



MONITORING AND EVALUATION

Several important data sets (including soil and elevation maps, vegetation inventories, and surveys of animal population), used in the HGM evaluation for Cokeville Meadows were somewhat dated, incomplete, or measured at relatively large spatial scales. As these data become more contemporary and comprehensive, certain analyses and mapping developed in this study should be refined. Future management of Cokeville Meadows NWR should include regular monitoring and directed studies to determine how ecosystem structure and function are changing, regardless of whether restoration and management options identified in this report are undertaken. Ultimately, the success in restoring and sustaining communities and ecosystem functions/values at Cokeville Meadows NWR will depend on how well the physical and hydrological integrity of the Bear River Valley is protected and how key ecological processes and events, especially pulsed short duration spring flooding, can be restored or emulated by management actions. Uncertainty exists about the ability to make some system changes because of boundary, water rights and historical uses, and land uses in the larger Bear River watershed, especially upstream from the refuge. Also, techniques for controlling or reducing introduced plant species, such as creeping foxtail, are not entirely known.

Whatever future management actions occur on Cokeville Meadows NWR, activities should be done in an adaptive management framework where: 1) predictions about community response and water issues are made (e.g., reduced occurrence of robust emergent species and possibly creeping foxtail) relative to specific management actions (e.g., restoring long-term alternating drying vs. prolonged flooding in floodplain depressions) and then 2) follow-up monitoring is conducted to evaluate ecosystem responses to the action. Critical information and

monitoring needs for Cokeville Meadows NWR are identified below:

KEY BASELINE ECOSYSTEM DATA

Important site- and regionally-specific data that are needed for the Cokeville Meadows region include:

- Detailed soils mapping and description, especially within the alluvial floodplain areas.
- More refined topographic information, preferably to < 1 foot accuracy.
- Comprehensive inventory and mapping of all vegetation, including invasive and noxious species.
- Comprehensive surveys of key animal species that represent major taxa, species of concern or management emphasis, and primary trophic levels.

RESTORING NATURAL WATER REGIMES AND WATER FLOW PATTERNS

This report suggests several physical and management changes to help restore some more natural topography, water flow, and flooding dynamics in floodplain habitats. Most changes involve restoring at least some more natural water flow through natural drainages and tributaries and across floodplain meadows in a sheetflow manner and to manage depressions and impounded sites for more seasonally- and annually-dynamic flooding and drying regimes.

The following monitoring will be important to understand effects of these changes if implemented:

- Annual monitoring of water use for refuge areas including source, delivery mechanism or infrastructure, extent and duration of flooding/drying, and relationships with non-refuge water and land uses. These data will also document how existing water rights are used and maintained.
- Documentation of how water moves across floodplain areas including interactions with non-refuge lands.
- Evaluation of surface and groundwater interactions and flow across and through alluvial fans and terraces onto floodplain areas and eventual discharge into the Bear River.
- Periodic monitoring of water quality in all drainage and floodplain areas.

Cokeville Meadows NWR is sparse. In addition to determining current distribution and dynamics of species, long term survey/monitoring programs are needed to understand changes over time and in relation to management activities (e.g., USFWS 2007). Important survey/monitoring programs are needed for:

- Distribution and composition of major plant communities including expansion or contraction rates of introduced and invasive species.
- Survival, growth, and regeneration rates of willow and cottonwood in riparian forest corridors.
- Abundance, chronology of use, survival, and reproduction of key waterbird and neotropical migrant songbirds such as dabbling ducks, sandhill crane, American bittern, etc.
- Occurrence and abundance of ungulates.
- Occurrence and abundance of amphibians, reptiles, and fish.

LONG TERM CHANGES IN VEGETATION AND ANIMAL COMMUNITIES

As stated, comprehensive baseline data on historic, and even current, plant and animal communities for



Karen Kyle

