INTRODUCTION

Cokeville Meadows National Wildlife Refuge (NWR) is a relatively new refuge authorized to contain 26,657 acres within an approved refuge boundary in Lincoln County, Wyoming (Fig. 1). Current NWR lands include 6,466 acres owned in fee title by the U.S. Fish and Wildlife Service (USFWS), 1,672 acres protected with conservation easements, 758 acres in Farmers Home Administration (FmHA) lands, and a 363 acre State of Wyoming land lease for a total of 9,259 acres. Cokeville Meadows NWR lies within the Bear River Valley and historically contained diverse floodplain and upland habitats that supported large numbers of breeding and migrating waterbirds and Neotropical migrant songbirds, wetland and upland associated mammals, endemic amphibian and reptile species, and a few native western riverine fish species.

The Bear River and its floodplain are the primary ecological features on Cokeville Meadows NWR. The Bear River originates in the Unita Mountains in Utah and flows northward into Wyoming and through the Cokeville Meadows NWR reach. Water in the Bear River now is seasonally impounded in some areas immediately upstream and in Cokeville Meadows NWR and is diverted into floodplain meadows and grasslands through a system of ditches, dikes, and water-control structures. Other water diversions occur from major tributaries to the Bear River, especially the Smith's Fork River. This diversion of river waters floods wetland depressions, irrigates meadows and supports extensive haying and grazing of the floodplain, and provides irrigation of cropland and tame grass fields such as alfalfa within the refuge acquisition boundary. Numerous small levees are present along sections of the Bear River and within the river floodplain to facilitate irrigation. Other levees have been intentionally constructed to create seasonal wetland impoundments. Many roads and ditches cross the floodplain.

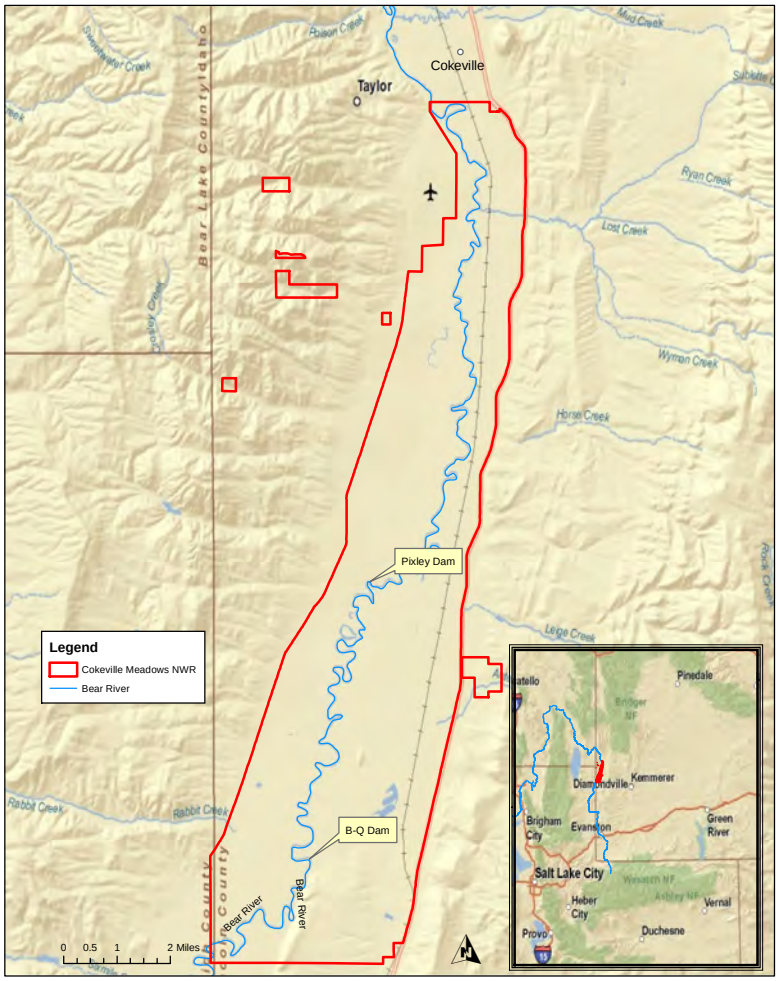

Figure 1. General location of the approved acquisition boundary for Cokeville Meadows NWR, WY.

The eastern boundary of the refuge has the greatest impacts from transportation where U.S. Highway 30 and a railroad grade transect the coalescing alluvial fans. Collectively, these physical structures have altered the hydrology of the Bear River and its floodplain, and along with many decades of haying and grazing, have contributed to changed vegetation communities in the system. Several introduced and invasive plant species are present on and adjacent to refuge lands.

In 2009, the USFWS initiated a Comprehensive Conservation Plan (CCP) for Cokeville Meadows NWR. The CCP process seeks to articulate the management direction for the refuge for the next 15 years and it develops goals, objectives, and strategies to define the role of the refuge and its contribution to the regional landscape in which it sets, and the overall mission of the NWR system. At Cokeville Meadows, the CCP is being facilitated by an evaluation of ecosystem restoration and management options using Hydrogeomorphic Methodology (HGM). HGM analyzes historic and current information about: 1) geology and geomorphology, 2) soils, 3) topography and elevation, 4) hydrologic condition and flood frequency, 5) aerial photographs and cartography maps, 6) land cover and vegetation communities, 7) key plant and animal species, and 8) physical anthropogenic features of the Cokeville ecosystem. HGM now is commonly used to evaluate ecosystems on NWR's (e.g., Heitmeyer and Fredrickson 2005, Heitmeyer et al. 2006, Heitmeyer and Westphall 2007, Heitmeyer et al. 2009) and provides a context to understand the physical and biological formation, features, and ecological processes of lands within the NWR and surrounding region. This historical assessment then provides the foundation, or baseline condition, to determine what changes have occurred in the abiotic and biotic attributes of the ecosystem and how these changes have affected ecosystem structure and function. Ultimately, HGM helps define the capability of the area to provide key ecosystem functions and values and identifies options that can help to restore and sustain fundamental ecological processes and resources.

This report provides HGM analyses for Cokeville Meadows NWR with the following objectives:

1. Identify the pre-European settlement (hereafter Presettlement) ecosystem condition and ecological processes in the Bear River Valley near Cokeville Meadows NWR.
2. Evaluate changes in the Cokeville Meadows NWR ecosystem from the Presettlement period with specific reference to alterations in hydrology, vegetation community structure and distribution, and resource availability to key fish and wildlife species.
3. Identify restoration and management options and ecological attributes needed to successfully restore specific habitats and conditions within the Cokeville Meadows NWR region.

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