

RECOMMENDATION 1-2021

To: Kankakee River Basin and Yellow River Basin Development Commission
From: Technical Advisory Committee (TAC)
Subject: Prioritization of Floodplain Reconnection Opportunities
Date: March 22, 2021

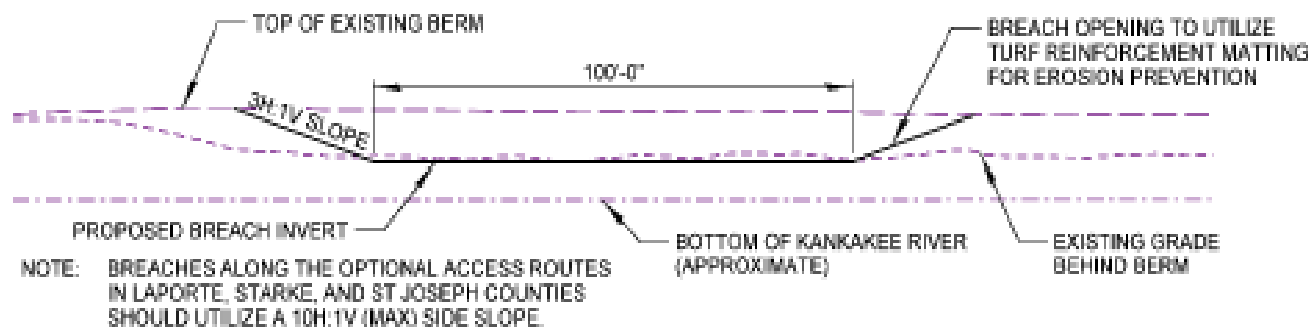
DESCRIPTION:

Work Plan Section 5.1.6

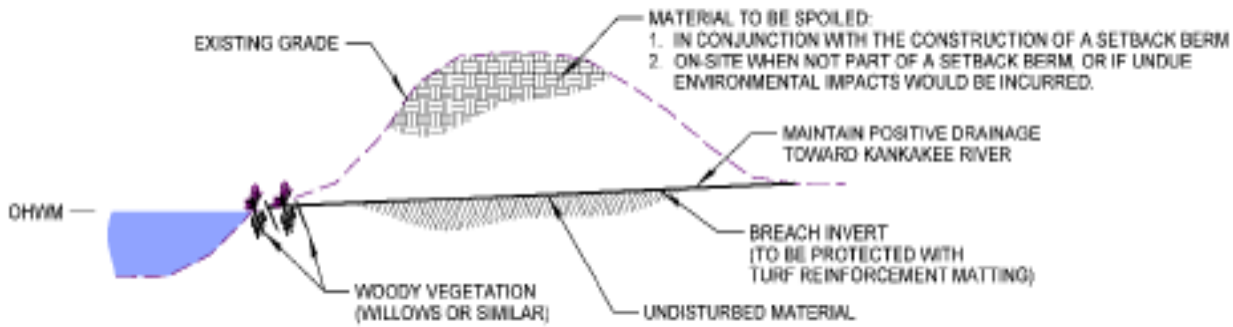
Strategically Remove Berms and Mitigate Flooding using Setback Berms

A system-wide set of constructed breaches in existing berms is recommended to activate inadvertently cut-off, naturalized floodplain areas and increase floodplain storage in particularly low-lying areas. The berm segments selected for breaching were carefully evaluated, preferentially selecting non-agricultural areas. Where the riverside berms were found to be continuous and provide some level of flood protection, alignments for setback levees were established to provide the same elevation of flood protection as the lowest point in the riverside berms protecting the area. The intent of the berm breaches and setback berms is to remove the need for maintaining the existing riverside berms, to provide more room for the river and connect it to its floodplain, and to eliminate the constant concern over bank and berm conditions.

In general, the berms along the Kankakee and its tributaries should not be maintained, and in many cases should be partially or completely removed. Berms that prevent effective use of areas identified as critical floodplain storage should be breached for a minimum of 100 feet at the upstream and downstream end of the berm to increase floodplain connectivity; additional breaches between the upstream and downstream ends may be necessary for larger floodplain areas and longer berms. Figure 15 and Figure 16 show a typical profile and a typical cross section of the suggested strategic breaches.



Typical Profile View of Strategic Breach in Existing Berm



Typical Section View of Strategic Breach in Existing Berm

Berms that provide meaningful flood protection to critical facilities or residential clusters away from the river channel should be removed or breached and replaced with strategic flood protection measures closer to the infrastructure or property being protected, as discussed in Section 5.1.10. Reinforcement or expansion of existing berms along the Kankakee by private landowners should be strongly discouraged and prohibited where possible. The ultimate objective of the strategic berm removal/breaching is to reestablish a functional floodplain adjacent to the main stem of the Kankakee and to eliminate the costs associated with maintaining features (berms) that are non-essential. The berm removal/breaching is intended to be strategic in that the reactivated floodplain areas are typically limited to natural wetlands or sub-marginal farmland.

Included in this recommendation is the removal/breaching of the internal berms at the Kankakee Fish and Wildlife Area to allow the free exchange of water between the Kankakee and Yellow River during flooding events. This will allow the rivers the greatest possible access to natural flood storage areas, return the Fish and Wildlife Area to a more natural hydrologic regime, and remove the need for active management by State entities in response to flood events.

Strategic removal/breaching of berms should be used to focus storage in designated areas to reduce impacts elsewhere. Storage opportunities may be encouraged and incentivized by purchasing property and leasing lands adjacent to the river, or by purchasing flood easements. Purchasing the property and leasing it to the previous (or other) landowner prevents the landowner from experiencing a loss of land value while maintaining the ability to farm the area. Purchasing a flood easement provides the landowner with one-time compensation for potential future losses and allows the farmer to either farm the area or leave the area fallow. It may be more appropriate for some of the more flood prone areas to be purchased and kept in permanent wetland management.

Hydraulic analysis of a scenario where all of the berms adjacent to the Kankakee are removed suggests that flow rates could be reduced by approximately 15% and flooding elevations in certain areas being lowered by 1.5 feet. This scenario was simulated to gain an understanding of the full potential of Kankakee River berm removal; however, the existing berms along tributaries and field ditches were left in place, which prevents a full activation of all potential floodplain areas. The proposed breaches and setback berms were also simulated in the hydraulic model to determine the anticipated impact. Flow rates and flooding elevations were reduced by a smaller margin, 9% and 0.9 feet, respectively. These reductions in flow rates and flood elevations were variable depending on the location along the Kankakee and the current condition of local berms. Reaches of the river with smaller cross-sectional areas and/or berms that currently inhibit activation of available flood storage (e.g. near Davis, IN) generally saw greater reductions in flood elevation under alternative berm

management scenarios than portions of the Kankakee that are wider and/or currently have greater access to floodplain storage (e.g. Dunn’s Bridge or Shelby, IN).

The improvements are primarily aimed at producing a more resilient river, reducing flooding and erosion-related losses, and preventing future losses by providing additional floodplain storage and eliminating incompatible land uses; however, reactivation of disconnected floodplain and wetland areas is also expected to result in substantial ecological benefit. While the ecological benefits have not necessarily been the primary target for this Work Plan, maximizing this ancillary benefit may be key to streamlining the permitting process and, more importantly, helping to attract funding partners, as discussed in Section 6.3.

A schematic showing the location of recommended berm breaches is provided in Exhibits 3 and 4. The anticipated cost for the constructing the berm breaches and setback berms is approximately \$58.8 million; additional details concerning the cost of constructing the improvements is provided in Appendix 4.

It should be noted that the selection and alignment of setback berms, either existing or proposed/improved, shown on Exhibit 3 was based on a conceptual level of analysis using desktop methods. The location and condition of these berms have not been field-verified. The final decision as to the location of constructed berm breaches as well as the alignment and the need for improvement of any existing berm to act as a setback line of protection will be made prior to the design and construction phase of each berm segment and expected to involve detailed field visits, consultations with local authorities/property owners having more intimate knowledge about the condition of these berms, and additional hydraulic analysis (as needed).

LOCATION: Indiana areas adjacent to the Kankakee River, Yellow River, and their tributaries.

ISSUE: Manageable reconnection of the Kankakee and Yellow Rivers to their floodplains is a recommended action in all forty-years of the Kankakee River Flood and Sediment Management Work Plan.

The work plan recommends scores of potential floodplain reconnections along both channels. However, the achievability of a specific reconnections is influenced by factors such as:

- 1) Property owner consent;
- 2) Construction and acquisition costs;
- 3) Need for new flood control structures;
- 4) Permits and approvals from USACE, IDEM, INDNR, USFW, and NRCS;
- 5) Grants of easements;
- 6) Viable access; and
- 7) Mitigation costs and requirements.

In the context of its mission, it is in the Commission’s interest to maximize the safe storage of floodwaters for the least overall cost in dollars, time, and opportunity. For that reason, the Commission may choose to set formal criteria for ranking the potential value of floodplain reconnection areas.

RECOMMENDATION: The Technical Advisory Committee recommends that potential floodplain reconnection and floodwater storage areas be prioritized for development based on six criteria. The chart does not cover all possibilities, as many would be illogical or have a very low likelihood or occurrence. Some options are meant to demonstrate the absolute necessity for landowner consent and the importance placed on a property’s inclusion in the work plan.

RANKING	LANDOWNER CONSENT	CONTROL STRUCTURE IN WORK PLAN	ZERO ACQUISITION COST	EXISTING SETBACK PROTECTION	PUBLIC LAND	NRCS EASEMENT ABSENT
1	Y	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y	N
3	Y	Y	Y	Y	N	Y
4	Y	Y	Y	Y	N	N
5	Y	Y	Y	N	Y	Y
6	Y	Y	Y	N	Y	N
7	Y	Y	Y	N	N	Y
8	Y	Y	Y	N	N	N
9	Y	Y	N	Y	N	Y
10	Y	Y	N	Y	N	N
11	Y	Y	N	N	N	Y
12	Y	Y	N	N	N	N
13	Y	N	N	N	N	Y
14	Y	N	N	N	N	N
NOT CONSIDERED	N	N	N	N	N	N

This table is intended to guide the Commission when setting priorities regarding the development of floodwater storage, particularly when multiple opportunities are competing for funds within the Commission’s budget. However, it is recognized that other, unpredictable factors might influence priorities for the development of potential floodwater storage properties. Possible factors include:

- 1) Acreage and overall hydrological impact;
- 2) Fixed time-windows for a property’s availability;
- 3) The furtherance or preservation of a strategic Commission partnership;
- 4) Delays in permitting of higher-ranked projects;
- 5) Unusually high or low acquisition and setback flood protection costs;
- 6) Infeasible mitigation costs; and
- 7) Preference for a property’s development through non-Commission conservation programs.

ADOPTED BY COMMITTEE 3/30/2021.

ADOPTED BY COMMISSION 5/14/2021.