Wyoming Wetlands Conservation Strategy

Wyoming Joint Ventures Steering Committee

Version 1.0

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List of Acronyms and Abbreviations

AFT …… American Farmland Trust
BLM …… U.S Bureau of Land Management
BMP …… Best Management Practice
BOC……. Board of Control (State Engineer's Office)
BOR …… U.S. Bureau of Reclamation
CRP…….. Conservation Reserve Program
CWA ……Federal Clean Water Act of 1972
CWCS…….. Comprehensive Wildlife Conservation Strategy
DEQ……. WY Department of Environmental Quality
DU…… Ducks Unlimited
EO…… Executive Order (Presidential)
EPA ……. U.S. Environmental Protection Agency
EQIP…… Environmental Quality Incentives Program
EWRA …… Emergency Wetlands Resources Act of 1986
FHA …… Federal Highway Administration
FR…… Federal Register
GRP……. Grassland Reserve Program
LWCF…….. Land and Water Conservation Fund
NAWCA…….. North American Wetland Conservation Act
NGO……. Nongovernmental Organization
NGPJV …… Northern Great Plains Joint Venture
NPDES …… National Point Source Discharge Elimination System
NPS ……. Nonpoint Source
NRCS …….. Natural Resources Conservation Service
NWP…… Nationwide Permit
NWPCP…… National Wetlands Priority Conservation Plan
OSM…… Federal Office of Surface Mining
PIF …….. Partners in Flight
PLPW…….. Private Lands / Public Wildlife Program
RGP……. Region General Permit
SCORP…… Statewide Comprehensive Outdoor Recreation Plan
SEO……. WY State Engineer's Office
SGCN ……. Species of Greatest Conservation Need
SMCRA …….. Federal Surface Mining Control and Reclamation Act
SWANCC…… Solid Waste Agency of Northern Crook County, Illinois
SWAP ……. State Wildlife Action Plan
SWG…… State Wildlife Grants
TNC……. The Nature Conservancy
USACE or CE……. U.S. Army Corps of Engineers
USDA …… U.S. Department of Agriculture
USFS ……... U.S. Forest Service
USFWS …….. U.S. Fish and Wildlife Service
USGS …….. U.S. Geological Survey
WGFD…… Wyoming Game and Fish Department
WHIP …….. Wildlife Habitat Incentives Program
WHMA…… Wildlife Habitat Management Area
WREP…….. Wetlands Reserve Enhancement Program
WRP…… Wetlands Reserve Program
WWNRT……. Wyoming Wildlife and Natural Resource Trust Account
WYDOT ……. Wyoming Department of Transportation
WY…… Wyoming

PURPOSE

This statewide wetlands conservation strategy was developed to serve the following purposes:

1) Delineate important wetland and riparian habitat areas throughout Wyoming and assess their condition;
2) Identify factors or threats that may impair the functional integrity of wetlands and riparian habitats;
3) Establish statewide and regional conservation goals and priorities;
4) Formulate effective strategies to conserve and manage wetlands and riparian habitats;
5) Bring together existing conservation programs and initiatives to build and expand upon partnerships;
6) Assemble links to other resources and programs that can assist conservation planning, funding, and collaboration efforts; and
7) Provide a technical foundation for the wetland component of the Wyoming State Wildlife Action Plan.

Although wetlands are the focus of this strategy, riparian corridors and open water habitats are also addressed.

For additional information concerning state wetlands conservation strategies, refer to: http://www.epa.gov/owow/wetlands/initiative/swcp.html.

INTRODUCTION

Wyoming contains proportionately less wetland and riparian area by comparison to more humid regions of the country (Hubert 2004). Indeed Wyoming is the fifth driest state, with an average rainfall of 16.8 inches (WSGS Water and Climate Working Group undated). Nonetheless, about 90% of wildlife species in Wyoming use wetlands and riparian habitats daily or seasonally throughout their life cycles and about 70% of Wyoming bird species are considered wetland or riparian obligates (Nicholoff 2003). Seventy-eight vertebrate species of greatest conservation need (SGCN) identified in our State Wildlife Action Plan use wetlands or riparian habitats on at least a seasonal basis (WGFD 2005). Fifty-eight vertebrate SGCN are considered wetland or riparian obligates (WGFD 2005). Riparian zones along the major stream courses also provide crucial migration and dispersal links traversing grassland and desert environments. Densities of breeding birds can be up to 10 times greater in riparian tracts compared to adjacent, non-riparian habitats (Lohman 2004).

Wetlands and riparian systems serve many functions in addition to wildlife habitat, such as flood attenuation, aquifer recharge and discharge, sediment filtering, contaminant removal, erosion control, and biomass export. Riparian systems act as sponges soaking up water during high flow events and later releasing it to maintain stable stream flows through the summer. Wetland and riparian systems are also used extensively for outdoor recreation such as hunting, fishing, wildlife viewing, and nature photography. Wetland

functions and values are comprehensively described by Novitzki et al. (1999), EPA (2001), Nicholoff (2003), McKinstry et al. (2004), and several other authors. Riparian system functions and values are described by GAO (1988), Manci (1989), Brinson et al. (2002), Chambers and Miller (2004), Hubert (2004), and Soman et al. (2007). Due to their limited distribution and the many important functions they serve, wetlands and riparian systems are inordinately valuable to wildlife and people in Wyoming.

DEFINITIONS

Wetland Definitions and Delineation Criteria

For purposes of this wetland strategy, geographic delineation of wetlands is based on the National Wetland Inventory, which relies on the definition of "wetland" adopted by the U.S. Fish and Wildlife Service (USFWS):

> "Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; and (3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season each year" (Cowardin et al. (1979).

The above definition is somewhat more inclusive than regulatory definitions currently in use by the Natural Resource Conservation Service (NRCS), the U.S. Army Corps of Engineers (USACE or CE) and Environmental Protection Agency (EPA). Regulatory definitions require all 3 criteria (hydrology, hydric soils, and hydrophytic vegetation) must be met. The NRCS applies the following definition in determining agricultural operators' eligibility for Farm Bill Program benefits:

> "Wetland, except when such term is a part of the term "converted wetland", means land that – (1) Has a predominance of hydric soils; (2) Is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and (3) Under normal circumstances does support a prevalence of such vegetation, except that this term does not include lands in Alaska identified as having a high potential for agricultural development and a predominance of permafrost soils." [7 CFR 12.2]. [ftp://ftp-fc.sc.egov.usda.gov/WLI/tn_b_77_a.pdf]

The USACE and EPA have adopted the following definition of wetlands with respect to regulatory programs under the Clean Water Act:

> "The term 'wetlands' means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under

normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." [33 CFR 328.3(b)] [http://www.usace.army.mil/CECW/Documents/cecwo/reg/materials/33cfr328.pdf]

The USFWS definition of "wetland" (Cowardin et al. 1979) encompasses additional areas such as alkali playas and temporary sheet water that may not strictly meet the NRCS or USACE/EPA regulatory definitions, but nonetheless function as important habitats for migrating birds. The USFWS, definition also does not distinguish between wetlands that are considered "jurisdictional" and "non-jurisdictional" under USACE and EPA regulatory programs – refer to "Clean Water Act of 1972" (page 26) for further discussion of "jurisdictional" wetlands. For purposes of this statewide wetland strategy, we have adopted the broader USFWS definition which is primarily habitat-based.

Riparian Habitat Definition

A regulatory definition of "riparian habitat" is not available. Collins et al. (2006) summarize numerous approaches that have been developed to identify riparian habitat. Most descriptions of "riparian habitat" are based on vegetation that is strongly influenced by hydrology associated with an adjacent stream or other water body. Odum (1971) provided the following conceptual definition: "'Riparian habitat' or 'riparian corridor' means an area of vegetation that exerts a direct biological, physical, and chemical influence on (and is influenced by) an adjacent stream, river, or lake ecosystem, through both above- and below-ground interactions. This area of association extends from the rooting systems and overhanging canopies of streamside flora outward to include all vegetation reliant on the capillary fringe characteristic of soils surrounding aquatic environments." NRCS (2005) developed the following working definition to identify riparian zones in the field: "Riparian areas are ecosystems that occur along watercourses or water bodies. They are distinctly different from the surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by free or unbound water in the soil. Riparian ecosystems occupy the transitional area between the terrestrial and aquatic ecosystems. Typical examples would include floodplains, stream banks, and lake shores." Depending on location, riparian habitats in Wyoming are commonly indicated by presence of cottonwood trees, willows, water birch, river birch, dogwood, sedges, tufted hair grass, reed canary grass, and other phreatophytic plant species.

ECOLOGICAL SETTING

Wyoming is a high-elevation, topographically diverse state. The total surface area is 97,914 mi^2 with an average elevation of approximately 6,700 ft above sea level. Elevations range from 3,100 ft along the Belle Fourche River in NE Wyoming to over 13,000 ft in mountain ranges of western Wyoming (U.S. Geological Survey, EROS Data Center 1999). The average frost-free growing season is 125 days in the principal agriculture regions, but can be 42 days or shorter in mountain valleys (Curtis and Grimes 2004). Average annual precipitation ranges from 5-15 inches in most basins and prairies,

15-30 inches in foothills, and up to 60 inches in montane environments. Average annual evaporation ranges from 30-50 inches.

The western two thirds of Wyoming are within the Rocky Mountains Geologic Province and the eastern third (east of the Laramie and Big Horn mountain ranges) is within the Interior Plains Geologic Province (Fenneman and Johnson 1946). The Interior Plains is further subdivided into the Missouri Plateau (NE Wyoming) and High Plains (SE Wyoming) physiographic regions (Barton et al. 2004).

Four dominant ecoregions cover the state: Northern Great Plains Steppe, Wyoming Basins, Utah-Wyoming Rocky Mountains, and Southern Rocky Mountains (Comer et al. 2003). At least 49 ecological cover types are present throughout the Wyoming portions of those 4 ecoregions. The most expansive are Wyoming big sagebrush shrubland and steppe (central/western Wyoming), and Great Plains mixedgrass and shortgrass prairie (eastern Wyoming), accounting for about half the state's surface. Other cover types with significant area include mixed salt desert shrub, lodgepole pine forest, limber pine – juniper woodland, foothills grassland, and ponderosa pine woodland and savanna.

WETLAND AND RIPARIAN HABITAT RESOURCES OF WYOMING

Prior to settlement, natural wetlands covered about 3.2% of Wyoming (Dahl 1990) and were predominantly associated with riparian corridors, glaciated montane regions, and playa lakebeds. By the mid-1980s, anthropogenic activities had reduced wetlands to approximately 2% of the state's surface. Both the number and area of natural wetlands continue to decline, while the acreage of ponds and other human-created water bodies has increased. Wyoming's palustrine wetlands are predominantly freshwater emergent (55% by number, 73% by area) and temporary (67% by number, 87% by area) (Table 1).

Palustrine wetlands can be divided into morphological groups based on their location and origin. Riverine complexes were historically the most abundant natural wetlands and open water habitats in Wyoming. Wetlands associated with river systems include oxbows, beaver ponds, and seasonally flooded or subirrigated meadows and shrub/scrub types. These are included in the acreage tallies for palustrine wetlands whereas the open water phase of streams and rivers is included in the riverine tally (Table 1). The plains and intermountain basins of Wyoming also contain low densities of seasonally flooded basins called playas that formed in blowouts and in some cases, a result of tectonic activity. Kettle, cirque, and moraine type wetlands and lakes are present in high elevation sites historically covered by glaciers. The New Fork Potholes north of Pinedale are an example. However, the Pleistocene glacial sheets that left dense wetland complexes throughout the U.S. and Canadian prairie pothole region did not reach Wyoming. Springs, bogs, and seeps are also scattered throughout the state, but are most common in the montane regions. Beaver activity has created and maintained palustrine wetlands in all parts of the state, but to the greatest degree in foothills and montane streams.

Riparian systems currently cover approximately 2.6% (2,552 mi^2) of the state's surface (Merrill et al. 1996). Forest- and shrub-dominated riparian areas each comprise 45% of the riparian systems, and the remaining 10% is grass-dominated (Table 2). There is little historic data to assess changes in total area of riparian habitat in Wyoming. However, many riparian systems throughout the West are in poor condition due to the influence of regulated stream flows, grazing, and other land use practices (Elmore and Beschta 1987; GAO 1988; Chaney et al. 1990; Chambers and Miller 2004).

Table 1. Composition of wetlands and open water habitats in Wyoming. †

Palustrine Wetlands

Based on Hydroperiod ‡	Number	Area
Temporary	186,646	803,717 acres
Semi-permanent	75,723	67,639 acres
Permanent	13,696	17,275 acres
Unknown	4,526	29,970 acres
TOTALS	280,591	918,601acres

Based on Classification ‡		
Freshwater emergent	153,263	671,005 acres
Freshwater Forested/Shrub	37,946	179,258 acres
Freshwater Pond	89,382	68,337 acres
TOTALS	280,591	918,600 acres

Open Water Types

Lake/Reservoir	4,262	404,455 acres
Riverine	15,483	89,094 acres
Other	26,679	43,561 acres
TOTALS	46,424	537,110 acres

Palustrine Wetlands + Open Water

TOTAL in Wyoming	327,015	1,455,711 acres

† Source: Copeland et al. (2010)
National Wetland Inventory data based on 1980 imagery
‡ Cowardin et al. (1979)

Table 2. Composition of riparian habitats in Wyoming. †

Type	Area
Forest dominated riparian	733,327 acres
Shrub dominated riparian	739,436 acres
Grass dominated riparian	160,658 acres
TOTAL	1,633,421 acres

† Source: Wyoming Gap Analysis (Merrill et al. 1996)

Wetland Complexes

Clusters of wetlands in close proximity (wetland complexes), especially wetlands of differing size, depth, chemistry, vegetation cover, and hydrology, tend to sustain more diverse ecological communities and concentrated use by wildlife (Stoudt 1971; Kantrud and Stewart 1977; Ruwaldt et al. 1979; Swanson et al. 1979; Mack and Flake 1980; Kantrud and Stewart 1984; Williams 1985; Brown and Dinsmore 1986; Weller 1987; Fredrickson and Reid 1988; McKinstry and Anderson 1994, 2002; Gammonly 2004; Rumble et al. 2004; Tessmann 2004). Along altitudinal gradients, wetlands at mid and lower elevations tend to support greater diversity and density of wildlife because the growing season is longer, enabling those wetlands to be more productive. Higher elevation wetlands can be important for specific life stages of several species, though they tend not to be as productive. Wetlands at over 8,000 ft elevation do not support significant waterfowl production in Wyoming because the ice-free period is too short to dependably fledge broods and invertebrate food sources are more limited. Most high-elevation wetlands are on lands managed by the U.S. Forest Service and National Park Service; approximately 40% of these wetlands are afforded a high degree of protection (Copeland et al. 2010).

Conservation efforts often focus on complexes of wetlands because greater benefits can be realized in terms of wildlife diversity and abundance. In general, species richness and abundance are positively correlated with the density and diversity of wetlands in a complex (Stoudt 1971; Kantrud and Stewart 1977, 1984; Ruwaldt et al. 1979; Swanson et al. 1979; Mack and Flake 1980; Proctor et al. 1983a,b; Williams 1985; Brown and Dinsmore 1986; Weller 1987; Fredrickson and Reid 1988; Tilton and Denison 1992; Gibbs 1993; McKinstry and Anderson 1994, 2002; Semlitsch 2000; Fredrickson and Laubhan 1994; Gammonly 2004; Lovvorn and Hart 2004; Rumble et al. 2004; Tessmann 2004). However, wetland scientists do not agree on the criteria used to define wetland complexes. In the prairie pothole region, Lokemoen et al. recommended 12-40 impoundments/km^2 (30-100/mi^2). On the other hand, McKinstry and Anderson (2002) recommended a minimum of 5 impoundments/km^2 (13/mi^2) on reclaimed bentonite mines in NE Wyoming. Proctor et al. (1983a,b) recommended an impoundment density of at least 1/km^2 (2.6/mi^2) to enhance wildlife habitat on surface coal reclamation.

The importance of isolated wetlands should not be overlooked, particularly within an arid landscape. Isolated wetlands provide a water source and enhanced cover and forage production, making them a hub of activity for terrestrial wildlife that inhabit the surrounding area. Such wetlands are often critical resting areas for birds migrating long distances across dry expanses. Species richness and abundance tend to increase with wetland size (Lokemoen 1973; Mack and Flake 1980; Hudson 1983; Brown and Dinsmore 1986; Belanger and Couture 1988; Leschisin et al. 1992; Marble 1992; McKinstry et al. 2001; McKinstry and Anderson 2002a). Therefore, larger size and a relatively permanent hydrologic regime are important attributes of isolated wetlands.

Two efforts have been undertaken to delineate and prioritize wetland complexes for conservation planning in Wyoming. The first assessment was conducted by the Wyoming Game and Fish Department (WGFD) with involvement by the USFWS during

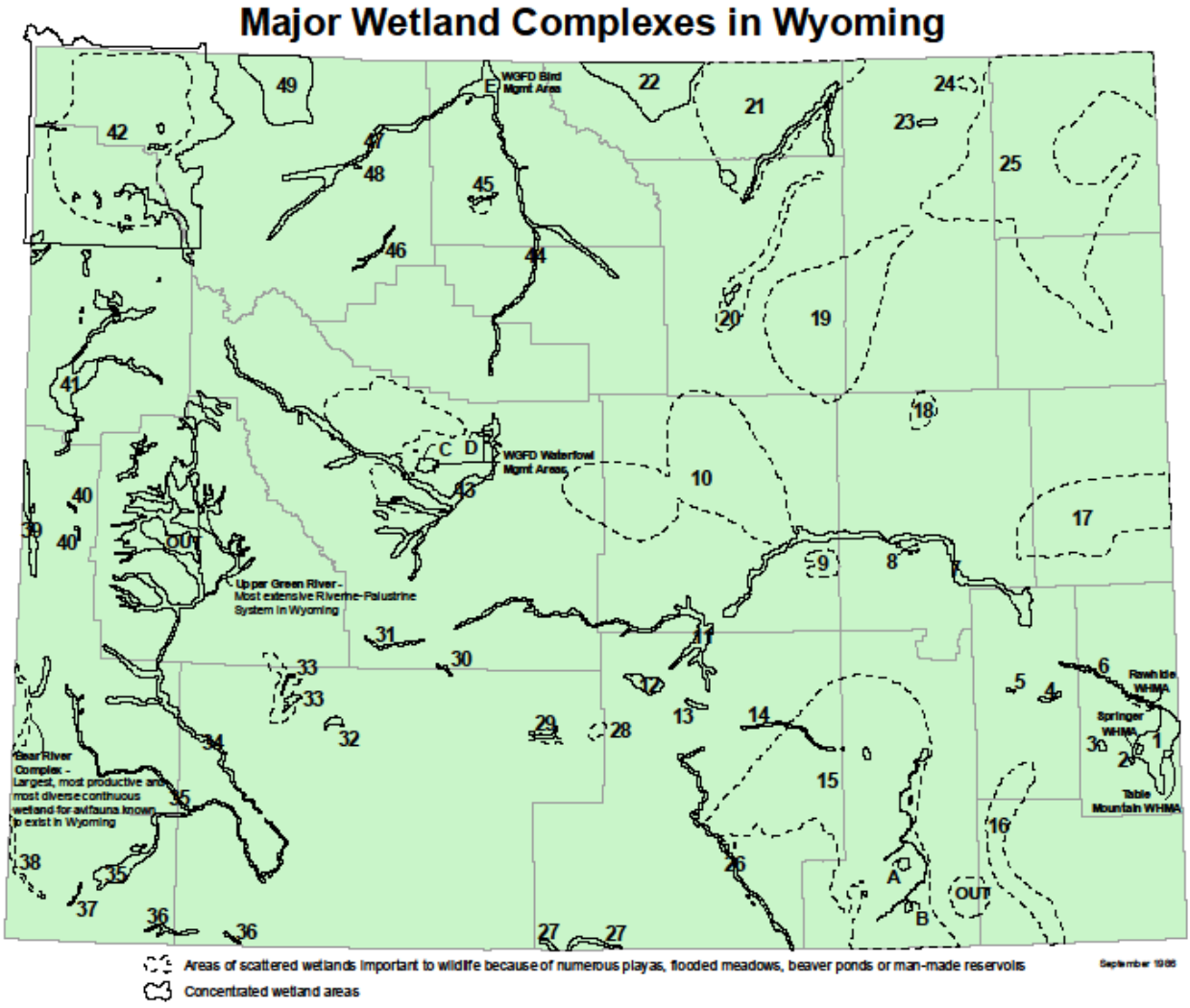
the late 1980s. The second assessment was conducted by The Nature Conservancy (TNC) in 2009 in conjunction with a project entitled "Wyoming Wetlands Integrity and Stressor Identification Project" (Copeland et al. 2010). The WGFD was also a cooperator in the TNC study.

WGFD Wetland Complex Delineation

The earlier delineation of wetland complexes became the foundation for the wetlands component of the 1995 Statewide Comprehensive Outdoor Recreation Plan (SCORP) (WGFD 1995; WY Dept. of Commerce 1995). The SCORP wetlands component was intended to identify wetland areas for potential acquisition under Section 303 of the Emergency Wetlands Resources Act of 1986 (EWRA) (USFWS 1989). The EWRA authorized expenditures from the Land and Water Resources Fund for the purpose of acquiring priority wetlands [http://www.fws.gov/laws/lawsdigest/emwet.html]. Delineation and prioritization of wetland complexes for the SCORP were based on the National Wetland Inventory maps and field experience of state and federal resource managers. Wetland complexes at elevations above 8,000 ft were excluded due to their limited value for waterfowl production. In all, 49 important wetland complexes were recognized in the SCORP wetlands component (Fig 1).

2009 Wetland Assessment

In 2009, The Nature Conservancy (TNC) and WGFD completed a more comprehensive inventory and assessment of wetland complexes based on available geospatial datasets throughout Wyoming (Copeland et al 2010). TNC's "Wyoming Wetlands Integrity and Stressor Identification Project," was funded by the Wyoming Department of Environmental Quality through Section 319 (Nonpoint Source Program) of the Clean Water Act. Complexes were spatially delineated based on five density strata ranging from 0.001-0.006 wetlands/acre (0.6-3.8 wetlands/mi^2) to 0.025-0.046 wetlands/acre (16-29 wetlands/mi^2). The TNC study recognized 222 individual wetland complexes throughout Wyoming (Figs. 2, 3). Several condition assessment metrics were developed in this study and are discussed in a later section entitled, "PRIORITY RANKING OF WETLAND COMPLEXES" (Page 66).



1. Goshen County	15. Laramie Plains A = Bamforth NWR B = Hutton Lake NWR	27. Little Snake River	38. Upper Bear River
2. Sinnard Reservoir		28. Mahoney, Mud Flat Lakes	39. Salt River
3. Miller (Glomill) Res.			40. Greys River
4. Gray Rocks Reservoir	16. Horse Creek	29. Chain Lakes	41. Snake River
5. Johnson Reservoir	17. Niobrara County	30. Picket Lake	42. Yellowstone Park
6. Lower N. Platte River	18. Betty Reservoir	31. Upper Sweetwater	43. Wind River C = Ocean L. WHMA D=Sand Mesa WHMA
7. Central N. Platte River	19. South Gillette	32. Killpecker Sand Dunes	
8. Bixby Reservoir	20. Crazy Woman Drainage		
9. Six Mile Reservoir		33. Farson-Eden (Big Sandy River)	44. Bighorn River E = Yellowtail WHMA
10. Natrona County	21. North Buffalo		
11. Sweetwater/ Pathfinder NWR	22. Parkman	34. Lower Green River	45. Lower Greybull R.
	23. Horse Creek	35. Blacks Fork/ Hams Fork	46. Upper Greybull R.
12. Sand Creek	24. Park Reservoir		47. Shoshone River
13. Sand Lakes	25. Northeast Wyoming	36. Henry's Fork	48. Beck/Alkali Lakes
14. Medicine Bow	26. Upper N. Platte River	37. Muddy Creek	49. Clarks Fork River

Fig. 1. Wetland complex delineations by WGFD (1995).

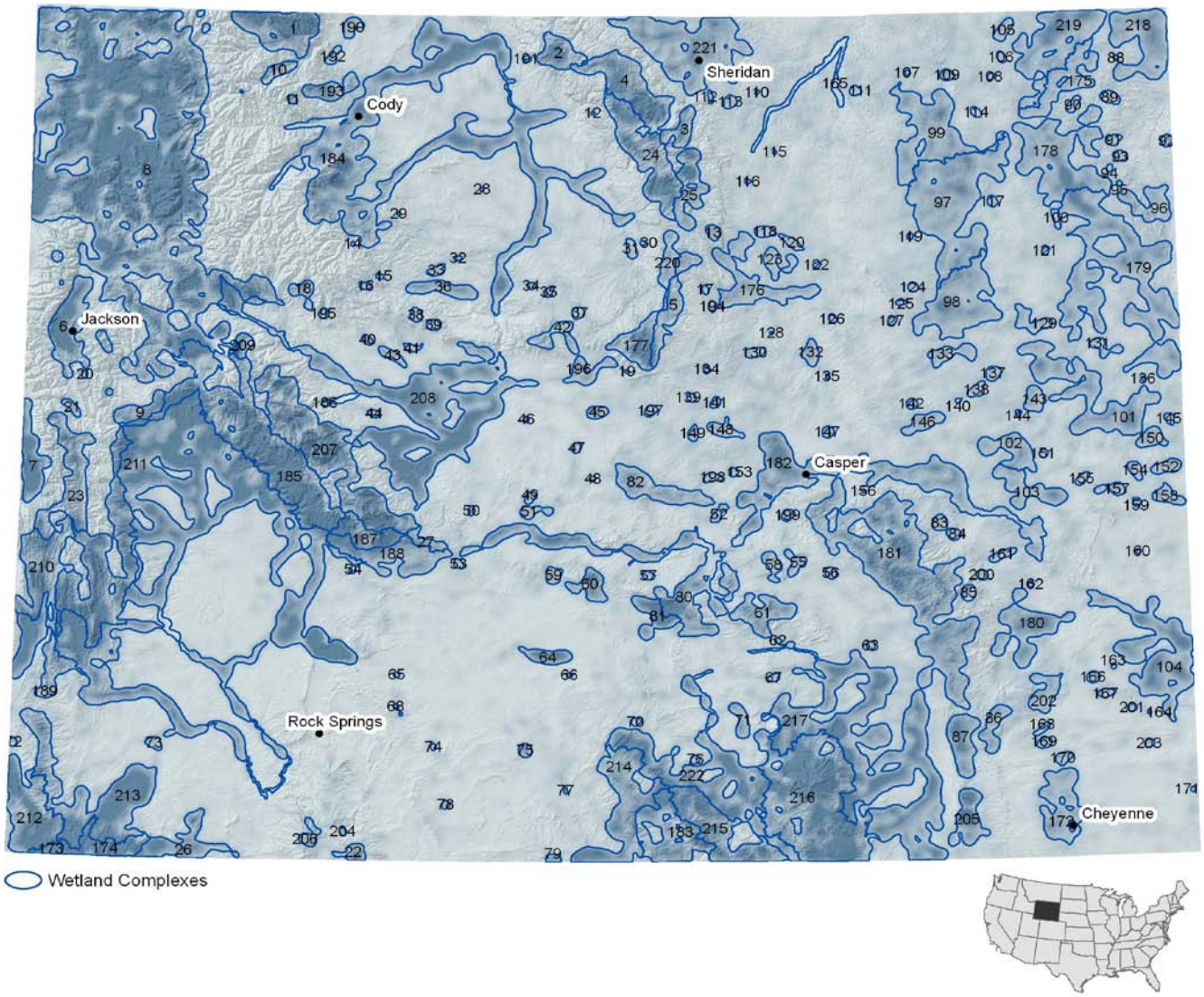


Fig. 2. Wetland complex delineations from Copeland et al. (2010).

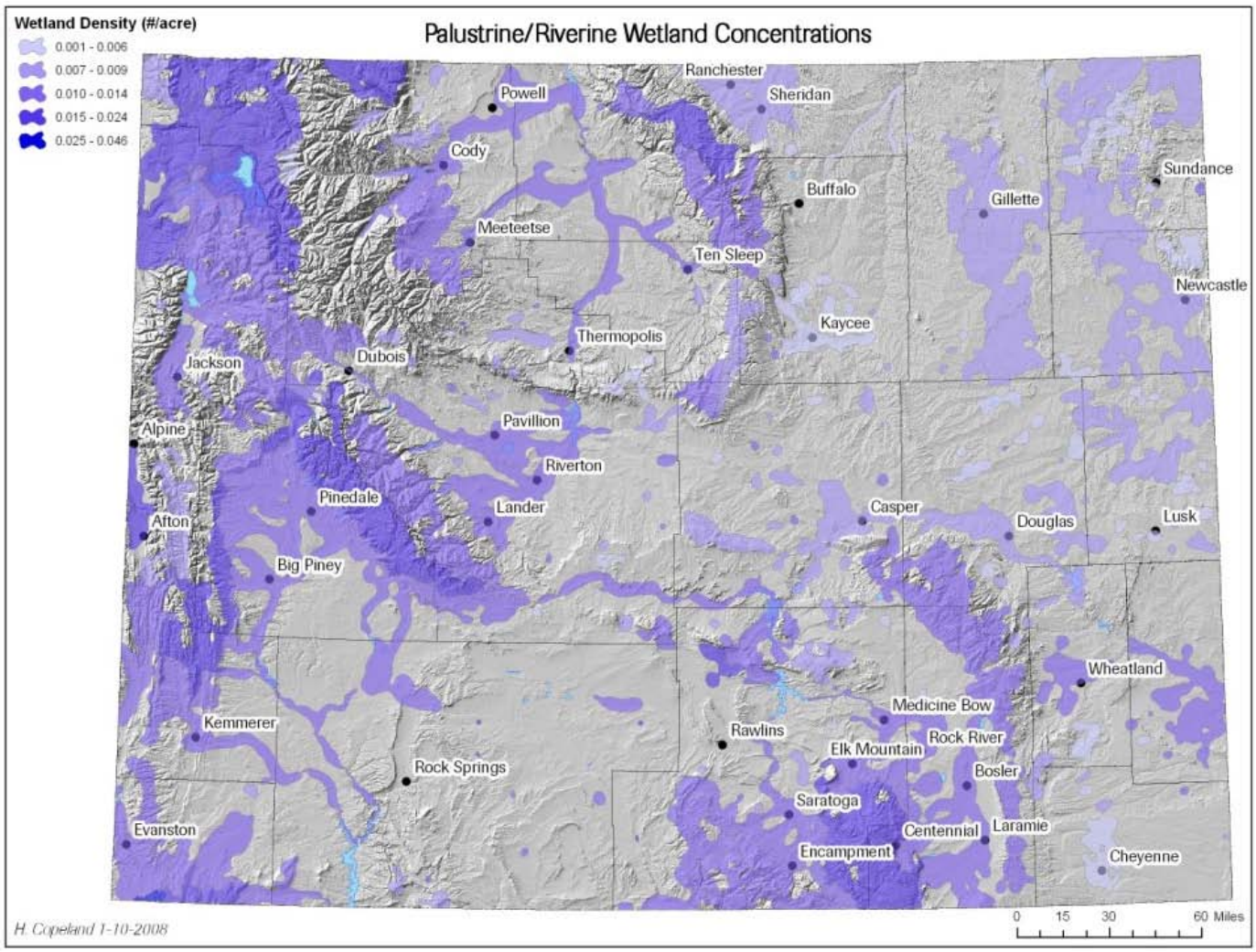


Fig. 3. Wetland densities from Copeland et al. (2010).

POTENTIAL THREATS TO WETLANDS

Activities and conditions that may adversely impact Wyoming's wetlands are qualitatively ranked in Table 3 and further discussed in the sections that follow.

Table 3. Threats to wetlands in Wyoming.

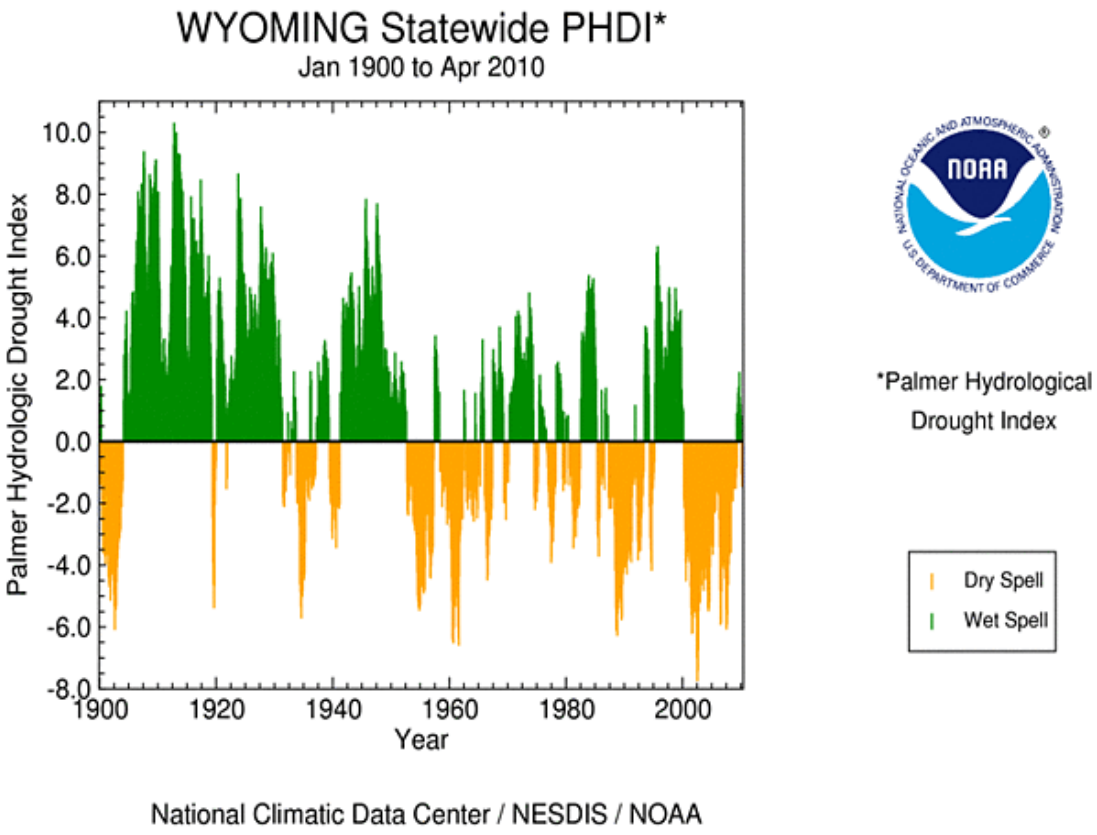
Potential Threats	Severity of Threat				Potential for Improvement[†]
	Low	Moderate	High	Extreme	
Climate Change / Drought				X	L
Compromised Regulatory Programs				X	M
Rural Residential Developments			X		L
Dam/Reservoir Construction			X		M
Stream Flow Stabilization				X	L
Stream Dewatering				X	L
Channel Alterations, Structures or Modifications in Floodplains			X		M
Transportation Infrastructure			X		M
Energy Exploration and Development			X		M
Mining		X			M
Timber Harvest		X			M
Irrigation Improvements (e.g., ditch & canal lining)		X			M
Conversions to Center Pivot Irrigation		X			L
Intensive Farming Practices			X		M
Overutilization by Ungulates			X		H
Invasive Plant Species			X		M
Management/Maintenance at Existing Wetland Projects			X		M
Disturbances Associated with Recreational Use		X			M
Public Awareness and Support			X		H
Available Funding for Monitoring, Protection, Mitigation			X		H

[†] "L" = low; "M" = moderate; "H" = high potential for improvement

Climate Change

Periodic drought is a natural climatic event and an important driver of wetland ecology in the West. Drying cycles restore productivity of wetlands by oxidizing wetland substrates and releasing organically bound nutrients. However, the frequency, intensity, and duration of drought cycles have increased markedly since the 1980s (Fig. 3). These climatic shifts are producing undesirable changes in wetland hydrology and long-term loss of functional wetlands in several regions. Climatologists predict frequency and severity of drought will increase as global climate change continues.

Annual evaporation exceeds precipitation by 2-5 times in most Wyoming basins. Consequently, isolated natural wetlands (predominantly shallow playas) can remain completely dry for extended periods during a drought cycle. Riverine systems fed by mountain snowpack or springs have more dependable water supplies (Hubert 2004), but are also impacted by low flows during extended drought. Wetlands associated with irrigation can be somewhat insulated from drought as long as water sources remain available. However, wetlands dependent on irrigation can also remain dry for extended periods when there are water shortages. Permitted wetland impoundments with junior appropriation rights are especially vulnerable under these conditions.



Source: http://www.ncdc.noaa.gov/oa/climate/research/2010/apr/st048dv00pcp201004.html

Fig. 4. Historic frequency and severity of drought in Wyoming.

For example, about 85% of human-created wetlands in the Goshen Hole Complex (SE Wyoming), including those on the Department's Wildlife Habitat Management Areas (WHMAs), depend directly or indirectly on irrigation. Although natural and created wetlands within the Goshen Hole Complex were generally in very good condition throughout the 1970s and 1980s, that timeframe coincided with a series of wetter than normal years. Water supplies decreased markedly from the late 1990s through 2009 and wetlands fed chiefly by irrigation flows or appropriations ceased to function in many cases. Springer Reservoir, Bump-Sullivan Reservoir, and all wetlands on the Springer WHMA were dry or nearly dry. Wetlands on the Table Mountain WHMA were also predominantly dry, in particular during the summer nesting and brood rearing period.

Water supplies were also impacted throughout the North Platte drainage due to a combination of drought and legal decisions (the Platte River Endangered Species Lawsuit). As a result, wetlands and deepwater habitats were severely depleted in a large area of southeast Wyoming. A conservative estimate placed the loss of wetland and reservoir-dependent recreation at 165,000 days annually (Tessmann 2007). This represented a loss to the State's economy of nearly $14 million per year. Some degree of recovery was realized during the 2009 water year and 2010 was an exceptionally wet year. Nonetheless, climatic records clearly depict a long term trend toward overall drier conditions and more frequent drought cycles.

Compromised Regulatory Programs

Two U.S. Supreme Court decisions, Solid Waste Agency of Northern Crook County (SWANCC) (2001) and Rapanos and Carabell (2006), significantly modified the federal interpretation of "waters of the United States" subject to regulation by the U.S. Army Corps of Engineers (USACE) and the Environmental Protection Agency (EPA) (Refer to "Clean Water Act of 1972 – *Section 404*" on page 26). In the SWANCC case, the court vacated the "Migratory Bird Rule" [Fed. Reg. 51: 41206, 41217] formerly used by the federal government to regulate activities within "isolated" wetlands. The Rapanos and Carabell case also established that wetlands must have a significant nexus to waters that are "navigable" in the traditional sense to be considered jurisdictional under the federal Clean Water Act (CWA).

As a consequence of the SWANCC and Rapanos and Carabell decisions, isolated wetlands lacking a "significant nexus" to traditional navigable waters no longer receive the protection of the CWA. The Swampbuster provision of the Food Security Act continues to afford some protection to isolated wetlands on agricultural lands. An operator who converts a wetland to agricultural production may lose eligibility for certain USDA farm program benefits including low-interest loans, tax credits, crop insurance, and price support programs. However, Swampbuster does not protect wetlands from non-agricultural activities such as housing subdivisions, energy developments, utility corridors, and road construction.

Federal district court opinions issued in 1997 (American Mining Congress et al. v USACE et al.), 1998 (National Mining Association et al. v. USACE et al.), and 2007

(National Association of Home Builders et al. v. USACE et al.) also overturned USACE and EPA regulations asserting Section 404 jurisdiction over certain activities resulting in the drainage and conversion of jurisdictional wetlands (Refer to "Clean Water Act of 1972" – "*Section 404*" on page 26). The regulatory interpretations known as the Tulloch Rule and Tulloch Rule II asserted the Corps had authority to regulate and permit excavations resulting in "incidental fallback" of dredged material and operation of equipment within jurisdictional wetlands. The courts' vacatur of the Tulloch rules created an additional loophole in the Nation's wetland protection laws by allowing unregulated excavation of drainage ditches for the purpose of converting jurisdictional wetlands into non-wetland areas that can later be developed.

Rural Residential Development

Rural residential construction has expanded rapidly in many parts of Wyoming, notably in the Pinedale, Jackson, Star Valley, Bear River, Bridger Valley, Lander, Cody, Casper, Sheridan, Laramie, and Cheyenne areas. According to the Wyoming State Engineer's Office, nearly 100,000 acres of rural lands were subdivided into lots smaller than 35 acres between 1998 and 2006. The American Farmland Trust (AFT) estimates 2.6 million acres of prime ranchland in Wyoming could be converted to residential development by 2020 (AFT 2002). The AFT study also found that 5 counties in Wyoming (Sublette, Park, Uinta, Big Horn, and Fremont) were among the top 25 counties in the Rocky Mountain region in terms of potential for conversion of prime ranchland to residential development.

Developers can drain and fill isolated wetlands without a permit at construction sites. In addition, rural residential construction is often situated within or near riparian corridors, which are appealing locations and often the only private land available for development in central and western Wyoming. Infrastructure such as roads, buildings, power lines, and fences, along with associated disturbance, can lessen the suitability of wetlands and riparian habitats for sensitive wildlife. Loose pets, especially cats, also pose a serious threat to wildlife within and near subdivisions.

Dam and Reservoir Construction

The Wyoming Game and Fish Department's Stream/Lake Database includes 666 manmade reservoirs covering slightly over 248,000 acres or 388 mi^2 in Wyoming (these figures do not include most livestock impoundments or waters within the Wind River Indian Reservation). At least 30 Wyoming reservoirs exceed 10,000 acre-ft storage capacity and 15 exceed 100,000 acre-ft. Although dams create large deepwater habitats, they often inundate significant areas of wetlands and riparian habitats. The larger water developments can flood many miles of natural streams and riparian habitats. The potential for wetland margins to develop along shorelines of large reservoirs is limited due to wave action and unstable water levels, which generally preclude establishment of wetland soils and vegetation.

Stream Flow Stabilization

Direct impacts from large, publicly funded water projects are typically mitigated through creation, enhancement, or acquisition of replacement wetlands and riparian habitats. However, project managers often fail to recognize the downstream impacts of dam operation through time. Flow stabilization and attenuation of peak floods alter channel-forming processes that are critical for creating and maintaining oxbow wetlands, pools, braided channels, point bars, and other natural habitat features. Rivers with heavily-regulated flows such as the lower North Platte tend to develop constricted channels that over time become encroached by tree growth. High flows may no longer achieve a sufficient stage or energy to form new braided channels or oxbow cutoffs between river loops. As existing oxbows accumulate sediment and transition into terrestrial habitats, they are no longer being replaced by new oxbows. Flow stabilization projects also lead to additional residential and commercial development within floodplains. Over time, the cumulative area impacted by flow stabilization can be many times the area directly inundated by a reservoir.

Floodplain Modifications

Levees, bank stabilization projects, and other structures cause additional impacts to riverine ecosystems. The Snake River levee system is a case in point. Levees constrain flow to the main channel, preventing water from spreading onto the floodplain during high runoff periods. This disrupts the natural tendency of the channel to shift and form meanders and braids, which are essential for maintenance and formation of floodplain wetlands. Smaller braided channels that are crucial spawning and nursery habitat for cutthroat trout and other species become severed from the main channel and fish access is blocked. Flow energy is also concentrated within the main channel, leading to downstream channel destabilization, downcutting, more frequent flooding, and the need for additional stabilization projects, which in turn impact even more wetland and riparian area. Some other floodplain modifications that alter natural flow dynamics include bridges, culverts, dikes, irrigation diversions, elevated roadways, railroad grades, and sand/gravel operations.

Transportation Infrastructure

Bridge reconstruction, road resurfacing, shoulder widening, curve realignment, and culvert installation and replacement projects are completed on an annual basis throughout Wyoming. Not all road construction or reconstruction affects wetlands, however projects involving stream and floodplain crossings often do. Road improvements can also impact "isolated" wetlands in drainage ditches, borrow pits, gravel quarries, and where surface drainage may have been impounded by the original roadbed. Road construction and culvert installation across wet meadows, especially in montane regions, can intercept and channel surface and groundwater flow thereby desiccating substantial areas of wetland. The multi-lane initiative of the Wyoming Department of Transportation (WYDOT) proposes to convert 490 miles of 2-lane highway into 4-lane highway between 2005 and 2025 (WYDOT 2005:43) and may affect additional wetland areas.

The WYDOT mitigates impacts to wetlands affected by road construction in accordance with Section 404 of the CWA, the Federal Highway Administration's (FHA's) Wetland Mitigation Policy [FR 65:82913] [http://www.fhwa.dot.gov/environment/fr29de00.pdf] and WYDOT's environmental mitigation practices [http://dot.state.wy.us/wydot/engineering_technical_programs/environmental_services]. In addition, any highway project that receives federal funding or authorization from the FHA is required to comply with Presidential Executive Order (EO) 11990 (Protection of Wetlands) [http://www.epa.gov/wetlands/regs/eo11990.html]. This EO requires (in part), "Each agency shall … take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for … providing Federally undertaken, financed, or assisted construction and improvements ..." The protections afforded by EO 11990 apply to all wetlands including isolated wetlands that are no longer subject to Section 404 jurisdiction pursuant to the SWANCC and Rapanos and Carabell decisions.

Nationwide Permit (NWP) 14 authorizes linear transportation projects that do not cause the loss of greater than 0.5 acre of waters of the United States.
[https://www.nwo.usace.army.mil/html/od-rwy/Wyoming.htm]
[https://www.nwo.usace.army.mil/html/od-rwy/NP%2014.pdf]
This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. General permit conditions require projects authorized under nationwide permits must not block aquatic life migration or adversely affect fish spawning habitat or migratory bird breeding habitat. The activity also cannot adversely impact federally-listed threatened or endangered species.

Other impacts associated with road improvements may include disturbance effects from increased traffic, which can displace sensitive species from nearby wetlands. Roadways also become a barrier to less mobile wildlife such as amphibians and turtles, resulting in additional habitat fragmentation for those species. Heavy traffic near wetlands can become a significant source of mortality for concentrations of wildlife that are attracted to those areas. Finally, salt, oil, and other pollutants washing from road surfaces can impair water quality in small streams and wetlands.

Energy Development and Mining

Large areas of the Wyoming landscape are dominated by energy production and mining. Wyoming is ranked 2nd among all states in terms of total BTUs of energy output (U.S. Energy Information Administration 2010). Wyoming is the nation's leading producer of coal (National Mining Association 2008) and is ranked 2th in natural gas production and 8th in crude oil production (U.S. Energy Information Administration 2010). Wyoming is also the leading producer of soda ash (also called trona) (Kostick 2008) and bentonite (Virta 2008). Wyoming ranks 7th nationally in wind power generating potential factoring in land status and environmental constraints (Elliott et al. 1991).

Based on a recent compendium of public land statistics, 175,980 acres of federal minerals are currently leased for coal extraction in Wyoming and oil and gas leases

total more than 8.8 million acres (BLM 2008). Over 42,000 oil and gas wells were in production as of April, 2008 (Barclay et al. 2008) and nearly 10,000 applications for permits to drill (APDs) were approved from January, 2008 through May, 2009 (Wyoming Oil and Gas Commission data available at http://wogcc.state.wy.us/). Natural gas production in Wyoming is projected to more than double from its current level by 2035 (Surdam undated, 2008).

Interest in Wyoming's wind resources is also escalating sharply. The Wyoming Game and Fish Department (WGFD) is aware of 30 new wind projects that will seek regulatory approval in the next few years and many additional proposals are expected as new transmission projects enter the regulatory process (WGFD 2010). The Wyoming Infrastructure Authority is also studying a conceptual design capable of collecting as much as 12,000 megawatts (MWs) of new electric generation within Wyoming. Typical turbines have a power generating capacity of approximately 1.5-2.5 megawatts and require approximately 50 acres of land per turbine. Therefore, the land area of wind farms in Wyoming could potentially exceed a quarter million acres.

Wyoming also ranks 12th among states in total non-fuel mineral production (National Mining Association 2008). By the late 1970s, bentonite mining had affected 50,000-60,000 acres (NRC Committee on Surface Mining and Reclamation 1979) and Wyoming continues to be the world's leading producer of bentonite. Soda ash or trona leases total 74,479 acres (BLM 2008). While most soda ash mining is underground, evaporation ponds used in the recovery process can occupy large areas of surface and pose a hazard to migrating waterbirds. In addition, Wyoming has 150 sand and gravel mining operations affecting an unspecified acreage of land (Bolen 2009). Uranium ore was historically mined from open pits, however since 1992 in-situ technologies have replaced surface mining to extract uranium, and only one operation is currently producing in Wyoming (WSGS Uranium Working Group undated).

Energy and mineral developments can have varying impacts on wetlands depending on the location and specific regulatory provisions governing each type of operation. In some cases wetlands have been enhanced through reclamation, mitigation, or acquisition of supplemental water sources. Modern mining and drilling operations that involve discharge of dredged or fill materials into waters of the United States must, at a minimum, comply with Section 404 of the Clean Water Act of 1972. Prior to the SWANCC and Rapanos and Carabell decisions, this meant nearly all wetlands had to be avoided or mitigated if avoidance was not feasible (i.e., if the project was "wetland dependant"). In Wyoming, extensive surface water (886 ponds occupying 909 acres) on abandoned bentonite mine workings had, in many cases, developed wetland characteristics (McKinstry 1993; McKinstry and Anderson 1994). During the late 1980s and early 1990s, the Wyoming Abandoned Mine Lands Program created and enhanced over 288 wetlands totaling some 593 acres in order to mitigate wetlands impacted by reclamation of these abandoned mine workings (McKinstry 1993; McKinstry and Anderson 1994). These wetlands were generally considered "isolated," therefore it is unclear whether they would have been retained or mitigated after the SWANCC and Rapanos and Carabell decisions reinterpreted the Clean Water Act. However, federally-

funded reclamation under the Abandoned Mine Lands Program is also required to comply with EO 11990 (Protection of Wetlands).

Coal mines are regulated under the Surface Mining Control and Reclamation Act of 1977 (SMCRA) and by approved state regulatory programs that can be no less stringent than SMCRA. Section 515(b)(24) of SMCRA stipulates, "[all surface coal mining and reclamation operations] shall… to the extent possible using the best technology currently available, minimize disturbances and adverse impacts of the operation on fish, wildlife, and related environmental values, and achieve enhancement of such resources where practicable." 30 CFR 715.13(a) further stipulates, "All disturbed areas shall be restored in a timely manner (1) to conditions that are capable of supporting the uses which they were capable of supporting before any mining …" Specific to wetlands and riparian habitats, 30 CFR 816.97(f) states, "The operator conducting surface mining activities shall avoid disturbances to, enhance where practicable, restore, or replace, wetlands, and riparian vegetation along rivers and streams and bordering ponds and lakes. Surface mining activities shall avoid disturbances to, enhance where practicable, or restore, habitats of unusually high value for fish and wildlife." Some regulators have incorrectly interpreted these obligations as being applicable only to wetlands that are "federally jurisdictional" under Section 404. However, all wetlands that comprise important wildlife habitat must be restored on reclaimed lands in order to preserve the *capability* of the land to support fish and wildlife habitat as defined at 30 CFR 715.13(c)(10) and in order to comply with the specific provisions of 30 CFR 816.97(f). SMCRA provides no distinction between habitats based on whether they are "jurisdictional" or "non-jurisdictional" under another regulatory authority. For example, there is no jurisdictional definition of "riparian habitat" and all riparian habitats must be restored or replaced in accordance with 30 CFR 816.97(f). Furthermore, Executive Order (EO) 11990 (Protection of Wetlands) applies to all permitting activities under the oversight of the Federal Office of Surface Mining (OSM). This EO states (in part), "Each agency shall … take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for … conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities." [http://www.epa.gov/wetlands/regs/eo11990.html]

Sand and gravel mining operations sited in floodplains also have potential to impact wetlands and riparian habitats. However, it is likely this type of mining has produced a net gain of wetlands and open water habitats relative to the acreages that were impacted because it was a common practice in the past to convert abandoned or reclaimed quarries into ponds and small lakes. Many of these impoundments have developed wetland margins of varying width depending on steepness of the basin slope. Conversely, the conversion of sand and gravel pits into open water habitats may have produced a net loss of riparian habitats.

Over the past 10 years, unprecedented development of oil and gas fields has taken place in Wyoming and other regions of the West. The trend will likely continue, at least cyclically, through upcoming decades. For the most part, well fields are located in arid upland sites with sparse wetland and riparian features. Nonetheless, vegetation clearing, road construction, and culvert installations can alter watershed characteristics by producing higher peak flows of shorter duration, and increased sediment loading, erosion, and pollutant runoff that impact downstream areas including wetlands. Poor road and culvert installation practices can eliminate wet meadow and swale areas by channeling flow, which induces down-cutting and desiccation of adjacent surfaces. Although these types of mesic habitats may or may not strictly meet the definition of wetland, they sustain enhanced forage production important to sage grouse, big game, and other species. Locating wells, roads, or buildings within or close to riparian habitats can also adversely affect wildlife. New housing and community infrastructure built to accommodate work forces and related population growth are often built near riparian areas because in the West, the private lands that are open to development are often situated along stream corridors. For example, sections of the Green and New Fork rivers have the potential to be heavily impacted.

In some areas, oil and gas developments have created new ponds and wetlands by discharging produced water onto the land surface. These wetlands can be beneficial for several species (e.g., waterfowl, shorebirds) if the discharged water is of suitable quality. Conversely, increasing the distribution of surface water within predominantly arid shrublands can alter the ecology of terrestrial ecosystems by changing timing and distribution of grazing and by creating mosquito breeding habitat which can lead to spread of West Nile virus. New surface water sources may not be desirable on winter ranges where they could enable larger numbers of ungulates to remain well into the summer and fall, thereby depleting forage availability during crucial winter periods. Discharging produced water into streams and tributary drainages can alter the natural range of hydrologic conditions resulting in either detrimental or beneficial effects on the species that are adapted to life in a particular stream. Most potential impacts to wetlands and riparian systems can be avoided or minimized by locating all oil and gas facilities at a sufficient distance and by implementing appropriate environmental “best management practices” (USDI and USDA 2007; WGFD 2009).

The potential impact of wind energy facilities also depends largely on site selection and setback distances. Turbines situated too close to wetlands and open water can cause aquatic birds and bats to displace from otherwise suitable habitat (Gill *et al.* 1996; Guillemette et al. 1998; Larsen and Madsen 2000; Noer et al. 2000; Percival 2001; Bruns et al. 2002; Christensen et al. 2002; Guillemette and Larsen 2002; Langston and Pullan 2003; Garthe and Hüppop 2004; Strickland 2004; Krijgsveld 2007; Stewart et al. 2007:6). Collision mortalities are also more frequent if turbines and powerlines are located too near migration corridors, refuges, and feeding and resting sites (Fiedler and Wissher 1980; Crwellia et al.1988; Morkill and Anderson 1991; Pacific Flyway Study Committee 2002; BLM 2005:5-63; Manville 2005; Rubolini et al. 2005; APLIC 2006; Mabey and Paul 2007; and Frost 2008).

The U.S. Fish and Wildlife Service identified avian collisions as a major issue related to wind farm construction near the Horicon National Wildlife Refuge in Wisconsin (USFWS 2004). As a result, the project sponsor was required to site all wind turbines at least 2 miles from the refuge property boundary (Public Service Commission of Wisconsin 2005:19). To reduce impacts on wetlands, the U.S. Fish and Wildlife Service recommends that turbines never be constructed in wetlands including lakes, ponds, marshes, sloughs, swales, swamps, or potholes, and that turbine locations should avoid obvious flight paths between larger (20 acres or greater) wetlands or sloughs or other known migratory bird corridors or flight paths. The Service further recommends turbines not be located in areas where birds are highly concentrated such as wetlands, state or federal refuges, private duck clubs, staging areas, rookeries, leks, roosts, riparian areas along streams, and landfills. Known daily flight corridors such as between roosting and feeding areas, and areas with a high incidence of fog, mist, low cloud ceilings, and low visibility should also be avoided (USFWS 2003). The Wyoming Game and Fish Department recommends that appropriate setback distances should be site-specifically determined when wind energy facilities are proposed within 2 miles of a wetland, stream, or riparian habitat (WGFD 2010).

Timber Harvest

Most of Wyoming's commercial timber is located on national forest system lands where timber harvest is conducted in accordance with forest management area prescriptions and silvicultural best management practices (USFS 1988; WY Dept. of Environmental Quality 2004). Annual timber harvest on Wyoming's national forests peaked at over 100 million board feet in 1987 and 1988, but has since declined. Only 12 million board feet were harvested in 2000 and 2001 (Morgan et al. 2005:14). This drop in harvest levels resulted from numerous constraints on harvesting timber on public lands, including appeals and litigation of timber sales, threatened and endangered species protection, and cumulative impacts of past harvesting on other resources such as water quality and wildlife (Morgan et al. 2005:2). Timber harvest rebounded slightly to 25 million board feet in 2002, the last year of data reported by Morgan et al. 2005).

Silvicultural operations can impact streams and wetlands by increasing runoff, peak flows, erosion, and siltation (Hutchens et al. 2004). In addition, access and haul roads can eliminate wet meadows and swales by channeling surface and groundwater flow through culverts where roads are constructed across these features. Forest prescriptions in Wyoming generally require leaseholders to harvest timber by means of clearcuts that mimic the size and shape of natural disturbances. Buffer strips are usually left standing adjacent to streams, lakes, and larger wetlands to reduce the impact to aquatic ecosystems. However, isolated springs and wetlands frequently are not mapped within forest harvest stands and may not be protected during logging operations. The decline in logging since the 1980s has lessened the potential impact. Current levels of commercial timber harvest are considered to have a low to moderate impact on wetlands and riparian habitats in Wyoming. The impending large-scale loss of mature boreal forest due to pine bark beetle infestation is expected to have a major impact, although the scope and magnitude are unpredictable at this time.

Irrigation System Improvements

An estimated 1,947,100 acres of land are irrigated in Wyoming (WY Water Development Commission 2007). Agricultural irrigation has impacted wetlands both positively and negatively. Stream diversions and dewatering can diminish or eliminate natural wetlands associated with riverine systems. On the other hand, release of stored irrigation water and subsurface return flows can enhance base stream flows during the summer period, thereby sustaining a higher water table and more permanent wetland conditions. Wetlands often form in locations where seepage along canals and lateral ditches, and runoff from irrigated fields support wetland hydrology. Irrigation systems can also provide opportunities for wetland creation and enhancement by conveying water to suitable wetland project locations. Irrigation system rehabilitation or improvement projects intended to reduce seepage losses, such as installing canal linings or pipe, will eliminate some wetlands. On the other hand, more efficient water delivery can increase water supplies to some wetlands and may also increase irrigation return flows into others. Projects that are publicly funded should include an assessment of wetland impacts and mitigation to offset potential losses.

Conversions to Center Pivot Irrigation

Past and ongoing conversions from flood irrigation to center pivot sprinkler systems have adversely impacted wetlands in several regions of Wyoming. Center pivot systems reduce water consumption by producing substantially less runoff or "waste water" that feeds into watersheds and wetland basins. Federal funding assistance is currently available from the Environmental Quality Incentives Program (EQIP) of the NRCS to convert flood irrigation to center pivot systems. The impact of this program on wetlands has not been fully recognized or mitigated. For example, return flows from flood-irrigated fields historically drained into wetlands on the Springer WHMA and provided a supplemental source of water. The amount of runoff has substantially decreased since several of those fields were converted to center pivot sprinkler systems.

Intensive Farming Practices that Impair Wetlands or Nesting Cover

Conversion to agricultural production was the leading cause of wetland losses nationally throughout the 20th century (Dahl 1990, 2000), and remained the second leading cause from 1998-2004 when urban and rural development was the leading cause (Dahl 2006). Ongoing conversions (drainage, tilling and planting) are comparatively minimal in Wyoming. However, if effective land conservation measures are not employed, certain farming practices may continue to adversely affect wetlands. Sediment runoff from tilled fields and heavily grazed pastures decreases the lifespan of ponds and wetlands, and impairs water quality. Agrichemical runoff, including fertilizers, pesticides, herbicides, and animal waste also adversely affect water quality, plant life, and wildlife. In some regions of the U.S., isolated wetlands continue to be drained and converted to agricultural production at a rapid pace.

Proximity to agricultural operations is factored into wetland integrity scores developed by Copeland et al. (2010) because specific agricultural practices can impair wetland functions. On the other hand, many wetlands in Wyoming exist as a direct byproduct of agriculture. For example, water supplies to most wetlands in the Laramie Basin are principally derived from irrigation flows and irrigation-enhanced groundwater tables (Peck and Lovvorn 2001; Lovvorn and Hart 2004; Peck et al. 2005). Numerous wetlands in Goshen Hole are also sustained by irrigation return flows, seepage along ditches and canals, and direct appropriations. In several cases, wetlands have been restored and created on agricultural lands through various federal and private cost-share and incentives programs. Adverse impacts of agriculture can be controlled and minimized by incorporating best management practices into agricultural operations. [Refer to: Oneale (1993), Nicholoff (2003), U.S. Environmental Protection Agency (2005), Welsch et al. (1995), WY Department of Environmental Quality (1997, 1999, 2004), McKinstry et al. (2004), Brockmann (1999), Niemuth, et al. (2004), and Tessmann (2004)]. Most impacts arising from agricultural practices can be minimized or avoided by implementing appropriate best management practices (Dressing et al. 2003). Retaining adequate vegetated buffers is the most effective means of filtering sediment and contaminants and protecting shorelines from excessive erosion. Intact vegetation also provides forage and nesting, thermal, and escape cover for wildlife.

Grazing Management

Improperly managed grazing has been a dominant factor resulting in loss and degradation of wetland margins and riparian systems throughout the western U.S. (GAO 1988; Jensen and Platts 1989; U.S. Department of the Interior 1994). Uncontrolled livestock spend a disproportionate time within wetland margins and riparian areas where they find water, succulent forage, and favorable micro-climates including shade, wind reduction, and higher humidity (Eng et al. 1979; Skovlin 1984; Clary and Webster 1989; U.S. Department of the Interior 1994). For these reasons, the risk of damage to wetlands and riparian habitats is high, particularly under season-long grazing strategies (Clary and Webster 1989; Chaney et al. 1993; U.S. Department of the Interior 1994). Excessive grazing within wetland basins can remove vegetation cover, damage root mats, increase turbidity and siltation, and destroy nests of ground-nesting birds. However, adverse impacts are avoided or minimized by implementing appropriate grazing management systems and best management practices [http://www.epa.gov/oecaagct/anprgbmp.html], and by properly regulating distribution of cattle (Clary and Webster 1989; Chaney et al. 1993; Natural Resource Conservation Service 1997; U.S. Dept. Agriculture 1997; WY Dept. of Environ. Qual. 1997; Smith et al. 1986; Ehrhart and Hansen 2004; Niemuth et al. 2004; Tessmann 2004).

Invasive Plants

Invasive plants impair habitat functions of wetlands and riparian communities in many regions of the country. In Wyoming, problem species include: tamarisk (*Tamarix spp.*), Russian olive (*Elaeagnus angustifolia*), cheatgrass (*Bromus tectorum*), smooth brome (*Bromus inermus*), leafy spurge (*Euphorbia esula*), Russian thistle (*Salsola kali*), halogeton (*Halogeton glomeratus*), field bindweed (*Convolvulus arvensis*), purple

loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*) and other designated noxious and prohibited weeds listed by the WY Dept. of Agriculture [http://wyagric.state.wy.us/divisions/techserv/docs/w&p_designated_list.pdf)]. Russian olive is a popular species for landscaping and habitat plantings. Several species of wildlife benefit from the cover, forage, and nest sites it provides. However, higher densities of predators and competitive species are attracted to stands of Russian olive and can be detrimental to native wildlife adapted to open grasslands or shrub-steppe ecosystems. In addition, high transpiration rates in dense, monoculture stands of Russian olive can adversely affect wetland hydrology and stream base flows. The natural vegetation of an area should be emphasized when wetland projects are built. Nonnative and invasive plants should be eradicated where possible and their spread vigorously controlled. To date, grants totaling over $2.4 million have been awarded for invasive plant control by the Wyoming wildlife and Natural Resources Trust Account.

Management and Maintenance of Wetland Projects

Most created wetlands rely on structural and mechanical features such as dikes, ditches, headgates, fences, and in some cases, mechanical pumps, all of which require periodic maintenance. Water control structures and fences can lapse into disrepair; erosion and rodent activity can damage earthen dikes; and personnel are not always present to monitor livestock or attend to water management. To sustain productive conditions, created wetlands and their watersheds should be managed through a prescribed regime of water level manipulations, vegetation treatments, and appropriate grazing and erosion control practices. Wetland projects are susceptible to failure unless management and maintenance responsibilities are contractually assigned and adequate resources are made available. Management and maintenance provisions should always be written into wetland project agreements and responsible parties identified (Erwin 1990; Jensen and Platts 1990; Levine and Willard 1990; Lowry 1990). Sufficient funding should be set aside to cover the costs of managing and maintaining wetland projects, and to correct project failures if necessary.

Recreational Use of Wetlands

Frequent disturbances by people, vehicles, and equipment can often result in loss of effective habitat for sensitive wildlife. However, Wyoming has a low human population density and continues to remain a predominantly rural state. For much of the year, disturbances associated with recreational activities are comparatively minimal in most wetlands throughout the state. Some notable and increasing exceptions include popular reservoirs and stream reaches that receive heavy pressure from boating, fishing, and other public uses, as well as wetlands near urban areas. During the fall and early winter, moderate hunting pressure on accessible lands can alter the distribution of migratory game birds and their use of wetlands for feeding and resting. To address this, the WGFD has closed hunting on several key areas that serve as refuges. A number of federal wildlife refuges operated by the USFWS are also present in strategic locations. Year round disturbances associated with housing subdivisions, road projects, and energy developments are increasing and pose a greater risk to the functional integrity of wetlands

and riparian habitats. Reasonable access for wildlife- and wetland-dependent recreation is beneficial because this instills cultural values that translate into political and financial support for wetlands conservation programs. However, such access needs to be managed in sensitive nesting areas to prevent disturbance and possible destruction or abandonment of nest sites. (Nicholoff 2003; Patla and Lockman 2005). Disturbance problems can also be alleviated to some degree through public education, signing, or seasonal restrictions. (Nicholoff 2003:89).

Public Awareness and Support

Wetlands conservation has received a great deal of national attention since the 1960s and this is reflected in the numerous landmark legislations and federal programs designed to protect and restore the integrity of the nation's wetlands and other waters. However, public awareness and vigilance are matters of ongoing urgency as efforts to modify the intent and interpretation of these legislations continue. In particular, new legislation is acutely needed to clarify Federal Clean Water Act jurisdiction pursuant to the SWANCC and Rapanos and Carabell U.S. Supreme Court Cases. As of this writing, such legislation appears to be stalled in Congress. In addition, there is a need for greater awareness of floodplain functions and services including the importance of maintaining healthy riparian systems and instream flows. Public awareness can be achieved best through a program of continuing education, outreach, and effective use of media resources. A wetlands conservation website proposed in this strategy will help disseminate information about the importance of wetlands and riparian habitats in Wyoming and will provide access to a range of resources that can assist in their conservation.

Funding Availability

In Wyoming, wetlands conservation is not so much limited by the availability of funding as by constraints placed on how funds are used. Major sources of funding for wetlands conservation include the North American Wetlands Conservation Act (NAWCA), NRCS Wetlands Reserve Program (WRP), USFWS Partners for Fish and Wildlife program, and the Wyoming Wildlife and Natural Resource Trust Account (WWNRT) to name a few (see "EXISTING CONSERVATION PLANS AND INITIATIVES" – Page 34). However, funding from these programs is primarily available for construction and in general cannot be applied to technical services including project planning, permitting, and administration. The shortage of human resources dedicated to grant writing, project planning, and implementation limits our ability to capture the available funds to get more projects done on the ground. Many government agencies and nongovernmental organizations (NGOs) also face hiring freezes and personnel caps that preclude them from filling additional positions even if funds were available. A potential solution is to include or increase funding allocations for technical services in the various conservation programs and initiatives that fund wetlands projects. The effect of providing reimbursement for technical services will be a substantial increase in on-the-ground project delivery and fuller utilization of the available funding.

WETLANDS REGULATORY PROGRAMS

Good discussions of regulatory and non-regulatory wetland protection strategies can be found at:
[http://www.water.ncsu.edu/watershedss/info/wetlands/protect.html];
[http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf];
[http://www.aswm.org/propub/statepartnership.pdf]; and
[http://www.aswm.org/propub/7_state_6_26_06.pdf].

Clean Water Act of 1972

Several provisions of the Clean Water Act regulate activities that impact wetlands [http://www.wetlands.com/regs/tlpge02a.htm]. Section 101 sets forth the objectives of the Act, which are implemented largely through Title III (Standards and Enforcement) and Title IV (Permits and Licenses). Section 301 [Prohibitions] prohibits the discharge of pollutants into waters of the United States. Point source discharges are subject to permitting requirements under Section 402 [National Pollutant Discharge Elimination System] and Section 404 [Discharges of Dredge or Fill Material]. Section 401 [Certification] sets forth additional requirements for permit review and certification at the state level. Section 319 establishes a program to assist states with the abatement of nonpoint source pollution through federally-assisted watershed management practices. These regulatory programs are discussed in detail in the sections that follow.

Section 404

Section 404 of the Clean Water Act, administered by the Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE), remains the nation's principal wetlands protection law
[http://www.epa.gov/OWOW/wetlands/regs/sec404.html].
Section 404 regulates discharge of dredged and fill materials into jurisdictional waters of the United States. Larger discharges (e.g., construction of a dam or marina), can only be authorized through issuance of individual permits preceded by a NEPA environmental impact statement. Smaller-scale discharges with minimal impact can be authorized through a system of nationwide permits
[http://www.usace.army.mil/cecw/pages/nw_permits.aspx]
and regional general permits [https://www.nwo.usace.army.mil/html/od-rwy/gpermits.htm]. The basic premise of the Section 404 regulatory program is that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded [http://www.epa.gov/owow/wetlands/pdf/reg_authority_pr.pdf].

In 1986, the Corps of Engineers issued interpretative jurisdictional guidelines that came to be known as the "Migratory Bird Rule" [51 Fed. Reg. 41206, 41217]. These guidelines specifically stated the agency had permitting jurisdiction over waters used to irrigate crops sold in interstate commerce, and waters that are, or could be used as a habitat by migratory birds or endangered species. This interpretation was based on the

Commerce Clause of the U.S. Constitution, which gives the Congress power to regulate intrastate activities having a significant effect on interstate commerce. Since migratory birds cross state political boundaries and sustain various forms of commerce, the Corps interpreted that use of isolated ponds and wetlands by migratory birds was sufficient to confer jurisdiction under Section 404. The expanded jurisdictional interpretation provided effective protection for most wetlands and other waters throughout the United States, including isolated potholes, playas, small lakes and ponds, and wetlands along ephemeral and intermittent drainages.

The "Migratory Bird Rule" was ultimately challenged in a U.S. Supreme Court case – Solid Waste Agency of Northern Crook County (SWANCC) [531 U.S. 159 (2001)]. In a 5:4 split decision, the Court held that the Corps' interpretation exceeded Congress' scope of authority under the Commerce Clause: "The grant of authority to Congress under the Commerce Clause, though broad, is not unlimited" [531 U.S. 159 (2001)]. "Use of 'isolated' ponds by migratory birds does not confer jurisdiction" (ELI 2007:13). [http://elistore.org/reports_detail.asp?ID=11225]

A second Supreme Court case, Rapanos and Carabell (2006), attempted to clarify the geographic extent of the Corps jurisdiction under the CWA (i.e., the degree of connection that must exist between a wetland and a traditionally navigable water in order for the Corps to assert jurisdiction). In a 4:1:4 decision (1 vote abstained), the court determined wetlands and streams must have a significant nexus to traditional navigable waters in order to be covered by the CWA, but did not agree on the factors necessary to establish whether a significant nexus does or does not exist. Instead, the issue has been returned to the lower courts for resolution [www.floods.org/PDF/Rapanos_Carabell_10-9-06.pdf]. The 2007 edition of the Clean Water Act Jurisdictional Handbook provides the following guidance: "A significant nexus exists where a wetland, either alone or in combination with similarly situated lands in the region, significantly affects the chemical, physical, and biological integrity of waters more readily understood as navigable." (ELI 2007:18). [http://elistore.org/reports_detail.asp?ID=11225]

"… wetlands and streams *need not necessarily* have a hydrologic connection with traditional navigable waters to significantly affect them. Sometimes it is the 'absence of hydrologic connection' that helps to demonstrate the positive effects of a non-navigable aquatic resource on navigable waters. For example … wetlands filter pollutants, hold back flood waters, and store runoff water. These wetland functions protect traditional navigable waters in the same aquatic system, even though the wetlands may have no interchange of waters with the traditional navigable waters." (ELI 2007:19). "A significant nexus also exists where the wetland, considered 'in combination with similarly situated lands in the region,' significantly affects the chemical, physical, and biological integrity of traditional navigable waters." (ELI 2007:19). "Lower federal courts can take years to interpret and give meaningful shape to a new legal precedent that first appears in a Supreme Court decision … As courts continue to hand down decisions interpreting the significant nexus test in various contexts, how the test is to be applied may become clearer – or, courts may disagree on how the test is applied in one or more

situations, potentially creating the possibility of further review by the Supreme Court. Regardless, a growing body of case law will … inform how the significant nexus test should be understood and applied in the future." (ELI 2007:21). http://elistore.org/reports_detail.asp?ID=11225

In 1993, the U.S. Army Corps of Engineers and EPA promulgated a regulation that defined "dredged and fill material" to include any substrate incidentally falling into a wetland from an apparatus used for dredging or ditching [58 FR 45008]. Known as the "Tulloch Rule," this regulation gave the Corps jurisdiction under Section 404 to regulate wetland drainage and conversion on the basis of "incidental fallback" from equipment used to excavate ditches, even if the intent was to deposit the dredged material outside the wetland area. In 1997, U.S. District Court for the District of Columbia set aside and invalidated the Tulloch Rule on the basis it exceeded Congressional intent regarding the scope of activities regulated under Section 404. The Corps appealed this decision, however the district court of appeals affirmed the lower court's decision in 1998 and the case was never brought before the U.S. Supreme Court.

In 2001, the USACE and EPA promulgated a regulation that regarded the use of mechanized earth-moving equipment in streams and wetlands as resulting in a discharge of pollutants requiring a permit under the Federal Clean Water Act unless project-specific evidence demonstrates the dredging results in only incidental fallback into substantially the same place as the initial removal [66 FR 4549]. Known as Tulloch Rule II, this regulation addressed the loophole created by the Courts' vacatur of the original Tulloch Rule. In 2007, U.S. District Court for the District of Columbia issued an opinion that the revised Tulloch Rule also exceeded the scope of regulatory jurisdiction intended under Section 404.

In December, 2008 the EPA and Corps of Engineers released a revised regulatory guidance memo providing the following direction to agency staff: [http://www.epa.gov/owow/wetlands/pdf/CWA_Jurisdiction_Following_Rapanos120208.pdf]

The agencies will assert jurisdiction over the following waters:

- Traditional navigable waters;
- Wetlands adjacent to traditional navigable waters;
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and
- Wetlands that directly abut such tributaries

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent;
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent; and

- Wetlands adjacent to but that do not directly abut a relatively permanent; non-navigable tributary

As a consequence of the Supreme Court's rulings in the SWANCC and the Rapanos and Carabell cases, isolated wetlands lacking a significant nexus to traditional navigable waters no longer receive protection under Corps of Engineers or EPA regulation. As a consequence of the District of Columbia Court's vacatur of the Tulloch rules, jurisdictional wetlands and other waters of the United States can be converted by ditching and draining. However, the Section 404 permitting process continues to provide a high degree of protection to traditional navigable waters, their tributaries, and wetlands that have a significant nexus to, or are hydrologically-connected with navigable waters. All permitting and jurisdictional determinations in Wyoming are handled through Wyoming Regulatory Office of the U.S. Army Corps of Engineers located in Cheyenne. [https://www.nwo.usace.army.mil/html/od-rwy/Wyoming.htm]

The 404(b)(1) Guidelines

[http://www.epa.gov/owow/wetlands/pdf/40cfrPart230.pdf]

The purpose of the 404(b)(1) guidelines is to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material in accordance with Section 404. The guidelines establish 4 conditions which must be satisfied in order to make a finding that a proposed discharge of dredged or fill material complies with the guidelines. No discharge of dredged or fill material shall be permitted if:

1. There is a practicable alternative to the proposed discharge which would have less adverse impact;
2. The proposed discharge would cause or contribute to violations of applicable State water quality standards or applicable toxic effluent standard under section 307 of the Act; or jeopardize the continued existence of a species listed as endangered or threatened or results in the destruction or adverse modification of the species' critical habitat;
3. The proposed discharge would cause or contribute to significant degradation of the waters of the United States; or
4. Appropriate and practicable steps have not been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

Nationwide and Region General Permits

[https://www.nwo.usace.army.mil/html/od-rwy/nwpermits.htm]
[https://www.nwo.usace.army.mil/html/od-rwy/FRv72n47.pdf]
[https://www.nwo.usace.army.mil/html/od-rwy/gpermits.htm]

Nationwide and regional general permits are intended to protect the aquatic environment and the public interest while effectively authorizing activities that have minimal individual and cumulative adverse effects on the aquatic environment. The Corps currently maintains 49 nationwide permits (NWPs) and 2 region general permits (RGPs) authorizing specific categories of dredge and fill activities that have minor impacts on

jurisdictional wetlands and other waters of the United States. Nationwide permits are also subject to "general conditions" set forth at: https://www.nwo.usace.army.mil/html/od-rwy/gconditions.pdf.
Pre-construction notification is required in accordance with General Condition No. 27 [https://www.nwo.usace.army.mil/html/od-rwy/pcn.pdf] when required by the terms of the NWP under which the prospective permittee plans to operate. The district engineer will notify the permittee whether the activity may proceed under the NWP along with any special conditions imposed by the district or division engineer. In addition, the Wyoming Regulatory Office has issued regional conditions (dated 11 May, 2007) for activities authorized by nationwide permits: https://www.nwo.usace.army.mil/html/od-rwy/wroconditions.pdf.
Nationwide and general permits are also subject to Section 401 water quality certification by the Wyoming Department of Environmental Quality (discussed next).

Section 401 Water Quality Certification

Water quality standards are an effective tool available to states to protect wetlands resources and the valuable functions they provide, including shoreline stabilization, nonpoint source runoff filtration, wildlife habitat, and erosion control, which directly benefit adjacent and downstream waters. Water quality standards, including designated uses, criteria, and an anti-degradation policy can provide a sound legal basis for protecting wetland resources through state water quality management programs.

Pursuant to the authorities contained in Section 401 of the CWA, the Wyoming Department of Environmental Quality (DEQ) reviews all Section 404 individual permits issued by the Wyoming Regulatory Office of the USACE to determine if they comply with State water quality standards. A Section 401 certification letter is required before activities involving discharges to the waters of the State can authorized by a Section 404 individual permit. In addition, DEQ has issued a Section 401 letter of certification (dated 20 March, 2007) with respect to activities authorized within Wyoming by USACE nationwide permits. DEQ's review of the nationwide permits found that some were acceptable as written, some required additional conditions to assure compliance with State water quality standards, and a few were denied certification. Certification was waived for a number of nationwide permits that do not involve discharges to waters of the State, or have little or no applicability in Wyoming. DEQ's Section 401 letter of certification for nationwide permits can be viewed at: http://deq.state.wy.us/wqd/watershed/Downloads/401/wdeq32007.pdf.

Section 402 CWA National Pollutant Discharge Elimination System
[http://cfpub.epa.gov/npdes/cwa.cfm?program_id=45]

The 1972 amendments to the Federal Water Pollution Control Act ([known as the Clean Water Act or CWA) created the statutory authority for the National Point Discharge Elimination System (NPDES) permit program and the basic structure for regulating the discharge of pollutants from point sources into waters of the United States. Section 402 of the CWA specifically required that EPA develop and implement the NPDES program.

The CWA requires anyone who wants to discharge pollutants must first obtain an NPDES permit. Otherwise, the discharge is considered illegal. The CWA allows EPA to approve state-run NPDES permit programs, enabling states to perform many of the permitting, administrative, and enforcement aspects of the NPDES Program. The EPA approved Wyoming's NPDES permit program in 1975.

Section 319 Non-point Source Management Program
[http://epa.gov/nps/cwact.html]

Under section 319 of the CWA, states, territories, and Indian tribes receive grant money which supports a wide variety of activities including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. The Wyoming Nonpoint Source Program (NPS) works through voluntary and incentive-based approaches to preserve and restore the quality of Wyoming's surface water and groundwater resources. The Nonpoint Source Program relies largely on local voluntary implementation by individual landowners and land users in a cooperative effort to address water quality improvements through watershed planning. The Wyoming Nonpoint Management Plan can be downloaded from: http://deq.state.wy.us/wqd/watershed/nps/npspg.htm. Activities that produce NPS pollution generally fall into one or more of the following categories: silviculture, grazing, farming, feedlot management, hydrological modification, mining, oil and gas, roads, rural development, urban activities, and recreation. Best management practices to reduce nonpoint pollution from these sources are described at: http://deq.state.wy.us/wqd/watershed/nps/BMPs.htm.

Swampbuster Provisions of the Food Security Act of 1985
[http://www.nrcs.usda.gov/programs/compliance/WCindex.html]

The Highly Erodible Land Conservation and Wetland Conservation Compliance provisions known as "Swampbuster" were introduced in the 1985 Farm Bill, with amendments in 1990, 1996, and 2002. The purpose of these provisions is to remove certain incentives to produce agricultural commodities on converted wetlands or highly erodible land, unless the highly erodible land is protected from excessive soil erosion. Persons who plant an agricultural commodity on wetlands that were converted between December 23, 1985 and November 28, 1990 will be ineligible for Farm Bill program benefits in any year an agricultural commodity is planted unless an exemption applies. Persons who convert a wetland making production of an agricultural commodity possible after November 28, 1990, will be ineligible for program benefits until the functions of the wetland that was converted are mitigated or unless an exemption applies.

In order to determine compliance with the Swampbuster Provisions, the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) will determine if a producer's land has wetlands that are subject to the provisions. The agency maintains a list of the plants and combinations of soils and plants found in wetlands, and uses these technical tools, along with the hydrology of the area, to conduct determinations. These

determinations stay in effect as long as the land is used for agricultural purposes or until the producer requests a review.

The Farm Bill allows producers to convert wetlands for production of an agricultural commodity if they compensate for the wetland functions that are lost. Landowners can work with USDA, conservation districts, or others to choose the best ways to mitigate wetlands. Landowners who want to convert or alter wetlands may enhance existing wetlands, restore former wetlands, or create new wetlands to offset functions and values that are lost from conversions or alterations. Wetland conversions authorized by Section 404 of the Clean Water Act will be accepted if the conversion activities are adequately mitigated.

Federal Income Tax Reform Act of 1986

Sec. 403 of the Tax Reform Act of 1986 eliminated federal tax incentives for draining wetlands by treating gains from sale of "converted wetlands" as ordinary income rather than the more favorable capital gains tax treatment. Section 1257(a) of the Internal Revenue Code stipulates, “Any gain on the disposition of converted wetland or highly erodible cropland shall be treated as ordinary income.”
[http://www.doi.gov/oepc/wetlands2/v2ch3.html

Fish and Wildlife Coordination Act, 1958 Amendments
[http://www.fws.gov/habitatconservation/fwca.html]
[http://www.fws.gov/habitatconservation/fwca.pdf]

The Fish and Wildlife Coordination Act (FWCA) provides the basic authority for the Fish and Wildlife Service’s involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources shall receive equal consideration to other project features. It also requires Federal agencies that construct, license or permit water resource development projects must first consult with the Service and state fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate those impacts.

Executive Order 11990 – Protection of Wetlands (signed by President Jimmy Carter in 1977)
[http://www.epa.gov/wetlands/regs/eo11990.html]

Executive Order 11990 requires each federal agency “shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.”

Section 1.(b) provides the following exception: "This Order does not apply to the issuance by Federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-Federal property."

Executive Order 11988 – Floodplains (signed by President Jimmy Carter in 1977) [http://www.epa.gov/owow/wetlands/regs/eo11988.html]

Perhaps the closest thing we have to a riparian habitat protection law, Executive Order 11988 requires each federal agency "shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities."

Wyoming Wetlands Act and Mitigation Bank

The Wyoming Wetlands Act [W.S. §§ 35-11-308 through 35-11-311] was passed by the Wyoming Legislature in 1991 and amended in 1994 [http://legisweb.state.wy.us/statutes/compress/title35.doc]. Section 309(a) of the Act declared all water, including collections of still water and waters associated with wetlands within the borders of this state are property of the state. The Act further declared water is one of Wyoming's most important natural resources and the protection, development and management of Wyoming's water resources is essential for the long-term public health, safety, general welfare and economic security of Wyoming and its citizens.

The two operative provisions of the Wyoming Wetlands Act are a notification requirement for persons intending to drain a wetland of 5 acres or more [Section 310], and the creation of a mitigation bank to consist of credits based on ecological functions and values of wetlands [Section 311]. The "Wyoming Statewide Wetland Mitigation Bank Guidelines for Interpretation and Implementation" can be downloaded from: http://deq.state.wy.us/wqd/watershed/Downloads/Wetlands/wet_guidelines.pdf.

Federal regulations governing use of mitigation banks as compensatory mitigation can be downloaded from: http://www.epa.gov/owow/wetlands/pdf/wetlands_mitigation_final_rule_4_10_08.pdf. The Society of Wetland Scientists position paper on mitigation banking can be downloaded from: http://www.sws.org/wetland_concerns/banking.mgi.

EXISTING CONSERVATION PLANS AND INITIATIVES IN WYOMING

Ducks Unlimited (DU) Conservation Regions and Initiatives

Portions of Wyoming lie within 3 of DU's conservation regions: Southern Great Plains [http://www.ducks.org/conservation/initiative17.aspx]; Northwestern Great Plains [http://www.ducks.org/conservation/initiative16.aspx]; and Northern and Southern Rockies [http://www.ducks.org/conservation/initiative10.aspx]. Conservation goals within these regions include:

- Maintain the integrity of existing wetlands – achieve a no net loss of wetlands and associated uplands within DU emphasis areas;
- Work with federal agencies and private landowners to create and enhance wetlands;
- Maintain strong funding for the North American Wetlands Conservation Act (NAWCA);
- Maintain strong funding for the Wetlands Reserve Program (WRP) and the conservation programs of the Farm Bill;
- Work with agencies and other organizations to protect large tracts of grasslands in areas with high wetland densities;
- Support the objectives of the joint ventures that deliver conservation within the 3 regions. [Includes the Intermountain West Joint Venture and Northern Great Plains Joint Venture in Wyoming];
- Apply GIS and remote sensing technologies to map and evaluate habitat; and
- Continue to support needed research.

DU has undertaken 2 conservation initiatives that benefit Wyoming: the Platte River and Rainwater Basin Initiative in the Southern Great Plains [http://www.ducks.org/conservation/initiative40.aspx], and the High Country Wetlands initiative in the Northern and Southern Rockies [http://www.ducks.org/conservation/initiative87.aspx].
Conservation strategies include:

- In the Rainwater Basin and along the Platte River corridor, Ducks Unlimited is finding innovative ways to protect, restore, and manage wetlands. With a combination of conservation easements, fee title acquisitions, and planned gifts; critical wetlands in the system are being permanently protected.
- DU developed the High Country Wetlands initiative to work with ranchers, farmers, public agencies and other conservation organizations across the Rocky Mountain range. This initiative primarily seeks to protect waterfowl breeding habitats through conservation easements, but also works to restore seasonal wetlands that have been drained or degraded.

DU was recently awarded 2 NAWCA standard U.S. grants to fund wetland and grassland conservation within the Platte River and Rainwater Basin Initiative area, which includes the lower North Platte River in Wyoming. Over the past 5 years, DU has expended approximately $1.5 million to protect wetlands and associated upland habitats in southern Goshen County, WY (Greg Kernohan *pers. comm.*). Much of the funding has been used

for permanent conservation easements, however several wetlands creation and restoration projects are also being completed. DU has contributed funding annually to the U.S. Fish and Wildlife Service's Partners for Fish and Wildlife Program and works closely with the program to develop additional projects throughout Wyoming, including projects in Crook, Fremont, Goshen, and Teton counties.

Since 1989, DU worked with partners to conserve 3,194 acres of wetland habitat throughout Wyoming [http://www.ducks.org/Page1856.aspx]. In addition, DU has provided technical assistance to manage and improve over 110,000 acres of private uplands.

USFWS Partners for Fish and Wildlife Program

The U.S. Fish and Wildlife Service's Partners Program (Partners) was established in 1987 to promote on-the-ground wetland restoration projects on private lands. The Wyoming program description can be downloaded from: http://ecos.fws.gov/docs/partners/web/pdf/563.pdf. The Partners' Program has identified 8 focus areas in which the majority of staff time is expended to implement wetlands and upland habitat conservation projects in Wyoming (USFWS 2007). Partners focus areas include the Wind River, Goshen Hole, Bear River, Laramie Plains, Upper Green River, Upper Sweetwater/Red Desert, Powder/Tongue River, and Black Hills Mixed Grass focus area. Partners staff expend approximately 70% of their time in the two staffed focus areas – Wind River and Goshen Hole. The remaining 30% is allocated among the other 6 focus areas.

Statewide goals are to: restore 15,000 acres of wetlands; restore or enhance 5 million acres of upland habitat; restore 1,000 miles of riparian habitat; and restore 1,000 miles of in-stream habitat. Five-year targets for the 8 focus areas are to restore/enhance 1,270 acres of wetlands, 87,000 acres of uplands, and 209 miles of stream/riparian habitat including at least 46,000 ft of in-stream work and fish barrier removal (USFWS 2007).

Natural Resources Conservation Service: Farm Bill Programs

The NRCS and Farm Service Agency administer 4 principal Farm Bill programs that provide funding and technical assistance for conservation and restoration of wetlands, watersheds, and wildlife habitat on private lands: the Wetland Reserve Program (WRP), Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives Program (WHIP), and Grassland Reserve Program (GRP). A comprehensive guide to the 2008 Farm Bill for Fish and Wildlife Conservation (Gray 2009) can be downloaded from: http://www.wetlands.com/fed/aug93wet.htm.

Wetlands Reserve Program (WRP)
[http://www.nrcs.usda.gov/Programs/wrp/]

The WRP is the largest and best-funded wetlands conservation program administered by the NRCS. This voluntary program provides landowners financial incentives and

technical assistance for restoring wetland functions and values while maximizing wildlife habitat benefits on eligible land. The program offers 3 enrollment options:

1. Permanent Easement – This is a conservation easement in perpetuity. In addition to paying for the easement, USDA pays up to 100 percent of the cost of restoring the wetland.
2. 30-Year Easement – Easement payments through this option are 75 percent of what would be paid for a permanent easement. USDA also pays up to 75 percent of restoration costs.
3. Restoration Cost-Share Agreement – This is an agreement (generally for a minimum of 10 years) to re-establish degraded or lost wetland habitat. USDA pays up to 75 percent of the cost of the restoration activity. This enrollment option does not place an easement on the property. Under all 3 options, any cost to the landowner can be covered through non-federal matching funds from the landowner or other partners.

[http://www.nrcs.usda.gov/Programs/WRP/2007_ContractInfo/2007WRPFactSheet.pdf]

Environmental Quality Incentives Program (EQIP)

[http://www.wy.nrcs.usda.gov/programs/eqip/eqip.html]

EQIP is a voluntary conservation program for farmers and ranchers, which promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical help to assist eligible participants with installation or implementation of structural and management practices on eligible agricultural land. EQIP provides payments up to 75 percent of the incurred costs and income foregone as a result of certain conservation practices and activities. Payments may be higher for certain categories of agricultural operations. National priorities for EQIP include:

1. Reduction of nonpoint source pollution, such as nutrients, sediment, pesticides, or excess salinity in impaired watersheds consistent with EPA total maximum daily loads (TMDLs) where available as well as the reduction of groundwater contamination and reduction of point sources such as contamination from confined animal feeding operations;
2. Conservation of ground and surface water resources;
3. Reduction of emissions, such as particulate matter, nitrogen oxides (NOx), volatile organic compounds, and ozone precursors and depleters that contribute to air quality impairment violations of National Ambient Air Quality Standards;
4. Reduction in soil erosion and sedimentation from unacceptable levels on agricultural land; and
5. Promotion of at-risk species habitat conservation.

[http://www.nrcs.usda.gov/programs/eqip/]
[http://www.or.nrcs.usda.gov/programs/eqip/fy10/ranking.html]

The Wyoming State Conservation Plan includes the following priorities for EQIP: grazing lands management; water quality, irrigation water management; wetlands; prevention of the conversion of agricultural lands to non-agricultural use; excessive erosion; streambank/riparian area protection; and fish and wildlife habitat. EQIP funding can be used in Wyoming to implement projects in these categories to meet the national

priorities. Statistics are not available regarding the number or acreage of wetland and riparian projects funded through EQIP in Wyoming.

Wildlife Habitat Incentive Program (WHIP)
[http://www.nrcs.usda.gov/programs/whip/]

WHIP is a voluntary program for landowners who want to develop and improve wildlife habitat on agricultural land, nonindustrial private forest land, and Indian land. The NRCS administers WHIP to provide both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP cost-share agreements between NRCS and the participant generally last from one year after the last conservation practice is implemented to not more than 10 years from the date the agreement is signed.

National priorities for WHIP include:

1. Promote the restoration of declining or important native fish and wildlife habitats;
2. Protect, restore, develop or enhance fish and wildlife habitat to benefit at-risk species;
3. Reduce the impacts of invasive species on fish and wildlife habitats; and
4. Protect, restore, develop or enhance declining or important aquatic wildlife species' habitats.

The Wyoming WHIP Plan sets forth the following priorities:

1. Riparian and Wetland Areas:
   Emphasize projects that will benefit rare and declining species or species of concern, including but not limited to: cold water fisheries, sage grouse, turkey, neotropical birds, bald eagle, waterfowl, deer, elk, moose, and amphibians. Practices will focus on: fencing with livestock management and off-site water developments; stream restoration; removal of barriers to fish movement; herbaceous or woody plantings; and creation or enhancement of shallow water areas for wetland dependent wildlife.
2. Upland Projects (grassland and shrub-steppe):
   Emphasize projects that will benefit rare and declining species or species of concern, including but not limited to: sage-grouse, Cassin's sparrow, lark bunting, and sage sparrow. Other target species that benefit include antelope, mule deer and elk. Practices to be applied may include: shrub thickets; grass or legume seedings; water facilities such as guzzlers; brush management; aspen stand regeneration; fencing and livestock management; water developments; and prescribed burnings.

[http://www.wy.nrcs.usda.gov/programs/whip/whip.html]
[ftp://ftp-fc.sc.egov.usda.gov/WY/whip/wyoming_whip_plan_09.pdf]

WHIP funding can be used to implement riparian, wetland, and upland projects to meet the national priorities. Statistics are not available regarding the number or acreage of wetland and riparian habitat projects funded through WHIP in Wyoming.

Grassland Reserve Program (GRP) [http://www.wy.nrcs.usda.gov/programs/grp/grp.html]

The GRP is a voluntary program that helps landowners and operators restore and protect grasslands, including rangeland and pastureland, and certain other lands, while maintaining the areas as grazing lands. Participants voluntarily limit future use of the land while retaining the right to conduct common grazing practices; produce hay, mow, or harvest for seed production (subject to certain restrictions during the nesting season of bird species that are in significant decline or those that are protected under Federal or State law); and conduct fire rehabilitation and construct firebreaks and fences. The program offers several enrollment options including 10-year, 15-year, 20-year, or 30-year rental agreements; permanent easements; 30-year easements; and restoration agreements.

Grassland restoration and protection projects can be designed to complement wetland conservation by improving watershed functions and by promoting nesting cover for a variety of waterfowl and other wetland-associated bird species.

North American Wetlands Conservation Act
[http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm]

The North American Wetlands Conservation Act of 1989 (NAWCA) was passed, in part, to support activities under the North American Waterfowl Management Plan, an international agreement that provides a strategy for the long-term protection of wetlands and associated uplands habitats needed by waterfowl and other migratory birds in North America. In December 2002, Congress reauthorized the Act and expanded its scope to include the conservation of all habitats and birds associated with wetlands ecosystems.

NAWCA provides matching grants to organizations and individuals who have developed partnerships to carry out wetlands conservation projects in the United States, Canada, and Mexico for the benefit of wetlands-associated migratory birds and other wildlife. Funding is administered through "Standard Grants" and "Small Grants" programs. Both are competitive and require that grant requests must be matched by partner contributions at no less than a 1:1 ratio. Funds from U.S. federal sources may contribute toward a project, but are not eligible as match. In order to successfully compete for NAWCA funding, projects generally provide at least a 2:1 nonfederal match ratio.

The Standard Grants Program supports projects in Canada, the United States, and Mexico that involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats. The Small Grants Program operates only in the United States, but supports the same type of projects and adheres to the same selection criteria and administrative guidelines as the U.S. Standard Grants Program. However, project activities are usually smaller in scope and less costly. Small grants may not exceed $75,000, and funding priority is given to grantees or partners new to the Act's grants program.

Since its inception in 1989 through June, 2010 NAWCA funded 2,015 small and large project grants totaling $1.05 billion in North America

[http://www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm]. The FY 2010 Congressional appropriation for NAWCA totaled $47,647,000. As of this publication, a single standard U.S. grant of $109,162 and 4 small grants totaling $152,680 in NAWCA funding have been awarded exclusively within Wyoming.
[www.fws.gov/mountain-prairie/reference/briefing_book_wy_2000.pdf]
[http://www.fws.gov/birdhabitat/grants/nawca/Small/Wyoming.shtm]
[http://www.fws.gov/birdhabitat/Grants/NAWCA/Standard/US/Wyoming_Std.shtm]

Two multi-state standard U.S. grants have been awarded to Ducks Unlimited through the Playa Lakes Joint Venture to support projects in Platte River confluence region of SW Nebraska, NE Colorado, and SE (specifically, Goshen County) Wyoming. Platte River Confluence Phase I, approved in 2007, was funded at $1 million with $2.3 million in matching funds. Platte River Wetlands Partnership II, approved in March, 2009, was also funded at $1 million with $2.1 million in matching funds.
[http://www.fws.gov/birdhabitat/Grants/NAWCA/Standard/US/Wyoming_Std.shtm].

Ducks Unlimited has administered a portion of the 2007 grant along with other funding to accomplish significant wetlands conservation work in Goshen County, WY. Many of the Wyoming projects involved conversion of short-term conservation easements into permanent easements to extend protection of USFWS Partners Program wetlands. DU has also built or enhanced several wetlands that will be protected by permanent conservation easements. Goshen County is included in the geographic area covered by the 2009 Partnership II grant as well.

Two other multi-state standard U.S. grants were awarded to the Teton Regional Land Trust, Inc. based in Driggs, ID for easement acquisitions primarily in Teton County, Idaho. The geographic area covered by the grants extends into a small portion of Teton County, WY. The Teton River Basin drains westerly from the Teton Range into Idaho and includes approximately 15 mi^2 of private land on the Wyoming side near Alta. "Teton River Basin Wetlands Conservation Phase III," approved in 2002, was funded at $1 million with $5,340,221 in matching funds. "Conservation of Priority Wetland Bird Focus Areas, Teton River Basin," approved in 2005, was also funded at $1 million with $13,671,151 in matching funds.
[http://www.fws.gov/birdhabitat/Grants/NAWCA/Standard/US/Wyoming_Std.shtm].

Intermountain West Joint Venture (IWJV) [http://www.iwjv.org/about.htm].
Coordinated Implementation Plan for Bird Conservation in Central and Western Wyoming (BCRs 10, 16, 18). (Cerovski et al. 2005).
[http://www.iwjv.org/Images/WYPlan2005.pdf].

The IWJV was established in 1994 with the following mission statement, "Our mission is to facilitate the long-term conservation of key avian habitat including planning, funding, and developing habitat projects that benefit all biological components of Intermountain ecosystems." The original administrative boundary of the IWJV included all of Wyoming, but was modified after 2002 to exclude 7 counties in NE Wyoming, which are now part of the Northern Great Plains Joint Venture.

The primary purpose of the Wyoming Implementation Plan is to assist the IWJV Management Board in reviewing and ranking habitat protection, restoration and enhancement projects for potential funding through the North American Wetlands Conservation Act and other programs. The Implementation Plan identifies priority bird species and lists statewide conservation goals for priority habitats (such as total acreage protected, maintained, enhanced, or restored). The plan also identifies 48 bird habitat conservation areas of which half are primarily wetland or riparian complexes. As of this publication, the IWJV Management Board has not recommended a large-scale project for Standard Grant funding exclusively or predominantly within Wyoming. One standard grant of $109,162 (Green River Wetlands) was approved in 1996. Four small grant projects have received NAWCA funding totaling $152,680 along with an additional $428,935 in matching and non-matching funds.

A wetland demonstration project at the Teton Science School (Jackson, WY) received $15,000 from the IWJV Cost Share Program in 2006. In 2008, a 3-year commitment of Capacity Grant funding ($15,000/year) was made to help support a shared NRCS Wildlife Biologist position working on farm bill projects within the Wyoming Landscape Conservation Initiative area. In 2009, The Nature Conservancy was awarded a $15,000 Capacity Grant to conduct a project readiness assessment of 3 focus areas – Bear River, Goshen County, and Little Snake River/Muddy Creek watershed. In 2010, The Nature Conservancy was awarded an additional $15,000 Capacity Grant to fund an "implementation partnership for a Wetland Reserve Program (with reserved grazing) pilot project in Wyoming."

Year	Project Name	NAWCA Funding
2008	Wyoming North Platte Wetlands Initiative	$75,000
2002	Lower Green River Wetland Restoration Project	$49,072
1997	Wetland Creation Riparian Enhancement Beaver Introduction	Not Specified
1996	Cottonwood Creek Riparian Habitat Protection & Enhancement	Not Specified
1996	Green River Wetlands	$109,162
TOTAL		$261,842

Northern Great Plains Joint Venture (NGPJV)

[http://www.northerngreatplainsjointventure.org]

Migratory Bird Management for the Northern Great Plains Joint Venture: Implementation Plan [http://www.northerngreatplainsjointventure.org/downloads.php]

The Northern Great Plains Joint Venture was established in 2002 with the following mission statement, "The mission of the Northern Great Plains Joint Venture is to seek out new opportunities and foster new partnerships while strengthening existing alliances for the protection, enhancement and restoration of prairie, riverine and forest ecosystems. These conservation actions will place an emphasis on sustaining and enhancing

populations of migratory birds, resident birds and wildlife consistent with current and future formal bird conservation objectives as expressed in regional, national and international plans." After its formation in 2002, the administrative boundary of the NGPJV was expanded to include 7 counties in NE Wyoming: Campbell, Converse, Crook, Johnson, Niobrara, Sheridan, and Weston.

The purpose of the NGPJV Implementation Plan is to "… contribute to the attainment of continental population goals, developed by all major bird initiatives, by strategically delivering habitat conservation within the NGP ecosystem" (Pool and Austin 2006). The geographic area covered by this plan is closely aligned with Bird Conservation Region (BCR) 17 of the North American Bird Conservation Initiative (NABCI). Conservation and implementation goals are described at a programmatic level, although specific goals are not established for each state. The programmatic goal most relevant at the state level is to, "design [projects] at multiple spatial scales (e.g., eco-region, landscape, project). Working groups will be encouraged to develop plans that outline the habitat improvements needed in each [scale] and to use the acreage objectives to estimate the ability of those improvements to contribute to the BCR's bird population goals." As of this publication, NGPJV has been engaged primarily in planning activities and is a cooperator in the development of a NE Wyoming regional component of this statewide Wetlands Conservation Strategy.

Wyoming Partners in Flight (PIF): Wyoming Bird Conservation Plan: Version 2.0
[http://www.partnersinflight.org/description.cfm]

Major purposes of the Wyoming Bird Conservation Plan are to identify priority species and habitats and to establish objectives for bird populations and habitats in Wyoming. The plan describes conceptual objectives at statewide and landscape scales. However, the objectives are not stepped down to regional and local scales. Wetland "best management practices" are described in the plan and could improve the functional integrity of wetlands if implemented on a watershed scale. The Wyoming Bird Conservation Plan can be accessed at: http://www.blm.gov/wildlife/plan/WY/menu.htm. The wetland component can be downloaded from: http://www.blm.gov/wildlife/plan/WY/Wetlands.htm#wetlands.

Audubon Wyoming
http://www.audubonwyoming.org/

Audubon Wyoming's goal is to protect and restore bird populations and important bird habitats, and build a network of citizen scientists to carry out on-the-ground conservation work and education programs throughout the state. Main areas of conservation are the Species Survival Plan [http://www.audubonwyoming.org/BirdSci_SSP.html]; Important Bird Areas (IBA) Program [http://www.audubon.org/bird/IBA/]; and MAPS Bird Banding Program [http://www.audubonwyoming.org/BirdSci_MAPS.html]. Thirty-nine Important Bird Areas (IBAs) are currently recognized in Wyoming (Table 4). Most IBAs include wetlands and/or riparian habitats.

Table 4. Audubon important bird areas in Wyoming.
http://iba.audubon.org/iba/stateIndex.do?state=US-WY

	IBA Name	Status	Priority	County
1.	Alkali and Beck Lakes	Recognized	State	Park
2.	Alpine Wetland	Recognized	State	Lincoln
3.	Bird Island- American White Pelican Nesting Colony	Recognized	State	Carbon
4.	Breteche Creek Ranch	Recognized	State	Park
5.	Canyon Creek	Recognized	State	Sweetwater
6.	Chapman Bench	Recognized	State	Park
7.	Cokeville Meadows National Wildlife Refuge	Recognized	State	Lincoln
8.	Commissary Ridge Raptor Migration Route	Recognized	State	Lincoln, Sublette, Uinta
9.	Edness Kimball Wilkens State Park	Recognized	State	Natrona
10.	Flat Creek Marshes and Wetland Complex	Recognized	State	Teton
11.	Grand Teton National Park	Recognized	State	Teton
12.	Gros Ventre Riparian Complex	Recognized		Teton
13.	Heart Mountain	Recognized	State	Park
14.	Jackson Canyon Eagle Roost	Recognized	State	Natrona
15.	Laramie Greenbelt	Recognized	State	Albany
16.	Laramie Plains Lakes Complex	Recognized	State	Albany
17.	Lions Park	Recognized	State	Laramie
18.	Little Sandy Landscape	Recognized	State	Fremont, Sublette, Sweetwater
19.	Loch Katrine Wetland	Recognized	State	Park
20.	Muddy Creek Wetlands	Recognized	State	Carbon
21.	Ninemile Draw	Recognized	State	Fremont
22.	Pathfinder National Wildlife Refuge	Recognized	State	Natrona
23.	Powder Rim	Recognized	State	Sweetwater
24.	Red Desert	Recognized	State	Fremont, Sweetwater
25.	Seedskadee National Wildlife Refuge	Recognized	State	Sweetwater
26.	Shamrock Hills Raptor Concentration Area	Recognized	Global	Carbon
27.	Shirely Basin	Recognized	State	Carbon, Natrona
28.	Snowy Range Peaks	Recognized	State	Albany
29.	Soda Lake	Recognized	State	Natrona
30.	Soda Lake Wildlife Habitat Management Area	Recognized	State	Sublette
31.	South Park Wildlife Habitat Management Area	Recognized	State	Teton
32.	Tensleep Preserve	Recognized	State	Washakie
33.	Teton Basin	Recognized	State	Teton
34.	The Nature Conservancy, Red Canyon Ranch	Recognized	State	Fremont
35.	The Nature Conservancy, Sweetwater River Project Area	Recognized	State	Fremont
36.	Thunder Basin National Grasslands Complex (3 IBAs)	Recognized		Campbell, Converse, Crook, Niobrara, Weston
37.	Wyoming Hereford Ranch	Recognized	State	Laramie
38.	Yellowstone National Park	Recognized	State	Park
39.	Yellowtail Wildlife Management Area	Recognized	State	Big Horn

Green River Trumpeter Swan Range Expansion Project

The WGFD began efforts as early as 1988 to establish a breeding population of swans in the Green River Basin of southwestern Wyoming (Patla and Lockman 2004; Patla and Oakleaf 2004; Lockman 2005). A nesting population was successfully established through release of captive-reared swans from 1994-2002. To provide additional shallow water summer habitat for this expanding flock of resident swans, a State Wildlife Grant was obtained in 2003 to identify potential wetlands projects on private lands. Plans were developed for over 20 projects – 4 projects have been completed to date.

Basin Management Plans – WGFD Fish Division

[http://gfi.state.wy.us/fish/management/] (WGFD basin plans are accessible through the WGFD intranet or by request).

The Fish Division manages aquatic resources through an integrated program of protection, regulation, propagation, restoration, and control to provide diverse, quality fisheries resources and angling opportunities. Basin management plans have been developed to summarize basic fisheries management information and goals for each basin. The plans provide management goals and objectives along with a summary of the aquatic wildlife communities, habitat conditions and wild brood stocks in each basin. Several basin plans also include a general description of watershed characteristics and stressors (land uses) that influence water quality and quantity and fish habitat. However, the primary focus is currently on fisheries management, with some limited attention given to wetlands and riparian habitat conditions.

Aquatic management is broadening from a traditional sport fish focus to include all aquatic wildlife and a watershed approach. Collaborative relationships with other state and federal agencies enhance the ability to gather information and promote management actions to maintain, enhance and restore native aquatic species. Substantial attention is given to evaluating potential impacts of land management activities through NEPA commenting on proposed projects.

State Wildlife Action Plan (SWAP) and State Wildlife Grants (SWG)

(formerly, "Comprehensive Wildlife Conservation Strategy for Wyoming" or CWCS)
[http://www.wildlifeactionplans.org/pdfs/action_plans/wy_action_plan.pdf]
[http://gf.state.wy.us/wildlife/CompConvStrategy/index.asp]

The SWAP is a long-range plan to conserve Wyoming's Species of Greatest Conservation Need (SGCN) that was developed to meet the requirements of the Congressionally-authorized State Wildlife Grants (SWG) Program. The plan identifies SGCN, key habitats, and conservation challenges statewide. Habitat quality or "intactness" was estimated using a modeling approach (Copeland et al. 2007) to assess the condition of ecological systems (Comer et al. 2003) throughout Wyoming. The 2005 CWCS did not contain a wetlands conservation section, however the 2010 update has incorporated many elements of this Wetlands Conservation Strategy.

The Nature Conservancy

[http://www.nature.org/wherewework/northamerica/states/wyoming/]

The mission of The Nature Conservancy (TNC) is to preserve the plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. TNC does this primarily through acquisitions of lands and easements to protect important representative communities and habitats in their natural state.

TNC recently completed a statewide wetland evaluation and risk assessment (Copeland et al. 2010) – also see *Wetlands Assessment Study* on page 68. The Nature Conservancy's study produced a statewide inventory of wetland complexes and condition metrics used in this Wetlands Conservation Strategy, and is relied upon as a principal source of information for the wetlands section of the 2010 SWAP update (discussed above). The main purpose of TNC's wetland condition dataset is to assist managers and NGOs in determining where to focus conservation efforts. Functional wetland complexes were identified based on several spatially defined criteria including mean wetland patch size, mean wetland densities, and distance between wetlands. The condition or integrity assessment was based on distances to features known to impair wetland functions, for example distances to roads, dams, pipelines etc. Another descriptive data layer depicts the protection status of wetlands within various terrestrial habitat types. Future site conditions (vulnerability) were modeled and "at risk" areas identified. The conceptual modeling process is described in Copeland et al. (2007).

Land Trusts

Four principal land trusts operate in Wyoming. They include The Nature Conservancy (discussed above), the Jackson Hole Land Trust, The Green River Valley Land Trust, and the Wyoming Stock Growers Agricultural Land Trust. The Wyoming Wildlife and Natural Resource Trust (next section) also funds conservation easements. In addition, a national land trust organization, The Conservation Fund, maintains a field office in Jackson, WY. The Conservation Fund finances short-term acquisitions for other partners to protect key vulnerable lands through a revolving fund [http://www.conservationfund.org/revolving-fund]

The Jackson Hole Land Trust [http://www.jhlandtrust.org/] was founded in 1980 as a non-profit organization with the sole purpose of preserving the scenic, ranching, and wildlife values in and around Jackson Hole. Since that time, the organization has ensured the permanent protection of over 20,000 acres. During winter, 2009 the Jackson Hole Land Trust launched an affiliated conservation effort, the Wind River Program to focus on conserving important scenic, agricultural and wildlife values in the upper Wind River watershed area [http://www.jhlandtrust.org/pdfs/NewConservationFocusWindRiverWatershed.pdf].

The Green River Valley Land Trust [http://www.grvlandtrust.org/] was founded in 2000 by a group of ranchers, teachers and local business owners who wanted to provide landowners, particularly working ranchers, with a voluntary way to conserve their land and the wildlife habitat and agricultural heritage it provides. To date, this land trust has

worked with more than 46 families to conserve nearly 30,000 acres of working ranchland, wildlife habitats and scenic views in Sublette County. In 2010, the Green River Valley Land Trust expanded its focus area statewide and will become the Wyoming Land Trust.

The Wyoming Stock Growers Agricultural Land Trust [http://www.wsgalt.org/] is dedicated to conserving Wyoming's working family farms and ranches and the wide open spaces, natural habitats, and western lifestyle they support. Founded in December of 2000, the Wyoming Stock Growers Agricultural Land Trust already holds 41 conservation easements on 108,115 acres of ranchland. Additional conservation easements are being negotiated throughout the State.

Wyoming Wildlife and Natural Resource Trust
[http://wwnrt.state.wy.us/]

The Wyoming Legislature created the Wyoming Wildlife and Natural Resource Trust (WWNRT) in 2005. The WWNRT is funded by interest earned on a permanent account, donations, and legislative appropriations. Its purpose is to enhance and conserve wildlife habitat and natural resource values throughout the state. Any project designed to improve wildlife habitat or natural resource values is eligible for funding. Projects with multiple partners and cost share contributions tend to rank higher in the selection process. An important service of the WWNRT is to provide a state source of funding that meets the non-federal match requirement of federal funding programs such as NAWCA, WHIP, WRP, and SWG.

From its inception through 2009, the WWNRT provided more than $7.7 million to help fund 76 projects directly or indirectly benefiting wetlands and riparian habitats throughout Wyoming. These WWNRT contributions helped leverage an additional $54.4 million from other sources. The WWNRT has helped fund several wetland creation and enhancement projects as well as wetland and riparian habitat restoration and stream improvements. The greater share of funding has been applied to conservation easements and efforts to control invasive plants that spread into wetland and riparian areas. Projects benefiting wetlands and riparian habitats accounted for over 50% of total WWNRT funding from 2005 through 2009. WWNRT funds cannot be used for fee simple acquisition of real property or to purchase water rights.

Federal Land Management Plans and Planning Processes

Public involvement in federal land use planning can influence a range of management practices and other actions and activities on public lands. Three principal agencies manage land and water resources that can affect wetlands and riparian habitats in Wyoming. The Bureau of Land Management (BLM) is responsible for multiple use management of public lands comprising 28% of the State's surface. The BLM periodically updates resource management plans, as appropriate, for each of its 10 districts in Wyoming [Ref: 43 USC 1712]. Resource management plans and plan

revisions can be viewed at: http://www.blm.gov/rmpweb/ and http://www.blm.gov/wy/st/en/programs/Planning/rmps.html.

The U.S. Forest Service (USFS) manages national forest system lands covering 15% of Wyoming. The USFS periodically updates forest management plans for each of the 10 national forest units in Wyoming [Ref: 16 USC 1604]. Forest management plans can be downloaded at: http://www.fs.fed.us/r2/projects/.

The Bureau of Reclamation (BOR) manages 59,960 acres (just 0.1% of Wyoming), but regulates dam operations at 21 reservoirs that affect flow regimes, wetlands, and riparian habitats along several hundred miles of streams. The most significant operation involves the 7 BOR facilities along the North Platte River, a completely regulated stream system. The BOR does not operate under a comprehensive management plan such as those prepared by the U.S. Forest Service and Bureau of Land Management. The BOR's operations are governed primarily by average historic allocations of water use and annual variations in water yield (John Lawson, *pers. comm.*). NEPA documents are prepared whenever a significant change in operational allocations is proposed. For example, the North Platte River EIS was developed when the Bureau was required to modify water releases to restore habitat for endangered species in central Nebraska.
[see: http://platteriverprogram.org/default.aspx; and http://cwcb.state.co.us/WaterSupply/EndangeredSpecies/PlatteRiverRecovery/]
The BOR also prepares annual operations plans for major project areas such as the North Platte River, but these are not subject to a formal public review. The Wyoming Area Office of the BOR holds two informal public meetings per year (spring and fall) to receive input regarding water operations in Wyoming. In addition, the BOR maintains a public involvement link on its website at: http://www.usbr.gov/gp/wyao/.

Wyoming Landscape Conservation Initiative
[http://www.wlci.gov/]

The Wyoming Landscape Conservation Initiative (WLCI) is a long-term, science-based, collaborative effort to ensure Wyoming's wildlife and crucial habitats are fully considered and addressed in the face of increasing land use pressures. The mission of the WLCI is to implement a long-term science-based program to assess and enhance the quality and quantity of aquatic and terrestrial habitats at a landscape scale in southwest Wyoming, while facilitating responsible development through local collaboration and partnerships. Cooperating agencies implementing the WLCI include the BLM, USFWS, WGFD, USFS, U.S. Geological Survey (USGS), Wyoming Department of Agriculture, and southwest Wyoming conservation districts and county commissions. Funding is provided through an annual appropriation from the USFWS, BLM, and USGS budgets totaling approximately $4.5 million. Additional funding is provided through independent donations. The geographic area covered by the WLCI is the portion of Wyoming west of the Continental Divide and all of Carbon County. The WLCI strategic plan can be downloaded from: http://my.usgs.gov/Public/WLCI/Bibliography/WLCI_Strategic_Plan_final.pdf.

To date, the WLCI has funded 17 projects directly or indirectly benefiting wetlands and riparian habitats. Among these are 11 noxious weed control projects, 3 conservation easements, 2 riparian habitat treatments, and 1 wetland enhancement project.

Wyoming Statewide Comprehensive Outdoor Recreation Plan
[http://wyoparks.state.wy.us/PlanningDocs/scorp/ch5.pdf]

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) is prepared and updated approximately every 5 years to maintain state eligibility for Land and Water Conservation Fund (LWCF) grants. LWCF guidelines require the SCORP document must include a wetlands component, which the Wyoming Game and Fish Department has prepared during each plan update. At a minimum, the wetland component must:

1) be consistent with the National Wetland Priority Conservation Plan prepared by the U.S. Fish and Wildlife Service (USFWS 1989) [http://library.fws.gov/wetlands/natwetlands_priority91.pdf];
2) provide evidence of consultation with the state agency responsible for fish and wildlife resources; and
3) contain a listing of those wetland types that should receive priority for acquisition. To our knowledge, no LWCF grants have been expended exclusively to acquire, protect or enhance wetlands in Wyoming. A handful of small stream and riparian areas have been encumbered by virtue of easements for recreation facilities developed on the same property and funded through LWCF grants.

A detailed inventory and prioritization of important wetland areas was developed for the 1995 SCORP, but the final published version only included a generalized list of water basins. The original detailed inventory and prioritization were reinstated in the 2008 SCORP update. In order to be eligible for LWCF funding, a project must include a recreation facility of some sort. Counties and municipalities have been the principal entities applying for grants through the LWCF in Wyoming. The possible use of LWCF funds for wetland acquisition and improvements to support wetland-based recreation needs to be investigated further. The State apportionment of LWCF funds has been nominal in recent years and is not expected to be a significant source of funding for wetland acquisitions in the near term. The total nationwide allocation for FY 2010 was just $38 million and Wyoming's apportioned share was $334,458. However, the Obama Administration has committed to achieve the authorized full funding level of $900 million for the overall LWCF Program by 2014 [http://www.nps.gov/ncrc/programs/lwcf/funding.html]. If this happens, the LWCF could become a very important source of additional funding for wetlands conservation.

Wyoming Nonpoint Source Management Plan: Watershed Planning Program
[http://deq.state.wy.us/wqd/watershed/Downloads/NPS%20Program/00712-DOC.pdf]
[http://deq.state.wy.us/wqd/watershed/#Planning]

The Wyoming Nonpoint Management Plan is effectively the State's implementation plan for Section 319 of the CWA. The plan recognizes the importance of wetlands

and riparian zones in a watershed approach to water quality management. The plan further recognizes natural wetlands are waters of the State that are protected from impairment caused by point and nonpoint sources. A Section 401 water quality certification is required for discharges into wetlands. The Nonpoint Management Plan includes a Wetlands Protection section and also summarizes the range of other state and federal programs that address wetlands management, protection, restoration and mitigation. DEQ plans to integrate wetlands monitoring into its surface water quality monitoring program and has contributed funding to complete digitization of the National Wetland Inventory in Wyoming. DEQ also funded "A geospatial assessment on the distribution, condition, and vulnerability of Wyoming's wetlands" (Copeland et al. 2010).

Wyoming State Water Plan

[http://waterplan.state.wy.us/frameworkplan-index.html]

The Wyoming Statewide Framework Water Plan provides future water resource planning direction for the State of Wyoming. The plan contains an inventory of the state's water resources and related lands, a summary of the state's present water uses, a projection of future water needs, and identification of alternatives to meet future water needs. Eight individual basin plans accompany the statewide framework plan. Wetlands are addressed in the context of an environmental consumptive use of water, a watershed management component, wildlife habitat, a source of recreation, and a resource that potentially must be mitigated if impacted by water development projects.

The plan includes a summary of potential water development projects and future water consumption needs that may impact wetlands as well as provide opportunities for wetlands enhancement and mitigation. In addition, the plan contains a discussion of interstate compacts, international treaties, court decrees and contracts, and agreements that can have a bearing on water availability for wetlands projects in specific geographic locations and drainages.

WETLANDS AND RIPARIAN HABITAT CONSERVATION STRATEGIES

A broad range of conservation programs are being applied by numerous agencies and organizations to restore, protect, manage, create, and enhance wetlands and riparian habitats throughout the Intermountain West. Relevant management and conservation practices are described in detail by Ehrhart and Hansen (2004); Niemuth et al. (2004); and Tessmann (2004). The EPA promotes an integrated watershed approach to manage and protect wetlands [http://water.epa.gov/type/wetlands/restore/watersheds_index.cfm]. Conservation strategies that have particular relevance and applicability in Wyoming are discussed in the following sections.

Project Capacity

Programs and funding sources available for wetlands conservation are currently underutilized in Wyoming primarily because additional technical resources and services are needed to secure grants and plan, permit and administer projects. This limiting factor has been especially problematic with respect to NAWCA and WRP funding. However, there is no shortage of opportunities for wetlands conservation work. It will be crucial to developing additional capacity in order to capture the funding that is available and get more projects done on the ground.

Priorities:

- Our highest administrative priority is to secure additional technical services needed to carry out wetland and riparian conservation projects. Specific expertise is needed to identify project opportunities, develop project proposals, secure grants from available funding sources, draw up certified engineering designs, conduct certified land surveys, secure permits and clearances, and administer projects. One potential strategy to accomplish this is a pooled agency approach whereby expertise housed in individual agencies and NGOs can work collaboratively on important wetland projects throughout the State. Due to hiring freezes and position caps in some government agencies, additional technical services may need to be secured from contractors or NGOs, with agency funding support.
- Create a statewide wetlands coordinator position whose principal role is to track and monitor projects, and connect project proponents and landowners with funding sources and expertise needed to get projects planned, designed, permitted, and implemented.
- Develop additional funding sources to contract technical services such as grant writing, engineering, land surveying, permitting, or cultural resource clearances.
- Identify/develop additional sources of non-federal matching funds to realize greater use of the available federal funding.
- Coordinate with the State Engineer's Office and Board of Control to facilitate permitting and other actions pertaining to water use. Investigate the potential to independently fund an additional State Engineer's Office position whose primary responsibility would be permitting environmental projects such as wetland impoundments, instream flow rights, etc.
- Create and maintain a Wyoming Wetlands Website. Include links to various wetland and riparian conservation and programs, a frequently updated list of project opportunities throughout Wyoming, funding contacts, statewide and regional wetland conservation strategies, best management practices, and other helpful resources.
- Prepare regional "step-down" plans identifying local and regional objectives and priorities, and tailor conservation strategies to address the specific threats, opportunities, and other unique circumstances within each region. Regional plans currently proposed or under construction include:
    - Bear River Initiative

- Goshen Wetland Complex
- Upper Wind River
- Upper Green River
- NE Wyoming (Little Missouri R. / Beaver Cr. / Belle Fourche R.)
- Salt River
- Red Desert (Great Divide Basin)
- Laramie Plains
- Little Snake/Muddy Creek

Preparers of step-down plans should consult other relevant plans such as the Wyoming Bird Conservation Plan (Nicholoff 2003) [http://www.blm.gov/wildlife/plan/WY/Wyoming%20Bird%20Conservation%20Plan.htm]; and the WGFD Strategic Habitat Plan (WGFD 2009) [http://gf.state.wy.us/downloads/pdf/SHP_Jan09.pdf].

Wetlands and Riparian Habitat Protection

Our highest conservation priority is to avoid further losses of existing wetlands and riparian habitats (i.e., "no net loss"). This is accomplished by monitoring and actively participating in permitting and planning actions that may potentially affect wetlands and riparian habitats; notifying appropriate regulatory authorities of water quality and Section 404 violations; implementing effective strategies to mitigate unavoidable adverse impacts; utilizing incentives programs such as WHIP, EQIP, and Section 319 of the CWA to their fullest potential; and by strategically protecting at risk areas through acquisitions, conservation easements, and management agreements. Effective participation in state and federal permitting, planning and incentives programs requires a comprehensive knowledge of the purpose, scope, and limitations of each program as well as vigilant awareness of ongoing and pending actions and opportunities. Wetlands managers should maintain close collaboration with government agencies and NGOs that administer various acquisition, easement, and incentives programs. The Internet resources listed under "EXISTING CONSERVATION PLANS AND INITIATIVES" (page 34) will provide useful program information and contacts to assist these efforts. Several specific strategies and priorities are discussed in the following sections:

Regulatory Programs and Mitigation

Jurisdictional wetlands are protected from harmful discharges and conversions through several permitting and incentive-based approaches. Non-jurisdictional wetlands are more susceptible to development and degradation. Voluntary and incentive-based strategies are the principal means of protecting non-jurisdictional wetlands and of protecting jurisdictional wetlands from activities that are not regulated, such as nonpoint source pollution or disturbances caused by nearby construction and other activities.

Priorities:

- Support ongoing Congressional efforts (Clean Water Restoration Act) to reinstate regulatory protections for isolated wetlands that were lost when U.S. Supreme

Court and other federal district court decision reinterpreted federal jurisdiction criteria under the Clean Water Act. [http://www.aswm.org/fwp/state_associations_letter_cwa_jurisdiction.pdf]

- Work collaboratively with landowners, developers, and agencies to plan effective mitigation for permitted discharges into jurisdictional wetlands. As appropriate and when opportunities allow, combine mitigation projects with other wetland creation and enhancement projects to realize more cost-effective mitigation and greater overall benefits. Maintain close liaisons with the Wyoming Regulatory Office of the Army Corps of Engineers and with agencies whose projects are likely to affect wetlands (WY Water Development Commission, WY Dept. of Transportation, Bureau of Reclamation, Federal Energy Regulatory Commission, etc.) [https://www.nwo.usace.army.mil/html/od-rwy/Wyoming.htm].
- Work collaboratively with all stakeholders to develop consensus regarding potential language modifications that would expand wetlands protection under the Wyoming Wetlands Act. Some specific considerations include:
    1. The 5-acre minimum size threshold [W.S. 35-11-310(a)] required to trigger the notification process before draining a wetland or series of wetlands;
    2. Scope of the Act with respect to activities resulting in the deposition of fill materials into wetlands;
    3. The exemption for wetlands affected by mining operations; and
    4. Mitigation for actions that impair the functional integrity of the State's wetlands.
- Work with WY Department of Transportation, county road and bridge departments, and railroad companies to minimize impacts of new and existing transportation infrastructure and stream bank stabilization projects.
- Review all large project applications involving significant wetland or riparian habitat impacts and recommend effective avoidance or mitigation alternatives.
- Notify appropriate regulatory authorities of possible CWA violations when they are encountered in the field.
- Work with county zoning departments to discourage residential and commercial developments within floodplains and wetlands.

Fee title acquisition

Fee title acquisition is the most permanent means of protecting wetlands, riparian areas, and surrounding watersheds. Outright ownership affords the greatest control over potentially harmful activities as well as the widest range of management options. However fee title acquisition is often the most expensive solution. Rural property values in Wyoming commonly exceed $1,000 per acre and can reach over $100,000 to $500,000 per acre in high end markets such as Jackson Hole. In addition, the NGO or governmental agency holding title assumes all property management and maintenance responsibilities including annual payment of property taxes. Some agencies are also constrained as to the amount of property they are allowed to acquire and hold. Fee title acquisitions may be appropriate in the following circumstances when supported by a willing seller:

- to protect the most important areas at risk;

- to acquire areas in which long-term management, restoration, or wetlands creation projects are planned;
- to acquire important areas when less costly protection strategies are inapplicable or cannot be negotiated;
- to provide public recreation access; and
- to secure a dependable water supply for wetlands creation or management.

Conservation Easements, Land Trusts
[http://www.fws.gov/mountain-prairie/pfw/r6pfw8b.htm]

Conservation easements are the most widely applied instrument for protecting important natural resource values throughout the West. A conservation easement conveys certain non-possessory interests in a private property to a nonprofit conservation organization or government agency. Terms of easements vary and can range from simple agreements to not develop the land, to agreements stipulating a specific ecological condition in which the land is to be maintained. The landowner retains title to the property but agrees to forego certain uses as specified in the easement contract. Perpetual easements are most common, but term-limited easements have been negotiated in a number of cases (e.g., USFWS Partners for Fish and Wildlife and WRP programs). The value of a perpetual easement is commonly 30-40% of the total property value, making this a substantially less expensive alternative when compared to fee title acquisition. In addition, fiscal responsibilities of ownership and management of the land are retained by the landowner. In the case of a donated perpetual conservation easement, the U.S. tax code allows the landowner to claim a substantial annual tax deduction and the taxable estate value can be reduced or eliminated for the landowner's heirs.
[http://www.privatelandownernetwork.org/plnlo/taxbenefits.asp]
[http://www.michbar.org/journal/article.cfm?articleID=95&volumeID=8]
[http://www.csrlt.org/PDF/John%20West%20-%20Conservation%20Easement%20Tax%20Benefits.doc]

Limited term or perpetual easements are a requirement of most wetland projects funded through the Wetland Reserve Program, Partners for Fish and Wildlife, and Ducks Unlimited. Conservation easements are also negotiated with individual property owners to protect key wetland and riparian habitat areas risk of being developed.

In some cases, it can be more cost effective to acquire fee title to a property for the purpose of attaching a conservation easement, and then resell the property with the easement to recoup most of the acquisition cost. This strategy provides a means of establishing a conservation easement in cases where the landowner is willing to sell the property, but not interested in negotiating an easement.

Priorities:

There are many opportunities throughout Wyoming to protect important wetlands and riparian habitats through purchased or donated conservation easements. Each of the 4 major land trusts – The Nature Conservancy, Jackson Hole Land Trust, Green River

Valley Land Trust, and Wyoming Stock Growers Agricultural Land Trust – has its own set of priorities. Some of the more pressing needs we have identified include:

- Secure additional lands within the acquisition boundary of Cokeville Meadows in cases where property owners are unwilling to sell their land.
- Continue converting term easements into permanent easements on Partners for Fish and Wildlife wetland projects, primarily in Goshen and Fremont counties.
- Continue exploring easement options to protect key wetland and riparian habitats with emphasis in the following areas:
  - Bear River Watershed (through the Bear River Initiative)
  - Upper Green River watershed
  - Salt River
  - North Platte River
  - Laramie Plains
  - Upper Wind River
  - New Fork River
  - Snake River
  - Little Snake River
  - Big Sandy River
  - Hams Fork
  - Blacks Fork
  - Little Missouri / Belle Fourche (NE WY Wetland Complex)

Land Use Planning

Executive Order 11990 requires each federal agency shall take actions to minimize loss or degradation of wetlands and preserve and enhance wetlands in carrying out its responsibilities. Executive Order 11988 requires each federal agency shall also preserve the natural and beneficial values served by floodplains.

Priorities:

- To assure the intent of these executive orders and other applicable laws and regulations are met, wetlands managers should participate in federal land use planning and other NEPA-driven decision processes.
- Each plan should contain a comprehensive inventory and condition assessment of wetlands and riparian habitats within the area covered by the plan or other federal action.
- Reviewers should recommend appropriate and applicable management practices including proper grazing management, fencing, pasture systems, setback distances, silvicultural practices, erosion control, water management, mitigation and other measures to restore and maintain the integrity and function of wetlands and riparian [floodplain] habitats affected by the plan or other action. [Refer to: Oneale (1993); Nicholoff (2003); U.S. Environmental Protection Agency (2005); Welsch et al. (1995); WY Department of Environmental Quality (1997, 1999, 2004); McKinstry et al. (2004); Brockmann (1999); Niemuth, et al. (2004); and Tessmann

(2004)].

Wetlands and Riparian Habitat Restoration

Priorities:

- Identify potential restoration sites (both wetland and riparian) for inclusion in Appendix B.
- Prioritize the list in Appendix B regionally based on wetland complexes depicted in Figs. 2 and 8.
- Make the list available to government agencies (NRCS, USFWS, BLM, USFS, WY DEQ, WGFD, etc.) and NGOs (DU, TNC, etc.) administering wetlands restoration programs.
- Post the prioritized list on a Wyoming Wetlands Website and provide frequent updates and status reports.

Wetlands Reserve Program

The primary mission of the wetlands reserve program is to restore wetlands that were historically drained and converted to crop production or other uses. However, the full potential of Wyoming's WRP program is not being fully realized due to insufficient staffing and technical services, and timeframes required to obtain permits for wetland impoundments. At the end of the federal fiscal year in 2009, the Wyoming NRCS turned back approximately $3.24 million of unobligated WRP funds from a total allocation of $ 5.24 million. This could potentially impact the amount of funding made available to Wyoming in the future.

Priorities:

- Build capacity by funding and securing additional technical services to identify candidate sites for wetlands restoration and to plan, permit, and administer wetlands restoration projects.
- Work with the State Engineer's Office to expedite permitting so WRP funds can be obligated to restoration projects during the fiscal year in which the funds are available.
- Fund a "Wetlands Reserve Enhancement Program (WREP) with reserved grazing" pilot project to increase landowner interest and participation in the WRP. WREP will enable the landowner to continue traditional grazing and haying where these practices are beneficial to wetlands management within WRP project easements, subject to some NRCS guidelines.

Conservation Easements

Conservation easements can be a valuable tool for both protection and restoration of wetlands. Management practices and stewardship responsibilities can also be written into easement contracts or agreements where appropriate. Conservation easements are nearly

always required to assure the long-term sustainability of federally funded wetlands restoration or creation projects under the WRP or Partners for Fish and Wildlife programs, and DU programs.

Priorities:

- Identify sites with high potential for restoration and improvement under a conservation easement strategy.
- Provide a prioritized list of candidate sites to the primary organizations that administer conservation easement and restoration programs in Wyoming – land trusts, NRS, USFWS Partners Program.
- Implement "sloughing easements" that allow stream channels to meander naturally.

Land Use Planning

Refer to "*Land Use Planning*" under Wetlands and Riparian Habitat Protection (Page 53).

Watershed Management

Sustaining watersheds in good ecological condition has tremendous potential to improve the condition of wetlands and riparian habitats throughout the Intermountain West. Bue et al. (1964) were among the first to generalize that good range management is good waterfowl management. Fredrickson and Reid (1986) similarly concluded manipulation of the surrounding upland is a more economical approach to manage wetlands for nongame. Furthermore, costly "in-basin" habitat improvements are likely to be short-lived in a poorly managed watershed (Tessmann 2004).

Sound watershed management is achieved primarily through compatible riparian and upland grazing practices, sediment and erosion control practices, abatement of nonpoint source pollution, retirement of highly erodible lands from grazing and crop production, appropriate use of prescribed fire, control of invasive plant species, appropriate silvicultural practices, and conservation easements. In Wyoming, programs and technical services available to plan, fund, and implement watershed rehabilitation and improvement practices include:
federal land use planning:
[http://www.blm.gov/rmpweb/]
[http://www.fs.fed.us/r2/projects/]
Section 319 nonpoint source program implementation:
[http://deq.state.wy.us/wqd/watershed/nps/npspg.htm]
Watershed best management practices:
[http://deq.state.wy.us/wqd/watershed/nps/BMPs.htm]
Extension services and technical assistance provided by NRCS, DEQ, WY Dept. Agriculture, Conservation Districts, and the University of Wyoming:
[http://www.wy.nrcs.usda.gov/technical/index.html]

[http://www.wy.nrcs.usda.gov/programs/cta/cta_index.html]
[http://www.conservewy.com/]
[http://deq.state.wy.us/wqd/watershed/]
[http://wyagric.state.wy.us/divisions/techserv.htm]
[http://uwadmnweb.uwyo.edu/UWrenewable/Renewable_Extension_Prgm.asp]

Farm Bill programs including the Conservation Reserve Program (CRP), Grassland Reserve Program (GRP), WRP, and EQIP:
[http://www.wy.nrcs.usda.gov/programs/crp/CRP.html]
[http://www.wy.nrcs.usda.gov/programs/grp/grp.html]
[http://www.wy.nrcs.usda.gov/programs/WRP/wrp-home.html]
[http://www.wy.nrcs.usda.gov/programs/eqip/eqip.html]

The EPA's Integrated Watershed Management program:
[http://water.epa.gov/type/wetlands/restore/watersheds_index.cfm]

The Wyoming State Water Plan, Basin Plans:
[http://waterplan.state.wy.us/BAG/]
[http://waterplan.state.wy.us/BAG/general/plancoord.html]

Wyoming Wildlife and Natural Resource Trust:
[http://wwnrt.state.wy.us/]

Stream Flow Management

Impoundment and regulation of stream flows has profoundly altered the natural processes responsible for maintaining riverine wetlands and riparian habitats throughout the West. Impacts commonly include loss of the flow characteristics required to create and maintain oxbow wetlands, braided channels, sand and gravel bars; channel encroachment and constriction by riparian vegetation; channel downcutting (degradation) due to silt load reduction in reservoir discharges; loss of floodplain functions; barriers to fish migration; and loss of fish spawning habitat (USBR and USFWS 2006).

Priorities:

- Implement flow management regimes to simulate the natural hydrograph of streams that are controlled by reservoirs.
- Establish adequate and effective instream flows.
- Remove or modify barriers to restore fish passage.
- Modify irrigation intakes to prevent fish entrainment.
- Discourage all construction and development within floodplains.

Management Agreements

Management agreements can be used to formalize a variety of arrangements made between a government resource agency or nonprofit organization and a land-owner to achieve habitat improvements and long-term management on private land. Management agreements usually center on an approved management plan developed by field staff together with the landowner prior to formalizing the agreement. The management plan specifies the restoration or management practices the landowner will undertake to

achieve specified conservation goals. The landowner receives partial financial compensation and technical assistance in exchange for implementing and maintaining improvements over a period of time.

Although conservation easements are also a type of management agreement having greater or lesser degrees of specificity, the option also exists to negotiate management practices independently of a conservation easement through a contractual arrangement with the landowner. The latter approach has considerable potential but is not widely used in Wyoming.

Leases

A landowner who prefers not to grant a conservation easement or assume wetland management responsibilities under a management agreement may be willing to lease the wetland area for management by a conservation agency or nonprofit organization. A lease gives the lessee the right of access and any other rights, as agreed upon, to provide for proper management of the land. It takes effect for a specified period, usually 15 to 25 years, and can be drafted to cover specific purposes or a broad range of uses. The lease can be donated or entered into in exchange for rental payments. It can provide for long-term protection and management of land, but does not require an interminable commitment on the part of either the landowner or the conservation group.

Mitigation

Wetland and riparian restoration projects offer potential opportunities to mitigate impacts caused by a permitted development or construction project if the company or agency responsible for the impact agrees to fund the restoration.

Priorities:

- Identify and maintain a statewide list of potential restoration sites – both wetland and riparian (Appendix B).
- Provide the list to the USACE, other state and federal agencies, and companies to make project proponents aware of potential mitigation opportunities.
- Develop a science-based, technologically-sound approach to wetland mitigation, e.g., Marble (1990, 1992); Interagency Workgroup on Wetland Restoration (2003). [http://www.epa.gov/owow/wetlands/pdf/restdocfinal.pdf]

Wetlands Creation and Enhancement

Innumerable opportunities exist throughout Wyoming to improve the wetland habitat base. Project capacity is the most constraining factor and the first priority addressed under the heading, "WETLANDS AND RIPARIAN HABITAT CONSERVATION STRATEGIES" (Page 48). Improved coordination and collaboration among all entities involved in wetland conservation would greatly increase our effective use of available resources to complete additional wetland projects.

Priorities:

- Develop and periodically update a statewide list of potential wetland creation and enhancement opportunities (Appendix B).
- Organize and prioritize the list regionally based on identified wetland complexes depicted in Fig. 1.
- Make the list available to government agencies (NRCS, USFWS, WGFD, etc.) and NGOs (DU, TNC, etc.) administering wetlands programs.
- Make the list available to agencies potentially involved in wetlands mitigation projects (USACE, Bureau of Reclamation, WY Dept. Transportation, WY Dept. Environ. Qual., WY Water Development Commission, etc.).
- Post the prioritized list on a Wyoming Wetlands Website and provide frequent updates and status reports.
- Wetlands creation, enhancement, restoration, and management should be based on the best available science and technology in the wetland design arts. Several design and management references are provided in Niemuth (2004); Erhart (2004); and Tessmann (2004). Several comprehensive design and management references include: Atlantic Waterfowl Council (1972); Weller (1978, 1987); Eng et al. (1979); Smith et al. (1986); Kusler and Kentula (1990); Marble (1992), Payne (1992); France (2002); EPA (2005); Mitsch and Gosselink (2007); and USDA NRCS (2008). Regionally-adapted design criteria should be addressed in regional step-down plans.

Mitigation

Wetland impacts caused by permitted development or construction are typically mitigated through wetland creation and enhancement projects. Mitigation by its nature does not normally produce a net gain in the habitat base. The concept is to avoid an overall net loss (i.e., "no net loss policy" http://www.wetlands.com/fed/aug93wet.htm). However, there can be opportunities to combine mitigation with other creation or enhancement projects to realize greater benefits through a coordinated and potentially more cost-effective approach.

Priorities:

- Develop and periodically update a statewide list of potential creation and enhancement sites (Appendix B).
- Make the list available to the USACE, other state and federal agencies, and companies to suggest mitigation options for consideration by project proponents.

Wyoming Wetlands Mitigation Bank

The Wyoming Wetlands Mitigation Bank can provide incentives for private or corporate entities to finance and build wetlands projects. Mitigation credits that are deposited into the bank can later be withdrawn and used or sold to mitigate impacts resulting from

construction activities. Deposited mitigation credits are a form of "currency" that a wetland project sponsor receives in exchange for financing or building a wetland enhancement project.
http://deq.state.wy.us/wqd/watershed/Downloads/Wetlands/wet_guidelines.pdf

State-owned Wildlife Habitat Management Areas (WHMAs)

Over the past 30-40 years, a number of wetland projects have been built on WHMAs managed by the Wyoming Game and Fish Department. Locating wetland projects on Department-managed lands has several advantages:

- The primary purpose of a WHMA is to provide wildlife habitat. All WHMAs are managed primarily for this purpose.
- Long-term management and maintenance of wetlands on WHMAs becomes the responsibility of a government agency; and
- Most WHMAs are open to public access year-round for such activities as hunting, fishing, wildlife viewing, educational field trips, and casual recreation. Encouraging public use of wetlands increases support and funding for wetland conservation. Where needed, seasonal closures are enforced on some WHMAs to minimize disturbance of wildlife during winter or nesting seasons.

Priorities:

- Develop and periodically update a list of wetlands creation, enhancement, and management opportunities on Department-owned WHMAs throughout the state, including conditions that need to be addressed to restore and maintain functional wetlands (Appendix B).
- Coordinate with DU to identify and promote viable new wetlands projects as part of the Platte River and Rainwater Basin initiative.
- Encourage wetlands projects that increase public access for wetland-dependent recreation. These types of projects may potentially be constructed on accessible public lands, Department lands, or private lands under agreement such as lands enrolled in the Department's Private Lands / Public Wildlife (PLPW) Program.

Water Supply Issues

Agricultural regions contain some of the densest and most productive wetland complexes in Wyoming. Wetland hydrology is often enhanced by irrigation practices. However, protracted drought and depleted water supplies have impacted the functional integrity of many irrigation-dependent wetlands since the late 1980s. As quantities of water reaching storage facilities, pastures, and cultivated fields dwindle, opportunities to create and manage wetland impoundments become increasingly limited. The following strategies may be considered to improve water supplies, where feasible and permissible under State of Wyoming water law:

Priorities:

- Collaborate with irrigation districts to help design and fund irrigation system rehabilitation and improvement projects that incorporate wetland conservation assurances and other wildlife benefits. Conservation assurances would typically set aside a quantity of water to sustain wetlands and may potentially be executed through a petition to change the use or location of use of an existing water right if approved by the State Engineer's Office (SEO) Board of Control (BOC) as part of a rehabilitation agreement. Wyoming statute allows for changes of use or location of use if the change does not increase the historic amount consumptively used or decrease the historic amount returned to the system [W.S. § 41-3-104]. This strategy should be investigated further in consultation with the SEO. In addition, conservation assurances can be negotiated directly with an irrigation district and executed through a contractual agreement such as between the City of Casper and the Casper-Alcova Irrigation District.

  The City of Casper paid for canal rehabilitation work in exchange for an option to utilize the amount of water conserved (7,000 acre-ft) if needed. Conservation assurances are most feasible in cases where the irrigation district owns stored water. [http://library.wrds.uwyo.edu/wrp/89-12/abstract.html]

  - Fabric liners are probably the most cost-effective means for reducing seepage losses and increasing delivery efficiency in leaky irrigation ditches and canals. Nonetheless, liners may cost several hundred thousand dollars per lineal mile. Concrete liners are even more expensive and also susceptible to frost heaving.
  - Feasibility of canal liners is probably limited to problem segments within the overall conveyance system.
  - Buried pipeline is another option to reduce seepage loss. In some circumstances, conversion from open ditches to pipeline will enable gravity-fed pumping systems to run sprinklers, thereby reducing water distribution losses on irrigated fields. However, complete elimination of seepage and farm runoff will also eliminate habitat areas that are sustained by irrigation-enhanced hydrology. If pipe is installed, it should be limited to short segments of canal where the most severe seepage problems exist.
  - Partial funding for system upgrades may be available from the Wyoming Water Development Commission. EQIP and other federal funding are also available for irrigation delivery improvements and on-farm systems.
  - Nonfederal match funding and in-kind match are potentially available from State Wildlife Grants, Wildlife and Natural Resources Trust Account, private landowners, NGOs, and other sources provided an agreement can be negotiated to assure conservation benefits.

  - Wetlands that were created and are sustained by seepage or leaks from irrigation ditches should be identified and mitigated in publicly funded projects.
- Explore options to expedite SEO permitting of wetlands creation, restoration, and enlargement projects.
- Explore a range of funding sources to enhance water delivery including North American Wetlands Conservation Act, Wetlands Reserve Program, Partners for Fish and Wildlife, Landowner Incentive Program, State Wildlife Grants, Wildlife and Natural Resources Trust, Wyoming Mineral Trust Fund, Water Development Account, energy mitigation funds, Ducks Unlimited, and others.
- Maintain existing water rights in good standing on all Department-held lands.
  - An adjudicated water right must be exercised at least once in each 5-year period when water is available to protect it from abandonment proceedings [Ref: W.S. § 41-3-401].
- Develop groundwater wells to augment surface water supplies into constructed wetlands.
  - Water yield from groundwater wells is highly variable depending on characteristics of the geologic strata into which wells can be drilled. Wells are a viable option to supplement wetland water supplies where yield is at least sufficient to offset evapotranspiration and seepage.
  - Restrictions on drilling and pumping groundwater are minimal unless the well is drilled within a groundwater control area [Ref: W.S. § 41-3-913] or interferes with another well having a higher priority or with a surface water right. A well that interferes with another well used for domestic or stock watering purposes, or interferes with a well having a senior appropriation date, may be ordered to cease or reduce withdrawals [Ref: W.S. § 41-3-911].
  - Wells drilled into a stream aquifer may be administered as a surface water diversion due to connectivity between the aquifer and surface flows resulting in potential impact on surface water availability.
- Lease or acquire property on which water rights can be managed to enhance wildlife habitats.
  - An irrigation water right is always attached to the land but can be moved to other lands or transferred to another use under existing provisions of water law.
  - A water right for the direct use of the natural unstored flow of any stream is also attached to the land, place or purpose for which it was acquired [Ref: W.S. § 41-3-101]. However, provisions of water law allow for the movement of water rights, including changes in place or type of use.
  - Return flows of water from irrigated crops and pastures (including habitat areas) can be captured within permitted wetland impoundments. However, the quantity of water that can be diverted for irrigation must then be reduced to account for the loss of return flow to the system. This change of use is subject to approval by the BOC. If no other historic information is available, the BOC commonly assumes 50% of the water diverted for flood irrigation eventually returns to the stream system. To

maintain the same quantity of water in the system and to protect other appropriators, the amount of allowable diversion could be reduced by double the volume of water intercepted in the impoundment. For example, if 100 acre-ft of water is applied to irrigate a field, 50 acre-ft would normally return to the system. If 10 acre-ft of irrigation return flows are intercepted in a new wetland impoundment, the total allowable diversion would be reduced from 100 acre-ft to 80 acre-ft. This yields 40 acre-ft of runoff of which 10 acre-ft is impounded and 30 acre-ft actually returns to the system. The 20 acre-ft reduction in the appropriation, combined with the 30 acre-ft of actual return flow equals the original 50 acre-ft that theoretically returned to the system before the impoundment was built.

  - A wetland impoundment built on top of irrigated land with water rights also represents a change in the permitted use of the water that must be approved by the BOC (i.e., the water is no longer being used to produce a crop). The same reduction in the allowable diversion applies – the diversion could be reduced by double the storage capacity of the impoundment.

- Acquire property with water rights and petition for a change of use or location of use to provide additional water supplies for wetlands [Ref: W.S. § 41-3-104]
  - Petitions for a change of use or location (place) of use must include consent from all potentially affected users on the system. Otherwise, the petition can only be considered after a public hearing on the requested change of water rights is heard before the BOC.
  - The change in use and/or location (place) of use may be allowed provided the quantity of water transferred shall not exceed the amount of water historically diverted under the existing use, nor exceed the historic rate of diversion under the existing use, nor increase the historic amount consumptively used under the existing use, nor decrease the historic amount of return flow, nor in any manner injure other existing lawful appropriators [W.S. § 41-3-104].
  - If the BOC approves a change of use and/or location of use from an irrigation right to a permitted impoundment, the volume of water that can be diverted under the existing water right is (without other evidence or information) reduced based on typical irrigation seasonal or return flow factors. Normally, the BOC assumes 50% of the water that is applied for flood irrigation returns to the system.
- Lease or purchase stored water to enhance water supplies to wetlands [Ref: W.S. § 41-3-320].
- Investigate the potential for temporary water transfers from other users to augment water supplies on Department-owned and private wetlands. Such transfers may be approved for periods of up to 2 years [Ref: § W.S. 41-3-110].
- Investigate the potential for water exchanges with other users to fulfill existing water rights at times of year (e.g. early spring/late summer) that may be more beneficial for wetland management [Ref: W.S. § 41-3-106].

- Establish water-harvesting features such as windrows and shrub stands to accumulate snowdrifts. On wetland construction sites, grade surface contours to maximize the wetland watershed and the amount of surface runoff captured.

Beaver Restoration

Opportunities exist throughout Wyoming to establish small palustrine wetlands by reintroducing beaver (*Castor canadensis*) into suitable vacant habitats (McKinstry and Anderson 1997; McKinstry et al. 2001). Beaver can be live-trapped and relocated to suitable stream environments on federal lands, and on private lands with the landowner's consent. A Chapter 10 permit is required from the WGFD to trap, handle, and relocate live beaver. Beaver that are removed to alleviate damage problems can also provide a potential source of relocation candidates. Areas most suitable for beaver reintroduction should have the following parameters (Saldi-Caromile 2004):

- The channel slope is less than 3% to minimize dam blow-outs;
- The water supply is perennial or beaver are released on ephemeral streams during a period with sufficient water to create a dam and lodge;
- The stream geomorphology is such that beaver activities will be supported;
- Beaver will not cause unacceptable damage to public or private property or facilities;
- There is an adequate food source (at least 18 acres of willow or 6 acres of *Populus* species within 100 feet of the stream) and dam building materials;
- Beaver activities will not conflict with other management prescriptions, such as endangered species management or instream flow issues;
- The valley is at least 60' wide (150' or more is best); and
- The site is below 6,000' elevation. The short growing season and heavy snowfall above this elevation may be limiting factors for beaver. (Exception note: beavers are known to thrive in suitable habitats as high as 8,000-10,000 ft in Wyoming).

Advantages of beaver restoration include:

- Ponds and wetlands created by beaver activity require no permits, water rights, engineering designs, land surveys, or cultural resource clearances;
- Beaver ponds are maintenance-free (except where dam building activity may clog culverts, head gates, or irrigation ditches);
- Beaver ponds are natural and blend into the landscape;
- Beaver ponds stabilize stream channels and through succession raise the streambed elevation, widen the floodplain, restore riparian systems, and increase forage production;
- Beaver ponds raise the alluvial water table, thereby creating suitable growing conditions for riparian vegetation and prolonging stream flows through the summer period; and
- The habitat associated with beaver ponds sustains a rich and diverse plant and wildlife community.

Some disadvantages of beaver restoration are:

- Success of colonization is uncertain – only about 15-20% of transplanted beaver remain in the stream system into which they are introduced (McKinstry and Anderson 2002b);
- It can be difficult to trap enough beavers to support a viable relocation program;
- Ponds created by beavers are typically small, often a fraction of an acre, however beaver colonies usually build several ponds of differing sizes in a complex;
- Beavers can cause problems if they are relocated near residential areas, irrigation systems, or road culverts; and
- Some landowners don't want beavers on their property.

Wetlands Maintenance and Management

Wetlands creation and enhancement projects often fail to meet ecological goals due to lack of an agreement or sufficient resources to support long-term management and maintenance. A stewardship agreement should be developed and included in any plan to mitigate, restore, create, or enhance wetlands (Levine and Willard 1990; Lowry 1990; Tessmann 2004). The agreement should identify the parties responsible for maintenance (e.g., fence, dike repair) and management of land uses (e.g., grazing). It should set forth permissible land use practices in and near the wetland and should specify the condition in which the wetland is to be maintained (Jensen and Platts 1989). Mitigation wetlands should be protected by a perpetual conservation easement if retained in private ownership, or they should be transferred to ownership by a governmental institution (Golet 1986; Erwin 1990).

State Water Law

The potential for wetlands restoration, creation, management, and maintenance can be constrained by applicable provisions of state water law depending upon type of facility being permitted and the precise use of the water. Water can only be appropriated and applied to a beneficial use recognized by the State of Wyoming. However, a considerable number of wetlands water rights have been approved by the SEO over the years, establishing that these uses of water are a beneficial use in Wyoming. (Jacobs et al. 2003) [http://seo.state.wy.us/PDF/b849r.pdf]
[W.S. 43-3-101] [http://legisweb.state.wy.us/statutes/compress/title41.doc].

The beneficial use of water is recognized by the State Engineer when a decision is made to approve a water right for a proposed use. There is no formal list of approved or defined beneficial uses in Wyoming and this has afforded the SEO flexibility to treat water appropriated for wetlands as a beneficial use. A review of water rights that have been issued in the State would demonstrate water rights have been issued for a variety of wetlands facilities, thus establishing that water supplied to wetlands is, in fact, a beneficial use in Wyoming.

Water rights for the direct use of the natural unstored flow of any stream are attached to the lands, place or purpose for which they are acquired. If an appropriator desires to make changes to their water right, there are a number of statutory authorities to accomplish this such as a change from a non-preferred to a preferred use as provided in W.S. 41-3-101. Preferred uses include rights for domestic and transportation purposes, municipal uses, steam power plants, and industrial purposes (Jacobs et al. 2003) [W.S. 41-3-102(a),(b)].

In addition, an appropriator can petition the BOC for a change of type or location of use provided the quantity of water transferred shall not exceed the amount of water historically diverted, nor exceed the historic rate of diversion, nor increase the historic amount consumptively used under the existing use, nor decrease the historic amount of return flow, nor in any manner injure other existing lawful appropriators [W.S. 41-3-104].

Stored water and rights acquired under reservoir permits that are not attached to any particular land by deed or other instrument may be sold, leased, transferred and used in such manner and upon such lands as the owner of such rights may desire, provided that such water must be used for beneficial purposes and in a manner consistent with the reservoir water rights [W.S. 41-3-303, W.S. 41-3-323]. However, it is common practice for the BOC to reduce the original permitted appropriation by double the volume applied to the new use or location, or by another factor specific to the situation before the BOC, in order to offset any reduction in return flows resulting from the new use or location. In addition, the new use or location cannot adversely impact other water users on the system.

Temporary water transfers of both direct flow and storage water rights are permitted for up to 2 years for highway or railroad construction purposes, drilling and producing operations, or "other temporary purposes" [W.S. 41-3-110]. A temporary transfer can potentially be applied to wetlands projects depending on how the water is specifically used.

Water conservation projects such as irrigation canal lining are done to reduce water losses, increase delivery efficiency, and provide some "insurance" against dry years when water supplies are short. However, the BOC, based on longstanding legal opinions and policy, does not view leaks or "seepage" as a "transferrable" consumptive use of water because [hypothetically] the water that leaks from a canal could eventually return back into the stream system and become available for use by another water right holder. Therefore the water saved is not treated as additional water that can be applied to any other use or location such as a wetland project. On the other hand, water that is saved and retained in a permitted storage facility can be made available to other uses subject to provisions of law that protect other appropriators from injury.

Priorities:

As appropriate, work collaboratively with all stakeholders to increase flexibility of water used for wetlands and habitat projects. Some potential strategies include:

- Formally recognize wildlife habitat creation, maintenance, enhancement or management (alternatively wetlands creation, maintenance, enhancement or management) is a beneficial use, in the same context as instream flows.
- Provide a mechanism whereby additional yield from water conservation practices such as irrigation infrastructure improvements can be permitted and applied to other beneficial uses including wetlands creation, maintenance or management [also see: Trout Unlimited *undated]*. [http://www.tu.org/atf/cf/%7BED0023C4-EA23-4396-9371-8509DC5B4953%7D/WYWaterWYSolutions.pdf].
- Clarify the process by which temporary water transfers might be applied to instream flows, wetlands, and other habitat projects [also see: Trout Unlimited *undated]*.
- In the case of petitions to change use or location of use, require that the original water right shall not be reduced by more than the quantity of water potentially taken away from other users as a result of the new use or location of use. This could be accomplished through a more detailed analysis and interpretation of the "no injury rule" under existing law.

PRIORITY RANKING OF WETLAND COMPLEXES

Two efforts have been undertaken to prioritize wetland complexes for conservation actions in Wyoming. The first assessment was completed by the WGFD and USFWS for inclusion in the 1995 Statewide Comprehensive Outdoor Recreation Plan (WY Dept. of Commerce 1995). A more recent study by TNC developed several sets of condition assessment metrics (indices) that can be applied in a variety of ways to prioritize wetlands (Copeland et al. 2010).

SCORP Wetland Complex Prioritizations

The 1995 SCORP prioritization relied upon qualitative ranking criteria adapted from National Wetlands Priority Conservation Plan (NWPCP), which was developed to implement Section 303 of the Emergency Wetlands Resources Act of 1986 (EWRA) (USFWS 1989). The EWRA authorized expenditures from the Land and Water Resources Fund for the purpose of acquiring priority wetlands. [http://www.fws.gov/laws/lawsdigest/emwet.html]. In all, 49 important wetland complexes were identified throughout Wyoming (Fig. 1). The original objective was to emphasize wetland acquisitions within the 8 highest priority complexes (Table 5). Priority rankings were based on the following NWPCP criteria and weights: wetland functions and values (33%), historic trends of wetland losses (33%), and relative threat of future loss or degradation (33%).

Table 5. Priority wetland complexes identified in the 1995 SCORP wetland component (WGFD 1995, 2008). [http://wyoparks.state.wy.us/PlanningDocs/scorp/ch5.pdf].

Rank	Complex	Qualities
1.	Bear River: Utah State line to Cokeville	Most extensive wetland complex in Wyoming Highest density of breeding ducks, geese, and sandhill cranes Very high wildlife species diversity
2.	Salt River: Afton to Palisades Reservoir	High waterfowl production Sandhill crane staging area Trumpeter swan habitat High wildlife diversity
3.	Bear River: Evanston to Woodruff Narrows	Very high duck, goose, waterbird production High wildlife species diversity
4.	Southern Goshen County (Goshen Hole Complex)	Several thousand acres of wetlands High waterfowl production, waterbird production, migration stopover, and winter habitat
5.	Laramie Plains	5,500 acres of wetlands High waterbird and waterfowl production Staging/migration area for thousands ducks and shorebirds
6.	South Park – Jackson	High waterfowl production Trumpeter swan winter and nesting habitat Bald eagle winter habitat
7.	Buffalo Valley – Moran	Trumpeter swan habitat High duck, goose and other waterbird production Moose winter range
8.	Central North Platte River Pathfinder Res. to Glendo Res.	High waterfowl production High waterbird production, especially gulls, pelicans, cormorants, and shorebirds Bald eagle winter habitat

The Nature Conservancy Wetlands Assessment Study

Copeland et al. (2010) developed several geospatial datasets to examine characteristics and conditions of 222 wetland complexes throughout Wyoming. Descriptors included wetland density (average number of wetlands per hectare within each complex perimeter), wildlife species richness (Number of SGCN present), species diversity (Shannon index based on SGCN), number of rare species (based on State and internationally-recognized species), wetland condition or integrity (based on proximity of land uses or activities known to impair wetland functions), and future vulnerability (based on models projecting future development and climatic conditions).

It can be tempting to generate composite scores or indices that combine several wetland attributes in an attempt to identify regional or statewide priorities. Ultimately, such approaches rely on subjective weighting and are inherently biased by differing cultural perspectives of functions and values. Furthermore, efforts to prioritize wetland complexes based on single or composite measures of functions and values can produce misleading results. For example, a low integrity score does not necessarily mean the wetland complex is unimportant. Rather, this serves to indicate that anthropogenic factors known to impair wetland functions exist nearby. The central and lower North Platte River complexes have low integrity scores due to regulated flows, extensive agricultural influences, and proximity to urban areas. However, the North Platte wetlands also support very high species diversity, provide critical migration and dispersal corridors, and are used extensively by breeding waterfowl. The North Platte region and its wetlands and riparian habitats are also important sources of wildlife-dependent recreation close to the state's urban centers.

For these reasons, Copeland et al. (2010) did not attempt to construct an overall prioritization of wetland sites. A better approach is to identify priorities based on the specific purpose and goals of each conservation program. It may be useful to apply more than one assessment metric in a nested sequence. For example, integrity scores (Fig.5) may be the most relevant screening criterion to identify intact, natural wetlands for possible acquisition or conservation easements. If the most desirable candidates are wetland complexes with diverse species assemblages or large numbers of SGCN, then those wetlands should be selected from among the wetlands with high integrity scores by applying an appropriate secondary index such as Shannon diversity (Fig. 6). A third criterion in the sequence could be vulnerability to loss or degradation (Fig. 7). In this example, desirable candidates for acquisition are functionally intact, natural wetlands that sustain high species diversity, but are vulnerable to future loss or degradation. Real estate values might be another consideration having implications for acquisition decisions or easement negotiations.

A remediation program such as Section 319 (non-point source pollution) may rely on a differing set or sequence of assessment metrics. The first screening level might identify wetland complexes with low integrity scores, indicating possible candidates for remediation or restoration. The second level might utilize a species diversity or richness score in order to identify sites on which treatments will realize the greatest benefits. On the other hand, a conservation program intended to increase waterfowl production might

consider breeding waterfowl densities or wetland densities as its first screening criterion, and so forth. Prioritizations that are based on ecological indicators such as functional integrity (Fig. 5) species diversity (Fig. 6), and vulnerability (Fig. 7), are particularly insightful for planning purposes.

Quantitative procedures that may be applied to rank sites for potential project consideration are not intended to preclude other sites from being considered at all. Rather, they provide general guidance on where significant benefits can be realized through various conservation actions that may have differing goals. It is appropriate for managers to encourage projects in "high priority" areas and enlist resources to get them done, but more often than not opportunity is a major driver behind project selection and implementation. Projects get done where there is interest, willing landowners and other partners, and available funding. Accordingly, managers should remain adaptable to take advantage of local and regional support leading to project implementation in non-priority areas as well as priority areas.

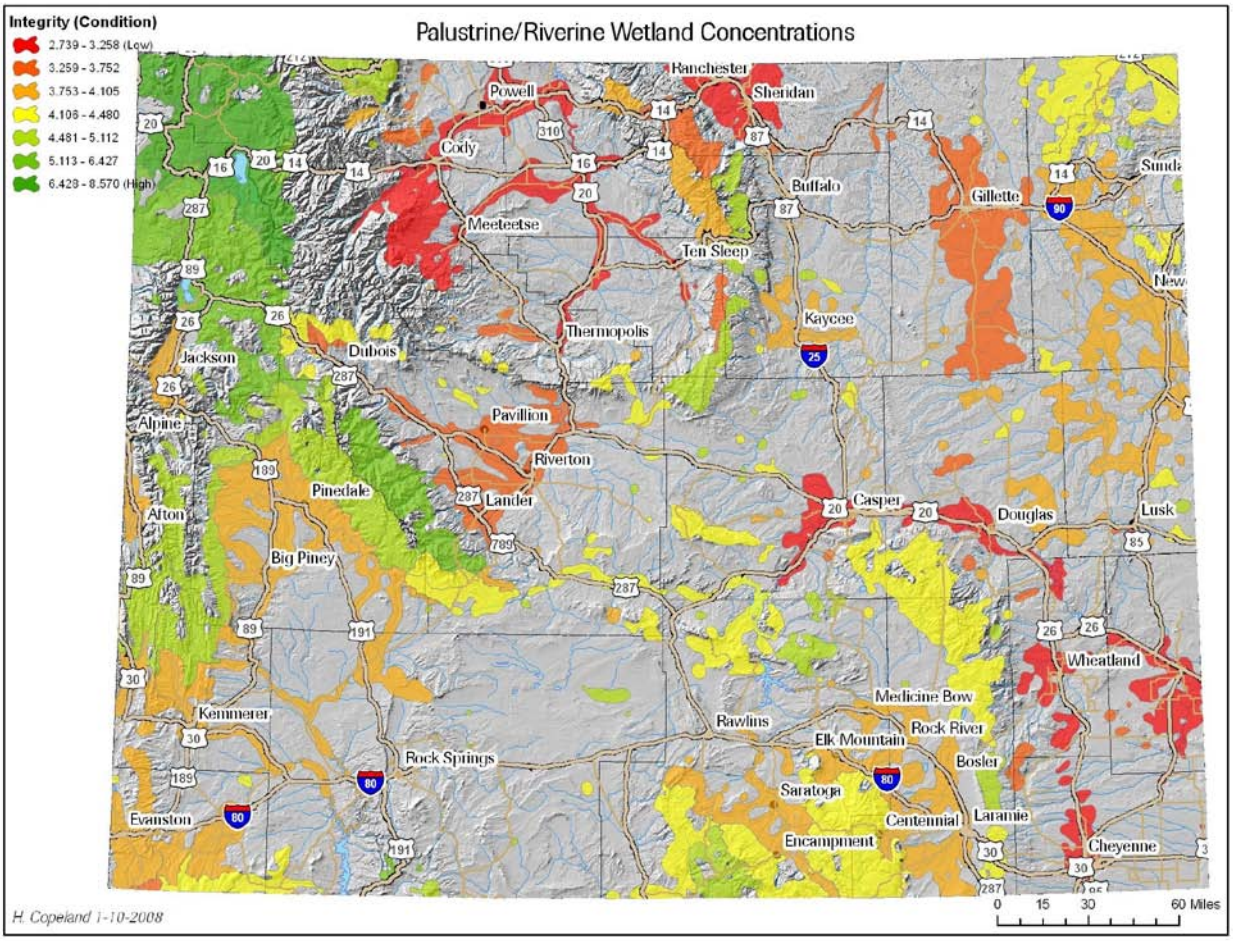


Fig. 5. Integrity scores of Wyoming wetland complexes (Copeland et al. 2010).

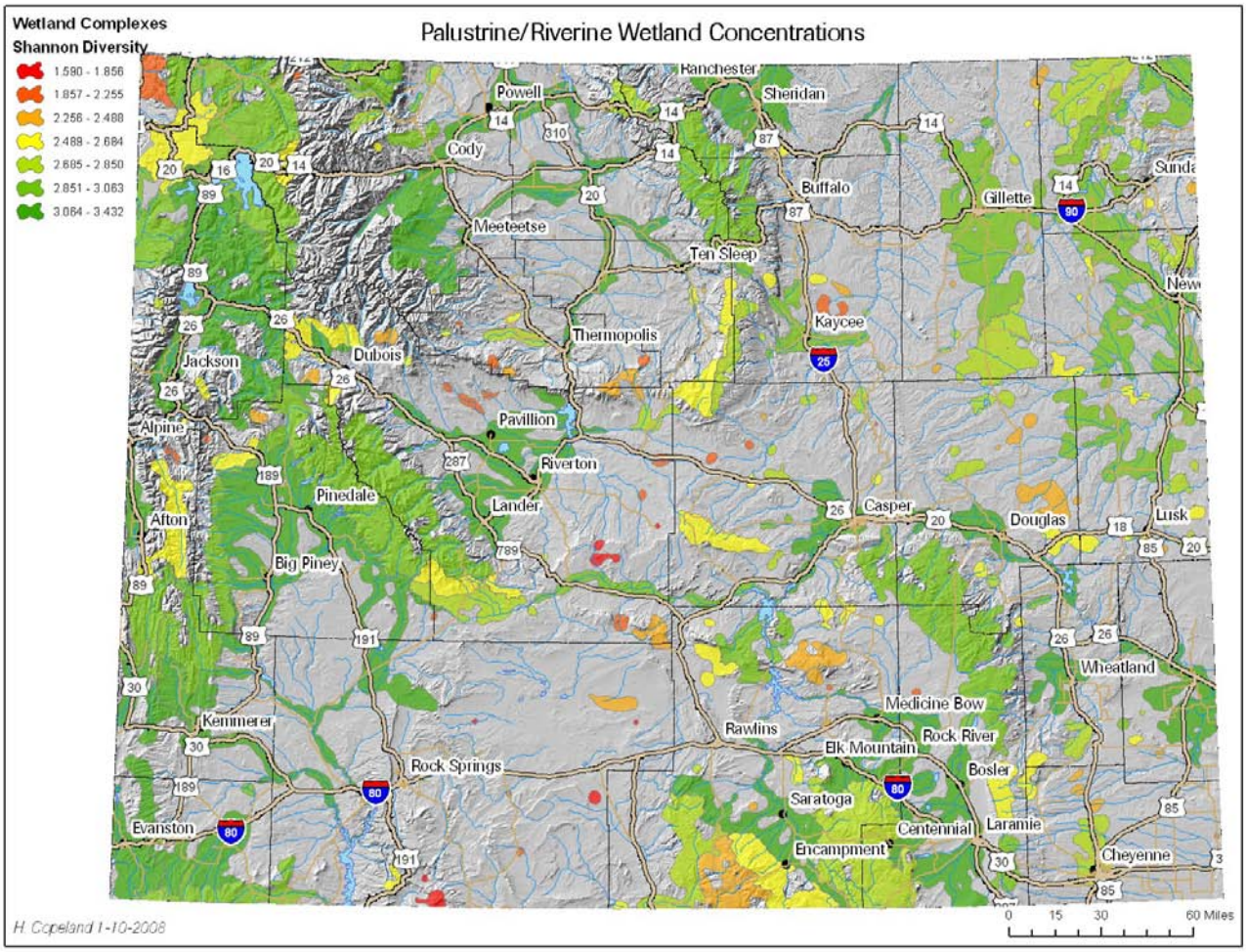


Fig. 6. Species diversity (Shannon Diversity Index) of Wyoming wetland complexes based on wetland-associated SGCN (Copeland et al. 2010).

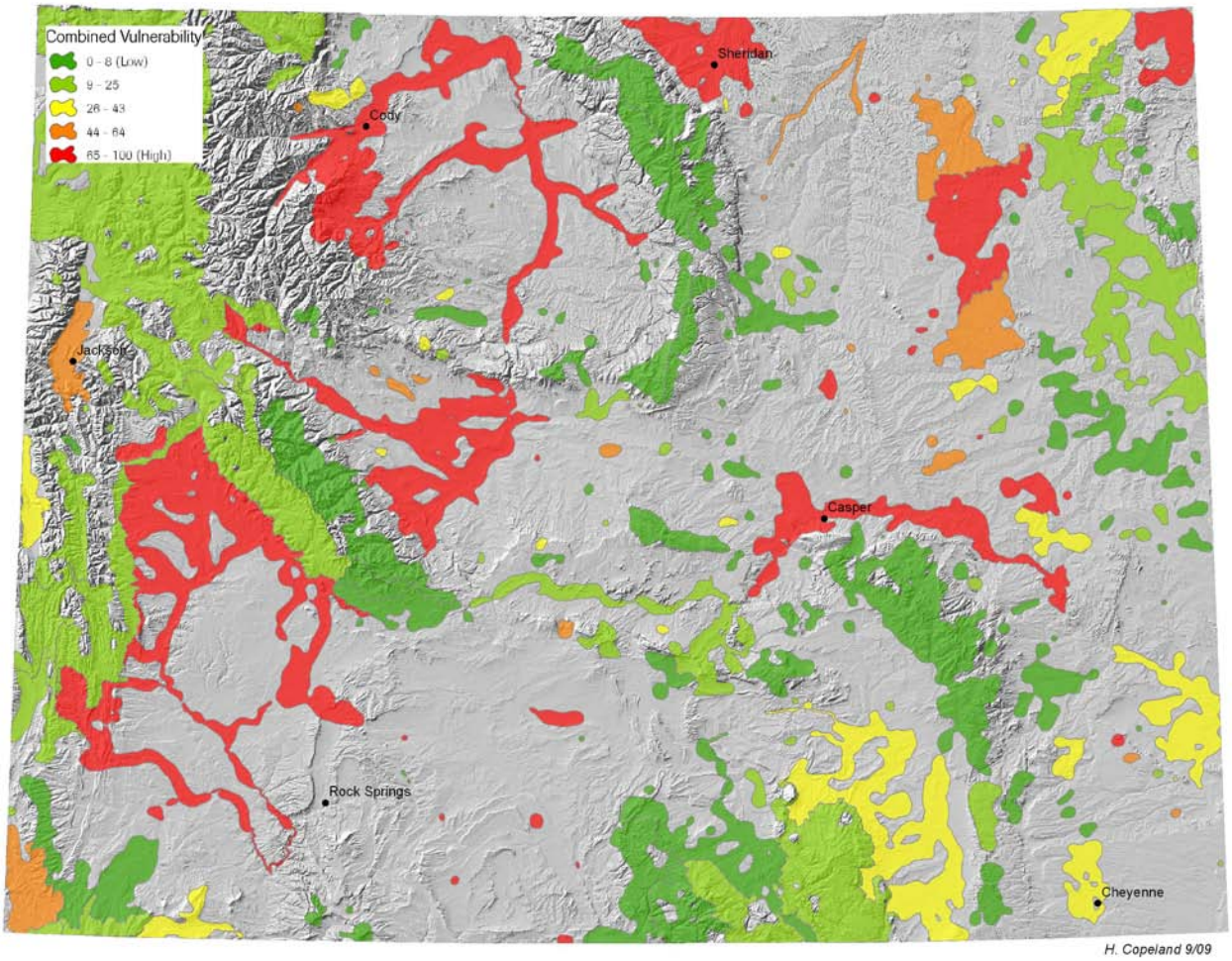


Fig. 7. Vulnerability of Wyoming wetland complexes to ongoing and future development (Copeland et al. 2010).

Wetland Delineation Comparisons

It is informative to compare the wetland complex delineations of WGFD (1995) with those of Copeland et al. (2010). The Copeland et al. analysis used an empirical approach based on strict geospatial interpretation of density strata, whereas the WGFD (1995) delineation recognized wetland complexes of known importance to waterfowl and other migratory bird species. Using these differing approaches, WGFD identified 49 wetland complexes whereas Copeland et al. (2010) identified 222. The WGFD delineation excluded high-elevation wetlands because they were not considered important waterfowl habitat and most are on National Forest and National Park Service lands. The Copeland et al. analysis included several high elevation and low-density (0.6-3.8 wetlands/mi^2) complexes and smaller, isolated clusters of wetlands that were largely omitted from the WGFD delineations.

Table 6 summarizes attributes of 28 wetland complexes with highest species diversity scores (Copeland et al. 2010), and attributes of 3 additional complexes identified by the Wyoming Joint Ventures Steering Committee based on high project potential and other unique ecological considerations. These 31 complexes are also depicted Fig. 8. The list in Table 6 includes all 8 priority complexes identified by WGFD (2005). Seven of the priority complexes identified by WGFD (2005) are included in the 11 complexes with highest species diversity scores identified by Copeland et al. (2010).

In general, the 8 priority complexes identified by WGFD (1995) are within the principal agricultural regions along major stream courses and at lower elevations. Low elevation wetlands are among the most productive in the state owing to a longer growing season and warmer average temperatures. Although these complexes received generally lower integrity scores, the Copeland et al. (2010) analysis verified they contain high densities of wetlands that sustain important habitat functions. However, the condition metrics used in the Copeland et al. (2010) analysis are unable to discriminate among the 8 WGFD complexes on a finer scale (i.e., they do not support a specific order of priority). For example, the species diversity scores range from 91-96 on a scale of 100, which is not enough separation to support reliable inferences regarding how the complexes compare to one another.

GEOGRAPHIC FOCUS AREAS AND PRIORITY CONSERVATION ACTIONS

Geographic Focus Areas

The Wyoming Joint Ventures Steering Committee has identified 9 primary focus areas (wetland complexes) in which partners are encouraged to focus project planning and implementation over the next 10-year planning horizon (refer to green-shaded rows in Table 6 and dark blue shaded complexes in Fig. 8). The criteria for selecting priority focus areas included a Shannon diversity rank of 5 or lower combined with "high" project opportunity. Six areas met those criteria:

Bear River	**Upper Green River**	**Snake River Valley (Jackson)**
Goshen Hole	**Wind River Basin**	**Laramie Plains**

The Steering Committee added 3 areas to the priority list based on unique ecological values and/or high project interest:

Little Snake R. / Muddy Cr.
NE Wyoming (Little Missouri R. / Belle Fourche R. / Beaver Cr.)
Red Desert / Great Divide Basin

Near term efforts to secure a NAWCA standard U.S. grant will focus on the Bear River, Goshen Hole, and Little Snake River complexes. In 2009, TNC was awarded an IWJV Capacity Grant to assess the potential for funding major projects, including partner interest and availability of in-kind matching funds, within those 3 areas.

The Steering Committee has identified a comparatively limited number of focus areas in which to concentrate wetlands conservation efforts. We stress that all wetlands are important and it is not the Committee's intent to discourage projects in other wetland complexes or regions of the state. The Steering Committee will assist conservation efforts in non-priority areas to the extent available resources allow. Where questions arise regarding the allocation of available funds and other resources, projects in priority areas will generally receive emphasis over projects in non-priority areas. Geographic priorities are subject to review and revision on an annual basis.

Conservation Objectives, Priorities, and Project Opportunities

Statewide conservation objectives and priorities are identified in Appendix A. Appendix A remains under construction and will be updated pending completion of regional step-down plans. This appendix shall also be updated periodically by consensus of the Wyoming Joint Venture Steering Committee. Appendix B is a list of project opportunities and project continuations for which partners and funding are sought. Many of the project descriptions are conceptual due to possible sensitivity of releasing detailed information about projects on private lands. The principal contacts identified on the project sheets can provide additional information. Appendix B will also be updated on a periodic basis.

Table 6. Attributes of 31 wetland complexes with high species diversity scores including identification of priority complexes. *

									Normalized Scores = [(raw score) ÷ (max score)] X 100				
TNC ID No.	WGFD ID No.	Shannon Diversity Rank	WGFD Rank	Complex Name	Complex Area (mi^2)	Wetland Density (No/mi^2)	Wetland Area (acres)	No. SGCN	Shannon Diversity	Rare Species Presence	Integrity	Vulnerability	Project Opportunity
1	49	11		Beartooth Plateau	255.9	10.7	3,433	27	86	83	81	22	Unk.
6	41	3	6,7	Snake R.Valley – Jackson	239.6	8.0	8,554	32	96	67	70	44	High
7	39	7	2	Salt River	155.2	10.8	10,064	27	91	67	70	36	Medium
26	36	11		Henrys Fork	168.4	6.7	10,377	28	86	67	75	31	Low
** 64,66	28,29			Red Desert/Great Divide Basin **	59.9	8.0	2,997	8	59	0	85	34	Medium
72,189 212	38	4	3	Bear River (3 segments)	587.6	8.0	40,060	32	94	67	71	24	High
** 75,77, 79, 214	27			Little Snake R./ Muddy Creek **	429.5	6.0	11,654	14	69	17	75	62	High
80	11	9		Pathfinder – Sweetwater River	573.9	6.0	12,527	33	89	67	79	19	Medium
104	1,2,3,6	4	4	Goshen Hole	491.0	5.7	7,149	32	94	50	56	29	High
136	17	10		Old Woman Creek	2.0	2.5	5	21	88	33	72	0	Low
165	21	7		Clear Creek – Powder River	92.2	0.8	109	30	91	33	66	56	Medium
173	37	12		Sulphur Creek	26.3	16.7	1,012	25	85	67	63	13	Medium
174	36	9		Wasatch Front	135.6	14.7	2,473	29	89	83	77	10	Unk.
** 175, 218-19	25			NE WY (L Missouri/ Belle F/Beaver Cr)**	877.9	5.0	5,371	23	83	33	76	42	High
178	25	9		Inyan Kara	477.3	4.6	3,497	27	89	33	71	21	Medium
179	25	10		Beaver Cr. – Upton	933.5	4.5	4,878	27	88	33	68	16	High

Table 6. (continued)

									Normalized Scores = [(raw score) ÷ (max score)] X 100				
TNC ID No.	WGFD ID No.	Shannon Diversity Rank	WGFD Rank	Complex Name	Complex Area (mi^2)	Wetland Density (No/mi^2)	Wetland Area (acres)	No. SGCN	Shannon Diversity	Rare Species Presence	Integrity	Vulnerability	Project Opportunity
180	4 & 5	6		Wheatland	236.6	5.6	4,819	30	92	50	52	8	Medium
181	N/A	9		Laramie Range	1,214.4	5.4	8,295	32	89	50	78	4	Low
182	8	3	8	Middle N. Platte R.	753.3	5.1	9,802	34	96	67	57	75	Low
184	44	1		Bighorn River/ Greybull River	1,859.4	5.7	29,825	41	100	100	53	90	Medium
185	N/A	10		West Wind R. Range	1,603.9	11.3	29,782	36	88	83	86	24	Low
193	Out	10		Skull Creek/Pat O'Hara Creek	80.2	5.4	147	30	88	67	64	37	Unk
207	Out	12		East Wind R. Range	709.7	8.1	9,783	35	85	67	93	6	Low
208	43	3		Wind River Basin	1,246.8	7.1	37,706	40	96	100	65	97	High
210	38	10		Smiths Fork/ Lower Bear River	317.7	5.7	4,860	32	88	67	82	10	High
211	34	2		Green River Basin	2,594.6	8.2	174,193	36	97	100	69	81	High
213	35	4		Blacks Fork/Little Muddy Creek	590.2	8.3	38,006	32	94	83	70	7	Unk.
216	Out	13		Snowy Range	1,021.1	10.1	22,461	30	81	67	73	13	Low
217	15	5	5	Laramie Plains	1,401.9	6.4	83,094	32	93	67	70	34	High
221	22	8		Tongue R. – Sheridan	564.6	4.8	3,625	29	90	33	54	81	High
222	26	6		Upper N. Platte R.	655.6	7.0	27,969	32	92	50	70	8	High

* Data from Copeland et al. (2010) and WGFD (1995, 2008). Areas highlighted in green are priority wetland complexes identified by the Wyoming Joint Ventures Steering Committee. Except as noted below, these areas have TNC diversity ranks in the top 5 and high project potential.

** Additional complexes were included at the discretion of the State Steering Committee because they have unique ecological values that are not be reflected by the TNC diversity scores plus exceptionally high potential for conservation projects.

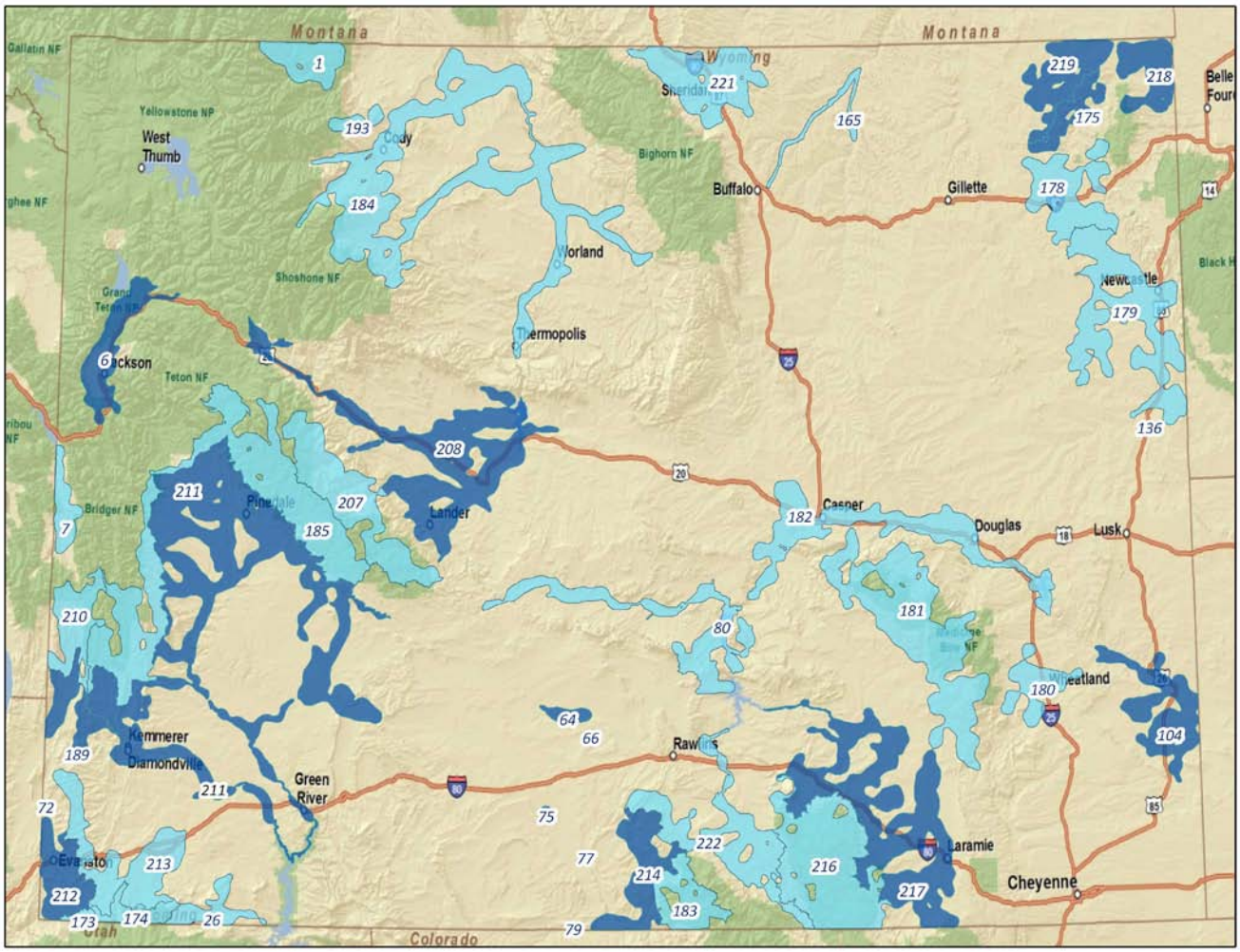


Fig. 8. Thirty-one priority wetland complexes including 9 primary focus areas (dark blue) identified by the Wyoming Joint Ventures Steering Committee. [based on data provided by Copeland et al. (2010)].

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APPENDIX A
(Under construction – a more comprehensive list of statewide objectives and priorities will be developed and updated pending completion of regional plans and future meetings of the Wyoming Joint Ventures Steering Committee).

STATEWIDE CONSERVATION OBJECTIVES AND PRIORITIES

Build Project Capacity

- Secure additional technical services to plan and carry out wetland and riparian conservation projects. Specific expertise is needed to identify and develop project proposals, obtain grants from available funding sources, draw up engineering designs, conduct certified land surveys, secure permits and clearances, and administer projects. In light of current hiring freezes and position caps, these technical services may be contracted or provided through NGOs, with agency funding support.
- Develop additional funding sources to pay for expert technical services such as grant writing, engineering, land surveying, or cultural resource clearances that may not be available through an agency pool.
- A statewide wetlands coordinator would greatly broaden opportunities to deliver wetland conservation by tracking and monitoring projects, and connecting project proponents with funding sources and expertise needed to get projects implemented. This type of position could be cooperatively funded and housed in an organization or agency not subject to hiring caps.
- Encourage effective public involvement and support for wetland and riparian conservation efforts.
- Create and maintain a Wyoming Wetlands Website. Include agency links to various wetland and riparian conservation programs, a periodically updated list of project opportunities and status throughout Wyoming, funding contacts, statewide and regional wetland conservation strategies, and other helpful resources. (The website will be discussed at the next WY Steering Committee meeting in early 2011)
- Identify and develop materials for the above website (to be assigned at the 2011 WY Steering Committee meeting).
- Prepare regional "step-down" plans identifying local and regional project priorities and tailor conservation strategies to address the specific threats, opportunities, and unique circumstances in each region. Regional plans currently assigned and/or under construction include:
    - Bear River Initiative – Carl Millegan
    - Goshen Wetland Complex – Steve Tessmann (draft completed)
    - Upper Wind River – Mark Hogan
    - Upper Green River – Susan Patla
    - NE Wyoming – Larry Roberts, Ken Sambor (NGPJV)
    - Salt River – Joe Bohne
    - Snake River Valley (Susan Patla, Jackson Hole Land Trust)
    - Great Basin (Red Desert) – Andrea Orabona
    - Laramie Basin – TNC, Larry Roberts
    - Little Snake/Muddy Creek – TNC, Steve Jester

Drafts of plans are due to the Steering Committee Chair by December 31, 2010.

Identification of Regional Focus Areas

The Wyoming Joint Ventures Steering Committee identified the following 9 priority wetland complexes in which projects and other conservation actions will be emphasized over the next 10-year planning horizon. (This list may be updated at the Steering Committee's annual meetings).

Bear River
Goshen Hole
Upper Green River
Wind River Basin
Snake River Valley (Jackson)
Laramie Plains
Little Snake River / Muddy Creek
NE Wyoming (Little Missouri River / Belle Fourche River /Beaver Creek)
Red Desert / Great Divide Basin

Although projects will be emphasized in these geographic regions, it is not our intent to discourage projects from being planned and implemented elsewhere. The Wyoming Wetlands Conservation Strategy is a statewide strategy. Opportunities to protect, create, or enhance wetlands and riparian habitats often depend on established relationships with landowners, NGOs, and agencies; available funding; motivated project proponents; and the natural resources within a given location. Projects should be viewed in the context of their individual value, the funding and organizational support they have, and the likelihood of getting the work done. Additional factors to consider are: quantity and quality of wetlands and riparian resources; risk of future loss or degradation; use by sensitive wildlife; functional interrelationships at the watershed scale; and potential to provide access for wetland-dependent recreation and educational opportunities. Compatible access fosters public support for conservation by instilling a cultural appreciation for the aesthetic and ecological values of wetlands and riparian habitats.

The following tasks will be based on objectives and priorities identified in the regional "step-down" plans discussed under "project capacity" (Page 49). Step-down plans are scheduled to be completed December 31, 2010.

Protection Priorities

Wetlands

- Develop statewide objectives for wetlands protection based on recommendations that will be provided in regional plans.
- Develop statewide priorities for acquisitions and conservation easements based on recommendations that will be provided in regional plans.
  – The above 2 tasks will be based on objectives and priorities identified in the regional "step-down" plans discussed under "project capacity. Step-down plans are scheduled to be completed December 31, 2010.
- Develop a list of project opportunities for acquisitions & conservation easements.
  – Refer to Appendix B, under construction.

- Support the Cokeville Meadows NWR acquisition process to secure the 18,551 acres that remain in private ownership within the approved 26,657-acre acquisition boundary.
- Continue to convert term-limited conservation easements to permanent easements at wetlands projects funded by Partners for Fish and Wildlife, WRP, and other programs in Goshen and Sweetwater Counties and elsewhere.

Riparian Habitats

- Develop statewide objectives for riparian habitat restoration and protection.
- Develop statewide priorities for acquisitions and conservation easements .
  – The above 2 tasks will be based on objectives and priorities identified in the regional "step-down" plans discussed under "project capacity. Step-down plans are scheduled to be completed December 31, 2010.
- List project opportunities.
  – Refer to Appendix B, under construction.

Restoration Priorities

Wetlands

- **Develop statewide objectives for wetland restoration based on recommendations that will be provided in regional plans.**
- **List project opportunities.**
- Develop additional project capacity to assist NRCS implementation of WRP.

Riparian Habitats

- **Develop statewide objectives for riparian habitat restoration based on recommendations that will be provided in regional plans.**
- **List project opportunities.**

Creation and Enhancement Priorities

- **Develop statewide objectives for wetland creation and enhancement based on recommendations that will be provided in regional plans.**
- **List project opportunities.**

Wetland-based Recreation & Public Access Priorities

- **Develop statewide objectives for wetland-based recreation based on recommendations of regional plans.**
- **Develop statewide priorities for improving public access to wetland and riparian habitat areas – emphasize regions in which this type of access is limited.**
- **List wetland enhancement and public access opportunities.**

APPENDIX B

PROJECT OPPORTUNITIES

This appendix lists potential projects, project concepts and project locations for consideration by persons interested in doing wetland and riparian conservation work in Wyoming. While the appendix is not a comprehensive listing, the projects we have identified will provide some guidance and personnel contacts within the various geographic regions of the state. The appendix is also intended to assist companies, agencies, and others searching for opportunities to mitigate development impacts to wetlands and riparian habitats. Due to the possible sensitivity of identifying individual private lands, most project descriptions are conceptual and encompass broader drainages or other geographic areas. The contacts listed at the top of each project sheet can provide more specific information about private landowners who are interested in cooperating within the project area. The project opportunities listed in this appendix will be periodically updated by the Wyoming Joint Ventures Steering Committee.

Contents:

Project Name: Blank Project Form

Contact(s): _____

Project Type: (check all that apply)

- ☐ easement
- ☐ acquisition
- ☐ creation
- ☐ restoration
- ☐ enhancement
- ☐ management
- ☐ remediation
- ☐ other (specify) _____

Wetland Complex Name: _____
(Complex in which project is located or stream/drainage name)

Location: _____
(legal description to nearest quarter section)

Dominant Ecological Cover Type: _____

Estimated Project Size: Total Acres: _____ Wetlands (No): _____

Wetlands: _____ (acres) Riparian: _____ (acres) Upland: _____ (acres)

Estimate Total Cost: _____
(if known)

Potential Partners: _____
(if known) _____

Possible Funding Source(s): _____
_____

Description (include wildlife species that will benefit): _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Project Name: Wetlands Project Database – 412 Potential Projects

Contact(s): Larry Roberts, Waterfowl Biologist, Casper, WY (307)-473-3412
larry.roberts@wgf.state.wy.us

Project Type: (check all that apply)

[X]	easement	[X]	acquisition	[X]	creation
[X]	restoration	[X]	enhancement	[X]	management
[X]	remediation	[ ]	other (specify)		

Wetland Complex Name: Projects are located in major wetlands complexes throughout Wyoming.
(Complex in which project is located or stream or drainage name)

Specific Location: Individual project descriptions include location information.
(legal description to nearest quarter section)

Dominant Ecological Cover Type: Projects are primarily in low-mid elevation habitats throughout Wyoming (all habitat types).

Estimated Project Size: Total Acres: by project Wetlands (No): by project

Wetlands: by project (acres) Riparian: N/A (acres) Upland: N/A (acres)

Estimate Total Cost: Cost estimates need to be updated or developed for each project.
(if known)

Potential Partners: Potential partners are identified in database records, as applicable.
(if known) Partners need to be recruited for many of the suggested projects.

Possible Funding Source(s): Funding sources for each project need to be identified.

Description (include wildlife species that will benefit): The wetlands project database is an inventory of project concepts that were identified in the 1980s and early 1990s by WGFD waterfowl biologists and personnel from the USFWS, BLM, and USFS. Each record identifies the project type and provides a description including the location, acreage, and other information. The database is searchable and can be sorted according to geographic area, project size, and additional parameters. A small number of projects have been completed, however the majority of records indicate projects that remain in the preliminary planning stage. The database can be accessed to identify mitigation opportunities as well as wetland protection, enhancement, and creation projects.

Project Name: Goshen CO Wetlands Projects and Enhancements

Contact(s): Steve Tessmann, WGFD; Mark Hogan, USFWS; Greg Kernohan, DU
(307)-777-4584 steve.tessmann@wgf.state.wy.us

Project Type: (check all that apply)	[X] easement	[X] acquisition	[X] creation
	[X] restoration	[X] enhancement	[X] management
	[ ] remediation	[ ] other (specify) _____	

Wetland Complex Name: Goshen Hole Wetland Complex

Location: Springer and Table Mountain WHMAs & Surrounding Areas
(T20-23N, R60-63W)

Dominant Ecological Cover Type: Planted and Cultivated fields; Northwestern Great Plains Mixedgrass Prairie; stringers of Western Great Plains Riparian & Floodplain

Estimated Project Size: Total Acres: indeterminate Wetlands (No): >30

Wetlands: >1,500 (acres) Riparian: indeterminate (acres) Upland: indeterminate (acres)

Estimate Total Cost: $ 1-2 million

Potential Partners: Local Conservation Districts, landowners, USFWS, NRCS, DU, WGFD, WWDC, DEQ, SEO

Possible Funding Source(s): NAWCA, WWNRT, EQIP, GRP, WHIP, WRP, WY Water Development Fund, PFW, private (in-kind)

Description: The Goshen Hole wetland complex is one of Wyoming's premier staging and migration conduits for waterfowl and waterbirds. The Wyoming Comprehensive Wildlife Conservation Strategy (WGFD 2005) identifies 50 vertebrate species of greatest conservation need (SGCN) that utilize wetland, riparian, and stream habitats in the Goshen Hole area. It has been estimates that between 30 – 50% of the native wetlands in the area have been altered, degraded or lost. The Goshen Hole regional plan address these losses by incorporating strategies to increase wetland habitat base by >10% through the development of additional wetland projects. Short term strategies include projects that enhance/restore hydrology of natural and irrigation water enhanced wetlands and shallow reservoirs in southern Goshen CO. Existing wetland complexes like Springer, Bump Sullivan, and Table will be improved by restoring or establishing new shallow water wetland acres adjacent to these refuge areas while providing additional secure nesting habitat. More recently, restoration work has been expanded to include restoration of backwater sloughs and oxbow wetland habitats along the North Platte River dewatered by past river alterations or filled by leveling

activities or wind erosion. Hydrology restoration of these sites entails excavating degraded (filled) sites, providing water table and riverine connection as well as removing invasive Russian olive trees to restore cottonwood gallery corridor habitat. Long term conservation needs will be met by incorporating conservation easements to protect wetlands, riparian and upland habitats. In addition, working with local landowners, irrigation and conservation districts on large scale water improvement projects will help provide secure water for existing and new wetland projects (refer to Horse Creek Conservation District Improvements Project Level II – WY Water Development Commission, 1998. Additional opportunities to provide wetland-dependent recreation also will be explored.

Project Name: Bush Rim Springs Protective Fencing

Contact(s): Andrea Orabona, WY Game and Fish Department (307)-332-7723 x 232
andrea.orabona@wgf.state.wy.us

Project Type: (check all that apply)

- [ ] easement
- [ ] acquisition
- [ ] creation
- [X] restoration
- [ ] enhancement
- [X] management
- [X] remediation
- [ ] other (specify) _____

Wetland Complex Name: Great Divide Basin (Red Desert)
(Complex in which project is located or stream or drainage name)

Location: NAD 83 Zone 12T 679508 4664629
(legal description to nearest quarter section)

Dominant Ecological Cover Type: _____

Estimated Project Size: Total Acres: ≈50 Acres Wetlands (No): 4 springs

Wetlands: 50 acres (acres) Riparian: _____ (acres) Upland: _____ (acres)

Estimated Total Cost: _____
(if known)

Potential Partners: Bureau of Land Management, Wyoming Game and Fish Dept.
(if known) _____

Possible Funding Source(s): State Wildlife Grants

Description (include wildlife species that will benefit): A series of 6 springs occurs along Bush Rim in the Red Desert. The water and associated vegetation and insects provide important habitat components for Greater Sage-Grouse and numerous Neotropical Migratory Birds, including Species of Greatest Conservation Need, especially in the midst of an otherwise dry environment. Two of the springs are fenced to exclude livestock from loitering in the sensitive wetland environment, but the remainder are unfenced and experiencing a varying degree of deterioration, both in habitat and water quality. One spring is readily accessible by vehicle and used by recreationists during the summer and hunters in the fall. While compatible recreation is not problematic, individuals have placed pit toilets directly in the flowing spring water, further degrading this important desert wetland site. Fencing would protect water quality, soils, and plants.

Project Name: Green River Wetlands and Conservation Easements

Contact(s): Susan Patla (307-733-2383x229 susan.patla@wgf.state.wy.us

Project Type: (check all that apply)

- [X] easement
- [X] acquisition
- [X] creation
- [ ] restoration
- [X] enhancement
- [ ] management
- [ ] remediation
- [ ] other (specify) _____

Wetland Complex Name: Green River Basin
(Complex in which project is located or stream/drainage name)

Location: Green River Basin north of Interstate 80
(legal description to nearest quarter section)

Dominant Ecological Cover Type: sagebrush-steppe, cottonwood-willow riparian gallery, mountain foothills, irrigated hayfields

Estimated Project Size: Total Acres: indeterminate Wetlands (No): >20

Wetlands: indeterminate (acres) Riparian: indeterminate (acres) Upland: indeterminate (acres)

Estimate Total Cost: Costs need to be estimated on a project-by-project basis.
(if known)

Potential Partners: BLM, USFS, private individuals, Green River Valley Land Trust, energy companies
(if known)

Possible Funding Source(s): NAWCA, WRP, WWNRT, WLCI, Green River Valley Land Trust, private individuals (in-kind match), energy companies

Description (include wildlife species that will benefit): A State Wildlife Grant was obtained in 2003 to identify and plan potential wetlands projects that will provide additional summer habitat for resident trumpeter swans on private lands. Plans were developed for over 20 projects; 4 projects have been completed to date. In addition, there is a need to protect wetlands and riparian habitats threatened by subdivisions and development throughout the region. There are also opportunities to build, enhance, and protect wetlands as mitigation for energy development impacts. The Wyoming Landscape Conservation Initiative may provide additional resources to conserve wetlands and riparian resources throughout this region.

Project Name: Wind River Wetland and Riparian Restoration Projects
Contact(s): Mark Hogan – USFWS Lander, Dave Skates –USFWS Lander

Project Type: (check all that apply)	[X] easement	[X] acquisition	[X] creation
	[X] restoration	[X] enhancement	[X] management
	[ ] remediation	[ ] other (specify) _____	

Wetland Complex Name: Ocean Lake Complex, Wind River Foothills and Montane Wetlands, and Upper Wind River Wetland and Riparian Wetlands

Location: Wind River Valley Floor, including Ocean Lake, Middle Depression and Sand Mesa WYGF Units, Midvale/Riverton Irrigation District, Ray/Coolidge Irrigation Districts, Bull Lake Dinwoody/Ring/Torrey Lake Area.

Dominant Ecological Cover Type: Montane, Sage Steppe, Cultivated Agriculture, Valley Floor

Estimated Project Size: Total Acres: Indeterminate Wetlands (No): >30

Wetlands: >1,500 (acres) Riparian: Indeterminate (acres) Upland: Indeterminate (acres)

Estimate Total Cost: + $ 2 million

Potential Partners: Local Conservation and Irrigation Districts, landowners, WGFD, WWDC, USFWS, NRCS, DU, Shoshone and Arapaho Tribes, BIA, TU, Popo Agie Anglers, RMEF, etc.

Possible Funding Source(s): Tribal Grants Programs, NAWCA, WWNRT, CREP, GRP, EQIP, WHIP, WRP, WY Water Development PFW, Private Landowner Match, TU, Popo Agie Anglers, County Rec. funds

Description (include wildlife species that will benefit): The Wind River valley floor contains more than 43,000 acres of palustrine wetlands associated with river floodplains, flood irrigation, and/or natural depressions. Complementing these wetlands is more than 3,000 miles of steam habitat and 500 plus glaciated lakes north of the Continental Divide. Valley floor wetlands function in several capacities, primarily as migration and production habitat for a variety of waterfowl and waterbirds including species like Trumpeter swans, American avocets, and Wilson's phalaropes, as well as a late spring staging area for ring-necked ducks and lesser scaup waiting for surrounding montane lakes and ponds thaw. Over the past ten years, more than 840 wetland acres have been restored on private lands in the valley with 2,400 acres of adjacent nesting habitat managed for the benefit of waterfowl.

Project Name: Snake River Wetlands and Conservation Easements

Contact(s): Susan Patla (307-733-2383x229 susan.patla@wgf.state.wy.us

Project Type: (check all that apply)

[X]	easement	[X]	acquisition	[X]	creation
[ ]	restoration	[X]	enhancement	[X]	management
[ ]	remediation	[ ]	other (specify)		

Wetland Complex Name: Snake River (Jackson)
(Complex in which project is located or stream/drainage name)

Location: Snake River drainage from Jackson north to the J.D. Rockefeller Parkway
(legal description to nearest quarter section)

Dominant Ecological Cover Type: big sagebrush shrubland, cottonwood-willow riparian gallery, aspen

Estimated Project Size: Total Acres: indeterminate Wetlands (No): indeterminate

Wetlands: indeterminate (acres) Riparian: indeterminate (acres) Upland: indeterminate (acres)

Estimate Total Cost: Costs need to be estimated on a project-by-project basis.

Potential Partners: Private individuals, Jackson Hole Land Trust, U.S. Forest Service, USFWS (National Elk Refuge), NPS, WGFD, Wyoming Wetland Society,

Possible Funding Source(s): NAWCA, WRP, WWNRT, Jackson Hole Land Trust, private individuals (in-kind match), USFS

Description (include wildlife species that will benefit): A number of landowners within the Snake River drainage have expressed an interest in establishing conservation easements to protect important and scenic habitats that may ultimately be threatened by sale and subdivision. There are also opportunities to continue building wetlands projects and enhancing wetlands both on federal and private lands.

Project Name: Cokeville Meadows NWR Acquisition

Contact(s): Carl Millegan, USFWS (307)-875-2187x19, carl_millegan@fws.gov

Project Type: (check all that apply)

[X]	easement	[X]	acquisition	[ ]	creation
[X]	restoration	[X]	enhancement	[X]	management
[ ]	remediation	[ ]	other (specify)		

Wetland Complex Name: Bear River
(Complex in which project is located or stream/drainage name)

Location: T22-24N, R119-120W
(legal description to nearest quarter section)

Dominant Ecological Cover Type: Sagebrush shrubland, irrigated hay meadows, cottonwood willow riparian gallery, wetlands.

Estimated Project Size: Total Acres: 26,657 Wetlands (No): no data

Wetlands: no data (acres) Riparian: 20-mile segment of the Bear R. + tributaries Upland: no data (acres)

Estimate Total Cost: Approximately $14 million, potentially less if some lands are secured through perpetual easements, leases, management agreements, or donations.

Potential Partners: USFWS, WGFD, IWJV, TNC, WLCI, NRCS, land trusts, private individuals

Possible Funding Source(s): Congressional appropriations (Land & Water Conserv. Fund, Migratory Bird Conserv. Fund.), NAWCA, WLCI, USDA-MRCS Wetlands Reserve Program (WRP), WWNRT (easements only), energy mitigation funds, land trusts, private (in-kind) match, **explore other options**

Description (include wildlife species that will benefit): The approved acquisition boundary for Cokeville Meadows NWR is 26,657 acres. Currently, 9,259 acres have been secured through fee title acquisition and perpetual easements. A total of 17,398 acres remain in private ownership and are at risk of being sold and subdivided or otherwise developed. The appraised value of ranchlands within the refuge boundary is approximately $800 per acre (2007 figures).

Project Name: Bear River Initiative

Contact(s): Carl Millegan, USFWS (307)-875-2187x19, carl_millegan@fws.gov
Steve Jester, TNC (307)-677-1404 sjester@tnc.org

Project Type: (check all that apply)

- [X] easement
- [X] acquisition
- [ ] creation
- [X] restoration
- [X] enhancement
- [X] management
- [ ] remediation
- [ ] other (specify) _____

Wetland Complex Name: Bear River

Location: T22-25N, R119-120W and T14-18N, R120-121W

Dominant Ecological Cover Type: Sagebrush shrubland, irrigated hayfields, Cottonwood-willow riparian gallery, wetlands.

Estimated Project Size: Total Acres: indeterminate Wetlands (No): indeterminate

Wetlands: indeterminate (acres) Riparian: 2 segments of the Bear R. (≈50 mi) + tributaries in WY Upland: indeterminate (acres)

Estimate Total Cost: Indeterminate – potentially a multi-million dollar project

Potential Partners: USFWS, WGFD, IWJV, TNC, WLCI, NRCS, land trusts, private individuals, UT, ID

Possible Funding Source(s): NAWCA, WLCI, WWNRT (easements only), energy mitigation funds, land trusts, private (in-kind) match, USDA-NRCS – Wetlands Reserve Program (WRP), **explore other options**

Description (include wildlife species that will benefit): The Bear River in WY, UT, and ID is an exceptionally diverse habitat and important migration corridor for migratory birds. Most lands throughout the corridor remain in traditional ranching operations, but are increasingly at risk of being sold and subdivided or otherwise developed. The Bear River Initiative is a cooperative effort to conserve key habitats along the Bear River system in Idaho, Utah, and Wyoming through a combination of restoration, enhancement, easements, and acquisitions. The project is being developed by the 3 refuge managers on the Bear River System in cooperation with The Nature Conservancy and other partners. The 3 refuges include Cokeville Meadows, Bear River, and Bear Lake NWRs. The project area covers the upper, middle, and lower Bear River watershed. All 3 reaches will come together to develop a single set of priorities for a Conservation Action Plan. Continuation of the acquisition process for Cokeville Meadows NWR could potentially be integrated within the scope of the Bear River Initiative. Although interest in the Bear River Initiative is high, funding and match availability are currently limited.

Project Name: Little Snake R. Projects & Conservation Easements

Contact(s): Steve Jester, TNC (307)-677-1404 sjester@tnc.org
Larry Hicks, Little Snake R. Conserv. District (307)-383-7860 lsrcd@yahoo.com

Project Type: (check all that apply)

[X]	easement	[X]	acquisition	[X]	creation
[X]	restoration	[X]	enhancement	[X]	management
[ ]	remediation	[ ]	other (specify)		

Wetland Complex Name: Little Snake River / Muddy Creek

Location: West of the Sierra Madre Range: T12N, R89-93W & T16N, R92W

Dominant Ecological Cover Type: Cottonwood/willow riparian gallery, sagebrush shrubland, greasewood flats, irrigated hayfields

Estimated Project Size: Total Acres: indeterminate Wetlands (No): indeterminate

Wetlands: >600 (acres) Riparian: indeterminate (acres) Upland: indeterminate (acres)

Estimate Total Cost: Potential for numerous projects/acquisitions totaling several million dollars.

Potential Partners: TNC, USFWS Partners Program, WRP, LSRCD, NRCS, WGFD, IWJV, private landowners,

Possible Funding Source(s): WWNRT (easements & enhancement projects), WRP, NAWCA, USFWS Partners Program, Wildlife Habitat Trust Fund, in-kind match

Description (include wildlife species that will benefit): Several landowners along the Little Snake River floodplain and tributaries are interested in establishing perpetual conservation easements on their properties. The Nature Conservancy and other land trusts have significant "in-kind" match available from other acquisitions and easements on both sides of the Wyoming/Colorado state line in this location. In addition, potential exists for wetlands creation, restoration, and enhancement projects along the Little Snake R. and Muddy Creek. The Muddy Creek wetlands project has created several hundred acres of wetlands along a 6-mile reach of Muddy Creek approximately 25 miles north of Baggs. There is potential for additional wetlands creation and also a need to fund maintenance and enhancement of the existing wetlands. The Muddy Creek Wetlands project is an Audubon Important Bird Area with 111 avian species documented including several T&E species and species of greatest conservation need.
http://iba.audubon.org/iba/viewSiteProfile.do?siteId=2608&navSite=state