# BEAR RIVER WETLANDS COMPLEX

## Regional Wetlands Conservation Plan

## Wyoming Bird Habitat Conservation Partnership

**Version 1.0**
**May 12, 2014**

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## INTRODUCTION

The Bear River flows through portions of Wyoming, Idaho, and Utah and eventually terminates in the Great Salt Lake. The Bear is the largest river in North America with no outlet to the ocean. Its watershed encompasses diverse ecological types including montane, forest, sagebrush-steppe, grassland, riparian, wetland, and aquatic habitats. The Nature Conservancy (Copeland et al. 2010) and the Wyoming Joint Ventures Steering Committee (WJVSC 2010) recently identified the Bear River as one of Wyoming's 9 priority wetland complexes that are exceptionally important to conservation of the state's wetlands and dependent wildlife (WJVSC 2010). This plan describes the landscape and wetland resources of the Bear River Priority Area, and outlines conservation needs, objectives and strategies.

## GENERAL DESCRIPTION AND LAND USE

The Bear River Wetlands Complex (Fig. 1) covers approximately 386,500 acres in Lincoln and Uinta counties, Wyoming. For purposes of this plan, approximately 6,500 acres of the Bear River floodplain from Cokeville, WY north to the confluence with the Thomas Fork were added to the complex originally delineated by Copeland et al. (2010) due to the similar habitat. Wetlands encompass about 52,000 acres, or approximately 13.5% of the total priority area. Considering only about 1.5% of Wyoming's area is wetlands, the Bear River complex represents a significant concentration of the state's wetlands.

Average annual precipitation is 12" at Evanston, WY, 10" at Sage, WY, and 14" at Border, WY near the north end of area. Significantly more precipitation falls within the higher elevations surrounding the complex, much of it as snow. Elevations range from 6,100 ft north of Cokeville to about 8,000 ft in the upper tributaries near the Utah state line. The average frost-free growing season is about 60-80 days throughout most of the wetlands complex area (Curtis and Grimes 2004).

The prevalent vegetation community is sagebrush-grassland. Dominant native species include big sagebrush (*Artemesia tridentata*), thickspike wheatgrass (*Elymus lanceolatus*), Sandberg bluegrass (*Poa secunda*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Common non-native plants are crested wheatgrass (*Agropyron cristatum*) and cheatgrass (*Bromus tectorum*). Serviceberry (*Amelanchier alnifolia*)) and tree species [e.g. aspen (*Populus tremuloides*) and Rocky Mountain juniper (*Juniperus scopulorum*)] become more common at higher elevations and within snow-catchment areas. Riparian and wetland habitats are mostly found along stream and river corridors in the complex. Prevalent riparian species include narrowleaf cottonwood (*Populus angustifolia*), willow (*Salix spp.*), basin wildrye (*Leymus cinereus*), smooth brome (*Bromus inermis*), sedges (*Carex spp.*), and a variety of native and non-native forbs. Common wetland plants include sedges, rushes (*Juncus spp.*), bulrushes (*Schoenoplectus spp.*), cattails (*Typha spp.*), and reed canarygrass (*Phalaris arundinacea*). Much of the 52,000 acres of wetland habitat in the Bear River Complex is maintained by flood-irrigation and dominated by non-native Garrison creeping meadow foxtail (*Alopecurus arundinaceus*).

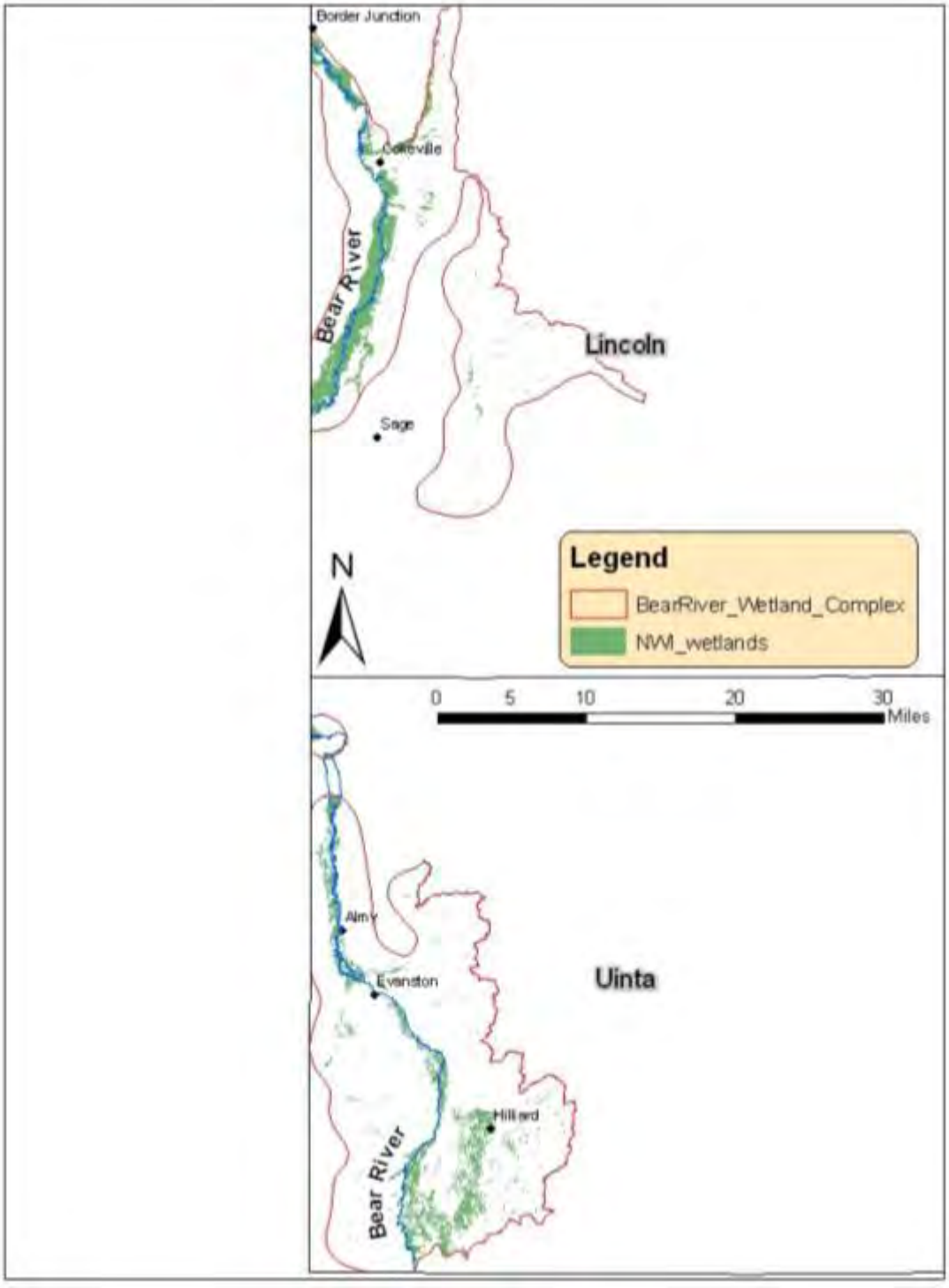


Fig. 1. Bear River Wetlands Complex.

The wetland complex is 63% private land, with the remainder a mix of state and federal lands. The dominant land use is agriculture associated predominantly with livestock production. Non-irrigated lands are mostly native rangeland, but include a minor component of tame-grass pastures. Irrigated lands cover 15% of the wetland complex and consist of mostly uncultivated native or tame grasses that

are harvested for hay during the growing season and grazed in the dormant season. Some cultivated haylands (e.g. alfalfa) are also present in portions of the priority area. Other types of irrigated or dryland crops are not common. Consequently, few if any Conservation Reserve Program (CRP) lands have been set aside. Livestock grazing and/or haying occur on both private and public lands although management goals and practices may differ. One exception is the portion of Fossil Butte National Monument within the complex, which is completely protected.

## Cokeville Meadows National Wildlife Refuge

Cokeville Meadows National Wildlife Refuge is a unique and important land-holding within the priority area because it protects a large area of wetlands that are crucial to breeding and migratory wetland-dependent wildlife. The 26,657 acre refuge acquisition area was approved in 1992 to preserve and protect wetland habitat for migratory, breeding, resident birds, and other wildlife. The refuge currently owns 6,466 acres and holds 2,473 acres of easements within the acquisition boundary. The refuge continues to secure additional land area inside the authorized acquisition boundary through the addition of fee-title land or conservation easements from willing sellers. Refuge habitats include narrow riparian corridors, robust emergent wetlands, "wet meadow" sedge and grass communities, and upland sagebrush/grassland communities. Early succession riparian forest species such as willow are present on newly deposited and scoured sand-silt and gravelly soils near the active channel of the Bear River. The Refuge has been managed primarily for waterfowl nesting and production. Utilizing existing irrigation ditches as the water delivery system, the refuge staff have improved and enhanced wet meadow habitats along the Bear River. Water level manipulations, irrigation, haying and livestock grazing are the primary tools used to manage wetland habitats on the refuge. The establishment of this refuge underscores the value of the complex for wetland-dependent species (USFWS 2013). Habitat management on the refuge largely replicates that on adjacent private lands, which has created a larger landscape of similar habitats used by wetland-dependent species during spring, summer, and fall.

## Wetland Characteristics & Hydrology

A basic understanding of the hydrology of the watershed is essential to understand wetland dynamics within the Bear River complex. The headwaters originate within the Uinta Mountains of northeast Utah. Tributaries converge to form the Bear River, which flows northward into Wyoming (Fig. 2). At roughly the point where the Bear River leaves the mountains and enters Wyoming, it forms a broad floodplain comprised predominantly of irrigated haylands. Major tributaries such as LaChapelle and Yellow creeks have natural riparian wetlands in the upper reaches. However, the majority of wetlands in the southern segment of the Bear River Complex, including those associated with Sulphur Creek, Mill Creek, and the Bear River proper, are sustained or enhanced by flood irrigation. Human-altered stream and wetland hydrology is a common theme throughout the Bear River wetland complex. Some irrigation water is diverted from points in Utah before it enters Wyoming. A detailed discussion of the mechanisms by which altered hydrology has impacted riparian habitat is beyond the scope of this plan. In general, diversion and application of irrigation water have reduced frequency and energy of flood events, increased the duration of consistent, moderate stream flows in early-summer, and decreased stream

flows in mid- to late-summer. The decrease of channel-forming flows during flood events and increased duration of moderate stream flows have caused stream channels to become incised (Degeorgio et al. 2010). This lowers the water table, resulting in loss of natural riparian wetlands. However, traditional flood-irrigation on the Bear River floodplain has replaced natural flood events and maintains some historic wetlands (e.g., old oxbows) while creating or enhancing others.

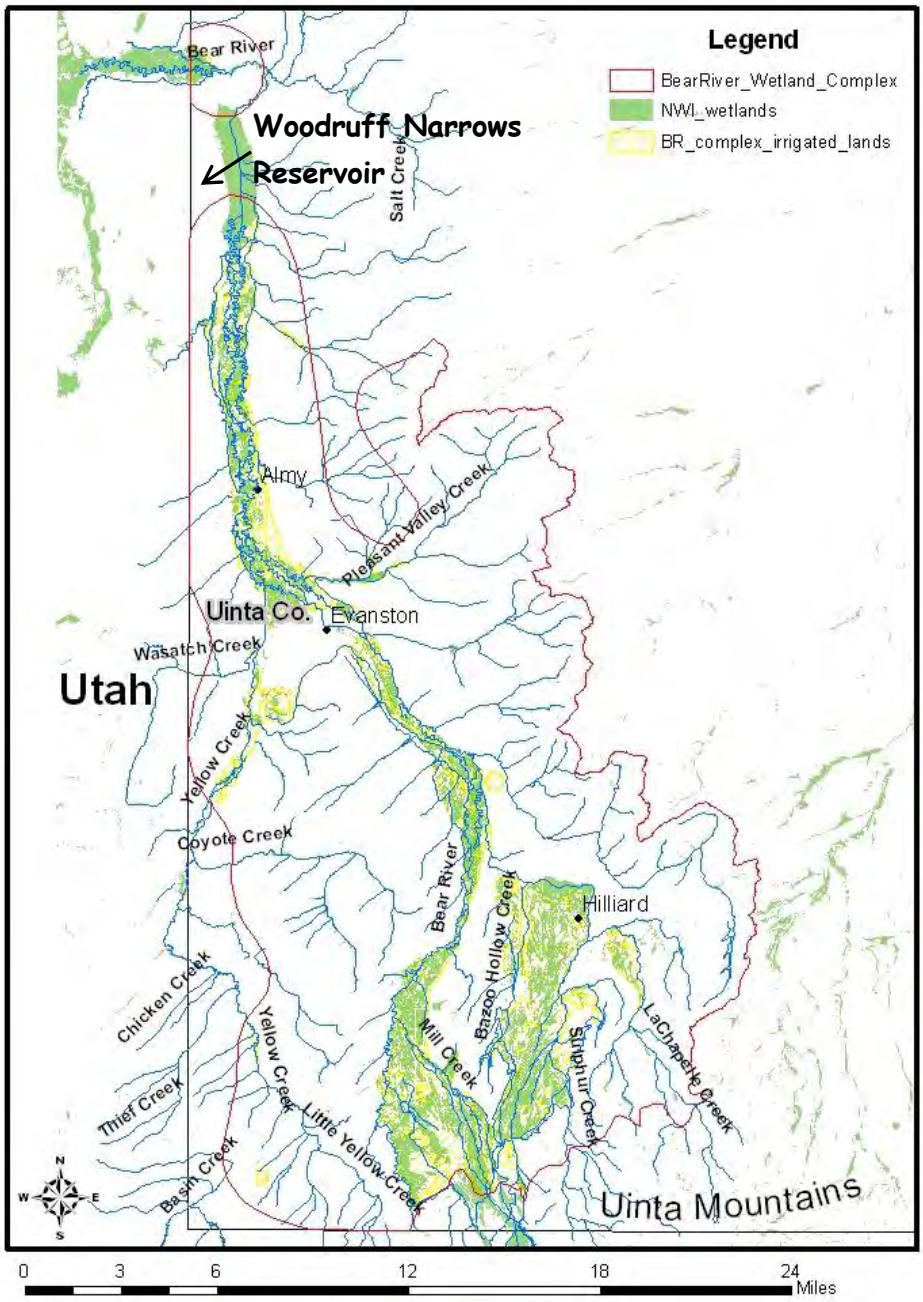


Fig. 2. Southern portion of the Bear River Wetlands Complex.

At lower elevations of the Bear River floodplain, precipitation decreases, evaporation increases, and the hydrograph of the Bear River and its tributaries becomes increasingly altered. The role of flood-irrigation in maintaining wetlands is increasingly important north of Evanston and beyond. Fifteen miles north of Evanston, Woodruff Narrows Reservoir is an on-channel dam that stores early season flows and releases them over an extended period. Tributaries such as Pleasant Valley Creek contain some non-irrigated riparian wetlands, but natural wetlands are less prevalent than in the upper reaches of the complex south of Evanston due to less consistent stream flows.

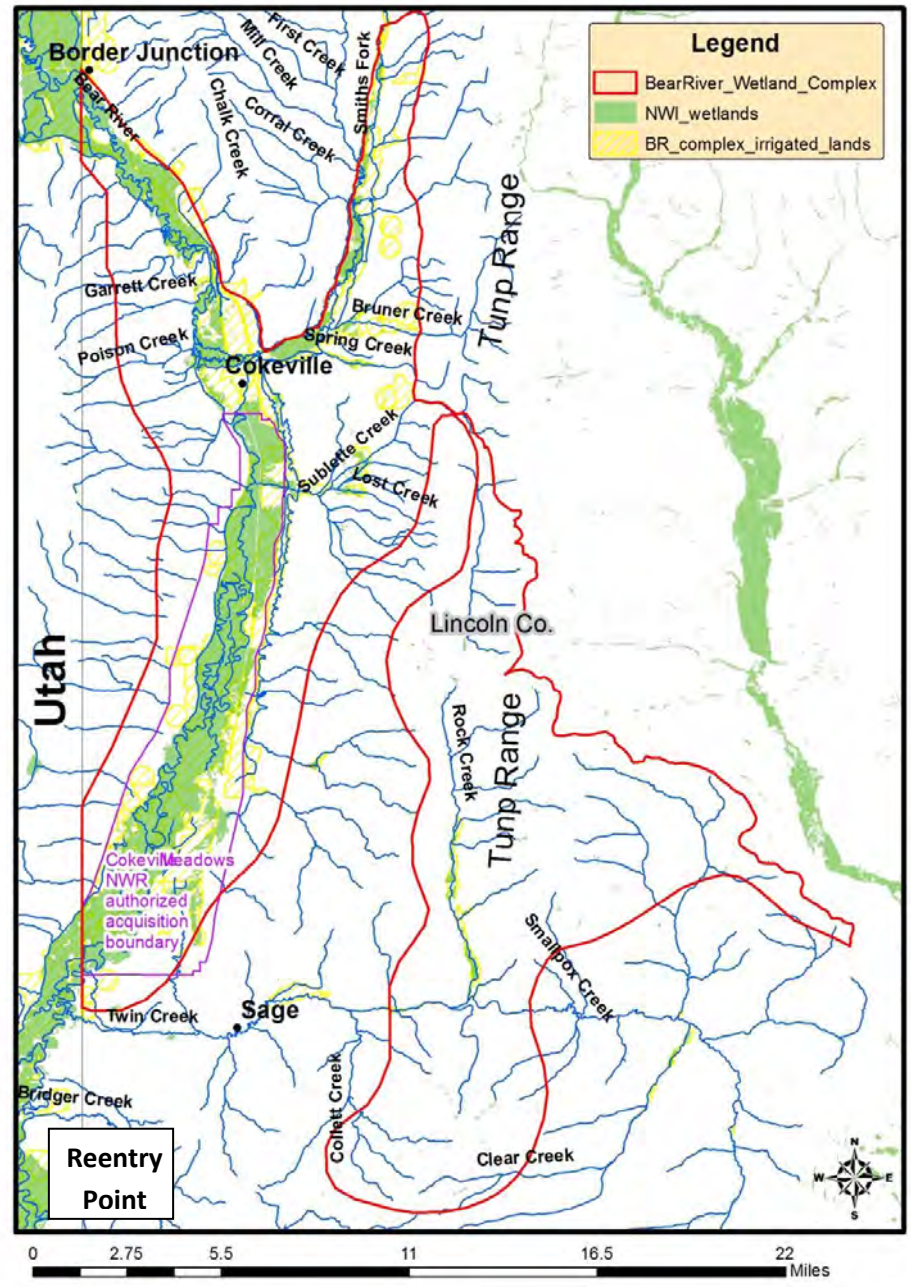


Fig. 3. Northern portion of the Bear River Wetlands Complex.

The Bear River flows out of Wyoming 20 miles downstream from Evanston and then reenters in Lincoln County another 21 miles north (Fig. 3). The reentry point also marks the southern end of the authorized acquisition boundary for Cokeville Meadows National Wildlife Refuge. The Bear River in Lincoln County has an even broader floodplain and flatter slope. As in northern Uinta County, the hydrology of this portion of the Bear River and associated wetlands is highly influenced by irrigated agriculture. As well, the vast majority of wetland acreage is irrigated hayland. A significant portion of the Twin Creek and Rock Creek watersheds in the Tunp Mountain Range is also within the wetland complex. Most of the wetlands in this portion are small, non-irrigated wetlands associated with riparian areas at higher (>7,000 ft) elevations. The Sublette Creek watershed enters the Bear River about 3 miles south of Cokeville and also includes a significant number of irrigated and non-irrigated wetlands.

A major tributary, the Smiths Fork contributes significant flow to the Bear River about 0.5 mi north of Cokeville. The Smiths Fork drains high elevations in the southern Wyoming Range, and its hydrograph is more similar to historic natural flows. The riparian area along the Smiths Fork contains many irrigation-maintained wetlands as well as natural wetlands dominated by willows. The Bear River Wetland Complex continues north from Cokeville to where the Bear River flows into Idaho. Irrigation-enhanced wetlands typify this portion of the complex, albeit with more natural hydrology, morphology, and plant species than exist south of Cokeville. This is likely due to the contributing influence of the Smiths Fork.

## Wetlands Management, Habitat & Wildlife Use

Interrelationships among climate, soils, topography, and land management within the Bear River Complex have produced diverse wetland habitats. Non-irrigated riparian wetlands on the smaller tributaries are generally linear and were historically vegetated with willows and sedges. Saturated soils in these wetlands are closely juxtaposed with uplands and the associated plant communities provide an important ecotone for species that favor these conditions. Beaver activity also plays an important role in maintaining and enhancing riparian wetlands (Fig. 4).

The largest wetland areas are within the floodplains of the Bear River, Mill Creek, and the Smiths Fork. Historically, the low-gradient streams flowing through these floodplains flooded almost annually, depositing sediment and cutting new channels. As a result, the floodplains have an abundance of ancient oxbows and side channels that formed as the channel migrated over time. Floodplains also had the best soils, topography, and water availability to flood-irrigate and produce hay for feeding livestock in winter. Flood-irrigation remains the most common agricultural practice on the floodplains (WWDC 2004). With few exceptions, local ranchers historically hayed around or through the old oxbows and channels, but did not fill or aggressively level them for hay production (Fig. 5). Low dikes were built on many fields to hold back irrigation water and flood higher elevation lands, resulting in site conversions from upland to wetland vegetation. Although the created wetlands that formed behind irrigation dikes often do not contain hydric soils indicative of historic wetlands, they afford similar functional values and benefits to wildlife.

Irrigation water, conveyed through variously developed systems of ditches is typically turned onto the fields in April. Water depths range from a few inches to a couple feet depending on topography. A diverse assemblage of waterfowl, shorebirds, and waterbirds rely on these wetlands during their northward spring migration. Some nest and raise broods in the fields. On average, the fields are drained in early- to mid-July and hayed in late July or early August. Depending on groundwater levels and the presence or absence of drainage ditches, some remnant oxbows and channels retain surface water well after mid-July, while others dry up (Figs. 6 & 7).

Photos: Dave Kimble, USFWS

Fig. 4. Beaver dam and wetland on Yellow Creek, Uinta County.

Photo: Mark Hogan, USFWS

Fig. 5. Wetlands on the Bear River floodplain during the irrigation season in June.

Photo: Dave Kimble, USFWS

Fig. 6. Brood-rearing habitat on a Bear River oxbow in August.

Photo: Mark Hogan, USFWS

Fig. 7. Irrigated wetlands in August. (Note lack of brood-rearing water.)

After the hay is baled and stacked, some fields are re-flooded to grow fall forage when irrigation water is available. This pooled surface water becomes a major attractant for fall-migrating birds. Most fields are grazed by livestock sometime in the fall. Depending on the intensity and duration of grazing and the topography of the field, some fields retain little or no residual cover, whereas large areas of unhayed, ungrazed cattails, rushes, sedges, and grasses remain in others (Figs. 8 & 9). Persistent snow generally covers the ground beginning about December 1. Many wetland fields are used for winter livestock feeding operations from December through March.

Photo: Dave Kimble, USFWS

Fig. 8. Irrigated wetlands in October. (Note margins of oxbow were not hayed).

Photo: Dave Kimble, USFWS

Fig. 9. Grazed wetland with little residual cover in November.

Although not universally beneficial for all wildlife, traditional irrigation, haying, and grazing has created and maintained wildlife habitat in the Bear River Wetlands Complex. For example, the combination of all 3 agricultural practices creates the open, shallow water preferred by many shorebirds and waterbirds during all or part of their life cycle (Fig. 10).

Photo: Mark Hogan, USFWS

Fig. 10. White-faced ibis using habitat that's been hayed, grazed, and irrigated in April.

About 90% of the wildlife species found in Wyoming use wetlands or riparian habitats at some point in their life cycle (Nicholoff 2003). Because the Bear River Wetland Complex includes upland, riparian, and aquatic habitats, a broad suite of resident and migratory wildlife can benefit from conservation actions in the area. Big game such as elk, mule deer, moose and pronghorn use all or portions of the wetlands complex. Significant areas in the Lincoln County portion have been designated elk, mule deer, and pronghorn crucial winter ranges, and areas in Uinta and Lincoln Counties are crucial moose winter range (Wyoming Game & Fish Department 2009). The State of Wyoming has also designated areas within the wetlands complex as core habitat of the greater sage-grouse, a candidate for ESA listing. Although sage-grouse are not wetland obligates, they regularly utilize wetland habitats for food and cover. Mesic sites in low-lying areas and wetland margins are essential brood rearing habitats.

Many wildlife species cannot survive or reproduce without wetlands. About 70% of bird species found in Wyoming are considered wetland or riparian obligates (Nicholoff 2003). Fifty-three of Wyoming's

vertebrate species of greatest conservation need (SGCN) are considered wetland or riparian obligates (WGFD 2010). Thirty-four of these are known or thought to inhabit the Bear River Wetlands Complex. In addition, 4 fish, 1 crustacean, and 2 mollusk SGCN are found within the Bear River watershed (Table 1). Other notable species in the complex include American avocet, Wilson's phalarope, sora, northern pintail, cinnamon teal, and long-billed curlew, as well as riparian species such as olive-sided flycatcher, western wood peewee, and yellow warbler (USFWS 2010) (Figs. 11, 12, & 13). The Lincoln County portion of the priority area also has the highest density of nesting waterfowl in Wyoming (WDSCR 2008).

Photo: Dave Kimble USFWS

Fig. 11. Redhead and canvasback drakes utilizing an old Bear River oxbow filled with irrigation water in May. (Hens presumably nest in the surrounding vegetation).

Several conservation plans have articulated the importance of the Bear River complex for both game and non-game wildlife. For example, the entire Bear River watershed is designated an aquatic conservation priority area and about 25% of the complex is a terrestrial conservation priority area in Wyoming's State Wildlife Action Plan (WGFD 2010). Large portions of the complex were prioritized in the Wyoming Game and Fish Department's Strategic Habitat Action Plan (WGFD 2009). Crucial Aquatic Habitat Priority Areas (Upper Yellow Creek, Bear River and tributaries, and Lower Bear River) comprise 61% of the complex area. The Bear River-Southern Wyoming Range and Uinta Crucial Terrestrial Habitat Priority Areas overlap 62% of the Bear River Wetlands Complex.

Table 1. Species of Greatest Conservation Need inhabiting riparian, wetland or aquatic habitats in the Bear River Wetlands Complex (adapted from WGFD 2010).

**Birds**

American Bittern (*Botaurus lentiginosus*)
Black-crowned Night-Heron (*Nycticorax nycticorax*)
Barrow's Goldeneye (*Bucephala islandica*)
Black Tern (*Chlidoniuas niger*)
Canvasback (*Aythya valisineria*)
Caspian Tern (*Hydropogne caspia*)
Clark's Grebe (*Aechmophorus clarkia*)
Forster's Tern (*Sterna forsteri*)
Franklin's Gull (*Leucophaeus pipixcan*)
Greater Sandhill Crane (*Grus Canadensis*)
Lesser Scaup (*Aythya affinis*)
Redhead (*Aythya americana*)
Snowy Egret (*Egretta thula*)
Trumpeter Swan (*Cygnus buccinator*)
Virginia Rail (*Rallus limicola*)
White-faced Ibis (*Plegadis chihi*)
Bald Eagle (*Haliaeetus leucocephalus*)
Swainson's Hawk (*Buteo swainsoni*)
Willow Flycatcher (*Epidonax traillii*)
Yellow-billed Cuckoo (*Coccyzus americanus*)

**Mammals**

Big Brown Bat (*Eptesicus fuscus*)
Little Brown Myotis (*Myotis lucifigus*)
Long-eared Myotis (*Myotis evotis*)
Pallid Bat (*Antrozous pallidus*)
Townsend's Big-eared Bat (*Coprynorhinus townsendii*)
Preble's Shrew (*Sorex preblii*)
Vagrant Shrew (*Sorex vagrans*)
Water Vole (*Arvicola amphibius*)
Shiras Moose (*Alces alces shirasi*)
Northern River Otter (*Lontra Canadensis*)

**Reptiles**

Valley Garter Snake (*Thamnophis sirtalis fitchi*)

**Amphibians**

Boreal Toad (*Bufo boreas boreas*)
Great Basin Spadefoot (*Spea intermontana*)
Northern Leopard Frog (*Lithobates pipiens*)

**Fish**

Bluehead sucker (*Catostomus discobolus*)
Bonneville cutthroat (*Oncorhynchus clarki Utah*)
Northern leatherside chub (*Lepidomeda copei*)
Mountain whitefish (*Prosopium williamsoni*)

**Crustaceans**

Pilose crayfish (*Pacifastacus gambelii*)

**Mollusks**

California floater mussel (*Anodonta californiensis*)
Western pearlshell mussel (*Margaritifera falcata*)

Photo: Dave Kimble, USFWS

Fig. 12. American avocet (*Recurvirostra americana*) on Yellow Creek in late July.

Photo:  Dave Kimble, USFWS

Fig. 13. Northern pintails utilizing floodplain wetlands in May.

## CHALLENGES & OPPORTUNITIES

Eighty-seven percent of the wetland acreage of the Bear River Complex is privately owned. An additional 4% of wetland acres are on State lands that, with few exceptions, are managed by the agricultural producers who lease them. Cokeville Meadows National Wildlife Refuge encompasses 7% of wetland acres in the complex and manages these lands specifically to benefit wildlife. Because over 90% of wetlands are owned or managed by private landowners, wetland conservation in the Bear River Wetlands Complex must focus on conservation concepts that are compatible with private working lands.

### Threats to Wetlands

The Nature Conservancy (TNC 2010) and others have identified 4 key issues that threaten wetlands throughout the Bear River watershed:

1. Rural residential development;
2. Water allocation policies;
3. Improper agricultural practices; and
4. Invasive species.

Two additional threats identified by TNC (2010) are especially applicable within the Upper Bear River in Wyoming:

5. Energy development; and
6. Conversion of flood-irrigation to sprinkler systems.

Climate change is also a potentially major threat to wetlands, but future climate-related impacts to the Bear River Wetland Complex in Wyoming cannot be predicted. Conservation strategies that address other threats to wetlands will, to some extent, also mediate future effects of climate change. Other threats are spatially limited, potentially less severe, or less probable. For this reason, only the 6 threats identified above will be discussed.

***Rural residential development.***

The populations of Lincoln and Uinta counties have grown significantly in recent decades, and additional future growth is anticipated (Table 2). Jobs in the energy industry, relatively low taxes, and the appeal of rural living are compelling incentives for people to move there. At the same time, technology is making it increasingly possible for people to work from home in more remote areas. As well, these areas are increasingly viewed as within commuting distance of rapidly growing urban centers such as Salt Lake City, UT and Jackson, WY. Growth as a result of population pressures in Utah is already evident within the Bear River priority area in Uinta County (Inman et al. 2002), especially toward the Uinta Mountains south of Evanston. Rural homebuilding has increased rapidly in the Star Valley of Lincoln County a short distance north of the Bear River complex (Fig. 14). Impacts associated with rural

residential development include direct loss of wetlands, habitat fragmentation, altered wetland hydrology due to road construction, increased levels of human disturbance, increased wildlife harassment and predation from pets running at large, and improper grazing, changes from traditional haying and irrigation practices, especially by inexperienced landowners (IWJV 2010).

Table 2. Human population change projected to 2030 in Lincoln and Uinta counties, Wyoming.

| | 1970-80 | 1980-90 | 1990-2000 | 2000-2010 | 1970-2010[a] | Proj. 2010-2020 | Proj. 2020-2030 |
|---|---|---|---|---|---|---|---|
| **Lincoln** | +29% | +4% | +15% | +24% | +109% | +6% | +9% |
| **Uinta** | +83% | +44% | +6% | +7% | +198% | +7% | +4% |

Source: Wyoming Economic Analysis Division, 2011: http://eadiv.state.wy.us/

[a]The U.S. population increased 51% from 1970 to 2010

***Water allocation policies.***

Wyoming water law requires water must be applied to a designated "beneficial use" on the land where the water was originally adjudicated. Current Wyoming law affords some protection to irrigation created/enhanced wetlands by requiring that water rights remain attached to the land unless a petition to move the water rights is granted on the basis that no other water users will be negatively impacted. Wyoming water rights cannot be sold. Because water rights cannot be sold, it is uncommon in the Bear River Wetlands Complex to move water rights from their original adjudicated land. In Utah and Idaho, water rights can be sold and detached from the land.

No unallocated water is available for new uses in much of Utah, but the Salt Lake City area is growing and seeking additional sources of water. Water demand is high in the West, and the economic value of Wyoming's water could potentially be greater if it were exported to urban areas out of state. While this is not currently happening, the impact on Bear River wetlands would be catastrophic if Wyoming's water laws were changed.

The Amended Bear River Compact of 1980 establishes minimum quantities of water allocated among Wyoming, Idaho, and Utah (WWDC 2001). As a signatory to the Compact, Wyoming has agreed not to consume more than its allocated share of water and to ensure flows from the state are sufficient to meet the minimum allocations granted Utah and Idaho. Pressures to fully utilize Wyoming's allocation under the Bear River Compact could become the impetus for new reservoir storage projects. Future projects could directly inundate existing wetlands, but more importantly, would alter downstream hydrology and eliminate additional riparian wetlands. Conversely, irrigating new areas may create some wetlands. However, most of the flatter portions of the Bear River floodplain are already irrigated. Therefore additional projects would likely be developed on slopes that are suitable only for sprinkler irrigation. This would not create wetlands.

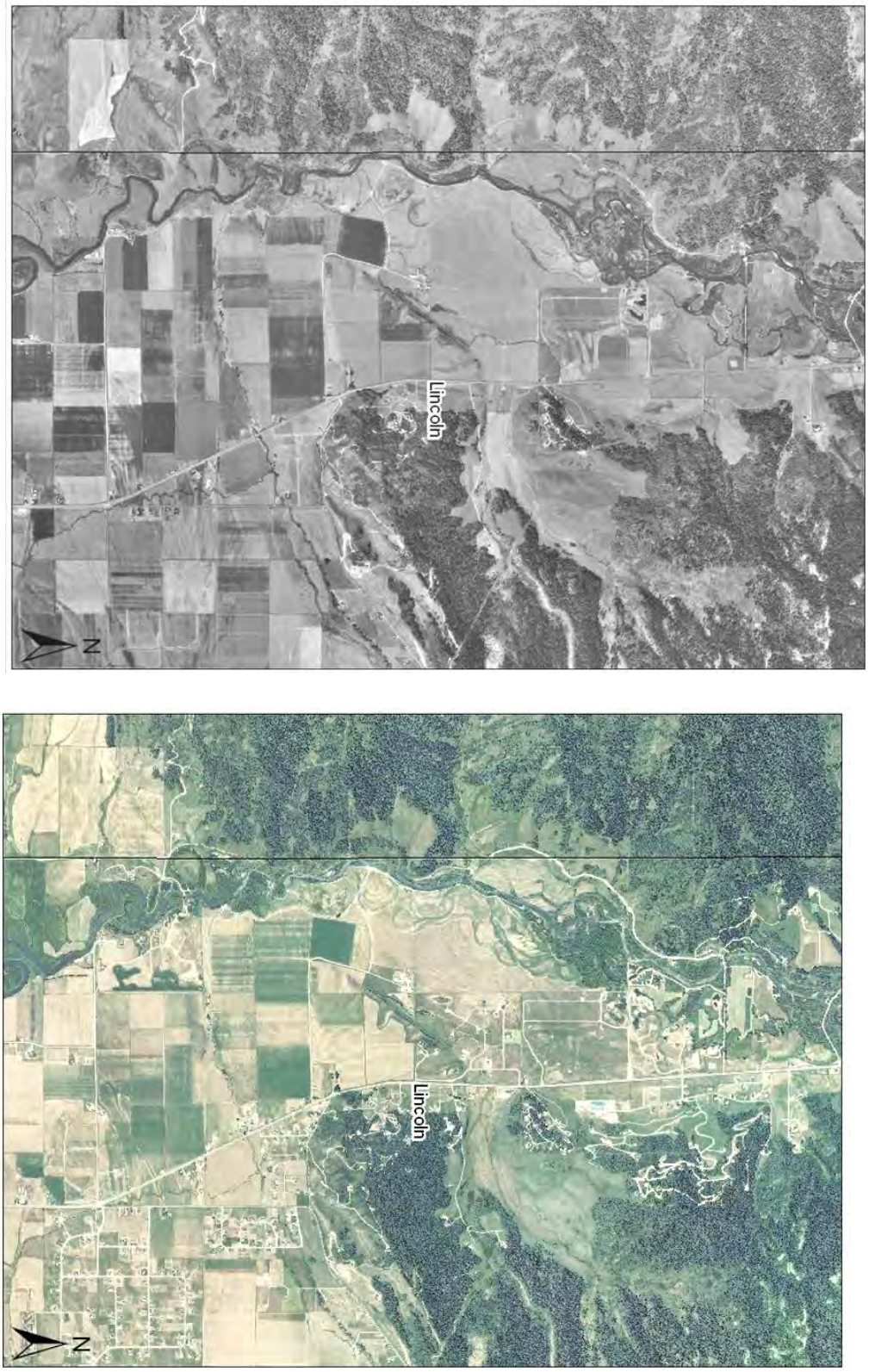


Fig. 14. Etna, Wyoming area (< 60 miles north of priority area) showing progression of development from 1994 (top) to 2009 (bottom).

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***Agricultural Practices***

Two of the most prevalent threats to wetlands in the Bear River Wetlands Complex include: improperly maintained or installed flood-irrigation infrastructure, and incompatible grazing management.

Aging and dilapidated dikes, ditches, and water control structures can become non-functional over time. Not only is an irrigated field's forage production reduced, but wetland habitat is reduced or lost. Old or improperly installed water control structures also do a poor job of holding and releasing irrigation return flows, which exacerbates sediment loading in streams. Some irrigation diversion structures in rivers or streams contribute to riparian wetland loss by accelerating channel incision, and have become barriers to fish passage.

Grazing impacts vary considerably based on type and location of wetlands in the complex. Most non-irrigated, linear riparian wetlands are located in higher elevations and grazed in summer and early fall. Some floodplain wetlands are ungrazed, but most are grazed in fall or winter. While not all grazing negatively impacts wetlands, it is an extremely widespread land use throughout the priority area and is improperly managed in some locations. Where they occur, negative impacts from livestock grazing are more commonly due to improper stocking rates than any other factor (Holechek et al. 1999). Other factors such as season of grazing, duration of grazing in a field or pasture, and distribution of livestock watering sources can also impact wetlands (Wyman et al. 2006). Where it occurs, summer grazing in riparian wetlands can reduce cover of important plants such as sedges and willows, and eventually impact channel stability and wetland hydrology. Even with appropriate pasture stocking rates, water, shade, flatter slopes, and succulent forage can cause livestock to spend a disproportionate amount of time grazing in riparian-wetland areas in summer and negatively impact the habitat (Wyman et al. 2006).

Grazing management within the irrigated wetlands of the Bear River and its major tributaries poses different challenges. Most grazing occurs outside the growing season so direct impacts to grasses and forbs are minor regardless of the stocking rate or management strategy. In fact, grazing residual cover in fall is necessary and beneficial to create habitat for some shorebirds and waterbirds (IWJV 2010). However, livestock can browse heavily on willows in fall and winter (Wyman et al. 2006) even when they are on hay feed. The combination of traditional winter livestock feeding operations, wildlife browsing, and altered stream hydrology is likely a major reason why willow habitats are absent from many locations on the Bear River today. In addition, livestock held on winter feeding fields for extended periods can contribute to streambank erosion.

***Invasive Species***

At the present time, invasive species are not having a major impact on wetlands in Wyoming's Bear River Wetlands Complex. However, invasive plants pose a significant threat to wetland habitats in nearby areas. Salt cedar (*Tamarix spp.*), Russian olive (*Elaeagnus angustifolia*), and the non-native subspecies of common reed (*Phragmites australis*) are all present in the watershed. These plants have the ability to outcompete native vegetation and drastically alter the habitat values and other functions of wetlands (Di Tomaso 1998). Based on the history of their spread and consequences of becoming established, invasive plants are considered a significant threat to wetlands in this priority area.

Other non-native plants such as Garrison creeping meadow foxtail and smooth brome have been prevalent in and around the wetlands of the priority area for a very long time. Negative impacts are unknown, as there are almost no relic areas to serve as controls for comparison. These long-established nonnative species are likely irreversible components of the existing ecosystem and not considered important present or future threats.

***Energy Development***

Wyoming is the United States' leading producer of coal, No 2 producer of natural gas, and No 8 producer of crude oil (WJVSC 2010). Extraction of hydrocarbon resources has increased in Wyoming in recent years and is likely to continue well into the future. There is potential for future development of oil and gas to directly impact wetlands within the Bear River priority area. However, more significant impacts are likely to come from associated infrastructure such as road construction and culvert installation, which alter downstream water quality and hydrology. Wind energy development in Wyoming has also grown in recent years. Wind farm infrastructure (roads, tower pads, powerlines) is expected to cause similar impacts at a watershed level. If wind farms are improperly sited near wetlands, they may also induce avoidance of otherwise suitable habitats and cause direct mortality due to bird strikes (WJVSC 2010). In many ways, the potential effects of energy development are similar those of rural residential development. It should also be noted that rural residential and energy development are often inextricably linked, as energy production jobs often bring a human population influx (Wyoming Game and Fish Department 2010).

***Conversion of Flood-irrigation to Sprinkler Systems.***

Conversions from flood to sprinkler irrigation are ongoing in many regions of Wyoming. Possible benefits include more efficient water use and improved water quality and quantity in streams and rivers. For these and other reasons, cost-share is available through the USDA Natural Resources Conservation Service's Environmental Quality Incentives Program (EQIP) to convert flood-irrigation to sprinkler. However, reduced runoff from sprinkler-irrigated fields will convert some irrigation-dependent wetland areas to non-wetlands. Negative impacts on wetlands and dependent wildlife are rarely fully recognized or mitigated (WJVSC 2010). In 2005-2011, the Irrigation System Sprinkler Conservation Practice (#442) was applied by NRCS to 5,209 acres in Lincoln and Uinta Counties (NRCS 2011). It would be incorrect to assume that 5,209 acres of wetlands were lost as a result, but the statistic serves to underscore that this is an ongoing, common practice.

## Wetland Conservation Opportunities

Wetland conservation efforts in the Bear River priority area should focus on working with private landowners to maintain traditional agricultural use of the land, while making economically and biologically justifiable improvements to management or infrastructure where appropriate. To that end, numerous strategies and actions are being implemented or could be pursued.

***Conservation Easements and Land Use Plans.***

Conservation easements are legal agreements whereby private landowners agree to restrict certain future uses on their lands. Strategically implemented conservation easements can alleviate most of the 6 major threats to wetlands in the Bear River priority area. Easements can be negotiated through various programs administered by private land trust organizations or government agencies. Depending on the type of easement, the landowner may agree to refrain from such actions as disposal of the land into subdivisions, construction of additional buildings or roads, wetland drainage, surface disturbance, and planting crops. Landowners can donate conservation easements and receive tax benefits, but most easements in the Bear River Wetlands Complex are sold. Most conservation easements are permanent, although the USDA Wetlands Reserve Program offers a 30-year term easement option.

The USDA-NRCS Wetlands Reserve Program (WRP) affords the greatest level of protection to wetlands, but also comes with the most restrictions. Land with wetland hydrology and hydrophytic vegetation, which can be protected, restored or enhanced to maximize wildlife habitat value, is eligible for enrollment in the WRP (WRP Program Manual 2010). Adjacent lands are also eligible, typically up to a 1:1 ratio of upland to wetland area. In exchange for the easement payment, landowners must agree to restore and maintain the wetlands, forgo any right to build structures, and relinquish their agricultural rights to hay and graze the protected lands. In essence, the requirement to maintain wetlands on WRP easements ties the irrigation water to the land where the wetlands are irrigation-dependent.

The WRP is rarely utilized in Wyoming, although it offers a lucrative payment. In 2011, the Geographic Area Rate Cap used as a basis for payment on permanent WRP easements was $1,864/acre for irrigated cropland and $600/acre for pasture or rangeland. According to the USDA National Agricultural Statistics Service, land values of irrigated cropland averaged $2000/acre and pasture averaged $420/acre in Wyoming in 2010-11 (NASS 2011). In some areas of Wyoming, landowners can enroll in WRP and receive a payment equal to, or greater than the value of the land enrolled. Nevertheless, only 622 acres were enrolled in the WRP *statewide* from 2005 to 2011 – a stark contrast to the 5,209 acres of sprinklers installed with NRCS cost-share assistance *in Lincoln and Uinta counties alone* during the same time period (NRCS 2011). Haying and grazing prohibitions are likely the primary reason for lack of interest in program participation within the Bear River Wetlands Complex. The rights to hay and/or graze WRP easements can be granted back to the landowner through a Compatible Use Agreement, but are not guaranteed. This degree of restriction on haying and grazing is not biologically justified in the Bear River priority area (IWJV 2010) and represents a significant risk for landowners that might otherwise be willing to enroll if they were assured of some level of continued agricultural use of the land. A more appropriate strategy would be to retain the landowner's rights to hay and/or graze, but ensure stocking rates, grazing periods, and haying dates are strategically planned to maintain and enhance the habitat conditions these practices have created.

The WRP Reserved Grazing Rights Pilot is a relatively new option available to landowners in the Bear River Wetlands Complex. The easement payment is reduced 25%, but landowners legally retain the right to graze the wetlands. A management plan is developed to ensure grazing is compatible with wildlife habitat needs. This is a more attractive option for working agricultural landscapes, and has been somewhat successful in the area. An opportunity that should be pursued by the NRCS and its conservation partners is to prescribe grazing that will improve willow and stream bank conditions on the Bear River parcels enrolled in the program. Possible strategies, in addition to appropriate stocking rates, include corridor fencing, reducing pasture size to reduce the time livestock spend in the riparian area, and alternative water source development. Although the Reserved Grazing Rights option is an improvement to the WRP, most fields with potential to enroll in the program are essential hayfields for landowners' operations. In order for WRP to be a truly effective wetlands conservation option in the Bear River Complex, a further improvement allowing carefully planned grazing *and haying* on enrolled wetlands, which legally offers this assurance when landowners sign up, is needed.

A new WRP requirement stipulating that land must contain at least 50% hydric soils to be eligible for enrollment will likely become a significant barrier to future enrollments in the Bear River Wetlands Complex (NRCS Easement Remediation staff presentation at Wyoming Association of Conservation Districts, November 2013). In contrast, the existing WRP Manual states: "For the purposes of enrollment in WRP, a 'certified' or 'official' wetland determination, as defined by Title 180, National Food Security Act Manual ('NFSAM' or 'Swampbuster'), Part 514, is not required to determine eligibility."

Most high-value wetland habitats within the Bear River Complex were historically created and enhanced by irrigation, but likely have not been influenced long enough by growing-season inundation needed to

develop hydric soils. If consistently implemented, the new WRP requirement for hydric soils will probably end further consideration of the program as a viable conservation tool in the Bear River Wetlands Complex. Other ongoing barriers to WRP participation include a lack of outreach efforts. For example, there is no readily available source of information from which the public can learn about the WRP Reserved Grazing Rights Pilot and the areas in Wyoming that are eligible (i.e. the Bear River watershed). Criteria for timely restoration of wetlands can also be a barrier.

Other than WRP, conservation easements in general have been well-received by private landowners in Wyoming. For example, from 2005-2012 over 100,000 acres were enrolled in the USDA-NRCS Grassland Reserve Program (GRP) and Farm and Ranchland Protection Program (FRPP) in Wyoming (NRCS 2012). While these easement programs prevent land subdivision (and the habitat fragmentation that results), they often do not specifically protect irrigation-dependent wetlands. Several successful land trust organizations purchase conservation easements (many funded in part with FRPP dollars) and also receive donated easements in Wyoming. A 25% cash match is required to close an FRPP easement, and this has been an ongoing challenge in the Bear River Wetlands Complex and elsewhere.

There is a need for a well-funded conservation easement program that protects wetlands within the Bear River Wetlands Complex, but does not unduly interfere with traditional agricultural practices. The U.S. Fish and Wildlife Service has approved a Land Protection Plan to purchase conservation easements from willing sellers in the Wyoming, Utah, and Idaho portions of the Bear River watershed (USFWS 2013). Goals of the Land Protection Plan are to establish perpetual conservation easements that protect aquatic, riparian, wetland, and upland habitats on private lands, while allowing traditional land management such as haying and grazing to continue. The approved project awaits funding.

***Wetland Restoration and Irrigation Infrastructure Improvement.***

Wetland drainage is not a significant, ongoing threat in the priority area. However some floodplain wetlands were historically drained to make them suitable for hay harvest. Ditches were excavated to release irrigation water and dry out natural depressions and oxbows in preparation for haying operations in late-summer. These drained wetlands generally hold water in spring and early summer due to the influence of flood-irrigation. However, waterfowl brood-rearing habitat can be lost in late summer after irrigation water is drained. This type of wetland drainage is often not obvious due to the existing labyrinth of irrigation *delivery* ditches present in most fields (See Fig. 15). However, experienced field personnel can identify historic drainage ditches and they present great opportunities for wetland restoration. Some ranchers are receptive to this type of wetland restoration if conservation funding is available and if the restoration does not significantly impact their current operations. For example, if the land is grazed in the fall but no longer hayed, it may be unnecessary to dry out the wetland in July. Modern incremental water control structures (Fig. 16) can be installed in the drainage ditches, enabling irrigators to drain most of the water at the end of the irrigation season but retain some water wetland basins. This can greatly improve late-season wetland habitat with minimal impact on the landowner's operation.

Valuable opportunities also exist to improve older flood irrigation infrastructure that created some of the earlier wetlands post-settlement. Decades and sometimes a century have passed since many dikes and water control structures were originally built. Ongoing deterioration of these structures will eventually result in loss of these wetlands (Fig. 16). Also, most existing water control structures release water from the lowest elevations of fields and wetlands, such that no pooled water or saturated ground may remain at the end of the irrigation season. There are opportunities to update the infrastructure with longer lasting components and the capability to preserve some late-season water for wetland wildlife (Fig. 17). Some older, nonfunctional dikes can also be refurbished in fields that were historically flood-irrigated in order to increase forage production and benefit wildlife where valid water rights still exist.

The Wyoming State Engineer's Office has at times made a determination that changes in irrigation infrastructure or management to restore and enhance wetlands may constitute a "change in use," even if haying or grazing continue and wetlands are regularly drained for these purposes. This necessitates an often complicated and expensive process to convert the wetland areas from irrigated acreage to "storage" reservoirs, with the end result being a reduction in permitted water and/or a newer, less "senior" priority date. Most private landowners will not make these changes to water rights, and this works at a cross-purpose with long-term conservation of wetlands on a working landscape. There is a need to determine more definitively what types of irrigated wetland improvements the State Engineer will allow without requiring a conversion of the existing agricultural water rights.


Fig 15. Aerial photo of drainage and water delivery ditches in an irrigated field, Bear River complex.

In-stream diversions can sometimes be replaced with structures that improve wetland and riparian habitat function. Older diversions often divert the entire stream even when flows exceed what is

needed for irrigation. This can eliminate riparian wetlands downstream, often creates a barrier to fish passage, and entrains fish in irrigation ditches. Numerous opportunities exist to update diversions such that they continue fulfilling the needs of water users, and at the same time reduce impacts to downstream habitat.

***Haying Management***

Haying and grazing in the irrigated meadows of the Bear River Wetlands Complex prevent excessive accumulation of residual vegetation on the soil. Large areas of open water created by the annual removal of plant matter are also habitat for many shorebirds, waterbirds, and waterfowl during migration and breeding seasons (IWJV 2010).

The climate and irrigation practices within the wetland complex determine when haying of wet meadows is possible – usually after August 1. Most bird species have completed nesting by then so nest failures due to haying should be minimal. Where needed, assurances to delay haying until after August 1 will help maintain successful nesting. Absent a financial incentive, restrictions on when haying can begin will likely need to be included in the terms of conservation easements, such those acquired by U.S. Fish and Wildlife Service or the NRCS-WRP.

Photo: Mark Hogan, USFWS

Fig. 16. Dilapidated irrigation infrastructure on the Bear River floodplain that drains fields from the bottom.

Photo: Dave Kimble, USFWS

Fig. 17. Retrofitting existing infrastructure with a top-down, incremental water control structure.

Highest nest densities and success of upland-nesting ducks, such as mallard and northern pintail, have been documented within large, unfragmented blocks of residual cover from the prior growing season (Klett et al. 1988). In general, traditional agricultural practices leave little residual cover in the Bear River priority area, though these practices create productive migration habitat benefitting many species. Specific research on the importance of residual nesting cover is lacking in Wyoming, however results of studies done in other areas are transferable. A study on a similar landscape in southeast Oregon (Jarvis and Harris 1971) revealed that nest density and success for ducks such as blue-winged teal, cinnamon teal, and mallard (all present in the Bear River area) were greater in unhayed irrigated wet meadows than in hayed meadows where little to no residual cover was available in April and early May. Meadows mowed the prior year did attract more later nesting or renesting birds as the growing season progressed, underscoring the importance of a late haying date where there are few large blocks of cover in available in late April and early May. While regular haying of wet meadows is essential in the Bear River priority area, ground-nesting waterfowl would benefit if some hayfields were occasionally rotated out of hay production for a year to provide large blocks of nesting habitat. These hayfields could still be grazed the previous fall or winter, as the residual cover left after (light to moderate) grazing far exceeds what is normally present after mowing. More research on this topic is needed in the Intermountain West, and it is essential that any strategy promoted by conservationists not compromise the ability of landowners to maintain traditional agricultural use of the land. The alternative, conversion to subdivisions and removal of water from the land, would decimate migratory bird habitats.

***Grazing Management***

Some wetlands have been degraded by intense livestock grazing over many years. Progressive methods of grazing management are being employed on private and public lands and should be increasingly utilized throughout the Bear River priority area. Strategies to improve the condition of wetlands and riparian habitats include pasture subdivision to decrease the amount of time livestock spent in riparian areas, fencing riparian areas into "special-use" pastures, complete exclusion of livestock from riparian corridors, and development of alternative, off-stream sources of livestock water. Whenever conservation funding is used for grazing infrastructure improvements, it is essential that livestock forage consumption is properly balanced with forage production to assure success of the practices.

Long-term fall/winter grazing by livestock has reduced woody vegetation far below the ecological potential of some sites (See Fig. 18 for an example of woody riparian site in good condition). This has negatively impacted habitat of many species, most notably neotropical migratory birds such as warblers and flycatchers. Many of the strategies used to relieve grazing pressure on riparian habitats in summer pastures can also be applied to winter pastures/hayfields. An additional option is to defer grazing or feeding for a year or more. Livestock producers sometimes use hayed fields as a winter feeding location. However, livestock concentrating in and around feeding sites can heavily browse nearby willows and other woody vegetation that is accessible to them. Since livestock producers are sometimes using winter feeding fields only as a location to feed hay, and are not dependent on the residual forage present there, it could be possible to completely rest a field from grazing and recover riparian vegetation.

Photo: Dave Kimble, USFWS

Fig. 18. Upper Bear River riparian wetland zone in December – Uinta County.

***Invasive Species Monitoring and Control.***

Invasive species are not currently a major problem in the Wyoming portions of the Bear River watershed. Efforts to monitor and aggressively control harmful species should continue. Some invasive species such as perennial pepperweed are well-established in many locations. Control efforts should focus on containing their spread with chemicals, mowing, and proper grazing management. Other non-native species such Garrison creeping meadow foxtail are widespread throughout the area, but apparently have little detrimental effect on the ecosystem. Funding and resources should not be consumed attempting to control nonnative species that do not seem to pose serious problems.

# WETLAND CONSERVATION ACTIONS

Although not an exhaustive list, the following are some specific actions that should be taken to pursue conservation opportunities in the Bear River wetland complex.

1. Secure conservation easements from willing landowners. About 10,000 of the 243,000 acres of private land in the Bear River Wetlands Complex have been protected with conservation easements, all within the last 20 years. Most of these easements have been secured in the last 5 years and a large proportion of their area is wetlands. A goal to double this to 20,000 acres by 2019 would seem achievable.

    a. Advocate for a more flexible, well-funded Wetlands Reserve Program with eligibility criteria that are better suited to the agricultural wetlands of the complex. Increase outreach to inform landowners of the program.

    b. Advocate for adequate funding, and explore additional funding options, to purchase conservation easements through the USFWS Bear River Watershed Conservation Area.

2. Restore and enhance wetlands. Since 2000, about 1,920 acres of wetlands have been restored or enhanced on private lands in the Bear River Wetlands Complex – about 140 acres per year. Continue this pace of voluntary wetland habitat improvements.

    a. Advocate for interpretations that will allow changes in infrastructure or water management benefiting wetland-dependent wildlife to occur within the scope of existing irrigation water rights, in order to maintain landowners' abilities to continue irrigating their land for livestock forage production (haying or grazing).

    b. Advocate for replacement of wetland values that are lost as a result of publicly-funded irrigation efficiency projects, regardless whether hydric soils are present in the impacted wetlands.

3. Continue to improve livestock grazing management in riparian areas through voluntary conservation on private and public lands, especially along the Bear River mainstem.

4. Initiate field studies within the Bear River Wetlands Complex to better understand local breeding habitat needs of wetland birds such as cinnamon teal, redhead, black-necked stilt, and white-faced ibis. Investigate effects of intensity, duration, and timing of livestock grazing, haying, and water-level manipulation on breeding success. Use results of research to design and advocate best management practices on public and private lands.

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