Riparian Protections

Applicability

These Best Management Practices ("BMPs") summarize recommended approaches to protect riparian areas that were created or rejuvenated by the 2011 flooding on the Musselshell River. The 2011 Musselshell River flood has been estimated as having a return frequency of 167 years, and much of the area inundated had never seen flooding since white settlement. The overall objective of the recommendations is to capitalize on the remarkable riparian response to the 2011 flooding, because in systems like the Musselshell, these events are exceedingly rare. The information is based upon the evaluation of riparian trends and discussions with producers on-site, and is intended for producers and residents who manage properties where the flood resulted in colonization of native woody riparian vegetation, primarily willows and cottonwoods.

Description

General Land Office (GLO) survey maps show that in 1883, the Musselshell River historically supported a wide berth of woody vegetation where irrigated fields exist today. The floodplain clearing that has taken place over the past 130 years has reduced the ability of the river corridor to resist erosion and remain stable during floods. In 2011, flooding resulted in not only floodplain erosion, but also massive recruitment of riparian seedlings, both native and non-native. Cottonwood and willow germination was extensive throughout the river corridor, concentrating on bare sand, silt, and gravel deposits. Seedlings took hold in near-channel environments such as point bars, within abandoned channels, and on the floodplain throughout pastures and irrigated fields. Post-flood NRCS monitoring indicated that in places, up to 129,000 cottonwood seedlings and 17,000 willow seedlings had established right after the flood.

Figure 1. 1883 survey map of Musselshell Valley below Musselshell.

With regard to non-native and noxious weed species, a Noxious Weed Control BMP has been developed separately from this document. This Riparian Protection BMP has been developed to support the protection of native riparian species while balancing existing land uses in the river corridor. In many cases, seedlings established in flood sediment on irrigated fields have been largely cleared by field re-leveling and tillage. Riparian protections outlined in this BMP are not focused on irrigated fields or even

floodplain pasture, but rather abandoned channels and near-stream environments. These areas are important areas of livestock protection during storms. By maintaining a robust corridor of native riparian vegetation in the near-stream environment, the system will more rapidly re-stabilize following the 2011 flood to provide cover for livestock, wildlife habitat, and future flood damage resistance.

Figure 2. 2011 Seedlings in abandoned channels and on floodplain. Photo credit: Karin Boyd.

I. Riparian Conservation in Abandoned Channels

Abandoned channels maintain depressions that provide riparian vegetation easy access to shallow groundwater. Some of the most rapid and dense riparian recovery following the 2011 flood has been in such channels. Survival rates are high, the vegetation is dense, and the land is not conducive to crop production. These areas are recommended for active riparian protections through carefully managed land uses, especially short-term riparian fencing and/or long-term grazing systems.

Figure 3. Cottonwood and willow growth in 2011 abandoned channel. Photo credit: Karin Boyd.

II. Riparian Protections in Near-Channel Environments

Many of the 2011 seedlings established on a high floodplain surface that is typically in crop production. These areas, which are well-suited to flood or sprinkler irrigation, cultivation, and forage grazing by livestock and wildlife, will probably support some riparian trees in the long-term without concerted management, just by virtue of the sheer number of seedlings present. In contrast, areas within the active channel support some dense seedlings, but these areas will be prone to future scour by winter ice, summer thunderstorms, or spring runoff. Although the vegetation in the active channel is vulnerable, there may be significant opportunity to manage land uses to optimize riparian recovery in slightly higher areas which can be described as the "low floodplain". These would be near-channel areas that are above the most severe influences of winter ice and spring runoff, but close enough to the channel to provide shallow groundwater access and some river disturbance. In general, these areas are between the area wetted by the typical spring runoff (~2-year event) and the ~5-year flood. Most of this ground would be within the overall channel cross section that enlarged during the 2011 flood, and has remained several feet above the main channel. These near channel areas are where most seedlings typically establish, hence require special attention with respect to riparian protections. Riparian areas on the low floodplain and within abandoned channels should be carefully managed for livestock use, especially in the winter months when livestock can have the biggest impact on woody plants. If grazing is used to help manage vegetation, a grazing plan is necessary.

Figure 4. Example of channel margin area supporting new woody riparian growth. Photo credit: Chris Boyer, Kestrel Aerial Services, Inc.

III. Monitoring

Continued monitoring of riparian recovery is recommended to help identify the land use practices that support survival, and to define the physical locations along the river where seedlings are most successful. This can be done through systematic collection of transects, photos, and plot counts in a range of near-channel environments. Monitoring will also help identify the level of wildlife and/or livestock browse pressure on the plants, which will provide information to support effective wildlife management and livestock grazing strategies, as appropriate.