



INTRODUCTION

Lee Metcalf National Wildlife Refuge (NWR), owned and managed by the U.S. Fish and Wildlife Service (USFWS), is a relatively small (ca. 2,800 acre) refuge in Ravalli County in the Bitterroot Valley of southwest Montana about 20 miles south of Missoula (Fig. 1). The refuge was established in 1963 and was originally named the Ravalli NWR. The name was changed to Lee Metcalf NWR in 1978 in honor of long-time U.S. Senator Lee Metcalf who was instrumental in establishing the refuge and was involved in many other conservation initiatives. The authorizing purposes for the refuge were: 1) “for use as an inviolate sanctuary, or for any other management purpose, for migratory birds” (Migratory Bird Conservation Act, 16 USC 715d) and 2) “suitable for incidental fish and wildlife-oriented recreational development, the protection of natural resources, and the conservation of endangered species or threatened species” (16 USC 460k-2; Refuge Recreational Act 16 USC 460k, as amended).

Lee Metcalf NWR borders the Bitterroot River between the scenic Bitterroot and Sapphire Mountain ranges and is within a rapidly expanding human population area of Montana. This unique location includes a diverse mosaic of western mountain valley ecosystem types and provides many public use opportunities including recreation, education and discovery, and research activities. Currently, intensive agriculture, housing, strip malls, and other urban amenities in the Bitterroot Valley surround the refuge. A golf course is present at the refuge boundary and has a large number of daily visitors. The nearby Bitterroot National Forest is visited by several thousand people each year, and Lee Metcalf NWR has over 140,000 visitors and

2,000 hunters annually. The refuge has an active Friends Group and volunteer program.

The Lee Metcalf NWR ecosystem has been altered by extensive roads, ditches, levees, dams, and water-control structures in the Bitterroot River floodplain; tile drainage and discharge from surround agricultural lands; water diversions and irrigation systems adjacent to, and within, the refuge; and expansion of invasive plant species. A frontline levee

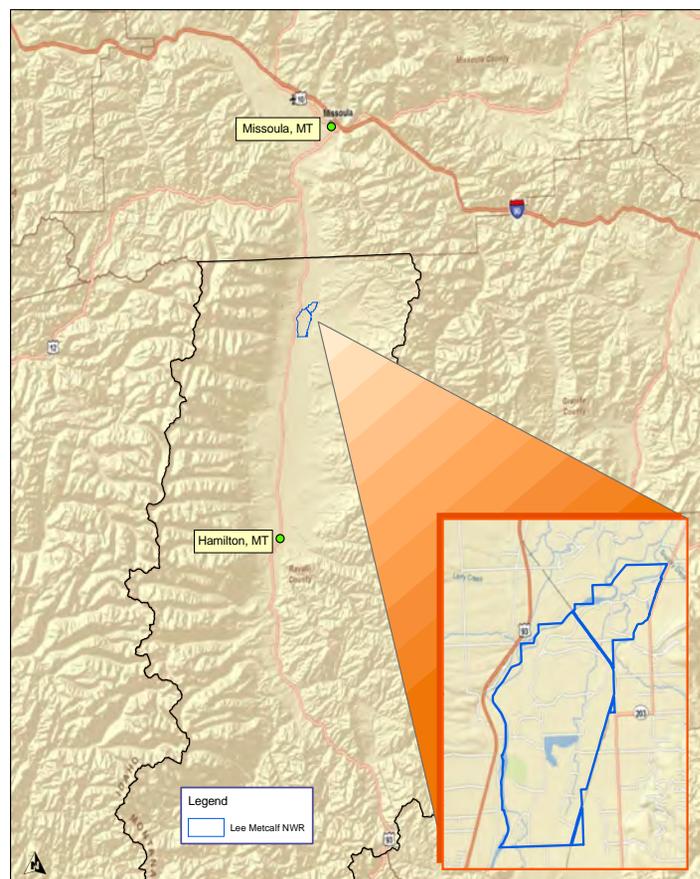


Figure 1. General location of Lee Metcalf National Wildlife Refuge.

along the Bitterroot River was constructed in the 1970s after a major flood event in 1974 and a complex network of water-control infrastructure was constructed for wetland management impoundments after the refuge was established. The refuge does not have senior water rights; but adjudication is an ongoing process to be completed in 2015.

Three major irrigation ditches (McElhaney, Warburton, and Alleman Ditches) flow into and through the refuge. Additionally two primary tile drain ditches (Middle and South Drains) that originate on surround private farm lands provide year-round water flow into the refuge. Extensive bank erosion on the Bitterroot River is present in many locations, and in some places levees and other water-control structures in wetland impoundments or “ponds” are in danger of being compromised by this erosion. Extensive areas of the Bitterroot River channel are rip-rapped to control erosion and river channel migration. Part of the river also has been channelized immediately upstream from an old railroad bridge across the Bitterroot River.

Past management of Lee Metcalf NWR primarily has been directed at increasing waterfowl production, especially dabbling ducks. Consequently, a series of wetland impoundments were constructed to provide more annually stable and consistent water levels on the refuge. This more prolonged water regime gradually shifted plant communities to wetter types, including extensive monocultures of cattail in deeper areas. Other intensive waterfowl production management included establishment of dense nesting cover and construction of predator fences to enhance duck nesting success; construction of islands and level-ditch dredge and spoil areas within impoundments; and compartmentalization of wetland units.

In 2009, the USFWS initiated preparation of a Comprehensive Conservation Plan (CCP) for Lee Metcalf NWR. The CCP process seeks to articulate the management direction for the refuge for at least the next 15 years and it develops goals, objectives, and strategies to define the role of the refuge and its contribution to the overall mission of the National Wildlife Refuge system. At Lee Metcalf NWR, the CCP process is being facilitated by an evaluation of ecosystem restoration and management options using Hydrogeomorphological Methodology (HGM). HGM now is commonly used to evaluate ecosystems on National Wildlife Refuges (e.g., Heitmeyer and Fredrickson 2005, Heitmeyer et al. 2006, Heitmeyer and Westphall 2007, Heitmeyer et al. 2009) by obtaining and analyzing historic and current information about:

1) geology and geomorphology, 2) soils, 3) topography and elevation, 4) hydrology, 5) plant and animal communities, and 6) physical anthropogenic features of refuges and surrounding landscapes. Specifically, HGM analyses for Lee Metcalf NWR: 1) uses the above information to develop appropriate, realistic, and sustainable options for “habitat-based” objectives on the refuge; 2) seeks to emulate natural hydrological and vegetation/animal community patterns and dynamics within the Bitterroot River floodplain ecosystem; 3) understands, complements, and at least partly mitigates negative impacts and alterations to Lee Metcalf NWR and surrounding lands; 4) incorporates “state-of-the-art” scientific knowledge of ecological processes and requirements of key fish and wildlife species in the region; and 5) identifies important monitoring needs of abiotic and biotic features.

This report provides HGM analyses for Lee Metcalf NWR with the following objectives:

1. Identify the pre-European settlement (hereafter “Presettlement”) ecosystem condition and ecological processes in the Bitterroot River floodplain near Lee Metcalf NWR.
2. Evaluate changes in the Lee Metcalf 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 area.



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