

Rehabilitating Habitat Complexes in Side Channels

Understanding a case history of channel changes downstream of Yellowtail Dam will help facilitate the restoration of side channels

Bottom Line

This study provides a comprehensive history of side channel formation and loss and associated channel changes before and after the construction of Yellowtail Dam and Afterbay, Montana, to determine the cause of habitat loss in side channels of the Bighorn River.

Better, Faster, Cheaper

This information will help improve river management of aquatic habitat by determining the cause of habitat loss and the most effective means of restoring side channels.

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Collaborators

Reclamation's

- Montana Area Office
- Science and Technology Program

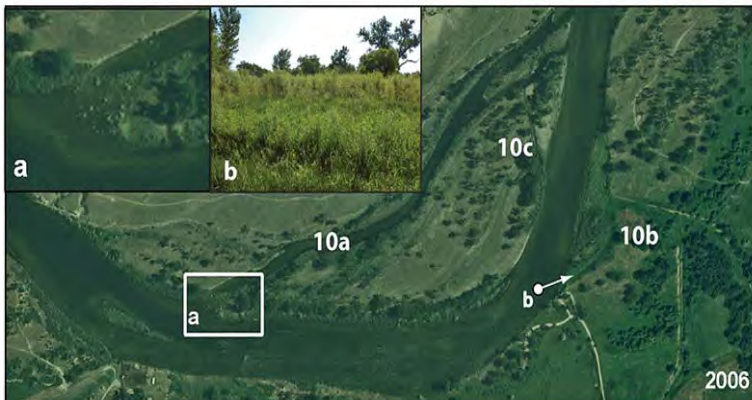
Western Area Power Administration
Montana Fish, Wildlife and Parks

Problem

Side channels provide critical spawning and rearing habitat for fish, including endangered species and sport fish. Not only do side channels provide critical habitat for fish such as juvenile salmonids, side channels also provide refuge for fish during floods and important habitat for riparian vegetation and wildlife.

Side channel habitat has been lost due to a combination of sediment deposition at side channel entrances, decreased flow magnitudes, loss of sediment supply, and vegetation encroachment. Previous studies on the downstream effects of large dams document decreases in flood peaks, sediment concentrations, and suspended load as well as degradation of channel beds, channel armoring, and increases in vegetation along river channels (e.g., Williams and Wolman, 1984). These changes tend to concentrate flow in the main channel while side channels are dewatered or receive flow only seasonally during larger flow releases, which may or may not be the corresponding time of year for spawning and rearing. Solutions are needed to rehabilitate side channels that have been progressively abandoned downstream from Reclamation structures and to prevent further losses of side channel habitat.

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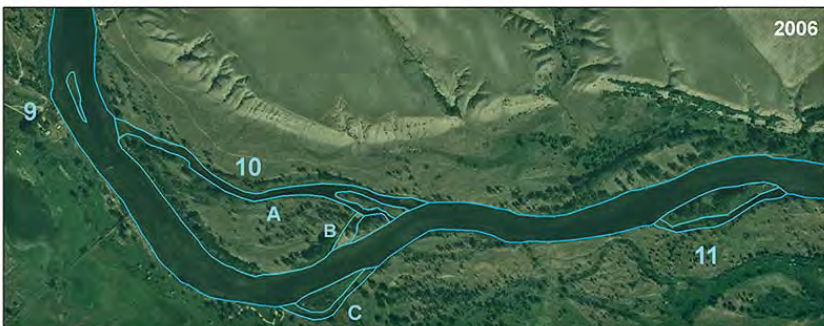
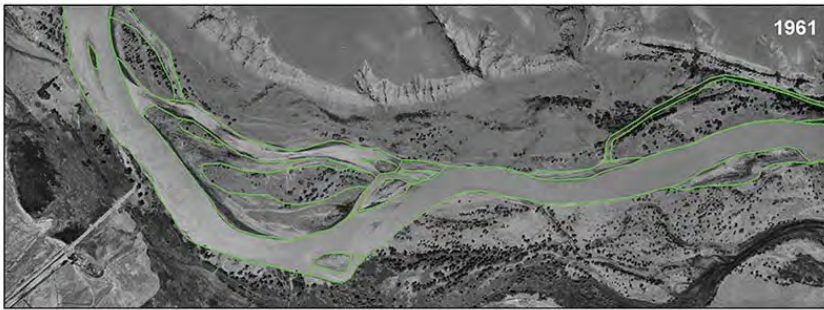
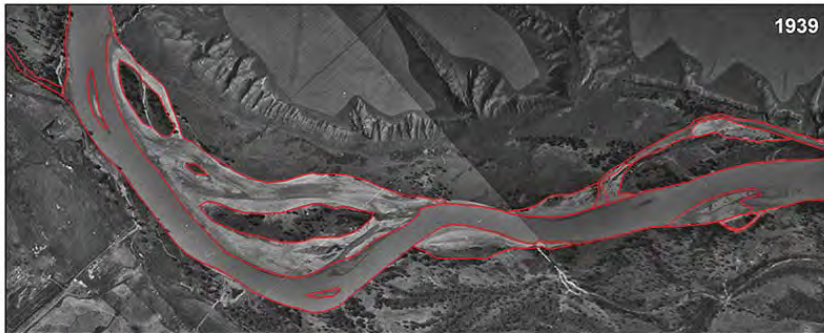
Channel changes at side channel complex 10 showing a comparison between 1960 and 2006; (a) vegetation establishment and sediment deposition in side channel 10a entrance; (b) vegetation growth in side channel 10b entrance.

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Solution

This Reclamation Science and Technology Program research project investigated ways to rehabilitate abandoned side channel habitat complexes through geomorphic investigations and hydraulic modeling. Potential solutions to reconnect abandoned side channels to the main stem included using in-stream structures, flow releases, gravel augmentation, and mechanical lowering of side channel entrances, etc. While these techniques have been applied on various rivers, there is still much that needs to be learned about the most effective method for a specific river system and, particularly, for river systems that have been impacted by the construction of dams.

The study was facilitated by a Memorandum of Understanding among multiple agencies and nonprofit groups including the National Park Service, Western Area Power Administration, State of Montana, State of Wyoming, Friends of the Bighorn River, Friends of the Bighorn Lake, Bighorn River Alliance, and Trout Unlimited.



Historical channel mapping for side channel complexes 9, 10, and 11 from 1939 to 2006.

“The research provided a case study of side channel abandonment and the solutions developed to address the loss of critical habitat downstream from a Reclamation structure. These solutions can be applied to other river systems that have experienced loss of side channel habitat as a result of dam construction.”

Jeanne Godaire
Geologist, Reclamation’s Technical Service Center

More Information
Science and Technology Program
www.usbr.gov/research/projects/detail.cfm?id=6257



Yellowtail Dam, Montana.



Yellowtail Reservoir at full pool in May. Photograph by Chuck Heinje.