC-FDA software, as well as the ability to calculate life loss information.

2. Display and discuss the results of the HEC-FDA model results.

   USACE Response: Not Adopted.
   The HEC-FIA software has all of the capabilities of the HEC-FDA software, as well as the ability to calculate life loss information. HEC-FDA is traditionally used to calculate only economic damages including structures and their contents, vehicles, and crops. The HEC-FIA results for these categories in addition to the results for life loss are included in the appropriate appendices to the Dam Safety Modification Report.

3. Explain why the model results do not affect the selection of the TSP.

   USACE Response: Not Adopted.
   Economic risk was evaluated as part of the DSMS. However, Dam Safety studies differ from more traditional Corps flood risk management planning studies in that they focus on the reduction in life loss risk, rather than on damages prevented. As such, for this study, the life loss estimates calculated with the HEC-FIA software were one of the primary considerations used during the screening of alternatives and the selection of the recommended RMP.

11. Medium/Low Significance - The Category 3 wetland delineation report has not been included in the appendices, but inclusion would help document impact conclusions and the significance of this area since this was important to the screening of measures and the selection of the TSP.

Four specific recommendations were made with this comment, all of which were adopted.

1. Add an overview section to the DSMR, Section 1.4, on existing environmental resources/controls and include a description of Waters of the U.S. and the Category 3 wetland.

   USACE Response: Adopted.
   Action Taken: The wetland was delineated according to the 1987 Army Corps Wetland Delineation Manual. The boundaries of the wetland were flagged at that time. A memorandum detailing this procedure and the wetland report has been added to Appendix H of the DSMR. Additional discussion has been added to the DSMR main report to make it clear there are no impacts expected to the wetland as a result of project construction.

2. Incorporate a wetland delineation report in the relevant technical appendices.

   USACE Response: Adopted.

Action Taken: The wetland was delineated during the study process, and additional information regarding the delineation has been included in the main report and appropriate technical appendices as Attachment 3 to Appendix H.

3. Add a brief discussion of construction sediment and erosion controls to prevent discharges to the Category 3 wetland in the DSMR, p. 52, 2nd full paragraph.

   USACE Response: Adopted.
   Action Taken: A brief discussion of the methods used to prevent damage to the wetlands during construction has been added to the discussion of the recommended RMP in the DSMR.

4. Discuss the Category 3 wetland and location of the delineation report in Appendix H, p.2.

   USACE Response: Adopted.
   Action Taken: A memorandum detailing the delineation procedure and describing the wetland itself has been added to Appendix H of the DSMR.

12. Low Significance - Current stormwater control regulations for retention/detention systems in Ohio capture events higher than the 20-year storm, whereas the discussion looks at high-frequency stormwater events that are 20-year events or less.

Three specific recommendations were made with this comment, all of which were adopted.

1. Modify Section 3.2.1.3 (p. 179) to reflect current Ohio stormwater quantity requirements.

   USACE Response: Adopted.
   Action Taken: The language in Section 3.2.1.3 has been changed to reflect the current State of Ohio storm water control requirements.

2. Clarify anticipated local benefits of onsite storage facilities in Section 3.2.1.3 (p. 180).

   USACE Response: Adopted.
   Action Taken: The language in Section 3.2.1.3 has been changed to clearly state the anticipated onsite storage facility capacities in the watershed.

3. Review, and revise if necessary, the overall discussion in Sections 3.2.1.3 to ensure that the discussion is consistent with recommended changes.

   USACE Response: Adopted.
   Action Taken: The language in Section 3.2.1.3 has been changed to ensure consistency with the previous recommendations.

13.Low Significance - The description of the baseline environmental conditions and impacts on various resources is limited in some parts of the report, which could affect the technical quality.

One specific recommendation was made with this comment. It was adopted.

1. Address the deficiencies as suggested by the bullets below:
    - DSMR, Section 1.4.1. Local and Regional Geology (p. 16): Add a discussion or a separate section that provides a concise overview of the natural/ecological resources, including a characterization of Walhonding status under Ohio WQ laws, wetlands, and threatened and endangered (T&E) species. It would be useful to add just enough detail to define the environmental controls/ environmental show stoppers, which will benefit the measure screening discussion and environmental impacts identified to screen measures.
    - DSMR, Seepage Berm Extension (Screened Out) (p. 47, 2nd paragraph): Quantify relative impacts on wetland in acres, even approximately. This could be a challenge without having done much design work, but would help establish significance and the magnitude of impacts this measure would have on the Class III wetland.
    - DSMR, Downstream Tailwater Weir (Screened Out) (p. 47, last sentence): Consider indicating how this measure would directly impact wetland hydroperiod, alter wetland vegetation composition over time, and provide an estimate of the acreage of wetland directly impacted due to construction of the weir.
    - DSMR (p. 50, 2nd paragraph): Acknowledge impacts on cultural resources, loss of woodland habitat, and potential T&E impacts stemming from tree clearing, since any impact may require Habitat Evaluation Procedure (HEP) analysis and potential mitigation, which could increase costs to the project.
    - DSMR - Replace and Augment Existing Relief Wells, Thicken Seepage Berm (Carried Forward) (p. 52, 2nd full paragraph, last sentence): While no adverse environmental impacts are anticipated, it appears there might be temporary construction impacts based on how close this is to the Category 3 wetland; however, it is hard to tell due to the scale. The primary concern with this alternative going forward is avoiding even temporary impacts, since Ohio State Certification Special Limitations and Conditions require an individual state water quality certification when temporary impacts are proposed on or in Category 3 wetlands.
    - DSMR (p. 58, 6th paragraph): Acknowledge habitat impacts. Even if there are no T&E impacts, impacts on woodland vegetation may trigger need for HEP analysis and mitigation of woodland habitat loss per USACE policy.

- Appendix A, Table 3.17 (p. 178): Explain the substantial loss of wetlands over the reported time period, a rather significant loss in acreage. Is the loss associated with an increase in impervious cover or is this a typo?

USACE Response: Adopted.
Action Taken:

- Bullet 1 - Information has been added to this section of the report which includes the Walhonding River's status under Ohio WQ laws, wetlands, and T&E species.
- Bullet 2 - This measure was screened out and not considered as part of the recommended RMP. If this measure had been selected it would have caused impacts to approximately 3 acres of wetland. This information has been added to the appropriate section of the report.
- Bullet 3 - This measure was also screened out and not considered as part of the recommended RMP. If this measure had been selected, it would have resulted in potential tree kills, sedimentation and 0.4 acres of wetland destroyed for weir construction, resulting in 4.5 acres being flooded longer and deeper during high water events.
- Bullet 4 - This measure was carried forward for additional consideration, however, it was not included in the recommended RMP. Additional information about cultural resources and potential impacts to Threatened and Endangered species has been added to the appropriate section of the report. Potential environmental effects associated with this measure include unknown cultural resource impacts from ground disturbance and impacts stemming from tree clearing of potential habitat for threatened and endangered species.
- Bullet 5 - This measure was also carried forward for additional consideration, however it was not included in the recommended RMP. There were no impacts to the wetland associated with this measure. The footprint of the plan does not encroach on the wetland, and plans and specifications, once developed will include direction to the construction contractor to avoid the area.
- Bullet 6 - This measure was also carried forward for additional consideration, however it was not included in the recommended RMP. Additional language describing the impacts to Threatened and Endangered Species which may be impacted by tree removal has been added to the report, however there are no anticipated impacts to woodland habitat and no loss of woodland habitat. All of the work will be completed in a previously disturbed mowed area. The footprint of the project has been minimized to not impact wetland and woodland areas.
- Bullet 7 - The source of the information in the table is the USGS. It has been checked for accuracy. Some of the wetland loss is due to growth in the area, including farmland expansion, the development of subdivisions and the placement of impervious cover.

14. Low Significance - The discussion of the inundation zone relative to the FWAC does not address the effects of forecasted climate change or the role of County Natural Hazards Mitigation Plans in mitigating future risks.

Five specific recommendations were made with this comment, all of which were adopted.

1. Add narrative to Appendix A as to whether future forecasted base flow changes due to climate change discussed in the DSMR will result in any potential changes in SFHA areas relative to forecasted inundation zone due to Mohawk Dam breach scenario.

   USACE Response: Adopted.
   Action Taken: The language about climate change effects in Appendix A has been changed to show whether those changes will affect Special Flood Hazard Areas (SPHA) relative to the flood zone from a Mohawk Dam Breach.

2. Clarify the relative difference in flood height between SFHA and inundation zone to understand risks (Appendix A, Section 3.2.4.2, p. 189)

   USACE Response: Adopted.
   Action Taken: The language in Appendix A Section 3.2.4.2. has been changed to explain the differences between the SFHA and the inundation zone.

3. Make a distinction between potential future floodplain development and changes in land use in the inundation zone (Appendix A, Section 3.2.3, p. 183)

   USACE Response: Adopted.
   Action Taken: The language in Appendix A Section 3.2.3 has been changed to show the difference between future development and land use in the inundation zone.

4. Modify Figure 3.9 (Appendix A, p. 188) to clarify the boundary of inundation area relative to the indicated SFPA.

   USACE Response: Adopted.
   Action Taken: Figure 3.9 in Appendix A has been changed to more clearly show the boundary of the inundation zone compared to the SFHA.

5. Add a brief discussion of the role that a County Natural Hazard Mitigation Plan can play in reducing future land use changes in the inundation zone.

   USACE Response: Adopted.
   Action Taken: A brief discussion of the role the County Natural Hazard Mitigation Plan can play in reducing future land use changes in the inundation zone has been added to the appropriate section of the report.