

fishes are described. The remainder of this section describes the invasive species, wildlife diseases, and contaminants found on the refuge.

Unless otherwise noted, the information in this section is from unpublished Service data; a hydrogeomorphic (HGM) report entitled “An Evaluation of Ecosystem Restoration and Management Options for Lee Metcalf National Wildlife Refuge,” developed by Greenbrier Wetland Services (Heitmeyer et al. 2010); or from another habitat analysis entitled “Lee Metcalf National Wildlife Refuge 2009 Assessment of Upland Units” prepared by Aeroscene Logic (Graham 2009). These data and reports are available at the refuge headquarters.

LAND COVER AND VEGETATION COMMUNITIES

The Bitterroot Valley is composed of the intermountain and foothill grassland ecotype cut and formed by the meandering Bitterroot River that creates core riparian zones and wetland areas. This ecotype harbors more wildlife communities than any other in Montana (MFWP 2005). The relatively low precipitation in the Bitterroot Valley prohibits the establishment of expansive areas of densely wooded or herbaceous wetland vegetation communities. Consequently, the distribution of woody or wetland-type species is restricted to areas of greater soil moisture—primarily sites next to the Bitterroot River and in floodplain drainages and depressions (Heitmeyer et al. 2010).

Historically, vegetation in the Bitterroot River floodplain on the Lee Metcalf Refuge included seven distinct habitat and community types: (1) riverfront-type forest, (2) floodplain gallery-type forest, (3) persistent emergent wetland, (4) wet meadow herbaceous, (5) floodplain and terrace grassland, (6) saline

grassland, and (7) grassland-sagebrush. Figure 15 is a composite model of potential historical vegetation communities present on the refuge before significant alteration and development beginning in the late 1800s; community identification was made on the basis of HGM attributes (table 5).

The Bitterroot River floodplain at the refuge historically supported a wide diversity of vertebrate and invertebrate animal species associated with the interspersed riparian woodlands, floodplain wetland, and grassland habitats (appendix G). Resources used by animal species were seasonally dynamic and also annually variable depending on long-term climate and riverflow and flooding patterns. In the refuge region, most bird species exploited seasonal resources during migration and in the summer, but a few species overwintered in the area. Many waterbirds likely stayed in the Bitterroot Valley during wet summers to breed when floodplain wetlands had more extensive and prolonged water regimes. In contrast, limited numbers of species and individuals probably bred in the valley during dry years. In the years when wet springs combined with carryover water in the fall, larger numbers of waterbirds would stopover in the valley during fall migration. In average or dry years, however, little wetland habitat would have been available in fall except in historical river channels. Cold winter temperatures freeze most wetlands in the floodplain, but the river and a few springs remain open throughout winter in most years and provided sanctuary, loafing, and some foraging resources for some species. Amphibian and reptile annual emergence and life cycle events coincided with spring thaw and flooding and the availability of key arthropod and other prey species. Larger mammals moved in and out of the floodplain

Table 5. Hydrogeomorphic matrix of historical distribution of vegetation communities and habitat types on Lee Metcalf National Wildlife Refuge, Montana.

<i>Habitat type</i>	<i>Geomorphic surface</i> ¹	<i>Soil type</i>	<i>Flood frequency</i> ²
Riverfront forest	Qal, Qaty	Riverside, Riverwash, Chamokane gravelly-sand, sand, fine sand-loam	1YR-I
Gallery forest	Qal	Chamokane loam and loamy sand	2-5YR
Robust emergent-shrub or scrub	Qal	Slocum poorly drained loam	1YR-P
Wet meadow	Qal	Slocum deep loams	2-5YR
Grassland	Qal, Qafy	Corvallis, Hamilton, Grantsdale silt loam	>5YR
Grassland-saline	Qal	Corvallis saline silt loam	>5YR
Grassland-sage	Qafy	Lone Rock mixed erosional alluvial fan	>10YR

¹ Qal = Quaternary alluvial deposits, Qafy = Quaternary younger alluvial fan and outwash terrace complex, Qaty = late Riverside and Hamilton terraces.

² 1YR-I = annually flooded for intermittent periods, primarily during high water periods of the Bitterroot River; 2-5YR = surface inundation at a 2- to 5-year recurrence interval; 1YR-P = annually flooded primarily for most of the year; >5YR = surface inundation at a greater than 5-year recurrence interval; >10YR = surface inundation rare except for lower elevations during extreme flood events.

Source: Heitmeyer et al. 2010.