



MONITORING AND EVALUATION

Future management of Lee Metcalf NWR will require regular monitoring and directed studies to determine how ecosystem structure and function are changing, regardless of whether restoration options identified in this report are pursued or not. Ultimately, the success in restoring and sustaining communities and ecological functions/values at Lee Metcalf NWR will depend on how well management can support the integrity of the Bitterroot River system and its floodplain and emulate natural water regimes that supported specific habitat types and ecological processes. This report identifies the critical issues related to these management considerations, and acknowledges the difficulty in making certain changes. Furthermore, uncertainty exists about the ability of some management actions to make the desired changes in river integrity, water regimes and flow patterns, and ultimately responses in native vegetation and animal communities. Whatever changes future management of Lee Metcalf NWR makes, the work should be done in an adaptive management framework where: 1) predictions about community restoration and water issues are made (e.g., conversion of higher elevation floodplain areas to Grassland) relative to specific management actions (e.g., removing levees and changing water management regimes to short duration seasonal flooding) and then 2) follow-up to systematically monitor and evaluate ecosystem responses to the action. Critical issues that need this monitoring are described below.

Maintaining the Physical/Hydrological Integrity of the Bitterroot River and its Floodplain

If actions are taken to allow the Bitterroot River to migrate into and through its floodplain at Lee Metcalf NWR then several ecosystem consequences might be expected including changes in the configu-

ration and path of the Bitterroot River, scouring and deposition of floodplain surfaces, and enhanced connectivity and frequency of overbank and backwater flooding into the floodplain. Specific data should be collected on:

- Channel morphology and bank erosion/stabilization along the refuge
- Frequency, timing, depth, location, and duration of overbank and backwater flooding of Bitterroot River water into the floodplain
- Effects on non-USFWS structures and lands, including the railroad bed and bridge, private lands areas above and below the refuge, and pond levees and infrastructure on the refuge

Restoring Natural Regimes and Water Flow Patterns

This report recommends many changes to water management and water flow patterns on Lee Metcalf NWR. Most changes involve restoring at least some natural water flow through floodplain drainages and tributaries and seasonally- and annually-dynamic flooding and drying regimes that will reduce the permanence of surface water on the site. The following data and monitoring programs are needed:

- Document annual water budgets and use for all management ponds including source, delivery mechanism, and extent and duration of flooding. These data also will provide data on how existing water rights are used and maintained.
- Water movement through and across the refuge, including routing through natural and man-

made drainages in the floodplain and sheetflow across terraces and alluvial fans.

- The efficiency and effectiveness of all water-control structures.
- Water quality in all drainage and floodplain areas.

Long Term Changes in Vegetation and Animal Communities

One important goal at Lee Metcalf NWR is to restore native plant communities in composition and distribution similar to historic conditions where possible. Certain past developments and changes in hydrology will constrain complete restoration of communities in exactly the same position and size as in pre-alteration periods. Nonetheless, general changes in community distribution should occur if the recommended changes in water management, topographic

restoration, and annual disturbances are followed. Specific monitoring needs are:

- Distribution and composition of major plant communities in all areas of the refuge.
- Survival, growth, regeneration, and reproduction of key individual species associated with each community/habitat type.
- Presence and distribution of invasive and exotic species and efficacy of control methods
- Occurrence and abundance of select animal species representing various taxon, guilds, and status. For example, response of bull trout to reestablishing more natural and complete connectivity between the Bitterroot River and Burnt Fork Creek.



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