Intermountain West Waterbird Conservation Plan

Version 1.2
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Note: Because of the complexity of the region covered by this plan (11 states and 4 Bird Conservation Regions [BCRs]) there are likely some errors in the data reported here and additional information which should be considered in future versions of this plan. If you notice errors or omissions or have ideas or comments, please send them to Gary Ivey (ivey@oregonvos.net), so they can be captured in future updates.

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EXECUTIVE SUMMARY

This Intermountain West Waterbird Conservation Plan (IWWCP) is one of several regional step-down plans designed to implement the North American Waterbird Conservation Plan (NAWCP, Kushlan et al. 2002, www.waterbirdconservation.org). As defined by these hierarchical plans, waterbirds are wetland-dependent species including both colonial breeders (e.g., gulls, terns, most grebes, cormorants, herons, egrets, ibis and pelicans), and solitary nesting marshbirds (e.g., cranes, rails, coots, bitterns and loons). Shorebirds and waterfowl are covered by other bird conservation initiatives and, thus, are excluded from this plan. Bird families represented here include: Gruidae, Rallidae, Laridae, Podicipedidae, Phalacrocoracidae, Ardeidae, Threskiornithidae, Pelecanidae, and Gaviidae. The goal of the IWWCP is to maintain healthy populations, distributions, and habitats of waterbirds throughout the Intermountain West region. The regional planning area includes the U.S. portions of 11 western states and four Bird Conservation Regions that are defined as geographic regions with similar habitat conditions delineated to facilitate bird conservation efforts (U.S. NABCI Committee 2000a).

This IWWCP was developed with the assistance of the Intermountain West Waterbird Working Group (hereafter, Group). This group is an informal association of biologists, wildlife managers, and interested citizens who provided input on the status and conservation needs of waterbirds and waterbird habitat throughout the planning process. The plan is intended to fill knowledge gaps and facilitate coordinated waterbird conservation efforts among the many public and private partners associated with all-bird conservation in the Intermountain West region. Included are a description of waterbird populations and habitats; a review of threats and management issues; the development of population and habitat objectives for priority species and habitats; monitoring and research recommendations; and conservation strategies for management, monitoring, and outreach.

The Intermountain West's dispersed high mountain lakes, large terminal hyper-saline lakes, marshes, playas, rivers, streams, riparian zones, and fresh and brackish wetlands host about 40 waterbird species, including many or most of the world's California Gulls, Eared Grebes, White-faced Ibises, and American White Pelicans. Breeding and migrant waterbird species are ranked and prioritized for the Intermountain West region based on modified national NAWCP rankings (colonial species) and national, state, and Partners In Flight (PIF) listings (marshbirds) in each of the four Bird Conservation Regions within the planning area. No waterbirds in the Intermountain West merited a ranking of highly imperiled at this regional scale. Eleven waterbirds are identified as species of high concern in one or more of the four Bird Conservation Regions within the planning area: Yellow Rail, Franklin's Gull, Black Tern, Eared Grebe, Western Grebe, Clark's Grebe, Snowy Egret, American White Pelican, Common Loon, American Bittern, and certain managed populations of the Greater and Lesser Sandhill Crane. An additional 10 species were identified as species of moderate conservation concern. For the purpose of this plan, waterbirds ranked as high or moderate conservation concern are considered priorities for conservation action in the Intermountain West region. Brief species profiles summarize the status and conservation needs of each of these 21 priority waterbirds.

Waterbirds using this region are highly adaptable to constantly changing wetland conditions and depend on a regional-scale association of wetlands to meet their habitat and forage requirements during various stages of their annual life cycle. The competing demands for water in support of human uses such as agriculture, development, and recreation pose the greatest threats to regional waterbird populations. Contaminants (e.g., mercury, DDT and its breakdown products) are also a significant threat to the region's waterbirds. Because of the West's feast-or-famine water regime, the IWWCP stresses the necessity of conserving a network of high-quality wetland habitats with secure water sources in order to provide options for waterbirds during drought and flood cycles. Based on the review of waterbird populations, habitats, threats, and issues, the following are some of the key conservation actions identified in the plan:

- Develop and implement a monitoring strategy to acquire sufficient information about the population dynamics; population trends; breeding, migration, and staging requirements; and habitat preferences of the region's waterbirds to make knowledgeable management recommendations.

- Preserve and enhance sufficient high-quality habitat to support healthy populations in the region. Specific strategies are recommended for nine critically important waterbird sites.

- Inform the public, decision-makers, and land managers about the importance of the region to waterbirds and about the biology, trends, and management of these species.

- Ensure that coordinated conservation efforts (regional, national, and international) are in place to address the key conservation priorities of waterbirds.

- Develop partnerships to facilitate coordinated waterbird conservation, including funding and implementation of management strategies.

Success of the activities outlined in this plan will be measured by both habitat and species monitoring. These include a monitoring strategy for focal species and important habitats, and identification of monitoring and research needed to develop population size and trend data for inadequately monitored species.

In the spirit of all-bird conservation, this plan is intended to facilitate waterbird conservation through on-the-ground projects and the incorporation of waterbird population and habitat objectives into joint venture projects, land use planning documents, and the conservation efforts of a diverse array of partners found throughout the Intermountain West region. Analogous regional waterbird plans are under development for states and Bird Conservation Regions adjacent to the Intermountain West, and the Canadian Wildlife Service has developed a Waterbird Conservation Plan for the Pacific and Yukon Regions (Gebauer 2003). The Intermountain West Waterbird Working Group and many public and private conservation partners will strive to integrate and coordinate waterbird conservation efforts with those underway in adjacent areas in the United States and Canada.

INTRODUCTION

Waterbirds are a diverse group of species dependent on aquatic habitats to complete portions of their life cycles. Defined here, the group encompasses cranes, rails, coots, gulls, terns, grebes, cormorants, herons, egrets, bitterns, ibises, pelicans, loons, and others; essentially, all aquatic bird species except waterfowl (i.e., ducks, geese, and swans) and shorebirds (e.g., sandpipers and plovers). It is often helpful to categorize waterbirds by their social behaviors. Many are colonial breeders, a strategy that increases population vulnerability by concentrating populations in a limited area. Of the solitary-nesting species, many are very secretive in their habits and, therefore, their population status is unknown. Threats to waterbirds and their habitats have stimulated a significant response by those concerned with their conservation.

In the arid Intermountain West, waterbirds rely on wetlands that are susceptible to natural cycles of droughts and floods, and are very dynamic in nature as precipitation patterns shift from wet to dry extremes. Many of the area's wetland systems have a low gradient bottom, which causes shorelines to be transitory through seasons and weather cycles. This condition induces intermittent waterbird nesting and use because of extreme changes in habitats. Emergent wetland habitat develops during periodic shoreline stability and provides nesting habitat for waterbirds. Nesting colonies generally persist until the emergent wetlands become desiccated or are deeply flooded as water levels fluctuate. Droughts strand emergent nesting cover and allow access by mammalian predators. Droughts also reduce the availability of food by limiting moist feeding areas. Conversely, floods inundate emergent nesting areas and nests, and sometimes kill stands of emergent vegetation, eliminating suitable nesting habitat. Although feeding areas are generally bountiful during flood cycles, suitable nesting habitat is typically scarce. Because of this shifting of water levels and habitats, individual wetlands are not consistently reliable as habitat for waterbirds. Local population variations and nesting colony abandonment reflect this instability. Many waterbird species are nomadic, apparently compensating for diverse wetland dynamics by moving among wetlands at a regional scale within and between years (e.g., Ryder 1967, Ivey et al. 1988, Henny and Herron 1989). Consequently, a large and widely distributed, diverse wetland base within the Intermountain West landscape is needed to maintain healthy waterbird populations (Haig et al. 1998).

The North American Waterbird Conservation Plan (NAWCP) is the product of the Waterbird Conservation for the Americas Initiative, an independent partnership of individuals and institutions having interest and responsibility for conservation of waterbirds and their habitats in the Americas (Kushlan et al. 2002, www.waterbirdconservation.org). The NAWCP provides a continental perspective on conservation needs for waterbirds, and complements plans developed by the other bird conservation initiatives linked through the North American Bird Conservation Initiative (U.S. NABCI Committee 2000a). NAWCP is being implemented through a series of regional plans such as this Intermountain West Waterbird Conservation Plan (IWWCP). The IWWCP is focused on regional waterbird populations, habitats, and associated conservation issues. It represents the next steps in waterbird conservation called for in the NAWCP.

This plan was developed with the assistance of the Intermountain West Waterbird Working Group, an informal association of biologists, wildlife managers and interested citizens who provided input into the planning process (see Appendix A). The planning area includes Bird Conservation Regions (BCRs) 9, 10, 15, and 16, and encompasses portions of 11 western states and two Canadian Provinces (Figure 1). BCRs are geographic regions with similar habitat conditions delineated by the North American Bird Conservation Initiative (NABCI) to facilitate coordinated bird conservation efforts (U.S. NABCI Committee 2000b). This plan focuses on the U.S. portions of the region while a complementary plan is being developed for Canada.

The Intermountain West region includes a vast inland area from the Rocky Mountains on the east to the Sierra Nevada and Cascades mountains on the west, and from southern Canada on the

north to northern New Mexico and Arizona on the south. It includes the extensive Great Basin, Columbia Basin, Colorado Plateau, and Wyoming Basin physiographic regions and their associated mountain ranges (Partners In Flight 2004). Characterized by diverse basin and range topography, the region provides a variety of habitats for waterbirds, including high mountain lakes, rivers and streams, fresh and brackish wetlands, and large terminal hyper-saline lakes. Due to the arid climate—a result of the rain shadow cast by the mountains to the west—Intermountain West wetlands serve as life-giving, yet inconsistent, oases for aquatic birds.

The overall goal of the IWWCP is the maintenance of healthy populations, distributions, and habitats of waterbirds throughout the Intermountain West region. This document:

- Assesses the importance of the Intermountain West to waterbirds.
- Describes current knowledge on population sizes and trends, habitat requirements, and distribution of individual species.
- Describes key sites for waterbirds in the region.
- Assesses status, vulnerability, and management priority rankings for each species on the basis of regional biological information, regional conservation issues, and continental ranking schemes.
- Identifies threats to waterbirds in the region.
- Provides guidance on conservation and management strategies applicable to waterbirds.
- Provides direction for integrated landscape-level waterbird conservation that considers and incorporates conservation planning for other species.
- Identifies high priority information gaps that must be filled to increase our ability to successfully manage waterbird species, and identifies related research questions needing to be addressed.
- Provides regionally-based waterbird conservation guidance that will step down the goals of the continental plan within the Intermountain West while simultaneously assisting in the rolling-up of population and habitat objectives for range-wide species conservation.

A number of actions will be required to successfully achieve the goals of the IWWCP, including:

- Acquiring sufficient information about the population dynamics, population trends, breeding, migration and staging strategies, and habitat preferences of the region's waterbirds to make knowledgeable management recommendations.
- Preserving and enhancing sufficient high-quality habitat to support healthy populations in the region.
- Informing the public, decision-makers, and land managers in the region about the importance of the region to waterbirds and about the biology, trends, and management of these species.
- Ensuring that coordinated conservation efforts (regional, national, and international) are in place to address the key conservation priorities of waterbirds.
- Developing partnerships that facilitate needed conservation including funding and management strategies.

Figure 1. Intermountain West Waterbird Conservation Plan planning area.

DESCRIPTION OF THE INTERMOUNTAIN WEST

Waterbird Habitat Types

The Intermountain West provides waterbirds with a diversity of habitats:

- Freshwater marsh complexes of great importance to breeding and migrating waterbirds; these areas often include numerous man-made managed wetlands on Wildlife Areas (WAs) and National Wildlife Refuges (NWRs).
- Freshwater lakes and reservoirs that provide nesting habitat for grebes and loons and foraging habitat for a variety of fish-eating waterbirds.
- Large saline lakes of importance to post-breeding and migrant Eared Grebes and gulls.
- Rivers, streams, and riparian areas that provide nesting and foraging habitats.
- Irrigated agricultural fields that serve as nesting and foraging sites for some species (e.g., rails, cranes, gulls, ibises).
- Various man-made structures that are used by nesting birds, especially dikes, berms, and roadways.

Freshwater marsh complexes. These are large wetland systems that include a variety of wetland types such as wet meadows, seasonal wetlands, emergent marshes and, in many cases, managed wetland impoundments. The region includes several large freshwater marsh complexes of critical importance to a variety of breeding waterbirds and numerous migrant species. Most notable are the marshes associated with the Great Salt Lake in Utah, Klamath Basin in Oregon and California, Lahontan Valley wetlands in Nevada, Malheur-Harney Lakes Basin in Oregon, and Centennial Valley and Freezeout Lake in Montana. There are many other important freshwater marsh complexes in the region and most of them have been identified as Important Bird Areas (IBAs).

Freshwater lakes and reservoirs. There are numerous lakes and reservoirs in the region. Their value to waterbirds generally depends on the level of recreational use they receive. The direct (e.g., disturbance) and indirect (e.g., erosion) effects of human activities decrease the quality of lakes and reservoirs as waterbird habitat. Additionally, rapid changes in water levels make many of these sites unsuitable for breeding waterbirds. Some notable examples of important lakes and reservoirs include Eagle Lake, Goose Lake, and Lake Almanor in California; Upper Klamath Lake in Oregon; and Blackfoot Reservoir and Lake Cascade in Idaho. These habitats are particularly important to nesting and staging Common Loons and grebes, and as foraging sites for fish-eating waterbirds. Staging is a term used to describe the congregation of birds in an area in preparation for migration.

Large saline lakes. Saline lakes provide an abundance of food in the form of brine flies and brine shrimp for a variety of birds. Brine shrimp are a critical food resource to migrating and molting Eared Grebes. Most of the world's population of Eared Grebes congregate at Great Salt and Mono lakes in the summer prior to migrating south. California, Franklin's, and Ring-billed gulls also stage at these lakes in large numbers. Other important saline lakes include Lake Abert, Harney, and Summer lakes in Oregon.

Rivers, streams and riparian areas. Modest numbers of waterbirds of many species migrate along and/or breed in association with riparian areas. These habitats are particularly valuable for fish-eating waterbirds such as Double-crested Cormorants and Great Blue Herons; both of these species sometimes nest in streamside cottonwoods. Adjacent wet meadows often provide habitat for rails, cranes, gulls, and ibises.

Irrigated agricultural fields. Cranes and rails utilize flood-irrigated hay fields for nesting, and many other waterbird species forage in these areas. Egrets and herons sometimes forage in dry pastures for mice and grasshoppers. Irrigated crops are also used for foraging in some cases (e.g., White-faced Ibises use irrigated alfalfa fields in the Lahontan Valley, Nevada, and around Great Salt Lake, Utah), and grain fields are important

for Sandhill Cranes during migration and winter. Where these habitats are associated with wetland complexes, they provide very important foraging options for many waterbird species.

Facilities and structures. Some waterbirds utilize structures built for other purposes. Examples include nesting and loafing on dikes, berms, power poles, and roadways. In some cases, birds have established nests on flooded buildings (e.g., flooded ranch houses, barns, and haystacks, G. Ivey pers. observ.). These facilities and structures sometimes provide important sites for colonial nesting waterbirds.

Bird Conservation Regions

BCRs are geographic areas with similar habitats that were developed to provide a consistent spatial framework for NABCI's bird conservation strategy. The BCRs comprising the Intermountain West are described below in terms of waterbird habitats.

Great Basin (BCR 9). This region is very dry due to its position in the rain shadow of the Cascade and Sierra Nevada ranges, and its wetlands are very dynamic due to extreme fluctuations in water supplies. The portion of this BCR within the true Great Basin is internally drained, while the other areas eventually drain into the Columbia River. There are several large wetland complexes, a number of which are among the most important on the continent for a variety of waterbirds. Most notable are the wetlands associated with the Great Salt Lake in Utah (particularly Bear River Migratory Bird Refuge and seven State WAs), Klamath Basin in Oregon and California, Malheur-Harney Lakes Basin in Oregon, and Lahontan Valley in Nevada. Many other wetlands in the area are heavily used by certain waterbird species (e.g., Walker Lake, Nevada [migrant Common Loons]). Large saline lakes created by internal drainage, such as Great Salt Lake and Mono Lake, are very important to most of the world's population of Eared Grebes and California Gulls. A myriad of areas are of moderate importance to breeding and migrant waterbirds, and thousands of ephemeral wetlands, streams, and man-made lakes in the region support various species of waterbirds.

Northern Rockies (BCR 10). Major wetland complexes important to waterbirds in this BCR include the Centennial Valley and Freezeout Lake in Montana, and Teton Basin and Grays and Bear lakes in Idaho. Many small mountain lakes in this region provide nesting sites for Common Loons. Additionally, numerous small wetlands occur in the mountains and the Wyoming Basin, as well as thousands of stream/river valleys and natural and man-made lakes.

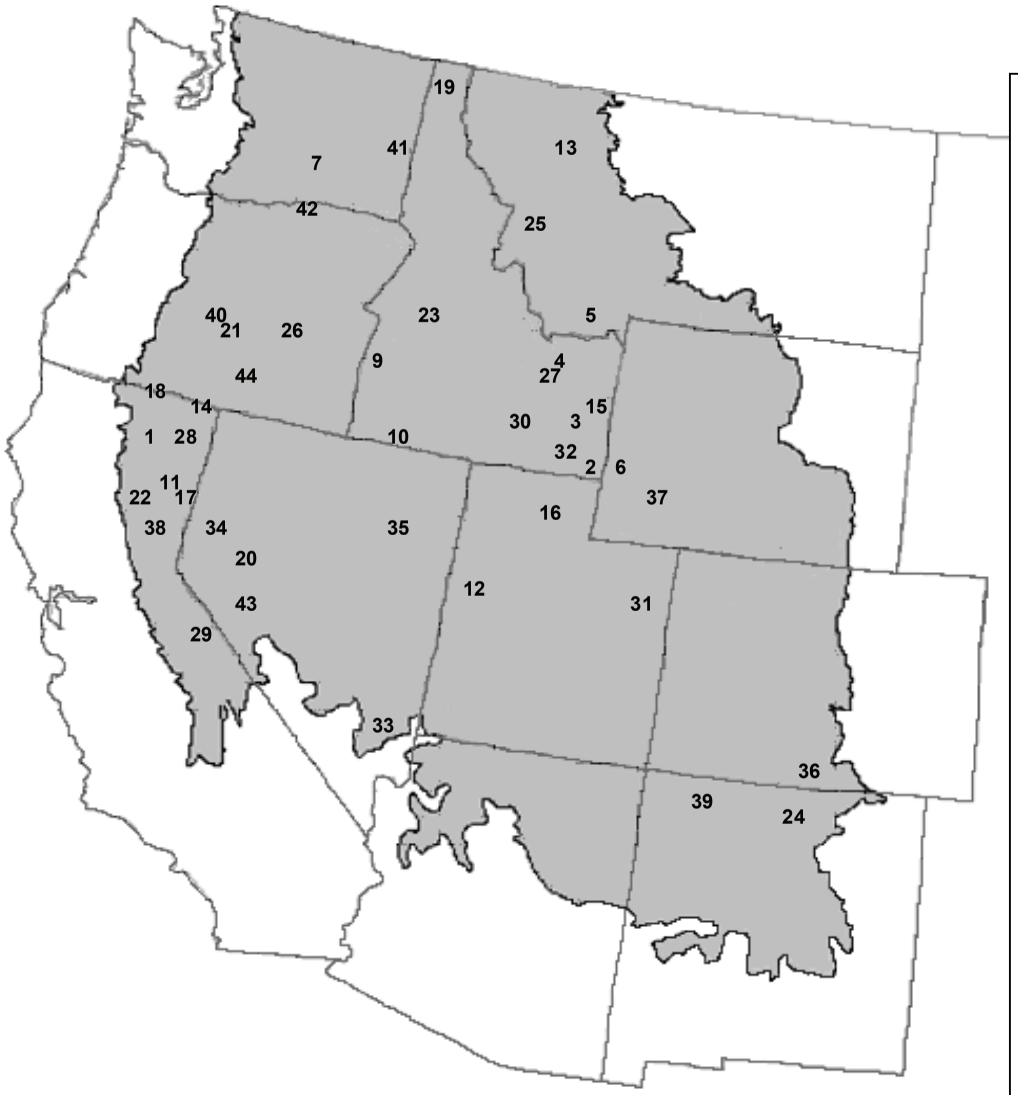
Sierra Nevada (*BCR 15)*. Important wetland habitats in this BCR are primarily mountain lakes, most significantly habitat at Eagle Lake and Lake Almanor. Many wet meadow systems provide habitat for breeding rails, and in larger meadows, Sandhill Cranes. Sierra Valley is the most important meadow/wetland complex in this BCR, however, there are numerous smaller wetland sites associated with streams and small lakes.

Southern Rockies - Colorado Plateau (BCR 16). The most significant waterbird area in this region is the San Luis Valley, where wetlands provide habitat for breeding waterbirds such as White-faced Ibises as well as staging habitat for Sandhill Cranes. Stinking Lake is New Mexico's largest natural freshwater wetland, and is important for breeding waterbirds. Other wetlands are widely scattered in this BCR, many of which are small, occurring in the form of montane streams and man-made impoundments. There is modest breeding waterbird diversity and usage by migrants.

Important Waterbird Sites

Figure 2 displays approximate locations of some important waterbird sites in the Intermountain West Region.

Figure 2. Approximate locations of notable waterbird sites in the Intermountain West Region.



1. Ash Creek WA, CA
2. Bear Lake NWR, ID
3. Blackfoot Reservoir, ID
4. Camas NWR, ID
5. Centennial Valley, MT
6. Cokeville Meadows, WY
7. Columbia NWR, WA
8. Conboy Lake NWR, WA
9. Deer Flat NWR, ID
10. Duck Valley, ID and NV
11. Eagle Lake, CA
12. Fish Springs NWR, UT
13. Freezeout Lake, MT
14. Goose Lake, CA and OR
15. Grays Lake, ID
16. Great Salt Lake, UT
17. Honey Lake WA, CA
18. Klamath Basin, CA and OR
19. Kootenai NWR, ID
20. Lahontan Valley, NV
21. Lake Abert, OR
22. Lake Almanor, CA
23. Lake Cascade, ID
24. Las Vegas/Maxwell NWRs, NM
25. Lee Metcalf NWR, MT
26. Harney Basin, OR
27. Market Lake/Mud Lake WMAs, ID
28. Modoc NWR, CA
29. Mono Lake, CA
30. Minidoka NWR, ID
31. Ouray NWR, UT
32. Oxford Slough WPA, ID
33. Pharanaget NWR, NV
34. Pyramid Lake, NV
35. Ruby Valley, NV
36. San Luis Valley, CO
37. Seedskadee NWR, WY
38. Sierra Valley, CA
39. Stinking Lake (Burford), NM
40. Summer Lake – Chewaucan Basins, OR
41. Turnbull NWR, WA
42. Umatilla NWR Complex, OR, WA
43. Walker Lake, NV

Waterbird species in the Intermountain West

The region's dispersed lakes, marshes, and riparian zones host 41 waterbird species (33 breeding species and eight additional migrants or vagrants). This group includes nine families of birds (Table 1). In this plan, species are listed in Sibley-Monroe order (Sibley and Monroe 1990), as this is standard for NAWCPs. The region supports approximately 500,000 breeding waterbirds and a few million migrants, including many or most of the world's California Gulls (Paul et al. 1990), Eared Grebes (Jehl 2001), White-faced Ibises (Ivey et al. *in prep* b), and American White Pelicans (D. Paul pers. comm.). Waterbird species using this region must be highly adaptable to constantly changing wetland conditions and depend on a landscape-scale association of wetlands. A list of waterbird species and their occurrence status for each BCR in the region is presented in Table 2. Scientific names of species mentioned in the plan are presented in Appendix B and acronyms defined in Appendix C.

Table 1. Bird families included in the Intermountain West Waterbird Conservation Plan

Family	Common name	Species/Subspecies
Gruidae	Cranes	2 subspecies
Rallidae	Rails	3 species
	Coots	1 species
	Moorhens	1 species
Laridae	Gulls	8 species
	Terns	4 species
Podicipedidae	Grebes	6 species
Phalacrocoracidae	Cormorants	2 species
Ardeidae	Egrets	3 species
	Herons	4 species
	Bitterns	2 species
Threskiornithidae	Ibises	1 species
Pelecanidae	Pelicans	1 species
Gaviidae	Loons	3 species

Table 2. Intermountain West waterbird species and their occurrence in Bird Conservation Regions (BCRs) 9, 10, 15, and 16 (b=breeding, m=migrant, and w=winter).

SPECIES	BCR 9	BCR 10	BCR 15	BCR 16
Greater Sandhill Crane	b, m	b, m	b, m	b, m, w
Lesser Sandhill Crane	m, w	m	m	m, w (rare)
Yellow Rail	b, w		b	
Virginia Rail	b, m, w	b, m, w (rare)	b, m, w	b, m, w
Sora	b, m, w	b, m, w (rare)	b, m, w	b, m, w
Common Moorhen	b, m, w (all rare)			b, m
American Coot	b, m, w	b, m, w	b, m, w	b, m, w
Mew Gull	m (rare)	m (rare), w (rare)		
Ring-billed Gull	b, m, w	b, m, w	b, m, w	m, w
California Gull	b, m, w	b, m, w	b, m, w	b, m, w
Glaucous-winged Gull	b, m (rare), w	w (rare)		
Thayer's Gull	m (rare), w (rare)	m, w (rare)	m, w (both rare)	
Herring Gull	m, w	m, w	m, w (both rare)	m, w (rare)
Bonaparte's Gull	m, w	m	m	m
Franklin's Gull	b, m	b, m		b, m
Caspian Tern	b, m	b, m	m	m (rare)
Common Tern	b (rare), m	b, m		m (rare)
Forster's Tern	b, m	b, m	b, m	b, m, w
Black Tern	b, m	b, m	b, m	b, m
Pied-billed Grebe	b, m, w	b, m, w	b, m, w	b, m, w
Red-necked Grebe	b, m (rare), w (rare)	b, m	-	m, w (both rare)
Horned Grebe	b, m, w (rare)	b, m, w	m, w	m, w
Eared Grebe	b, m, w	b, m	b, m	b, m, w
Western /Clark's Grebe	b, m, w	b, m, w	b, m, w	b, m, w (rare)
Neotropic Cormorant	-	-	-	m (rare)
Double-crested Cormorant	b, m, w	b, m	b, m, w (rare)	b, m, w
Little Blue Heron	-	-	-	m (rare)
Snowy Egret	b, m, w (rare)	b, m	b, m, w	b, m
Great Blue Heron	b, m, w	b, m, w	b, m, w	b, m, w
Great Egret	b, m, w	-	b, m	m
Cattle Egret	b, m, w (rare)	b (rare), m	b, m	b (rare), m
Green Heron	b, m, w (rare)	-	b, m	b, m
Black-crowned Night-Heron	b, m, w (rare)	b, m	b, m, w	b, m, w
Least Bittern	b, m (rare)	-	b, m	b (rare), m
American Bittern	b, m, w	b, m	b, m, w	b, m, w
White-faced Ibis	b, m, w (rare)	b, m	b, m	b, m
American White Pelican	b, m, w (rare)	b, m	m, w	b, m
Red-throated Loon	m (rare)	m (rare)	-	m (rare), w (rare)
Pacific Loon	m (rare)	m (rare)	-	m (rare), w (rare)
Common Loon	b, m, w	b, m, w (rare)	m, w (b: extirpated)	m, w (rare)

WATERBIRD CONSERVATION ISSUES AND THREATS

In this section, habitat alterations, mortality factors, conflicts between humans and waterbirds, and other issues pertaining to waterbird conservation are discussed. Though impacts to populations associated with each issue cannot be precisely quantified, these issues are generally ordered by degree of conservation concern.

Wetland Loss, Water Supplies, and Water Quality

Historically, reclamation projects drained wetlands and reduced options for breeding waterbirds. Ratti and Kadlec (1992) estimated that 57% of this region's historic wetlands have been lost. Loss of wetlands continues. Because of a 2000 Supreme Court decision, fill of many isolated wetlands is no longer regulated by the U.S. Army Corps of Engineers (U.S. Supreme Court 2000). Such areas include playas, wet meadows, and marshes that are not navigable and do not have an interstate commerce connection. Therefore, these areas are more vulnerable to development and loss.

Human demand for both agricultural and municipal water continue to threaten wetland habitats. For example, Lower Klamath NWR, the most significant waterbird nesting site in California, is threatened with loss of water as water rights are adjudicated in the Klamath Basin. Additionally, until the adjudication occurs, water for Lower Klamath is being directed to higher priority users within the Bureau of Reclamation's (BOR) Klamath Irrigation Project (i.e., endangered species needs [salmon and suckers], tribal subsistence [lake levels and river flows], and agricultural irrigation). Within the Federal list of responsibilities for the Klamath Irrigation Project, refuge water is fourth (Mauser 2001). In Idaho, Camas NWR is spending a great deal of money to pump water since ground water levels are dropping due to increased irrigation from wells and in-steam flows in Camas Creek are no longer sufficient to fill refuge wetlands. At Grays Lake, long-standing water rights and withdrawals result in very low water conditions in most summers and, in turn, insufficient habitat for brood-rearing or molting birds. In Utah, urbanization is altering hydrology of Great Salt Lake wetlands, causing changes in volume, timing, and location of discharge. At Stillwater NWR in Nevada, public support rallied to begin purchasing water rights, primarily because of concerns about concentrations of contaminants (USFWS 1996, Neel and Henry 1997).

Existing wetlands are also impacted by a variety of human-caused perturbations. Upslope development for housing and industrial use can alter water supplies and hydrology. Sedimentation from croplands can degrade existing wetlands.

Adequate water supplies need to be secured for important wetland areas. Because of the erratic water regime in the arid Intermountain West, wetland habitats are often insufficient to support waterbirds during drought periods. Water of high quality, which can be moved by gravity, will provide habitat for waterbirds wherever it is placed. Meeting the water needs for waterbirds will require planning on a large scale. Water rights purchases are underway at Stillwater NWR to ensure a more secure water supply for this refuge, resulting in increased wetland areas and improved habitat for waterbird feeding and nesting. Waterbirds at many other wetlands in the region would also benefit from water rights acquisition. The 2002 Farm Bill included provisions for improving water supplies for terminal lakes (At-Risk Desert Terminal Lakes Program), although these funds are targeted to be used to improve water conditions at Walker and Pyramid lakes in Nevada. Even though the Farm Bill appropriated an impressive sum of money to help conserve terminal lakes, the bill prohibits the use of this money for water acquisition. The BOR is attempting to determine how they can spend the money to benefit the lake and yet comply with this limitation.

Water supply has been an important concern at Mono Lake in California. Starting in 1941, water diversion to Los Angeles diminished Mono Lake's tributary streams, and eventually threatened the lake's value for countless birds. Birds became a rallying point for the lake's protection and a legal case that resulted in a mandate to manage the lake's water level between its pre-diversion

level of 1941 and its historic low in 1982 (State of California Water Resources Control Board 1994). This decision will help maintain the health of the lake's ecosystem, maintain minimum stream flows, and allow for continued managed diversions to Los Angeles. Implementation of the decision and the Water Board's 1998 restoration order will help restore lake levels and Mono Lake's damaged tributary streams. However, as the lake's water level rises, the decreased salinity may impact the lake's brine flies and brine shrimp populations, and the Eared Grebes, gulls, and other species that depend on them.

Competing demands for water supplies affect water quality. Reduced flows can exacerbate contaminant problems (e.g., mercury concentration in Lahontan Valley wetlands) and threaten wildlife values of important areas. Salinity level in large Great Basin hypersaline lakes is also a major issue. The natural hydrology of these lakes supports large populations of brine shrimp and brine flies, an important food source for staging and breeding waterbirds. Great Salt Lake, Lake Abert, and Mono Lake are crucial to Eared Grebes and California and Ring-billed gulls. Each of these large hypersaline lakes are subject to water level manipulations that can result in reduced or increased salinity, beyond the tolerance of brine flies and brine shrimp.

Conversions in agricultural irrigation practices from flood irrigation to mechanized pivot irrigation systems conserve water, but reduce breeding habitat and limit feeding options for many waterbird species. Private flood-irrigated meadows and hayfields provide breeding and foraging habitat for several waterbird species (e.g., rails, cranes, Black Terns, ibises). Flood-irrigated croplands are also important foraging areas for some species (particularly ibises). Loss of these habitats due to water conservation measures is a significant threat to associated waterbird species and should be mitigated by providing additional seasonal wetland habitats.

Wetland Habitat Management

The dynamic wetland conditions of this region dictate holistic, integrated wetland management approaches. Enhancing habitat diversity should be a component of on-the-ground wetland projects, providing variable water depths in wetlands with waterbird nesting, roosting, and foraging needs in mind. Project planners should consider wetlands at a landscape level to determine the most critical waterbird requisites at a particular location. Many waterbird needs overlap with those of waterfowl and shorebirds. Therefore, wetland management for these species lends itself to a guild approach. Both spatial and temporal diversity is important, and wetland managers need to understand waterbird needs as well as natural hydrologic cycles. For example, managers could maintain stable water levels within wetlands during the nesting period and provide lower water depths in late summer that provide enhanced foraging conditions for waterbirds. Another consideration is maintenance of ideal habitat conditions at select key sites to provide alternatives for waterbirds during extreme drought and flood years.

The challenge to effective comprehensive wetland management for all birds is to think in terms of landscape-level habitat conditions and focus on maintaining productive wetlands through time. Most waterbird species are relatively long-lived and can maintain their populations through a few bad years. For example, some species (e.g., cranes) thrive reproductively during years when conditions are very good, and can maintain their populations despite several years of very low recruitment. Droughts and floods are very important ecological processes that enhance wetland productivity and habitat value to birds. Fish populations may crash during droughts, yet they rapidly recover when water conditions improve, and for a few years after a drought size-classes of fishes are ideal for various fish-eating birds. Grebe numbers generally increase when fish are very small, but decline as their prey becomes larger, benefiting increasing numbers of cormorants and pelicans. Eventually some species of fish become so large that even pelican and cormorant use decreases (Ivey et al. *in prep* a). Aquatic invertebrates and aquatic plants also go through cycles as wetlands change and various waterbird populations respond positively to them when foraging conditions are optimal.

An issue at several reservoir sites in the region is the problem of water-level manipulations during the nesting period for irrigation or power needs. This management practice can cause productivity problems for waterbirds as a result of the loss or abandonment of eggs or young due to flooding or stranding. Where water level manipulations negatively impact waterbirds, measures to minimize impacts should be developed on a site-by-site basis. Likewise, on both public and private managed

wetlands, objectives that favor the aggregation of waterfowl during the fall hunting season may divert or delay the delivery of water which might otherwise have been available for waterbirds, waterfowl, and shorebirds during the nesting season (Neel 1994).

Exotic Species

Invasive exotic plants pose a threat to many waterbird habitats in the region. Some of the most significant problem species include salt cedar, Russian olive, and purple loosestrife, each of which is capable of replacing native vegetation and reducing wetland habitat quality for waterbirds. Although salt cedar and Russian olive provide some benefit to birds, both species compete with native riparian vegetation that better serves native avifauna. In some cases, although salt cedar and Russian olive have replaced important riparian gallery forests, both still provide habitat for some species. Alternative habitat restoration using native trees should be a component of a pest management program for these two exotic plant species. Purple loosestrife is a major problem in the Snake and Columbia River basins. Eurasian water milfoil, a submersed aquatic plant, is a problem in some wetlands and lakes (e.g., Lake Tahoe). Common reed is primarily a local problem in some wetlands (e.g., Great Salt Lake) as it replaces more suitable emergent plant species. Perennial pepperweed (tall whitetop) has invaded grasslands, riparian areas, and shallow wetland habitats at many sites, displacing native vegetation and limiting foraging habitats. Giant river cane is a problem in California and may eventually spread to Nevada via the Truckee River. Biological controls for some exotic species are available. Even more extensive habitat conversions are on the horizon unless all forces are brought to bear on exotic vegetation and there are some significant breakthroughs in control.

Exotic fishes have been introduced in many of the region's aquatic systems and, in many cases, these exotics have significantly compromised the natural values of these systems. The carp has severe impacts on North American aquatic systems, disrupting food chains, causing turbidity, eliminating beneficial aquatic plants, and out-competing native fish and wildlife (Ivey et al. 1998). While carp are a major food source for pelicans, they can get too large for pelicans to consume and can out-compete native fishes (Ivey et al. *in prep* a). Fisheries management should be geared towards eliminating carp where possible, otherwise populations should be managed to maintain younger age classes. This is a difficult issue, but an important one, particularly at Malheur-Harney Lakes Basin, Great Salt Lake, Bear Lake, and Lahontan Valley wetlands. Additionally, many species of exotic game fish (e.g., catfish, bass, sunfish, and trout) have been introduced and, in many instances, may directly compete with waterbirds for available wetland foods. Direct competition for forage occurs when larger sport fish like introduced trout eat smaller forage fish that piscivorous waterbirds depend on. Coordination between waterbird and fisheries managers is essential in order to eliminate or minimize these conflicts.

Water Quality and Contaminants

Contaminants have been identified as a problem to waterbirds at several sites in the region. The Carson River below Dayton, Nevada, is mercury laden, and birds using the Lahontan Valley and Carson Lake are exposed locally and/or remotely to elevated levels of mercury, selenium, and DDT and its metabolites (DDE). Evidence of mercury-related toxicity was found to affect the immune (spleen, thymus, bursa), detoxicating (liver, kidneys), and nervous systems of young Black-crowned Night-Herons, Snowy Egrets, and/or Double-crested Cormorants nesting along the Carson River (Henny et al. 2002). A study is now underway to determine if post-fledging survival (via radio-telemetry) of young snowy egrets is reduced due to these contaminants. Migrant Common Loons staging at Walker Lake, Nevada have the highest blood mercury levels documented in the U.S. (M. Yates pers. comm.), and sources of contamination within the watershed have been identified (Seiler et al. 2004). DDE may have played a role in the historic decline of White-faced Ibises, as DDT-DDE contamination causes eggshell thinning and lowered hatching success (e.g., Henny and Herron 1989, Henny and Bennett 1990). DDE levels have remained high among ibises in Carson Lake in recent years (Henny 1997). PCP residues were found in Double-crested Cormorant eggs from American Falls Reservoir in Idaho (U. S. Geological Survey 1988-89).

The use of pesticides and herbicides for agriculture, mosquito control, and other purposes also poses a threat to waterbirds (Henny et al. 1985). These chemicals often enter wetlands via runoff from adjacent areas. Oil fields can also contribute contaminants to wetlands. There are direct and

indirect effects of the use of pesticides; overdoses of organochlorine chemicals (e.g., Malathion) can kill birds, and the loss of invertebrate foods from spraying can limit foraging opportunities. Spraying for mosquito control has increased in some areas because of the appearance of encephalitis and West Nile virus. The disturbance associated with spraying can also be a problem, especially around active nesting sites. Outreach is needed to better educate the public about environmentally sound options for mosquito problems. National concern for West Nile virus could trigger a massive effort toward mosquito control on wetlands in coming years. The problems with mosquito control could be far-reaching and impacts are little known, even for biological controls such as Bti (a bacterium used for mosquito control). Land managers and citizens need to integrate vector control with other wetland management objectives. Indiscriminate application of vector control without consideration of other wetland values could potentially have far-reaching negative effects on wildlife.

Waterbird Conflicts

There are several cases of waterbirds causing perceived damage to agricultural crops and fish stocks, and of colonies becoming established in urban areas and causing aesthetic problems. These are generally very local but important issues. Demands for control (i.e., bird removal or destruction) can be intense and the consequences of negative public perception far-reaching.

Crop Depredation. USDA Animal and Plant Health Inspection Service, Wildlife Services (WS) is the Federal agency mandated by Congress to manage programs to reduce human/wildlife conflicts. This includes the management of waterbirds to reduce agricultural crop damages, conflicts in urban areas, and management to reduce conflicts with threatened or endangered species. Under the authorities of the Migratory Bird Treaty Act, the USFWS can authorize lethal control of depredating migratory birds through permits on a case-by-case basis, by designating special hunting seasons in some cases, or permit lethal control through depredation orders that allow the take of specific species without individual permits to alleviate depredations. For example, staging Sandhill Cranes sometimes depredate grain crops, seed potatoes, and newly-planted alfalfa (Subcommittee on Rocky Mountain Population of Greater Sandhill Cranes 1997, Launhan and Gammonley 2002). These problems have been addressed through authorization of special hunting seasons in some areas (e.g., in southeast Idaho and northwest Utah). However, there is no evidence that hunting is reduces crane depredation. Rather, the hunting program encourages the perception that something is being done about a problem that is actually minor in scope (e.g., McIvor and Conover 1994a, 1994b). Feeding White-faced Ibises have also caused crop damage in alfalfa fields near Stillwater NWR.

Fishery predation and depredation. There are several examples of birds consuming fish that are perceived as impacting sensitive fish populations or desirable game species. These include cormorants and pelicans consuming cui-ui, a threatened species in Pyramid Lake, Nevada; pelicans consuming endangered Yellowstone cutthroat trout at Blackfoot Reservoir, Idaho; cormorants consuming rare endemic fish at White River Valley, south of Ely, Nevada; and pelicans eating game fish at Canyon Ferry Reservoir, Montana. In some areas of the United States Double-crested Cormorant populations have greatly increased, creating fishery conflicts with both commercial aquaculture and warmwater fish management. This issue is addressed in an environmental impact statement (USFWS and WS 2003).

In the Intermountain West, fishery conflicts with waterbirds are typically site-specific problems such as waterbirds consuming fish at privately owned aquaculture facilities. The USFWS has issued depredation permits to control losses of commercially raised fish at privately owned aquaculture facilities when non-lethal measures (e.g., hazing with cracker shells, netting, or wire grids over rearing ponds) have failed to alleviate depredation. Lethal control is not authorized at federally owned or operated hatcheries as these facilities serve to demonstrate the array and efficacy of non-lethal measures to control depredation.

Commercial harvest of brine shrimp. This activity is occurring at Great Salt Lake and Lake Abert; the concern is that over-harvest of brine shrimp could have negative impacts on birds that depend on them (especially Eared Grebes). This issue is currently being studied at Great Salt Lake where the Utah Division of Wildlife Resources has regulatory and stewardship responsibility for brine shrimp under the guidance of the Great Salt Lake Ecosystem Project assisted by an advisory team. The primary

goal is to sustain long-term populations of brine shrimp for their ecological values and commercial harvest. This is accomplished this through a model for brine shrimp sustainability that considers waterbird food needs as well as harvest interests. For example, the brine shrimp density requirements for staging Eared Grebes at the Great Salt Lake was recently investigated through a PhD program in association with Utah State University (Caudell 2001).

Urban colonies. In some areas, particularly BCR 16, urban waterbird colonies (usually Black-crowned Night-Herons) have created concerns about public health and sanitation as birds defecate on dwellings. A standard programmatic approach is needed to address this issue. These situations are typically addressed by WS in coordination with USFWS (when lethal control measures are necessary).

Golf courses. American Coots sometimes cause problems on golf courses by consuming grasses and defecating on the greens. This issue could be incorporated into the initiative for all-bird conservation on golf courses by developing recommendations that reduce coot use.

Use of artificial nesting sites. Waterbirds sometimes nest on artificial substrates, which can conflict with human activities. For example, a gull colony appeared on dikes at a sewage pond facility in Hines, Oregon, blocking a maintenance road. Gull colonies sometimes appear in landfills, interfering with refuse burial, and cormorants have nested on bridges and in shipyards interfering with operational and maintenance needs.

Aircraft strikes. Larger species, such as cranes and pelicans, can threaten human safety through aircraft strikes. Low-level military training routes pose the greatest aircraft strike risk. It is important to work with the military to integrate consideration for the timing of migration and movements of larger waterbird species into training activities to minimize risk of strikes.

Disturbance

Human intrusion into waterbird nest sites can cause abandonment, especially early in the breeding season during nest-site selection, nest building, and incubation (e.g., Ryder and Manry 1994). Disturbance keeps adults away from nests and can lead to hypothermia or hyperthermia of eggs and young, increased predation, and ultimately reduced production. Disturbance during the late portion of the nesting season is particularly harmful because late nesting birds will not have another chance to nest. The effects of recreation on wildlife have been reviewed (York 1994, DeLong 2002). Bunnel et al. (1981) describe the effects of disturbance on nesting pelicans.

Disturbance caused primarily by recreational boating on lakes is a problem for nesting Common Loons and grebes in particular because of the low profile of their floating nests. Boat wakes often wash eggs from nests, and excess disturbance reduces productivity, precludes loon nesting (Richardson et al. 2000), or causes abandonment of loon (Casey 2000) and Western and Clark's grebe nests (D. Anderson pers. comm., Ivey 2004). Boat recreation is increasing on many lakes as lakeside cottages expand, and some lakes are used for jet skiing and snowmobile surfing (driving snowmobiles across water). Public education is an important element in the protection of nesting security. For instance, in Montana 75 percent of loon nesting lakes are bordered by private land; it will take awareness by landowners to ensure continued nesting (Casey 2000). In addition to outreach and education (in some cases hiring Loon Rangers to educate the public at selected sites), managers in Montana and Wyoming are signing territories and establishing wake zones for boating (wakeless designation areas with 200 m wakeless buffers). Wildlife officials in British Columbia are not as concerned about loon disturbance issues as loons are more abundant there.

Recreational boating disturbance likely prevents colonial nesting waterbirds from using otherwise suitable islands and in some cases has caused abandonment of colonies. For example, 800 pelican nests were abandoned on an island in Malheur Lake when artifact hunters illegally visited the island in 1988 (Ivey et al. *in prep* a).

Surveys of nesting colonies can also cause problems if not thoughtfully conducted. For example, the pelican colony on an island at a National Wildlife Refuge re-established in the mid 1980s after survey methods were converted from an invasive off-shore boat survey to a non-invasive ground count from a nearby shore.

Biologists typically use airboats to survey marsh colonies. This method allows collection of data

on Global Position System coordinates, colony configuration, nest density, and nesting chronology, and may be most effective in remote sites as nests and/or attending adults are often visible. Airboats can be a useful and often necessary tool in the assessment of colonies, however, caution should be taken to reduce disturbance as much as possible. Occasional use near ibis colonies does not appear to adversely effect nesting success or nesting effort (G. Ivey and D. Paul pers. observ.). However, prolonged use in close proximity to nesting ibis colonies can result in nest abandonment (Kelchlin 2000), and short-term airboat use within colonies has resulted in destroyed nests and wakes that wash eggs from nests (G. Ivey pers. observ.). Some waterbirds construct nests of emergent vegetation that are often unattached to other vegetative structures and are low to the water (e.g., Eared and Western Grebes), thus, are highly susceptible to boat wash. Pelicans seem particularly sensitive to airboat surveys which have caused nest abandonment in some cases.

Agricultural Activities

In some areas, flood-irrigated private lands (especially hay meadows and pastures) provide very important habitats to nesting and foraging waterbirds. These habitats are being lost in some cases to development (e.g., Great Salt Lake, Utah, and Carson Sink, Nevada). In some areas there is a movement to conserve water by replacing the wildlife-beneficial practice of flood-irrigation with sprinkler or drip irrigation. If this conversion continues on a large scale, significant wetland area will be lost.

Timing of irrigation, farming, and ranching activities can affect the success of nesting waterbirds. In Oregon, wetlands in private ownership which support nesting waterbirds have been dewatered to facilitate haying and livestock grazing, resulting in nest abandonment and production failures (G. Ivey and M. St. Louis pers. comm.). Water is drained from hayfields about three weeks before mowing commences. This reduces food supplies and tends to concentrate young birds near remaining water, increasing their vulnerability to predators (G. Ivey pers. observ.). Early cutting of hay, as early as mid-June on some native hay meadows in the region, results in mortality of unfledged waterbirds. Young rails and cranes are particularly vulnerable to haying mortality. Overgrazing by livestock and inappropriate or unmanaged livestock grazing systems can degrade wetland habitats, making them less suitable for waterbirds. For example, nests are sometimes trampled by cattle on private lands grazed during the nesting season (Capen 1977, Herron and Lucas 1978). Nesting trees of Great Blue Herons have been bulldozed on private land in southern Idaho (Trost and Gerstell 1994).

Riparian Forests and Associated Habitats

Riparian gallery forests and associated wetlands or wet meadows provide nesting sites for some species (e.g., Great Blue Heron, Green Heron). Species such as Virginia Rail, Sora, American Bittern, American Coot, and Black-crowned Night-Heron will use the cottonwood-willow association. Cottonwoods and willows are sometimes damaged by colonial nesting birds as they become over-fertilized by the urea excreted by the birds. Riparian wetlands and meadows have, in many cases, been degraded by improper livestock use. The need to restore and maintain these habitats overlaps with needs of certain landbird species.

Mortality Factors

Because waterbird species are generally long-lived, adult mortality is a key determinant in population trends. Thus, threat management aimed at reducing adult mortality can help maintain regional populations.

Disease. In some areas of this region, chronic outbreaks of avian botulism and avian cholera occur almost annually. Erysipelas, a bacterial disease, killed several thousand Eared Grebes at Great Salt Lake in 2001, and avian cholera killed about 30,000 Eared Grebes in 2004 (F. Howe pers. comm.). Salmonellosis was a cause of severe gull mortality in Idaho (Winkler 1996). Newcastle disease, encephalitis, and West Nile virus are potential future threats. Further research is needed to identify causes and remedies (e.g., are contaminants exacerbating disease outbreaks). One consideration is the ability to control water to rapidly drain or deep flood managed wetlands where disease outbreaks occur, especially for avian botulism.

Lead poisoning. Hunting shot and fishing weights containing lead cause mortality in some waterbirds when ingested for grit or incidentally while feeding. Common Loons are particularly

susceptible to consuming fishing weights. Sandhill Cranes occasionally succumb to lead poisoning from consumption of lead shot. While lead shot is now illegal for hunting waterfowl, some areas still allow its use for upland species which are hunted near wetlands (e.g., pheasants), prolonging the problem of lead poisoning in wetland birds. Changes in policies should be considered regarding where lead shot can be used. The use of lead weights should be prohibited on lakes used by loons.

Powerlines and fences. Powerline strikes are among the major mortality factors for adult cranes and pelicans, as well as some other waterbirds. Options for reducing powerline strikes include removing unnecessary lines, burying lines (though this is very expensive), or installing line markers to increase their visibility to birds (Brown and Drewien 1995, Morkill and Anderson 1991). Barbed-wire fences have killed cranes and other waterbirds, and are particularly problematic where they cross streams and wetlands. Fences should be removed where possible or marked to increase visibility near wetlands. These are very local issues; sites with a history of mortalities should be addressed on a case-by-case basis.

Predators. For some species, predators have had significant impacts on populations, primarily through depredation of eggs and young. Sandhill Cranes and other solitary-nesting species are particularly vulnerable to predators. Human-induced changes have led to increases in predation in some areas. For example, the Common Raven, an aggressive egg predator, has generally increased in the region, likely because of increases in available forage from agriculture, highway systems (providing roadkills), and garbage dumps. Powerlines and other human structures have increased options for raven nest sites. Elimination of wolves from the landscape has allowed coyote populations to increase, and introduced red foxes have become problem predators in some areas. Red foxes are particularly adept at hunting ground-nesting birds. Mink and raccoons are a significant problem at some sites since they are more aquatic and sometimes swim to colonies. Feral cats can also pose a problem for young waterbirds in some situations. Future research on this issue should focus on the primary predators and their interactions with breeding waterbirds. There are some means to protect nesting sites from predators, such as keeping water levels high so that nesting islands do not become peninsulas or installing electric fencing to protect peninsula-nesting waterbirds. However, in many cases, our understanding of the causes of predation and the means to ameliorate the problems (i.e., management to reduce predation) is poor. Changing predator communities have resulted in both favorable and unfavorable situations for waterbirds, depending on local conditions. Interactions between predators and prey are complex and dynamic.

Interspecific Conflicts

Conflicts sometimes arise between waterbirds and other wildlife species. An example includes a common waterbird species out-competing a rare or sensitive species. These should be taken into account when planning for waterbird conservation. To help resolve conflicts, there is a need to prioritize management objectives and understand species behavior, biology, and ecology.

Nest site competition. There are local incidents of competition for nest sites. For example, Canada Geese sometimes compete with Double-crested Cormorants and Great Blue Herons for nest sites and also sometimes take over loon nests in Canada. The increasing population of cormorants may impact nest site availability to other waterbird species. In Utah, artificial islands constructed for waterfowl and shorebird nesting have been colonized by California Gulls to the exclusion of other species.

Waterbirds as predators on other birds. Some species of waterbirds prey on other wetland birds. California Gulls and Black-crowned Night-Herons are particularly adept at eating ducklings and young shorebirds. To minimize conflicts, guidelines for establishing artificial colony sites should be developed (e.g., it would be unwise to build a bare nesting island in a marsh that is important for duck broods or an important shorebird breeding site). However, duck nesting near gull colonies can be highly successful, and if good brood cover is nearby, the broods may have good survival after hatching as well. Careful planning and an understanding of ecological relationships are needed to effectively manage or avoid conflicts arising from waterbird predation on other birds.

Beavers

Beavers often provide habitat for a variety of waterbirds, such as cranes, bitterns, and rails, through their dam-building activities. Their distribution and abundance is critical as they generally benefit smaller wetlands in forest environments. Beavers can cause water control problems on managed wetlands. There are nonlethal ways to minimize beaver conflicts, such as modifying water control structures and by using electric fences. Wetland managers should be informed about these beaver-friendly methods of solving water control problems.

Threats Outside the Region

Waterbirds using the Intermountain West also face threats outside the region, often at wintering or staging sites. Large numbers of waterbirds are occasionally killed by oil spills on the Pacific Coast (especially loons, grebes, gulls, and terns), and by disease outbreaks at wintering areas such as the Salton Sea (grebes, pelicans). Some waterbirds are exposed to pesticides in the Imperial Valley, California, and in Mexico and Central America. Also, some birds staging in the region primarily breed in BCRs outside of the region (e.g., Eared Grebes, Common Loons); degrading habitat conditions in those regions may reduce the numbers using the Intermountain West. These external threats may affect the status of waterbird populations and should be addressed by establishing a network for coordination between BCRs using an international/flyway approach.

CONSERVATION STATUS ASSESSMENT

Species Rankings

In order to determine which waterbird species should receive greater conservation efforts and population objectives, we assessed their status in each of the four BCRs in the Intermountain West. This involved several steps:

1. Estimating BCR waterbird populations and assessing data quality.
2. Determining Area Importance (AI) scores.
3. Reviewing species' status on Federal, state, and PIF plan lists.
4. Reviewing the NAWCP rankings for colonial waterbird species.
5. Developing criteria for colonial and marshbird species' regional rankings.
6. Developing a concern matrix for each BCR to identify priority waterbird species.
7. Developing a waterbird species priority list for the Intermountain West.

Details of this species ranking process are described in Appendix D. Final priority rankings for species are detailed in Table 3. Species accounts for these priority waterbirds appear in Appendix E. Waterbirds ranked as High or Moderate concern are considered Priority species, and will serve as the focus for implementing the conservation measures identified in this plan.

Table 3. Concern matrix for priority waterbird species in each Bir d Conservation Region (BCR) in the Intermountain West Waterbird Conservation Plan (breeding species are reported here unless noted as migrant; b = breeding, m = migrant).

Concern Category	BCR 9	BCR 10	BCR 15	BCR 16
High Concern	Greater Sandhill Crane (CVP) (b, m) Greater Sandhill Crane (LCRVP) (m) Lesser Sandhill Crane (PFP) (m) Yellow Rail Franklin's Gull (b) Black Tern Eared Grebe (m) Western Grebe Clark's Grebe Snowy Egret American White Pelican (b, m) Common Loon (b)	Franklin's Gull American White Pelican Common Loon	Greater Sandhill Crane (CVP) Western Grebe Clark's Grebe Common Loon	Greater Sandhill Crane (RMP) (m) American Bittern
Moderate Concern	Greater Sandhill Crane (LCRVP) (b) Virginia Rail Sora California Gull Franklin's Gull (m) Forster's Tern Pied-billed Grebe Great Blue Heron Black-crowned Night-Heron Least Bittern American Bittern White-faced Ibis Common Loon (m)	Greater Sandhill Crane (RMP) Virginia Rail Sora California Gull Forster's Tern Black Tern Pied-billed Grebe Western Grebe Clark's Grebe Snowy Egret Great Blue Heron Black-crowned Night-Heron American Bittern White-faced Ibis	Virginia Rail Sora Black Tern Pied-billed Grebe American Bittern	Greater Sandhill Crane (RMP) (b) Virginia Rail Sora Black Tern Pied-billed Grebe Western Grebe Clark's Grebe Snowy Egret Green Heron Black-crowned Night-Heron Least Bittern
Low Concern	Greater Sandhill Crane (RMP) Caspian Tern Red-necked Grebe Horned Grebe Eared Grebe (b)	Greater Sandhill Crane (CVP) Greater Sandhill Crane (LCRVP) Caspian Tern Red-necked Grebe Horned Grebe Eared Grebe	Forster's Tern Eared Grebe Black-crowned Night-Heron White-faced Ibis	California Gull Franklin's Gull Forster's Tern Eared Grebe White-faced Ibis American White Pelican

POPULATION AND HABITAT OBJECTIVES

Comprehensive wetland bird management requires conscious balancing of objectives. Waterbird objectives must be integrated into wetland management strategies that consider annual needs in a context of long-term population maintenance. An understanding of the ecology and biology of the various species being managed is necessary to set appropriate habitat management objectives. Establishing explicit management objectives from a sound biological basis will best serve waterbird conservation. Appendix E reviews basic ecology of priority species and Appendices G and H review habitat objectives and conservation strategies that can be used to form management objectives for waterbirds.

Population Objectives

Population objectives are scientifically-based targets that will function as a basis for setting habitat objectives and as performance indicators. We derived numerical population objectives for priority (High or Moderate Concern) waterbird species by each state and BCR (Appendix F). Habitat objectives are detailed in Appendix G. For priority migrant species, population objectives are set for individual sites that support high numbers and were derived from estimates of peak numbers of staging birds using those sites. The focus for species in this category will be based on maintenance of habitat at those key staging sites (see Appendix H, Conservation Strategies). For breeding waterbirds, population objectives were derived using the methodology described below. These numbers are, as possible, consistent with other plans (e.g., recovery plan goals for endangered species, Flyway plans). Two steps were involved in this process:

1. Determine population trend (PT) index. A consensus was reached by the planning team to use the PIF approach as a foundation for determining Population Trend (PT), with some necessary modifications. In PIF documents, PT scores were based on the degree of population change or trend, indicated by Breeding Bird Survey (BBS) data since 1966, with objectives defined for different PT levels. The overall objective for PIF is to return populations toward historic levels in the early BBS years (1966-68). Because BBS data often does not well represent waterbird trends, our approach relies less on BBS and uses other sources of trend information (sometimes anecdotal). Table 4 summarizes the criteria used here to establish objectives.

2. Derive State and BCR numerical population objectives. Using criteria from Table 4 and species population estimates on a state-by-state-by-BCR level (Tables D-2 to D-5 in Appendix D), we derived population objectives. Table 5 summarizes objectives for each BCR, while Table 6 summarizes objectives for each state. Appendix F details the objectives derivation process and the distribution of objectives among states and BCRs.

Habitat Objectives

Establishing habitat objectives is a difficult task at this time, as existing information is not adequate to translate population objectives into habitat objectives. Defining relationships of population numbers to habitat is an important research need. An inventory of existing wetland habitats is also needed to further this task. National Wetland Inventory coverage is incomplete in this region and we should advocate for completion of this survey for future habitat assessments.

While more detailed habitat objectives should be identified in the future, we decided to use objectives developed by the 11 western states in their Coordinated Bird Conservation Implementation Plans (Arizona Steering Committee 2005, California Steering Committee 2005, Colorado Steering Committee 2005, Idaho Steering Committee 2005, Montana Steering Committee 2005, Nevada Steering Committee 2005, New Mexico Steering Committee 2005, Eastern Oregon Working Group 2005, Utah Steering Committee 2005, Washington Steering Committee 2005, Wyoming Steering Committee 2005). These plans identify priority habitat types for all birds (including waterbirds), Bird Habitat Conservation Areas (BHCAs), and habitat goals and objectives. These BHCAs are designated geographic areas that were selected by state committees at focus meetings that choose sites

from regions of each state. The selection criteria were relatively similar within each state and were driven by these criteria:

- Areas rich in priority birds and habitats
- Opportunities for conservation and partnerships
- Threats to priority species and habitats
- Areas large enough in scale to achieve meaningful conservation and small enough to capture local working groups

The Intermountain West Joint Venture (IWJV) is encouraging Coordinated Bird Conservation Implementation Plan Committees to stay organized and use the BHCAs as work areas within their shared bird habitat conservation efforts. Each State Committee has or is encouraged to have individuals interested and involved with the IWWCP as committee members. This will provide some potential brokering for waterbird habitat conservation within the BHCAs. The IWJV is focusing cost-share funding opportunities within these BHCAs to assist in waterbird and other bird habitat conservation. The IWJV Technical Committee also has a waterbird biologist as a committee member. Digital maps of BHCAs were produced to calculate acreages of all habitats which include the priority habitat targets of the BHCA by state. These priority acreage numbers are the measurable habitat objectives in the BHCA that will be targeted for specific conservation work. Partners will use these acreage targets as focal points to develop specific conservation actions (e.g., improve colonial nesting habitat for x number of pairs of White-faced Ibis and other species in the marsh nesting guild—see Conservation Strategies below). The mapping will also identify land ownership to assist in partnership development and on-the-ground planning. Habitat objectives that relate to waterbirds are listed in Table 7. Additional details on these objectives and habitat type definitions can be found in each state's Coordinated Bird Conservation Implementation Plans.

Table 4. Definitions of Population Trend (PT) indices for priority waterbird species and population objective goal for the Intermountain West Waterbird Conservation Plan.

PT Index	PT Definition	Population Objective Goal
PT = 5	Species with a biologically significant (estimated 50%) historic population decline or range contraction. This includes species that were severely impacted by market hunting, habitat loss, and contaminants (primarily DDT-DDE). Also species with evidence of recent major declines and those that have been extirpated or nearly extirpated in a state.	Double the current population over the next 50 years or restore breeding populations of extirpated species.
PT = 4	Species that experienced significant historic declines and have shown an increasing trend, but have not recovered to their potential. Also species with recent moderate population decline.	Increase the current population by 50% over the next 50 years.
PT = 3	Species that historically declined and have apparently recovered. Also species with recent unknown trends. Priority migrant species are also included, but did not receive numerical objectives (only habitat objectives).	Maintain or increase the current population over the next 50 years.
PT = 2	Species with recent suspected or moderate increase.	Maintain the current population over the next 50 years.
PT = 1	Species with recent large population increase.	Maintain the current population over the next 50 years.

Table 5. Population objectives for priority waterbird species by Bird Conservation Regions (BCRs) in the Intermountain West Waterbird Conservation Plan region (b = breeding, m = migrant, TBD = To Be Determined after data become available or species resumes nesting).

Species	BCR 9 objective #	BCR 10 objective #	BCR 15 objective #	BCR 16 objective #
Greater Sandhill Crane (CVP) (b)	3,630		190	
Greater Sandhill Crane (CVP) (m)	>8,000			
Greater Sandhill Crane (LCRVP) (b)	TBD			
Greater Sandhill Crane (LCRVP) (m)	>2,000			
Greater Sandhill Crane (RMP) (b)		TBD		450
Greater Sandhill Crane (RMP) (m)				>18,000
Lesser Sandhill Crane (PFP) (m)	>2,000			
Yellow Rail (b)	1,220			
Virginia Rail (b)	TBD	TBD	TBD	TBD
Sora (b)	TBD	TBD	TBD	TBD
California Gull (b)	314,400	9,470		
Franklin's Gull (b)	42,580	21,100		
Franklin's Gull (m)	>85,000			
Forster's Tern (b)	7,340	230		
Black Tern (b)	9,780	>670	270	40
Pied-billed Grebe (b)	TBD	TBD	TBD	TBD
Eared Grebe (m)	>3 million			
Western Grebe (b)	17,280	>5,030	1,930	380
Clark's Grebe (b)	5,130	>110	20	210
Snowy Egret (b)	3,400	50		940
Green Heron				220
Great Blue Heron (b)	4,560	>1,800		
Black-crowned Night-Heron (b)	5,590	>320		660
Least Bittern (b)	TBD			TBD
American Bittern (b)	TBD	TBD	TBD	TBD
White-faced Ibis (b)	57,980	1,710		
American White Pelican (b)	34,110	10,500		
American White Pelican (m)	>55,000			
Common Loon (b)	>10	270	TBD	
Common Loon (m)	>1,000			

Table 6. Population objectives for priority waterbird species by state in the Intermountain West Waterbird Conservation Plan region (b = breeding, m = migrant, TBD = To Be Determined after data become available or species resumes nesting).

Species	AZ	CA	CO	ID	MT	NV	NM	OR	UT	WA	WY
Greater Sandhill Crane (CVP) (b)		1,390				30		2,140		260	
Greater Sandhill Crane (CVP) (m)		>8,000						>6,000		>2,000	
Greater Sandhill Crane (LCRVP) (b)				TBD		TBD			TBD		
Greater Sandhill Crane (LCRVP) (m)						>2,000					
Greater Sandhill Crane (RMP) (b)			450	TBD	TBD						TBD
Greater Sandhill Crane (RMP) (m)			>18,000								
Lesser Sandhill Crane (PFP) (m)		>20,000		>1,000				>20,000		>20,000	
Yellow Rail (b)		20						1,200			
Virginia Rail (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Sora (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
California Gull (b)		62,470		72,640	920	4,200		11,330	150,000	14,000	8,310
Franklin's Gull (b)		150		23,500	6,000	10		3,270	30,650		100
Franklin's Gull (m)									>85,000		
Forster's Tern (b)		3,510		40	130	190		1,610	1,590	400	100
Black Tern (b)		5,820	30	200	200	550		>3,180	130	300	100
Pied-billed Grebe (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Eared Grebe (m)		>2 million						>20,000	>1.6 million		
Western Grebe (b)	200	7,390	150	6,140	250	80		>5,800	730	1,000	430
Clark's Grebe (b)	50	1,030	150	>710	30	450	10	2,560	300	100	80
Snowy Egret (b)			400	650		600	500	250	1,980		10
Green Heron			20				200				
Great Blue Heron (b)		110		1,970	900	660		>320	470	1,530	400
Black-crowned Night-Heron (b)		310	600	1,610	50	910	40	>1,380	470	1,000	200
Least Bittern (b)	TBD	TBD	TBD	TBD		TBD	TBD	TBD	TBD		
American Bittern (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
White-faced Ibis (b)		2,310		6,760	20	12,230		18,100	20,000		270
American White Pelican (b)		5,880		2,770	8,000	12,620		2,360	10,120	360	2,500
American White Pelican (m)									>55,000		
Common Loon (b)		TBD		>10	200			TBD		20	50
Common Loon (m)						>1,000					

Table 7. Waterbird habitat objectives (in acres) for the Intermountain West Waterbird Conservation Plan, by state.

State:	Playa/ vernal pool	Agriculture	Alkaline wetlands	Open Water Lacustrine	Emergent Marsh Palustrine	Wet Meadow	Grassland	Riparian Woodland	Riparian Shrub	Aspen
Arizona		28,000		maintain existing	19,000		513,000	17,200 (690 miles)		10,000
California				36,733	25,871	12,069	30,521	6,397		1,404
Colorado		880,000		30,000	100,000		400,000	(6,500 km)		
Idaho		1,780,000			270,5371		1,300,000	289,705		432,161
Montana		972,773			292,6581		3,400,000	199,547	175,442	252,237
Nevada		13,000			25,0001			(450 miles)		40,000
New Mexico				no net loss	no net loss	protect		no net loss	no net loss	
Oregon	55,500	215,000	95,000	176,100	175,000	185,000	365,000	7,000	40,000	25,000
Utah	126,200				440,4501	36,000		55,808		
Washington	15,000	200,000			80,000		2,000,000	45,000		3,500
Wyoming		430,000			27,000	270,000	282,000	317,000		176,000

Conservation Strategies

A variety of conservation strategies will be used to implement the IWWCP and achieve population and habitat objectives (Appendices F and G). Because wetlands are generally isolated oases in the Intermountain West landscape, most waterbird habitat conservation will be focused on important wetland sites in the region, within BHCAs and IBAs. Descriptions of IBAs provide an additional source of conservation strategies which should be consulted when developing conservation plans (Audubon Society 2004). Additionally, waterbird-focused habitat management practices need to be implemented at a broad scale in wetlands around the region. A regional assessment of waterbird habitat enhancement opportunities, restoration projects, and local management issues should be conducted. Site-specific habitat conservation should be addressed using the strategies in Appendix H and IBA descriptions as guidelines. Appendix I summarizes some potential sources of funds for conservation projects.

Critical Conservation Needs and Recommendations at Major Waterbird Sites

Several important waterbird sites need support and attention to resolve outstanding issues that are limiting waterbird values, including:

Mono Lake protection. Issues that need to be resolved at Mono Lake include monitoring of the effects of meromixis (a condition in which lighter, less saline water overlies heavier, more saline water) on staging grebes and breeding gulls, and controlling human disturbance. State Water Board-mandated water levels may affect brine shrimp and brine fly abundance, and unregulated recreational boating disturbance could impact grebe use and gull nesting colonies (J. Jehl pers. comm.). We recommend inclusion of Mono Lake in the USFWS National Wildlife Refuge System or as a State Wildlife Area to help ensure protection of its high wildlife values.

Lower Klamath NWR water supplies. This most significant waterbird nesting site in California is currently at risk of insufficient water supplies to maintain refuge wetlands. Due to a multitude of competing demands (endangered fish, tribal treaty rights, agriculture, and power generation), water supplies for wetland management are extremely limited in the Klamath River Basin (Basin). Lower Klamath NWR lies within the Klamath Reclamation Project (Project), which has no legislated fish or wildlife purpose. As a result, refuge wetlands are the lowest priority for water delivery in the Project. Ultimately, some of the water priority issue will be resolved by the ongoing State of Oregon Klamath River Adjudication. In filing for both irrigation and Federal reserved water rights in the Adjudication, the USFWS may achieve some certainty for refuge wetlands. However, a long-term solution in the Basin will require that individuals, agencies, nongovernmental organizations (NGOs), and others interested in waterbird conservation and other natural and social resource issues become involved in negotiations and discussions to achieve a balanced solution to the Basin's water issues.

Grays Lake NWR water levels. Grays Lake has chronic water problems, as water levels typically decline during the spring and summer due to water withdrawals by the Bureau of Indian Affairs (BIA) for the Fort Hall Irrigation District. This has resulted in regular failures of nesting colonies of waterbirds using the marsh (S. Bouffard pers. comm.). Annual drawdown results in declining water levels during the nesting season, which may limit nest success for some species, and low water levels each summer seriously limit the availability and quality of habitat for brood-rearing and molting. Also, the artificially-managed hydroperiod, which remains static across most wet and dry years, provides no opportunity for high water—a necessary component of natural flood-drought variations for healthy wetland ecosystems. Water levels cannot be manipulated because of long-standing agreements with local landowners and the Fort Hall Irrigation District. The Shoshone-Bannock Tribe owns the water rights. A modification of the water management agreement between the USFWS, BIA, and private landowners is needed to allow higher water levels during most summer and fall seasons, and to allow greater natural annual variability in water levels. These changes are needed to provide enhanced conditions for nesting birds, enhanced habitat for brood-rearing and molting, and allow the Grays Lake NWR to fulfill its mission.

Lake Abert conservation. Lake Abert, Oregon, is currently designated as a Bureau of Land Management (BLM) Area of Critical Environmental

Concern. However, this designation does not necessarily offer long-term protection of the site, which has been threatened in the past by water development proposals. Commercial harvest of brine shrimp is another concern. We recommend inclusion of Abert Lake in the NWR System to ensure protection of its high wildlife values.

Lahontan Valley Wetlands water supplies. Stillwater NWR and Management Area and the Lahontan Valley Wetlands represent the most vital wetland ecosystem in Nevada. It is important that support continue for efforts currently underway to increase the quantity and quality of water entering the Lahontan Valley Wetlands by acquiring sufficient water and water rights to sustain, on a long-term average, approximately 25,000 acres of primary wetland habitat within Lahontan Valley. The three primary wetland areas have been identified as the Stillwater NWR and Management Area, Carson Lake and Pasture, and Fallon tribal land wetlands.

Great Salt Lake foraging habitat loss. Foraging habitat losses on flood-irrigated farm lands, particularly within the Great Salt Basin in Utah, are a threat to some species of waterbirds (e.g., ibises). At Great Salt Lake, ibis-colonized wetlands are closely associated with feeding sites dominated by flood-irrigated pastures. During the last 20 years, there has been a steady loss of these farmland habitats to urbanization, as well as the conversion of flood-irrigated agriculture to sprinkler irrigation. Flood irrigation has been converted to pressurized water-delivery systems as the landscape has changed from farms to houses. There are now 1.5 million people living between Great Salt Lake and the Wasatch Mountains, and the loss of quality foraging habitat has emerged as a limiting factor for ibises (Ivey et al. *in prep* b). Losses of flood-irrigated agriculture on private lands should be mitigated through development of additional seasonal wetland foraging sites on NWRs and WAs. Due to the significant human population and projected growth, there is a significant threat to a stable water supply for wetlands and the Great Salt Lake proper. This threat will impact water volume, distribution, distribution type and points, and quality.

Walker Lake water supplies and mercury contamination. Diminishing water supplies here will impact migrant Common Loons. Walker Lake, Nevada, a remnant of the ancient Lake Lahontan at the terminus of Walker River, is rapidly declining in both water volume and water quality. Since 1920, the surface elevation of Walker Lake has dropped by over 110 feet, and the alkalinity of the water is increasing. If the current trend continues, fish habitat in the lake will no longer exist, resulting in the loss of prey for loons and other piscivorous waterbirds. Lake water levels are expected to decline for several more decades due to its deficit water balance, and will likely reach equilibrium (evaporation losses = lake inflow) in about 50 to 100 years. At that time, the total water volume of the lake will be about one-fourth of the current volume and the lake will cease to exist as a viable fishery. While significant money has been appropriated by Congress to address the problem, an effective conservation strategy acceptable to all local interests has yet to be devised. Negotiations among stakeholders must continue, and discussions must address the stickiest political issues if Walker Lake's current wildlife values are to be preserved. Time will run out for Walker Lake if it cannot gain the status of a regional resource treasure valued by the entire community with stake in its future.

Cokeville Meadows NWR acquisition. Cokeville Meadows is the most extensive waterbird nesting and foraging site in Wyoming (A. Cerovski pers. comm.), however, much of the land within the approved refuge boundary has not yet been acquired. The USFWS is acquiring additional private parcels along with water rights as willing sellers come forward. Fluctuating water levels and water management are also issues to be addressed here.

Conboy Lake NWR acquisition. Conboy Lake NWR is an important nesting site for Greater Sandhill Cranes in Washington, where the species is listed as endangered. Only about half of the land within the approved refuge boundary in the historic Camas Prairie has been acquired by USFWS. The private ownership of the south half of the lake bed has made refuge water management very difficult, as water levels cannot be maintained while the neighbors drain water from their land for early haying. This situation has resulted in lower productivity and wetland degradation there. This issue is discussed in the state's crane recovery plan (Littlefield and Ivey 2002) and the USFWS and Washington Department of Fish and Wildlife should pursue resolution to the water and land ownership issues through easements, land use agreements, or acquisition as willing sellers emerge.

POPULATION MONITORING ACTIVITIES AND NEEDS

The most important information needed to further waterbird conservation in the Intermountain West is improved estimates of waterbird population status, distribution, and trends. These estimates will be facilitated by the development and implementation of a regional waterbird monitoring program. This comprehensive multi-species monitoring program will refine planning and evaluate management actions to achieve the IWWCP's overall goal of maintaining healthy waterbird populations. Although some monitoring has been, and is being, conducted in the region (Appendix J), existing information is inadequate to estimate population numbers and trends for most waterbird species. Because few sites have good historic data, many current population estimates and trend information are imprecise. A well-planned monitoring program will help avoid waterbird crises and will reduce the need for future Threatened and Endangered (T&E) listings.

For efficiency, waterbird monitoring should be integrated with other bird monitoring programs (i.e., landbird, shorebird and waterfowl programs) and Coordinated Bird Monitoring Plans (CBM, see Bart 2003a) for states, BCRs, and the region. Because most waterbird colonies are on State or Federal lands, region-wide monitoring is a feasible goal. Similarly, because several refuges and State agencies already conduct local surveys, region-wide monitoring need not be an economic burden to any single agency and will be conducted through a partnership of State, Federal, Tribes, and NGOs. State wildlife agencies and tribes will soon have additional funding resources to implement monitoring programs from USFWS's State and Tribal Wildlife Grants Program (http://federalaid.fws.gov/swg/swg.html). Some western states have prepared coordinated aquatic bird monitoring plans or are near their completion (e.g., Idaho Bird Inventory and Survey [IBIS]). These plans will be advantageous to region-wide monitoring. They follow similar protocols and design that complement the process recommended here.

Goal and Objectives

One goal of this plan is to facilitate a coordinated, meaningful approach to waterbird monitoring in the Intermountain West by developing reliable, comparable estimates of populations and trends of priority waterbird species. The IWWCP will also provide recommendations for assessing the effect of habitat and management projects on local waterbird populations. A formal monitoring plan will be developed for the entire region. This plan will be linked with national and international monitoring schemes to facilitate evaluation of continental trends. A regional monitoring plan will complement existing local monitoring programs while providing the added value of a regional context of waterbird population estimates and trends. Existing long-term monitoring efforts (e.g., state, NWR, WA programs) should continue at key waterbird concentration sites, where annual surveys allow interpretation of local long-term trends. Because of our lack of precise trend and population numbers, we should strive to derive improved population and trend estimates for all priority waterbird species. Ideally, they should be monitored annually until we have a better understanding of their status. However, comprehensive regionally coordinated annual surveys may not be practical. As a second-best option, we may invoke efforts to survey a particular species or nesting guild in a given year. For example, while some NWRs or states may count local colonies of White-faced Ibises annually, a coordinated survey of *all* ibis colonies in the Intermountain West might be conducted every third year. The following objectives should be accomplished over the next five years:

1. Develop a regional waterbird monitoring plan.
2. Develop regional standardized protocols for monitoring priority species.
3. Implement regional waterbird monitoring.

4. Develop atlases of current and historical waterbird breeding colony locations and important waterbird congregation sites within each state and BCR in the Intermountain West. Periodic, rather than annual, surveys focused on a particular species or nesting guild will be more practical to implement and yield reliable data on population size and trends over time.
   - Write site descriptions for these sites (Bart 2003a).
   - Conduct an inventory to determine the distribution and species composition of colonies within each area of interest.
5. Derive population estimates and trends for priority species.
6. Update waterbird distributional information as new information is developed.

Justification. The status and trends of waterbird populations must be understood at various geographic scales in order to make informed management decisions. Collection of site-specific data using different methodologies confounds interpretation of population trends at larger geographic scales; therefore, it is important to standardize waterbird survey methodologies and coordinate survey efforts regionally in order to identify problems with species and evaluate their responses to management actions.

Elements of a Monitoring Plan

Several sources provide useful guidance for designing a monitoring program. A draft Waterbird Monitoring Manual, focused on colony monitoring, is available (Steinkamp et al. 2003a), and this information is supplemented by a paper on waterbird sampling designs (Steinkamp et al. 2003b). A standardized monitoring protocol aimed at secretive marsh bird species is also available (Conway 2004). A plan for regional monitoring has been proposed by Jon Bart, U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center (Bart 2003a, 2003b). Such a plan should define standard monitoring protocols to ensure that data collected are meaningful and comparable, coordinated regionally, and have enough statistical power to determine waterbird trends. The North American Waterbird Conservation Plan sets as a target the ability to detect a 50 percent change in population over 10 years or three generations. To derive population estimates and trends for some species, surveys should be stratified to sample numerous wetlands of all sizes and types found in the region. To document regional changes in distribution, surveys should be geographically extensive and should be referenced to allow development of habitat models. Survey data should be linked to local indices of water conditions to further our understanding of waterbird dynamics in relation to wetland conditions at local and regional scales. The monitoring program should also address other considerations such as costs, frequency, timing, and techniques, including measures of detectability. Monitoring efforts should focus on priority waterbird species, however, for some surveys, it would be prudent to count all associated species (e.g., colony censuses). Different species require different survey methodology; for some species, complete censuses are appropriate (e.g., breeding colonies), while for others (e.g., secretive marshbirds), a sampling strategy may be more useful for estimating populations and trends. The BBS survey may adequately serve for monitoring trends of some species, and might be used to derive population estimates. Monitoring priorities should be based on species priorities (and/or guilds) in this plan, and should be designed to test management prescriptions and fill important information gaps.

Monitoring Committee

A monitoring committee to develop and coordinate regional waterbird monitoring was commissioned by the Regional Working Group in 2002. The committee will integrate waterbird monitoring with CBM efforts in states, BCRs, and the region. Also, the committee should participate in a continental alliance (a waterbird monitoring partnership to use comparable techniques and share data; e.g., keep in communication with the monitoring coordinator at Patuxent). The committee will use the Western Working Group meetings as an opportunity to share recommendations with the Intermountain West Waterbird Working Group.

Management of Monitoring Data

The National Bird Population Data Center at U.S. Geological Survey, Patuxent Wildlife Research Center, has developed a data repository to archive data on waterbirds throughout their ranges, regardless of survey locality or survey method. This centralized database is publicly accessible via the World Wide Web (Patuxent Wildlife Research Center 2004), and all monitoring data should be

sent to this repository. This will help facilitate information exchange and species status reviews in the future.

Monitoring Priorities and General Approaches

Priority species will be the primary focus of region-wide waterbird monitoring (Table 8). However, other bird species should be counted in conjunction with surveys for these priority species, when practical. Because of the varied life histories of waterbirds, a mix of monitoring strategies for different species and guilds is necessary to accomplish objectives. Table 9 summarizes recommended methods and frequencies of surveys for priority waterbird species. Detailed standardized protocols need to be developed for each regionally coordinated survey. Table 10 summarizes proposed annual regional accomplishments over the next 5 years. While recommendations for frequencies of surveys are provided in Table 10, it would be ideal to conduct annual regionally-coordinated surveys for all priority species, and this annual surveying option should be evaluated during the development of the regional waterbird monitoring plan.

Table 8. Focal species list for waterbird monitoring efforts in the Intermountain West.

Priority Species:	
Greater Sandhill Crane (breeding, migrants)	Western Grebe (breeding)
Lesser Sandhill Crane (migrants)	Clark's Grebe (breeding)
Yellow Rail (breeding)	Snowy Egret (breeding)
Virginia Rail (breeding)	Great Blue Heron (breeding)
Sora (breeding)	Green Heron (breeding—BCR 16)
California Gull (breeding)	Black-crowned Night-Heron (breeding)
Franklin's Gull (breeding, migrant in UT)	Least Bittern (breeding)
Forster's Tern (breeding)	American Bittern (breeding)
Black Tern (breeding)	White-faced Ibis (breeding)
Pied-billed Grebe (breeding)	American White Pelican (breeding, migrants in UT)
Eared Grebe (migrants)	Common Loon (breeding, migrants in NV)

Table 9. Potential strategies for monitoring individual species or guilds of waterbirds in the Intermountain West.

Monitoring Strategies	Species	Minimum frequency
Count and map breeding territories (all populations)	Sandhill Crane Common Loon	Every 10 years Annually
Complete census at important staging sites for priority migrant species	Sandhill Crane Franklin's Gull (Great Salt Lake) Eared Grebe (Great Salt Lake, Mono, Abert Lake) American White Pelican (Great Salt Lake) Common Loon (Walker Lake)	Annually Annually Annually Annually Annually
Develop a sampling strategy to estimate breeding population trends	Sandhill Crane Black and Forster's Tern Green Heron	Annually Every 5th year Every 5th year
N.A. Marsh Bird Monitoring Protocol for secretive marsh birds—develop a regional sampling strategy, stratified by state and BCR	Yellow Rail, Virginia Rail, Sora, Pied-billed Grebe, Least Bittern, American Bittern	Annually at official survey stations
Comprehensive survey of all island-nesting colonial waterbirds	American White Pelican, California Gull, Forster's Tern, Great Blue Heron	Every 3rd year
Comprehensive survey of all marsh-nesting colonial waterbirds	Franklin's Gull, Forster's Tern, Black Tern, Snowy Egret, Great Blue Heron, Black-crowned Night-Heron, White-faced Ibis	Every 3rd year
Tree-nesting colonial waterbirds	Great Blue Heron	Every 3rd year
Lake-nesting colonial waterbird	Clark's Grebe Western Grebe	Every 3rd year

Table 10. Proposed schedule of accomplishments for regional waterbird monitoring in the Intermountain West, through 2010.

Year	Activities
2005	• Develop a draft regional monitoring plan. • Develop an atlas of all known and historical colony locations in each state, by BCR. • Develop site descriptions for important waterbird congregation sites in each state, by BCR. • Design a protocol for conducting secretive marsh bird species surveys during the breeding season on an annual basis for each state, by BCR. Select an adequate sample size of survey sites and define the protocols for each site. • Conduct surveys of priority staging species (annually). • Enter all available waterbird data into state and national databases.
2006	• Finalize Intermountain West waterbird monitoring plan. • Finalize an atlas with site descriptions of all known colony locations and important waterbird congregation sites in each state, by BCR. • Conduct region-wide coordinated survey of all American White Pelican colonies and other island nesting guild species; repeat this survey every third year (i.e., 2009, 2012, etc.). • Conduct pilot secretive marsh bird surveys to test methodologies and identify problems with survey routes. • Conduct annual surveys of priority staging species. • Enter all available colony data into the Waterbird Database.
2007	• Conduct region-wide coordinated survey of marsh-nesting colonial waterbird guild, Black Tern, Forster's Tern; repeat this survey every third year (i.e., 2010, 2013, etc.). • Implement annual secretive marsh bird surveys at selected sites. • Conduct annual surveys of priority staging species. • Enter all available colony data into the Waterbird Database.
2008	• Conduct region-wide coordinated survey of tree-nesting colonial waterbird guild; repeat this survey every third year (i.e., 2011, 2014, etc.). • Conduct region-wide coordinated survey of lake-nesting colonial waterbird guild (grebes); repeat this survey every third year (i.e., 2011, 2014, etc.). • Conduct annual secretive marsh bird surveys at selected sites. • Conduct surveys of priority staging species (annually). • Enter all available colony data into the Waterbird Database.
2009	• Conduct region-wide coordinated survey of all American White Pelican colonies and other island-nesting guild species; repeat this survey every third year (i.e., 2012, etc.). • Conduct surveys of priority staging species (annually). • Enter all available colony data into the Waterbird Database.
2010	• Conduct region-wide coordinated survey of marsh-nesting colonial waterbird guild, Black Tern, Forster's Tern; repeat this survey every third year (i.e., 2013, 2016, etc.). • Implement annual secretive marsh bird surveys at selected sites. • Conduct annual surveys of priority staging species. • Enter all available colony data into the Waterbird Database.

RESEARCH AND INFORMATION NEEDS

This plan provides an opportunity to encourage research on waterbirds and related conservation issues that will influence future research funding. Our goals for research include increasing funding opportunities for research, addressing important waterbird issues, facilitating regionally coordinated research, and increasing funding opportunities for research. Members of the Research Committee, as well as research needs and recent and current research programs, are summarized in Appendix K.

Setting Research Priorities

Applied research that results in the beneficial management of waterbird populations and their habitats through the determination of causes of population declines, and the engagement of important waterbird issues, should be encouraged. Considerations for assigning research priorities include:

1. Determines causes of population decline.
2. Addresses priority species.
3. Refines links between population and habitat objectives.
4. Fills an important information gap relating to waterbird issues.
5. Considers multiple waterbird species.
6. Results applicable at regional and continental scales.

Funding Needs

Currently, there are few direct funding opportunities for waterbird research. The USFWS' Webless Migratory Game Bird Research Grants Program provides some research funding for cranes, coots, moorhens, and gallinules (hunted waterbird species). Partners should support full funding for this program. Additional funding dedicated to waterbird research is needed at the Federal and State level and waterbird partners should seek such funding. Research projects would best be funded by multiple partnerships between agencies and the private sector, possibly through the IWJV.

Education and Outreach Needs

There is a need to increase public understanding of the Intermountain West's importance to waterbird populations. Much wetland habitat has been lost historically, as some of the most important habitats for waterbirds were perceived as wastelands to be "reclaimed" for human use. With the current over-allocation of water resources in the west, political decisions about water use rarely take waterbird needs into account. Agencies often identify waterbird conservation as a secondary target in management schemes and, frequently, land managers are not trained in waterbird habitat management practices. There is also need for environmental education materials about waterbird ecology, management, and the value of these birds to our quality of life. Without the availability of this information, funding for waterbird management and research often remains low on the priority list of organizations responsible for wildlife conservation. An informed and engaged public can assist with monitoring of colonies, work to improve management of colonies and wetland habitats, and seek adoption of appropriate legislation to protect waterbirds and their habitats. Appendix L summarizes outreach recommendations for waterbirds in the region from various sources.

Outreach Committee

An outreach committee should be established to coordinate and facilitate important aspects of outreach related to the IWWCP. This would best be accomplished through a partnership approach with multiple agency and private sector partners. The committee should recruit a volunteer who is a professional information management specialist to lead this group. Efforts should be coordinated among the many agencies, organizations, and groups involved with communication of wetland issues to maximize communication efficiency and encourage frequent communication through relevant media. Media releases involving other partners should be reviewed by them in advance. Articles should be shared with the committee in a timely fashion.

An Outreach Strategy

An outreach strategy should be developed to help further the goals of the IWWCP. A well planned outreach strategy will greatly further the waterbird conservation goals and objectives in this plan. Outreach is needed on many levels—from informing land managers and agencies about waterbird management techniques and educating anglers and boaters about disturbance issues, to teaching children about their wildlife heritage. Waterbird education and public awareness should be incorporated into the many existing outreach programs, with emphasis on local programs to provide personal experiences with waterbirds. Steps for developing an outreach program and many ideas for outreach programs are identified in the NAWCP, including internet sites, training workshops, school programs, interpretive programs and signs, public monitoring programs, and waterbird merchandise (Kushlan et al. 2002). There are several important steps to develop an outreach strategy. Following is a summary of a draft outreach approach for consideration by the Outreach Committee:

Identify audiences. This task involves assessing groups of people who can make a difference for waterbird conservation. Following is a list of current and potential partners to engage in implementation of the IWWCP through habitat delivery and management:

International Partners:
- Tribes
- British Columbia Fish and Wildlife Recreation and Allocation Branch
- Alberta Sustainable Resource Development Fish and Wildlife Division
- Canadian Wildlife Service
- Waterbird Conservation Council of the Americas

Governmental agencies:
- State fish and wildlife agencies
- State land management agencies
- U. S. Fish and Wildlife Service
- U. S. Forest Service
- Bureau of Land Management
- Natural Resource Conservation Service
- Bureau of Indian Affairs
- Agricultural Experiment Stations
- Bureau of Reclamation
- Department of Defense
- Environmental Protection Agency
- Municipalities
- Universities

Non-governmental conservation organizations:
- Intermountain West Joint Venture
- Partners In Flight
- Intermountain West Shorebird Group
- Audubon Society
- Bird observatories
- Ducks Unlimited, Inc.
- The Nature Conservancy
- Trust for Public Lands
- Land trusts
- Waterfowl conservation organizations (e.g., California Waterfowl Association)
- Wetland conservation organizations
- Water resources agencies

Private interests:
- Private landowners, especially farmers and ranchers
- Outdoor recreation groups: hunting, fishing, off-road vehicle groups, birdwatchers
- Power industries, utilities
- Water related industries, irrigation districts, irrigators
- Aquaculture industry
- Birding/ecotourism industry

The following groups should be informed about waterbird issues and to seek funding and legislation to support waterbird conservation:

Political affiliates:
- State and national legislators
- County governments
- Fish and Game Commissions
- Policy makers - State and Federal levels
- Universities and community colleges
- Public and private elementary and secondary schools
- Non-government conservation organizations
- General public

Identify key outreach messages and strategies. The following important messages and strategies have been identified for outreach to IWWCP partners and appropriate audiences:

General public, partners and legislators
- Importance of water for wildlife; especially aquatic birds in the west, including seasonal availability, quality, and amount.
- Benefits of wetlands to ecosystem functions, the importance of wetland complexes, and the dynamic and ephemeral nature of wetlands.
- The importance of upland management to wetland ecosystems and waterbird populations.

- Importance of the Intermountain West to continental waterbird populations.
- Waterbird conservation issues and funding needs and, where possible, integrate IWWCP and IBA goals into State laws and ordinances for zoning and planning.
  - Develop field trips to educate legislators.
- Educate the public and legislators about the effects of mosquito control on waterbirds and about bird-borne diseases (e.g., West Nile virus).

Resource users

- Facts behind fisheries issues.
  - Educate public to the importance of rough-fish fisheries to pelicans and other piscivorous birds.
- The impacts of disturbance on Common Loons (e.g., Loon Ranger Program) and other waterbirds. Develop guidelines for public lands to minimize human disturbance to colonial waterbirds on public lands (see Erwin 1989).
  - The successful Loon Ranger programs in Idaho and Montana could be expanded to other species. This is a great outreach tool requiring small funding levels to hire seasonal people to administer the program.
- The negative effects of lead fishing sinkers and lead shot on waterbirds.
  - Availability of lead-free alternatives.
- Inform educational organizations associated with waterbird areas. Work to incorporate the Shorebird Sister Schools Program, Project WILD, Flying WILD, or other programs of importance to waterbirds into the curriculum or activities of these organizations.
- Develop Watchable Wildlife Programs with some focus on outreach about waterbirds (Washington is proposing to develop a program on a heron rookery if it can be accomplished without causing disturbance).
- Involve schools in local wetland/habitat projects.
- Utilize NWRs, State WAs, birding trails, and Important Bird Areas as opportunities for outreach.

Federal, State, Tribal and private land managers:

- Integrate IWWCP goals and objectives into agency land management plans.
- Educate the public, policy makers, and ranchers about the wildlife values and best management practices for flood-irrigated haylands.
  - Provide information on how to grow good hay and provide quality waterbird habitat.
  - Engage agricultural extension offices to help get the messages across.
  - Use NWRs that manage haylands as demonstration sites for good examples.
- Availability of key resources, such as the USFWS's Partners for Fish and Wildlife program and the U.S. Department of Agriculture's Natural Resources Conservation Service programs.
- Management needs for waterbirds on private lands.

Private volunteers:

- Recruitment through outreach programs: local naturalists, bird enthusiasts and conservation groups who can assist in monitoring of waterbirds (e.g., Rocky Mountain Bird Observatory's Project Colony Watch).
- Develop user-friendly citizen scientist protocols, including surveys, IBA designation forms, wetland enhancement and habitat preservation how-to materials, and ecotourism development plans.
- Involve volunteers in noxious weed control programs.
- Utilize sportsmen, scout groups, and wildlife enthusiasts to help clean up wildlife areas and develop habitat enhancement projects.

Identify outreach products. Outreach media (fliers, videos, brochures, signs, websites, etc.) should be tailored in formats for specific users (e.g., provide waterbird objectives on website for North American Wetlands Conservation Act [NAWCA] proposals), and written in layman's terms. Determine what sorts of outreach materials are important. Following is our preliminary list of potential products:

- Develop Best Management Practices for waterbird management for land managers.
- Develop a manual for wetland managers specific to the management of colonial waterbird habitats in the Great Basin. The document should describe management of ephemeral wetlands, playa lakes, salt marshes, flood-irrigated agricultural lands, water distribution needs, and food and foraging habitats for waterbirds.
- Develop landowner incentive programs that encourage wildlife-friendly management programs in coordination with extension programs for farmers and ranchers.
- Develop an Intermountain West Bird Conservation page on the IWJV website.

- Develop classroom materials for children.
- Develop user-friendly packages with map layers to address conservation needs for public use (e.g., acquisition planning by land trusts).
- Work with the media to develop a TV documentary on Intermountain West waterbirds.
- Develop articles and submit to outdoor magazines.
- Develop fliers on specific topics for distribution at agency public use areas and other locations.
- Develop wetland/waterbird information kits.
- Host workshops to promote and advance waterbird monitoring.

IMPLEMENTATION AND COMMUNICATION

Implementation of the IWWCP will require the cooperation of partners from private and governmental sectors and strong public support. Communication among the various public and private partners who will implement the IWWCP will be critical to successful plan implementation.

Implementation Process and Adaptive Planning

Implementation of the IWWCP provides the opportunity for many groups and individuals to partner and develop an integrated landscape approach to waterbird conservation. While the IWWCP will serve as a guiding document for regional waterbird conservation, implementation will require communication among partners to coordinate and facilitate projects, track accomplishments, measure and celebrate successes, and facilitate future updates of the plan. The IWJV is committed to integrated bird conservation and will assist in the implementation of this plan. Under the leadership of an IWWCP Coordinator, the committees that have been mentioned throughout this document will promote the implementation of the IWWCP. It is proposed that the Coordinator serve a term of time to be determined and that the coordinator position be shared through time by Federal, State, and conservation organizations on a rotating basis.

The purpose of this plan was to synthesize available information, identify information needs, and prioritize conservation issues with the goal of guiding waterbird conservation in the Intermountain West. Actual implementation of the plan is an additional step that will need to be undertaken by partners within the region.

An excellent conservation base and partnership network exists in the IWJV, which is committed to the conservation of waterbirds as well as the species covered by other bird initiatives. For funding, programs such as NAWCA grants, as well as some Federal and state-level habitat grant programs, are available to support conservation efforts. The IWWCP was developed with limited information, and objectives and expectations will change as new information becomes available. It is imperative that the IWWCP be flexible and updated periodically, using an adaptive management approach.

Communications Among Partners

To maintain a viable plan and facilitate communication, IWWCP implementers need to take advantage of opportunities to meet and discuss current waterbird issues. Partners In Flight's Western Working Group's biannual meetings will provide a primary opportunity for such communication. IWWCP implementers will also take advantage of other meeting opportunities to discuss IWWCP implementation, such as Flyway meetings, professional meetings, and agency meetings. BCR coordinators and the IWJV will help communicate and facilitate the IWWCP goals and objectives to further implementation of the plan. BCR coordinators will work to integrate waterbird objectives and priorities into agency plans and State Comprehensive Wildlife Conservation Strategies. Flyway Council involvement is also anticipated. Committees will work to further monitoring, research, outreach, and other elements of the plan, as needs arise. The IWWCP, our accomplishments, and current events will be posted on NAWCP's and IWJV's web pages and periodically reported in newsletters of the various partners.

CONCLUSION

The ultimate measure of success of the IWWCP will be how well it meets the stated goal of "maintenance of healthy populations, distributions, and habitats of waterbirds throughout the Intermountain West region." A number of actions will be required to successfully achieve this goal and further waterbird conservation in the Intermountain West, including:

- Acquire sufficient information about the population dynamics, population trends, breeding, migration and staging strategies, and habitat preferences of waterbirds in the region to make knowledgeable management recommendations.
- Preserve and enhance sufficient high-quality habitat to support healthy populations in the region, and securing the water needed to support these habitat values.
- Ensure that coordinated conservation efforts (regional, national, and international) are in place to address the key conservation priorities of waterbirds. Collaboration should occur between partners within and between states, BCRs, and other regions, as well as internationally, to achieve conservation objectives.
- Facilitate communication by informing the public, decision-makers, and all those involved in land management in the region about the importance of the region to waterbirds, and about the biology, trends, and management of waterbird species. Lobby for legislation and funding to further aquatic bird conservation.
- Implement regional monitoring, coordinated at all levels, and support priority research projects. Develop statistically sound, defensible estimates of abundance and population trends for key waterbird species in the Intermountain West.
- Resolve conservation issues at important sites.
- Update the IWWCP and refine population and habitat objectives and conservation strategies.
- Advocate for a complete inventory of existing wetland habitats to further this plan. Partners should lobby for complete National Wetland Inventory coverage in this region.
- Track accomplishments and celebrate successes.

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APPENDIX A. List of Contacts for Development of the Intermountain West Waterbird Conservation Plan.

Table A-1. List of Contacts in alphabetical order.

Name		State/Region	Association
Jackee	Alston	UT	UT Div. of Wildlife Resources
Bob	Altman	OR	BCR 5 Coordinator
Daniel	Anderson	CA	Univ. of California, Davis
Jane	Austin	ND	USGS-BRD, Northern Prairie Wildlife Research
Alison	Banks Cariveau	CO	Rocky Mountain Bird Observatory
Jay	Banta	UT	USFWS, Fish Springs NWR
Jon	Bart	ID	USGS-BRD
Carol	Beardmore	AZ	USFWS, Sonoran Joint Venture
André	Berault	B.C., Canada	Canadian Wildlife Service
Gael	Bissel	MT	MT Fish, Wildlife, and Parks
Sam	Blankenship	CA	CA Dept. of Fish and Game, Sacramento
Steve	Bouffard	ID	USFWS, Minidoka NWR
Sean	Boyd	B.C., Canada	Canadian Wildlife Service
Howard	Browers	OR	USFWS, Mid-Columbia River Refuge Complex
Heidi	Brunkal	WA	USFWS, Saddle Mountain NWR
Kris	Cafaro	CO	CO Audubon IBA Coordinator
Richard	Callus	CA	CA Dept. of Fish and Game, Redding
Erick	Campbell	NV	BLM, Reno
Dick	Cannings	B.C., Canada	B.C. Waterbird Plan Coordinator
Chris	Carey	OR	OR Dept. of Fish and Wildlife, Bend
John	Carlson	MT	MT Natural Heritage Program
Dan	Casey	MT	Northern Rockies BCR Coordinator
John	Cecil	PA	National Audubon IBA Coordinator
Andrea	Cerovski	WY	WY Game and Fish
Pam	Cherny	CA	CA Dept. of Fish and Game, Honey Lake WA
Dan	Christopherson	ID	Shoshone-Bannock Tribes
Myke	Chutter	B.C., Canada	B. C. Wildlife Branch
Greg	Clark	AZ	Independent
Jim	Cole	UT	Intermountain West JV Coordinator
Ken	Collis	OR	Real Time Research
Shilo	Comeau	MT	USFWS, Red Rock Lakes NWR
Dan	Cooper	CA	CA Audubon IBA Coordinator
Troy	Corman	AZ	AZ Game and Fish
Diana	Craig	CA	USFS, San Francisco
Eve	Davis	UT	PacifiCorp
Bruce	Deuel	CA	CA Dept. of Fish and Game, Redding
Walt	DeVaurs	NV	BLM, Carson City
Rita	Dixon	ID	ID Dept. of Fish and Game, Nongame
Rod	Drewien	ID	Hornocker Wildlife Institute, Moscow
Bruce	Dugger	OR	Oregon State Univ., Corvallis
Susan	Earnst	ID	USGS-BRD
Jim	Eidel	NV	Great Basin Bird Observatory

Table A-1. Continued.

Name		State/Region	Association
Mary Jo	Elpers	NV	USFWS, Reno Field Office (retired)
Joe	Engler	WA	USFWS, Conboy Lake NWR
Suzanne	Fellows	CO	USFWS, Region 6 Nongame Migratory Bird Program
Bob	Flores	WA	USFWS, Columbia NWR
Todd	Forbes	OR	BLM, Lakeview
Craig	Foster	OR	OR Dept. of Fish and Wildlife, Lakeview
Brent	Frazier	OR	USFS, Winema NF
Ron	Friesz	WA	WA Dept. Fish and Wildlife
Lindy	Garner	MT	USFWS, National Bison Range
Steve	Gniadak	MT	NPS, Glacier NP
Val	Grant	UT	UT Audubon IBA Coordinator
Mike	Green	OR	USFWS, Region 1 Nongame Migratory Bird Program
Lauri	Hanauska-Brown	ID	ID Dept. of Fish and Game
Jan	Hanf	OR	BLM, Prineville
Homer	Hansen	AZ	Aplomado Environmental LLC
Charles	Henny	OR	USGS, Corvallis
Bill	Henry	NV	USFWS, Stillwater NWR
Caroline	Herziger	OR	IWWCP compiler
Randy	Hill	WA	USFWS, Columbia NWR
Bill	Howe	NM	USFWS, Region 2 Nongame Migratory Bird Program
Matt	Hunter	OR	Oregon Important Bird Area Coordinator
Gary	Ivey	OR	IWWCP compiler
Joe	Jehl	CA	Smithsonian Institute, Washington, D.C.
Stephanie	Jones	CO	USFWS, Region 6 Nongame Migratory Bird Program
Eric	Kelchlin	WA	USFWS, Columbia NWR
Dave	Krueper	NM	USFWS, Region 2 Nongame Migratory Bird Program
Chuck	LaRue	AZ	Private
Susan	Lenard	MT	MT Audubon IBA Coordinator
Tony	Leukering	CO	Rocky Mountain Bird Observatory
Rich	Levad	CO	Rocky Mountain Bird Observatory
John	Luft	UT	UT Division of Wildlife Resources
Alison	Lyon	WY	Audubon WY IBA Coordinator
Jeff	Mackay	NV	USFWS, Ruby Lake NWR
Robert	Magill	AZ	AZ Game and Fish
Ann	Manning	UT	UT Div. of Wildlife Resources
Meg	Marriot	NV	USFWS, Ruby Lake NWR
David	Marshall	OR	Portland Audubon
Jennifer	Martin	AZ	AZ Game and Fish
Bob	Martinka	MT	MT Fish, Wildlife, and Parks
Dave	Mauser	CA	USFWS, Klamath NWRs
Cal	McCluskey	ID	BLM, Boise
Don	McIvor	NV	NV Audubon IBA Coordinator
Wayne	Melquist	ID	ID Dept. of Fish and Game (retired)
Carl	Mitchell	ID	USFWS, Grays Lake NWR
Emily	Miwa-Vogan	MT	USFWS, Lee Metcalf NWR
Colleen	Moulton	ID	ID Dept. of Fish and Game, Nongame

Table A-1. Continued.

Name		State/Region	Association
Larry	Neel	NV	NV Division of Wildlife, Nongame
John	Neill	UT	UT Div. of Wildlife Resources
Terry	Nelson	CA	USFS, Lassen NF
Heidi	Newsome	WA	USFWS, Saddle Mountain NWR
Kit	Novick	CA	CA Dept. of Fish and Game, Butte Valley WA
Bridget	Olson	UT	USFWS, Bear River MBR
Lewis	Oring	NV	Univ. of Nevada, Reno
Jim	Parrish	UT	UT Div. of Wildlife Resources
Don	Paul	UT	Great Basin BCR Coordinator
Ken	Popper	OR	The Nature Conservancy
Mary	Powell-McConnell	AZ	Sonora Desert Museum, Tucson
Tom	Ratcliff	CA	USFS, Modoc NF (retired)
Earl	Reinerston	OR	OR Duck Hunters Association
Tom	Rickman	CA	USFS, Lassen NF
John	Robinson	CA	USFS, Vallejo
Dan	Roby	OR	Oregon State Univ., Corvallis
Rick	Roy	OR	USFWS, Malheur NWR
Mike	Rule	WA	USFWS, Turnbull NWR
Rex	Sallabanks	ID	ID Dept. of Fish and Game, Nongame
Trent	Seager	CA	USFWS, Yreka
Saul	Schneider	B.C., Canada	Environment Canada
Dave	Shuford	CA	PRBO Conservation Science
Kris	Shull	OR	USFS, Malheur NF
Gary	Skiba	CO	CO Division of Wildlife
Robert	Smith	CA	CA Dept. of Fish and Game, Shasta Valley WA
Martin	St. Louis	OR	OR Dept of Fish and Wildlife, Summer Lake WA
Dale	Stahlecker	NM	Eagle Environmental, Inc.
Vernon	Stofleth	OR	BLM, Lakeview
Kelli	Stone	CO	USFWS, Alamosa –Monte Vista NWR Complex
George	Studinski	CA	USFS, Modoc NF (retired)
Tice	Supplee	AZ	AZ Game and Fish
Bruce	Taylor	OR	OR Joint Venture Coordinator
Jenny	Taylor	ID	USFS, Coeur d'Alene
Sue	Thomas	OR	USFWS, Region 1 Nongame Migratory Bird Program
Brett	Tiller	WA	Batelle PNNL
Lauri	Turner	OR	USFS, Deschutes NF
Martha	Wackenhut	ID	ID Dept. of Fish and Game
George E.	Wallace	CO	Rocky Mountain Bird Observatory
Jennifer	Wheeler	VA	Regional Waterbird Plans Coordinator
Scott	Wilbor	AZ	AZ Audubon IBA Coordinator
Sandy	Williams	NM	NM Game and Fish
Donna	Withers	NV	USFWS, Stillwater NWR
Mike	Yates	NV	Boise State University
Steve	Zender	WA	WA Dept. Fish and Wildlife
Tara	Zimmerman	OR	USFWS, Region 1 Nongame Migratory Bird Program

Table A-2. List of contacts in state order.

Name		State/Region	Association
Carol	Beardmore	AZ	USFWS, Sonoran Joint Venture
Greg	Clark	AZ	Independent
Troy	Corman	AZ	AZ Game and Fish
Homer	Hansen	AZ	Aplomado Environmental LLC
Chuck	LaRue	AZ	Private
Robert	Magill	AZ	AZ Game and Fish
Jennifer	Martin	AZ	AZ Game and Fish
Mary	Powell-McConnell	AZ	Sonora Desert Museum, Tucson
Tice	Supplee	AZ	AZ Game and Fish
Scott	Wilbor	AZ	AZ Audubon IBA Coordinator
Daniel	Anderson	CA	Univ. of California, Davis
Sam	Blankenship	CA	CA Dept. of Fish and Game, Sacramento
Richard	Callus	CA	CA Dept. of Fish and Game, Redding
Pam	Cherny	CA	CA Dept. of Fish and Game, Honey Lake WA
Dan	Cooper	CA	CA Audubon IBA Coordinator
Diana	Craig	CA	USFS, San Francisco
Bruce	Deuel	CA	CA Dept. of Fish and Game, Redding
Joe	Jehl	CA	Smithsonian Institute, Washington, D.C.
Dave	Mauser	CA	USFWS, Klamath NWRs
Terry	Nelson	CA	USFS, Lassen NF
Kit	Novick	CA	CA Dept. of Fish and Game, Butte Valley WA
Tom	Ratcliff	CA	USFS, Modoc NF (retired)
Tom	Rickman	CA	USFS, Lassen NF
John	Robinson	CA	USFS, Vallejo
Trent	Seager	CA	USFWS, Yreka
Dave	Shuford	CA	PRBO Conservation Science
Robert	Smith	CA	CA Dept. of Fish and Game, Shasta Valley WA
George	Studinski	CA	USFS, Modoc NF (retired)
Alison	Banks Cariveau	CO	Rocky Mountain Bird Observatory
Kris	Cafaro	CO	CO Audubon IBA Coordinator
Suzanne	Fellows	CO	USFWS, Region 6 Nongame Migratory Bird Program
Stephanie	Jones	CO	USFWS, Region 6 Nongame Migratory Bird Program
Tony	Leukering	CO	Rocky Mountain Bird Observatory
Rich	Levad	CO	Rocky Mountain Bird Observatory
Gary	Skiba	CO	CO Division of Wildlife
Kelli	Stone	CO	USFWS, Alamosa –Monte Vista NWR Complex
George	Wallace	CO	Rocky Mountain Bird Observatory
Jon	Bart	ID	USGS-BRD
Steve	Bouffard	ID	USFWS, Minidoka NWR
Dan	Christopherson	ID	Shoshone-Bannock Tribes
Rita	Dixon	ID	ID Dept. of Fish and Game, Nongame
Rod	Drewien	ID	Hornocker Wildlife Institute, Moscow
Susan	Earnst	ID	USGS-BRD
Lauri	Hanauska-Brown	ID	ID Dept. of Fish and Game
Cal	McCluskey	ID	BLM, Boise
Wayne	Melquist	ID	ID Dept. of Fish and Game (retired)

Table A-2. Continued.

Name		State/Region	Association
Carl	Mitchell	ID	USFWS, Grays Lake NWR
Colleen	Moulton	ID	ID Dept. of Fish and Game, Nongame
Rex	Sallabanks	ID	ID Dept. of Fish and Game, Nongame
Martha	Wackenhut	ID	ID Dept. of Fish and Game, Nongame
Jenny	Taylor	ID	USFS, Coeur d'Alene
Gael	Bissel	MT	MT Fish, Wildlife, and Parks
John	Carlson	MT	MT Natural Heritage Program
Dan	Casey	MT	Northern Rockies BCR Coordinator
Shilo	Comeau	MT	USFWS, Red Rock Lakes NWR
Lindy	Garner	MT	USFWS, National Bison Range
Steve	Gniadak	MT	NPS, Glacier NP
Susan	Lenard	MT	MT Audubon IBA Coordinator
Bob	Martinka	MT	MT Fish, Wildlife, and Parks
Emily	Miwa-Vogan	MT	USFWS, Lee Metcalf NWR
Jane	Austin	ND	USGS-BRD, Northern Prairie Wildlife Research
Bill	Howe	NM	USFWS, Region 2 Nongame Migratory Bird Program
Dave	Krueper	NM	USFWS, Region 2 Nongame Migratory Bird Program
Dale	Stahlecker	NM	Eagle Environmental, Inc.
Sandy	Williams	NM	NM Game and Fish
Erick	Campbell	NV	BLM, Reno
Walt	DeVaurs	NV	BLM, Carson City
Jim	Eidel	NV	Great Basin Bird Observatory
Mary Jo	Elpers	NV	USFWS, Reno Field Office (retired)
Bill	Henry	NV	USFWS, Stillwater NWR
Jeff	Mackay	NV	USFWS, Ruby Lake NWR
Meg	Marriot	NV	USFWS, Ruby Lake NWR
Don	McIvor	NV	NV Audubon IBA Coordinator
Larry	Neel	NV	NV Division of Wildlife, Nongame
Lewis	Oring	NV	Univ. of Nevada, Reno
Donna	Withers	NV	USFWS, Stillwater NWR
Mike	Yates	NV	Boise State University
Bob	Altman	OR	BCR 5 Coordinator
Howard	Browers	WA	USFWS, Mid-Columbia River Refuge Complex
Chris	Carey	OR	OR Dept. of Fish and Wildlife, Bend
Ken	Collis	OR	Real Time Research
Bruce	Dugger	OR	Oregon State Univ., Corvallis
Todd	Forbes	OR	BLM, Lakeview
Craig	Foster	OR	OR Dept. of Fish and Wildlife, Lakeview
Brent	Frazier	OR	USFS, Winema NF
Mike	Green	OR	USFWS, Region 1 Nongame Migratory Bird Program
Jan	Hanf	OR	BLM, Prineville
Charles	Henny	OR	USGS, Corvallis
Caroline	Herziger	OR	IWWCP compiler
Matt	Hunter	OR	Oregon Important Bird Area Coordinator
Gary	Ivey	OR	IWWCP compiler
David	Marshall	OR	Portland Audubon

Table A-2. Continued.

Name		State/Region	Association
Ken	Popper	OR	The Nature Conservancy
Earl	Reinerston	OR	OR Duck Hunters Association
Dan	Roby	OR	Oregon State Univ., Corvallis
Rick	Roy	OR	USFWS, Malheur NWR
Kris	Shull	OR	USFS, Malheur NF
Martin	St. Louis	OR	OR Dept of Fish and Wildlife, Summer Lake WA
Vernon	Stofleth	OR	BLM, Lakeview
Sue	Thomas	OR	USFWS, Region 1 Nongame Migratory Bird Program
Bruce	Taylor	OR	OR Joint Venture Coordinator
Lauri	Turner	OR	USFS, Deschutes NF
Tara	Zimmerman	OR	USFWS, Region 1 Nongame Migratory Bird Program
John	Cecil	PA	National Audubon IBA Coordinator
Jackee	Alston	UT	UT Div. of Wildlife Resources
Jay	Banta	UT	USFWS, Fish Springs NWR
Jim	Cole	UT	Intermountain West JV Coordinator
Val	Grant	UT	UT Audubon IBA Coordinator
Eve	Davis	UT	PacifiCorp
John	Luft	UT	UT Div. of Wildlife Resources
Ann	Manning	UT	UT Div. of Wildlife Resources
John	Neill	UT	UT Div. of Wildlife Resources
Bridget	Olson	UT	USFWS, Bear River MBR
Jim	Parrish	UT	UT Div. of Wildlife Resources
Don	Paul	UT	Great Basin BCR Coordinator
Jennifer	Wheeler	VA	Regional Waterbird Plans Coordinator
Heidi	Brunkal	WA	USFWS, Saddle Mountain NWR
Joe	Engler	WA	USFWS, Conboy Lake NWR
Bob	Flores	WA	USFWS, Columbia NWR
Ron	Friesz	WA	WA Dept. Fish and Wildlife
Brett	Tiller	WA	Batelle PNNL
Randy	Hill	WA	USFWS, Columbia NWR
Eric	Kelchlin	WA	USFWS, Columbia NWR
Heidi	Newsome	WA	USFWS, Saddle Mountain NWR
Mike	Rule	WA	USFWS, Turnbull NWR
Steve	Zender	WA	WA Dept. Fish and Wildlife
Andrea	Cerovski	WY	WY Game and Fish
Alison	Lyon	WY	Audubon WY IBA Coordinator
André	Berault	B.C., Canada	Canadian Wildlife Service
Sean	Boyd	B.C., Canada	Canadian Wildlife Service
Dick	Cannings	B.C., Canada	B.C. Waterbird Plan Coordinator
Myke	Chutter	B.C., Canada	B. C. Wildlife Branch
Saul	Schneider	B.C., Canada	Environment Canada

APPENDIX B. Scientific Names of Species Mentioned in the Intermountain West Waterbird Conservation Plan.

BIRDS

Common name	Scientific name
Canada Goose	*Branta canadensis*
Greater Sandhill Crane	*Grus canadensis tabida*
Lesser Sandhill Crane	*Grus canadensis canadensis*
Yellow Rail	*Coturnicops noveboracensis*
Virginia Rail	*Rallus limicola*
Sora	*Porzana carolina*
Common Moorhen	*Gallinula chloropus*
American Coot	*Fulica americana*
Mew Gull	*Larus canus*
Ring-billed Gull	*Larus delawarensis*
California Gull	*Larus californicus*
Glaucous-winged Gull	*Larus glaucescens*
Thayer's Gull	*Larus thayeri*
Herring Gull	*Larus argentatus*
Bonaparte's Gull	*Larus philadelphia*
Franklin's Gull	*Larus pipixcan*
Caspian Tern	*Sterna caspia*
Common Tern	*Sterna hirundo*
Forster's Tern	*Sterna forsteri*
Black Tern	*Chlidonias niger*
Pied-billed Grebe	*Podilymbus podiceps*
Red-necked Grebe	*Podiceps grisegena*
Horned Grebe	*Podiceps auritus*
Eared Grebe	*Podiceps nigricollis*
Western Grebe	*Aechmophorus occidentalis*
Clark's Grebe	*Aechmophorus clarkii*
Neotropic Cormorant	*Phalacrocorax brasilianus*
Double-crested Cormorant	*Phalacrocorax auritus*
Little Blue Heron	*Egretta caerulea*
Snowy Egret	*Egretta thula*
Great Blue Heron	*Ardea herodias*
Great Egret	*Ardea alba*
Cattle Egret	*Bubulcus* ibis
Green Heron	*Butorides virescens*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Least Bittern (Western)	*Ixobrychus exilis hesperis*
American Bittern	*Botaurus lentiginosis*
White-faced Ibis	*Plegadis chihi*
American White Pelican	*Pelecanus erythrorynchos*
Common Loon	*Gavia immer*
Common Raven	*Corvus corax*

PLANTS

Common name	Scientific name
Common reed	*Phragmites australis*
Cottonwood	*Populus* spp.
Eurasian water milfoil	*Myriophyllum spicatum*
Giant river cane	*Arundo donax*
Perennial pepperweed/ tall white top	*Lepidium latifolium*
Purple loosestrife	*Lythrum salicaria*
Russian olive	*Elaeagnus angustifolia*
Salt cedar/tamarisk	*Tamarix* spp.
Willow	*Salix* spp.

MAMMALS

Common name	Scientific name
Beaver	*Castor canadensis*
Cat (feral)	*Felis silvestris*
Coyote	*Canis latrans*
Mink	*Mustela vison*
Raccoon	*Procyon lotor*
Red fox	*Vulpes vulpes*
Wolf	*Canis lupus*

FISH

Common name	Scientific name
Bass	*Micropterus* spp.
Carp	*Cyprinus carpio*
Catfish	*Ameiurus* spp., *Ictalurus* spp.
Cui-ui	*Chasmistes cujus*
Lahontan tui chub	*Gila bicolor obesus*
Sunfish	*Lepomis* spp.
Trout	*Salmo* spp., *Salvelinus* spp., *Oncorhynchus* spp.
Yellowstone cutthroat trout	*Oncorhynchus clarkii bouvieri*

INVERTEBRATES

Common name	Scientific name
Brine flies	*Ephydra* spp.
Brine shrimp	*Artemia* spp.
Mosquitoes	*Aedes* spp., *Culex* spp., *Anopheles* spp.

BACTERIA

Common name	Scientific name
Bti	*Bacillius thuringiensis israelensis*

APPENDIX C. Acronyms Used in the Intermountain West Waterbird Conservation Plan.

ACRONYM	DEFINITION
AGFD	Arizona Game and Fish Department
AI	Area Importance
BBS	Breeding Bird Survey
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BHCA	Bird Habitat Conservation Area
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
CBC	Christmas Bird Count
CDFG	California Department of Fish and Game
CDOW	Colorado Division of Wildlife
CRP	Conservation Reserve Program
CS	Candidate Species
CVP	Central Valley Pop. of Greater Sandhill Cranes
DU	Ducks Unlimited, Inc.
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act
IBA	Important Bird Area
IDFG	Idaho Department of Fish and Game
IWCP	Inland Wetland Conservation Program
IWJV	Intermountain West Joint Venture
IWWCP	Intermountain West Waterbird Conservation Plan
LCRVP	Lower Colorado River Valley Population of Greater Sandhill Cranes
LKNWR	Lower Klamath NWR, California
MFWP	Montana Fish, Wildlife, and Parks
NABCI	North American Bird Conservation Initiative
NAWCA	North American Wetlands Conservation Act
NAWCP	North American Waterbird Conservation Plan
NDOW	Nevada Division of Wildlife
NMGF	New Mexico Game and Fish
NP	National Park
NRCS	Natural Resource Conservation Service
NWR	National Wildlife Refuge
ODFW	Oregon Department of Fish and Wildlife
ONHP	Oregon Natural Heritage Program
PIF	Partners In Flight
RMP	Rocky Mountain Population of Greater Sandhill Cranes
SC	Species of Concern
T&E	Threatened and Endangered
TNC	The Nature Conservancy
UDWR	Utah Division of Wildlife Resources
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WA	Wildlife Area
WDFW	Washington Department of Fish and Wildlife
WG&F	Wyoming Game and Fish
WHIP	Wildlife Habitat Incentive Program
WRP	Wetland Reserve Program
WS	Wildlife Services

APPENDIX D. Waterbird Species Prioritization for Bird Conservation Regions (BCRs) 9, 10, 15, and 16 in the Intermountain West.

This appendix describes the methods used to rank breeding and migrant waterbird species in the Intermountain West and assign numerical population objectives to priority species.

Determining Species Prioritization

In order to determine which waterbird species should receive greater conservation efforts and population objectives, we assessed their status in each of the four Bird Conservation Regions (BCRs) in the Intermountain West: Great Basin (BCR 9), Northern Rockies (BCR 10), Sierra Nevada (BCR 15), and Southern Rockies-Colorado Plateau (BCR 16). This involved several steps:

1. Estimating BCR waterbird populations and data quality (DQ).
2. Determining Area Importance (AI) scores.
3. Reviewing species' status on Federal, state, and Partners In Flight (PIF) plan lists.
4. Reviewing the North American Waterbird Conservation Plan (NAWCP) rankings for colonial waterbird species.
5. Developing criteria for colonial and marshbird species' regional rankings.
6. Developing a concern matrix for each BCR to identify priority waterbird species.
7. Developing a waterbird species priority list for the Intermountain West.

Step 1. Estimating BCR waterbird populations and data quality (DQ)

Breeding populations of waterbirds that have been historically of management concern are generally well known (e.g., Sandhill Crane), and status assessments have been completed for others in some parts of the Intermountain West (e.g., Caspian Tern). However, for many species, population data were incomplete, and for others, there were no data available (e.g., most marshbirds). Table D-1 details the indices used to classify data quality (DQ) on a 1-3 scale, based on professional judgment and reviewed by the Regional Waterbird Working Group.

Tables D-2, D-3, D-4, and D-5 summarize the most recent available waterbird population data for each BCR and their associated DQ score. All data are from the 1990s-2004, except for the Warner Basin in Oregon, a potentially major waterbird breeding area in BCR 9, which has not been thoroughly surveyed since the late 1980s. The numbers in these tables undoubtedly represent minimum population sizes, as many areas are not surveyed specifically for waterbirds; lack of data in the tables does not mean a certain species does not breed or is not a migrant in that state or BCR. It also was problematic to combine data for a total population estimate, as surveys were conducted in different years, in different climatic periods, by different methods, at different times within the nesting season, and shifts between breeding sites may have occurred as conditions changed. These data will be updated in future versions of the IWWCP as they become available through concurrent monitoring, and the DQ index will likely increase.

Breeding species are the focus of this plan, but some species occur only as migrants in some BCRs. Although breeding species also occur as migrants, only some were selected to have a separate category as a migrant if they met one of the following criteria: 1) a specific site in a BCR supported 10% of the North American population in migration (e.g., Eared Grebe at Mono Lake in BCR 9); or 2) specific threats were identified at staging sites for migrant populations (e.g., mercury contaminant issues for Common Loons at Walker Lake in BCR 9).

Note that the species are listed in Sibley-Monroe order (Sibley and Monroe 1990), as this is the standard for NAWCP. Scientific names are in Appendix B. Only Sandhill Cranes were addressed separately by subspecies and populations because there are existing Flyway Management Plans for them. They include Central Valley Population of Greater Sandhill Cranes (CVP), Lower Colorado River Valley Population of Greater Sandhill Cranes (LCRVP), Mid-Continent Population of Sandhill Cranes (MCP), Rocky Mountain Population of Greater Sandhill Cranes (RMP), and Pacific Flyway Population of Lesser Sandhill Cranes (PFP; Central and Pacific Flyway Councils 2001; Pacific Flyway Council 1983, 1995, 1997).

Step 2. Determining Area Importance (AI) scores

Based on the population data in Tables D-2 to D-5, Area Importance (AI) scores were derived for each species in each BCR using a 1-5 scale based on PIF protocols, where 5 represented at least 50% of the North America population (Tables D-6, D-7, D-8, and D-9). For breeding species with unknown total populations for North American or BCR, scores were based on professional judgment and reviewed by the Group.

For those breeding waterbird species with a North American population estimate (Tables D-6 to D-9), we summarized the population data for each BCR and the percentage of the North American population and AI score, and combined all BCRs to derive a total for the Intermountain West (Table D-10). The species with more than 25% of the North American population were Greater Sandhill Crane (CVP, LCRVP and RMP), California Gull, Clark's Grebe, and White-faced Ibis.

Step 3. Reviewing species' status on Federal, State, and PIF plan lists

Some waterbird species are listed as a Federal Bird of Conservation Concern (BCC), State Threatened and Endangered (T&E) or Sensitive Species/ Species of Concern (SC), or as a Focal (priority) species in PIF Bird Conservation Plans (states) and Physiographic Area Plans (regional, Table D-11). While listings apply to entire states, the Group reviewed them, and believed they were appropriate for the BCRs.

Step 4. Reviewing the NAWCP rankings for colonial waterbird species

The planning team for NAWCP provided preliminary rankings for colonial waterbird species only (Kushlan et al. 2002, Table D-12). For the Intermountain West, they fell into four categories: High, Moderate, Low, and Not at Risk; we have no Highly Imperiled species. If a species was ranked as High Concern and bred and wintered only in North America, it was placed near the upper, left-hand corner of the matrix. Conservation efforts should be focused on these species, as they are among the most vulnerable to further decline and for which North American managers have the greatest responsibility. If a species was ranked Not at Risk and occurred only peripherally within North America with a much larger distribution elsewhere, it fell in the lower, right-hand corner of the matrix, and is considered of the least concern. The Group was challenged with identifying criteria for adjusting the NAWCP rankings for colonial species and adding marshbirds (see Step 5). It was recommended that regional planners should first disregard any colonial species occurring only peripherally in a BCR; species in parentheses were removed from consideration because of their rarity in all four BCRs.

Step 5. Developing criteria for colonial and marshbird species' regional rankings

Both AI scores and concern listings were used to either demote or promote each colonial species in each BCR from the national ranking in Table D-12. Marshbirds were placed in the concern matrix using similar criteria developed with input from the Group. The methodology for rankings was as follows:

Breeding colonial species

- Species were promoted one concern category if AI score = 5, and demoted one category if AI score = 1 (per NAWCP methodology).
- State and PIF listings were also used to adjust rankings to account for regional concerns, as requested by NAWCP (no colonial species were federally listed). Those species on state T&E lists were ranked High Concern, regardless of AI score. Species were promoted one concern category if they were on more than one state SC list, and/or listed as Focal on more than one state or regional PIF plan, but not above Moderate unless they were on three or more lists in different states.

Breeding marshbird species

- Marshbirds were not assigned a national ranking by NAWCP; therefore, rankings could not be adjusted by an AI score. Instead, the Group decided to use national, state and PIF listings as a base to rank these species.
- Species were listed as High Concern if they appeared on the USFWS' BCC list or on a state T&E list. Species could also be listed as High Concern if they were on three or more SC or PIF Focal species lists in different states.
- Species were listed as Moderate Concern if they appeared on more than one state SC list and/or as a Focal species in one or more PIF plans.
- Species were listed as Low Concern if they appeared on only one state SC list or as a Focal species in one PIF plan.

- For species not covered by concern lists, AI scores were used to assign rankings. Those with an AI score of 5 were placed in High Concern, 4 to 3 to Moderate, 2 to Low, and 1 to Not at Risk.
- Since status and trend data were unavailable for most marshbirds, several widespread breeding species were elevated to Moderate Concern (if they were below that level; Virginia Rail, Sora, Pied-billed Grebe, Least Bittern [BCRs 9 and 16 only], and American Bittern).

Migrants (colonial and marshbird species)
- All migrant species were dropped to Not At Risk except those breeding species that had been identified as needing a separate migrant category (see Step 1). For these species, those with an AI score of 5 were elevated to High Concern, and those with a score of 4 or 3 to Moderate.

Species with specific threats
- Breeding and migrant species that were identified as needing additional conservation priority because of species-specific or site-specific threats were adjusted in rankings as decided by the Group.

BCR 15: Since California is the only state in BCR 15 (a small portion of Nevada is within the BCR but contains no waterbird habitat), different but similar rules were applied.

Breeding colonial species
- As for other BCRs, these species were promoted one concern category if AI score = 5, and demoted one category if AI score = 1.
- Species on the state's T&E list were rated as High Concern, regardless of AI score. Rankings were promoted one category if a species was on the state's draft SC list.

Breeding marshbird species
- Species on the state's T&E list were rated High Concern. Those on the state's SC list in the extirpated or first priority list were also rated High, species on the second priority list to Moderate, and those on the third priority list to Low.
- As for other BCRs, for species not covered by concern lists, AI scores were used to assign rankings using the same protocol.
- Also as for other BCRs, Virginia Rail, Sora, Pied-billed Grebe, and American Bittern were elevated to Moderate Concern (if they were below that level).

Migrants and species with specific threats
- Species were ranked as for other BCRs.

Step 6. Developing a concern matrix for each BCR to identify priority waterbird species

Using the criteria in Step 5, national rankings were adjusted for colonial species and added for marshbirds for each BCR (Tables D-13, D-14, D-15 and D-16).

Step 7. Developing a waterbird species priority list for the Intermountain West

A list of the priority waterbird species for each BCR in the Intermountain West was developed (Table D-17), based on the information from the previous tables (Tables D-13 to D-16). For the purpose of this Plan, breeding species ranked as High and Moderate concern are considered Priority Species and these received a numerical population objective. Priority migrant species received habitat objectives only in the state that met the criteria in Step 1. All Priority Species are discussed in the Monitoring section and should be considered in management plans and project proposals.

Table D-1. Indices used to designate data quality (DQ) of population data for waterbird species covered by the Intermountain West Waterbird Conservation Plan.

DQ INDEX	DATA DESCRIPTION
3	Recent comprehensive breeding surveys or recent status reviews were available. Relatively high degree of data accuracy. Population estimates were the best available and are likely closest to the actual populations in the region.
2	Moderate degree of data accuracy. Population estimates were likely lower than actual populations in the region.
1	Available data were insufficient for a reasonable population estimate.

Table D-2. Waterbird population estimates and their associated data quality (DQ) indices for Bird Conservation Region (BCR) 9 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Greater Sandhill Crane (CVP) (b)			3,002	3	
CA	2,000: 401 pairs	802			Ivey and Herziger 2001
NV	1999: 11 pairs	22			Ivey and Herziger 2000
OR	1999-00: 1,069 pairs	2,138			Ivey and Herziger 2000
WA	2004: 20 pairs	40			J. Engler pers. comm.
Greater Sandhill Crane (CVP) (m)[1]	Entire pop. likely through CA, OR, WA		>90% of NA pop.	2	Pacific Flyway Council 1997
Greater Sandhill Crane (LCRVP) (b)	Est. 95% of breeding pop. in this BCR		1,900	2[2]	R. Drewien pers. comm.
ID	Unknown	unknown			
NV	Unknown	unknown			
UT	Unknown	unknown			
Greater Sandhill Crane (LCRVP) (m)[1]	Entire pop. likely through NV		>90% of NA pop.	2	Pacific Flyway Council 1983
Greater Sandhill Crane (RMP) (b)	Est. 10% of breeding pop. in this BCR		1,868	2[3]	R. Drewien pers. comm.
ID	unknown	unknown			
UT	Unknown	unknown			
Lesser Sandhill Crane (PFP) (m)[2]	Entire pop. likely through CA, ID, OR, WA		>90% of NA pop.	2	Littlefield and Ivey 2002
Yellow Rail (b)			608	2	
CA	near Shasta 2001-04: 1 male calling	2			Popper/Shuford pers. comm.
CA	Surprise Valley 2002-03: 1-3 males calling	6			Popper/Shuford pers. comm.
OR	South-central OR 2002: 300 males calling	600			K. Popper pers. comm.
Virginia Rail (b)	insufficient data		unknown	1	
Sora (b)	insufficient data		unknown	1	
Common Moorhen (b)	NV unknown, insufficient data		unknown	1	L. Neel pers. comm.
American Coot (b)	insufficient data		unknown	1	

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Ring-billed Gull (b)			70,116	2	
CA	NE CA avg. 1994-97: 11,448 pairs	22,896			Shuford and Ryan 2000
ID	S. ID 1993: 7,000 nests	14,000			Trost and Gerstell 1994
NV	Est. 700 breeding pop.	700			L. Neel pers. comm.
OR	E. Columbia R. early 1990s: 5,000 pairs	10,000			Butler 2003a
OR	Gerber Reservoir 2003: 1,024 pairs	2,048			Shuford et al. 2004
OR	Malheur NWR 1990-98 avg.: 150 nests	300			G. Ivey unpubl. data
OR	Warner Basin 1987: 586 pairs	1,172			Stern 1988
UT	Est. 5,000 breeding pop.	5,000			D. Paul pers. comm.
WA	1996: 7,000 pairs	14,000			Smith et al. 1997
California Gull (b)			314,398	2	
CA	NE CA avg. 1994-97: 31,236 pairs	62,472			Shuford and Ryan 2000
ID	S. ID 1993: 36,200 nests	72,400			Trost and Gerstell 1994
NV	Est. 4,200 breeding pop.	4,200			L. Neel pers. comm.
OR	E. Columbia R. early 1990s: 5,000 pairs	10,000			Butler 2003b
OR	Malheur NWR 1990-98 avg.: 560 nests	1,120			G. Ivey unpubl. data
OR	Warner Basin 1987: 301 pairs	206			Stern 1988
UT	Est. 150,000 breeding pop.	150,000			D. Paul unpubl. data
WA	1996: 7,000 pairs	14,000			Smith et al. 1997
Glaucous-winged Gull (b)					
OR/WA	Columbia River (east): occasionally nest	0	0	1	Hodder 2003
Herring Gull (m)	insufficient data		unknown	1	
Bonaparte's Gull (m)	insufficient data		unknown	1	
	Occasionally hundreds in fall at Great Salt Lake				D. Paul pers. comm.
Franklin's Gull (b)			42,588	2	
CA	Lower Klamath NWR 2003: 154 pop.	154			Shuford et al. 2004
ID	Camas NWR, Mud/Market lks.: 3,500 pop.	3,500			S. Bouffard pers. comm.

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
ID	Oxford Slough WMA:5,000 breeding	5,000			S. Bouffard pers. comm.
NV	Ruby L. NWR 2003-04 avg.: 6 pairs	12			J. Mackay pers. comm.
OR	Malheur NWR 1990-98 avg.: 1,635 nests	3,270			G. Ivey unpubl. data
UT	Est. 30,652 breeding pop.	30,652			D. Paul pers. comm.
Franklin's Gull (m)[4]			> 13% of NA pop.	2	
UT	Great Salt Lake: up to 86,000	86,000			Paul et al. 2001
Caspian Tern (b)			3,940	3	
CA	Avg. 1997-03: 469 pairs	938			USFWS 2005
ID	Avg. 1997-2003: 60 pairs	120			USFWS 2005
NV	Avg. 1997-03: 118 pairs	236			USFWS 2005
OR	Avg. 1997-03: 457 pairs	914			USFWS 2005
UT	Est. 100 breeding pop.	100			D. Paul pers. comm.
WA	Avg. 1997-03: 816 pairs	1,632			USFWS 2005
Common Tern (b)	insufficient data (former breeder in ID)	0	0	1	Trost and Gerstell 1994
Forster's Tern (b)			7,342	2	
CA	NE CA 1997: 1,756 pairs	3,512			Shuford 1998
ID	S. ID 1993: 20 nests	40			Trost and Gerstell 1994
NV	Est. 150 breeding pop.	150			L. Neel pers. comm.
NV	Ruby L. NWR 1990-02 avg.: 42 breeding	42			J. Mackay pers. comm.
OR	Klamath Basin (OR) 2003: 1,412 pop.	1,412			Shuford et al. 2004
OR	Malheur NWR 1990-98 avg.: 100 nests	200			G. Ivey unpubl. data
UT	Est. 1,586 breeding pop.	1,586			Paul et al. 2001
WA	Est. 400 breeding pop.	400			R. Friesz pers. comm.
Black Tern (b)			7,925	2	
CA	NE CA 1997: 1,849 nests	3,698			Shuford 1998
ID	Est. 78 breeding pop.	78			C. Moulton pers. comm.
NV	Ruby L. NWR avg.: 275 nests	550			Shuford 1999

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
OR	Klamath Basin (OR) 2003: 2,089 pop.	2,089			Shuford et al. 2004
OR	Malheur NWR 1990-98 est. avg. 150 nests	300			G. Ivey unpubl. data
OR	Sycan Marsh avg: 300 nests	600			Shuford 1999
OR	Warner Basin 1987: 95 pairs	190			Stern 1988
UT	Est. 120 breeding pop.	120			D. Paul pers. comm.
WA	Est. 300 breeding pop.	300			R. Friesz pers. comm.
Pied-billed Grebe (b)	insufficient data		unknown	1	
Red-necked Grebe (b)			32	1	
OR	Upper Klamath L. 1989: 28	28			Spencer 2003d
WA	2 pairs	4			R. Hill pers. comm.
Horned Grebe (b)	insufficient data		unknown	1	
Eared Grebe (b)[3]			27,318	2	
CA	Black Lake 1993: 268 breeding adults	268			Shuford and Metropulos 1996
CA	Crowley Lake 1990-95 avg.: 626 pairs	1,252			Shuford and Metropulos 1996
CA	Eagle Lake 1996-97 avg.: 2,715 nests	5,430			Shaw 1998
CA	Klamath Basin (CA) 2003: 13,074 pop.	13,074			Shuford et al. 2004
CA	Shasta Valley WA est. avg.: 50 nests	100			R. Smith pers. comm.
ID	S. ID 1993: 324 nests	648			Trost and Gerstell 1994
NV	Est. 226 breeding pop.	226			L. Neel pers. comm.
NV	Ruby L. NWR 1990-02 avg.: 164 breeding	164			J. Mackay pers. comm.
OR	Copeland Res. 1998: 22 pairs	44			Spencer 2003b
OR	Difficulty Res. 2000: 50 pairs	100			Spencer 2003b
OR	Klamath Basin (OR) 2003: 2,200 pop.	2,200			Shuford et al. 2004
OR	Malheur NWR 1990-98 avg.: 556 nests	1,112			G. Ivey unpubl. data
UT	Est. 1,200 breeding pop.	1,200			D. Paul pers. comm.
WA	Est. 1,500 breeding pop.	1,500			R. Friesz pers. comm.

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Eared Grebe (m)[5]			>90% of NA pop.	2	
CA	Mono L.: 2,000,000	2,000,000			Boyd and Jehl 1998
OR	Lake Abert avg.: 21,500	21,500			W. DeVaurs pers. comm.
UT	Great Salt Lake est.: 1,600,000	1,600,000			D. Paul unpubl. data
Western Grebe (b)			12,088	2	
CA	Bridgeport Reservoir 2003: 80 nests	160			Ivey 2004
CA	Crowley Lake 1990-95 avg.: 64 pairs	128			Shuford and Metropulos 1996
CA	Eagle Lake 1996-03 avg. : 1,626 nests	3,252			Ivey 2004
CA	Klamath Basin (CA) 2003: 1,705	1,706			Shuford et al. 2004
CA	Shasta Valley WA avg.: 13 nests	26			R. Smith pers. comm.
ID	Minidoka NWR: 267 nests	534			S. Bouffard pers. comm.
ID	Other sites S. ID 1993: 330 nests	660			Trost and Gerstell 1994
NV	Est. 50 breeding pop.	50			L. Neel pers. comm.
NV	Ruby L. NWR 1990-02 avg.: 6 breeding	6			J. Mackay pers. comm.
OR	Klamath Basin (OR) 2003: 3,164	3,164			Shuford et al. 2004
OR	Malheur NWR 1990-98 est.: 300 nests	600			G. Ivey unpubl. data
OR	Summer Lake WA avg.: 30 nests	60			M. St. Louis pers. comm.
OR	Warner Basin 1987: 21 pairs	42			Stern 1988
UT	Est. 700 breeding pop.	700			D. Paul pers. comm.
WA	Est. 1,000 breeding pop.	1,000			R. Friesz pers. comm.
Clark's Grebe (b)			3,546	2	
CA	Crowley Lake 1990-95 avg.: 10 pairs	20			Shuford and Metropolis 1996
CA	Eagle Lake 1996-03 avg.: 181 nests	362			Ivey 2004
CA	Goose L. 2003: 60 nests	120			Ivey 2004
CA	Klamath Basin (CA) 2003: 168	168			Shuford et al. 2004
ID	S. ID 1993: 103 nests	206			Trost and Gerstell 1994

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
ID	Minidoka NWR: 133 nests	266			S. Bouffard pers. comm.
NV	Est. 300 breeding pop.	300			L. Neel pers. comm.
OR	Klamath Basin (OR): 1,504	1,504			Shuford et al.2004
OR	Malheur NWR 1990-98 est.: 100 nests	200			G. Ivey unpubl. data
UT	Est. 300 breeding pop.	300			D. Paul pers. comm.
WA	Est. 100 breeding pop.	100			R. Friesz pers. comm.
Double-crested Cormorant (b)			10,556	2	
CA	NE CA 1997: 1,394 nests	2,788			Shuford 1998
ID	S. ID 1993: 1,366 nests	2,732			Trost and Gerstell 1994
NV	Est. 400 breeding pop.	400			L. Neel pers. comm.
NV	Ruby L. NWR 1990-02 avg.: 54 breeding	54			J. Mackay pers. comm.
OR	Crane Prairie Res. 1998-99 avg.: 57 pairs	114			Matthews et al. 2003
OR	Malheur NWR 1990-98 avg.: 308 nests	616			G. Ivey unpubl. data
OR	Summer Lake WA 1998-00 avg.: 27 pairs	54			M. St. Louis pers. comm.
OR	Swan Lake 2003: 43 pairs	86			Shuford et al. 2004
OR	Up. Klamath NWR 1997-01 avg: 646 nests	1,292			USFWS data
OR	Warner Basin 2002: 60 nests	120			C. Foster pers. comm.
UT	Est. 800 breeding pop.	800			Paul et al. 2001
WA	Est. 1,500 breeding pop.	1,500			R. Friesz pers. comm.
Snowy Egret (b)			3,322	2	
ID	S. ID 1993: 306 nests	612			Trost and Gerstell 1994
NV	Est. up to 300 nesting pairs	600			C. Henny pers. comm.
OR	Chewaucan/Rivers End: 40 nests	80			M. St. Louis pers. comm.
OR	Malheur NWR 1990-98 avg.: 33 nests	66			G. Ivey unpubl. data
OR	Warner Basin 1987: 10 pairs	20			Stern 1988
UT	Fish Springs NWR: 594 breeding pop.	594			J. Banta pers. comm.
UT	Great Salt Lake avg.: 1,350 breeding pop.	1,350			Paul et al. 2001

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Great Blue Heron (b)			4,560	2	
CA	Clear Lake NWR 1997-99 avg.: 35 nests	70			USFWS data
CA	L. Klamath NWR 1997-01 avg.: 20 nests	40			USFWS data
ID	S. ID 1993: 898 nests	1,796			Trost and Gerstell 1994
NV	Est. 600 breeding pop.	600			L. Neel pers. comm.
NV	Ruby L. NWR 1990-02 avg.: 58 breeding	58			J. Mackay pers. comm.
OR	Klamath Game Mgmt. Area 2003: 35 pairs	70			Shuford et al. 2004
OR	Malheur NWR 1990-98 avg.: 88 nests	176			G. Ivey unpubl. data
OR	Up. Klamath NWR 1997-01 avg.: 14 nests	28			USFWS data
OR	Warner Basin 2002: 25 nests	50			C. Foster/M. St. Louis, p. c.
UT	Fish Springs NWR: 12 breeding pop.	12			J. Banta pers. comm.
UT	Great Salt Lake avg.: 460 breeding pop.	460			D. Paul pers. comm.
WA	Est. 1,200 breeding pop.	1,200			R. Friesz pers. comm.
Great Egret (b)			2,238	2	
CA	Clear Lake NWR 1997-01 avg.: 39 nests	78			USFWS data
CA	L. Klamath NWR 1997-01 avg.: 282 nests	564			USFWS data
CA	Tule Lake NWR 1997-01 avg.: 41 nests	82			USFWS data
ID	S. ID 1993: 26 nests	52			Trost and Gerstell 1994
NV	Est. 226 breeding pop.	226			L. Neel pers. comm.
OR	Klamath Game Mgmt. Area 2003: 5 pairs	10			Shuford et al. 2004
OR	Malheur NWR 1990-98 avg. 247 nests	494			G. Ivey unpubl. data
OR	Up Klamath NWR 1997-01 avg.: 136 nests	272			USFWS data
OR	Warner Basin 2002: 126 nests	252			C. Foster/M. St. Louis, p. c.
UT	Fish Springs NWR: 2 breeding pop.	2			J. Banta pers. comm.
UT	Great Salt Lake avg.: 6 breeding pop.	6			D. Paul pers. comm.
WA	Est. 200 breeding pop.	200			R. Friesz pers. comm.

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Cattle Egret (b)			916	2	
ID	S. ID 1993: avg. 33 nests	66			Trost and Gerstell 1994
NV	Est. 250 breeding pop.	250			L. Neel pers. comm.
OR	Malheur NWR: nests occasionally	0			G. Ivey unpubl. data
UT	Est. 600 breeding pop.	600			Paul et al. 2001
Green Heron (b)	insufficient data–peripheral species		unknown	1	
Black-crowned Night-Heron (b)			5,586	2	
CA	Clear Lake NWR 1997-00 avg.: 6 nests	12			USFWS data
CA	L. Klamath NWR 1997-01 avg.: 140 nests	280			USFWS data
CA	Tule Lake NWR 1997-01: 8 nests	16			USFWS data
ID	S. ID 1993: 769 nests	1,538			Trost and Gerstell 1994
NV	Est. 800 breeding pop.	800			L. Neel pers. comm.
NV	Ruby L. NWR 1990-02 avg.: 106 breeding	106			J. Mackay pers. comm.
OR	Malheur NWR 1990-98 avg. 178 nests	356			G. Ivey unpubl. data
OR	Three Mile Is. 1991: 54 nests	108			Blus et al. 1997
OR	Up. Klamath NWR 1997-01 avg.: 30 nests	60			USFWS data
OR	Warner Basin 1987: 430 nests	860			Stern 1988
UT	Fish Springs NWR: 250 breeding pop.	250			J. Banta pers. comm.
UT	Great Salt Lake avg.: 200 breeding pop.	200			D. Paul pers. comm.
WA	Est. 1,000 breeding pop.	1,000			R. Friesz pers. comm.
Least Bittern (b)	insufficient data		unknown	1	
American Bittern (b)	insufficient data		unknown	1	
White-faced Ibis (b)			57,978	3	
CA	1997-99 avg.: 1,157 nests	2,314			Ivey et. al. *in prep* b
ID	S. ID 1993: 2,670 nests	5,340			Trost and Gerstell 1994
NV	1997-99 avg.: 6,116 nests	12,232			Ivey et. al. *in prep* b

Table D-2. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
OR	1997-99 avg.: 9,048 nests	18,096			Ivey et. al. 2005
UT	1997-99 avg.: 9,983 nests	19,996			Ivey et. al. 2005
American White Pelican (b)			26,924	2	
CA	Clear Lake NWR 1997-01 avg.: 1,831 nests	3,662			USFWS data
CA	L. Klamath NWR 1997-01 avg.: 114 nests	228			USFWS data
CA	Meiss Lake 1999-00: 15 nests	30			K. Novick pers. comm.
ID	Blackfoot Res. 2003: 837 nests	1,674			M. Wackenhut pers. comm.
ID	Minidoka NWR: 550 nests	1,100			S. Bouffard pers. comm.
NV	Anaho Is. 2000-04 avg: 4,207 nests	8,414			USFWS data
OR	Malheur NWR 1990-98 avg.: 273 nests	546			G. Ivey unpubl. data
OR	Up Klamath NWR 1997-01 avg.: 309 nests	618			USFWS data
OR	Warner Basin 2002: 206 nests	412			M. St. Louis/C. Foster, p. c.
UT	Est. 10,000 breeding pop.	10,000			Paul et al. 2001
WA	Columbia River: 120 nests	240			H. Browers pers. comm.
American White Pelican (m)[6]			> 46% of NA pop.	2	
UT	Great Salt Lake: exceeds 55,000 frequently	55,000			D. Paul pers. comm.
Common Loon (b)			8	1	
CA	Extirpated	0			PRBO 2003
ID		0			
OR	Cascades early 1990s only: 1 nest	0			C. Carey pers. comm.
WA	4 nests	8			Richardson et. al. 2000
Common Loon (m)[6]			>1,050	3	
NV	Walker Lake avg.: 1,050	1,050			L. Neel pers. comm.

[1] Listed as separate migrant species because entire North American population likely migrates through this BCR.
[2] Total population estimate counted at wintering areas = 3, but breeding distribution not available by state.
[3] Total population estimate counted at staging areas = 3, but breeding distribution not available by state.
[4] Listed as separate migrant species because 10% of North American population uses this site in migration.
[5] Listed as separate migrant species because >90% of North American population stages at Mono Lake and Great Salt Lake.
[6] Listed as separate migrant species because contaminants issues for migrants at Walker Lake, Nevada.

Table D-3. Waterbird population estimates and their associated data quality (DQ) indices for Bird Conservation Region (BCR) 10 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Greater Sandhill Crane CVP (b)			164	3	
OR	1999-00: 82 pairs	164			Ivey and Herziger 2000
Greater Sandhill Crane LCRVP (b)[1]			100	2[1]	
ID	Est. 50-100 breeding pop.	100			estimate
Greater Sandhill Crane RMP (b)[2]	Est. 88% of breeding pop. in this BCR		16,515	2[2]	R. Drewien pers. comm.
ID	Unknown	unknown			
MT	Unknown	unknown			
WY	Unknown				
Virginia Rail (b)	insufficient data		unknown	1	
Sora (b)	insufficient data		unknown	1	
American Coot (b)	insufficient data		unknown	1	
Ring-billed Gull (b)			9,350	2	
ID	Zero	0			C. Moulton pers. comm.
MT	Est. 9,300 breeding pop.	9,300			D. Casey pers. comm.
OR	Confirmed breeding bird atlas 1995-99	unknown			Adamus et al. 2001
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 50 breeding pop.	50			A. Cerovski pers. comm.
California Gull (b)			9,474	2	
ID	Bear Lake NWR: 120 nests	240			C. Moulton pers. comm.
MT	Est. 920 breeding pop.	920			D. Casey pers. comm.
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 8,314 breeding pop.	8,314			A. Cerovski pers. comm.
Herring Gull (m)	insufficient data		unknown	1	
Bonaparte's Gull (m)	insufficient data		unknown	1	
Franklin's Gull (b)			19,050	2	
ID	Bear Lake NWR: >5,000 breeding pop.	5,000			S. Bouffard pers. comm.
ID	Grays Lake NWR: >10,000 breeding pop.	10,000			S. Bouffard pers. comm.

Table D-3. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
MT	Est. 4,000 breeding pop.	4,000			D. Casey pers. comm.
WY	Est. 100 breeding pop.	100			A. Cerovski pers. comm.
Caspian Tern (b)			180	2	
MT	Avg. 1997-03: 40 pairs	80			USFWS 2005
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 50 breeding pop.	50			A. Cerovski pers. comm.
Forster's Tern (b)			176	2	
MT	Est. 126 breeding pop.	126			D. Casey pers. comm.
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 100 breeding pop.	100			A. Cerovski pers. comm.
Black Tern (b)			674	2	
ID	Est. 124 breeding pop.	124			C. Moulton pers. comm.
MT	Est. 200 breeding pop.	200			D. Casey pers. comm.
OR	Confirmed breeding bird atlas 1995-99	unknown			Adamus et al. 2001
WA	Est. 250 breeding pop.	250			R. Friesz pers. comm.
WY	Est. 100 breeding pop.	100			A. Cerovski pers. comm.
Pied-billed Grebe (b)	insufficient data		unknown	1	
Red-necked Grebe (b)			500	1	
ID	Est. 50 pairs	100			C. Moulton pers. comm.
WA	Up to 400 breeding pop.	400			R. Friesz pers. comm.
Horned Grebe (b)	insufficient data		unknown	1	
Eared Grebe (b)			2,412	2	
ID	S. ID 1993: 40 nests	80			Trost and Gerstell 1994
MT	Est. 700 breeding pop.	700			D. Casey pers. comm.
OR	Rabbit Valley Res. 2000: 250 nests	500			Spencer 2003b
WA	Est. 200 breeding pop.	200			R. Friesz pers. comm.
WY	Est. 932 breeding pop.	932			A. Cerovski pers. comm.

Table D-3. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Western Grebe (b)			3,580	2	
ID	Cascade Reservoir 2004: 1,350 nests	2,700			C. Moulton pers. comm.
ID	Other N. ID sites: 200 breeding pop.	200			Moulton/Taylor pers. comm.
MT	Est. 250 breeding pop.	250			D. Casey pers. comm.
OR	Confirmed breeding bird atlas 1995-99	unknown			Adamus et al. 2001
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 430 breeding pop.	430			A. Cerovski pers. comm.
Clark's Grebe (b)			106	2	
ID	Cascade Res./Lk. Pend Oreille: unknown	unknown			Moulton/Taylor pers. comm.
MT	Est. 26 breeding pop.	26			D. Casey pers. comm.
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 80 breeding pop.	80			A. Cerovski pers. comm.
Double-crested Cormorant (b)			1,976	2	
ID	N. ID: unknown	unknown			Moulton/Taylor pers. comm.
ID	S. ID 1993: 35 nests	70			Trost and Gerstell 1994
MT	Est. 1,150 breeding pop.	1,150			D. Casey pers. comm.
OR	Confirmed breeding bird atlas 1995-99	unknown			Adamus et al. 2001
WA	Est. >100 nests	200			S. Zender pers. comm.
WY	Est. 556 breeding pop.	556			A. Cerovski pers. comm.
Snowy Egret (b)			70	2	
ID	S. ID 1993: 20 nests	40			Trost and Gerstell 1994
MT	Zero	0			D. Casey pers. comm.
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 10 breeding pop.	10			A. Cerovski pers. comm.
Great Blue Heron (b)			1,600	2	
ID	N. ID: unknown	unknown			Moulton/Taylor pers. comm.
ID	S. ID 1993: 85 nests	170			Trost and Gerstell 1994
MT	Est. 900 breeding pop.	900			D. Casey pers. comm.

Table D-3. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
OR	Confirmed breeding bird atlas 1995-99	unknown			Adamus et al. 2001
WA	Est. 165 nests	330			R. Friesz pers. comm.
WY	Est. 400 breeding pop.	400			A. Cerovski pers. comm.
Cattle Egret (b)			20	1	
ID	S. ID 1993: 10 nests	20			Trost and Gerstell 1994
MT	Zero	0			D. Casey pers. comm.
WY	Zero	0			A. Cerovski pers. comm.
Black-crowned Night-Heron (b)			520	2	
ID	S. ID 1993: 35 nests	70			Trost and Gerstell 1994
MT	Est. 50 breeding pop.	50			D. Casey pers. comm.
OR	Confirmed breeding bird atlas 1995-99	unknown			Adamus et al. 2001
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 200 breeding pop.	200			A. Cerovski pers. comm.
American Bittern (b)	insufficient data		unknown	1	
White-faced Ibis (b)			1,708	2	
ID	S. ID 1993: 710 nests	1,420			Trost and Gerstell 1994
MT	Est. 20 breeding pop.	20			D. Casey pers. comm.
WY	Est. 268 breeding pop.	268			A. Cerovski pers. comm.
American White Pelican (b)			10,500	2	
MT	Est. 8,000 breeding pop.	8,000			D. Casey pers. comm.
WA	Zero	0			R. Friesz pers. comm.
WY	Est. 2,500 breeding pop.	2,500			A. Cerovski pers. comm.
Common Loon (b)			270	3	
ID	Est. 2004: up to 14 breeding pop.	14			C. Moulton pers. comm.
MT	Est. 200 breeding pop.	200			D. Casey pers. comm.
WA	3 nests	6			Richardson et al. 2000
WY	Est. 50 breeding pop.	50			A. Cerovski pers. comm.

[1] Total population estimate counted at wintering areas = 3, but breeding distribution not available by state.

[2] Total population estimate counted at staging areas = 3, but breeding distribution not available by state.

Table D-4. Waterbird population estimates and their associated data quality (DQ) indices for Bird Conservation Region (BCR) 15 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Greater Sandhill Crane (CVP) (b)			128	3	
	2000: 64 pairs	128			Ivey and Herziger 2000
Virginia Rail (b)	insufficient data		unknown	1	
Sora (b)	insufficient data		unknown	1	
American Coot (b)	insufficient data		unknown	1	
Ring-billed Gull (m)	insufficient data		unknown	1	
California Gull (b)	Occasionally nest L. Almanor, not recently	0	0	2	Shuford and Ryan 2000
Bonaparte's Gull (m)	insufficient data		unknown	1	
Caspian Tern (m)	insufficient data		unknown	1	
Forster's Tern (b)			108	2	
	Pope Marsh, Lake Tahoe 1998: 16 nests	32			PRBO unpubl. data
	Mountain Meadows Res. 1997: 38 pairs	76			Shuford 1998
Black Tern (b)			182	3	
	1997: 91 pairs	182			Shuford 1998
Pied-billed Grebe (b)	insufficient data		unknown	1	
Eared Grebe (b)			600	2	
	Mountain Meadows Res. 1999: 300 nests	600			Cooper 2004
Western Grebe (b)			1,286	2	
	Lake Almanor 2002-03 avg.: 633 nests	1,266			Ivey 2004
	Mountain Meadows 2003: 10 nests	20			Ivey 2004
Clark's Grebe (b)			12	2	
	Lake Almanor 2003: 12 adults with young	12			Ivey 2004
Double-crested Cormorant (b)			42	2	
	Butt Valley Res. 1997: 21 nests	42			Shuford 1998
Snowy Egret (m)	insufficient data		unknown	1	
Great Blue Heron (b)	insufficient data		unknown	1	

Table D-4. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Great Egret (m)	insufficient data		unknown	1	
Green Heron (b)	insufficient data		unknown	1	
Black-crowned Night-Heron (b)	insufficient data		unknown	1	
American Bittern (b)	insufficient data		unknown	1	
White-faced Ibis (b)			2,854	2	
	Sierra Valley 2000: 1,427 pairs	2,854			D. Shuford pers. comm.
Common Loon (b)	Extirpated		0	1	PRBO 2003

Table D-5. Waterbird population estimates and their associated data quality (DQ) indices for Bird Conservation Region (BCR) 16 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Greater Sandhill Crane (RMP) (b)	300	300	300	2	R. Levad pers. comm.
CO					
Greater Sandhill Crane (RMP) (m)[1]	Entire pop. likely stages at San Luis Valley	18,680	>90% of NA pop.	3	
CO					Sharp et al. 2002
Sandhill Crane (MCP) (m)	Est. 6,700	6,700	>3% of NA pop.	2	
CO					Sharp et al. 2002
NM	Est. 12,500	12,500			Sharp et al. 2002
Virginia Rail (b)	insufficient data		unknown	1	
Sora (b)	insufficient data		unknown	1	
Common Moorhen (b)	<10 pairs	20		1	
NM			20		B. Howe pers. comm.
American Coot (b)	insufficient data		unknown	1	
Ring-billed Gull (m)	insufficient data		unknown	1	
California Gull (b)	500 nests	1,000	1,000	3	
CO					R. Levad pers. comm.
Bonaparte's Gull (m)	insufficient data		unknown	1	
Franklin's Gull (b)	Est. 100 breeding pop.	100	100	3	
CO					R. Levad pers. comm.
Forster's Tern (b)	1994-2004 avg.: 29 pairs	58	72	2	
CO					R. Levad pers. comm.
UT	Ouray NWR 1990-99 avg.: 14 breed. pop.	14			USFWS data
Black Tern (b)	1994-2004 avg.: 7 nests	14	24	2	
CO					R. Levad pers. comm.
UT	Ouray NWR 1990-99 avg.: 10 breed. pop.	10			USFWS data
Pied-billed Grebe (b)			unknown	1	
NM	<100	100			B. Howe pers. comm.
Eared Grebe (b)			6,704	2	
AZ	Est. avg. 400 nests	800			T. Supplee pers. comm.

Table D-5. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
CO	Est. avg. 2,000 nests	4,000			R. Levad pers. comm.
NM	Stinking Lake 1993-97 avg.: 950 nests	1,900			Stahlecker 1996, 1997
UT	Ouray NWR 1990-99 avg.: 4 breed. pop.	4			USFWS data
Western Grebe (b)			382	2	
AZ	Est. avg. 100 nests	200			T. Supplee pers. comm.
CO	Est. avg. 75 nests	150			R. Levad pers. comm.
UT	Ouray NWR 1990-99 avg.: 32 breed. pop.	32			USFWS data
Clark's Grebe (b)			210	2	
AZ	Est. avg. 25 nests	50			T. Supplee pers. comm.
CO	Est. avg. 75 nests	150			R. Levad pers. comm.
NM	<5 nests	10			B. Howe pers. comm.
Double-crested Cormorant (b)			722	2	
AZ	Est. avg. 65 pairs	130			T. Supplee pers. comm.
CO	Est. 500 breeding pop.	500			R. Levad pers. comm.
UT	Ouray NWR 1990-99 avg.: 92 breed. pop.	92			USFWS data
Little Blue Heron (b)			unknown	1	
NM	1-2 nests, occasionally	4			B. Howe pers. comm.
Snowy Egret (b)			940	2	
CO	Est. avg. 200 nests	400			R. Levad pers. comm.
NM	Est. avg. 250 nests	500			B. Howe pers. comm.
UT	Ouray NWR 1990-99 avg.: 40 breed. pop.	40			USFWS data
Great Blue Heron (b)			2,082	2	
AZ	Est. avg. 75 nests	150			T. Supplee pers. comm.
CO	Est. 900 breeding pop.	900			R. Levad pers. comm.
NM	2001: 486 nests	972			B. Howe pers. comm.
UT	Ouray NWR 1990-99 avg.: 60 breed. pop.	60			USFWS data
Great Egret (m)	insufficient data		unknown	1	

Table D-5. Continued.

Species	Population data	Area pop. estimate	Total BCR pop.	DQ index	Population data source
Cattle Egret (b)			226	2	
CO	Est. avg. 100 nests	200			R. Levad pers. comm.
NM	Avg. 26 breeding pop.	26			B. Howe pers. comm.
Green Heron (b)			220	1	
CO	>10 nests	20			R. Levad pers. comm.
NM	~ 100 nests	200			B. Howe pers. comm.
Black-crowned Night-Heron (b)			656	2	
CO	Est. avg. 300 nests	600			R. Levad pers. comm.
NM	Stinking Lake 1990-97 avg.: 20 nests	40			Stahlecker 1996, 1997
UT	Ouray NWR 1990-99 avg.: 16 breed. pop.	16			USFWS data
Least Bittern (b)	insufficient data		unknown	1	
American Bittern (b)	insufficient data		unknown	1	
White-faced Ibis (b)			10,124	2	
AZ	Zero	0			T. Supplee pers. comm.
CO	Est. avg. 5,000 nests	10,000			R. Levad pers. comm.
NM	Stinking Lake 1990-97 avg.: 14 nests	28			Stahlecker 1996, 1997
UT	Ouray NWR 1997-99 avg.: 48 nests	96			Ivey et al. *in prep* b
American White Pelican (b)			400	3	
CO	Est. avg. 200 nests	400			R. Levad pers. comm.
AZ, NM, UT	No breeding	0			
Common Loon (m)	insufficient data		unknown	1	

[1] Listed as separate migrant species because entire North American population likely stages at this site.

Table D-6. Waterbird population estimates and Area Importance (AI) scores in Bird Conservation Region (BCR) 9 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	N. American pop. estimate	Source of N. American pop. estimate	BCR pop. estimate	% of N. American pop. in BCR	BCR AI score[1]	Comments on AI score
Greater Sandhill Crane (CVP) (b)	8,000	G. Ivey pers. observ.	3,002	38%	4	
Greater Sandhill Crane (CVP) (m)	8,000	G. Ivey pers. observ.	unknown	>90%	5	entire pop.
Greater Sandhill Crane (LCRVP) (b)	2,000	Pacific Flyway Council 1995	1,900	95%	5	
Greater Sandhill Crane (LCRVP) (m)	2,000	Pacific Flyway Council 1995	unknown	>90%	5	entire pop.
Greater Sandhill Crane (RMP) (b)	18,680	Sharp et al. 2002	1,868	10%	3	entire pop.
Lesser Sandhill Crane (PFP) (m)	25,000	Pacific Flyway Council 1983	unknown	>90%	5	
Yellow Rail (b)	unknown		608	unknown	5	entire western pop.
Virginia Rail (b)	unknown		unknown	unknown	3	prof. judgment
Sora (b)	unknown		unknown	unknown	3	prof. judgment
Common Moorhen (b)	unknown		unknown	unknown	1	prof. judgment
American Coot (b)	2,000,000	Kushlan et al. 2002	unknown	unknown	3	prof. judgment
Ring-billed Gull (b)	1,700,000	Kushlan et al. 2002	70,116	4%	2	
California Gull (b)	414,000	Kushlan et al. 2002	314,398	76%	5	
Glaucous-winged Gull (b)	380,000	Kushlan et al. 2002	0	<1%	1	nests occasionally
Herring Gull (m)	246,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Bonaparte's Gull (m)	unknown	Kushlan et al. 2002	unknown	unknown	2	prof. judgment
Franklin's Gull (b)	653,236	Kushlan et al. 2002	42,588	7%	2	
Franklin's Gull (m)	653,236	Kushlan et al. 2002	unknown	>13%	3	
Caspian Tern (b)	68,000	Kushlan et al. 2002	3,940	6%	2	
Common Tern (b)	300,000	Kushlan et al. 2002	0	<1%	1	may breed in ID
Forster's Tern (b)	49,500	Kushlan et al. 2002	7,342	15%	3	
Black Tern (b)	300,000	Kushlan et al. 2002	7,925	3%	2	
Pied-billed Grebe (b)	unknown		unknown	unknown	3	prof. judgment
Red-necked Grebe (b)	unknown		32	<1%	1	prof. judgment
Horned Grebe (b)	unknown		unknown	unknown	2	prof. judgment
Eared Grebe (b)	3,800,000	Kushlan et al. 2002	27,318	<1%	1	

Table D-6. Continued.

Species	N. American pop. estimate	Source of N. American pop. estimate	BCR pop. estimate	% of N. American pop. in BCR	BCR AI score[1]	Comments on AI score
Eared Grebe (m)	3,800,000	Kushlan et al. 2002	unknown	>90%	5	
Western Grebe (b)	110,000	Kushlan et al. 2002	12,088	11%	3	
Clark's Grebe (b)	15,000	Kushlan et al. 2002	3,546	24%	3	
Double-crested Cormorant (b)	740,000	Kushlan et al. 2002	10,556	1%	2	
Snowy Egret (b)	143,000	Kushlan et al. 2002	3,322	2%	2	
Great Blue Heron (b)	83,000	Kushlan et al. 2002	4,560	5%	2	
Great Egret (b)	180,000	Kushlan et al. 2002	2,238	1%	2	
Cattle Egret (b)	unknown		916	<1%	1	prof. judgment
Green Heron (b)	unknown		unknown	unknown	1	prof. judgment
Black-crowned Night-Heron (b)	50,000	Kushlan et al. 2002	5,586	11%	3	
Least Bittern (b)	unknown		unknown	unknown	1	prof. judgment
American Bittern (b)	unknown		unknown	unknown	3	prof. judgment
White-faced Ibis (b)	100,000	Kushlan et al. 2002	57,978	58%	5	
American White Pelican (b)	218,000-breeders	Kushlan et al. 2002	26,924	22%	3	
American White Pelican (m)	120,000	Kushlan et al. 2002	unknown	>46%	4	
Common Loon (b)	unknown		8	unknown	1	prof. judgment
Common Loon (m)	unknown		>1,050	unknown	2	prof. judgment

[1] Based on percentage of North American population in a BCR: 50%=5, 25-49%=4, 10-24%=3, 1-9%=2, <1%=1.

Table D-7. Waterbird population estimates and Area Importance (AI) scores in Bird Conservation Region (BCR) 10 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	N. American pop. estimate	Source of N. American pop. estimate	BCR pop. estimate	% of N. American pop. in BCR	BCR AI score[1]	Comments on AI score
Greater Sandhill Crane (CVP) (b)	8,000	G. Ivey pers. observ.	164	2%	2	
Greater Sandhill Crane (LCRVP) (b)	2,000	Pacific Flyway Council 1995	100	5%	2	
Greater Sandhill Crane (RMP) (b)	18,680	Sharp et al. 2002	16,512	88%	5	
Virginia Rail (b)	unknown		unknown	unknown	2	prof. judgment
Sora (b)	unknown		unknown	unknown	2	prof. judgment
American Coot (b)	2,000,000	Kushlan et al. 2002	unknown	unknown	2	prof. judgment
Ring-billed Gull (b)	1,700,000	Kushlan et al. 2002	9,350	1%	2	
California Gull (b)	414,000	Kushlan et al. 2002	9,474	2%	2	
Herring Gull (m)	246,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Bonaparte's Gull (m)	unknown	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Franklin's Gull (b)	653,236	Kushlan et al. 2002	19,050	3%	2	
Caspian Tern (b)	68,000	Kushlan et al. 2002	180	<1%	1	
Forster's Tern (b)	49,500	Kushlan et al. 2002	176	<1%	1	
Black Tern (b)	300,000	Kushlan et al. 2002	674	<1%	1	
Pied-billed Grebe (b)	unknown		unknown	unknown	2	prof. judgment
Red-necked Grebe (b)	unknown		500	unknown	2	prof. judgment
Horned Grebe (b)	unknown		unknown	unknown	2	prof. judgment
Eared Grebe (b)	3,800,000	Kushlan et al. 2002	2,412	<1%	1	
Western Grebe (b)	110,000	Kushlan et al. 2002	3,580	3%	2	
Clark's Grebe (b)	15,000	Kushlan et al. 2002	106	<1%	1	
Double-crested Cormorant (b)	740,000	Kushlan et al. 2002	1,976	<1%	1	
Snowy Egret (b)	143,000	Kushlan et al. 2002	70	<1%	1	
Great Blue Heron (b)	83,000	Kushlan et al. 2002	1,600	2%	2	
Cattle Egret (b)	unknown	Kushlan et al. 2002	20	<1%	1	
Black-crowned Night-Heron (b)	50,000	Kushlan et al. 2002	520	1%	2	
American Bittern (b)	unknown		unknown	unknown	2	prof. judgment
White-faced Ibis (b)	100,000	Kushlan et al. 2002	1,708	2%	2	
American White Pelican (b)	218,000 breeders	King and Anderson 2005	10,500	5%	2	
Common Loon (b)	unknown		270	unknown	2	prof. judgment

[1] Based on percentage of North American population in a BCR: 50%=5, 25-49%=4, 10-24%=3, 1-9%=2, <1=1.

Table D-8. Waterbird population estimates and Area Importance (AI) scores in Bird Conservation Region (BCR) 15 in the Intermountain West Waterbird Conservation Plan (b = breeding, m =migrant).

Species	N. American pop. estimate	Source of N. American pop. estimate	BCR pop. estimate	% of N. American pop. in BCR	BCR AI score[1]	Comments on AI score
Greater Sandhill Crane (CVP) (b)	8,000	G. Ivey pers. observ.	128	2%	2	
Virginia Rail (b)	unknown		unknown	unknown	1	prof. judgment
Sora (b)	unknown		unknown	unknown	1	prof. judgment
American Coot (b)	2,000,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Ring-billed Gull (m)	1,700,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
California Gull (b)	414,000	Kushlan et al. 2002	0	<1%	1	nests occasionally
Bonaparte's Gull (m)	unknown	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Caspian Tern (m)	68,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Forster's Tern (b)	49,500	Kushlan et al. 2002	108	<1%	1	
Black Tern (b)	300,000	Kushlan et al. 2002	182	<1%	1	prof. judgment
Pied-billed Grebe (b)	unknown		unknown	unknown	1	prof. judgment
Eared Grebe (b)	3,800,000	Kushlan et al. 2002	600	<1%	1	
Western Grebe (b)	110,000	Kushlan et al. 2002	1,286	1%	2	
Clark's Grebe (b)	15,000	Kushlan et al. 2002	12	<1%	1	prof. judgment
Double-crested Cormorant (b)	740,000	Kushlan et al. 2002	42	<1%	1	
Snowy Egret (m)	143,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Great Blue Heron (b)	83,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Great Egret (m)	180,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Green Heron (b)	unknown		unknown	unknown	1	prof. judgment
Black-crowned Night-Heron (b)	50,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
American Bittern (b)	unknown		unknown	unknown	1	prof. judgment
White-faced Ibis (b)	100,000	Kushlan et al. 2002	2,854	3%	2	
Common Loon (b)	unknown		0	0	NA	extirpated

[1] Based on percentage of North American population in a BCR: 50%=5, 25-49%=4, 10-24%=3, 1-9%=2, <1=1.

Table D-9. Waterbird population estimates and Area Importance (AI) scores in Bird Conservation Region (BCR) 16 in the Intermountain West Waterbird Conservation Plan (b = breeding, m =migrant).

Species	N. American pop. estimate	Source of N. American pop. estimate	BCR pop. estimate	% of N. American pop. in BCR	BCR AI score[1]	Comments on AI score
Greater Sandhill Crane (RMP) (b)	18,680	Sharp et al. 2002	300	2%	2	entire pop.
Greater Sandhill Crane (RMP) (m)	18,680	Sharp et al. 2002	unknown	>90%	5	
Sandhill Crane (MCP) (m)	464,000	Sharp et al. 2002	unknown	>3%	2	prof. judgment
Virginia Rail (b)	unknown		unknown	unknown	1	prof. judgment
Sora (b)	unknown		unknown	unknown	1	prof. judgment
Common Moorhen (b)	unknown		20	unknown	1	prof. judgment
American Coot (b)	2,000,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Ring-billed Gull (m)	1,700,000	Kushlan et al. 2002	unknown	unknown	1	
California Gull (b)	414,000	Kushlan et al. 2002	1,000	<1%	1	prof. judgment
Bonaparte's Gull (m)	unknown	Kushlan et al. 2002	unknown	unknown	1	
Franklin's Gull (b)	653,236	Kushlan et al. 2002	100	<1%	1	
Forster's Tern (b)	49,500	Kushlan et al. 2002	72	<1%	1	
Black Tern (b)	300,000	Kushlan et al. 2002	24	<1%	1	prof. judgment
Pied-billed Grebe (b)	unknown		unknown	unknown	1	
Eared Grebe (b)	3,800,000	Kushlan et al. 2002	6,704	<1%	1	
Western Grebe (b)	110,000	Kushlan et al. 2002	382	<1%	1	
Clark's Grebe (b)	15,000	Kushlan et al. 2002	210	1%	2	
Double-crested Cormorant (b)	740,000	Kushlan et al. 2002	722	<1%	1	prof. judgment
Little Blue Heron (b)	unknown	Kushlan et al. 2002	unknown	unknown	1	
Snowy Egret (b)	143,000	Kushlan et al. 2002	940	<1%	1	
Great Blue Heron (b)	83,000	Kushlan et al. 2002	2,082	3%	2	prof. judgment
Great Egret (m)	180,000	Kushlan et al. 2002	unknown	unknown	1	prof. judgment
Cattle Egret (b)	unknown	Kushlan et al. 2002	226	unknown	1	prof. judgment
Green Heron (b)	unknown	Kushlan et al. 2002	220	unknown	1	
Black-crowned Night-Heron (b)	50,000	Kushlan et al. 2002	656	1%	2	prof. judgment
Least Bittern (b)	unknown		unknown	unknown	1	prof. judgment
American Bittern (b)	unknown		unknown	unknown	1	
White-faced Ibis (b)	100,000	Kushlan et al. 2002	10,124	10%	3	prof. judgment
American White Pelican (b)	218,000	King and Anderson 2005	400	<1%	1	
Common Loon (m)	unknown		unknown	unknown	1	prof. judgment

[1] Based on percentage of North American population in a BCR: 50%=5, 25-49%=4, 10-24%=3, 1-9%=2, <1=1.

Table D-10. Breeding population estimates for selected waterbird species, percentage of the North American population, and Area Importance (AI) score in the Intermountain West Waterbird Conservation Plan.

Species	Area	Estimated breeding population	% of N. American breeding pop.	AI score[1]
Greater Sandhill Crane (CVP) (b)	North America	8,000		
	BCR 9	3,002	38%	4
	BCR 10	164	2%	2
	BCR 15	128	2%	2
	BCR 16	0	0	NA
	Intermountain West total	3,294	42%	4
Greater Sandhill Crane (LCRVP) (b)	North America	2,000		
	BCR 9	1,900	95%	5
	BCR 10	100	5%	2
	BCR 15	0	0	NA
	BCR 16	0	0	NA
	Intermountain West total	2,000	100%	5
Greater Sandhill Crane (RMP) (b)	North America	18,680		
	BCR 9	1,868	10%	3
	BCR 10	16,512	88%	5
	BCR 15	0	0	NA
	BCR 16	300	2%	2
	Intermountain West total	18,680	100%	5
Ring-billed Gull (b)	North America	1,700,000		
	BCR 9	70,116	4%	2
	BCR 10	9,350	1%	2
	BCR 15	0	0	NA
	BCR 16	0	0	NA
	Intermountain West total	79,466	5%	2
California Gull (b)	North America	414,000		
	BCR 9	314,398	77%	5
	BCR 10	9,474	2%	2
	BCR 15	0	0	NA
	BCR 16	1,000	<1%	1
	Intermountain West total	324,872	78%	5
Franklin's Gull (b)	North America	653,236		
	BCR 9	42,588	7%	2
	BCR 10	19,050	3%	2
	BCR 15	0	0	NA
	BCR 16	100	<1%	1
	Intermountain West total	61,738	10%	3

Table D-10. Continued.

Species	Area	Estimated breeding population	% of N. American breeding pop.	AI score[1]
Caspian Tern (b)	North America	68,000		
	BCR 9	3,940	6%	2
	BCR 10	180	<1%	1
	BCR 15	0	0	NA
	BCR 16	0	0	NA
	Intermountain West total	4,120	6%	2
Forster's Tern (b)	North America	49,500		
	BCR 9	7,342	15%	3
	BCR 10	176	<1%	1
	BCR 15	108	<1%	1
	BCR 16	72	<1%	1
	Intermountain West total	7,698	16%	3
Black Tern (b)	North America	300,000		
	BCR 9	7,925	3%	2
	BCR 10	674	<1%	1
	BCR 15	182	<1%	1
	BCR 16	24	<1%	1
	Intermountain West total	8,805	3%	2
Eared Grebe (b)	North America	3,800,000		
	BCR 9	27,318	<1%	1
	BCR 10	2,412	<1%	1
	BCR 15	600	<1%	1
	BCR 16	6,704	<1%	1
	Intermountain West total	37,034	1%	2
Western Grebe (b)	North America	110,000		
	BCR 9	12,088	11%	3
	BCR 10	3,580	3%	2
	BCR 15	1,286	1%	2
	BCR 16	382	<1%	1
	Intermountain West total	17,336	16%	3
Clark's Grebe (b)	North America	15,000		
	BCR 9	3,546	24%	3
	BCR 10	106	<1%	1
	BCR 15	12	<1%	1
	BCR 16	210	1%	2
	Intermountain West total	3,874	26%	3

Table D-10. Continued.

Species	Area	Estimated breeding population	% of N. American breeding pop.	AI score[1]
Double-crested Cormorant (b)	North America	740,000		
	BCR 9	10,556	1%	2
	BCR 10	1,976	<1%	1
	BCR 15	42	<1%	1
	BCR 16	722	<1%	1
	Intermountain West total	13,296	2%	2
Snowy Egret (b)	North America	143,000		
	BCR 9	3,322	2%	2
	BCR 10	70	<1%	1
	BCR 15	0	0	NA
	BCR 16	940	<1%	1
	Intermountain West total	4,332	3%	2
Great Blue Heron (b)	North America	83,000		
	BCR 9	4,560	5%	2
	BCR 10	1,600	2%	2
	BCR 15	unknown	unknown	1
	BCR 16	2,082	3%	2
	Intermountain West total	8,242	10%	3
Great Egret (b)	North America	180,000		
	BCR 9	2,238	1%	2
	BCR 10	0	0	NA
	BCR 15	0	0	NA
	BCR 16	0	0	NA
	Intermountain West total	2,238	1%	2
Black-crowned	North America	50,000		
Night-Heron (b)	BCR 9	5,586	11%	3
	BCR 10	520	1%	2
	BCR 15	unknown	unknown	1
	BCR 16	656	1%	2
	Intermountain West total	6,762	13%	3
White-faced Ibis (b)	North America	100,000		
	BCR 9	57,978	58%	5
	BCR 10	1,708	2%	2
	BCR 15	2,854	3%	2
	BCR 16	10,124	10%	3
	Intermountain West total	72,664	73%	5

Table D-10. Continued.

Species	Area	Estimated breeding population	% of N. American breeding pop.	AI score[1]
American White Pelican (b)	North America	120,000		
	BCR 9	26,924	22%	3
	BCR 10	10,500	9%	2
	BCR 15	0	0	NA
	BCR 16	400	<1%	1
	Intermountain West total	37,824	32%	4

[1] Based on percentage of North American population in a BCR: 50%=5, 25-49%=4, 10-24%=3, 1-9%=2, <1=1.

Table D-11. Waterbird species on lists of USFWS' Birds of Conservation Concern (BCC); state Endangered (SE), Threatened (ST), or Sensitive Species/Species of Concern (SC)[1]; or Focal priority species (F) in Partners In Flight (PIF) state and regional Bird Conservation Plans and Physiographic Area Plans[2], by Bird Conservation Region (BCR) in the Intermountain West Waterbird Conservation Plan.

Species[3]	BCR 9	BCR 10	BCR 15[4]	BCR 16
Greater Sandhill Crane (CVP)	SE: WA[5] ST: CA SC: OR F: NV, Columbia Plateau[5]	SC: OR	ST: CA	
Greater Sandhill Crane (LCRVP)	F: ID[5], NV	F: ID[5]		
Greater Sandhill Crane (RMP)	F: ID[5]	SC: WY[5] F: ID[5]		SC: CO[5]
Lesser Sandhill Crane (PFP)	SE: WA[5] SC: CA			
Yellow Rail	BCC: National, USFWS Reg. 1 SC: CA, OR			
Ring-billed Gull	F: ID			
California Gull	F: ID	F: ID		
Franklin's Gull	SC: OR F: ID, Basin & Range, Columbia Plateau	SC: MT, WY F: ID, MT, WY, Central Rocky Mountains		
Caspian Tern	F: ID	SC: MT, WY F: MT		
Forster's Tern	F: ID	SC: MT, WY F: MT, WY		
Black Tern	SC: CA, ID F: ID, NV	SC: ID, MT, WY F: ID, MT, WY	SC3: CA	
Red-necked Grebe	SC: OR	F: ID		
Horned Grebe		F: MT		
Eared Grebe	F: ID	F: ID		
Western Grebe	SC: WA F: ID, Columbia Plateau	SC: WY F: ID, WY		
Clark's Grebe	F: ID, NV	SC: WY F: ID, MT, WY		SC: AZ F: NM
Snowy Egret	SC: OR F: ID	SC: WY F: ID		
Great Egret	SC: ID			
Black-crowned Night-Heron		SC: MT, WY F: MT		
Least Bittern	SC: CA			SC: AZ
American Bittern	F: ID	SC: WY F: ID, MT, WY		SC: AZ F: AZ, NM
White-faced Ibis	F: ID, NV	SC: MT, WY F: ID, MT		F: NM
American White Pelican	SE: WA SC: CA, ID, OR, UT F: ID, NV, UT, Basin & Range	SC: MT, WY F: MT, WY, Central Rocky Mountains, Wyoming Basin		
Common Loon	SC: CA, ID, WA	SC: ID, MT, WA, WY F: MT, WY	SCe: CA	

[1] SM (State Monitor) species for Washington and Species on Review for Montana were not included.
[2] Latta et al. 1999, Neel 1999, Idaho PIF 2000, Montana PIF 2000, Rustay 2000, Parrish et al. 2002 and Nicholoff 2003.
[3] No SC lists for NV or NM, and CA list is in review, so adjustments may be needed after final list is sanctioned. No waterbirds were listed in PIF plans for California, Colorado, Oregon/Washington, or the Sierra Nevada, Colorado Plateau, Utah Mountains or Southern Rocky Mountains Physiographic Area plans.
[4] The draft California Bird Species of Concern List (PRBO 2003) details are listed for this BCR because priorities were used for ranking species here because only one state (see Step 5). SC3: Third priority. SCe: Extirpated status.
[5] Status does not specify subspecies of Sandhill Crane.

Table D-12. Preliminary concern matrix for breeding colonial waterbirds in the Intermountain West based on NAWCP[1].

	Global Distribution				
Concern Category	**North America**	**Western Hemisphere**	**Northern Hemisphere**	**Cosmopolitan**	**Peripheral**
Highly Imperiled					
High		Little Blue Heron Snowy Egret			
Moderate	American White Pelican California Gull Forster's Tern Western Grebe	Bonaparte's Gull Franklin's Gull	(Thayer's Gull)	Black-crowned Night-Heron Black Tern Eared Grebe	
Low	Clark's Grebe Green Heron	White-faced Ibis	Glaucous-winged Gull	Caspian Tern Common Tern Herring Gull	
Not at Risk	Double-crested Cormorant Ring-billed Gull	Great Blue Heron		Cattle Egret Great Egret (Mew Gull)	

[1] Global distribution categories were broadly defined as:
- North America: Species that breed and winter only in North America and associated oceanic regions.
- Western Hemisphere: Species that breed and winter in North and South America and associated oceanic regions.
- Northern Hemisphere: All species, except those included in the above categories, that breed and winter in the Northern Hemisphere and associated oceanic regions.
- Cosmopolitan: Species that breed and winter in most hemispheres including North America and associated oceanic regions.
- Peripheral: Species that occur largely outside of North America but with breeding and/or non-breeding ranges that overlap peripherally with North America and associated oceanic regions.

Table D-13. Concern matrix for waterbirds in Bird Conservation Region 9 in the Intermountain West Waterbird Conservation Plan (breeding species unless noted as migrant; b = breeding, m = migrant)[1].

	Global Distribution				
Concern Category	**North America**	**Western Hemisphere**	**Northern Hemisphere**	**Cosmopolitan**	**Peripheral**
High Concern	Greater Sandhill Crane (CVP) (b, m) Greater Sandhill Crane (LCRVP) (m) Yellow Rail Western Grebe Clark's Grebe American White Pelican (b, m)	Franklin's Gull (b) Snowy Egret	Lesser Sandhill Crane (PFP) (m) Common Loon (b)	Black Tern Eared Grebe (m)	
Moderate Concern	Greater Sandhill Crane (LCRVP) (b) Sora California Gull Forster's Tern American Bittern	Virginia Rail Franklin's Gull (m) Pied-billed Grebe Great Blue Heron Least Bittern White-faced Ibis	Common Loon (m)	Black-crowned Night-Heron	
Low Concern	Greater Sandhill Crane (RMP)		Red-necked Grebe Horned Grebe	Caspian Tern Eared Grebe (b)	
Not at Risk	American Coot Ring-billed Gull Bonaparte's Gull (m) Green Heron Double-crested Cormorant	Common Moorhen	Glaucous-winged Gull	Great Egret Cattle Egret	Herring Gull (m) Common Tern

[1] Changes in rankings for colonial species (all species not noted below remained at the national ranking level):
- California Gull kept at Moderate because although AI = 5, healthy populations, lack of threats, and increasing trend.
- Glaucous-winged Gull to Not at Risk because AI = 1.
- Herring Gull and Bonaparte's Gull to Not at Risk because migrant, Herring Gull also to Peripheral because of rarity.
- Franklin's Gull (b) to High because SC in OR, Focal in ID and Basin & Range and Columbia Plateau PIF plans.
- Franklin's Gull (m) to Moderate (UT only) because AI = 3 and reliance on specific food source at Great Salt Lake (brine flies).
- Common Tern to Not at Risk because AI = 1 and breeding status unknown, and Peripheral because of rarity.
- Black Tern to High because SC in ID and on draft CA SC list, and Focal in ID and NV.
- Eared Grebe (b) to Low because AI = 1.
- Eared Grebe (m) to High (CA and UT) because AI = 5 and threat of water diversion and development at Lake Abert staging site (OR).
- Western Grebe to High because SC in WA, Focal in ID and Columbia Plateau PIF plan, and threats (disturbance and water drawdown in CA and ID). Clark's Grebe also to High because shares issues, managed together (Focal ID and NV).
- Great Blue Heron to Moderate because of moderate threat of potential loss of riparian forests.
- Green Heron to Not at Risk because AI = 1.
- White-faced Ibis to Moderate because Focal in ID and NV and AI = 5.
- American White Pelican (b) to High because SE in WA; SC in ID, OR, UT, and on draft CA SC list; and Focal in ID, NV, UT, and Basin and Range PIF plan.
- American White Pelican (m) to High (UT only) because AI = 5.

Rankings for marshbirds:
- Greater Sandhill Crane (CVP) (b) to High because SE in WA, ST in CA, SC in OR, and Focal in NV and Columbia Plateau PIF plan.
- Greater Sandhill Crane (CVP) (m) to High (CA, OR, WA only) because AI = 5.
- Greater Sandhill Crane (LCRVP) (b) to Moderate because Focal in ID and NV.
- Greater Sandhill Crane (LCRVP) (m) (NV only) to High because AI = 5.
- Greater Sandhill Crane (RMP) to Low because Focal in ID.
- Lesser Sandhill Crane (PFP) (m) to High (CA, ID, OR, WA only) because AI = 5.
- Yellow Rail to High because on National and Region 1 BCC lists, SC in CA and OR.
- Virginia Rail, Sora, Pied-billed Grebe, Least Bittern (on draft CA SC list), and American Bittern (Focal in ID) to Moderate per Regional Waterbird Working Group.
- Common Moorhen to Not at Risk because AI = 1.
- American Coot to Moderate because AI = 3, but to Not at Risk per Regional Waterbird Working Group.
- Red-necked Grebe to Low because SC in OR.
- Horned Grebe to Low because AI = 2.
- Common Loon (b) to High because SC in ID and WA, on draft CA SC list (extirpated), and likely extirpated in OR.
- Common Loon (m) to Moderate (NV only) because of mercury contamination threat at Walker Lake, NV.

Table D-14. Concern matrix for waterbirds in Bird Conservation Region 10 in the Intermountain West Waterbird Conservation Plan (breeding species unless noted as migrant; b = breeding, m = migrant)[1].

	Global Distribution				
Concern Category	**North America**	**Western Hemisphere**	**Northern Hemisphere**	**Cosmopolitan**	**Peripheral**
High Concern	American White Pelican	Franklin's Gull	Common Loon		
Moderate Concern	Greater Sandhill Crane (RMP) Sora California Gull Forster's Tern Western Grebe Clark's Grebe American Bittern	Virginia Rail Pied-billed Grebe Snowy Egret Great Blue Heron White-faced Ibis		Black Tern Black-crowned Night-Heron	
Low Concern	Greater Sandhill Crane (CVP) Greater Sandhill Crane (LCRVP)		Red-necked Grebe Horned Grebe	Caspian Tern Eared Grebe	
Not at Risk	American Coot Ring-billed Gull Bonaparte's Gull (m) Double-crested Cormorant			Cattle Egret	Herring Gull (m)

[1] Changes in rankings for colonial species (all species not noted below remained at the national ranking level):
- Herring Gull to Not at Risk because migrant and Peripheral because of rarity.
- Bonaparte's Gull to Not at Risk because migrant.
- Franklin's Gull to High because SC in MT and WY; and Focal in ID, MT, WY, and Central Rocky Mountains PIF plans.
- Caspian Tern to Not at Risk because AI = 1, but to Low because SC in MT and WY and Focal for MT.
- Forster's Tern to Low because AI = 1, but to Moderate because SC and Focal in MT and WY.
- Black Tern to Low because AI = 1, but to Moderate because SC and Focal in ID, MT, WY.
- Eared Grebe to Low because AI = 1, Focal only in ID.
- Western Grebe to Low because AI = 1, but to Moderate because SC in WY, Focal in ID and WY, and water drawdown and disturbance issues in ID (C. Moulton pers. comm.). Clark's Grebe also to Moderate because shares issues and managed together (SC in WY; Focal in ID, MT, and WY).
- Snowy Egret to Moderate because AI = 1, remains there because only SC in WY and Focal in ID.
- Great Blue Heron to Moderate because of moderate threat of potential loss of riparian forests.
- White-faced Ibis to Moderate because SC in MT and WY and Focal in ID and MT.
- American White Pelican to High because SC in MT and WY, and Focal in MT, WY and Central Rocky Mountains and Wyoming Basin PIF plans.

Rankings for marshbirds:
- Greater Sandhill Crane (CVP) to Low because SC in OR.
- Greater Sandhill Crane (LCRVP) to Low because Focal in ID.
- Greater Sandhill Crane (RMP) to Moderate because SC in WY and Focal in ID.
- Virginia Rail, Sora, and Pied-billed Grebe to Moderate per Regional Waterbird Working Group (see below for American Bittern).
- American Coot to Low because AI = 2, but to Not at Risk per Regional Waterbird Working Group.
- Red-necked Grebe to Low because Focal in ID.
- Horned Grebe to Low because Focal in MT.
- American Bittern to Moderate because SC in WY and Focal in ID, MT, and WY.
- Common Loon to High because SC in ID, MT, WA, and WY; Focal in MT and WY; and because of disturbance threats.

Table D-15. Concern matrix for waterbirds in Bird Conservation Region 15 in the Intermountain West Waterbird Conservation Plan (breeding species unless noted as migrant; b = breeding, m = migrant)[1].

	Global Distribution				
Concern Category	**North America**	**Western Hemisphere**	**Northern Hemisphere**	**Cosmopolitan**	**Peripheral**
High Concern	Greater Sandhill Crane (CVP) Western Grebe Clark's Grebe		Common Loon		
Moderate Concern	Sora American Bittern	Virginia Rail Pied-billed Grebe		Black Tern	
Low Concern	Forster's Tern	White-faced Ibis		Eared Grebe Black-crowned Night-Heron	
Not at Risk	American Coot Ring-billed Gull (m) California Gull Bonaparte's Gull (m) Double-crested Cormorant Green Heron	Snowy Egret (m) Great Blue Heron		Caspian Tern (m) Great Egret (m)	

[1] Changes in rankings for colonial species (all species not noted below remained at the national ranking level):
· California Gull to Low because AI = 1, but to Not at Risk fide D. Shuford.
· Forster's Tern, Eared Grebe, and Black-crowned Night-Heron to Low because AI = 1.
· Bonaparte's Gull, Caspian Tern, and Snowy Egret to Not at Risk because migrants.
· Black Tern to Low because AI = 1, but to Moderate because 3rd priority on draft CA SC list.
· Western and Clark's Grebe to High because of water level fluctuation and disturbance issues (Ivey 2004; L. Oring pers. comm.).
· Green Heron to Not at Risk because AI =1.

Rankings for marshbirds:
· Greater Sandhill Crane (CVP) to High because ST in CA.
· Virginia Rail, Sora, Pied-billed Grebe, and American Bittern to Moderate per Regional Waterbird Working Group.
· American Coot to Not at Risk because AI = 1.
· Common Loon to High because on extirpated category on draft CA SC list.

Table D-16. Concern matrix for waterbirds in Bird Conservation Region 16 in the Intermountain West Waterbird Conservation Plan (breeding species unless noted as migrant; b = breeding, m = migrant)[1].

	Global Distribution				
Concern Category	**North America**	**Western Hemisphere**	**Northern Hemisphere**	**Cosmopolitan**	**Peripheral**
High Concern	American Bittern Greater Sandhill Crane (RMP) (m)				
Moderate Concern	Greater Sandhill Crane (RMP) (b) Sora Western Grebe Clark's Grebe Green Heron	Virginia Rail Pied-billed Grebe Snowy Egret Least Bittern		Black Tern Black-crowned Night-Heron	Little Blue Heron
Low Concern	California Gull Forster's Tern American White Pelican	Franklin's Gull White-faced Ibis	Common Loon (m)	Eared Grebe	
Not at Risk	American Coot Ring-billed Gull (m) Double-crested Cormorant	Common Moorhen Great Blue Heron	Sandhill Crane (MCP) (m)	Cattle Egret	Bonaparte's Gull (m) Great Egret (m)

[1] Changes in rankings for colonial species (all species not noted below remained at the national ranking level):
- California Gull, Franklin's Gull, Forster's Tern, and Eared Grebe to Low because AI = 1.
- Bonaparte's Gull to Not at Risk because migrant, and Peripheral because of rarity.
- Black Tern to Low because AI =1, but to Moderate because nearly extirpated as a breeder from CO and considered high concern in the state (T. Leukering pers. comm.).
- Clark's Grebe to Moderate because SC in AZ and Focal in NM. Western Grebe also to Moderate because shares issues and managed together.
- Little Blue Heron to Moderate because AI = 1, but Peripheral because of rarity.
- Snowy Egret to Moderate because AI =1.
- Great Egret to Not at Risk because migrant, but to Peripheral fide D. Krueper.
- Green Heron to Low because AI = 1, but to Moderate fide D. Krueper.
- American White Pelican to Low because AI = 1.

Rankings for marshbirds:
- Greater Sandhill Crane (RMP) (b) to Moderate because SC in CO and extirpated from NM.
- Greater Sandhill Crane (RMP) (m) to High (CO only) because AI = 5.
- Sandhill Crane (MCP) (m) to Not at Risk because migrant.
- Virginia Rail, Sora, Pied-billed Grebe, and Least Bittern (SC in AZ) to Moderate per Regional Waterbird Working Group (see below for American Bittern).
- Common Moorhen and American Coot to Not at Risk because AI = 1.
- American Bittern to Moderate because SC in AZ and Focal in AZ and NM, but extirpated in AZ, to High fide D. Krueper.
- Common Loon (m) to Not at Risk because migrant, but to Low fide D. Krueper.

Table D-17. Concern matrix for priority waterbird species in each Bird Conservation Region (BCR) in the Intermountain West Waterbird Conservation Plan (breeding species unless noted as migrant; b = breeding, m = migrant).

Concern Category	BCR 9	BCR 10	BCR 15	BCR 16
High Concern	Greater Sandhill Crane (CVP) (b, m[1]) Greater Sandhill Crane (LCRVP) (m)[1] Lesser Sandhill Crane (PFP) (m)[1] Yellow Rail Franklin's Gull (b) Black Tern Eared Grebe (m)[1] Western Grebe Clark's Grebe Snowy Egret American White Pelican (b, m[1]) Common Loon (b)	Franklin's Gull American White Pelican Common Loon	Greater Sandhill Crane (CVP) Western Grebe Clark's Grebe Common Loon	Greater Sandhill Crane (RMP) (m)[1] American Bittern
Moderate Concern	Greater Sandhill Crane (LCRVP) (b) Virginia Rail Sora California Gull Franklin's Gull (m)[1] Forster's Tern Pied-billed Grebe Great Blue Heron Black-crowned Night-Heron Least Bittern American Bittern White-faced Ibis Common Loon (m)[1]	Greater Sandhill Crane (RMP) Virginia Rail Sora California Gull Forster's Tern Black Tern Pied-billed Grebe Western Grebe Clark's Grebe Snowy Egret Great Blue Heron Black-crowned Night-Heron American Bittern White-faced Ibis	Virginia Rail Sora Black Tern Pied-billed Grebe American Bittern	Greater Sandhill Crane (RMP) (b) Virginia Rail Sora Black Tern Pied-billed Grebe Western Grebe Clark's Grebe Snowy Egret Green Heron Black-crowned Night-Heron Least Bittern
Low Concern	Greater Sandhill Crane (RMP) Caspian Tern Red-necked Grebe Horned Grebe Eared Grebe (b)	Greater Sandhill Crane (CVP) Greater Sandhill Crane (LCRVP) Caspian Tern Red-necked Grebe Horned Grebe Eared Grebe	Forster's Tern Eared Grebe Black-crowned Night-Heron White-faced Ibis	California Gull Franklin's Gull Forster's Tern Eared Grebe White-faced Ibis American White Pelican

[1] Priority migrant species and states that received a habitat objective:

BCR 9
· Greater Sandhill Crane (CVP): CA, OR, WA
· Greater Sandhill Crane (LCRVP): NV
· Lesser Sandhill Crane (PFP): CA, ID, OR, WA
· Franklin's Gull: UT
· Eared Grebe: CA, OR, UT
· American White Pelican: UT
· Common Loon: NV

BCR 16
· Greater Sandhill Crane (RMP): CO

APPENDIX E. Species Accounts for Priority Waterbirds in the Intermountain West Waterbird Conservation Plan.

Sandhill Crane (Greater) - *Grus canadensis tabida*
Grue Canadienne, Grue de Canada - Grulla, Grulla Cenicienta, Grulla del Canada

Status Summary: Continental conservation priority: Not yet determined

Global and BCR populations: Global: For the greater subspecies: 65-75,000 (NPWRC website).

Recognized populations: Central Valley Population (CVP), Lower Colorado River Valley Population (LCRVP), and Rocky Mountain Population (RMP)

BCR 9: 3,002 CVP breeders, 1,900 LCRVP breeders, 1,868 breeders (RMP); entire CVP, LCRVP migrant
BCR 10: 164 CVP breeders, 100 LCRVP breeders, 16,512 breeders (RMP)
BCR 15: 128 CVP breeders
BCR 16: 300 RMP breeders; entire RMP migrant

Population trend in BCR 9: CVP increasing, but may be due to lack of drought or greater survey coverage (Ivey and Herziger 2000). LCRVP stable (CDFG *in prep*). In Nevada, population declined from 1983-1993, then slow rebound in mid 1990s (Nevada PIF 1999). RMP stable to slightly declining (NPWRC website), stable to increasing (NAWCP Marshbird Workshop Aug 2001).

Population trend in BCR 10: CVP increasing, but may be due to lack of drought or greater survey coverage (Ivey and Herziger 2000). RMP stable to slightly declining (NPWRC website), stable to increasing (NAWCP Marshbird Workshop Aug 2001).

Population trend in BCR 15: Increasing but may be due to lack of drought or greater survey coverage (Ivey and Herziger 2001).

Population trend in BCR 16: RMP stable to slightly declining (NPWRC website), stable to increasing (NAWCP Marshbird Workshop Aug 2001).

Population trend in North America: Greaters increasing rapidly in eastern portion, generally stable elsewhere, some western populations may be declining (NPWRC website). BBS data not well applicable to this species due to remote breeding locations and inconspicuous behavior while nesting.

Abundance status in BCR 9: Locally common breeder, locally common to abundant migrant.

Abundance status in BCR 10: Locally abundant.

Abundance status in BCR 15: Locally abundant.

Abundance status in BCR 16: Locally abundant.

BCR 9 % of Global population: 38% of CVP, 95% of LCRVP, 10% of RMP (breeding),
100% CVP, LCRVP migrant

BCR 9 conservation priority: High concern: CVP (breeding), CVP, LCRVP (migrant)
Moderate concern: LCRVP (breeding)

BCR 10 % of Global population: 2% of CVP, 5% of LCRVP, 88% of RMP (breeding)
BCR 10 conservation priority: Moderate concern: RMP (breeding)

BCR 15 % of Global population: 2% of CVP (breeding)
BCR 15 conservation priority: High concern: CVP (breeding)

BCR 16 % of Global population: 2% of RMP (breeding)
BCR 16 conservation priority: High concern: RMP (migrant), Moderate concern: RMP (breeding)

Occurrence in BCR 9: Breeder (non-colonial), migrant. CVP breeds in south-central Washington, eastern Oregon, northeast California, and northwest Nevada; LCRVP breeds in southwest Idaho, northeast Nevada, northwest Utah, and likely northwest Idaho; RMP breeds in southeast Idaho, and northern Utah (Littlefield and Ivey 2002). Largest breeding populations of CVP at Malheur NWR, Oregon, with 245 pairs in 1999 (Ivey and Herziger 2000). Elko and White Pine counties of northeast Nevada hold the greatest number of LCRVP birds (Pacific Flyway Council 1995). Important staging areas for CVP include Malheur NWR and Klamath Marsh, Oregon, and Ash Creek WA/Big Valley, California (Ivey and Herziger 2000, 2001); for LCRVP at Lund, Nevada (Pacific Flyway Council 1995); only small numbers stage in this BCR for RMP (Subcommittee on Rocky Mountain Greater Sandhill Cranes 1997).

Occurrence in BCR 10: Breeder (non-colonial), migrant. CVP breeds in northeast Oregon; RMP breeds in southwest Montana, western Wyoming, and northern Colorado (Littlefield and Ivey 2002), with greatest concentration at Grays Lake, Idaho. The LCRVP likely breeds in northwest Idaho. Migrate through BCR, but no major staging sites for either population.

Occurrence in BCR 15: Breeder (non-colonial), migrant. Up to 1000 in spring migration at Sierra Valley (Cooper 2004).

Occurrence in BCR 16: Breeder (non-colonial), migrant, winters. RMP breeds in northeast Utah and northwest Colorado (Littlefield and Ivey 2002). Major migration site at San Luis Valley Colorado (Subcommittee on Rocky Mountain Greater Sandhill Cranes 1997). Winters in New Mexico (NMGF website, B. Howe pers. comm.) and Colorado (www.auduboncolorado.org/birdcon_iba.html, R. Levad, pers. comm.).

Global distribution: North America.

Habitat requirements: Occupies breeding territories in wetlands, closed drainage basins, and mountain meadows, usually nests in isolated areas in shallow-flooded meadows or emergents, also open water (Tacha et al. 1992, Littlefield and Ivey 2002). Preferred nesting in Nevada is on islands or peninsulas adjacent to marsh vegetation, also river islands, river banks, and large expanses of flooded meadow and alkali playa (Nevada PIF 1999). Nests in Nevada in hay meadow complexes where a mosaic of native hay, hardstem bulrush, and willow of various age classes and structures, also in flooded greasewood, Great Basin wildrye (Nevada PIF 1999). Post-breeding birds roost in open water where little emergent vegetation is present. Feeds in wetlands or uplands within territory during breeding season, in migration in traditional areas free from disturbance, concentrating in agricultural regions with cereal and other small grain crops, also wetlands (Littlefield and Ivey 2002).

Common Issues in BCRs 9, 10, 15, and 16: Breeding and staging habitat have been lost to drainage, pivot irrigation, conversion to row crops, and urban development. Water rights are important to maintain quality of habitat. Most nesting areas and migration stopovers are in private ownership and, thus, not secure. Changes in farming practices such as flooding and early de-watering for haying make foods unavailable for cranes. Grazing may preclude breeding attempts or trample chicks. Mowing may kill chicks or encourage predators by providing easy access. Powerlines and fences have caused deaths. Disturbance of nesting pairs is detrimental to breeding success. Limited hunts of RMP at premigration sites in BCRs 9, 10, and 16 aim to reduce crop depredations, but needs to be cautiously managed because of delayed sexual maturity and low recruitment rates (Drewien et al. 1995).

Specific Issues in BCR 9: Renewed interest in mining for gold on nearby National Forest lands result in attendant water quality concerns at Grays Lake, Idaho (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm); agricultural runoff at Franklin Lake, Nevada (McIvor 2005) and water diversion for irrigation (3/02 meeting) and noxious weeds at Grays Lake, Idaho (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm) threaten habitat. Recruitment is lowest in any hunted avian species in North America, with LCRVP at 4.8%, and CVP 5.6-6.1% (Drewien et al. 1995); low rates of <5-6% should be cause for concern (Drewien et al. 1995), but recruitment census can give distorted results due to presence of non-reproductive sub-adults (Nevada PIF 1999). Damage to unharvested small grains and seed potatoes a problem from migrating RMP birds in Idaho (Subcommittee on Rocky Mountain Greater Sandhill Cranes 1997), and depredation complaints may be expected to increase with expanding grain production in some areas (Pacific Flyway Council 1995).

Specific Issues in BCR 10: Minor threat of invasive or non-native plants at Red Canyon Ranch and Sweetwater River Project, Wyoming (WY IBAs). Potential threat of oil pollution/degradation at Loch Katrine, Wyoming (www.audubonwyoming.com/m3item3.html). Avian tuberculosis has been a significant disease problem in the Rocky Mountains (NMGF website).

Specific Issues in BCR 15: Development a threat at Lake Almanor and Mountain Meadows (Cooper 2004). Other issues include building development, lowering of water table and resulting decrease of wetlands, and overgrazing in Sierra Valley (Cooper 2004). Recruitment is lowest in any hunted avian species in North America, with CVP 5.6-6.1% (Drewien et al. 1995); low rates of <5-6% should be cause for concern (Drewien et al. 1995), but recruitment census can give distorted results due to presence of non-reproductive sub-adults (Nevada PIF 1999).

Conservation Status and Management Actions:

- E in Washington (2001 list), T in California (1999 list), SV in Oregon (ONHP 2001 list), SC in Colorado (2001 list); formerly listed as Threatened, but studies in the early 1990s by Van Graham of CDOW indicated a stable, slowly increasing nesting population and the major nesting areas (California Park and Steamboat Lake in Routt County) are well protected (R. Levad pers. comm.).
- High priority breeding bird species in Idaho (Idaho PIF 2000). Management priority species in Nevada (Nevada PIF 1999).
- Focal species for "marsh/grasslands" habitat suite for BCR 9 (Rosenberger et al. 2001).
- Priority bird species in PIF Columbia Plateau (#89) Physiographic Area Plan.
- Global Heritage Status Rank: G5 (large range, stable or increasing in most areas).
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S3N in Arizona; S2 in California; S3B, S4N in Colorado; S5B, SZN in Idaho; S2N, S5B in Montana; S3B in Nevada; S4N in New Mexico; S3B in Oregon; S1B in Utah; S1B, S3N in Washington; S4B, S4N in Wyoming.
- Partners In Flight Rank: 18.
- PIF continental concern (Rosenberger et al. 2001).
- Management plans written by Pacific and Central Flyways (Pacific Flyway Council 1997, Pacific and Central Flyways 2001, Pacific Flyway Council 1995).
- Recovery plans written for Washington (Littlefield and Ivey 2002), being written for California (CDFG *in prep*).
- RMP hunted in some areas of Intermountain West. Hunting programs and harvest is monitored.
- Annual fall surveys for annual RMP population index.
- Statewide survey of breeding population in California in 2000 (Ivey and Herziger 2001).
- Statewide survey of breeding population in Oregon in 1999-00 (Ivey and Herziger 2000).
- Annual surveys of breeding populations in Washington (J. Engler pers. comm.) and Klamath Basin (D. Mauser pers. comm.), Malheur NWR through 1998 (G. Ivey pers. observ.). Fall counts at Lower Klamath NWR (D. Mauser pers. comm.).
- Color-marking of CVP and RMP birds (C. D. Littlefield, G. Ivey pers. observ., Drewien et al. *in prep*).
- Telemetry studies of fates of CVP colts (Littlefield and Lindstedt 1992, G. Ivey pers. observ.).
- Grain planted as supplemental feed at Bear Lake, Camas, and Grays Lake NWRs, Idaho, and Utah (Subcommittee on Rocky Mountain Greater Sandhill Cranes 1997).

Action needed:

- Preserve and protect breeding, feeding, and roosting habitats: Increase management efforts at use areas on public lands and acquire habitat. Discourage water projects which would impact crane breeding habitat, acquire water rights where possible, and maintain water levels. Work with private landowners to encourage compatible land use practices and maintain breeding and migrating habitat (water, grazing, and hay dates). If grazing is used on breeding areas, the season should be during the fall (after 10 August) and winter period (ending by March), and utilization should be moderate. Delay hay mowing until after 10 August at or near breeding sites. Place line-markers or other devices on powerlines to ensure high visibility, and where possible, move or bury lines transecting crane habitats. Where possible, remove internal fences. Monitor water quality. Monitor for exotic species. Establish objectives for

individual staging areas, modified as warranted (Drewien et al. *in prep*). Develop additional migration sites to disperse birds to avoid threat of disease and crop depredation, continue to provide grain for staging cranes, and encourage late plowing (Subcommittee on Rocky Mountain Greater Sandhill Cranes 1997, Pacific Flyway Council 1995).

- Limit disturbance at breeding, feeding, and roosting areas.
- Monitor population: Monitor recruitment; if predators are limiting or preventing population growth at specific sites, predator control should be considered. Monitor hunting program. Determine subspecies status and distribution in Pacific Flyway (NAWCP Marshbird Workshop Aug 2001). Use satellite monitoring to identify breeding, migration, and wintering ranges of subspecies using Pacific Flyway (NAWCP Marshbird Workshop Aug 2001). Develop population estimates for subspecies and work on genetic issues (NAWCP Marshbird Workshop Aug 2001).
- Promote staging areas as "adventure destinations" in combination with other birding opportunities, local sightseeing, and historical study, promoting local restaurants and motels (Nevada PIF 1999).

Is there a BNA for this species? Yes.

Sandhill Crane (Lesser) - *Grus canadensis canadensis*

Grue Canadienne, Grue de Canada - Grulla, Grulla Cenicienta, Grulla del Canada

Status Summary: Continental conservation priority: Not yet determined

Global and BCR populations: Global: For the lesser/Canadian subspecies: 450,000 (NPWRC website).

BCR 9: entire Pacific Flyway Population stages here

Population trend in BCR 9: unknown

Population trend in North America: Probably stable (NPWRC website). Increasing (NAWCP Marshbird Workshop Aug 2001).

Abundance status in BCR 9: Locally abundant.

BCR 9 % of Global population: 100% ***BCR 9 conservation priority:*** High concern (migrant)

Occurrence in BCR 9: Non-breeder, migrant. Migrates through most of BCR.

Global distribution: Northern Hemisphere.

Habitat requirements: Feeds in areas with agricultural crops, pasturelands, hayfields, and wetlands, and roosts in open water ponds (Littlefield and Ivey 2002).

Issues in BCR 9: Staging habitat loss to drainage and conversion. Most migration stopovers in private ownership and not secure. Water rights important to maintain quality of habitat. Changes in farming practices such as late irrigation or flooding make foods unavailable for cranes. Powerlines a threat.

Conservation Status and Management Actions:

- E in Washington (2001 list).
- Global Heritage Status Rank for Sandhill Crane: G5 (large range, stable or increasing in most areas).
- National Heritage Status Rank for Sandhill Crane: N5B, N5N.
- Sandhill Crane Heritage Status Rank: SNRB, SNRN in California; S5B in Idaho; S3B in Nevada; S3 in Oregon; S3?B in Utah; S1B, S3N in Washington.
- Partners In Flight Sandhill Crane Rank: 18.
- Management plan written by Pacific Flyway (Pacific Flyway Council 1983).
- Recovery plan for Washington (Littlefield and Ivey 2002).

Action needed:

- Preserve and protect feeding and roosting habitats: Work with private landowners to encourage compatible land use practices and maintain migration habitat. Place line-markers or other devices on powerlines to ensure high visibility, and where possible, move or bury lines transecting crane habitats. Establish objectives for individual staging areas, develop additional sites to disperse birds to avoid threat of disease and crop depredation.
- Limit disturbance at feeding and roosting areas.
- Monitor population: Determine subspecies status and distribution in Pacific Flyway (NAWCP Marshbird Workshop Aug 2001). Use satellite monitoring to identify breeding, migration, and wintering ranges of subspecies using Pacific Flyway (NAWCP Marshbird Workshop Aug 2001). Develop population estimates for subspecies and work on genetic issues (NAWCP Marshbird Workshop Aug 2001).
- Promote staging areas as “adventure destinations” in combination with other birding opportunities, local sightseeing, and historical study, promoting local restaurants and motels (Nevada PIF 1999).

Is there a BNA for this species? Yes.

Yellow Rail - *Coturnicops noveboracensis*

Râle jaune - Gallineta amarilla

Status Summary: Continental conservation priority: Not yet determined

Global and BCR populations: Global: Unknown, likely highly under-detected during surveys (Bookhout 1995). Distribution may be more wide ranging than currently known due to secretive nature, especially in the West, particularly for migrant and wintering populations (Stern and Popper 2003).

BCR 9: 608 breeders (600 in Oregon, 8 in California)

Population trend in BCR 9: AOU listed species as extirpated from both Oregon and California as of 1983, however, in 1982, two were reported calling in June near Fort Klamath Historic Monument, Oregon, with many sightings following in the Fort Klamath and adjoining Wood River Valley area (Stern and Popper 2003). In May 1989, breeding was documented in Oregon; first time in the western U.S. in nearly 40 yrs (Stern et al. 1993). In a 1992 survey in south-central Oregon, 86 recorded (Stern et al. 1993), recent estimates of approximately 235-285 pairs (Stern and Popper 2003). From 1995-1998, 34 nests were found in the Wood R. Valley, the largest sampling of nests ever found in the U.S. (Stern and Popper 2003). In California, historically bred in the 1950s in wet meadows of Mono County, and one recent record for summer for California (1985) was from marsh at Mono Lake County Park (Cooper 2004). More recently, birds have been documented in Surprise Valley and near Mount Shasta. No data on breeding trend (PIF Prioritization Database).

Population trend in North America: Unknown, local populations variable (Bookhout 1995). No known breeding in western U.S. in nearly 40 years until nest located in Oregon in 1989 (Stern et al. 1993). BBS data not available for this species.

Abundance status in BCR 9: Rare breeder in southern Oregon and northeastern California; accidental in summer in southern Idaho (Svingen and Dumroese 1997).

BCR 9 % of Global population: Unknown ***BCR 9 conservation priority:*** High concern

Occurrence in BCR 9: Breeder (non-colonial), migrant. Breeds in Klamath and Lake counties of south-central Oregon (the only known breeding population in the western U.S.), with other unconfirmed records scattered through eastern Washington and Oregon (Stern and Popper 2003). Recent breeding records from Surprise Valley and near Mount Shasta, California. Winter records from Mono County, California (Bookhout 1995).

Global distribution: North America.

Habitat requirements: Breeds in Oregon in wet montane meadows near a cold water spring, seep, flowing creek, or in a river floodplain with poorly-drained soils; vegetation usually consist of *Carex* sp. and water depth from 2-30 cm (Stern et al. 1993). Of 34 nests found 1995-1998 in Oregon, 85% were completely or nearly completely covered with a canopy of senescent vegetation; the remaining nest with domes of live vegetation (Stern and Popper 2003). In migration, found in hay and grain fields, wet meadows, and marshlands (Bookhout 1995).

Issues in BCR 9: Most persistent threat is loss of wetland habitat through diking, ditching and draining of wetlands; not only because of loss of habitat, but lowering of the water table in the adjoining wetlands making the site too dry (Stern and Popper 2003). This occurred during the 1980s in the Wood River Valley of Oregon, and led to abandonment of the sites in subsequent years. However, rails may also colonize restored wetlands (Stern and Popper 2003). Flood irrigation practices delivering a pulse of water to nesting meadows in June or July may inundate nests (Stern and Popper 2003). Nesting birds use previous year's vegetation to conceal nests, and intensive livestock grazing which removes more than 50% of the cover may render potential nesting areas unsuitable for the following year due to the lack of adequate cover (Stern and Popper 2003). Drought conditions may limit habitat availability (Popper 2004).

Conservation Status and Management Actions:

- Federal Species of Management Concern (Regions 1 and 6) because depends on vulnerable or restricted habitats (USFWS 1995), also on updated list (Birds of Conservation Concern) in 2002 on national, Region 1, and BCR 9 lists (USFWS 2002).
- BSSC in California (2003 draft list), SC in Oregon (ONHP 2001 list).
- Global Heritage Status Rank: G4 (widespread distribution centered in south-central and southeastern Canada, apparently rather rare in most areas, though this is partly because of difficulty in detection; known to be fairly common in some areas; evidently declining in some areas where habitat destruction is ongoing, but there are some significant areas of protected habitat).
- National Heritage Status Rank: N3B, N4N.
- Heritage Status Rank: S1S2 in California; no rank in Idaho; no rank in Nevada; S1B in Oregon; no rank in Utah; no rank in Washington.
- Partners In Flight Rank: 22.
- PIF continental concern (Rosenberg et al. 2001).
- Survey in Wood R. Valley, Klamath Marsh NWR, and Sycan Marsh, Oregon from 1988-1992 (Stern et al. 1993).
- From 1995-2000, 242 rails were banded in Klamath County, Oregon (Lundsten and Popper 2001).

Action needed:

- Habitat management: Protect wetlands from conversion and draining. Maintain water levels. Manage livestock grazing. Fire is used heavily as a marsh management tool, but can have negative impacts (NAWCP Marshbird Workshop Aug 2001).
- Obtain more accurate information (NAWCP Marshbird Workshop Aug 2001).
- Increase population to pre-1970s levels and prevent range contraction (NAWCP Marshbird Workshop Aug 2001).

Is there a BNA for this species? Yes.

Virginia Rail - *Rallus limicola*

Râle de Virginie - Rascón de agua, Gallineta, Kidika

Status Summary: Continental conservation priority: Not yet determined.

Global and BCR populations: Global: Unknown (Conway 1995). Insufficient data (NAWCP Marshbird Workshop Aug 2001).

BCR populations: Unknown.

Population trend in BCR 9: Breeding trend possibly increasing (PIF Prioritization Database). On Columbia Plateau routes, a non-significant increase of 22.9%, 26% from 1980-2000 (Sauer et al. 2004). Greatest increase per year on BBS routes from 1966-1996 in south-central and eastern Oregon, northeast California, southern Idaho, northwest Nevada, and northern Utah (Sauer et al. 2004).

Population trend in BCR 10: Unknown.

Population trend in BCR 15: Unknown.

Population trend in BCR 16: Unknown.

Population trend in North America: Relatively stable, but declining in many areas (Conway 1995). BBS data showed significant decline of 2.2%/yr 1982-1991, but problems in interpreting data for this species (Conway 1995). BBS data showed significant 4.1% increase from 1966-2000, and 3.1% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Uncommon in spring through fall, rare to uncommon in winter in eastern Washington (checklists); fairly common breeder, rare in winter in eastern Oregon (Gilligan et al. 1994); uncommon in spring and fall, uncommon to common in summer, rare in winter in northern California (checklists); common in summer, rare in winter in southern Idaho (Svingen and Dumroese 1997); uncommon in spring and fall, uncommon to common in summer, rare to occasional in winter in Nevada (checklists); rare to uncommon in spring, fall, and winter, and uncommon to common in summer in western Utah (checklists).

Abundance status in BCR 10: Unknown.

Abundance status in BCR 15: Unknown.

Abundance status in BCR 16: Unknown.

BCR 9 % of Global population: Unknown
BCR 10 % of Global population: Unknown
BCR 15 % of Global population: Unknownn
BCR 16 % of Global population: Unknown

BCR 9 conservation priority: Moderate concern
BCR 10 conservation priority: Moderate concern
BCR 15 conservation priority: Moderate concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (non-colonial), migrant, winters. Breeds through most of BCR (Conway 1995, National Geographic Society 1999). Important staging areas unknown (Conway 1995), but migrant through most of BCR (checklists). Winters in most of BCR (checklists).

Global distribution: Western Hemisphere.

Habitat requirements: Nests in freshwater and brackish marshes and wetlands with robust emergents such as cattails and bulrush. However, dense emergents usually found in older marshes impedes movement (Conway 1995). Most important habitat components are shallow water, emergent cover, and substrate with high invertebrate abundance (Conway 1995). Uses drier marsh areas than Soras (Conway 1995). Migrants require variety of water depths, robust vegetative cover, and short-stemmed seed-producing plants (Conway 1995); may occur in flooded fields. Winter habitats similar to breeding (Conway 1995). For feeding, needs standing water, moist soil, or mudflats, preferring shallow and intermediate water depths, but will use deep water if enough vegetation to walk and forage on, generally more open areas than nesting habitat, may also feed on uplands (Conway 1995).

Issues in BCR 9: None reported.

Issues in BCR 10: None reported.

Issues in BCR 15: None reported.

Issues in BCR169: None reported.

Conservation Status and Management Actions:

- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: SNR in California; S5B in Idaho; S3S4B in Nevada; S4 in Oregon; S3N, S4B in Utah; S4B, S3N in Washington.
- Partners In Flight Rank: 11.

Action needed:

- Habitat management: Increase the quality and quantity of both breeding and wintering habitat to 1900 levels (NAWCP Marshbird Workshop Aug 2001).
- Obtain more accurate information (NAWCP Marshbird Workshop Aug 2001): Identify relatively important breeding areas not shown by existing data (NAWCP Marshbird Workshop Aug 2001). Identify migration route and stop-over areas (NAWCP Marshbird Workshop Aug 2001). Assess food resource availability (i.e., the timing of availability and types of food) (NAWCP Marshbird Workshop Aug 2001). Assess complex habitat (marsh and grassland) criteria, in relation to marsh size requirements (NAWCP Marshbird Workshop Aug 2001).
- Increase population to pre-1970s levels and prevent range contraction (NAWCP Marshbird Workshop Aug 2001).

Is there a BNA for this species? Yes.

Sora - *Porzana carolina*

Marouette de Caroline - Gallineta de Cienaga

Status Summary: Continental conservation priority: Not yet determined

Global and BCR populations: Global: Unavailable since reclusive species and lack of data, but considered most abundant and widely-distributed rail in North America (Melvin and Gibbs 1996). Insufficient data (NAWCP Marshbird Workshop Aug 2001).

BCR populations: Unknown.

Population trend in BCR 9: Breeding trend possibly increasing (PIF Prioritization Database). On Basin and Range BBS routes, significant increase of 8.0% from 1966-2000, 9.2% from 1980-2000 (Sauer et al. 2004).

Population trend in BCR 10: No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 15: No data on breeding trend (PIF Prioritization Database).

Population trend in North America: Likely more localized due to wetland loss and degradation (Melvin and Gibbs 1996). From 1982-1991, population stable in Canada (non-significant), but declined significantly 8.5%/yr in U.S. (Melvin and Gibbs 1996). BBS data indicated significant decline 3.3% annually from 1966-1991 (Melvin and Gibbs 1996). BBS data showed significant 1.3% increase from 1966-2000, and 2.5% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Uncommon in spring through fall, rare to occasional in winter in eastern Washington (checklists); abundant to fairly common breeder (especially common in Klamath, Lake and Harney counties), rare in winter in eastern Oregon (Gilligan et al. 1994); uncommon in spring and fall, uncommon to common in summer, rare in winter in northern California (checklists); common in summer, rare in winter in southern Idaho (Svingen and Dumroese 1997); uncommon in spring, uncommon to common in summer, rare to common in fall, rare to occasional in winter in Nevada (checklists); rare to uncommon in spring, fall, and winter, and uncommon to common in summer in western Utah (checklists).

Abundance status in BCR 10: Common in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 15: Unknown.

Abundance status in BCR 16: Unknown.

BCR 9 % of Global population: Unknown
BCR 10 % of Global population: Unknown
BCR 15 % of Global population: Unknown
BCR 16 % of Global population: Unknown

BCR 9 conservation priority: Moderate concern
BCR 10 conservation priority: Moderate concern
BCR 15 conservation priority: Moderate concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (non-colonial), migrant, winters. Breeds through most of BCR (Melvin and Gibbs 1996, National Geographic Society 1999, Sibley 2000). Migrant and winters through most of BCR (checklists).

Occurrence in BCR 10 and 15: Breeder (non-colonial), migrant, occasionally in winter (Melvin and Gibbs 1996, National Geographic Society 1999, Sibley 2000).

Global distribution: North America.

Habitat requirements: Nests primarily in freshwater wetlands with shallow and intermediate water depths dominated by emergents such as cattails, sedges, burreeds, and bulrushes (Melvin and Gibbs 1996). In migration, uses freshwater emergent wetlands or brackish marshes, also upland fields, pastures, lawns, etc.; uses wetter areas of marshes than Virginia Rail (Melvin and Gibbs 1996). Winters in freshwater or brackish marshes in emergent vegetation, also canals, ditches, fields, pastures, and small ponds and rivers (Melvin and Gibbs 1996). Feeds in stands of robust emergent vegetation interspersed with shorter, seed-producing emergents or floating and submergent vegetation and debris that provides good substrate for invertebrates near the surface of the water (Melvin and Gibbs 1996).

Issues in BCR 9: Early de-watering of irrigated hay fields likely reduces productivity.

Issues in BCR 10: None reported.

Issues in BCR 15: None reported.

Issues in BCR 16: None reported.

Conservation Status and Management Actions:

- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: SNRB, SNRN in California; S5B in Idaho; S3S4B in Nevada; S4 in Oregon; S3N, S4S5B in Utah; S4B in Washington.
- Partners In Flight Rank: 11.

Action needed:

- Habitat management: Increase the quality and quantity of both breeding and wintering habitat to 1900 levels (NAWCP Marshbird Workshop Aug 2001).
- Obtain more accurate information (NAWCP Marshbird Workshop Aug 2001): Identify relatively important breeding areas not shown by existing data (NAWCP Marshbird Workshop Aug 2001). Identify migration route and stop-over areas (NAWCP Marshbird Workshop Aug 2001). Assess food resource availability (i.e., the timing of availability and types of food) (NAWCP Marshbird Workshop Aug 2001). Assess complex habitat (marsh and grassland) criteria, in relation to marsh size requirements (NAWCP Marshbird Workshop Aug 2001).
- Increase population to pre-1970s levels and prevent range contraction (NAWCP Marshbird Workshop Aug 2001).

Is there a BNA for this species? Yes.

California Gull - *Larus californicus*

Goéland de Californie - Gaviota Californiana

Status Summary: Continental conservation priority: Species of moderate concern.

Population trend	3
Relative abundance	2
Threats to breeding	5
Threats to non-breeding	2
Breeding distribution	2
Non-breeding distribution	3

Global and BCR populations: Global: Probably between 500,000 and 1,000,000 (Winkler 1996). Greater than 414,000 breeders in North America (NAWCP Appendix).

BCR 9: 134,398 breeders (App. D, Table D-10)
BCR 10: 9,474 breeders (App. D, Table D-10)

Population trend in BCR 9: Fluctuates at Malheur NWR in Oregon (range 0 to 1500 from 1988-1998, G. Ivey pers. observ.); likely increasing substantially in California but early data rough, no longer nest at Tule Lake NWR as in the early 1990s (Shuford and Ryan 2000), with second lowest nesting population in 17 years at Mono Lake in 1999, lowest in 1998 (34,932, Shuford et al. 2000); apparently decreasing southern Idaho (C. Moulton pers. comm.); Breeding trend in Utah is increasing (D. Paul pers. comm.). Breeding trend possibly decreasing (PIF Prioritization Database).

Population trend in BCR 10: Breeding trend stable (PIF Prioritization Database).

Population trend in North America: Patchy distribution does not allow for determining trend (Winkler 1996). BBS data showed 0.8% non-significant decline from 1966-2000, and 0.1% from 1980-2000 (Sauer et al. 2004), but not very accurate for abundance for this species since highly colonial (Winkler 1996). CBC data also not appropriate (Winkler 1996).

Abundance status in BCR 9: Mono Lake and Great Salt Lake are the largest rookeries in the world (Cooper 2004). Uncommon to common in spring and fall, uncommon to abundant in summer, rare to common in winter in eastern Washington (checklists); uncommon to locally common breeder and migrant, locally uncommon in winter in eastern Oregon (Gilligan et al. 1994); uncommon to common in spring and fall, common in summer, rare to uncommon in winter in northern California (checklists); abundant resident in southern Idaho (Svingen and Dumroese 1997); occasional to common in spring and summer, occasional in fall, rare in winter in Nevada (checklists); rare to common in spring, occasional to common in summer, rare to common in fall and winter in western Utah (checklists).

Abundance status in BCR 10: Common in Wyoming (Cerovski et al. 2004).

BCR 9 % of Global population: 77%
BCR 10 % of Global population: 2%

BCR 9 conservation priority: Moderate concern.
BCR 10 conservation priority: Moderate concern.

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Breeds through most of BCR except northern Washington, central and eastern Nevada, and southwest Utah (Winkler 1996, Smith et al. 1997, National Geographic Society 1999). Largest colonies in North America at Great Salt Lake, Utah; Mono Lake, California; and American Falls Reservoir, Idaho (Winkler 1996). Other major colonies in Lake, Klamath, and Harney counties, and on Columbia River islands, Oregon (Gilligan et al. 1994); Butte Valley and Honey Lake Wildlife Areas, Clear Lake NWR (Shuford and Ryan 2000) and Meiss Lake (Cooper 2004), California; Mormon Reservoir, Deer Flat NWR, and Blackfoot Reservoir, Idaho; and Utah Lake, Utah (Trost and Gerstell 1994, Winkler 1996). Migrant through most of BCR (Sibley 2000, checklists). Winters in most of BCR (checklists).

Occurrence in BCR 10: Breeder (colonial), migrant, winters. Breeds through most of BCR except northeast Washington (Smith et al. 1997), northern Idaho (Trost and Gerstell 1994), parts of western Montana, central and southeastern Wyoming, and northern Colorado (Winkler 1996). Bamforth NWR in Wyoming is one of

largest breeding areas in state (www.audubonwyoming.com/m3item3.html). Migrant through most of BCR (checklists). Winters in eastern Oregon (Gilligan et al. 1994) and northern Idaho (Svingen and Dumroese 1997), up to 1,000 as late as November at Flathead Lake, Montana (Winkler 1996).

Global distribution: North America.

Habitat requirements: Nests nearly always on islands on natural lakes or rivers or in reservoirs of fresh or saline water (Winkler 1996), may use solar evaporation ponds (Intermountain West/Desert Southwest Regional Workshop April 2000); locations based on need to have enough water to limit predator access (Winkler 1996). In northeast California, nests mainly on islands and rarely on peninsulas at natural lakes, reservoirs, managed wetlands, and saline or alkaline lakes (Shuford and Ryan 2000). Uses habitats similar to breeding in migration and winter (Winkler 1996), can be found at lakes, ponds, large rivers, flooded fields, as well as garbage dumps (Gilligan et al. 1994). Feeds on lakes where they breed or in open areas as far as 60 km away in fields, marshes, meadows, dumps, rivers, etc. (Winkler 1996).

Issues in BCR 9: *Water levels.* At Mono Lake, government-prescribed raise in lake level to isolate most historically-important nesting islands has created controversy over effects on gull populations (Winkler 1996). Water levels at Great Salt Lake are changing (D. Paul pers. comm.). All nests were destroyed at Malheur NWR in 1998 by increased water levels (G. Ivey pers. observ.). Low water levels at some sites in California allowed access by coyotes with resulting decreased nesting success (Shuford and Ryan 2000). Low water levels likely contributed to colony failures in Idaho in 2004 (C. Moulton pers. comm.).

Other. The largest colony in the world (60,000 adults) was managed by Morton Salt, but the site was sold to Kennecott and the site was used for tailings and the colony was abandoned (Intermountain West/Desert Southwest Regional Workshop April 2000). Development, proposed highway, and a dumping site for toxic chemicals at Great Salt Lake could threaten gull colonies (D. Paul pers. comm.). Seasonal closure of nesting areas were effective at increasing nesting success at Mono Lake (Shuford and Ryan 2000). Heavy recreational use, with few restrictions on public access or recreational activities, and insufficient funding of enforcement to prevent dumping, vandalism, disturbance, and illegal hunting at Potholes Reservoir, Washington (Cullinan 2001). Numbers may reduce in Idaho due to covering of dumps (Trost and Gerstell 1994). Cherry depredation problem in Utah (Winkler 1996). Salmonellosis is severe cause of mortality in Idaho (Winkler 1996).

Issues in BCR 10: Salmonellosis is a severe cause of mortality in Idaho (Winkler 1996). Numbers may reduce in Idaho due to covering of dumps (Trost and Gerstell 1994). Critical threat of water drainage and diversion, and potential threat of toxic pollution at Soda Lake, Wyoming (www.audubonwyoming.com/m3item3.html). Potential threat of invasive or non-native plants at Sweetwater River Project, Wyoming (www.audubonwyoming.com/m3item3.html).

Conservation Status and Management Actions:

- Moderate priority breeding bird species in Idaho (Idaho PIF 2000).
- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S2 in California; S4B, SZN in Colorado; S2S3B, S3N in Idaho; S5B, SZN in Montana; S5B in Nevada; S5 in Oregon; S5 in Utah; S4B, S5N in Washington.
- Partners In Flight Rank: 13.
- PIF regional concern (breeding) (Rosenberg et al. 2001).
- Annual surveys at Klamath Basin (D. Mauser pers. comm.), at Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Statewide survey in California from 1994-1997 (Shuford and Ryan 2000). Southern Idaho surveyed in 1993 (Trost and Gerstell 1994).
- Numbers of nesting birds decreased at Lower Klamath NWR when nesting islands removed to reduce predation on waterfowl nests and young (Shuford 1998).
- Statewide survey in Colorado in 2000 (Leukering et al. 2000).

Action needed:

- Preserve and protect wetlands: Protection of colonies best achieved by comprehensive conservation plans for all nesting colonial species (Shuford and Ryan 2000). Greatest need is nesting islands secure from predators (maintain water levels) and human disturbance (Shuford and Ryan 2000). Would benefit from maintenance of isolated breeding sites and enhancement of foraging habitat in northeast California (Shuford 1998). Solar evaporation ponds should be managed--salt works companies should take nesting birds needs into their site management plans (Intermountain West/Desert Southwest Regional Workshop April 2000).
- Protect colonies from disturbance. Restrict access to nesting areas and provide enforcement or interpretation, but may draw attention (Shuford and Ryan 2000).
- Monitor the population: Should be monitored every 3-5 years in northeast California using species-appropriate measures for accurate counts, minimizing time and expense (Shuford 1998).
- Monitor for disease.
- Evaluate effects of dumps.
- Cherry depredation in Utah.

Is there a BNA for this species? Yes.

Franklin's Gull - *Larus pipixcan*

Mouette de Franklin - Gaviota de Franklin; Gaviotin (Chile); Caguil, Caulle (Araucano); Fardella (Peru)

Status Summary: Continental conservation priority: Species of moderate concern

Population trend	3
Relative abundance	1-2
Threats to breeding	4
Threats to non-breeding	3
Breeding distribution	2
Non-breeding distribution	2

Global and BCR populations: Global: Probably 500,000, but controversy over current numbers. No national colony surveys because of remote nesting habits and vulnerability to disturbance (Burger and Gochfeld 1994). Number of breeding birds in U.S. (not including Canada) in 1994 was 330,770 (Burger and Gochfeld 1994); in North America 315,608-990,864 breeders (NAWCP Appendix).

BCR 9: 42,588 breeders, >85,000 migrants (App. D)
BCR 10: 19,050 breeders (App. D)

Population trend in BCR 9: Fluctuates but generally increasing at Malheur NWR in Oregon (range 225-4450 from 1988-1998, G. Ivey pers. observ.); stable or increasing in southern Idaho (Trost and Gerstell 1994); fairly stable in Utah (Burger and Gochfeld 1994). First breeding in Utah in 1916, Oregon in 1948, Idaho in 1950, Nevada in 1971, and California in 1990 (Burger and Gochfeld 1994). Breeding trend uncertain (PIF Prioritization Database). On Basin and Range BBS routes, significant increase of 23.3% from 1966-2000 (Sauer et al. 2004).

Population trend in BCR 10: Stable to increasing at Benton Lake NWR, increasing at Freezeout Lake, and Red Rock Lakes NWR, Montana (Burger and Gochfeld 1994). Breeding trend uncertain (PIF Prioritization Database).

Population trend in North America: Controversy over apparent recent declines; BBS data suggests overall 90% decline from 1968-1991, but trend not consistent with colony reports and data not appropriate for this species since it nests in remote marshes in shifting sites with few routes nearby; additionally, birds counted on this survey are failed breeders away from colonies not breeding populations (Burger and Gochfeld 1994). Burger and Gochfeld (1994) collected colony data and noted variance from year-to-year; little evidence of decline, and some range expansion.

Abundance status in BCR 9: Rare in spring and summer, rare to occasional in fall in eastern Washington (checklists); locally common breeder, uncommon to rare in summer, uncommon to rare migrant in eastern Oregon (Gilligan et al. 1994); rare to uncommon in spring and summer, rare in fall in northern California (checklists); abundant in summer in southeast, uncommon migrant in southwest in Idaho (Svingen and Dumroese 1997); 2 small colonies in some years, fairly common migrant in Nevada (Burger and Gochfeld 1994), rare to occasional in spring through fall (checklists); rare in spring, rare to common in summer in western Utah (checklists). Great Salt Lake colonial nest survey accounted for 14,500 breeding adults in 2000 (Paul et al 2000).

Abundance status in BCR 10: Common in Wyoming (Cerovski et al. 2004).

BCR 9 % of Global population: 7% ***BCR 9 conservation priority:*** High concern (breeding); Moderate concern (migrant)

BCR 10 % of Global population: 3% ***BCR 10 conservation priority:*** High concern (breeding)

Occurrence in BCR 9: Breeder (colonial), migrant. Breeds in southeast Oregon, southeast Idaho, western Nevada, and northern Utah (Burger and Gochfeld 1994), in early 1990s in northeast California. Major colonies at Malheur NWR, Oregon; Oxford Slough WPA, Market Lake WMA, and Mud Lake, Idaho; and Harold Crane and Farmington Bay WMAs, Utah (Burger and Gochfeld 1994). Migrant through most of BCR (Sibley 2000, checklists).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds in western Montana and western and

southeastern Wyoming (Burger and Gochfeld 1994, National Geographic Society 1999). Grays Lake is the largest colony in the Intermountain West (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm). Migrant through most of BCR (Sibley 2000, checklists).

Global distribution: Western Hemisphere.

Habitat requirements: Only gull that nests exclusively in marshes, requires large area with emergents (including bulrush and burreed) and deep water to prevent predator access (Herziger and Ivey 2003c). In migration, roosts on lakes (Burger and Gochfeld 1994) and feeds in marshes, irrigated hay meadows, grass, forb, and plowed field habitats (Herziger and Ivey 2003c).

Issues in BCR 9: No recent breeding in some locations due to drought (Camas NWR, ID, Stillwater NWR, NV; C. Moulton pers. comm., Burger and Gochfeld 1994). Exotic plant species and decreased water levels at Market Lake WMA, Idaho (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm). Pesticides in low levels in eggs at Malheur NWR (Cornely et al. 1993). At sites with plentiful carp, number of nesting pairs diminish as little food is available as carp muddy the water, reducing water quality and therefore aquatic invertebrates (Herziger and Ivey 2003c).

Issues in BCR 10: Colonies are sensitive to disturbance and caution must be used when studying them or working nearby (Montana PIF 2000). Introduced carp and noxious weeds, addition of nutrients and sediment from water diversion for agriculture are issues at Bear Lake NWR, Idaho (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm). Noxious weeds, complicated pattern of ownership and conflicting interests, diversion of water for irrigation, and renewed interest in mining for gold on nearby National Forest lands, and attendant water quality concerns are issues at Grays Lake, Idaho (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm).

Conservation Status and Management Actions:

- SP in Oregon (ONHP 2001 list), SC in Montana (2001 list).
- High priority breeding bird species in Idaho (Idaho PIF 2000).
- NSS3 in Wyoming.
- Priority bird species in PIF Basin and Range (#80) Physiographic Area Plan (highest percent population of any physiographic area) and PIF Columbia Plateau (#89) Physiographic Area Plan. High Priority bird species in PIF Central Rocky Mountains (#64) Physiographic Area Plan.
- Global Heritage Status Rank: G4G5.
- National Heritage Status Rank: N4B, NZN.
- Heritage Status Rank: SNA in California; S4S5N in Colorado; S2B in Idaho; S3B in Montana; S3?B in Nevada; S2B in Oregon; S4B in Utah; SNA in Washington; SHB in Wyoming.
- Partners In Flight Rank: 20.
- Former C-2 ESA candidate species (Montana PIF 2000).
- Annual surveys at Great Salt Lake (J. Neill pers. comm.); at Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Southern Idaho surveyed in 1993 (Trost and Gerstell 1994). Statewide survey in Colorado in 2000 (Leukering et al. 2000).

Action needed:

- Habitat: Management issues primarily concerned with providing ideal colony site conditions: vegetation open enough for nest construction, and water level management so that nests remain afloat and providing invertebrate populations (Montana PIF 2000). Wetland management at known and potential colony sites should include vegetation management to provide fairly open vegetative cover over water (Montana PIF 2000). Maintain water levels. Monitor for exotic species and water quality.
- Monitoring: Size and distribution of colonies should be monitored over time throughout the range of the species in the state (Montana PIF 2000).
- Minimize human disturbance to nesting colonies during the nesting season (April through August) (Montana PIF 2000).

Is there a BNA for this species? Yes.

Forster's Tern - Sterna forsteri

Sterne de Forster - Gaviota de Forster, Charrán de Forster

Status Summary: Continental conservation priority: Species of moderate concern

Population trend	4
Relative abundance	3
Threats to breeding	3
Threats to non-breeding	2
Breeding distribution	2
Non-breeding distribution	2

Global and BCR populations: Global: 47,000-51,500 in North America (NAWCP Appendix).

BCR 9: 7,342 breeders (App. D)
BCR 10: 176 breeders (App. D)

Population trend in BCR 9: Breeding trend possibly decreasing (PIF Prioritization Database). Irregular breeder at Malheur NWR in Oregon (320 pairs in 1993 was last observed, G. Ivey pers. observ.); limited and mostly anecdotal knowledge of historic northeast California populations makes trend assessment difficult (Shuford 1998); and total reproductive failures in southern Idaho in 1993 (Trost and Gerstell 1994). An average of 1,300 breeding individuals was recorded during a five-year study at Great Salt Lake, Utah (Paul et al. 2001).

Population trend in BCR 10: Breeding trend possibly decreasing (PIF Prioritization Database).

Population trend in North America: BBS data 1966-1999 showed no statistically significant change in U.S., but there was no state with a large sample size, and this method is not well suited for colonial species (McNicholl et al. 2001). BBS data shows significant decline of 1.9% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Rare to common in spring and summer, rare to occasional in fall in eastern Washington (checklists); locally common breeder, uncommon to rare summer resident and migrant in eastern Oregon (Gilligan et al. 1994); common spring through fall in northern California (checklists); abundant in summer in southern Idaho (Svingen and Dumroese 1997); uncommon to common in spring, common to abundant in summer, occasional to uncommon in fall in Nevada (checklists); rare to abundant in spring, common to abundant in summer, rare to occasional in fall in western Utah (checklists).

Abundance status in BCR 10: Common in Wyoming (Cerovski et al. 2004).

BCR 9 % of Global population: 15%
BCR 10 % of Global population: <1%

BCR 9 conservation priority: Moderate concern
BCR 10 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (colonial), migrant. Breeds in most of BCR except northern Washington (Smith et al. 1997, Adamus et al. 2001, McNicholl et al. 2001). Sites with highest breeding numbers in North America include Klamath Basin (McNicholl et al. 2001); Malheur NWR (up to 3,000--Gilligan et al. 1994), Oregon; Goose Lake and Boles Meadow (Shuford 1998) and Bridgeport Reservoir, California (Cooper 2004). Migrant through most of BCR (Sibley 2000, checklists).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds in western Montana and Wyoming (National Geographic Society 1999, McNicholl et al. 2001). Migrant through most of BCR (Sibley 2000, checklists).

Global distribution: North America.

Habitat requirements: Breeds primarily in fresh and brackish marshes, including marshy borders of lakes, islands, and streams; more frequently in open, deeper portions of marshes and large stands of island-like vegetation and/or large mats of floating vegetation (McNicholl et al. 2001). Migration habitat similar to breeding (McNicholl et al. 2001). Feeds in shallow and deep marshes and open water (Idaho PIF 2000). Also feeds in irrigation reservoirs > 640 acres, and reservoirs and stockponds < 640 acres (Montana PIF 2000). Found in Idaho on marshes, unlike Common Terns which are usually found on larger reservoirs (Trost and Gerstell 1994).

Issues in BCR 9: Winter fish kills (caused by drought followed by lingering snow and also agency control) is likely reason behind lack of reproduction in southern Idaho (Trost and Gerstell 1994). Water levels determine availability of nesting sites at Bridgeport Reservoir, California; lowered water levels often force out nesting (Cooper 2004). Overgrazing, agricultural runoff, changing water levels are issues at Franklin Lake, Nevada (McIvor 2005). At Fall River Valley in California, potential conflict over allocation of water from Big Lake (owned by Pacific Gas and Electric)--ranchers don't want wetlands expanded to impact grazing opportunities, and PG&E wants it reserved for hydropower, which often leaves relatively little for wildlife (Cooper 2004). Heavy grazing pressure by cattle and sheep at Bridgeport Valley, California, has eliminated most of the marsh habitat (Cooper 2004). Heavy recreational use (few restrictions on public access or recreational activities) and insufficient funding of enforcement (to prevent dumping, vandalism, disturbance, and illegal hunting) are issues at Potholes Reservoir, Washington (Cullinan 2001).

Issues in BCR 10: Threats include human disturbance, development of nesting areas, and loss of nests to flooding (Montana PIF 2000). Not adequately surveyed in Montana or the region (Montana PIF 2000). Secure breeding sites in Wyoming are limited in distribution and site suitability and availability can be unstable due to water level fluctuations and changes in land use practices (Oakleaf et al. 1996).

Conservation Status and Management Actions:

- Moderate priority breeding bird species in Idaho (Idaho PIF 2000); SC in Montana (2001 list), NSS3 in Wyoming (1999 list).
- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S4 in California; ; S2B, S4N in Colorado; S2S3B in Idaho; S2B in Montana; S3B in Nevada; S3B in Oregon; S4B in Utah; S3B in Washington; S1B in Wyoming.
- Partners In Flight Rank: 15.
- PIF regional responsibility (Rosenberg et al. 2001).
- Annual surveys at Klamath Basin (D. Mauser pers. comm.), Great Salt Lake (J. Neill pers. comm.); at Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Surveyed in northeast California in 1997 (Shuford 1998). Statewide survey in Idaho in 1993 (Trost and Gerstell 1994). Annual surveys at important sites in Wyoming (A. Cerovski pers. comm.). Statewide survey in Colorado in 2000 (Leukering et al. 2000).
- Vocalizations and behavior studied in Washington by Hall (McNicholl et al. 2001).

Action needed:

- Habitat: Preserve and protect wetland habitats. Provide adequate water levels to protect nesting islands from mammalian predators and manage water levels on lake and river nesting areas so as not to flood nest sites (Montana PIF 2000); sites with more stable levels can be better managed (Oakleaf et al. 1996). Would benefit from maintenance of isolated breeding sites and enhancement of foraging habitat in northeast California (Shuford 1998). Monitor grazing. Monitor water quality. Develop site specific management techniques and strategies if needed (Oakleaf et al. 1996).
- Minimize human disturbance at nesting colonies during the breeding season (Montana PIF 2000) and maintain minimum buffer zone of 330-590 ft (100-180 m, Oakleaf et al. 1996). Document human activity levels and if excessive, educational efforts should be implemented (Oakleaf et al. 1996). Minimize disturbance when conducting research (Oakleaf et al. 1996).
- Should be monitored every 3-5 years in northeast California using species-appropriate measures for accurate counts, minimizing time and expense (Shuford 1998). Survey known nesting colonies on an annual basis to determine status (Montana PIF 2000), conduct statewide surveys every three years (Oakleaf et al. 1996). Develop a positive relationship with private landowners so that surveys can be conducted (Oakleaf et al. 1996). Identify factors impacting or limiting population (Oakleaf et al. 1996).

Is there a BNA for this species? Yes.

Black Tern - *Chlidonias niger*

Guifette noire - Gaviotin negro, Charrán negro, Fumarel negro

Status Summary: Continental conservation priority: Species of moderate concern

Population trend	3
Relative abundance	2
Threats to breeding	4
Threats to non-breeding	3
Breeding distribution	2
Non-breeding distribution	2

Global and BCR populations: Global: Not available, but U.S. breeding population is reasonably in the low hundreds of thousands (Shuford 1999). 100,000-500,000 breeders in North America (NAWCP Appendix). No estimates (Dunn and Agro 1995).

BCR 9: 7,925 breeders (App. D, Table D-10).
BCR 10: 674 breeders (App. D, Table D-10).
BCR 15: 182 breeders (App. D, Table D-10).
BCR 16: 24 breeders (App. D, Table D-10).

Population trend in BCR 9: Declining in California (declining along Humboldt River for last 15 years); stable or increasing in Idaho; unknown in Nevada (declining since 1980s in Lahontan Valley with increase in mid-1990s); and unknown in Oregon, Utah, and Washington (was declining in Columbia Basin of Washington but now recovering, Shuford 1999). Breeding trend possibly decreasing (PIF Prioritization Database). On Columbia Plateau BBS routes, a significant decrease of 12.4% from 1966-1996 (Sauer et al. 2004).

Population trend in BCR 10: Declining in Colorado; stable or increasing in Idaho; unknown trend in Oregon, Washington (numbers in northeast increased from late 1970s to mid-1990s), Montana (largest colony in Montana formerly at Red Rock Lakes prior to mid-1980s), and Wyoming (Cokeville Meadows once hosted up to 500 pairs in the 1980s, but highest count in recent years was 50 in 2002; A. Cerovski pers. comm.). Breeding trend uncertain (PIF Prioritization Database).

Population trend in BCR 15: No data on breeding trend (PIF Prioritization Database). Over 100 pairs historically nested at Lake Tahoe but no longer do so (Shuford 1999).

Population trend in BCR 16: Declining in Colorado (Shuford 1999), with no nests found in 1999 and 2000 (Leukering et al. 2000); unknown trend in Utah (Shuford 1999).

Population trend in North America: Declines across continent, especially since 1960s, with 61% overall decrease between 1966-1996, but some increases in 1990s, recently leveled off or increased slightly (Shuford 1999). In early 1990s, one-third as many as in late 1960s (Dunn and Agro 1995). Occupies most of former range (Shuford 1999). BBS data is only available for trends, but is too few for trend analysis, deficient in surveying this species (Shuford 1999), and contradictory and inconclusive (Nevada PIF 1999).

Abundance status in BCR 9: Uncommon breeder in eastern Washington (Shuford 1999); locally fairly common to common breeder, uncommon migrant in eastern Oregon (Gilligan et al. 1994); uncommon to common in spring through fall in northern California (checklists); uncommon in summer in southern Idaho (Svingen and Dumroese 1997); occasional to common in spring and summer, rare to uncommon in fall in Nevada (checklists); common to uncommon in summer in Utah (Shuford 1999).

Abundance status in BCR 10: Uncommon breeder in eastern Washington (Shuford 1999) and common in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 15: Common (L. Oring and L. Neel pers. comm.)

Abundance status in BCR 16: Unknown.

BCR 9 % of Global population: 3%
BCR 10 % of Global population: <1%
BCR 15 % of Global population: <1%
BCR 16 % of Global population: <1%

BCR 9 conservation priority.: High concern
BCR 10 conservation priority: Moderate concern
BCR 15 conservation priority: Moderate concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (colonial), migrant. Breeds in most of BCR except north-central and southeast Washington, northern Oregon, eastern California, and parts of southeast Idaho (Shuford 1999). Most abundant on western edge of Great Basin in northeast California and Ruby Lakes NWR (Nevada PIF 1999). Most common at Turnbull NWR in Washington; Sycan Marsh, Klamath Basin, Malheur NWR, Chewaucan marshes, and Warner Valley, Oregon; Modoc County in California (not Klamath Basin as reported by Small in 1994, Shuford 1999); small, scattered colonies in southeast Idaho; Ruby Lake, Nevada; and Great Salt Lake, Utah Lake, and Uinta Basin in Utah (Shuford 1999). Migrant through most of BCR (Sibley 2000, checklists). Crucial staging areas include Malheur NWR, Oregon, and Tule Lake NWR, and Siskiyou and Modoc counties, California; Bear River MBR may be important (1,000 in 1996, Shuford 1999).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds through most of BCR except northeast Oregon, and central Idaho and Wyoming (Shuford 1999). Northeast Washington is most important area in state; most in Montana at Benton Lake NWR, Freezeout WMA, and Blackfoot WPA; Laramie Plains and Cokeville Meadows in Wyoming (Shuford 1999, A. Cerovski pers. comm.). Migrant through most of BCR (Sibley 2000, checklists).

Occurrence in BCR 15: Breeder (colonial, Shuford 1999, L. Oring and L. Neel pers. comm.), migrant (L. Oring and L. Neel pers. comm.).

Occurrence in BCR 16: Breeder (colonial), migrant. Breeds in northeast Utah and western Colorado (Shuford 1999). Largest numbers in Colorado formerly at San Luis Valley (Shuford 1999). Migrant through most of BCR (Sibley 2000, checklists).

Global distribution: Cosmopolitan.

Habitat requirements: Breeds in freshwater ponds, lakes, sloughs, and marshes in Washington (Shuford 1999); in marshes and marsh-bordered lakes and rivers in Oregon (Gilligan et al. 1994); in freshwater marshes, ponds, lake borders, and flooded fallow fields in northeast California (Shuford 1999); on shallow lakes and wetlands, usually in cattail and/or spikerush, but also more saline typified by bulrush and submergent pondweeds in Nevada (Nevada PIF 1999); in wetlands associated with northern lakes in Utah (Utah Division of Wildlife Resources 1998). In migration, feeds in and over freshwater lakes, rivers, wetlands, and plowed fields. Ideal habitat is emergent marshes with 50:50 vegetation to open water ratio, prefers more open water in California (Shuford 1999). Feeds on or over lakes, rivers, wetlands, or plowed fields (Dunn and Agro 1995) in Montana, feeding and migration at Prairie Intermountain West wetlands, irrigation reservoirs > 640 acres, and reservoirs and stockponds < 640 acres in Montana (Montana PIF 2000).

Issues in BCR 9: *Habitat.* Habitat loss and degradation on breeding grounds are main cause of population declines, may also include introduced species, human disturbance, and contaminants (Shuford 1999). In Washington, spread of purple loosestrife and phragmites may reduce habitat (Shuford 1999); noxious weeds a problem at Boyd Ranch, Nevada (McIvor 2005). Invasive non-native plants and water quality at North Potholes Reserve, Washington (Cullinan 2001). Increased use of water for residential and agricultural uses, significant agricultural runoff from nearby lands contains nitrogen and phosphorus which has caused algae blooms in several wetlands at Turnbull NWR, Washington (Cullinan 2001). Main threat in Oregon is loss of habitat, with possible oil spills at Upper Klamath Lake from roads, railroad, or boats; and possible impact from early dewatering of hay fields for harvest in Harney Basin (Shuford 1999). Loss of habitat in northeast California (particularly in Klamath Basin) may have been partially offset in Modoc Plateau by creation of shallow reservoirs and efforts to increase waterfowl habitat; over 90% of all nesting birds in northeast California on private lands (Shuford 1999). At Fall River Valley, California, potential conflict over allocation of water from Big Lake (owned by Pacific Gas and Electric)—ranchers don't want wetlands expanded to impact grazing opportunities, and PG&E wants it reserved for hydropower, which often leaves relatively little for wildlife (Cooper 2004). Main threat in Idaho is loss of habitat and limited water supplies for marshes due to overdrafting of ground water, and bombing range proposed for Duck Valley Reservation could impact nesting birds (Shuford 1999). Habitat loss and poor water quality are main threats in Nevada, suspected to be sensitive to water quality and pesticide accumulation (Nevada PIF 1999). Overgrazing, agricultural runoff, changing water levels are threats at Franklin Lake, Nevada (McIvor 2005). Habitat loss

to agricultural and commercial development in Utah, but creation of reservoirs may have helped balance habitat loss (Shuford 1999).

Disturbance. Potential for recreational overuse and disturbance to nesting birds is a substantial threat at North Potholes Reserve, Washington (Cullinan 2001).

Issues in BCR 10: *Habitat.* Habitat loss main threat in Oregon and Montana (Shuford 1999), leading to direct loss and fragmentation (Montana PIF 2000). Loss of habitat and limited water supplies for marshes because of overdrafting of ground water are main threats statewide in Idaho (Shuford 1999). Water level fluctuations in nesting areas due to natural events or manipulation for other species in Montana, and new dam at Red Rock Lakes caused a dramatic decline in nesting birds (Shuford 1999). Water level fluctuations primary threat in Wyoming, along with potential threat of natural pests and diseases, oil pollution and degradation (A. Cerovski pers. comm., www.audubonwyoming.com/m3item3.html). High levels of selenium may influence reproduction at some nesting areas in Montana (Montana PIF 2000). Most colonies in Montana are in wetlands surrounded by agricultural land, and vulnerable to contamination from agricultural runoff which can cause excessive growth of emergents and algae making the wetland unsuitable for nesting or foraging (Montana PIF 2000). Spread of purple loosestrife and phragmites may reduce habitat in Washington (Shuford 1999).

Disturbance. Loss of breeding habitat from human disturbance main threat in Wyoming (Shuford 1999). Disturbance in nesting colonies a potential problem in colonies on boatable/fishable waters in western Montana, such as Browns Lake near Ovando (Montana PIF 2000).

Predation. Low fur prices, habitat fragmentation, farming practices, introduction of non-native predators, and enhancement of native avian predator populations (corvids and gulls) have contributed to increased predation levels of birds nesting in fragmented wetlands (Montana PIF 2000).

Issues in BCR 15: At Lake Tahoe, development and lowering of water levels eliminated breeding terns (Shuford 1999). Development is a threat at Mountain Meadows Reservoir in California Sierra, east of Lake Almanor (Cooper 2004). Building development, lowering of water table and resulting decrease of wetlands, and overgrazing are threats in Sierra Valley (Cooper 2004). Habitat has been eliminated in portions of northeast California due to agricultural practices and water diversions (USFS 2001). If the Forest Service does not acquire land with suitable habitat, there may be a risk to existing populations of colonies on national forest land (USFS 2001). Because the nesting habits make them vulnerable to weather and flooding, success of future colonies depends on protection of large landscape level wetland areas (USFS 2001).

Issues in BCR 16: Habitat loss to agricultural and commercial development in Utah, but creation of reservoirs may have helped balance habitat loss (Shuford 1999). On the verge of extirpation as a breeder in Colorado as no nests found in 1999 or 2000; requires immediate attention (Leukering et al. 2000). Some recovery in 2001 (R. Levad pers. comm.).

Conservation Status and Management Actions:

- Former Federal Species of Management Concern (Regions 1 and 6) because documented or apparent population decline (USFWS 1995), but not on 2002 list (USFWS 2002).
- BSSC in California (2003 draft list), SC in Idaho (2001 list), SC in Montana (2001 list), SP in Utah (1998 list), NSS3 in Wyoming (1999 list).
- Moderate priority breeding bird species in Nevada (Nevada PIF 1999).
- Focal species for "marsh/grasslands" habitat suite for BCR 9 (Rosenberg et al. 2001).
- Global Heritage Status Rank: G4 (widespread distribution and relatively abundant, but habitat alteration and degradation threaten the species).
- National Heritage Status Rank: N4B, NZN.
- Heritage Status Rank: SN in Arizona; S2 in California; S2B, SZN in Colorado; S2B, SZN in Idaho; S3B, SZN in Montana; S2S3B in Nevada; ; S4N in New Mexico; S3B in Oregon; S2B in Utah; S4B, SZN in Washington; S1B, SZN in Wyoming.
- Partners In Flight Rank: 17.
- Annual surveys at Klamath Basin (D. Mauser pers. comm.). Northeast California surveyed in 1997 (Shuford 1999). Southern Idaho surveyed in 1993 (Trost and Gerstell 1994).

- Studied at Sycan Marsh, Oregon (Stern 1988, Stern and Jarvis 1991), and Eagle Lake, northeast California (Gould 1974).
- In the Columbia Basin of Washington, responding favorably to removal of purple loosestrife and phragmites which have been choking out marshes (Shuford 1999).
- Annual surveys of most important breeding habitats in Wyoming started in 1994 (Shuford 1999). Statewide survey in Colorado in 2000 (Leukering et al. 2000). Limited research in Montana at Freezeout Lake WMA and Benton Lake NWR in recent years, monitoring at NWRs including Benton Lake and Ninepipe; partial statewide survey in Montana in 1997 (Shuford 1999). Southern Idaho surveyed in 1993 (Trost and Gerstell 1994).
- Water management at Freezeout Lake provides a buffer against water fluctuations caused by large storm events or severe drought, thus maintaining nesting habitat for this species in very wet or very dry years (Montana PIF 2000).
- At Benton Lake NWR, few nested during the late 1980s, but when water management changed to increase the amount of emergent vegetation in one of the pond units, nesting increased dramatically in the 1990s (Montana PIF 2000). Benton Lake NWR is implementing actions to address high selenium levels in their water units (Montana PIF 2000). Studies have been conducted at Freezeout Lake WMA to evaluate both selenium and salinity in their units (Montana PIF 2000).
- Studied at Eagle Lake in 1974 (Gould 1974).
- Statewide survey in Colorado in 2000 (Leukering et al. 2000). Monitoring programs at Alamos and Arapaho NWRs in Colorado (Shuford 1999).

Action needed:

- Protect, acquire, preserve, and maintain wetlands from development or drainage. Obtain water rights and maintain water levels; sites with more stable levels can be better managed (Oakleaf et al. 1996). Initiate priority management for breeding birds at important population centers (Nevada PIF 1999).
- Investigate habitat preferences to develop habitat model for use by wetland managers, but obtain status and trend information before adjusting management strategies (Nevada PIF 1999).
- Form partnerships to protect and restore wetlands to slow wetland loss (Shuford 1999).
- Manage habitat for this species based on current knowledge while conducting research to identify limiting factors and evaluate additional management techniques (Shuford 1999).
- Develop site specific management techniques and strategies if needed (Oakleaf et al. 1996). In most cases, waterfowl production managers can provide suitable nesting habitat for terns without any major changes to their water management (Montana PIF 2000). Provide managers with information on the specific needs of Black Terns (Montana PIF 2000). Incorporate known and potential habitats into any wetlands restoration program (Montana PIF 2000). Form partnerships to protect and restore wetlands to slow wetland loss (Oakleaf et al. 1996, Shuford 1999). Undertake continued management actions at waterfowl management areas to reduce salinity and selenium concentrations (Montana PIF 2000). Take steps to reduce nutrient loading from runoff at known nesting sites (Montana PIF 2000).
- Monitor grazing.
- Study of sensitivity to water quality and pesticides probably warranted; collect baseline contaminant residue information from nesting colonies (Nevada PIF 1999).
- Create conservation easement agreements to protect nesting sites on private lands with major colonies (Nevada PIF 1999), work with private landowners for late irrigation dates.
- Educate the public about the value of wetlands and effects of their actions on this species (Shuford 1999).
- Minimize disturbance at nesting areas and maintain minimum buffer zone of 330-590 ft (100-180 m) (Oakleaf et al. 1996). Document human activity levels and, if excessive, educational efforts should begin (Oakleaf et al. 1996); implement public education and signing program similar to that for Common Loons (Montana PIF 2000). Minimize disturbance when conducting research (Oakleaf et al. 1996).
- Monitor the population: Refine monitoring techniques to better detect population trends and determine causes of changes (Shuford 1999). Conduct surveys of potential nesting sites and create atlas of significant sites; monitor nesting activity and productivity on priority management sites (Nevada PIF 1999). Should be monitored every 3-5 years in northeast California using species-appropriate measures for accurate counts, minimizing time and expense (Shuford 1998). Monitoring program should be developed in cooperation with State, Federal, and tribal entities that manage wetlands in Montana

(Montana PIF 2000). Survey known and potential breeding sites, conduct statewide surveys every three years (Oakleaf et al. 1996). Develop a positive relationship with private landowners so that surveys can be conducted (Oakleaf et al. 1996). Identify factors impacting or limiting population (Oakleaf et al. 1996).

- Assess effects of predation: Predator management should be addressed, as needed, around nesting wetlands (Montana PIF 2000).
- Monitor for disease.

Is there a BNA for this species? Yes.

Pied-billed Grebe – *Podilymbus podiceps*

Grebe a bec bigarre – Zambullidor piquigrueso/Zambullidor Piquipinto

Status Summary: Continental conservation priority has not yet been determined.

Global and BCR populations: Global: No estimate available. BCR populations unknown.

Population trend in BCRs 9,10, 15, 16: Uncertain trend (PIF Prioritization Database). BBS data show no significant trend.(Sauer et al. 2004).

Population trend in North America: BBS data showed no significant trend (Sauer et al. 2004).

Abundance status in BCRs: Common breeder in palustrine wetlands.

BCR 9 % of Global population: unknown
BCR 10 % of Global population: unknown
BCR 15 % of Global population: unknown
BCR 16 % of Global population: unknown

BCR 9 conservation priority: Moderate concern
BCR 10 conservation priority: Moderate concern
BCR 15 conservation priority: Moderate concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Common in Northern Great Basin and Columbia Basin, Uncommon elsewhere.

Occurrence in BCR 10: Common in northeast WA, northern ID, and northwest MT. Uncommon elsewhere.

Occurrence in BCR 15: Common in Lassen, Modoc, Shasta and Plumas counties. Uncommon elsewhere.

Occurrence in BCR 16: Common in Colorado Plateau. Uncommon elsewhere.

Global distribution: Western Hemisphere.

Habitat requirements: Palustrine wetlands.

Issues in Intermountain West region: Likely affected by habitat loss.

Conservation Status and Management Actions:

- Global Heritage Status Rank: G5 (very large range and common in many areas).
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S5 in Arizona; no rank in California; no rank in Colorado; no rank in Idaho; S5B,SZN in Montana, no rank in Nevada; no rank in New Mexico; no rank in Oregon; no rank in Utah; S4B,S5N in Washington.
- Partners In Flight Rank: 13.

Action needed:

- Obtain more accurate information (NAWCP Marshbird Workshop Aug 2001): Determine migration routes; return rates to breeding grounds; movement and habitat use prior to fall migration; movement and habitat use of juveniles; population estimate, distribution and population trends, and availability of appropriate habitat; wintering habitat needs; survival of young and juveniles; extent of double-brooding and re-nesting; marsh size and distribution requirements for breeding and wintering; verification of response rates to passive listening and broadcast call recordings; use of restored and created wetlands and effects of management techniques (NAWCP Marshbird Workshop Aug 2001). Find out where birds from important areas winter, and what are most important wintering areas (NAWCP Marshbird Workshop Aug 2001). Assess food resource availability (i.e., the timing of availability and types of food, NAWCP Marshbird Workshop Aug 2001). Assess complex habitat (marsh and grassland) criteria, in relation to marsh size requirements (NAWCP Marshbird Workshop Aug 2001).

Is there a BNA for this species? Yes.

Eared Grebe - *Podiceps nigricollis*

Grèbe à cour noir - Zambullidor orejudo

Status Summary: Continental conservation priority: Species of moderate concern

Population trend	3
Relative abundance	1
Threats to breeding	2
Threats to non-breeding	4
Breeding distribution	2
Non-breeding distribution	3

Global and BCR populations: Global: North American population 4.1 million in 1997; the most abundant grebe in the world (Cullen et al.1999). In fall, 3,500,000-4,100,000 individuals in North America (NAWCP Appendix).

BCR 9: 27,318 breeders, >3 million migrants

Population trend in BCR 9: Fluctuates at Malheur NWR in Oregon (range 0-1633 from 1988-1998, G. Ivey pers. observ.); "Healthy and reproducing well in southern Idaho" (Trost and Gerstell 1994); Lake Mead, Nevada, supported 50,000 to 100,000 as late as 1972, but then numbers disappeared, may have been migrants, not wintering birds (Cullen et al. 1999). Breeding trend increasing significantly (PIF Prioritization Database).

Population trend in North America: No demonstrable trends in distribution, but local increases and decreases (Cullen et al. 1999). BBS data showed significant 5.6% increase from 1966-2000, 5.1% from 1980-2000 (Sauer et al. 2004), but not useful for this species except for range (Cullen et al. 1999).

Abundance status in BCR 9: Most of the population stages at Mono Lake, California, or Great Salt Lake, Utah (Cullen et al. 1999); together supports more than 90% of North American birds in fall (Mono Lake Committee website). Occasional to common in spring and fall, occasional to abundant in summer in eastern Washington (checklists); locally common breeder, fairly common to abundant migrant, rare winter in eastern Oregon (Gilligan et al. 1994), but several hundred will winter in mild conditions (Spencer 2003b); uncommon to common in spring, common to abundant in summer, uncommon to abundant in fall, rare to uncommon in winter in northern California (checklists); common in summer, rare in winter in southern Idaho (Svingen and Dumroese 1997); common in spring through fall, uncommon in winter in Nevada (checklists); uncommon to abundant migrant, uncommon in summer, rare to uncommon in winter in western Utah (checklists).

BCR 9 % of Global population: >90% (migrants)
BCR 9 conservation priority: High concern (migrant)

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Breeds in most of BCR except central Washington and north-central Oregon (Smith et al. 1997, Cullen et al. 1999, Adamus et al. 2001). Major colonies at Harney, Lake, Klamath, and Deschutes counties, Oregon (Gilligan et al. 1994); Eagle Lake, California (Cooper 2004); Mud Lake WMA and Duck Valley Indian Reservation, Idaho (Trost and Gerstell 1994). Migrant through most of BCR (checklists). Major migration stops include Lake Abert, Oregon (30,000 in 1994); Mono Lake, California (from 1-2 million stage and molt each fall [Mono Lake Committee website]), and Great Salt Lake with 1-1.5 million (D. Paul pers. comm. and internal agency reports 1997-2004). Winters in most of BCR, especially in mild winters (Spencer 2003b, checklists).

Global distribution: Cosmopolitan.

Habitat requirements: Breeds in shallow lakes and ponds with emergent vegetation and highly productive marcoinvertebrate communities; rarely on ponds with fish; only time of year when does not prefer saline habitats for breeding (Cullen et al. 1999). In migration, prefers saline habitats which have superabundant invertebrate populations due to lack of fish and late freeze-over periods; and ponds and lakes where adults feed offshore in open water, while juveniles feed near shore in very shallow water; these age-specific feeding

differences are especially apparent when food is scarce (Cullen et al. 1999). In winter, found on lakes, reservoirs, shallow saline lakes, and salt ponds (Cullen et al. 1999). Uses sewage treatment ponds in all seasons in Oregon (Spencer 2003b).

Issues in BCR 9: Development, proposed highway, and a dumping site for toxic chemicals, and changing water levels all threaten habitat at Great Salt Lake (D. Paul pers. comm.). Mass fallouts of migrants can occur after leaving staging areas such as Great Salt Lake when disoriented in fog or snow and attracted to lights (Cullen et al. 1999). Nesting failures in Oregon occur due to rising water levels, waves from high winds, and water recession (Spencer 2003b). Potential loss of habitat at Mono Lake due to future water diversions and increased recreation (J. Jehl pers. comm.).

Conservation Status and Management Actions:
- Moderate priority breeding bird species in Idaho (Idaho PIF 2000).
- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: SNRB, SNRN, SNRM in California; S4B, SZN in Idaho; S4B in Nevada; S4 in Oregon; S3N, S4B in Utah; S2B, S4N in Washington.
- Partners In Flight Rank: 12.
- Coordinated monitoring program at major staging areas during migration (Great Salt Lake, Mono Lake, and Lake Abert).
- Monitoring program and staging survey at Great Salt Lake (Intermountain West/Desert Southwest Regional Workshop April 2000). Annual surveys at Tule Lake NWR (D. Mauser pers. comm.), at Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Statewide survey in Idaho in 1993 (Trost and Gerstell 1994).

Action needed:
- Protect and preserve habitat. Maintain water levels and forage base (brine shrimp) at saline lakes.

Is there a BNA for this species? Yes.

Western Grebe - *Aechmophorus occidentalis*

Le Grèbe de l'Ouest - (Nahuatl) Achichilique, Acitli

Status Summary: Continental conservation priority: Species of moderate concern

Population trend	3
Relative abundance	2
Threats to breeding	4
Threats to non-breeding	4
Breeding distribution	3
Non-breeding distribution	3

Global and BCR populations: Global: Unavailable since no thorough surveys and not always separated out from Clark's Grebe in surveys. Split with Clark's Grebe in 1985 confounds data, so accurate trend unavailable (Storer and Nuechterlein 1992). >120,000 in N. America (Jehl 2001 in Spencer 2003e). Greater than 110,000 breeders (NAWCP Appendix)

BCR 9: 12,088 breeders
BCR 10: 3,580 breeders
BCR 15: 1,286 breeders
BCR 16: 382 breeders

Population trend in BCR 9: No data (Storer and Nuechterlein 1992, PIF Prioritization Database). On Basin and Range BBS routes, significant increase of 9.3% from 1966-2000 (Sauer et al. 2004).

Population trend in BCR 10: No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 15: No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 16: No data on breeding trend (PIF Prioritization Database).

Population trend in North America: No data available (Storer and Nuechterlein 1992). Christmas bird count data suggests declines (Ivey 2004).

Abundance status in BCR 9: Occasional in spring and fall, rare to occasional in summer in eastern Washington (checklists); locally common breeder, locally common to rare in winter in eastern Oregon (Gilligan et al. 1994); uncommon to common in spring, common to abundant in summer and fall, rare in winter in northern California (checklists); abundant in summer, uncommon in winter in southern Idaho (Svingen and Dumroese 1997); rare to common in spring, rare to occasional in summer, uncommon to common in fall, rare to occasional in winter in Nevada (checklists); rare to uncommon in spring and fall, uncommon to common in summer, rare in winter in western Utah (checklists). Populations on neighboring lakes in Oregon and California vary widely in proportion between Western and Clark's (Storer and Nuechterlein 1992); in equal numbers compared to Westerns in Klamath County, less common at Goose Lake in Lake County, far more numerous in Harney County, Oregon (Gilligan et al. 1994). Summer counts of Westerns and Clark's in northern California, southern Oregon, and Utah showed 50.8% of 1,584 birds to be Westerns (Storer and Nuechterlein 1992). In western Nevada, breeding Clark's outnumber Westerns 60/40-90/10 (Nevada PIF 1999).

Abundance status in BCR 10: Common in northern Idaho, particularly at Lake Cascade where 1350 nests were detected in 2004 (C. Moulton pers. comm.). Common in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 15: Unknown.

Abundance status in BCR 16: Unknown.

BCR 9 % of Global population: 11%
BCR 10 % of Global population: 3%
BCR 15 % of Global population: 1%
BCR 16 % of Global population: <1%

BCR 9 conservation priority: High concern
BCR 10 conservation priority: Moderate concern
BCR 15 conservation priority: High concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Breeds in most of BCR (Storer and Nuechterlein 1992, National Geographic Society 1999). Major colonies at Eagle Lake, California (Cooper

2004); and American Falls Reservoir and Minidoka NWR, Idaho (Trost and Gerstell 1994). Migrant through most of BCR (checklists). Winters through most of BCR except Washington (Gilligan et al. 1994, Svingen and Dumroese 1997, checklists). Especially common in Oregon in winter in Klamath Basin (Gilligan et al. 1994).

Occurrence in BCR 10: Breeder (colonial), migrant, winters. Breeds in most of BCR (Storer and Nuechterlein 1992). Migrant through most of BCR (checklists). Winters in northern Idaho (Svingen and Dumroese 1997) and western Montana (Metcalf NWR checklist).

Occurrence in BCR 15: Breeder (colonial), migrant, winters. Year-round, small numbers winter (National Geographic Society 1999, Sibley 2000, L. Oring and L. Neel pers. comm.). Major colony at Eagle Lake, California (Cooper 2004).

Occurrence in BCR 16: Breeder (colonial), migrant, winters. Breeds in most of BCR (Storer and Nuechterlein 1992). Breeds most frequently in New Mexico at Las Vegas NWR and northern lakes (Rustay 2000). Migrant through most of BCR (checklists). Rare in winter in northern New Mexico (Las Vegas NWR checklist).

Habitat requirements: Breeds on freshwater lakes and marshes with extensive areas of open water bordered by emergent vegetation (Storer and Nuechterlein 1992). Requires open water for displaying, feeding, and social flocking; and large areas of tall emergent aquatic plants such as tule or cattail for nesting (Trost and Gerstell 1994). In migration, usually on large bodies of water, in winter on brackish bays, lakes, occasionally on rivers (Storer and Nuechterlein 1992). Western usually forages in shallower water closer to shore than Clark's, at least at Upper Klamath Lake (Oregon) and Idaho, distinction less if shallow areas far from shore (Storer and Nuechterlein 1992, Trost and Gerstell 1994).

Global distribution: North America

Issues in BCR 9: Concern over effects of water level fluctuations and poor water quality on nesting birds in Idaho; no longer nest at Lake Lowell due to fluctuating water levels and nutrient load (Trost and Gerstell 1994). Winter fish kills likely lowers breeding success which occurs when low water levels, caused by drought or management to control nongame fish, are followed by a cold winter (Trost and Gerstell 1994). Flooding and drops in water levels destroyed colonies in Oregon and Utah (Spencer 2003e). Heavy recreational use, with few restrictions on public access or recreational activities, and insufficient funding of enforcement to prevent dumping, vandalism, disturbance, and illegal hunting are issues at Potholes Reservoir, Washington (Cullinan 2001). Except for long-term viability of Walker Lake fishery, few issues in Nevada (Nevada PIF 1999). Water levels and use of Rotenone for carp control effect numbers of breeding birds at Malheur NWR (Gilligan et al. 1994); lack of control resulted in presence of only adult carp that were too large for feeding grebes; carp control resulted in near elimination of carp followed by years with an unusually large population of fingerling sized carp appropriate for feeding grebes (Spencer 2003e).

Issues in BCR 10: Concern over effects of water level fluctuations and poor water quality on nesting birds in Idaho (Trost and Gerstell 1994). Winter fish kills likely lowers breeding success; this results when low water levels caused by drought or management to control nongame fish are followed by a cold winter (Trost and Gerstell 1994). Flooding and drops in water levels destroyed colonies in Oregon and Utah (Spencer 2003e).

Issues in BCR 15: Water level drawdowns for power generation at Lake Almanor caused major nest losses.

Issues in BCR 16: Flooding and drops in water levels destroyed colonies in Utah (Spencer 2003e).

Conservation Status and Management Actions:

- Candidate for listing in Washington (2001 list). High priority breeding bird species in Idaho (Idaho PIF 2000).
- High priority breeding bird species in Idaho (Idaho PIF 2000), Utah focal (Parrish et al. 2002).
- NSS4 in Wyoming (Cerovski et al. 2004).
- Focal species for "open water, lakes" habitat suite for BCRs 9 and 16 (Rosenberg et al. 2001).
- Priority bird species in PIF Columbia Plateau (#89) Physiographic Area Plan.

- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S3 in Arizona; SNRB, SNRN in California; S4B in Colorado; S4B in Idaho; S4B in Montana; S4B in Nevada; S3B, S5N in New Mexico; S3B, S2S3N in Oregon; S3N, S4B in Utah; S3B, S3N in Washington; S4B in Wyoming.
- Partners In Flight Rank: 17.
- PIF continental concern (Rosenberg et al. 2001).
- Statewide survey in Idaho in 1993 (Trost and Gerstell 1994). Statewide survey in Colorado in 2000 (Leukering et al. 2000).

Action needed:
- Habitat management: Maintain water levels. Monitor water quality. Consider carp control. Modify lake restrictions from no wake to trolling speed only to favor wildlife (Rustay 2000). Control grazing along shores and banks through low intensity or rest-rotation (Rustay 2000). Fence cattail/bulrush areas during dry years for rapid recovery of nesting habitat (Rustay 2000).
- Minimize disturbance at nesting areas.
- Collect data on status, trend, and population parameters to differentiate from Clark's.
- All known colonies should be surveyed on an annual basis to track distribution and numbers of both Western and Clark's (Montana PIF 2000).

Is there a BNA for this species? Yes.

Clark's Grebe - *Aechmophorus clarkii*

Le Grèbe de Clark - (Nahuatl) Achichilique, Acitli

Status Summary: Continental conservation priority: Species of low concern

Population trend	3
Relative abundance	3
Threats to breeding	3
Threats to non-breeding	3
Breeding distribution	3
Non-breeding distribution	3

Global and BCR populations: Global: 10,000-20,000 individuals (NAWCP Appendix).

BCR 9: 3,546 breeders (App. D, Table D-10)
BCR 10: 106 breeders (App. D, Table D-10)
BCR 15: 12 breeders (App. D, Table D-10)
BCR 16: 210 breeders (App. D, Table D-10)

Population trend in BCR 9: Not always separated out from Western Grebes in surveys and taxonomic split between Western and Clark's grebes in 1985 confounds data, so accurate trend unavailable. No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 10: No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 15: No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 15: No data on breeding trend (PIF Prioritization Database).

Population trend in North America: BBS data showed non-significant 0.4% increase from 1966-2000, and 1.9% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Rare to occasional in spring, rare in summer and fall in eastern Washington (checklists); locally common breeder, rare in winter in eastern Oregon (Gilligan et al. 1994); uncommon to common in spring and fall, common in summer, rare in winter in northern California (checklists); locally common breeder, accidental in winter in southwest Idaho (Svingen and Dumroese 1997); rare to uncommon in spring and summer in Nevada (checklists); rare to common in summer, rare in winter in western Utah (checklists). Populations on neighboring lakes in Oregon and California vary widely in proportion between Western and Clark's (Storer and Nuechterlein 1992); in equal numbers compared to Westerns in Klamath County, more common at Goose Lake in Lake County, far less numerous in Harney County (Gilligan et al. 1994.). Summer counts of Western/Clark's in northern California, southern Oregon, and Utah showed 49.2% of 1,584 birds to be Clark's (Storer and Nuechterlein 1992). In western Nevada, breeding Clark's outnumbered Westerns 60/40-90/10 (Nevada PIF 1999).

Abundance status in BCR 10: Uncommon in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 15: Unknown.

Abundance status in BCR 16: Unknown.

BCR 9 % of Global population: 24%
BCR 10 % of Global population: <1%
BCR 15 % of Global population: <1%
BCR 16 % of Global population: 1%

BCR 9 conservation priority: High concern
BCR 10 conservation priority: Moderate concern
BCR 15 conservation priority: High concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Breeds in most of BCR (Storer and Nuechterlein 1992, National Geographic Society 1999). Upper Klamath and Goose lakes, Oregon, and California's Modoc Co. support the largest known concentrations of this species within its range (Spencer 2003a). Migrant through most of BCR (checklists). Rare in winter through most of BCR (Gilligan et al. 1994, Svingen and Dumroese 1997, Nevada PIF 1999, checklists), in large numbers on Walker Lake, Nevada (Nevada PIF 1999).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds in most of BCR (Storer and Nuechterlein 1992), except northern Idaho (Trost and Gerstell 1994). Migrant in northern Idaho (Svingen and Dumroese 1997) and southwest Montana (Red Rock Lakes NWR checklist).

Occurrence in BCR 15: Breeder (colonial), migrant, winters. Year-round, small numbers in winter (National Geographic Society 1999, Sibley 2000, L. Oring and L. Neel pers. comm.).

Occurrence in BCR 16: Breeder (colonial), migrant, winters. Breeds in most of BCR (Storer and Nuechterlein 1992) except Arizona (AGFD 1996). Breeds most frequently in New Mexico at Las Vegas NWR and northern lakes (Rustay 2000). Migrant in northern New Mexico (Las Vegas NWR checklist, NMGF website). Rare in winter in northern New Mexico (Las Vegas NWR checklist).

Global distribution: North America.

Habitat requirements: Breeds on freshwater lakes and marshes with extensive areas of open water bordered by emergent vegetation (Storer and Nuechterlein 1992). In migration, usually on large bodies of water (Storer and Nuechterlein 1992), needs deep lakes with fish (Nevada PIF 1999). In winter on brackish bays, lakes, occasionally on rivers (Storer and Nuechterlein 1992). Clark's usually forages in deeper water further from shore than Western, at least in Upper Klamath Lake (Oregon) and Idaho, distinction less if shallow areas far from shore (Storer and Nuechterlein 1992, Trost and Gerstell 1994). Uses wetlands, irrigation reservoirs < 640 acres, and reservoirs and stockponds < 640 acres for nesting, foraging, and migration in Montana (Montana PIF 2000).

Issues in BCR 9: Concern over effects of poor water quality and water level fluctuations on nesting birds in Idaho; no longer nest at Lake Lowell due to fluctuating water levels and nutrient load (Trost and Gerstell 1994). Winter fish kills likely lowers breeding success, which occurs when low water levels, caused by drought or management to control nongame fish, are followed by a cold winter (Trost and Gerstell 1994). Except for long-term viability of Walker Lake fishery, few issues in Nevada (Nevada PIF 1999).

Issues in BCR 10: Poorly understood and monitored in Montana (Montana PIF 2000).

Issues in BCR 15: Water level drawdowns at Lake Almanor causing nest failures.

Issues in BCR 16: Unknown.

Conservation Status and Management Actions:

- Candidate species in Arizona (1996 list), moderate priority breeding bird species in Idaho (Idaho PIF 2000), SC in Montana, management priority species in Nevada (Nevada PIF 1999), wetland priority species in New Mexico (Rustay 2000), Utah focal (Parrish et al. 2002), SSC4 in Wyoming (1999 list).
- Focal species for "open water, lakes" habitat suite for BCRs 9 and 16 (Rosenberg et al. 2001).
- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S3 in Arizona; SNRB, SNRN in California; S4B, SZN in Colorado; S2B, SZN in Idaho; S2S4B, SZN in Montana; S2B; S4B in Nevada; S4B, S5N in New Mexico; S4 in Oregon; S3N, S3S4B in Utah; S2B, SZN in Washington; SZN in Wyoming.
- Partners In Flight Rank: 17.
- PIF continental concern (Rosenberg et al. 2001).
- Statewide survey in Idaho in 1993 (Trost and Gerstell 1994). Statewide survey in Colorado in 2000 (Leukering et al. 2000). Montana Natural Heritage Program has tracked occurrences of known nesting sites in Montana (Montana PIF 2000).

Action needed:

- Habitat management: Maintain semi-permanent marshes with well-developed emergent and submergents, abundant fish populations, and stable water levels May 1 to November 15 (Nevada PIF 1999). Adjust water plans to adjust to nesting schedule of that year (Nevada PIF 1999). Accumulate water rights for Lahontan Valley wetlands to provided optimum breeding habitats (Nevada PIF 1999). Coordinate annual habitat management objectives of important colony sites in the Great Basin, review annual performance, and plan on an ecoregional scale (Nevada PIF 1999). Monitor water quality. Habitat

needs should be incorporated into water level and habitat management decisions at refuges and other management areas (Montana PIF 2000). Modify lake restrictions from no wake to trolling speed only to favor wildlife (Rustay 2000). Control grazing along shores and banks through low intensity or rest-rotation (Rustay 2000). Fence cattail/bulrush areas during dry years for rapid recovery of nesting habitat (Rustay 2000).

- Monitor population: Coordinate state management and monitoring of major colony sites with national planning efforts (Nevada PIF 1999). Conduct censuses of staging and wintering areas, and maintain abundant fish populations at important sites (Nevada PIF 1999). Collect data on status, trend, and population parameters to differentiate from Western. All known colonies should be surveyed on an annual basis to track distribution and numbers of both Western and Clark's (Montana PIF 2000).

Is there a BNA for this species? Yes.

Snowy Egret - *Egretta thula*

Aigrette neigeuse - Garceta pie-dorado, Garza chusmita, Garza nivea

Status Summary: Continental conservation priority: Species of high concern

Population trend	4
Relative abundance	2
Threats to breeding	4
Threats to non-breeding	3
Breeding distribution	3
Non-breeding distribution	4

Global and BCR populations: Global: Inadequate data (Parsons and Master 2000). Greater than 143,000 breeders in North America (NAWCP Appendix).

BCR 9: 3,322 breeders
BCR 10: 70 breeders
BCR 16: 940 breeders

Population trend in BCR 9: May be declining in Oregon (Intermountain West/Desert Southwest Regional Workshop April 2000), declining at Malheur NWR (range 0 to 85 from 1988-1998, G. Ivey pers. observ.); stable or increasing in southern Idaho (Trost and Gerstell 1994); nest total for Lahontan Valley in 2001 was 30% below the five-year average (Bradley et al. 2001). On Basin and Range BBS routes, significant decrease of 10.8% from 1966-2000 (Sauer et al. 2004).

Population trend in BCR 10: No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 16: No data on breeding trend (PIF Prioritization Database).

Population trend in North America: Widespread declines in late 20th century, populations have fluctuated, with colonization on mid-Atlantic Coast and northeast tempered with declines (Parsons and Master 2000). BBS data showed significant 3.4% increase from 1966-2000, and 4.3% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Uncommon breeder, rare to uncommon migrant in eastern Oregon (Gilligan et al. 1994); rare to uncommon in spring, rare to common in summer, uncommon to common in fall in northern California (checklists); common to uncommon in summer in southern Idaho (Svingen and Dumroese 1997); common in spring, common to abundant in summer, uncommon to common in fall in Nevada (checklists); rare to abundant in spring, common to abundant in summer, rare to occasional in fall, rare in winter in western Utah (checklists).

Abundance status in BCR 10: Uncommon in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 16: Unknown.

BCR 9 % of Global population: 2%
BCR 10 % of Global population: <1%
BCR 16 % of Global population: <1%

BCR 9 conservation priority: High concern
BCR 10 conservation priority: Moderate concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Breeds in most of BCR from southern Oregon and Idaho south (National Geographic Society 1999, Parsons and Master 2000). Migrant in most of BCR from Oregon and Idaho south (checklists). Rare in winter in northern Utah (checklists). Common breeder at Great Salt Lake, Utah (Paul et al 2001).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds in western Wyoming (National Geographic Society 1999, Parsons and Master 2000). Migrant in northern Idaho (Svingen and Dumroese 1997) and western Montana (Montana Natural Heritage Program website).

Occurrence in BCR 16: Breeder (colonial), migrant. Breeds in northeast Utah, central and southern Colorado (Parsons and Master 2000), and northern New Mexico (B. Howe pers. comm.). Migrant through most of BCR (checklists).

Global distribution: Western Hemisphere

Habitat requirements: Nests on reservoirs, grassy marshes, wet meadows (Parsons and Master 2000), riparian, marsh, and tree habitats, in hardstem bulrush, cattails, shrub willows, and on sparsely-vegetated islands (Herziger and Ivey 2003d); in willows along large rivers in Nevada (Parsons and Master 2000). Forages in shallow water (Parsons and Master 2000), in lakes, meadows, marshes, ponds, streams, and urban habitats, including migration (Herziger and Ivey 2003d).

Issues in BCR 9: DDE present in eggs in Nevada, Oregon, and Idaho, and effected reproductive success (Henny et al. 1985).

Issues in BCR 10: None reported.

Issues in BCR 16: Urban colonies and human conflicts in New Mexico (B. Howe pers. comm.).

Conservation Status and Management Actions:
- T in Arizona (1996 list); SV in Oregon (ONHP 2001 list); NSS3 in Wyoming (Cerovski et al. 2004).
- Moderate priority breeding bird species in Idaho (Idaho PIF 2000).
- Global Heritage Status Rank: G5 (very large range, relatively secure on a global level; threatened in some areas by loss/degradation of wetland habitat).
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S1B, S4N in Arizona; S4 in California; S2B, SZN in Colorado. S2B, SZN in Idaho; SAB, SZN in Montana; S4B in Nevada; S4B, S4N in New Mexico; S2B in Oregon; S4S5B in Utah; SZN in Washington; S3B, SZN in Wyoming.
- Partners In Flight Rank: 9.
- Annual surveys at Klamath Basin (D. Mauser pers. comm.), Great Salt Lake (J. Neill pers. comm.); at Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Southern Idaho surveyed in 1993 (Trost and Gerstell 1994). Annual surveys at important sites in Wyoming (A. Cerovski pers. comm.). Statewide survey in Colorado in 2000 (Leukering et al. 2000).

Action needed:
- Monitor effects of pesticides.
- Better data needed on nesting bird numbers (Intermountain West/Desert Southwest Regional Workshop April 2000).

Is there a BNA for this species? Yes.

Great Blue Heron - *Ardea herodias*

Grand Héron - Garza morena, Garza blanca granda, Gallinaza

Status Summary: Continental conservation priority: Species not at risk.

Population trend	1
Relative abundance	2
Threats to breeding	2
Threats to non-breeding	2
Breeding distribution	2
Non-breeding distribution	3

Global and BCR 9 populations: Global: Unavailable due to incomplete data (Butler 1992). Greater than 83,000 breeders in North America (NAWCP Appendix).

BCR 9: 4.560 breeders
BCR 10: 1,600 breeders
BCR 15: unknown
BCR 16: 2,082 breeders

Population trend in BCR 9: Probably stable in Washington (Butler 1992); decreasing at Malheur NWR in Oregon (range 45-682 from 1988-1998, G. Ivey pers. observ.); stable or increasing in southern Idaho (Trost and Gerstell 1994); nest total for Lahontan Valley in 2001 was 92% below the five-year average (Bradley et al. 2001); formerly nested on largest island on Great Salt Lake, Utah (now a state park, Intermountain West/Desert Southwest Regional Workshop April 2000). On Basin and Range BBS routes, non-significant increase of 2.3% from 1966-2000, 1.9% from 1980-2000; on Columbia Plateau routes, a non-significant decrease of 2.5% from 1966-2000, 4.5% from 1980-2000 (Sauer et al. 2004). Greatest increase per year on BBS routes from 1966-1996 in southern Washington, northern and eastern Oregon, eastern California, southern Idaho, most of Nevada, and northern Utah (Sauer et al. 2004).

Population trend in BCR 10: Breeding trend possibly increasing (PIF Prioritization Database). On Wyoming Basin routes, non-significant increase of 6.2% from 1966-2000, and non-significant increase of 12.2% from 1980-2000 (Sauer et al. 2004). Greatest increase per year on BBS routes from 1966-1996 in northeast Oregon, central Idaho, southwest Montana, western Wyoming, and northern Colorado (Sauer et al. 2004).

Population trend in BCR 15: Breeding trend uncertain (PIF Prioritization Database).

Population trend in BCR 16: Breeding trend uncertain (PIF Prioritization Database). On Southern Rockies BBS routes, non-significant increase of 17.6% from 1966-2000, and significant increase of 21.2% from 1980-2000 (Sauer et al. 2004). Greatest increase per year on BBS routes from 1966-1996 in eastern Utah, western Colorado, and central Arizona (Sauer et al. 2004).

Population trend in North America: Stable or increasing in most areas (NatureServe). BBS data showed significant 2.3% increase from 1966-2000, and 1.1% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Common spring through fall, occasional to uncommon in winter in eastern Washington (checklists); uncommon to locally common breeder, uncommon to fairly common most winters in eastern Oregon (Gilligan et al. 1994); common spring through fall, rare in winter in northern California (checklists); most widespread and successful ciconiform in Idaho (Trost and Gerstell 1994)--common resident (Svingen and Dumroese 1997); common spring through fall, uncommon to common in winter in Nevada (checklists); common year-round in western Utah (checklists).

Abundance status in BCR 10: common spring through fall, rare in winter.

Abundance status in BCR 15: uncommon spring through fall, rare in winter.

Abundance status in BCR 16: uncommon spring through fall.

BCR 9 % of Global population: 4%
BCR 10 % of Global population: 1%

BCR 9 conservation priority: Moderate concern
BCR 10 conservation priority: Moderate concern

BCR 15 % of Global population: 1% ***BCR 15 conservation priority:*** Not at risk
BCR 16 % of Global population: 1% ***BCR 16 conservation priority:*** Not at risk

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Year-round in most of BCR (Butler 1992, National Geographic Society 1999, checklists). Most colonies in Oregon in Klamath and Harney basins; Deer Flat NWR, Island Park Reservoir, Idaho (Trost and Gerstell 1994). Highest densities in winter include Great Salt Lake (Butler 1992), Klamath and Harney basins and along Columbia River in Oregon (Gilligan et al. 1994).

Occurrence in BCR 10: Breeder (colonial), migrant, winters. Year-round in most of BCR except for portions of northern Idaho and western Wyoming and Montana (Butler 1992, checklists).

Occurrence in BCR 15: Breeder (colonial), migrant, winters. Year-round (Butler 1992, National Geographic Society 1999, L. Oring and L. Neel pers. comms.).

Occurrence in BCR 16: Breeder (colonial), migrant, winters. Year-round in most of BCR except western Colorado and northwest New Mexico (Butler 1992, National Geographic Society 1999).

Global distribution: North and Central America; Galapagos.

Habitat requirements: Nests in marsh and riparian habitats on islands, lakes, wetlands, trees (including cottonwoods and willows in Oregon and Douglas Fir in Idaho, Trost and Gerstell 1994, G. Ivey pers. observ.). Little information on habitats in migration and winter, but probably similar to breeding (Butler 1992). Feeds mostly in slow moving or calm freshwater, including lakes, ponds, marshes, streams, wet meadows, urban areas (Butler 1992), and dry fields (especially in winter Gilligan et al. 1994).

Issues in BCR 9: Recreational and agricultural developments threaten habitat in inholdings and on adjacent lands, no secure water rights at Columbia NWR, Washington (Cullinan 2001). Nesting trees bulldozed in Idaho (Trost and Gerstell 1994). Potential removal of area protective status and resulting agricultural development, invasion of non-native plants, and increasing adverse impacts from recreational use, particularly motorized boats, at Hanford Reach, Washington (Cullinan 2001). Potential for recreational overuse and disturbance to nesting birds is a substantial threat; other threats include invasive non-native plants and water quality at North Potholes Reserve, Washington (Cullinan 2001). Increased use of water for residential and agricultural uses and runoff of chemicals and organic nutrients from adjacent agricultural lands may result in contamination of water and soils, or cause algae blooms in smaller ponds and wetlands, especially in several wetlands at Turnbull NWR in Washington (Cullinan 2001); dredging and gravel mining in the river floodplains causes loss of habitat and may alter hydrology; some additional habitat may be lost because of urban development near the eastern edge of Toppenish Creek/Yakima River Oxbows, Washington (Cullinan 2001). Pesticides and eggshell thinning found in eggs at Malheur NWR (Cornely et al. 1993), but DDE and PCB residues in birds in Washington, Oregon, and Nevada not high enough to cause reproductive problems; species not considered sensitive to DDT effects (Fitzner et al. 1988).

Issues in BCR 10: Minor threat of invasive or non-native plants at Red Canyon Ranch and Sweetwater River Project, Wyoming (WY IBAs).

Issues in BCR 15: None reported.

Issues in BCR 16: Animal Damage Control in New Mexico reports taking average of ten a year using leghold traps (NMGF website).

Conservation Status and Management Actions:
- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S4 in California; S5B, S5N in Idaho; S5 in Nevada; S4 in Oregon; S3S4 in Utah; S4S5 in Washington; S4B, SZN in Montana; S4B, SZN in Wyoming; S3B, SZN in Colorado; S5 in Arizona; S4B, S5N in New Mexico.
- Partners in Flight Rank: 9.
- Annual surveys at Klamath Basin (D. Mauser pers. comm.), Great Salt Lake (J. Neill pers. comm.); at

Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Statewide survey in Idaho in 1993 (Trost and Gerstell 1994). Statewide survey in Colorado in 2000 (Leukering et al. 2000). Statewide survey in Wyoming in 1994 (Intermountain West/Desert Southwest Regional Workshop April 2000). Statewide survey in Idaho in 1993 (Trost and Gerstell 1994).

Action needed:

- Preserve and protect wetland habitat: secure water rights and maintain water levels and encourage preservation of nesting trees on private lands.
- Monitor for exotic species.
- Monitor water quality.
- Minimize disturbance at nesting areas.
- Watch placement of leghold traps.

Is there a BNA for this species? Yes.

Green Heron - *Butorides virescens*

Heron vert - Garcita verde

Status Summary: Continental conservation priority: Species of low concern

Population trend	2
Relative abundance	3
Threats to breeding	2
Threats to non-breeding	3
Breeding distribution	2
Non-breeding distribution	4

Global and BCR populations: Global: Unknown (Davis and Kushlan 1994, NAWCP Appendix).

BCR 16: unknown

Population trend in BCR 16: No data on breeding trend (PIF Prioritization Database).

Population trend in North America: Sparse early data makes trend unavailable, but range expansion has occurred in middle of continent and on the Pacific Coast (Davis and Kushlan 1994). BBS data indicates significant 0.8% decline from 1966-2000, 2.0% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 16: unknown

BCR 16 % of Global population: unknown ***BCR 16 conservation priority:*** Moderate concern

Occurrence in BCR 16: Breeder (non-colonial), migrant. Breeds in southeast Utah, northwest Arizona, (Davis and Kushlan 1994, National Geographic Society 1999) at Fort Collins and possibly Grand Junction in Colorado (Leukering et al. 2000), and New Mexico (B. Howe pers. comm.). Migrant in most of BCR (checklists).

Global distribution: North America.

Habitat requirements: Nests in marshes, lakes, ponds, human-made impoundments, dry woods and orchards if feeding site available (Davis and Kushlan 1994). Likely uses wetlands in migration (Davis and Kushlan 1994). Feeds in riparian zones along creeks and streams, marshes, human-made ditches, canals, ponds, lake edges, open floodplains, and mudflats; prefers to feed in thick vegetation, but will use open areas on mudflats, open marshes, and pond edges (Davis and Kushlan 1994).

Issues in BCR 16: Loss of riparian habitats. Invasive plant species (e.g., salt cedar)

Conservation Status and Management Actions:

- Global Heritage Status Rank: G5 (large range, common in many areas).
- National Heritage Status Rank: N5B N5N.
- Heritage Status Rank: S1B, SAN in Utah; S3B, SZN in Colorado; S4 in Arizona; S4B, S4N in New Mexico.
- Partners In Flight Rank: 10.
- Statewide survey in Colorado in 2000 (Leukering et al. 2000).

Action needed:

- Conservation and restoration of woody riparian habitats along rivers and streams.

Is there a BNA for this species? Yes.

Black-crowned Night-Heron - *Nycticorax nycticorax*

Bihoreau a couronne noire (Canada) - Yaboa Real, Guanaba (Puerto Rico), Guaco (Venezuela)

Status Summary: Continental conservation priority: Species of moderate concern

Population trend	4
Relative abundance	3
Threats to breeding	3
Threats to non-breeding	3
Breeding distribution	2
Non-breeding distribution	3

Global and BCR populations: Global: Greater than 50,000 breeders in North America not including Central America, NAWCP Appendix).

BCR 9: 5,586 breeders
BCR 10: 520 breeders
BCR 16: 656 breeders

Population trend in BCR 9: Fluctuates but generally decreasing at Malheur NWR in Oregon (range 29-350 from 1988-1998, G. Ivey pers. observ.); stable or increasing in southern Idaho (Trost and Gerstell 1994); nest total for Lahontan Valley in 2001 was 81% below the five-year average (Bradley et al. 2001). On Basin and Range BBS routes, non-significant decrease of 2.1% from 1966-2000, 1.4% from 1980-2000; on Columbia Plateau routes, non-significant increase of 3.2% from 1966-2000, 4.4% from 1980-2000 (Sauer et al. 2004). Greatest increase per year on BBS routes from 1966-1996 in southern Oregon, northeast and eastern California, southwest Idaho, most of Nevada, and west-central Utah (Sauer et al. 2004).

Population trend in BCR 10: Where disturbance minimized and water levels consistent, some colonies used for 30 consecutive years or more in Montana (Montana PIF 2000). No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 16: Breeding trend uncertain (PIF Prioritization Database).

Population trend in North America: Lack of data makes trend difficult, but most populations stable or increasing (Davis 1993). BBS data showed significant 5.9% increase from 1966-2000 and 5.3% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Rare to common in spring and summer, rare to uncommon in fall in eastern Washington (checklists); fairly common breeder in summer, uncommon in migration and winter in eastern Oregon (Gilligan et al. 1994); common in spring through fall, rare to uncommon in winter in northern California (checklists); common in summer, uncommon in winter in southern Idaho (Svingen and Dumroese 1997); common in spring and fall, common to abundant in summer, occasional to uncommon in winter in Nevada (checklists); rare to abundant in spring, common to abundant in summer, rare to common in fall and winter in western Utah (checklists).

Abundance status in BCR 10: Uncommon in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 16: Unknown

BCR 9 % of Global population: 11%
BCR 10 % of Global population: 1%
BCR 16 % of Global population: 1%

BCR 9 conservation priority: Moderate concern
BCR 10 conservation priority: Moderate concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Breeds through most of BCR (Davis 1993, National Geographic Society 1999, Sibley 2000). Most important colonies in Harney, Lake, and Klamath counties, Oregon (Gilligan et al. 1994), and Thousand Springs, Idaho (Trost and Gerstell 1994). Migrant through most of BCR (checklists). Major migration staging sites include Malheur NWR (3,000 or more) (Gilligan et al. 1994). Winters in most of BCR except Washington and northern Oregon (Davis 1993, Trost and Gerstell 1994, checklists).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds in most of BCR except northeast Washington

(Smith et al. 1997), northern Idaho, parts of western Montana, and parts of southeastern and central Wyoming (Davis 1993, National Geographic Society 1999). Uncommon migrant in northern Idaho (Svingen and Dumroese 1997), rare in other areas of BCR (checklists).

Occurrence in BCR 16: Breeder (colonial), migrant, winters. Breeds through most of BCR (Davis 1993). Migrant through most of BCR (checklists). Winters in northwest Arizona and central New Mexico (Davis 1993), rarely in southern Colorado (Alamosa-Monte Vista NWRs checklist).

Global distribution: Cosmopolitan.

Habitat requirements: Breeds in marsh and riparian habitats in marshes, streams, rivers, pools, ponds, lakes, man-made ditches, canals, reservoirs, and wet agricultural fields (Davis 1993); in Oregon and Idaho on trees, shrubs, islands, and in emergents (Cornely et al. 1993, Trost and Gerstell 1994). Prefers sites over water or on islands, in bulrush or cattail marshes for nesting in Montana, but also cottonwoods, willows, or other wetland vegetation (Montana PIF 2000). Uses wetlands in migration, wide variety of wetland habitats in breeding season in winter (Davis 1993). For feeding, prefers shallow, weedy and margins, creeks, and marshes (Davis 1993); forages primarily in wetlands, also grasslands in Montana (Montana PIF 2000). Uses Intermountain West wetlands, and reservoirs and stockponds < 640 acres for nesting, foraging, and migration in Montana (Montana PIF 2000).

Issues in BCR 9: Greatest mortality in Magic Valley, Idaho, probably due to concentration of prey at trout hatcheries (Trost and Gerstell 1994). With low water levels, grazing cattle may gain access to island colonies and cause abandonment (Trost and Gerstell 1994). Potential for recreational overuse and disturbance to nesting birds is a substantial threat, as well as invasive non-native plants and water quality at North Potholes Reserve, Washington (Cullinan 2001). Runoff of chemicals and organic nutrients from adjacent agricultural lands may result in contamination of water and soils, or cause algae blooms in the smaller ponds and wetlands; dredging and gravel mining in the river floodplains causes loss of habitat and may alter hydrology; some additional habitat may be lost because of urban development near the eastern edge of Toppenish Creek/Yakima River Oxbows, Washington (Cullinan 2001). Reproductive problems related to DDE in Washington, Oregon, and Nevada have been observed eight years after substance banned (clutch size decreased, productivity decreased, and greater incidence of cracked eggs), particularly Nevada; however, residues have declined (Henny et al. 1984) and no pesticides have been found at colony sites, thus birds must acquire these pesticides elsewhere (Henny et al. 1985).

Issues in BCR 10: None reported.

Issues in BCR 16: Riparian woodland decadence and exotic plant species in New Mexico (salt cedar and Russian olive) threaten nesting habitat (B. Howe pers. comm.).

Conservation Status and Management Actions:

- SC in Montana (2001 list). Formerly NSS3 in Wyoming (Cerovski et al. 2004).
- Global Heritage Status Rank: G5 (very large range, fairly common in many local areas).
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S3 in Arizona; S3 in California; SZN in Colorado; Partners In Flight Rank: 9.S3B, SZN in Idaho; S2S3B, SZN in Montana; S4B, S4N in New Mexico S5B in Nevada; S4 in Oregon; S3N, S3S4B in Utah; S3B, S3N in Washington; S3B, SZN in Wyoming.
- Annual surveys at Klamath Basin (D. Mauser pers. comm.), Great Salt Lake (J. Neill pers. comm.); at Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Statewide survey in Idaho in 1993 (Trost and Gerstell 1994). Annual surveys at some sites in Wyoming (A. Cerovski pers. comm.). Statewide survey in Colorado in 2000 (Leukering et al. 2000).

Action needed:

- Prevent access to hatchery fish.
- Preserve and protect wetlands and riparian habitats. Maintain water levels. Monitor for exotic species. Monitor water quality.
- Minimize disturbance at breeding areas.

- Annual surveys should be conducted to track the occupancy of known and potential colony sites, and develop population trends (Montana PIF 2000).

Is there a BNA for this species? Yes.

Least Bittern (Western) - *Ixobrychus exilis hesperis*

Blongios minute - Ardeola, Garza enana, Garcilla

Status Summary: Continental conservation priority: Not yet determined

Global and BCR populations: Global: Little information due to secretive behavior (Gibbs et al. 1992b). Insufficient data (NAWCP Marshbird Workshop Aug 2001). BCR populations unknown

Population trend in BCR 9: Uncertain trend (PIF Prioritization Database). Historically nested at Great Salt Lake, now a rare migrant in most of the Great Basin (Gibbs et al. 1992b). Small numbers at Modoc NWR recently; virtually unknown otherwise in northeastern California (Cooper 2004).

Population trend in BCR 16: No data on breeding trend (PIF Prioritization Database).

Population trend in North America: Secretive behavior makes trend unclear (Gibbs et al. 1992b), and BBS data not conclusive as species breeds away from roadsides and peak of vocal activity is past standard survey period (NatureServe). Showed stability 1966-1989 on the few routes this species was recorded (less than 10 routes in any state except Florida, Gibbs et al. 1992b); BBS data showed significant decline of 2.9% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Rare in spring and summer in Oregon (Spencer 2003c); rare in spring and summer in northern California (checklists); rare spring through fall in Nevada (checklists).

BCR 9 % of Global population: unknown
BCR 16 % of Global population: unknown

BCR 9 conservation priority: Moderate concern
BCR 16 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (non-colonial), migrant. Breeds in southern Oregon and northeast California (Gibbs et al. 1992b, checklists). Western population concentrations include Klamath and Malheur basins of Oregon and Modoc Plateau of California (Gibbs et al. 1992b). Rare migrant and occasional in winter in most of the Great Basin (Gibbs et al. 1992b, National Geographic Society 1999).

Occurrence in BCR 16: Breeder (non-colonial), migrant. Breeds in New Mexico (B. Howe pers. comm.), and at only a few locations in Arizona (AGFD 1996). Migrant through most of BCR (checklists).

Global distribution: Western Hemisphere.

Habitat requirements: Breeds in low-lying areas associated with large rivers and lakes in freshwater and brackish marshes with dense, tall growth of aquatic or semi-aquatic vegetation, particularly where cattail, sedge, bulrush, or wapato are interspersed with clumps of woody vegetation and open water (Gibbs et al. 1992b). Migration habitat similar to breeding (Gibbs et al. 1992b). Feeds along deep, open waters in tall, dense stands of emergents (Gibbs et al. 1992b). Uses a narrower range of wetland types, more densely vegetated sites and deeper water than American Bittern (Gibbs et al. 1992b). Breeds in cattail marshes in central New Mexico (B. Howe pers. comm.). Migration habitat similar to breeding (Gibbs et al. 1992b).

Issues in BCR 9: Unknown.

Issues in BCR 16: Habitat threatened by channelization and dredging, stream diversions, flood control clearing and draining of marshes (AGFD 1996).

Conservation Status and Management Actions:

- Former Federal Species of Management Concern (Region 1) because depends on vulnerable or restricted habitats (USFWS 1995), but not on 2002 BCC list (USFWS 2002).
- Candidate species in Arizona (1996 list); BSSC in California (2003 draft list); SP in Oregon (ONHP 2001 list).
- Global Heritage Status Rank: G5 (very large range and common in many areas).
- National Heritage Status Rank: N5B, N5N.
- Heritage Status Rank: S2B, S3 in Arizona; S1 in California; SZN in Colorado; no rank in Idaho; S2N in Nevada; S3B, S3N in New Mexico; S1B in Oregon; S1B in Utah; no rank in Washington.

- Partners In Flight Rank: 15.
- This species recorded in Colorado in 2000 when encountered on statewide colonial survey (Leukering et al. 2000).

Action needed:

- Preserve and protect habitat; Increase the quality and quantity of both breeding and wintering habitat to 1900 levels (NAWCP Marshbird Workshop Aug 2001).
- Obtain more accurate information (NAWCP Marshbird Workshop Aug 2001); Determine migration routes; return rates to breeding grounds; movement and habitat use prior to fall migration; movement and habitat use of juveniles; population estimate, distribution and population trends, and availability of appropriate habitat; wintering habitat needs; survival of young and juveniles; extent of double-brooding and re-nesting; marsh size and distribution requirements for breeding and wintering; verification of response rates to passive listening and broadcast call recordings; use of restored and created wetlands and effects of management techniques (NAWCP Marshbird Workshop Aug 2001). Find out where birds from important areas winter and what are most important wintering areas (NAWCP Marshbird Workshop Aug 2001). Assess food resource availability (i.e., the timing of availability and types of food) (NAWCP Marshbird Workshop Aug 2001). Assess complex habitat (marsh and grassland) criteria, in relation to marsh size requirements (NAWCP Marshbird Workshop Aug 2001).
- Increase population to pre-1970s levels and prevent range contraction (NAWCP Marshbird Workshop Aug 2001).

Is there a BNA for this species? Yes.

American Bittern - *Botaurus lentiginosis*

Butor d'Amérique - Torcomón, Avetoro lentiginoso

Status Summary: Continental conservation priority: Not yet determined

Global and BCR populations: Global: Unknown (Gibbs et al. 1992a). Insufficient data (NAWCP Marshbird Workshop Aug 2001).

BCRs: Unknown

Population trend in BCR 9: Likely declining in Idaho (Svingen and Dumroese 1997). Breeding trend uncertain (PIF Prioritization Database). On Basin and Range BBS routes, non-significant increase of 130% from 1966-2000, 174.1% from 1980-2000; on Columbia Plateau routes, non-significant increase of 9.9% from 1966-2000, 18.4% from 1980-2000 (Sauer et al. 2004).

Population trend in BCR 10: Breeding trend significantly decreasing (PIF Prioritization Database).

Population trend in BCR 15: No data on breeding trend (PIF Prioritization Database).

Population trend in BCR 16: Decreasing in Arizona and New Mexico (Intermountain West/Desert Southwest Regional Workshop April 2000); historically nested in Mongollon Plateau in Arizona (Latta et al. 1999). Breeding trend uncertain (PIF Prioritization Database). Greatest increase per year on BBS routes from 1966-1996 in northeast Utah, south-central Colorado, and north-central New Mexico (Sauer et al. 2004).

Population trend in North America: Substantially declining over most of U.S. (Gibbs et al. 1992a). BBS data showed significant 2.4% annual decline 1966-1989, but only in U.S. (no change in Canada, where overall more frequent than U.S.; Gibbs et al. 1992a). However, BBS data is unreliable, as this species is encountered too infrequently, uses habitats away from roads, past peak of vocal activity to assess trends in most states (NatureServe).

Abundance status in BCR 9: Occasional to uncommon in spring through fall, rare to occasional in winter in eastern Washington (checklists); uncommon breeder, rare in winter in eastern Oregon (Gilligan et al. 1994); uncommon in spring and fall, common to uncommon in summer, rare in winter in northern California (checklists); uncommon breeder in southern Idaho (Svingen and Dumroese 1997); rare to common in spring and fall, occasional to common in summer in Nevada (checklists); rare to uncommon year-round in western Utah (checklists).

Abundance status in BCR 10: Uncommon in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 15: Uncommon breeders (small numbers) (L. Oring and L. Neel pers. comm.).

Abundance status in BCR 16: Rare

BCR 9 % of Global population: Unknown, 1.53% (PIF Prioritization Database based on BBS data).
BCR 10 % of Global population: Unknown, 1.07% (PIF Prioritization Database based on BBS data).
BCR 15 % of Global population: Unknown, likely less than 1%.
BCR 16 % of Global population: Unknown, 0.4% (PIF Prioritization Database based on BBS data).

BCR 9 conservation priority: Moderate concern species
BCR 10 conservation priority: Moderate concern species
BCR 15 conservation priority: Moderate concern species
BCR 16 conservation priority: High concern species

Occurrence in BCR 9: Breeder (non-colonial), migrant, winters. Breeds in most of BCR except southern Nevada and Utah (Gibbs et al. 1992a, National Geographic Society 1999). Most common in Harney, Klamath, and Lake counties in Oregon (Gilligan et al. 1994); in Idaho at Camas NWR, Market Lake WMA, and Silver Creek Preserve (Svingen and Dumroese 1997). Migrant and winters through most of BCR (checklists).

Occurrence in BCR 10: Breeder (non-colonial), migrant. Breeds in most of BCR (Gibbs et al. 1992a, National Geographic Society 1999). Migrant through most of BCR (checklists).

Occurrence in BCR 15: Breeder (non-colonial), migrant, winters (Sibley 2000). Breeds (L. Oring and L. Neel pers. comm.).

Occurrence in BCR 16: Breeder (non-colonial), migrant, winters. Breeds in northeast Utah, western Colorado, and northern New Mexico (Gibbs et al. 1992a, Sibley 2000). Migrant through most of BCR (checklists). Winters in southern Colorado (Alamosa-Monte Vista NWRs checklist) and northern New Mexico (Las Vegas NWR checklist).

Global distribution: North America.

Habitat requirements: Entire life cycle depends on wetlands. Breeds in freshwater marshes with emergent vegetation, including Baltic rush, bulrush, burreed, cattail, common reed, creeping wildrye, and Nevada bluegrass (Gibbs et al. 1992a, Svingen and Dumroese 1997, Herziger and Ivey 2003a). Migration habitats are not well known but likely similar to breeding. In winter, uses wetlands where temperatures remain above freezing and waters remain open; may forage on uplands (Gibbs et al. 1992a). Feeds on vegetation fringes and shorelines of wetlands dominated by tall emergent vegetation, avoiding older, dense, or dry vegetation (Gibbs et al. 1992a). Uses a wider variety of wetland types, less densely vegetated sites, and shallower water than Least Bittern (Gibbs et al. 1992a).

Issues in BCR 9: Runoff of chemicals and organic nutrients from adjacent agricultural lands may result in contamination of water and soils, or cause algae blooms in the smaller ponds and wetlands; dredging and gravel mining in the river floodplains causes loss of habitat and may alter hydrology; some additional habitat may be lost because of urban development near the eastern edge of Toppenish Creek/Yakima River Oxbows, Washington (Cullinan 2001).

Issues in BCR 10: Since prefers tall nesting cover; will not tolerate haying, mowing, or grazing immediately prior to nesting season (Montana PIF 2000). Poorly monitored (Montana PIF 2000).

Issues in BCR 15: Unknown

Issues in BCR 16: No longer exists in Arizona as result of habitat loss (Latta et al. 1999). Habitat threatened by marsh desiccation, fires, and grazing (AGFD 1996).

Conservation Status and Management Actions:

- Former Federal Bird of Conservation Concern (Regions 1 and 6) because documented or apparent population decline (USFWS 1995), but not on 2002 list (USFWS 2002).
- Candidate species in Arizona (1996 list).
- Moderate priority breeding bird species in Idaho (Idaho PIF 2000).
- Wetland priority species in New Mexico (Rustay 2000).
- NSS3 in Wyoming (1999 list).
- Moderate priority breeding bird species in Idaho (Idaho PIF 2000).
- Priority species in Montana (Montana PIF 2000).
- Focal species for marsh habitat in BCRs 10 and 16 (Rosenberg et al. 2001).
- Heritage Status Rank: S1S2 in Arizona; S3 in California; S3S4B, SZN in Colorado; S4B, SZN in Idaho; S3S4B in Nevada; S3B, S4N in New Mexico; S4B, SZN in Montana; S4 in Oregon S3S4B in Utah; S4N, S4B in Washington; S2B, SZN in Wyoming;
- National Heritage Status Rank: N4B, N4N.
- Global Heritage Status Rank: G4 (widespread distribution but populations are declining; threat of habitat destruction).
- National Heritage Status Rank: N4B, N4N.
- This species recorded in Colorado in 2000 when encountered on statewide colonial survey (Leukering et al. 2000).

Action needed:

- Protect and maintain habitat: Increase quality and quantity of both breeding and wintering habitat to pre-1970s levels (NAWCP Marshbird Workshop Aug 2001). Monitor water quality.
- Obtain more accurate information (NAWCP Marshbird Workshop Aug 2001): Identify relatively

important breeding areas not shown by existing data (NAWCP Marshbird Workshop Aug 2001). Identify migration route and stop-over areas (NAWCP Marshbird Workshop Aug 2001). Find out where birds from important areas winter and what are most important wintering sites (NAWCP Marshbird Workshop Aug 2001). Better describe winter habitat (NAWCP Marshbird Workshop Aug 2001). Assess food resource availability (i.e., the timing of availability and types of food) (NAWCP Marshbird Workshop Aug 2001). Assess complex habitat (marsh and grassland) criteria in relation to marsh size requirements (NAWCP Marshbird Workshop Aug 2001). Maintain annual detectable populations at known breeding areas (Rustay 2000).

- Increase population to pre-1970s levels and prevent range contraction (NAWCP Marshbird Workshop Aug 2001).
- Management of wetland complexes for waterfowl should include dense emergent vegetation for this and other priority species (Montana PIF 2000). Increase quality and quantity of both breeding and wintering habitat to pre-1970s levels (NAWCP Marshbird Workshop Aug 2001).
- Aggressive marsh management is needed to increase population numbers in Arizona (Latta et al. 1999). Maintain freshwater wetlands >10 ha (2.5 ac) and support state and national wildlife refuges where highest concentrations of bitterns breed and winter (Latta et al. 1999); establish or maintain blocks of 24ac (9.7ha) patches of habitat to sustain one or more breeding pair to ensure sustained breeding (Rustay 2000). Maintain shallow water levels in freshwater marshes (<10 cm/4") (Latta et al. 1999). Manage fire in marsh habitats. Manage grazing. Increase quality and quantity of both breeding and wintering habitat to pre-1970s levels (NAWCP Marshbird Workshop Aug 2001). Protect freshwater marsh areas from chemical contaminants and manage to control siltation and eutrophication (Latta et al. 1999).

Is there a BNA for this species? Yes.

White-faced Ibis - *Plegadis chihi*

Ibis á Face Blanche, Bec Crosha (Cajun), Pêcheur - Atotola, Cuervillo de Cañada, Cuervo de Cañada

Status Summary: Continental conservation priority: Species of low concern

Population trend	2
Relative abundance	2
Threats to breeding	4
Threats to non-breeding	3
Breeding distribution	3
Non-breeding distribution	4

Global and BCR populations: Global: Unavailable since lack of census data, variations in colony locations and populations from year-to-year also make totals difficult (Ryder and Manry 1994). Greater than 100,000 breeders in North America (NAWCP Appendix).

BCR 9: 57,978 breeders
BCR 10: 1,708 breeders

Population trend in BCR 9: Great Basin Population has increased more than 4-fold since 1985 (Ivey et al. *in prep* b). Breeding population has increased from an estimated 7,500 pairs among 19 colonies in the mid 1980s to an average of over 33,000 pairs using over 40 colonies in the late 1990s, however, not all colonies were surveyed each year. Traditionally, most have bred in Utah and Nevada, with fluctuating peripheral colonies in California, Idaho, and Oregon; the peripheral colonies, particularly in Oregon, have grown steadily in recent years (Ivey et al. *in prep* b). Breeding trend significantly increasing (PIF Prioritization Database).

Population trend in BCR 10: Increasing (Ivey et al. *in prep* b).

Population trend in North America: Drastic decline in 1960s and 1970s, increasing in the 1980s and 1990s (Ryder and Manry 1994). Breeding range and population expanded in last two decades, but fluctuates from year-to-year, some areas show declines (Ryder and Manry 1994). BBS data showed significant 8.3% increase from 1966-2000, and 4.9% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Locally common breeder, uncommon to common migrant. Utah supported 32% of the Great Basin Population from 1997-1999, Oregon 30%, Nevada 20%, and Idaho 11% (Ivey et al. *in prep* b).

Abundance status in BCR 10: Locally common breeder, uncommon to common migrant.

BCR 9 % of Global population: 58%
BCR 10 % of Global population: 2%

BCR 9 conservation priority: Moderate concern
BCR 10 conservation priority: Moderate concern

Occurrence in BCR 9: Breeder (colonial), migrant. Breeds in south-central Oregon, northeast California, southern Idaho, and northern Nevada and Utah (Ivey et al. *in prep* b). Major colonies in 1999 at Lower Klamath NWR and Mendota WMA, California; Carson and Quinn lakes, Nevada; Malheur NWR, Oregon; and Bear River MBR and Layton Wetland Preserve, Utah (Ivey et al. *in prep* b). Attempted to breed in southeast Washington but water levels dropped (Denny 2002). Migrant through most of BCR. Major migration areas are American Falls Reservoir, Idaho (Ryder and Manry 1994); Great Salt Lake Basin, Utah; and Carson Lake Basin, Nevada (Ivey et al. *in prep* b). Rare in winter in Nevada (checklist, 3/02 meeting).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds in western Montana (Montana PIF 2000) and Wyoming (www.audubonwyoming.com/m3item3.html , A. Cerovski pers. comm.). Casual migrant in northern Idaho (Svingen and Dumroese 1997) and Wyoming (National Elk Refuge checklist), most migrants in southwest Montana (Montana PIF 2000).

Global distribution: Western Hemisphere.

Habitat requirements: Usually breeds in mixed colonies over water in emergent vegetation in areas

isolated from disturbance and predators (Ivey et al. *in prep* b). Feeds in seasonal wetlands, shallow lake shores, mudflats, or agricultural fields, often focusing on receding wetlands and newly flooded habitats where prey is concentrated (Ivey et al. *in prep* b). Irrigated crops are also important feeding sites, particularly native hay meadows, pastures, alfalfa and barley fields within 6 km (4 mi) of breeding areas (Ivey et al. *in prep* b). Uses similar habitats in migration.

Issues in BCR 9: Nomadic species pose special management and conservation challenges because of the large area they occupy and their unique population dynamics.

Habitat. Development at and proposed highway through Great Salt Lake threaten habitat (D. Paul pers. comm.). Some foraging areas in flood-irrigated habitats lost to urbanization and conversion to sprinkler irrigation (Ivey et al. *in prep* b). Some breeding sites severely damaged by cattle grazing and trampling in Utah and Nevada (Ryder and Manry 1994), including Franklin Lake, Nevada (McIvor 2005).

Water levels. Many wetlands used by ibises do not have adequate water supplies and water rights to ensure their existence in the future (Ivey et al. *in prep* b). Managing habitat for the aggregation of waterfowl during the hunting season may divert or delay the delivery of water which might otherwise have been available for nesting ibis (Ivey et al. *in prep* b). Nest loss and complete abandonment of nesting colonies can be caused by fluctuating water levels from floods, droughts, or wetland drawdowns (Ivey et al. *in prep* b). Colonies in private ownership in Oregon have been dewatered to facilitate haying and livestock grazing, resulting in abandonment and production failures (Ivey et al. *in prep* b).

Water quality. Species' habit of feeding in agricultural fields and in shallow wetlands subject to spraying of pesticides for agricultural pest and mosquito control has increased exposure for birds to DDT and DDE which cause eggshell thinning, reduced clutch size, lower hatching success, and possibly delaying breeding lowering overall production (Ivey et al. *in prep* b). Proposed dumping site for toxic chemicals at Great Salt Lake (D. Paul pers. comm.) and addition of nutrients and sediment from water diversion for agriculture at Franklin Lake, Nevada potentially will affect water quality (McIvor 2005).

Disturbance. Human intrusion into nesting colonies can cause abandonment, especially early in the nesting season (Ivey et al. *in prep* b).

Other. All major nesting areas have a history of periodic outbreak of botulism (Ivey et al. *in prep* b). In Nevada and Utah, some farmers have blamed ibis for causing soil compaction and trampling of alfalfa crops, making it difficult to harvest (Ryder and Manry 1994).

Issues in BCR 10: *Habitat.* Many wetlands used by ibises do not have adequate water supplies and water rights to ensure their existence in the future (Ivey et al. *in prep* b). Managing habitat for the aggregation of waterfowl during the hunting season may divert or delay the delivery of water which might otherwise have been available for nesting ibis (Ivey et al. *in prep* b). Nest loss and complete abandonment of nesting colonies can be caused by fluctuating water levels from floods, droughts, or wetland drawdowns (Ivey et al. *in prep* b). Occupation of sites and nesting success easily effected by water level changes (Montana PIF 2000).

Water quality. Potential threat of oil pollution/degradation at Loch Katrine, Wyoming (www.audubonwyoming.com/m3item3.html). Renewed interest in mining for gold on nearby National Forest lands, resulting in water quality concerns at Grays Lake, Idaho (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm). Addition of nutrients and sediment from water diversion for agriculture at Bear Lake NWR, Idaho affect water quality (www.fishandgame.idaho.gov/cms/wildlife/nongame/birds/iba.cfm).

Water levels. Inadequate water levels at Grays Lake NWR have caused regular major nest failures.

Other. Potential threat of natural pests/diseases at Loch Katrine, Wyoming (www.audubonwyoming.com/m3item3.html).

Conservation Status and Management Actions:

- Former Federal Species of Management Concern (Regions 1 and 6) (USFWS 1995), but not on 2002 list (USFWS 2002).
- SC in Idaho (2001 list), SC in Montana (2001 list), NSS3 in Wyoming (1999 list).
- High priority breeding bird species in Idaho (Idaho PIF 2000). Focal species in Nevada (Nevada PIF 1999).

- Focal species for marsh/grasslands habitat suite for BCR 9 (Rosenberg et al. 2001).
- Global Heritage Status Rank: G5 (secure due mainly to large range; locally fairly common; relatively small number of breeding areas; vulnerable to habitat alteration, disturbance during nesting, and pesticide contamination).
- National Heritage Status Rank: N4B, N4N.
- Heritage Status Rank: S1 in California; S2B, SZN in Colorado; S2B, SZN in Idaho; S1B, SZN in Montana; S3B in Nevada; S3B in Oregon; S2S3B, SAN in Utah; SZN in Washington; S1B, SZN in Wyoming.
- Partners In Flight Rank: 12.
- PIF continental concern (Rosenberg et al. 2001).
- White-faced Ibis Status Update and Management Guidelines for Great Basin Population (Ivey et al. *in prep* b).
- Several NWRs have specific objectives listed in Master Plans or Refuge Management Plans (e.g., Malheur, Ruby Lake, Southeast Idaho NWRs), however, Comprehensive Conservation Plans are replacing these plans (Bear River MBR's plan prescribes maintenance of habitats which should meet the needs of feeding and nesting ibises); a few WMAs have objectives for ibis or other colonial waterbirds (e.g., Summer Lake and Mason Valley WMAs, Ivey et al. *in prep* b).
- Since 1995, the majority of nesting colonies in the Great Basin have been monitored; however, these efforts have not been coordinated among the states or agencies and techniques and data quality varied considerably among efforts (Ivey et al. *in prep* b). Annual surveys at Lower Klamath NWR (D. Mauser pers. comm.), Great Salt Lake (J. Neill pers. comm.), and at Malheur NWR through 1998 (G. Ivey pers. observ.). Annual surveys at some sites in Wyoming (A. Cerovski pers. comm.). Statewide survey in Colorado in 2000 (Leukering et al. 2000).
- Intermountain West Joint Venture efforts have led to several important wetland restoration projects that have improved ibis breeding habitats, including The Nature Conservancy's Sycan Marsh Preserve in Oregon, and many other project areas used for foraging (Ivey et al. *in prep* b).
- The Utah Mitigation and Conservation Commission has invested several million dollars in Great Salt Lake wetland procurement and enhancement projects over the past 10 years as part of the Central Utah Water Project (Ivey et al. *in prep* b).
- The Nature Conservancy has played an important role in protection of colony sites at Layton Wetland Preserve and Farmington Bay areas, enhancing several breeding sites (Ivey et al. *in prep* b).
- To track source of contaminants in Nevada, a satellite study of birds from Stillwater NWR, and Carson Lake, Nevada, tracked to California and Mexico. Blood analyses indicate 3 hot spots for DDT contamination may be identified, and prey were sampled at selected stopover and wintering sites and tested for contamination (Center for Conservation Research and Technology website).

Action needed:

- Protect and preserve habitat: Monitor grazing. Monitor for exotic species (fish, plants). Acquire water rights where possible to maintain nesting and foraging habitat by not diverting all water to deep-water habitats (Nevada PIF 1999). Monitor water quality. Wetland management decisions should be made in a regional context since species nomadic. Provide stable water levels at colony sites during duration of nesting cycle (Montana PIF 2000); sites with more stable levels can be better managed (Oakleaf et al. 1996). Acquire water rights. Monitor water quality. Management in Wyoming should focus on Bear River Marshes since it is less susceptible to drought, close to agricultural foraging sites, and not on edge of range (Oakleaf et al. 1996). Develop site specific management techniques and strategies if needed (Oakleaf et al. 1996).
- Minimize disturbance at nesting areas and maintain minimum buffer zone of 330-590 ft (100-180 m) (Oakleaf et al. 1996). Document human activity levels and if excessive, educational efforts should begin (Oakleaf et al. 1996). Minimize disturbance when conducting research (Oakleaf et al. 1996).
- Conservation of Ibises should be integrated with other wetland and bird conservation initiatives such as Joint Ventures and the North American Bird Conservation Initiative (Ivey et al. *in prep* b). Monitor for disease.
- Monitor population: Continue to survey known and potential breeding locations to track status of species on an annual basis (Montana PIF 2000), conduct statewide surveys every three years (Oakleaf et al.

1996). Develop a positive relationship with private landowners so that surveys can be conducted (Oakleaf et al. 1996). Identify factors impacting or limiting population (Oakleaf et al. 1996).

Is there a BNA for this species? Yes.

American White Pelican - *Pelecanus erythrorynchos*

Pelican (blanc) d'Amerique - Pelicano Norteamericano

Status Summary: Continental conservation priority: Species of moderate concern

Population trend	3
Relative abundance	2
Threats to breeding	4
Threats to non-breeding	3
Breeding distribution	2
Non-breeding distribution	2

Global and BCR populations: Global: 400,000 in 1995 (including nonbreeders, Keith 2005).

BCR 9: 26,924 breeders (App. D, Table D-10); >55,000 staging migrants at Great Salt Lake.
BCR 10: 10,500 breeders (App. D, Table D-10)

Population trend in BCR 9: Uncertain. Formerly nested in central Washington and Oregon (Evans and Knopf 1993); throughout northeast California (Cooper 2004); and Utah Lake, Utah (Utah Division of Wildlife Resources 1998). Colony found in 1994 in Washington was first in state since 1926 (Smith et al. 1997); declining trend at Malheur NWR, Oregon (G. Ivey pers. observ.); limited and mostly anecdotal knowledge of historical northeast California populations makes trend assessment difficult (Shuford 1998), but Klamath Basin colony sites have decreased from 12 to 2 during the 1990s (Intermountain West/Desert Southwest Regional Workshop April 2000); increasing in southern Idaho (Trost and Gerstell 1994); declining trend at Anaho Island, Nevada (USFWS data), slight increasing trend in colonies at Great Salt Lake (UTDWR data).

Population trend in BCR 10: Uncertain. Breeding trend possibly increasing (PIF Prioritization Database).

Population trend in North America: West of Rockies has declined considerably, increasing in east (King and Anderson 2005). BBS data showed 5.3%/yr increase from 1966-1991 (Evans and Knopf 1993). From 1966-2000, BBS data showed 1.7% non-significant increase, but significant increase of 2.7% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Accidental to uncommon in spring and fall, accidental to occasional in summer in eastern Washington (checklists); locally common breeder and migrant, rare in winter in eastern Oregon (Gilligan et al. 1994); uncommon to common in spring and fall, common in summer, rare in winter in northern California (checklists); abundant in summer, casual in winter in southern Idaho (Svingen and Dumroese 1997); occasional to common in spring, uncommon to abundant in summer and fall, rare in winter in Nevada (checklists); rare to common in spring, occasional to common in summer, rare to occasional in fall, and rare in winter in western Utah (checklists).

Abundance status in BCR 10: Common in Wyoming (Cerovski et al. 2004).

BCR 9 % of Global population: 22%
BCR 10 % of Global population: 9%

BCR 9 conservation priority: High Concern species
BCR 10 conservation priority: High Concern species

Occurrence in BCR 9: Breeder (colonial), migrant, winters. Breeds in patchy distribution in southeast Washington (Smith et al. 1997), southern Oregon, northeast California, northwest Nevada, southern Idaho, and northwest Utah (Evans and Knopf 1993). Major colonies usually include Malheur NWR and Klamath and Warner basins, Oregon (Evanich 1990); Clear Lake and Lower Klamath NWR, California (Shuford 1998); Blackfoot Reservoir and Minidoka NWR, Idaho (Trost and Gerstell 1994); Anaho Island, Nevada (Nevada PIF 1999); and Great Salt Lake, Utah (Utah Division of Wildlife Resources 1998). Daily flights made from Pyramid to Walker lakes to feed in Nevada occur (>145 km), but Lahontan Valley (97 km) and Humboldt Sink (64 km) are more common (Nevada PIF 1999). Columbia River near Hanford Reach is important summer roost area for nonbreeders (Smith et al. 1997). Migrant through most of BCR (Sibley 2000, checklists). Major post-breeding migration sites include the Klamath Basin, Malheur NWR, and along the Columbia River in Umatilla County, Oregon (Gilligan et al. 1994); and Bear River NWR, Utah (Trost and

Gerstell 1994). Year-round in south-central Washington (Cullinan 2001), rarely in rest of BCR (checklists).

Occurrence in BCR 10: Breeder (colonial), migrant. Breeds in western Montana and northwestern, southeastern and central Wyoming (Evans and Knopf 1993, Montana Natural Heritage Program website, www.audubonwyoming.com/m3item3.html). Yellowstone NP is one of most significant colonies in Northern Rockies, and the only one in a National Park (www.audubonwyoming.com/m3item3.html). Migrant through most of BCR (Sibley 2000, checklists).

Global distribution: North America.

Habitat requirements: Breeds on isolated lakes and marshes on sparsely vegetated islands (Herziger and Ivey 2003b). Uses similar habitats in migration and winter for foraging and loafing (Evans and Knopf 1993). Feeds in shallow water in marshes, lakes, rivers, and canals (Herziger and Ivey 2003b). Feeding areas typically are 30-60 cm deep, may be as far as 50 miles (85 km) from nesting site (Evans and Knopf 1993). Uses Intermountain West wetlands, and irrigation reservoirs >640 acres for nesting, foraging, and migration in Montana; also forages in reservoirs and stockponds <640 acres and high elevation wetlands (Montana PIF 2000).

Issues in BCR 9: *Habitat.* The largest U.S. breeding colony on Anaho Island does not provide adequate food as a result of wetland losses to irrigation projects, therefore, pelicans must fly about 60 miles one way to feed where prey is increasingly scarce and contaminated with arsenic, selenium, mercury, and boron (NatureServe). Development, proposed highway and dumping site for toxic chemicals, and changing water levels at Great Salt Lake threaten habitat (D. Paul pers. comm.). Adversely impacted by loss of foraging (wetland) habitat, environmental contaminants, and water level fluctuations (Utah Division of Wildlife Resources 1998). Habitat degradation from flooding and drought allows access to mammal predators. All nests were destroyed at Malheur NWR by increased water levels in 1998 (G. Ivey pers. observ.). Recreational and agricultural developments threaten habitat on inholdings and on adjacent lands, and there are no secure water rights at Columbia NWR, Washington (Cullinan 2001). The following threaten habitats: Potential removal of area protective status and resulting agricultural development, and invasion of non-native plants at Hanford Reach, Washington (Cullinan 2001). Invasive non-native plants and water quality at Potholes Reserve, Washington (Cullinan 2001). Water diversion and contaminants at Lahontan Valley Wetlands, Nevada (McIvor 2005). An estimated 958 more fledglings would have been produced annually at Anaho Island if Truckee River was not diverted (Murphy and Tracy 2005). Overgrazing, agricultural runoff, changing water levels at Franklin Lake, Nevada, are also issues (McIvor 2005). At Walla Walla River Delta, Washington, invasive non-native plants have aggressively colonized newly-deposited mudflats; and site surrounded on three sides by industrial facilities, including a pulp mill, which could be a source of contamination (Cullinan 2001). Historically nested at Eagle Lake, California, but now over-summers only; may re-establish if changes are made to lake management (Cooper 2004).

Disturbance. Particularly sensitive to disturbance (Shuford 1998). Increasing adverse impacts from recreational use, particularly motorized boats, at Hanford Reach, Washington; potential for recreational overuse and disturbance to nesting birds is a substantial threat at North Potholes Reserve (Cullinan 2001). Heavy recreational use, with few restrictions on public access or recreational activities, and insufficient funding of enforcement to prevent dumping, vandalism, disturbance, and illegal hunting at Potholes Reservoir, Washington (Cullinan 2001).

Fish. At Anaho Island birds are eating an endangered fish (cui-ui); an example of difficulties with single species management as opposed to ecosystem conservation (Intermountain West/Desert Southwest Regional Workshop April 2000). Although carp are a pelican food item, they can disrupt their food supply. In some cases, they have dominated wetland resources, outcompeting indigenous fish species while becoming too large to serve as pelican food (Ivey et al. *in prep* a). Native fish are a better food source (Intermountain West/Desert Southwest Regional Workshop April 2000). Carp also increase turbidity which may affect foraging (Intermountain West/Desert Southwest Regional Workshop April 2000). In the past, anglers thought this species reduced game fish numbers and apparently destroyed colonies in southern Idaho (Trost and Gerstell 1994).

Misc. Powerlines (G. Ivey pers. observ.); soaring birds may be a threat to Fallon Naval Air Station aircraft

(Yates 1999); some mortality occurs from botulism every year (Nevada PIF 1999); subject to die-offs during droughts, from starvation, and heavy parasite loads (Nevada PIF 1999).

Issues in BCR 10: Secure nesting habitat in Wyoming only at Yellowstone NP (Oakleaf et al. 1996), but the park is overused by tourism, outdoor recreation, and increased development within and bordering the park; exotic plant and animal species are potential threats to integrity of ecosystem, including introduced lake trout, a snail from New Zealand, and various non-native plants (www.audubonwyoming.com/m3item3.html). At Bird Island in Pathfinder Reservoir, Wyoming, a major threat is recreational development/overuse (boating and hunting). Potential threats also include irrigation and drought (www.audubonwyoming.com/m3item3.html). There are some concerns about local effects on sports fisheries near colonies in Montana, resulting in some pressure to control colony size (Montana PIF 2000); numbers of birds, especially nonbreeders, have greatly increased and may have exceeded acceptable levels for users of game fish (Oakleaf et al. 1996).

Conservation Status and Management Actions:

- E in Washington (2001 list); BSSC in California (2003 draft list), SC in Colorado (2001 list), SC in Idaho (2001 list), SV in Oregon (ONHP 2001 list), SD in Utah (1998 list).TE in SSC3 in Montana (2001 list), Washington (2001 list); NSS3 in Wyoming (1999 list).
- Management priority species in Nevada (Nevada PIF 1999).
- Focal species for "open water, lakes" habitat suite for BCRs 9 and 10 (Rosenberg et al. 2001).
- Priority bird species in PIF Basin and Range (#80) Physiographic Area Plan. Priority bird species in PIF Central Rocky Mountains (#64) and Wyoming Basin (#86) Physiographic Area Plans.
- Global Heritage Status Rank: G3.
- National Heritage Status Rank: N3B, N3N.
- Heritage Status Rank: S1 in California; S1B, SZN in Colorado; S1B, SZN in Idaho; S2B, SZN in Montana; S2B in Nevada; S1 in Oregon; S1B in Utah; S1B, SZN in Washington; S1B, SZN in Wyoming;
- Partners In Flight Rank: 16.
- PIF continental concern (Rosenberg et al. 2001).
- Surveys of breeding colonies at Klamath Basin (D. Mauser pers. comm.) at Malheur NWR in Oregon through 1998 (G. Ivey pers. observ.). Northeast California surveyed in 1997 (Shuford 1998). Southern Idaho surveyed in 1993 (Trost and Gerstell 1994). Nevada and Utah colonies surveyed annually (Neil 2002, D. Withers pers. comm.).
- Satellite telemetry study of Nevada birds provided insights into soaring bird flight patterns (as a threat to aircraft) and migration, producing a model using weather forecasts to predict flight altitudes of pelicans (Yates 1999).
- Electric fence exclosures built to protect nesting birds from coyotes at Clear Lake, California (Shuford 1998).
- Recent work with mercury contaminants and curved bills (L. Neel pers. comm.).
- Wyoming's Piscivorous Bird Management Plan (Wyoming Game and Fish Department 1997).
- Breeding colonies monitored annually in Wyoming (A. Cerovski pers. comm.) Statewide survey in Colorado in 2000 (Leukering et al. 2000).

Action needed:

- Protect and maintain wetland habitats: Manage for ecosystem, not single species. Obtain water rights and maintain water levels. Protection of two remaining colonies in northeast California is crucial, and establishment of additional colony would be valuable (Shuford 1998). Maintain variety of shallow fish sites within commuting distances of colonies (Nevada PIF 1999). Monitor water quality. Maintain water levels. Monitor for exotic plants. Monitor grazing. Consider carp control. Remove or mark powerlines where possible.
- Known colonies should be monitored annually to assess statewide populations, and water levels managed to minimize mammalian predation (Oakleaf et al. 1996, Montana PIF 2000). Studies are needed to assess the effects of nesting colonies on fish populations (Montana PIF 2000). Public should be educated about feeding habits and preferred food sources and provided with Wyoming's Piscivorous Bird Management Plan (Wyoming Game and Fish Department 1997).
- Protect colonies from disturbance: Minimize disturbance at nesting areas and maintain minimum buffer

zone of 330-590 ft (100-180 m, Oakleaf et al. 1996). Document human activity levels and, if excessive, educational efforts should begin (Oakleaf et al. 1996). Minimize disturbance when conducting research (Oakleaf et al. 1996). Keep jet training routes out of heavy pelican use areas in Nevada (Nevada PIF 1999).

- Monitor for disease.

Is there a BNA for this species? Yes.

Common Loon - *Gavia immer*

Plongeon huard - Colimbo mayor, Colimbo común

Status Summary: Continental conservation priority: Not yet determined.

Global and BCR populations: Global: 500,000 to 700,000, with most in Canada (McIntyre and Barr 1997; 250,000 pairs, 600,000 individuals (NAWCP Marshbird Workshop Aug 2001).

BCR 9: 8 breeders, >1,050 migrants (App. D)
BCR 10: 270 breeders (App. 4)
BCR 15: extirpated breeder

Population trend in BCR 9: No evidence of a declining population or a substantial change in distribution in Washington; number of known nests have increased over the past 15 years, but this increase may be a result of increased survey effort (WDFW website). No longer nests at 4 lakes in western Washington and one lake in eastern Washington where nesting was known early in the 20th century (WDFW website); formerly bred in northeast California (no dates given) (McIntyre and Barr 1997).

Population trend in BCR 10: No evidence of population declines in Montana (Montana PIF 2000). Breeding trend significantly increasing (PIF Prioritization Database). On Northern Rockies BBS routes, non-significant increase of 0.6% from 1966-2000, and non-significant increase of 1.0% from 1980-2000 (Sauer et al. 2004). Greatest increase per year on BBS routes from 1966-1996 in northern Washington, Idaho, and Montana (Sauer et al. 2004).

Population trend in BCR 15: Extirpated historic breeder.

Population trend in North America: Increasing across range (McIntyre and Barr 1997). BBS data showed significant 2.8% increase from 1966-2000, and 2.5% from 1980-2000 (Sauer et al. 2004).

Abundance status in BCR 9: Rare breeder, common in migration and winter in Washington (WDFW website); uncommon to rare in migration and winter, rare in summer in eastern Oregon (Gilligan et al. 1994); rare to uncommon in spring and fall, rare in winter in northern California (checklists); uncommon in summer, common migrant, and rare in winter in southern Idaho (Svingen and Dumroese 1997); rare in spring and fall in Nevada (checklists); occasional to uncommon migrant, rare to occasional in summer in western Utah (checklists).

Abundance status in BCR 10: Uncommon in Wyoming (Cerovski et al. 2004).

Abundance status in BCR 15: Uncommon (small numbers, L. Oring and L. Neel pers. comm.).

BCR 9 % of Global population: <1% ***BCR 9 conservation priority:*** High (breeding), Moderate concern (migrant)
BCR 10 % of Global population: <1% ***BCR 10 conservation priority***: High concern
BCR 15 % of Global population: 0% ***BCR 15 conservation priority:*** High concern

Occurrence in BCR 9: Breeder (non-colonial), migrant, winters. Breeds in north-central Washington (Smith et al. 1997). Migrant through most of BCR (Sibley 2000). Large numbers of migrants use Topaz Lake, Mono County, particularly in spring (Cooper 2004), also western Nevada, especially Walker Lake (McIntyre and Barr 1997) with numbers up to 1,400 (Nevada Wildlife Federation website). Birds travel from Walker Lake through eastern Oregon and Washington and western Idaho to breeding grounds in Saskatchewan (Boise State Univ. website). Rare in winter in most of BCR except Utah (Gilligan et al. 1994, Svingen and Dumroese 1997, Cullinan 2001, checklists).

Occurrence in BCR 10: Breeder (non-colonial), migrant, winters. Breeds in northeast Washington (Smith et al. 1997), northern Idaho, and northwest Montana and Wyoming (McIntyre and Barr 1997). Breeding in Montana restricted to northwest which supports the highest density of nesting loons in the west (Montana PIF 2000). Migrant through most of BCR (Sibley 2000). Important migration sites in Montana include Canyon Ferry Reservoir (Montana PIF 2000). Rare in winter in northern Idaho (Svingen and Dumroese 1997).

Occurrence in BCR 15: Non-breeder (non-colonial), migrant (Sibley 2000, L. Oring and L. Neel pers. comm.), winters (National Geographic Society 1999, L. Oring and L. Neel pers. comm.).

Global distribution: Northern Hemisphere.

Habitat requirements: Characteristic nest sites in Washington are relatively undisturbed forest lakes at least 20 ha (49 ac) in size, with deep inlets and bays, with islands or logs and other floating debris for nest sites, and characterized by good water quality, an adequate food source, and seclusion from intense human activity (WDFW website). About half the loon nests documented each year in Washington are located on water bodies that are relatively inaccessible to people (WDFW website). Uses rivers and larger lakes and reservoirs in migration and winter as it needs adequate room for space-consuming takeoff (McIntyre and Barr 1997). Feeds primarily in littoral zone with good underwater visibility, low-density vegetation, but may feed in turbid water if shallow (McIntyre and Barr 1997). Uses Intermountain Valley and high elevation wetlands for nesting and foraging in Montana, most breeding on lower elevation glacial lakes, usually greater than 20 ha unless at least half the shoreline is undisturbed (Montana PIF 2000). Requires both nesting sites (small islands or herbaceous shorelines) and nursery areas (sheltered shallow coves with abundant insects and small fish) for successful nesting (Montana PIF 2000, Oakleaf et al. 1996). Wide variety of open water habitats used in migration in Montana, but larger lakes and rivers preferred; occasionally winters on large lakes and reservoirs (Montana PIF 2000).

Issues in BCR 9: Shoreline development, including homes, roads, and powerlines, has eliminated nesting habitat and increased the level of human activity in the vicinity of potential loon nests in Washington (WDFW website). Human disturbance is likely to reduce loon productivity and may preclude nesting at important sites; persecution directed toward loons can cause abandonment of nesting sites (WDFW website). Drastic changes in water level (frequent events at reservoirs) either flood nests or render them unapproachable, causing abandonment (WDFW website). Walker Lake, Nevada, has greatly reduced volume and degraded water quality largely caused by decreased water flows from the Walker River for upstream use, threatening the lake's fishery; upstream diversions are causing water level decreases and salt content increases to levels lethal to the resident fish and invertebrates (Boise State Univ. website). Loon blood samples (n=98) were taken at this site, and analyses revealed blood mercury levels placing 45% of birds in a high risk category (3.0 ppm and above). Subsequent investigation revealed elevated mercury levels in 1996 on composite samples of Lahontan tui chub from the lake and sources of mercury within the river basin. Thus, loons, and perhaps other fish eating birds, that use Walker Lake face a double threat: loss of the food base and environmental contamination from the food that is available now. The use of rotenone to kill unwanted fish may affect the food supply of common loons for several years (WDFW website). Wintering areas with unknown densities are of most conservation concern (NAWCP Marshbird Workshop Aug 2001).

Issues in BCR 10: *Habitat.* Population in northwest Montana limited primarily by quantity and quality of nesting habitat (Montana PIF 2000); habitat also limited in Wyoming and therefore may not be able to expand population to secure levels (Oakleaf et al. 1996). Shoreline development including homes, roads, and powerlines result in lost habitat and increased recreational use during the nesting and young-rearing seasons; problems occur in Montana and Washington, and loons are highly intolerant of human activity in nesting territory (Montana PIF, WDFW website). Drastic changes in water level (frequent events at reservoirs) either flood nests or render them unapproachable, causing abandonment (WDFW website). Maintaining breeding pairs in the state is important since young return only within 40 mi from natal lakes (Montana PIF 2000). Wintering areas with unknown densities are of most conservation concern (NAWCP Marshbird Workshop Aug 2001). Results from heavy metal tests in Montana were among lowest levels recorded, but at one site (Island Lake) an egg tested at the risk level (1.34) for mercury, and therefore there may be a point source (Montana PIF 2000). Acidification of nesting lakes could lower nest success rates or render them unsuitable through reduction of available foods for young (Montana PIF 2000). Water quality degradation from faulty septic systems, road building, timber harvest or other activities near nesting lakes has potential to change prey populations and vegetation patterns at nesting lakes (Montana PIF 2000).

Disturbance. Human disturbance is likely to reduce loon productivity and may preclude nesting at

important sites (WDFW website). Persecution directed toward loons can cause abandonment of nesting sites; public education is an important element in the protection of nesting security (Montana PIF 2000). Seventy-five percent of nesting lakes used in Montana are bordered by public land; it will take awareness by landowners to ensure continued nesting (Montana PIF 2000).

Other: Wyoming loons may be genetically isolated and highly susceptible to stochastic influences (Oakleaf et al. 1996).

Issues in BCR 15: Wintering areas with unknown densities are of most conservation concern (NAWCP Marshbird Workshop Aug 2001).

Conservation Status and Management Actions:

- Former Federal Species of Management Concern (Regions 1 and 6) because of specific threats (USFWS 1995), but not on 2002 list (USFWS 2002).
- BSSC in California (2003 draft list), SC in Idaho (2001 list), SC in Montana (2001 list), S in Washington (2001 list), NSS1 in Wyoming (1999 list).
- Focal species for "open water, lakes" habitat suite for BCRs 9 and 10 (Rosenberg et al. 2001).
- Global Heritage Status Rank: G5.
- National Heritage Status Rank: N4B, N5N.
- Heritage Status Rank: S2B, S1 in California; SZN in Colorado; S1B, S2N in Idaho; S1S2B, SZN in Montana; S2S3N in Nevada; SH in Oregon; SZN in Utah; S5N in Washington; S2B, SZN in Wyoming.
- Partners In Flight Rank: 14.
- Floating nest platforms, access restrictions, and educational campaigns have helped loons to persist and successfully reproduce at certain sites (WDFW website).
- The development of reservoirs on rivers from dam construction has created some nesting and wintering habitat for common loons (WDFW website).
- Montana Common Loon Management Plan (MCLMP) written in 1990 in response to perceived need to consider this species in management of northwest Montana lakes (Montana PIF 2000). Montana Loon Working Group (MLWG) established in 1999 to implement items of MCLMP (Montana PIF 2000). Flathead NF (USFS) has loon management plan which addresses protection of habitat quality at nesting lakes (Montana PIF 2000). Management goal in Montana is to provide for a stable loon population within the suitable habitat which presently exists in the northwest part of the state, with a population goal to maintain suitable habitat for 57-185 territories (Montana PIF 2000); all management strategies involve protection or enhancement of nesting habitat. Five-year objective in Wyoming to maintain a minimum of 15 nesting pairs (Oakleaf et al. 1996).
- Annual population surveys in Montana conducted primarily by volunteers and coordinated by the Montana Loon Society (Montana PIF 2000). Annual migration counts in spring and fall at important migration sites in Montana (Montana PIF 2000). Occupied lakes in Montana have been prioritized based on perceived or documented threats or conflicts and reproductive history (Montana PIF 2000).
- Management tools include controlling access to or near nests, easements, acquisition of traditional sites, signing, physical barriers, use of artificial nest structures, and recreational use restrictions (Montana PIF 2000). Use of floating signs to delineate and limit access into nesting and nursery areas has been shown to increase nesting success and number of chicks produced (Montana PIF 2000). Floating nesting platforms have been used with some success in lakes which lack nesting islands or where water level fluctuations threaten nesting success at natural sites, but should not be viewed as alternative to protection of natural nest sites (Montana PIF 2000.)
- Nesting loon sites sampled for heavy metals as part of a nationwide assessment (Montana PIF 2000).

Action needed:

- Protect and maintain wetland habitat: Minimize development on known nesting lakes (Montana PIF 2000). Top priority is maintaining the suitability of currently-used nesting territories (Montana PIF 2000). Maintain water levels and obtain water rights. Pursue site-specific conservation of lake habitat (NAWCP Marshbird Workshop Aug 2001). Determine impacts of shoreline development/recreational activities (NAWCP Marshbird Workshop Aug 2001). Pursue site-specific conservation of lake habitat (Oakleaf et al. 1996, NAWCP Marshbird Workshop Aug 2001). Review and comment on proposed

projects near suitable habitats (Oakleaf et al. 1996). Consider impacts on loons before using Rotenone for fish control. Continue to monitor contaminants in water and fish at Walker Lake. Determine impacts of mercury contamination, and other contaminants such as lead sinkers (NAWCP Marshbird Workshop Aug 2001).

- Minimize disturbance in nesting areas: Increased development and recreational pressure leading to disturbance at sensitive nesting lakes must be actively managed to prevent further loss of nesting loons (WDFW website). Protection and education programs must be expanded to appropriate lakes that currently do not support breeding loons to allow the species to recolonize and nest undisturbed, ensuring a stable and well-distributed population (WDFW website). Minimize recreational activities on known nesting lakes, at least during critical portions of the breeding cycle (Montana PIF 2000). Personal contact with the public builds local support for loon conservation (Montana PIF 2000). Evaluate disturbance on occupied and potential breeding lakes (Oakleaf et al. 1996).
- Monitor the population: Monitoring points should be established for migration, molt, and staging areas (NAWCP Marshbird Workshop Aug 2001). Continue inventory and monitoring and identify and prioritize breeding sites; continue surveys, public contacts, education and outreach to ensure that breeding territories remain suitable and available in Wyoming (Oakleaf et al. 1996). Connect breeding and wintering populations (NAWCP Marshbird Workshop Aug 2001). Quantify demography (age structure) of populations (breeding/winter). Document nesting success and protect occupied territories; if nesting pairs are lost or are unsuccessful year after year there will be no young to recruit into the population, and over time this can cause local populations to disappear (Montana PIF 2000). This implies that monitoring programs will be continued and developed throughout range (NAWCP Marshbird Workshop Aug 2001). Assess body condition of breeding adults throughout range (NAWCP Marshbird Workshop Aug 2001). Assess manipulated (reservoirs) and degraded breeding/wintering habitat (NAWCP Marshbird Workshop Aug 2001).
- Continued testing may be needed at sites with continued high levels of heavy metals (Montana PIF 2000). Determine impacts of mercury contamination, shoreline development/recreational activities, and other contaminants such as lead sinkers (NAWCP Marshbird Workshop Aug 2001).
- Compile habitat data. Gather habitat data (digital lake and wetland atlases) from throughout range and integrate with population estimates from throughout range to produce spatially-specific population model of loons throughout range and BCR (NAWCP Marshbird Workshop Aug 2001). Assess manipulated (reservoirs) and degraded breeding/wintering habitat (NAWCP Marshbird Workshop Aug 2001).
- Montana Loon Working Group should continue to meet at least semiannually to coordinated construction and use of floating signs and nest structures; coordinate annual surveys of occupancy and production at known, historic and potential nesting areas; serve as a clearinghouse for the compilation and use of population data; develop and disseminate public outreach materials; facilitate public contacts throughout the nesting season on high conflict lakes; and provide information to managers, planners, developers, and landowners regarding potential conflicts on lakes used for nesting (Montana PIF 2000). Wyoming Game and Fish should continue working with Yellowstone NP to share information (Oakleaf et al. 1996). Monitoring points should be established for migration, molt, and staging areas (NAWCP Marshbird Workshop Aug 2001). Connect breeding and wintering populations (Oakleaf et al. 1996, NAWCP Marshbird Workshop Aug 2001), and determine if genetic isolation, risk assessment, and population increases should be investigated (Oakleaf et al. 1996).
- Studies at Walker Lake, Nevada: determine inter-seasonal movements using satellite transmitters; determine source and pathways of Mercury contamination, and intra-season migration chronology (BRILoon.org). To learn about the ecology and threats to the loons that use Walker Lake, birds tracked by satellite (Boise State Univ. website).

Is there a BNA for this species? Yes.

APPENDIX F. Intermountain West Waterbird Population Objectives.

Population objectives are scientifically-based targets that will function as a basis for setting habitat objectives and as performance indicators. We derived numerical population objectives for priority (High or Moderate Concern) waterbird species by each state and BCR. For priority migrant species, population objectives are for individual sites that support high numbers and were derived from estimates of peak numbers of staging birds using those sites (Appendix D, Tables D-2 to D-5,). The focus for species in this category will be based on maintenance of habitat at those key staging sites (see Appendix H: Conservation Strategies). For breeding waterbirds, population objectives were derived using the methodology described below. These numbers are, as possible, consistent with other plans (e.g., recovery plan goals for endangered species, Flyway plans). Two steps were involved in this process:

1. Determine population trend (PT) index.
2. Derive state and BCR numerical population objectives.

Step 1. Determine Population Trend (PT) index

A consensus was reached by the planning team to use the PIF approach as a foundation for determining Population Trend (PT), with some necessary modifications. In PIF documents, PTs were based on the degree of population change or trend, indicated by Breeding Bird Survey (BBS) data since 1966, with objectives defined for different PT levels. The overall objective for PIF is to return populations toward historic levels in the early BBS years (1966-68). We adapted this methodology to waterbirds by the following:

- BBS data are poor indices to waterbird population trends; therefore, survey data and professional judgment (if no data were available) were used instead.

- Since most waterbird species populations change more slowly than most landbirds, it was appropriate to use a longer time to evaluate population trends. We chose 50 years as the period on which to base recovery, although achieving these goals should be earlier (more details are in Step 2). In this document, we were not trying to restore populations to historic numbers because they are unknown and there have been drastic wetland habitat declines. Instead, our goal is to have populations reach our objectives within the 50-year period.

- For some species, a PT has been established in a state PIF plan and was used in the IWWCP. Although some were based on BBS data, scores were reviewed by members of the Group.

- For Sandhill Crane in Washington and American White Pelican in Utah, previously set state objectives were used.

- Western and Clark's grebes were assigned the same ranking in each BCR because they have similar habitat requirements and would both benefit from management actions.

- For priority migrant species, we did not set numeric population objectives, but did set habitat objectives.

PT definitions are in Table F-1. The Group decided to assign a score for each High and Moderate concern species in each state and each BCR, for although this is a regional plan, it also accounts for state interests, and species' status often varied between states. The index was then applied to the population for each state to determine the population objective. Justifications for each score are in Tables F-2 to F-5.

Step 2. Derive state and BCR numerical population objectives

Table F-6 summarizes State population objectives for priority waterbird species, derived from population data (see Appendix D, Tables D-2 to D-5), and rounded off to the nearest ten and manipulated by the process required by the PT score (Tables D-2 to D-5). In Tables D-7 to D-10, State objectives were added together to derive a total objective for each BCR. PT scores vary by state; therefore, objectives may have been derived differently (i.e., the objective may be the same as the current estimate for one state, but increased in another).

It should be emphasized that the objectives are based on available information, and the quality of the data is variable. Therefore, objectives should be considered interim until more current and

concurrent data become available from monitoring programs. Some goals may not be achievable due to biological, ecological, and/or social constraints (e.g., drought, global warming, disturbance), either within the region, or at migration and/or wintering habitat outside the region. Assuming new data will become available, a five-year status review should be conducted of the last 10 years of data to evaluate trends and determine the effectiveness of habitat management and the response of different species. Population objectives, DQ and PT scores can then be re-evaluated.

Table F-1. Definitions of Population Trend (PT) indices for priority waterbird species and population objective goal for the Intermountain West Waterbird Conservation Plan.

PT index	PT definition	Population objective goal
PT = 5	Species with a biologically significant (estimated 50%) historic population decline or range contraction. This includes species that were severely impacted by market hunting, habitat loss, and contaminants (primarily DDT-DDE). Also species with evidence of recent major declines and those that have been extirpated or nearly extirpated in a state.	Double the current population over the next 50 years or restore breeding populations of extirpated species.
PT = 4	Species that experienced significant historic declines and have shown an increasing trend, but have not recovered to their potential. Also species with recent moderate population decline.	Increase the current population by 50% over the next 50 years.
PT = 3	Species that historically declined and have apparently recovered. Also species with recent unknown trends. Priority migrant species were also included, but did not receive numerical objectives (only habitat objectives).	Maintain or increase the current population over the next 50 years.
PT = 2	Species with recent suspected or moderate increase.	Maintain the current population over the next 50 years.
PT = 1	Species with recent large population increase.	Maintain the current population over the next 50 years.

Table F-2. Justification for Population Trend (PT) scores for High and Moderate concern waterbird species in Bird Conservation Region (BCR) 9 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	PT index	Trend justification
Greater Sandhill Crane (CVP) (b)	PT = 5	WA: Historic declines and range contraction (Littlefield and Ivey 2002). State recovery plan set population objective.
	PT = 4	CA: Historic declines due to market hunting and habitat loss (Littlefield and Ivey 2002). Recent breeding surveys (Ivey and Herziger 2001) suggest increasing trend, and potential for expansion into former range. NV: Historic declines due to market hunting and habitat loss (Littlefield and Ivey 2002). Recent increasing trend and potential for expansion into former range.
	PT = 3	OR: Historic declines due to market hunting and habitat loss (Littlefield and Ivey 2002). Recent breeding surveys (Ivey and Herziger 2000) suggest remaining available habitat is close to saturation in the state.
Greater Sandhill Crane (CVP) (m)	PT = 3	CA, OR, WA: Migrant.
Greater Sandhill Crane (LCRVP) (b)	PT = 4	ID: PT set at 4 (Idaho PIF 2000). NV: Recovering from historic declines, potential for expansion into former range.
	PT = 3	UT: PT set at 3 (Parrish et al. 2002).
Greater Sandhill Crane (LCRVP) (m)	PT = 3	NV: Migrant.
Lesser Sandhill Crane (PFP) (m)	PT = 3	CA, ID, OR, WA: Migrant.
Yellow Rail (b)	PT = 5	CA: Historic nesting in Mono County (Grinnell and Miller 1944), with recent records in last few years in Siskiyou and Modoc counties (Popper/Shuford pers. comm.).
		OR: Thought to be extirpated in state until 1980s (Stern and Popper 2003).
Virginia Rail (b)	PT = 3	CA, ID, NV, OR, UT, WA: Uncertain trend.
Sora (b)	PT = 3	CA, ID, NV, OR, UT, WA: Uncertain trend.
California Gull (b)	PT = 3	ID: PT set at 3 (Idaho PIF 2000).
	PT = 1	CA, NV, OR, WA: Increasing trend.
		UT: PT set at 1 (Parrish et al. 2002).
Franklin's Gull (b)	PT = 3	ID: PT set at 3 (Idaho PIF 2000). UT: PT set at 3 (Parrish et al. 2002).
	PT = 2	NV: Slightly increasing population (now breeding in small numbers).

Table F-2. Continued.

Species	PT index	Trend justification
	PT = 1	CA: First nested at Lower Klamath NWR in 1990 followed by increasing trend. PT = 1. OR: First nested at Malheur NWR in 1947, significantly increasing trend (Herziger and Ivey 2003c).
Franklin's Gull (m)	PT = 3	UT: Migrant.
Forster's Tern (b)	PT = 3	CA, NV, OR, WA: Uncertain trend. ID: PT set at 3 (Idaho PIF 2000). UT: PT set at 3 (Parrish et al. 2002).
Black Tern (b)	PT = 4	CA: Declining in recent years (Shuford 1999).
	PT = 3	ID: PT set at 3 (Idaho PIF 2000). NV, OR, WA: Equivocal or unknown (Shuford 1999). UT: PT set at 3 (Parrish et al. 2002).
Pied-billed Grebe (b)	PT = 3	CA, ID, NV, OR, UT, WA: Uncertain trend.
Eared Grebe (m)	PT = 3	CA, OR, UT: Migrant.
Western Grebe (b)	PT = 4	CA, OR: Evidence of recent moderate population decline (Ivey 2004, G. Ivey unpubl. data). ID: PT set at 3 (Idaho PIF 2000), but recent declining trends (C. Moulton pers. comm.). NV: Recent population decline (e.g., Topaz Lake).
	PT = 3	UT: PT set at 3 (Parrish et al. 2002). WA: Unknown trend.
Clark's Grebe (b)	PT = 4	CA, OR: Evidence of recent moderate population decline (Ivey 2004, G. Ivey unpubl. data). ID: PT set at 3 (Idaho PIF 2000), but recent declining trends (C. Moulton pers. comm.). NV: Recent population decline (e.g., Topaz Lake).
	PT = 3	UT: PT set at 3 (Parrish et al. 2002). WA: Unknown trend.
Snowy Egret (b)	PT = 4	OR: Historic declines due to market hunting in the late 1800s near Malheur Lake, nesting did not resume until 1941 (Herziger and Ivey 2003d). Recent decline at Malheur NWR (G. Ivey unpubl. data).
	PT = 3	ID: PT set at 3 (Idaho PIF 2000). NV: Unknown trend. UT: PT set at 1 (Parrish et al. 2002), but need more information fide D. Paul.
Great Blue Heron (b)	PT = 3	CA, ID, NV, OR, WA: Uncertain trend. UT: PT set at 3 (Parrish et al. 2002).

Table F-2. Continued.

Species	PT index	Trend justification
Black-crowned Night-Heron (b)	PT = 3	CA, ID, NV, OR, WA: Uncertain trend. UT: PT set at 3 (Parrish et al. 2002).
Least Bittern (b)	PT = 3	CA, ID, NV, OR, UT: Uncertain trend.
American Bittern (b)	PT = 3	CA, ID, NV, OR, UT, WA: Uncertain trend.
White-faced Ibis (b)	PT = 3	CA, NV, OR: Historic declines due to market hunting and contaminants, apparent recent recovery (Ivey et al. *in prep* b). ID: PT set at 3 (Idaho PIF 2000). UT: PT set at 3 (Parrish et al. 2002).
American White Pelican (b)	PT = 4	CA: Formerly nested at Eagle Lake, Honey Lake WA (PRBO 2003) and Goose Lake. Declines due to habitat loss and degradation, disturbance, harassment by fishermen, contaminants. NV: Decreasing trend at Anaho Island (USFWS data). OR: Common Malheur Lake late 1800s, no colonies in state by 1932 due to drought and draining, resumed nesting Upper Klamath Lake 1934, sporadic Malheur Lake and abandoned 1960, resumed 1985 (Herziger and Ivey 2003b). Recent moderate decline at Malheur NWR (G. Ivey unpubl. data). WA: Extirpated from two sites, started nesting at new island in 1994 (Doran et al. 2004).
	PT = 3	ID: PT set at 3 (Idaho PIF 2000). UT: PT set at 3 (Parrish et al. 2002). UT. State PIF plan set population objective.
American White Pelican (m)	PT = 3	UT: Migrant.
Common Loon (b)	PT = 5	CA: Extirpated (PRBO 2003).
		OR: Historically probable breeder Malheur Lake, present at Cascade Lakes, breeding range from northern California to British Columbia (Gabrielson and Jewett 1940), only one recent record (early 1990s).
	PT = 4	WA: Unknown trend, but formerly more widely distributed (Richardson et al. 2000).
	PT = 3	ID: Unknown trend.
Common Loon (m)	PT = 3	NV: Migrant.

Table F-3. Justification for Population Trend (PT) scores for priority waterbird species in Bird Conservation Region (BCR) 10 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	PT index	Trend justification
Greater Sandhill Crane (RMP) (b)	PT = 4	ID: PT set at 4 (Idaho PIF 2000). WY: Historic declines due to market hunting and habitat loss (Ivey and Littlefield 2002). Population may have recovered, but potential for expansion into former range (R. Drewien pers. comm.).
	PT = 2	MT: PT set at 2 (Montana PIF 2002).
Virginia Rail (b)	PT = 3	ID, MT, OR, WA, WY: Uncertain trend.
Sora (b)	PT = 3	ID, MT, OR, WA, WY: Uncertain trend.
California Gull (b)	PT = 3	ID: PT set at 3 (Idaho PIF 2000). MT: PT set at 3 (Montana PIF 2002). WY: Uncertain trend.
Franklin's Gull (b)	PT = 4	MT: PT set at 4 (Montana PIF 2002).
	PT = 3	ID: PT set at 3 (Idaho PIF 2000). WY: Uncertain trend.
Forster's Tern (b)	PT = 3	MT: PT set at 3 (Montana PIF 2002). WY: Unknown (Nicholoff 2003).
Black Tern (b)	PT = 3	ID: PT set at 3 (Idaho PIF 2000). MT, OR, WA, WY: Equivocal or unknown trend (Shuford 1999).
Pied-billed Grebe (b)	PT = 3	ID, MT, OR, WA, WY: Uncertain trend.
Western Grebe (b)	PT = 4	ID: PT set at 3 (Idaho PIF 2000), but recent declining trends (C. Moulton pers. comm.).
	PT = 3	MT, OR, WY: Uncertain trend.
Clark's Grebe (b)	PT = 4	ID: PT set at 3 (Idaho PIF 2000), but recent declining trends (C. Moulton pers. comm.).
	PT = 3	MT: PT set at 3 (Montana PIF 2002). WY: Uncertain trend.
Snowy Egret (b)	PT = 3	ID: PT set at 3 (Idaho PIF 2000). WY: Uncertain trend.
Great Blue Heron (b)	PT = 3	ID, OR, WA, WY: Uncertain trend. MT: PT set at 3 (Montana PIF 2002).
Black-crowned Night-Heron (b)	PT = 3	ID, OR, WY: Uncertain trend. MT: PT set at 3 (Montana PIF 2002).
American Bittern (b)	PT = 3	ID, OR, WA: Uncertain trend. MT: PT set at 3 (Montana PIF 2002). WY: Unknown (Nicholoff 2003).
White-faced Ibis (b)	PT = 3	ID: PT set at 3 (Idaho PIF 2000). MT: PT set at 3 (Montana PIF 2002). WY: Uncertain trend.
American White Pelican (b)	PT = 3	MT: PT set at 3 (Montana PIF 2002). WY: Unknown (Nicholoff 2003).
Common Loon (b)	PT = 4	WA: Trend unknown, but formerly more widely distributed (Richardson et al. 2000).
	PT = 3	ID: Uncertain trend. MT: PT set at 3 (Montana PIF 2002). WY: Unknown (Nicholoff 2003).

Table F-4. Justification for Population Trend (PT) scores for priority waterbird species in Bird Conservation Region (BCR) 15 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	PT index	Trend justification
Greater Sandhill Crane (CVP) (b)	PT = 4	CA: Historic declines due to market hunting and habitat loss (Littlefield and Ivey 2002). Recent breeding surveys (Ivey and Herziger 2001) suggest increasing trend and potential for expansion into former range.
Virginia Rail (b)	PT = 3	CA: Uncertain trend.
Sora (b)	PT = 3	CA: Uncertain trend.
Black Tern (b)	PT = 4	CA: Declining in recent years (Shuford 1999).
Pied-billed Grebe (b)	PT = 3	CA: Uncertain trend.
Western Grebe (b)	PT = 4	CA: Evidence of recent moderate population decline (Ivey 2004).
Clark's Grebe (b)	PT = 4	CA: Evidence of recent moderate population decline (Ivey 2004).
American Bittern (b)	PT = 3	CA: Uncertain trend.
Common Loon (b)	PT = 5	CA: Extirpated.

Table F-5. Justification for Population Trend (PT) scores for priority waterbird species in Bird Conservation Region (BCR) 16 in the Intermountain West Waterbird Conservation Plan (b = breeding, m = migrant).

Species	PT index	Trend justification
Greater Sandhill Crane (RMP) (b)	PT = 4	CO: Historic declines due to market hunting and habitat loss (Ivey and Littlefield 2002). Population may have recovered, but potential for expansion into former range (R. Drewien pers. comm.).
Greater Sandhill Crane (RMP) (m)	PT = 3	CO: Migrant.
Virginia Rail (b)	PT = 3	AZ, CO, NM, UT: Uncertain trend.
Sora (b)	PT = 3	AZ, CO, NM, UT: Uncertain trend.
Black Tern (b)	PT = 5	CO: Nearly extirpated (T. Leukering pers. comm.).
	PT = 3	UT: Uncertain trend.
Pied-billed Grebe (b)	PT = 3	AZ, CO, NM, UT: Uncertain trend.
Western Grebe (b)	PT = 3	AZ, CO: Uncertain trend.
		UT: PT set at 3 (Parrish et al. 2002).
Clark's Grebe (b)	PT = 3	AZ, CO, NM: Uncertain trend.
Snowy Egret (b)	PT = 3	CO, NM, UT: Uncertain trend.
Green Heron (b)	PT = 3	CO, NM: Uncertain trend.
Black-crowned Night-Heron (b)	PT = 3	CO, NM: Uncertain trend.
		UT: PT set at 3 (Parrish et al. 2002).
Least Bittern (b)	PT = 3	AZ, CO, NM, UT: Uncertain trend.
American Bittern (b)	PT = 5	AZ: Extirpated.
	PT = 3	CO, NM, UT: Uncertain trend.

Table F-6. Population objectives for priority waterbird species in the Intermountain West Waterbird Conservation Plan by state. Some states are in more than one Bird Conservation Regions (BCR). TBD = To Be Determined (after data become available or species resumes nesting)[1].

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
Arizona	Virginia Rail (b) (PT = 3)	TBD				TBD
	Sora (b) (PT = 3)	TBD				TBD
	Pied-billed Grebe (b) (PT = 3)	TBD				TBD
	Western Grebe (b) (PT = 3)	200				200
	Clark's Grebe (b) (PT = 3)	50				50
	Least Bittern (b) (PT = 3)	TBD				TBD
	American Bittern (b) (PT = 5)	TBD				TBD
California	Greater Sandhill Crane (CVP) (b) (PT = 4)	1,390	1,200		190	
	Greater Sandhill Crane (CVP) (m) (PT = 3)	>8,000	>8,000			
	Lesser Sandhill Crane (PFP) (m) (PT = 3)	>20,000	>20,000			
	Yellow Rail (b) (PT = 5)	20	20			
	Virginia Rail (b) (PT = 3)	TBD	TBD		TBD	
	Sora (b) (PT = 3)	TBD	TBD		TBD	
	California Gull (b) (PT = 1)	62,470	62,470			
	Franklin's Gull (b) (PT = 1)	150	150			
	Forster's Tern (b) (PT = 3)	3,510	3,510			
	Black Tern (b) (PT = 4)	5,820	5,550		270	
	Pied-billed Grebe (b) (PT = 3)	TBD	TBD		TBD	
	Eared Grebe (m) (PT = 3)	>2 million	>2 million			
	Western Grebe (b) (PT = 4)	9,320	7,390		1,930	
	Clark's Grebe (b) (PT = 4)	1,030	1,010		20	
	Great Blue Heron (b) (PT = 3)	110	110			
	Black-crowned Night-Heron (b) (PT = 3)	310	310			
	Least Bittern (b) (PT = 3)	TBD	TBD			

Table F-6. Continued.

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
	American Bittern (b) (PT = 3)	TBD	TBD		TBD	
	White-faced Ibis (b) (PT = 3)	2,310	2,310			
	American White Pelican (b) (PT = 4)	5,880	5,880			
	Common Loon (b) (PT = 5)	TBD	TBD		TBD	
Colorado	Greater Sandhill Crane (RMP) (b) (PT = 4)	450				450
	Greater Sandhill Crane (RMP) (m) (PT = 3)	>18,000				>18,000
	Virginia Rail (b) (PT = 3)	TBD				TBD
	Sora (b) (PT = 3)	TBD				TBD
	Black Tern (b) (PT = 5)	30				30
	Pied-billed Grebe (b) (PT = 3)	TBD				TBD
	Western Grebe (b) (PT = 3)	150				150
	Clark's Grebe (b) (PT = 3)	150				150
	Snowy Egret (b) (PT = 3)	400				400
	Green Heron (b) (PT = 3)	20				20
	Black-crowned Night-Heron (b) (PT = 3)	600				600
	Least Bittern (b) (PT = 3)	TBD				TBD
	American Bittern (b) (PT = 3)	TBD				TBD
Idaho	Greater Sandhill Crane (LCRVP) (b) (PT = 4)	TBD	TBD			
	Greater Sandhill Crane (RMP) (b) (PT = 4)	TBD		TBD		
	Lesser Sandhill Crane (PFP) (m) (PT = 3)	>1,000	>1,000			
	Virginia Rail (b) (PT = 3)	TBD	TBD	TBD		
	Sora (b) (PT = 3)	TBD	TBD	TBD		
	California Gull (b) (PT = 3)	72,640	72,400	240		
	Franklin's Gull (b) (PT = 3)	23,500	8,500	15,000		
	Forster's Tern (b) (PT = 3)	40	40			

Table F-6. Continued.

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
	Black Tern (b) (PT = 3)	200	80	120		
	Pied-billed Grebe (b) (PT = 3)	TBD	TBD	TBD		
	Western Grebe (b) (PT = 4)	6,140	1,790	4,350		
	Clark's Grebe (b) (PT = 4)	>710	710	TBD		
	Snowy Egret (b) (PT = 3)	650	610	40		
	Great Blue Heron (b) (PT = 3)	1,970	1,800	170		
	Black-crowned Night-Heron (b) (PT = 3)	1,610	1,540	70		
	Least Bittern (b) (PT = 3)	TBD	TBD			
	American Bittern (b) (PT = 3)	TBD	TBD	TBD		
	White-faced Ibis (b) (PT = 3)	6,760	5,340	1,420		
	American White Pelican (b) (PT = 3)	2,770	2,770			
	Common Loon (b) (PT = 3)	>10	TBD	10		
Montana	Greater Sandhill Crane (RMP) (b) (PT = 2)	TBD		TBD		
	Virginia Rail (b) (PT = 3)	TBD		TBD		
	Sora (b) (PT = 3)	TBD		TBD		
	California Gull (b) (PT = 3)	920		920		
	Franklin's Gull (b) (PT = 4)	6,000		6,000		
	Forster's Tern (b) (PT = 3)	130		130		
	Black Tern (b) (PT = 3)	200		200		
	Pied-billed Grebe (b) (PT = 3)	TBD		TBD		
	Western Grebe (b) (PT = 3)	250		250		
	Clark's Grebe (b) (PT = 3)	30		30		
	Great Blue Heron (b) (PT = 3)	900		900		
	Black-crowned Night-Heron (b) (PT = 3)	50		50		
	American Bittern (b) (PT = 3)	TBD		TBD		

Table F-6. Continued.

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
	White-faced Ibis (b) (PT = 3)	20		20		
	American White Pelican (b) (PT = 3)	8,000		8,000		
	Common Loon (b) (PT = 3)	200		200		
Nevada	Greater Sandhill Crane (CVP) (b) (PT = 4)	30	30			
	Greater Sandhill Crane (LCRVP) (b) (PT = 4)	TBD	TBD			
	Greater Sandhill Crane (LCRVP) (m) (PT = 3)	>2,000	>2,000			
	Virginia Rail (b) (PT = 3)	TBD	TBD			
	Sora (b) (PT = 3)	TBD	TBD			
	California Gull (b) (PT = 1)	4,200	4,200			
	Franklin's Gull (b) (PT = 2)	10	10			
	Forster's Tern (b) (PT = 3)	190	190			
	Black Tern (b) (PT = 3)	550	550			
	Pied-billed Grebe (b) (PT = 3)	TBD	TBD			
	Western Grebe (b) (PT = 4)	80	80			
	Clark's Grebe (b) (PT = 4)	450	450			
	Snowy Egret (b) (PT = 3)	600	600			
	Great Blue Heron (b) (PT = 3)	660	660			
	Black-crowned Night-Heron (b) (PT = 3)	910	910			
	Least Bittern (b) (PT = 3)	TBD	TBD			
	American Bittern (b) (PT = 3)	TBD	TBD			
	White-faced Ibis (b) (PT = 3)	12,230	12,230			
	American White Pelican (b) (PT = 4)	12,620	12,620			
	Common Loon (m) (PT = 3)	>1,000	>1,000			
New Mexico	Virginia Rail (b) (PT = 3)	TBD				TBD
	Sora (b) (PT = 3)	TBD				TBD

Table F-6. Continued.

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
	Pied-billed Grebe (b) (PT = 3)	TBD				TBD
	Clark's Grebe (b) (PT = 3)	10				10
	Snowy Egret (b) (PT = 3)	500				500
	Green Heron (b) (PT = 3)	200				200
	Black-crowned Night-Heron (b) (PT = 3)	40				40
	Least Bittern (b) (PT = 3)	TBD				TBD
	American Bittern (b) (PT = 3)	TBD				TBD
Oregon	Greater Sandhill Crane (CVP) (b) (PT = 3)	2,140	2,140			
	Greater Sandhill Crane (CVP) (m) (PT = 3)	>6,000	>6,000			
	Lesser Sandhill Crane (PFP) (m) (PT = 3)	>20,000	>20,000			
	Yellow Rail (b) (PT = 5)	1,200	1,200			
	Virginia Rail (b) (PT = 3)	TBD	TBD	TBD		
	Sora (b) (PT = 3)	TBD	TBD	TBD		
	California Gull (b) (PT = 1)	11,330	11,330			
	Franklin's Gull (b) (PT = 1)	3,270	3,270			
	Forster's Tern (b) (PT = 3)	1,610	1,610			
	Black Tern (b) (PT = 3)	>3,180	3,180	TBD		
	Pied-billed Grebe (b) (PT = 3)	TBD	TBD	TBD		
	Eared Grebe (m) (PT = 3)	>20,000	>20,000			
	Western Grebe (b) (PT = 4, 3)	>5,800	5,800	TBD		
	Clark's Grebe (b) (PT = 4)	2,560	2,560			
	Snowy Egret (b) (PT = 4)	250	250			
	Great Blue Heron (b) (PT = 3)	>320	320	TBD		
	Black-crowned Night-Heron (b) (PT = 3)	>1,380	1,380	TBD		
	Least Bittern (b) (PT = 3)	TBD	TBD			
	American Bittern (b) (PT = 3)	TBD	TBD	TBD		

Table F-6. Continued.

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
	White-faced Ibis (b) (PT = 3)	18,100	18,100			
	American White Pelican (b) (PT = 4)	2,360	2,360			
	Common Loon (b) (PT = 5)	TBD	TBD			
Utah	Greater Sandhill Crane (LCRVP) (b) (PT = 3)	TBD	TBD			
	Virginia Rail (b) (PT = 3)	TBD	TBD			TBD
	Sora (b) (PT = 3)	TBD	TBD			TBD
	California Gull (b) (PT = 1)	150,000	150,000			
	Franklin's Gull (b) (PT = 3)	30,650	30,650			
	Franklin's Gull (n) (PT = 3)	>85,000	>85,000			
	Forster's Tern (b) (PT = 3)	1,590	1,590			
	Black Tern (b) (PT = 3)	130	120			10
	Pied-billed Grebe (b) (PT = 3)	TBD	TBD			TBD
	Eared Grebe (m) (PT = 3)	>1.6 million	>1.6 million			
	Western Grebe (b) (PT = 3)	730	700			30
	Clark's Grebe (b) (PT = 3)	300	300			
	Snowy Egret (b) (PT = 3)	1,980	1,940			40
	Great Blue Heron (b) (PT = 3)	470	470			
	Black-crowned Night-Heron (b) (PT = 3)	470	450			20
	Least Bittern (b) (PT = 3)	TBD	TBD			TBD
	American Bittern (b) (PT = 3)	TBD	TBD			TBD
	White-faced Ibis (b) (PT = 3)	20,000	20,000			
	American White Pelican (b) (PT = 3)	10,120[2]	10,120			
	American White Pelican (m) (PT = 3)	>55,000	>55,000			
Washington	Greater Sandhill Crane (CVP) (b) (PT =5)	260[3]	260			
	Greater Sandhill Crane (CVP) (m) (PT = 3)	>2,000	>2,000			

Table F-6. Continued.

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
	Lesser Sandhill Crane (PFP) (m) (PT = 3)	>20,000	>20,000			
	Virginia Rail (b) (PT = 3)	TBD	TBD	TBD		
	Sora (b) (PT = 3)	TBD	TBD	TBD		
	California Gull (b) (PT = 1)	14,000	14,000			
	Forster's Tern (b) (PT = 3)	400	400			
	Black Tern (b) (PT = 3)	550	300	250		
	Pied-billed Grebe (b) (PT = 3)	TBD	TBD	TBD		
	Western Grebe (b) (PT = 3)	1,000	1,000			
	Clark's Grebe (b) (PT = 3)	100	100			
	Great Blue Heron (b) (PT = 3)	1,530	1,200	330		
	Black-crowned Night-Heron (b) (PT = 3)	1,000	1,000			
	American Bittern (b) (PT = 3)	TBD	TBD	TBD		
	American White Pelican (b) (PT = 4)	360	360			
	Common Loon (b) (PT = 4)	20	10	10		
Wyoming	Greater Sandhill Crane (RMP) (b) (PT = 4)	TBD		TBD		
	Virginia Rail (b) (PT = 3)	TBD		TBD		
	Sora (b) (PT = 3)	TBD		TBD		
	California Gull (b) (PT = 3)	8,310		8,310		
	Franklin's Gull (b) (PT = 3)	50		50		
	Forster's Tern (b) (PT = 3)	50		50		
	Black Tern (b) (PT = 3)	100		100		
	Pied-billed Grebe (b) (PT = 3)	TBD		TBD		
	Western Grebe (b) (PT = 3)	430		430		
	Clark's Grebe (b) (PT = 3)	80		80		
	Snowy Egret (b) (PT = 3)	30		30		

Table F-6. Continued.

State	Species	State total objective #	State BCR objective #			
			BCR 9	BCR 10	BCR 15	BCR 16
	Great Blue Heron (b) (PT = 3)	200		200		
	Black-crowned Night-Heron (b) (PT = 3)	400		400		
	American Bittern (b) (PT = 3)	TBD		TBD		
	White-faced Ibis (b) (PT = 3)	270		270		
	American White Pelican (b) (PT = 3)	2,500		2,500		
	Common Loon (b) (PT = 3)	50		50		

[1] PT = 5: Double the current population over the next 50 years, PT = 4: Increase the current population by 50% over the next 50 years, PT = 3: Maintain or increase the current population over the next 50 years, PT = 2 and 1: Maintain the current population over the next 50 years.

[2] Objective set in state PIF plan (Parrish et al. 2002).

[3] Objective set in state recovery plan (Littlefield and Ivey 2002).

Table F-7. Population objectives for priority waterbird species in Bird Conservation Region (BCR) 9 in the Intermountain West Waterbird Conservation Plan. TBD = To Be Determined (after data become available or species resumes nesting)[1].

Species	BCR objective #	State objective # for BCR					
		CA[2]	ID[3]	NV	OR[3]	UT[4]	WA[3]
Greater Sandhill Crane (CVP) (b)	3,630	1,200		30	2,140		260[5]
Greater Sandhill Crane (CVP) (m)	>8,000	>8,000			>6,000		>2,000
Greater Sandhill Crane (LCRVP) (b)	TBD		TBD	TBD		TBD	
Greater Sandhill Crane (LCRVP) (m)	>2,000			>2,000			
Lesser Sandhill Crane (PFP) (m)	>25,000	>20,000	>1,000		>20,000		>20,000
Yellow Rail (b)	1,220	20			1,200		
Virginia Rail (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Sora (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD
California Gull (b)	314,400	62,470	72,400	4,200	11,330	150,000	14,000
Franklin's Gull (b)	42,580	150	8,500	10	3,270	30,650	
Franklin's Gull (m)	>85,000					>85,000	
Forster's Tern (b)	7,340	3,510	40	190	1,610	1,590	400
Black Tern (b)	9,780	5,550	80	550	3,180	120	300
Pied-billed Grebe (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Eared Grebe (m)	>3 million	>2 million			>20,000	>1.6 million	
Western Grebe (b)	17,280	7,910	1,790	80	5,800	700	1,000
Clark's Grebe (b)	5,130	1,010	710	450	2,560	300	100
Snowy Egret (b)	3,400		610	600	250	1,940	
Great Blue Heron (b)	4,560	110	1,800	660	320	470	1,200
Black-crowned Night-Heron (b)	5,590	310	1,540	910	1,380	450	1,000
Least Bittern (b)	TBD	TBD	TBD	TBD	TBD	TBD	
American Bittern (b)	TBD	TBD	TBD	TBD	TBD	TBD	TBD
White-faced Ibis (b)	57,980	2,310	5,340	12,230	18,100	20,000	
American White Pelican (b)	34,110	5,880	2,770	12,620	2,360	10,120[6]	360
American White Pelican (m)	>55,000					>55,000	
Common Loon (b)	>10	TBD	TBD		TBD		10
Common Loon (m)	>1,000			>1,000			

[1] State PT scores by state can be found in Table F-6.
[2] California has objectives in BCR 15 as well. See Table F-6 for state totals.
[3] Idaho, Oregon, and Washington have objectives in BCR 10 as well. See Table F-6 for state totals.
[4] Utah has objectives in BCR 16 as well. See Table F-6 for state totals.
[5] Objective set in state recovery plan (Littlefield and Ivey 2002).
[6] Objective set in state PIF plan (Parrish et al. 2002).

Table F-8. Population objectives for priority waterbird species in Bird Conservation Region (BCR) 10 in the Intermountain West Waterbird Conservation Plan. TBD = To Be Determined (after data become available or species resumes nesting)[1].

Species	BCR objective #	State objective # for BCR				
		ID[2]	MT	OR[2]	WA[2]	WY
Greater Sandhill Crane (RMP) (b)	TBD	TBD	TBD			TBD
Virginia Rail (b)	TBD	TBD	TBD	TBD	TBD	TBD
Sora (b)	TBD	TBD	TBD	TBD	TBD	TBD
California Gull (b)	9,470	240	920			8,310
Franklin's Gull (b)	21,050	15,000	6,000			100
Forster's Tern (b)	180		130			100
Black Tern (b)	>670	120	200	TBD	250	100
Pied-billed Grebe (b)	TBD	TBD	TBD	TBD	TBD	TBD
Western Grebe (b)	>5,030	4,350	250	TBD		430
Clark's Grebe (b)	>110	TBD	30			80
Snowy Egret (b)	70	40				10
Great Blue Heron (b)	>1,600	170	900	TBD	330	400
Black-crowned Night-Heron (b)	>520	70	50	TBD		200
American Bittern (b)	TBD	TBD	TBD	TBD	TBD	TBD
White-faced Ibis (b)	1,710	1,420	20			270
American White Pelican (b)	10,500		8,000			2,500
Common Loon (b)	270	10	200		10	50

[1] State PT scores by state can be found in Table F-6.
[2] Idaho, Oregon and Washington have objectives in BCR 9 as well. See Table F-6 for state totals.

Table F-9. Population objectives for priority waterbird species in Bird Conservation Region (BCR) 15 in the Intermountain West Waterbird Conservation Plan. TBD = To Be Determined (after data become available or species resumes nesting)[1].

Species	BCR objective #	State objective # for BCR
		CA[2]
Greater Sandhill Crane (CVP) (b)	190	190
Virginia Rail (b)	TBD	TBD
Sora (b)	TBD	TBD
Black Tern (b)	270	270
Pied-billed Grebe (b)	TBD	TBD
Western Grebe (b)	1,930	1,930
Clark's Grebe (b)	20	20
American Bittern (b)	TBD	TBD
Common Loon (b)	TBD	TBD

[1] State PT scores by state can be found in Table 6-6.
[2] California has objectives in BCR 9 as well. See Table 6-6 for state totals.

Table F-10. Population objectives for priority waterbird species in Bird Conservation Region (BCR) 16 in the Intermountain West Waterbird Conservation Plan. TBD = To Be Determined (after data become available or species resumes nesting)[1].

Species	BCR objective #	State objective # for BCR			
		AZ	CO	NM	UT[2]
Greater Sandhill Crane (RMP) (b)	450		450		
Greater Sandhill Crane (RMP) (m)	>18,000		>18,000		
Virginia Rail (b)	TBD	TBD	TBD	TBD	TBD
Sora (b)	TBD	TBD	TBD	TBD	TBD
Black Tern (b)	40		30		10
Pied-billed Grebe (b)	TBD	TBD	TBD	TBD	TBD
Western Grebe (b)	380	200	150		30
Clark's Grebe (b)	210	50	150	10	
Snowy Egret (b)	940		400	500	40
Green Heron (b)	220		20	200	
Black-crowned Night-Heron (b)	660		600	40	20
Least Bittern (b)	TBD	TBD	TBD	TBD	TBD
American Bittern (b)	TBD	TBD	TBD	TBD	TBD

[1] State PT scores by state can be found in Table 6-6.
[2] Utah has objectives in BCR 9 as well. See Table 6-6 for state totals.

APPENDIX G. Intermountain West Waterbird Habitat Objectives.

Establishing habitat objectives is a difficult task at this time, as existing information is not adequate to translate population objectives into habitat objectives. Defining relationships of population numbers to habitat is an important research need. An inventory of existing wetland habitats is also needed to further this task. National Wetland Inventory coverage is incomplete in this region. The discussion in this appendix was a preliminary attempt at defining habitat objectives; however, because of the difficulties in translating population objectives to habitat objectives, the Intermountain West Waterbird Group decided to use the habitat objectives developed in state-coordinated implementation plans. Therefore, the following discussion is informational and may prove useful for developing more site-specific habitat objectives and management strategies.

The Guild Approach

Waterbirds can be classified into guilds by their preference for a specific type of wetland utilized during the breeding season. Waterbird breeding habitat guilds were delineated into five generalized groups and are represented in Table G-1, however, more detailed species habitat requirements are recorded in the waterbird species accounts in Appendix E. These guilds are the primary basis for establishing habitat objectives for breeding waterbirds. Table G-2 details the rationale used to derive habitat objectives for each guild.

Some species overlap with more than one habitat guild. Guild 1 species generally nest in extensive stands of emergent vegetation. These sites range from flooded sedge meadows to cattail or bulrush stands in deep water marshes and are usually seasonal wetlands. Habitat for Guild 2 species consists of mostly larger, semi-permanent freshwater marshes with patches of emergent vegetation interspersed with open water, approaching a 50:50 mix of open water to emergent cover (hemi-marsh). The wetlands used by species in Guild 3 are characterized as having mostly permanent water, and are deep-water marshes or lakes usually with some emergent vegetation stands and extensive areas of open water. Guild 4 species utilize trees adjacent to wetlands or streams for nesting. Guild 5 species use those wetlands or waterways with an island, a sandbar along a river, or an exposed shoreline of a river or lake. Although these species are separated into general categories, there is the likelihood that habitat preference will overlap substantially across the region.

Individual Site Approach

After an assessment of existing waterbird sites, habitat objectives could be defined considering waterbird priorities and objectives and could eventually be rolled up into a state and BCR objective. This is the approach we used to set preliminary habitat objectives for priority migrant species.

Table G-1. Description of waterbird guilds in the Intermountain West, based on breeding habitats used.

GUILD:	Guild 1	Guild 2	Guild 3	Guild 4	Guild 5
HABITAT TYPES:	Seasonal wetlands Vast emergent wetlands Wet meadows	Semi-permanent wetlands Hemi-marsh wetlands	Freshwater Lakes Deeper wetlands Mostly permanent Some emergents Extensive open water	Tree nesting Near wetlands Woody riparian habitats	Island nesting Lake or River Open water Barren ground
PRIORITY SPECIES:	Sandhill Crane Yellow Rail Virginia Rail Sora Least Bittern American Bittern Black Tern	Franklin's Gull Forster's Tern Black Tern Pied-billed Grebe Snowy Egret Black-crowned Night-Heron Least Bittern American Bittern White-faced Ibis	Western Grebe Clark's Grebe Common Loon	Snowy Egret Great Blue Heron Green Heron Black-crowned Night-Heron	California Gull Forster's Tern American White Pelican
OTHER SPECIES:	Common Moorhen American Coot	Common Moorhen American Coot Horned Grebe Eared Grebe Great Egret Cattle Egret	Red-necked Grebe Eared Grebe	Double-crested Cormorant Little Blue Heron Great Egret Cattle Egret	Double-crested Cormorant Ring-billed Gull Herring Gull Caspian Tern Common Tern

Table G- 2. Description of potential criteria for setting habitat objectives using a guild approach.

Guild	Criteria for setting objectives
Guild 1 Seasonal wetlands Vast emergent wetlands	· Use professional judgment from each state to set habitat objective. · Consider amount of current habitat under conservation and set objective to increase the conserved acreage by 25% over the next 50 years.
Wet meadows:	· Use Sandhill Crane as umbrella species for this guild: 75 acres/pair, approximately based on median territory size (Littlefield 1968, Drewien 1973). · Set specific objectives within Yellow Rail breeding range in OR and CA.
Guild 2 Semi-permanent wetlands Hemi-marsh wetlands	· Use professional judgment from each state to set habitat objective. · Consider amount of current habitat under conservation and set objective to increase the conserved acreage by 25% over the next 50 years.
Guild 3 Freshwater Lakes Deeper wetlands Mostly permanent Some emergents Extensive open water	· Use professional judgment from each state to set habitat objective. · Consider amount of current habitat under conservation and set objective to increase the conserved acreage by 25% over the next 50 years. · Implement management practices to improve productivity at current nesting sites.
Guild 4 Tree nesting Near wetlands Woody riparian habitats	· Use professional judgment from each state to set habitat objective. · Consider amount of current habitat under conservation and set objective to increase the conserved acreage by 25% over the next 50 years. · Consider the current amount of habitat available and prescribe management to increase the total suitable riparian habitat by 50% over the next 50 years.
Guild 5 Island nesting Lake or River Open water Barren ground	· Use professional judgment from each state to set habitat objective. · Consider amount of current habitat under conservation and set objective to increase the number of conserved and suitable island nesting sites by 25% over the next 50 years.

An example: BCR 9, Oregon:

Guild 1: Establish conservation status on at least 150,000 acres of private flood-irrigated wet meadows in Klamath, Lake and Harney counties (Silvies Floodplain, Chewaucan Marshes, Klamath Marsh, Warner Basin, Goose Lake Valley, and Paulina Marsh). Lobby to develop legislation to protect the flood-irrigation practice on these lands for its wildlife values.
Priority waterbird benefactors: Greater Sandhill Crane, Lesser Sandhill Crane (staging), California Gull, Franklin's Gull, Black Tern, Snowy Egret, Black-crowned Night-Heron and White-faced Ibis.

Guild 2: Develop 5-10 large (100-500 acre) impoundments and manage them for hemi-marsh conditions (Malheur NWR, Goose Lake Basin, Fremont NF, BLM).
Priority waterbird benefactors: California Gull, Franklin's Gull, Black Tern, Forster's Tern, Snowy Egret, Black-crowned Night-Heron and White-faced Ibis.

Guild 3: Seek a higher level of conservation status for Lake Abert to ensure protection from threats. Limit boating disturbance on Cascades lakes which have suitable habitat to support nesting loons (list possibilities). Develop barriers to reduce wind fetch and protect grebe nests on Goose and Upper Klamath lakes.
Priority waterbird benefactors: Eared Grebe, Western Grebe, Common Loon.

Guild 4: Restore and enhance at least 10 miles of riparian forests along rivers and streams near large wetlands (Silvies Floodplain, Summer Lake).
Priority waterbird benefactors: Snowy Egret, Black-crowned Night-Heron

Guild 5: Construct permanent pelican nesting islands (one each) at Malheur Lake, Goose Lake, and Summer Lake.
Priority waterbird benefactors: American White Pelican, California Gull, Forster's Tern.

APPENDIX H. Intermountain West waterbird conservation strategies.

A variety of conservation strategies will be used to implement the IWWCP and achieve population and habitat objectives (Table H-1). Because wetlands are generally isolated oases in the Intermountain West landscape, most waterbird habitat conservation will be focused on important wetland sites in the region, within BHCAs and IBAs. Descriptions of IBAs provide an additional source of conservation strategies which should be consulted when developing conservation plans (see Audubon Society 2004). Additionally, waterbird-focused habitat management practices need to be implemented at a broad scale in wetlands around the region. A regional assessment of potential for waterbird habitat enhancement and restoration projects, and local management issues should be conducted. Site-specific habitat conservation should be addressed using the strategies in Table H-1 and IBA descriptions as guidelines.

Table H-1. Waterbird conservation strategies for priority species in Bird Conservation Regions of the Intermountain West, by state.

Priority Species	BCR	Conservation Strategies
ARIZONA:		
Virginia Rail, Sora (b)	16	· No net loss of existing seasonal wetlands or wet meadow habitats.
Pied-billed Grebe (b)	16	· No net loss of existing seasonal or semi-permanent wetlands.
Western/Clark's Grebe (b)	16	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 100 pairs of Western Grebes and 25 pairs of Clark's Grebes. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004). · Maintain suitable breeding habitat and security at Mormon Lake and Many Farms and Ganado Lakes (later 2 on the Navajo Reservation).
Least Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats.
American Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac, Brown and Dinsmore 1986).
CALIFORNIA:		
Greater Sandhill Crane CVP (b)	9	· Maintain, restore and conserve at least 45,000 acres of suitable wet meadow/seasonal wetland breeding habitat at breeding sites throughout northeastern California (Ivey and Herziger 2001) to support at least 600 pairs.
Greater Sandhill Crane CVP (b)	15	· Maintain, restore and conserve at least 7,125 acres of suitable wet meadow/seasonal wetland breeding habitat at breeding sites in the northern Sierras (Ivey and Herziger 2001) to support at least 95 pairs.
Greater Sandhill Crane CVP (m)	9	· Maintain grain fields and roost sites at traditional staging areas to support at least 8,000 birds (e.g., Lower Klamath and Modoc NWRs, Honey Lake and Butte Valley WAs).
Lesser Sandhill Crane PFP (m)	9	· Maintain grain fields and roost sites at traditional staging areas to support at least 20,000 birds (e.g., Goose Lake Valley, Modoc NWR, and Honey Lake WA).
Yellow Rail (b)	9	· Prioritize habitat conservation of wet meadows in known breeding sites in Modoc (Surprise Valley) and Shasta counties. · Search for additional breeding locations and determine wintering area.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
Virginia Rail, Sora (b)	9, 15	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	9	· Implement conservation measure to maintain existing breeding sites (Shuford and Ryan 2000).
Franklin's Gull (b)	9	· Maintain emergent nesting habitat at Lower Klamath NWR.
Forster's Tern (b)	9	· No net loss of existing nesting habitat at known breeding sites (Shuford 1998).
Black Tern (b)	9	· Maintain emergent wetland habitat at known breeding sites to support at least 2,775 pairs (Shuford 1998).
Black Tern (b)	15	· Maintain emergent wetland habitat at known breeding sites to support at least 135 pairs (Shuford 1998).
Pied-billed Grebe (b)	9, 15	· No net loss of existing seasonal or semi-permanent wetlands.
Eared Grebe (m)	9	· Maintain foraging conditions to support at least 2 million birds. · At Mono Lake, work with water users to develop a strategy to maintain water chemistry favorable to high populations of brine shrimp and brine flies. · Minimize human disturbance during staging periods. · Seek conservation status for Mono Lake (e.g., as a NWR) to allow it to continue to support >1.6 million grebes.
Western/Clark's Grebe (b)	9	· Maintain suitable emergent nesting habitat at major breeding sites in the region (Eagle Lake, Tulelake NWR, Goose Lake, Crowley Lake, and Bridgeport Reservoir). Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004).
Western/Clark's Grebe (b)	15	· Maintain suitable emergent nesting habitat at major breeding sites in the region (Lake Almanor and Mountain Meadows Reservoir). Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004).
Great Blue Heron	9	· Maintain suitable breeding habitats at Clear Lake and Lower Klamath NWRs to support at least 55 nests.
Black-crowned Night-Heron (b)	9	· Maintain suitable breeding habitats at Clear Lake, Tulelake and Lower Klamath NWRs to support at least 155 nests.
Least Bittern (b)	9	· No net loss of existing seasonal or semi-permanent wetland habitats.
American Bittern (b)	9, 15	· No net loss of existing seasonal or semi-permanent wetland habitats.
White-faced Ibis (b)	9	· Maintain suitable emergent wetland breeding habitats at Lower Klamath NWR, Modoc NWR and Honey Lake WA and other nesting sites to support at least 1,155 nests (Ivey et al. *in prep* b).
American White Pelican (b)	9	· Maintain suitable nesting sites at Clear Lake, Lower Klamath NWRs and Butte Valley WA to support at least 2,940 nests. · Consider building a nesting island, along the Oregon border, to restore nesting to Goose Lake (in cooperation with Oregon). · Consider building a nesting island (during a dry year) at Hartson Reservoir, Honey Lake WA (Shuford 1998).
Common Loon (b)	9, 15	· Monitor for nesting at potential lakes and reservoirs. If nesting resumes in the state, initiate conservation measures to protect nests from human disturbance.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
COLORADO:		
Greater Sandhill Crane RMP (b)	16	· Increase efforts for habitat conservation in potential wet meadow/ seasonal marsh breeding habitats. · Conserve, restore and protect 16,875 acres of nesting habitat to support at least 225 pairs.
Greater Sandhill Crane RMP (m)	16	· Maintain grain fields and roost sites at traditional staging areas to support at least 18,000 cranes in the San Luis Valley, especially Monte Vista and Alamosa NWRs; along the Rio Grande; Northpark; Fruit Growers Reservoir (Delta Co.); Morgan Bottom and adjacent areas; Hart's Basin near Eckert; Grand Valley; Gunnison and White River Valleys; .and the Elk River near the confluence of the Yampa River (Routt Co.) (Pacific and Central Flyways 2001; Todd Sanders, Colorado Div. of Wildlife, Fort Collins, pers. comm.). · Maintain grain fields and roost sites at traditional wintering areas (e.g., near Escalante WMA, near Montrose).
Virginia Rail, Sora (b)	16	· No net loss of existing seasonal wetlands or wet meadow habitats.
Black Tern (b)	16	· Maintain emergent wetland habitat at known breeding sites to support at least 15 pairs.
Pied-billed Grebe (b)	16	· No net loss of existing seasonal or semi-permanent wetlands.
Western /Clark's Grebe (b)	16	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 75 pairs of each species. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (Ivey 2004).
Snowy Egret (b)	16	· Maintain suitable emergent wetland breeding habitats to support at least 200 nests.
Green Heron (b)	16	· Maintain suitable riparian nesting areas to maintain at least 10 pairs.
Black-crowned Night-Heron (b)	16	· Maintain suitable emergent wetland breeding habitats to support at least 300 nests.
Least Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats.
American Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986).
IDAHO:		
Greater Sandhill Crane RMP (b)	9, 10	· Conserve, restore and protect wet meadow/seasonal marsh breeding habitats.
Greater Sandhill Crane LCRVP (b)	9, 10	· Conserve, restore and protect wet meadow/seasonal marsh breeding habitats.
Lesser Sandhill Crane PFP (m)	9	· Maintain grain fields and roost sites to maintain at least 1000 cranes at traditional staging areas in Treasure and Payette River Valleys.
Virginia Rail, Sora (b)	16	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	9	· Implement conservation to maintain existing breeding sites.
California Gull (b)	10	· Implement conservation to maintain existing breeding sites (Bear Lake NWR).
Franklin's Gull (b)	9	· Implement conservation to maintain existing breeding sites (Camas NWR, Mud and Market lakes).

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
Franklin's Gull (b)	10	· Implement conservation to maintain existing breeding sites (Oxford Slough WPA, Bear Lake and Grays Lake NWRs). · Strive to resolve water level issues at Grays Lake (Ivey et al. *in prep* b).
Forster's Tern (b)	9	· No net loss of existing nesting habitat at known breeding sites to maintain at least 20 pairs.
Black Tern (b)	9	· Maintain emergent wetland habitat at known breeding sites to support at least 40 pairs.
Black Tern (b)	10	· Maintain emergent wetland habitat at known breeding sites to support at least 60 pairs. · Maintain habitat for colony at Kootenai NWR.
Pied-billed Grebe (b)	9, 10	· No net loss of existing seasonal or semi-permanent wetlands.
Western /Clark's Grebe (b)	9	· Maintain suitable emergent nesting habitat at major breeding sites (Minidoka NWR and Deer Flat NWR) to support at least 895 pairs of Western Grebes and 355 pairs of Clark's Grebes. · Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (Ivey 2004).
Western /Clark's Grebe (b)	10	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 2175 pairs (Lake Cascade). Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (Ivey 2004). · Maintain suitable nesting habitat and conservation for at least 2 colony sites (Lake Cascade and Bear Lake NWR).
Snowy Egret (b)	9	· Maintain suitable emergent wetland breeding habitats to support at least 305 nests (Trost and Gerstell 1994).
Snowy Egret (b)	10	· Maintain suitable emergent wetland breeding habitats to support at least 20 nests (Trost and Gerstell 1994).
Great Blue Heron (b)	9	· Maintain suitable riparian nesting areas to maintain at least 900 pairs.
Great Blue Heron (b)	10	· Maintain suitable riparian nesting areas to maintain at least 85 pairs.
Black-crowned Night-Heron (b)	9	· Maintain suitable emergent wetland breeding habitats to support at least 770 nests (Trost and Gerstell 1994).
Black-crowned Night-Heron (b)	10	· Maintain suitable emergent wetland breeding habitats to support at least 35 nests (Trost and Gerstell 1994).
Least Bittern (b)	9	· No net loss of existing seasonal or semi-permanent wetland habitats.
American Bittern (b)	9, 10	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986).
MONTANA:		
White-faced Ibis (b)	9	· Maintain suitable emergent wetland breeding habitats at nesting sites to support at least 2,670 nests (Market and Mud Lake WAs, Camas NWR, Oxford Slough WPA, and Duck Valley Indian Reservation) (Ivey et al. *in prep* b). · Restore hydrology to Grays Lake to improve productivity of Franklin's Gulls and other waterbirds.
White-faced Ibis (b)	10	· Maintain suitable emergent nesting habitat for at least 2 colony sites (Grays Lake NWR, Bear Lake NWR) to support at least 710 nests (Ivey et al. *in prep* b). · Negotiate some form of conservation agreement with the Duck Valley Tribes to protect the Duck Valley wetlands.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
American White Pelican	9	· Maintain habitat to support at least 1,385 pairs and minimize disturbance during the nesting season at Blackfoot Reservoir.
Common Loon	9, 10	· Maintain suitable nesting habitat at major breeding sites in the region to support at least 10 pairs. Minimize human disturbance. · Protect one known territory in the Greater Yellowstone Ecosystem.
Greater Sandhill Crane RMP (b)	10	· Maintain, restore and conserve suitable wet meadow/seasonal wetland breeding habitat at breeding sites throughout the region.
Virginia Rail, Sora (b)	10	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	10	· Implement conservation measure to maintain existing breeding sites to support at least 460 pairs.
Franklin's Gull (b)	10	· Maintain emergent nesting habitat to support at least 3,000 pairs..
Forster's Tern (b)	10	· No net loss of existing nesting habitat at known breeding sites to maintain at least 65 pairs. · See Casey (2000) for management considerations.
Black Tern (b)	10	· Maintain emergent wetland habitat at known breeding sites to support at least 100 pairs (Casey 2000).
Pied-billed Grebe	10	· No net loss of existing seasonal or semi-permanent wetlands.
Western /Clark's Grebe (b)	10	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 125 pairs of Western Grebes and 15 pairs of Clark's Grebes. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (Ivey 2004).
Great Blue Heron (b)	10	· Maintain suitable riparian nesting areas to maintain at least 450 pairs.
Black-crowned Night-Heron (b)	10	· Maintain suitable emergent wetland breeding habitats to support at least 25 nests.
American Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986).
White-faced Ibis (b)	10	· Maintain suitable emergent wetland breeding habitats at nesting sites to support at least 10 nests.
American White Pelican	10	· Manage known and newly formed colonies at 2 sites: Canyon Ferry Reservoir and Arod Lakes to support at least 4,000 pairs.
Common Loon	10	· Maintain suitable nesting habitat at major breeding sites in the region to support at least 100 pairs. Minimize human disturbance on nesting lakes. · Maintain productivity of at least 1.4 young/nesting pair. · Protect/enhance productivity at known territories with buoys, floating nests and outreach as needed. Preparation of site-specific territory management plans is a primary strategy (Casey 2000).
NEVADA:		
Greater Sandhill Crane CVP (b)	9	· Maintain, restore and conserve at least 45,000 acres of suitable wet meadow/seasonal wetland breeding habitat at breeding sites in northwestern Nevada (Ivey and Herziger 2001) to support at least 15 pairs.
Greater Sandhill Crane LCRVP (b)	9	· Maintain, restore and conserve at least 7 suitable wet meadow/ seasonal wetland breeding habitat at breeding sites in the northeastern Nevada (Nevada Partners In Flight 1999).

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
Greater Sandhill Crane LCRVP(m)	9	· Maintain grain fields and roost sites at traditional staging areas (e.g., Lund area and Pharanaget NWR).
Virginia Rail, Sora (b)	9	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	9	· Implement conservation measure to maintain existing breeding sites to support at least 2,100 pairs.
Franklin's Gull (b)	9	· Maintain emergent nesting habitat at Ruby Lake NWR to support at least 5 pairs.
Forster's Tern (b)	9	· No net loss of existing nesting habitat at known breeding sites to support at least 95 pairs.
Black Tern (b)	9	· Maintain emergent wetland habitat at known breeding sites to support at least 225 pairs
Pied-billed Grebe	9	· No net loss of existing seasonal or semi-permanent wetlands.
Western/Clark's Grebe (b)	9	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 40 pairs of Western Grebes and 225 pairs of Clark's Grebes. Restore emergent nesting habitat at Topaz Lake. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Nevada Partners In Flight 1999, Ivey 2004).
Snowy Egret (b)	9	· Maintain suitable emergent wetland breeding habitats to support at least 300 nests.
Great Blue Heron	9	· Maintain suitable breeding habitats to support at least 330 nests.
Black-crowned Night-Heron (b)	9	· Maintain suitable breeding habitats to support at least 455 nests.
Least Bittern (b)	9	· No net loss of existing seasonal or semi-permanent wetland habitats.
American Bittern (b)	9	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986).
White-faced Ibis (b)	9	· Maintain suitable emergent wetland breeding habitats at Carson Lake, Stillwater NWR, Ruby Lake NWR, and Franklin Lake and other nesting sites to support at least 6,115 nests (Ivey et al. *in prep* b). · Mitigate losses of flood irrigated agricultural feeding sites in the Lahontan Valley by creating seasonal wetlands.
American White Pelican (b)	9	· Maintain suitable nesting sites at Anaho Island in Pyramid Lake to support at least 6,310 nests. · Provide adequate water level management of Pyramid Lake such that a land bridge from Pyramid Point to Anaho Island would never be exposed (Nevada Partners In Flight 1999). · Consider building a nesting Island at Ruby or Franklin Lake.
Common Loon (m)	9	· Acquire enough water to maintain suitable fish forage base at Walker Lake to support at least 1,000 staging loons.
NEW MEXICO:		
Virginia Rail, Sora (b)	16	· No net loss of existing seasonal wetlands or wet meadow habitats.
Pied-billed Grebe	16	· No net loss of existing seasonal or semi-permanent wetlands.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
Western/Clark's Grebe (b)	16	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 10 pairs Clark's Grebes. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004). · Maintain suitable breeding habitat at Las Vegas and Maxwell NWRs; Elephant Butte, Caballo and the Jicarilla Lakes. Control grazing along shores and banks through low intensity or rest-rotation and fence cattail/bulrush areas during dry years for rapid recovery of nesting habitat.
Snowy Egret (b)	16	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 250 pairs. · During wet years, maintain suitable nesting habitat near Zuni, and on the Jicarilla Apache reservation. Maintain habitat in dry years, through fencing of bulrush and cattail areas, for quick recovery in wetter years.
Green Heron (b)	16	· Maintain suitable riparian nesting areas to maintain at least 100 pairs.
Black-crowned Night-Heron (b)	16	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 20 pairs.
Least Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats.
American Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986). · Establish or maintain blocks of 24ac (9.7ha) patches of habitat to sustain one or more breeding pair to ensure sustained breeding (Rustay 2000).
OREGON:		
Greater Sandhill Crane CVP (b)	9	· Maintain, restore and conserve at least 80,250 acres of suitable wet meadow/seasonal wetland breeding habitat at breeding sites throughout central and eastern Oregon (Ivey and Herziger 2000) to support at least 1,070 pairs.
Greater Sandhill Crane CVP (m)	9	· Maintain grain fields and roost sites at traditional staging areas (e.g., Malheur NWR, Summer Lake, Chewaucan Marsh, Langell and Warner Valleys).
Lesser Sandhill Crane PFP (m)	9	· Maintain grain fields and roost sites at traditional staging areas (e.g., Silvies River Floodplain, Goose Lake Basin, Warner Basin, Summer Lake/Chewaucan Basins, and Paulina Marsh).
Yellow Rail (b)	9	· Prioritize habitat conservation of wet meadows in known breeding sites in Klamath and Lake Counties (at known breeding sites (Wood River Valley, Klamath Marsh, Sycan Marsh, Camas Prairie, Jack Spring, Odessa Creek near Shoalwater Bay and Aspen Lake) to support at least 600 pairs.
Virginia Rail, Sora (b)	9, 10	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	9	· Implement conservation measure to maintain existing breeding sites to support at least 5,665 pairs.
Franklin's Gull (b)	9	· Maintain emergent nesting habitat at Malheur NWR to support at least 1,635 pairs.
Forster's Tern (b)	9	· No net loss of existing nesting habitat at known breeding sites to support at least 805 pairs.
Black Tern (b)	9	· Maintain emergent wetland habitat at known breeding sites to support at least 1,590 pairs.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
Black Tern (b)	10	· Maintain emergent wetland habitat at known breeding sites.
Pied-billed Grebe	9, 10	· No net loss of existing seasonal or semi-permanent wetlands.
Eared Grebe (m)	9	· Maintain suitable water chemistry to support brine shrimp at Lake Abert and Stinking Lake. · Seek conservation status for Lake Abert (e.g., as a NWR) to allow it to continue to support >25,000 grebes. · Monitor harvest of brine shrimp to and halt harvest when there appears to be an effect on forage base. · Maintain favorable habitat at Stinking Lake (Malheur NWR) by not allowing unnatural surface flows to enter the basin to maintain its hypersaline character.
Western/Clark's Grebe (b)	9	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 2,900 pairs of Western Grebes and 1,280 pairs of Clark's Grebes. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004).
Western/Clark's Grebe (b)	10	· Maintain suitable emergent nesting habitat at breeding sites in the region. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004).
Snowy Egret (b)	9	· Maintain suitable emergent wetland breeding habitats to support at least 125 nests.
Great Blue Heron	9	· Maintain suitable breeding habitats to support at least 160 nests.
Great Blue Heron	10	· Maintain suitable riparian breeding habitats at known colony locations.
Black-crowned Night-Heron (b)	9	· Maintain suitable breeding habitats to support at least 690 nests.
Black-crowned Night-Heron (b)	10	· Maintain suitable breeding habitats at known colony sites.
Least Bittern (b)	9	· No net loss of existing seasonal or semi-permanent wetland habitats.
American Bittern (b)	9	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986).
White-faced Ibis (b)	9	· Maintain suitable emergent wetland breeding habitats at Malheur NWR, Warner Basin, Summer Lake WA, Sycan Marsh, Chewaucan Marsh and other nesting sites to support at least 9,050 nests (Ivey et al. *in prep* b). · Ensure that all major colony sites are protected by some sort of conservation strategy. Seek some form of conservation for the privately-owned Chewaucan Marsh.
American White Pelican (b)	9	· Maintain suitable nesting sites at Malheur Lake and Crump Lake to support at least 1,180 nests. · Consider construction of a nesting island during a dry year which would provide suitable breeding site at most water levels, in Malheur Lake and Goose Lake (to restore an historic nesting site).
Common Loon (b)	9, 10	· Monitor for nesting at potential lakes and reservoirs. If nesting resumes in the state, initiate conservation measures to protect nests from human disturbance.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
UTAH:		
Greater Sandhill Crane LCRVP (b)	9	· Maintain, restore and conserve suitable wet meadow/seasonal wetland breeding habitat at breeding sites throughout northwest Utah.
Virginia Rail, Sora (b)	9, 16	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	9	· Implement conservation measure to maintain existing breeding sites to support at least 75,000 pairs. · Continue to manage Gunnison and Bird (Hat) Islands for breeding colonial birds with emphasis on American White Pelicans and California Gulls.
Franklin's Gull (b)	9	· Maintain emergent nesting habitat in Great Salt Lake wetlands to support at least 15,325 pairs.
Franklin's Gull (b)	9	· Maintain suitable foraging habitat in Great Salt Lake basin to support at least 85,000 birds.
Forster's Tern (b)	9	· No net loss of existing nesting habitat at known breeding sites to support at least 795 pairs.
Black Tern (b)	9	· Maintain emergent wetland habitat at known breeding sites to support at least 60 pairs.
Black Tern (b)	16	· Maintain emergent wetland habitat at Ouray NWR to support at least 5 pairs. · Enhance seasonal wetland habitats near Pelican Lake and along the Green River to increase breeding population.
Pied-billed Grebe	9, 16	· No net loss of existing seasonal or semi-permanent wetlands.
Eared Grebe (m)	9	· Maintain suitable water chemistry to support brine shrimp at Great Salt Lake. · As possible, maintain habitat conditions in GSL to allow it to continue to support >1 million grebes. · Work with water users to develop a strategy to maintain water chemistry favorable to high populations of brine shrimp and brine flies. · Monitor harvest of brine shrimp to and halt harvest when there appears to be an effect on forage base.
Western/Clark's Grebe (b)	9	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 350 pairs of Western Grebes and 150 pairs of Clark's Grebes. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004).
Western Grebe (b)	16	· Maintain suitable emergent nesting habitat at Ouray NWR to support at least 15 pairs. Maintain stable water levels through the nesting period (late September, Ivey 2004).
Snowy Egret (b)	9	· Maintain suitable emergent wetland breeding habitats to support at least 970 nests in the Great Salt Lake wetlands and Fish Springs NWR.
Snowy Egret (b)	16	· Maintain suitable emergent wetland breeding habitats at Ouray NWR to support at least 20 nests.
Great Blue Heron	9	· Maintain suitable breeding habitats to support at least 235 nests.
Black-crowned Night-Heron (b)	9	· Maintain suitable breeding habitats in Great Salt Lake wetlands and at Fish Springs NWR to support at least 225 nests.
Black-crowned Night-Heron (b)	16	· Maintain suitable breeding habitats at Ouray NWR to support at least 10 nests.
Least Bittern (b)	9, 16	· No net loss of existing seasonal or semi-permanent wetland habitats.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
American Bittern (b)	9, 16	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986).
White-faced Ibis (b)	9	· Maintain suitable emergent wetland breeding habitats in the Great Salt Lake basin and other nesting sites to support at least 10,000 nests (Ivey et al. *in prep* b). · Maintain suitable habitat to support breeding colonies at Ouray NWR.
American White Pelican (b)	9	· Maintain suitable nesting sites at Gunnison and Bird Islands to support at least 5,060 nests (Parrish et al. 2002). · Continue to manage Gunnison and Bird (Hat) Islands for breeding colonial birds with emphasis on American White Pelicans and California Gulls. · Provide, through statutory and wildlife rule regulation, breeding season protection from human disturbance to these and other breeding sites as they occur. · Provide management and protection of breeding colonies from human and terrestrial predation to allow for a > 0.69 nesting survival rate per nest (Parrish et al. 2002).
American White Pelican (m)	9	· Maintain suitable foraging conditions in Great Salt Lake wetlands to support at least 55,000 staging pelicans. · Key foraging areas should be identified and managed for sustainable fisheries in balance with other Wetland management objectives especially within the Bear River, Ogden/Weber River and Jordan River systems.
WASHINGTON:		
Greater Sandhill Crane CVP (b)	9	· Maintain, restore and conserve at least 8,125 acres of suitable wet meadow/seasonal wetland breeding habitat at breeding sites in south-central Washington) to support at least 260 pairs (Littlefield and Ivey 2002.
Greater Sandhill Crane CVP (m)	9	· Maintain grain fields and roost sites at traditional staging areas (e.g., Turnbull NWR and Columbia NWR areas).
Lesser Sandhill Crane PFP (m)	9	· Maintain grain fields and roost sites at traditional staging areas to support at least 10,000 spring migrants at important use areas in Okanogan, Grant, Lincoln and Douglas counties (e.g., Columbia NWR area).
Virginia Rail, Sora (b)	9, 10	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	9	· Implement conservation measure to maintain existing breeding sites to support at least 7,000 pairs.
Forster's Tern (b)	9	· No net loss of existing nesting habitat at known breeding sites to support at least 200 pairs.
Black Tern (b)	9	· Maintain emergent wetland habitat at known breeding sites to support at least 150 pairs.
Black Tern (b)	10	· Maintain emergent wetland habitat at known breeding sites to support at least 125 pairs.
Pied-billed Grebe	9, 10	· No net loss of existing seasonal or semi-permanent wetlands.

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
Western/Clark's Grebe (b)	9	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 500 pairs of Western Grebes and 50 pairs of Clark's Grebes. Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (late September, Ivey 2004).
Great Blue Heron	9	· Maintain suitable breeding habitats at colony sites to support at least 600 nests.
Great Blue Heron	10	· Maintain suitable breeding habitats at colony sites to support at least 165 nests.
Black-crowned Night-Heron (b)	9	· Maintain suitable breeding habitats at colony sites to support at least 500 nests.
American Bittern (b)	9, 10	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac, Brown and Dinsmore 1986).
White-faced Ibis (b)	9	· Maintain suitable emergent wetland breeding habitats at Malheur NWR, Sycan Marsh and other nesting sites to support at least 9,050 nests (Ivey et al. *in prep* b).
American White Pelican (b)	9	· Maintain suitable nesting sites at existing colony sites to support at least 180 nests.
Common Loon (b)	9	· Maintain suitable habitat to support at least 5 nests. Monitor for nesting at potential lakes and reservoirs. Initiate conservation measures to protect nests from human disturbance.
Common Loon (b)	10	· Maintain suitable habitat to support at least 5 nests. Monitor for nesting at potential lakes and reservoirs. Initiate conservation measures to protect nests from human disturbance.
WYOMING:		
Greater Sandhill Crane RMP (b)	10	· Maintain, restore and conserve suitable wet meadow/seasonal wetland breeding habitat at breeding sites throughout the region.
Virginia Rail, Sora (b)	10	· No net loss of existing seasonal wetlands or wet meadow habitats.
California Gull (b)	10	· Implement conservation measure to maintain existing breeding sites to support at least 4,155 pairs. · Maintain suitable nesting habitat and conservation for at least 3 colony sites: Pathfinder Res., Bamforth Lake, and Yellowstone Lake.
Franklin's Gull (b)	10	· Maintain emergent nesting habitat at colony sites to support at least 25 nests (Cerovski et al. 2001).
Forster's Tern (b)	10	· No net loss of existing nesting habitat at known breeding sites to maintain at least 25 pairs (Cerovski et al. 2001).
Black Tern (b)	10	· Maintain emergent wetland habitat at known breeding sites to support at least 50 pairs. · Provide marshes or marsh complexes greater than 50 acres (20 ha, Cerovski et al. 2001).
Pied-billed Grebe	10	· No net loss of existing seasonal or semi-permanent wetlands.
Western /Clark's Grebe (b)	10	· Maintain suitable emergent nesting habitat at major breeding sites in the region to support at least 215 pairs of Western Grebes and 40 pairs of Clark's Grebes. · Minimize human disturbance and boat wakes near nesting colonies. Maintain stable water levels through the nesting period (Cerovski et al. 2001, Ivey 2004).

Table H-1. Continued.

Priority Species	BCR	Conservation Strategies
Snowy Egret (b)	10	· Maintain emergent nesting habitat at colony sites to support at least 15 nests.
Great Blue Heron (b)	10	· Maintain suitable riparian nesting areas to maintain at least 100 pairs.
Black-crowned Night-Heron (b)	10	· Maintain suitable emergent wetland breeding habitats at colony sites to support at least 200 nests.
American Bittern (b)	16	· No net loss of existing seasonal or semi-permanent wetland habitats. · Maintain freshwater wetlands >10 ha (2.5 ac) (Brown and Dinsmore 1986). · Maintain a complex of wetlands of sufficient size [50 to 450 acres (20 to 180 ha)] to provide habitats at various stages of succession (Cerovski et al. 2001).
White-faced Ibis (b)	10	· Maintain suitable emergent wetland breeding habitats at Bear River Marshes-Cokeville Meadows NWR to support at least 135 nests.
American White Pelican	10	· Maintain suitable habitat at colony sites to support at least 1,250 pairs. · Maintain a minimum disturbance-free buffer zone of 330 to 590 feet (100 to 180 m) at breeding colonies (Cerovski et al. 2001). · See Cerovski et al. 2001 for additional management considerations.
Common Loon (b)	10	· Maintain suitable nesting habitat at major breeding sites in the region to support at least 25 pairs. Minimize human disturbance on nesting lakes. · Protect known territories: 15 in Yellowstone NP and 5 outside on 7 lakes. · Consider use of artificial platforms (Cerovski et al. 2001).

APPENDIX I. List of Potential Sources of Funding for Habitat Initiatives Which Could be Applicable to the Intermountain West Waterbird Conservation Plan.

North American Wetlands Conservation Act (NAWCA) grants. These Federal grants provide funding for wetland restoration and enhancement on both public and private lands. Past NAWCA grants have provided considerable funding for wetland projects within the IWJV. Generally, NAWCA funds are used to cost-share on wetland projects and the landowners will agree to maintain the project for a minimum time (10-25 years). Landowner contributions may be met through cash expenditures or in-kind services. There is also a program for small grants (up to $50,000). Ducks Unlimited, Inc. (DU) often serves as facilitator for NAWCA grant proposals.

Intermountain West Joint Venture (Joint Venture). The IWJV provides matching funds for proposals that initiate or complete funding of projects that support the mission and objectives of the Joint Venture and have developed broad-based partnerships. In 1999, the Joint Venture mission was expanded to include conservation actions for all bird habitats within the Joint Venture boundary. Thus, the purpose is to assist partners to implement the major bird conservation initiatives, including the North American Waterfowl Management Plan, National Shorebird Conservation Plan, Partners In Flight, and the North American Waterbird Conservation Plan. This is a small grant program, and the maximum grant amount for which partners may apply is $50,000. Although a direct match is not required, grant funds must be leveraged with partner funds at least on a 1:1 basis to be considered. Partner funding may come from Federal, State, or private sources. Key elements that are evaluated, in order of their importance, are: avian habitat benefits; partnership significance; special considerations, including risk, urgency, and listed species; and ranking by the State Steering Committee.

Wetland Reserve Program (WRP). The Natural Resource Conservation Service (NRCS) administers this program, which provides landowners financial incentives to retire farmland and restore it to wetlands. To be eligible for the WRP, the property must have hydric (wetland) soils and an agricultural history. WRP offers landowners three options: permanent easements, 30-year easements, and 10-year restoration agreements. Permanent easements purchase development rights in perpetuity and the payment will be the lesser of the three: 1) the agricultural value of the land, 2) an established payment cap ($2,000/acre), or 3) an amount offered by the landowner. In addition to the permanent easement payment, the NRCS pays 100% of the cost of restoring easement lands back to wetlands. The 30-year easement buys the property development rights for 30 years and pays 75% of the permanent easements value and 75% of the restoration costs. The 10-year restoration agreement does not put an easement on the property; instead it pays 75% of the cost of restoration and requires that the restored wetland be maintained for a minimum of 10 years. Undeveloped recreation activities, such as hunting and fishing, are allowed and other uses such as livestock grazing can be negotiated. For further information contact your county NRCS/U.S. Department of Agriculture office.

Conservation Reserve Program (CRP). This program is available in some areas. NRCS will pay landowners on a per acre/per year basis for entering a 10-year agreement to follow a management plan that enhances wetland habitat on their property. The NRCS verifies compliance with the agreement each summer and makes payments accordingly.

U.S. Fish and Wildlife Service's (USFWS) Partners for Fish and Wildlife Program. This program provides participating landowners 50% of the implementation costs for wetland restoration and enhancement projects. Interested landowners are encouraged to contact USFWS staff who will work closely with landowners to develop a Habitat Restoration Proposal which is submitted for funding. Once a project is selected for funding, the landowner and USFWS enter into an agreement in which USFWS agrees to reimburse the cooperating landowner for 50% of the project cost, and the landowner agrees to maintain the project for a minimum of 10 years. The landowners' contribution towards the project may be met through cash expenditures and/or in-kind services. USFWS contributions are generally limited to $25,000 per project per year.

Wildlife Habitat Incentive Program (WHIP). NRCS will provide landowners up to 75% of the costs for habitat restoration and enhancement projects. Participants agree to implement a wildlife habitat development plan, and NRCS agrees to provide cost-share assistance for the initial implementation of wildlife habitat development practices. NRCS and program participants enter into a cost-share agreement for wildlife habitat development. This agreement generally lasts a minimum of 10 years from the date that the contract is signed. Similar to the Partners for Fish and Wildlife Program, applications and project proposals are submitted annually for funding. When funded, an agreement is entered in which the NRCS reimburses the landowner for 75% of the project costs and the landowner agrees to maintain the project for a minimum of 10 years. NRCS contributions are limited to $10,000 per project per year.

Environmental Quality Incentives Program (EQIP). This NRCS program provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement. The program is funded through the Commodity Credit Corporation. The purposes of the program are achieved through the implementation of a conservation plan that includes structural, vegetative, and land management practices on eligible land. Five- to 10-year contracts are made with eligible producers. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree planting, and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management, and grazing land management. Fifty percent of the funding available for the program will be targeted at natural resource concerns relating to livestock production. The program is carried out primarily in priority areas that may be watersheds, regions, or multi-state areas, and for significant statewide natural resource concerns that are outside of geographic priority areas.

National Fish and Wildlife Foundation's (Foundation) Challenge Grant Program. The Foundation has five initiatives through which challenge grants are awarded. These include Neotropical Migratory Bird Conservation, Wetlands and Private Lands, and Wildlife and Habitat Management. Grants generally fall into one or more areas, including species conservation and applied conservation, and habitat protection and restoration. A non-federal to federal match of 2:1 is required for all grants.

U.S. Environmental Protection Agency's Wetland Grants. This program assists the public, local governments, states, and tribes to develop the ability to conserve, manage, and restore wetlands. Projects funded under this program generally support the initial development of a wetlands conservation, restoration, or management program or support enhancement of an existing program. The required minimum local, state, or tribal match is 25 percent of the total project costs.

Inland Wetland Conservation Program (IWCP). The California State Wildlife Conservation Board (WCB) implements this program which will cost-share with California's private landowners on wetland restoration and enhancement projects. Landowners interested in pursuing cost-share projects with the IWCP must first contact WCB staff and or a local sponsor (such as DU, California Waterfowl Association, local resource conservation districts, or city or county agencies). Working cooperatively, the landowner, WCB staff, and the local sponsor design and submit a project proposal for funding (submitted quarterly). When funded, the WCB's payment for the project is passed on to the landowner through the local sponsor. The landowner's contribution towards the project may be met through cash expenditures and or in-kind service.

Missouri/Madison Watershed Restoration Fund. PPL Corporation has provided $10 million seed money for Montana wildlife projects, management plans for riparian restoration, and conservation easements; several Montana IBAs are involved. The project has received matching funding through the NRCS-Conservation Reserve Enhancement Program.

Arizona Heritage Fund Program. Funding is available for management and protection, including land acquisition and conservation easements for

species of concern and/or federally listed species. Arizona Game and Fish Department administers an annual granting program for governmental entities, including educational institutions, to fund proposed research and management projects.

National Natural Landmark Program. The National Natural Landmarks Program recognizes and encourages the conservation of outstanding examples of our country's natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. National Natural Landmarks are designated by the Secretary of the Interior with the owner's concurrence. To date, fewer than 600 sites have been designated. The National Park Service administers the program and, if requested, assists owners and managers with the conservation of these important sites.

Waterways for Wildlife. This voluntary cooperative program promotes corporate and private sector leadership in the development of comprehensive regional ecosystem management programs aimed at wildlife habitat enhancement. Through coordinated land management goals, Waterways for Wildlife expands habitat acreage by linking private and public lands into integrated corridors used by wildlife for migration and to sustain and expand populations. These projects engage participants by increasing and diversifying participation by private landowners; expanding project awareness along major water channels; developing environmental and habitat awareness within the communities; and forming partnerships between private landowners with local, State and Federal as well as provincial agencies.

Wyoming Wildlife Heritage Foundation. This is an independent charitable organization whose purpose is to provide financial support, through philanthropy, to critical wildlife conservation efforts in Wyoming, with goals to further species conservation, habitat protection and enhancement, and public conservation education.

Research grants:

Webless Migratory Game Bird Research Grants. Grants are available from USFWS's Webless Migratory Gamebird Research Program for certain waterbird species (rails, coots, moorhens, cranes).

APPENDIX J. Monitoring Committee and a Summary of Past and Ongoing Monitoring Projects in the Intermountain West Region.

Monitoring Committee

Jon Bart (USGS), Dan Casey (BCR 10 Coordinator-American Bird Conservancy), Gary Ivey, Rich Levad (Rocky Mountain Bird Observatory), Jeff Mackay (Ruby Lake NWR), Sue Thomas (USFWS—Region 1), and Don Paul (BCR 9 Coordinator—Intermountain West Joint Venture) volunteered to serve on this committee.

Past and ongoing monitoring projects

Regional. Coordinated eared grebe surveys are being conducted at Great Salt Lake in Utah and Mono Lake in California to document numbers of fall-staging eared grebes. Mono Lake grebe staging has been monitored by Dr. Joseph Jehl for over 20 years, and the data collected are incomparable as they reflect the status of the entire North American population and are an indicator of water conditions over a broad region. The Mono Lake data have been supplemented with a similar data set from the Great Salt Lake over the same 20 year period by the Utah Div. of Wildlife Resources. This program should continue on an annual basis.

Arizona. Winter waterfowl aerial surveys record sightings of waterbirds. Arizona breeding bird range surveys have recently been completed and the Arizona breeding bird atlas is in preparation. Audubon Christmas bird counts are another organized data collection activity for bird populations. There are no significant breeding waterbird populations in the Arizona portion of BCR 16. Most migration/wintering populations are in southern Arizona in BCRs 33 and 34.

California. Annual counts of some colonial nesting waterbirds have been conducted at Klamath Basin NWRs. State Wildlife Areas (Honey Lake, Butte Valley, and Shasta Valley) keep some records of nesting colonies. Modoc NWR has a long history of monitoring breeding Sandhill Cranes on the refuge. Inland-nesting waterbirds (gulls, terns, pelicans, cormorants) in northeast California were inventoried in 1997 (Shuford 1998); pelicans and cormorants were resurveyed in 1999 (PRBO unpubl. data); gulls were surveyed annually 1994-1997 (Shuford and Ryan 2000). Black Terns were surveyed in 1997 (Shuford et al. 2001). Breeding Sandhill Crane pairs were mapped in 1981, 1986, and 2000 (Littlefield 1989, Littlefield et al. 1994, Ivey and Herziger 2001). J. Dow Sr. Wetland has been monitored annually by University of Nevada, Reno. Lassen National Forest staff has monitored cranes and other waterbirds annually at key sites on the forest (T. Rickman pers. comm.). Monitoring on other National Forests in northeastern California has been sporadic (T. Ratcliff pers. comm.). Eared Grebes and California Gulls have been monitored annually at Mono Lake by Dr. Joseph Jehl (retired). Since 1983, the nesting population of California Gulls at the lake has been monitored annually (Shuford and Ryan 2000). PRBO has been monitoring the Negit Islets (and Negit Island, when occupied), which hold the vast majority of the gulls in any year, and until the last few years Dr. Joseph Jehl monitored the much smaller population on the Paoha Islets. PRBO now monitors all breeding islands.

Colorado. Rocky Mountain Bird Observatory has initiated a monitoring program for colonial species called Project Colony Watch (currently three years of data, R. Levad pers. comm.).

Idaho. Idaho is currently developing a plan (Idaho Bird Inventory and Survey) to monitor all birds in the state, including waterbirds (R. Sallabanks pers. comm.). Bear Lake, Camas, Grays Lake, and Minidoka NWRs, and Oxford Slough WPA staff have done some monitoring of colonial nesting waterbirds, but nest estimates have been imprecise because of concerns about disturbance to birds (S. Bouffard pers. comm.). A comprehensive survey of colonial waterbirds in southern Idaho was conducted in 1993 (Trost and Gerstell 1994). An aerial survey technique is planned to try and enumerate some of the colonial nesters at Blackfoot Reservoir and Grays Lake NWR in 2003 (C. Mitchell pers. comm.). Some Great Blue Heron colonies have been tracked in the panhandle (R. Sallabanks pers. comm.). Staging RMP Sandhill Cranes are counted in southeast Idaho each fall (Sharp et al. 2002). Staging Sandhill Cranes are also monitored in the Teton Basin by the Teton Regional Land Trust. In Spring/Summer 2004, IDFG surveyed California Gull/Ring-billed Gull

colonies (direct nest counts) at Magic and Mormon Reservoirs, and will expand colonial waterbird surveys in Spring/Summer 2005. Also in 2004, IDFG began secretive marshbird surveys, using Conway (2004) survey protocols (with playback), at Camas Prairie Centennial Marsh and Silver Creek Preserve, and will expand this effort in 2005. Finally, IDFG has begun breeding season general waterbird surveys at five different wetland locations (one location is surveyed monthly year-round) and likely will expand this effort to more than 20 wetland sites in 2005.

Nevada. Nevada Division of Wildlife and USFWS have cooperatively monitored waterbird numbers in northwestern Nevada since 1986 (L. Neel pers. comm.). Stillwater NWR has long-term data on nesting pelicans at Anaho Island in Pyramid Lake (S. Bell pers. comm.). Ruby Lake NWR colonies have been tracked since the late 1970s, and Sandhill Cranes and rails have also been monitored there (J. Mackay pers. comm.).

Oregon. There is a long-term data set on colonial waterbirds and Sandhill Cranes from Malheur NWR, and colonial waterbirds and cranes are monitored annually at Klamath Basin NWRs. Yellow rails have been monitored in the Klamath Basin in recent years (Stern and Popper 2003, Popper 2004), and a comprehensive waterbird survey was initiated in the Klamath Basin in 2003 by Point Reyes Bird Observatory (Shuford et al. 2004). Klamath Basin Bird Observatory conducts annual Black Tern surveys in the Upper Klamath Basin (Alexander et al. 2004). Waterbird colonies have also been tracked at Summer Lake WA and there is periodic data for colonies at other sites. Breeding Sandhill crane pairs were mapped in 1999 and 2000 (Ivey and Herziger 2000).

New Mexico. Monitoring has been scant in the state, but good data exists on Double-crested Cormorants, and for some sites on the Jicarilla Apache and Zuni Reservations. There is at least a 10-year data set for waterbirds from Stinking Lake (Stahlecker 1996, 1997). Wildlife Services monitors urban colonies.

Montana. Nesting Common Loons are annually monitored for occupancy and productivity. Colonial species have been monitored well at some sites, but not at all. Pelicans at some sites covered well (e.g., Canyon Ferry Reservoir). Refuges and WMA monitoring efforts have been sporadic. Good data exists for some species, but not others, with grebe data being poorest. A one-time state-wide Black Tern survey was conducted. Heritage Program information is incomplete, but most sites are in their database. They track loons and several colonial species. Red Rock Lakes NWR has monitored nesting Great Blue Herons in the past (C. Mitchell pers. comm.). The Montana Bird Conservation Partnership is developing the "Montana Integrated Avian Monitoring Plan." The plan prescribes stratified surveys, which include colonial waterbirds and some focus sites and a pilot program was initiated in 2002 (D. Casey pers. comm.).

Utah. Bear River MBR has long-term data on colonial species. At Great Salt Lake, California Gulls were monitored intermittently from the 1940s-1990s, nesting pelicans have been tracked for about 20 years, and emergent nesting colonials (ibises, Franklin's Gulls, grebes, etc.) have been counted the past five years. A five-year intensive waterbird survey (waterbirds, shorebirds, waterfowl) was conducted from 1997-2001 at Great Salt Lake. A final report should be available in 2003. Also, some heron tree rookeries have been monitored outside the Great Salt Lake Basin (D. Paul pers. comm.).

Washington. Monitoring efforts have been sporadic for most species. Common Loons are monitored annually. Heron colonies have been more closely monitored in recent years (R. Friesz pers. comm.). Sandhill Cranes are monitored annually at Conboy Lake NWR (Engler and Brady 2000), and Conboy Lake and Columbia NWRs have some data on other waterbird species. The state's Wildlife Diversity Program maintains a database on several waterbird species (R. Friesz pers. comm.).

Wyoming. The 13 most important colonial nesting sites have been carefully monitored from canoes to minimize disturbance to colonies. Pelican nest surveys have been conducted from the air. Nesting Common Loons are currently surveyed three times per year to determine productivity. In Yellowstone NP, Common Loons are monitored aerially and nesting pelicans, California Gulls and Caspian Terns on the Molly Islands are counted by motorboat. In 1990, Wyoming Game and Fish inventoried habitats and waterbird use in each District (A. Cerovski pers. comm.).

APPENDIX K. Research Committee Makeup, a Preliminary List of Waterbird Research Needs in the Intermountain West, and a Summary of Current and Recent Waterbird Research Conducted in the Region.

Research Committee

At our 2002 meeting we decided a research committee should be formed to develop and prioritize research needs. The following individuals either volunteered or were recommended: Bruce Dugger (Oregon State University), Charles Henny (BRD), Gary Ivey (private consultant), Joseph Jehl (private consultant), Dave Mauser (USFWS), Lew Oring (University of Nevada, Reno), and Mike Yates (Boise State University). This committee could serve to help prioritize research proposals under consideration by various funding sources.

Research needs

Identification and prioritization of research needs is an important element of waterbird conservation. The following is a brief, unprioritized summary of research needs developed for the Intermountain West:

General:

- Develop an understanding of factors affecting adult survival and productivity.
- Increase our understanding of the influence of environmental conditions, particularly water conditions, on dispersal and population shifts of waterbirds.
- Determine the impacts of diseases such as avian botulism, avian cholera, and West Nile virus on waterbird populations.
- Effects of exotic fish on waterbirds.
- Control exotic vegetation (e.g., salt cedar, Russian olive, common reed).
- Effects of recreation on waterbirds.
- Grassland, wetland restoration research.
- Relationships between agricultural practices and waterbirds:
  – Quantify the impact of agricultural practices (e.g. grazing, irrigation, dewatering, mowing, etc.) on waterbird breeding success.
- Study wetland dynamics of salt lakes to understand what conditions are needed to maintain brine flies and brine shrimp.
- Study the biology of brine flies and relationships to waterbirds (primarily gulls).
- Examine bird movements through different wetland-cycle extremes.
- Relationships of waterbirds to native and exotic fish population dynamics.
- Effects of predation on waterbird populations.
- Develop documentation of historical status of wetland and riparian habitats.
- Study fire effects on waterbirds.
- Study conflicts between different suites of wildlife (e.g., management for curlews might be negative for some waterbird species).
- Study effects of water level elevations (floods and droughts) on waterbirds.
- Study the importance of alternate breeding habitats on a landscape scale to understand landscape-level wetland connectivity.
- Evaluate, assess, and review existing data sets.

Contaminants:

- Monitor the effects of contaminants and maintain long-term data. Changes in habitat due to water quality should be avoided and reversed (Kushlan et al. 2002).
- Research on use of lead sinkers and the effects on waterbird mortality (Kushlan et al. 2002).
- Effects of elevated mercury levels in Walker Lake and Lahontan Valley, Nevada.
- Explore relationships between contaminants and diseases.
  – Study gull die-offs (Market Lake, Idaho) to understand disease dynamics.
- Effects of water quality and contaminants on nesting grebes at Eagle Lake, California

Species-specific. Most of these came from discussions at our 2002 meeting, but were also gleaned some from other sources (Flyway plans, PIF plans, etc.).

American Bittern

- Study basic breeding biology, including: diet, home range, habitat requirements, mating systems, mortality rates, and dispersal (Latta et al. 1999).
- Identify migration routes, stopover sites, and wintering areas.
- Monitor contaminant levels in birds and their eggs throughout their range (Gibbs et al. 1992a).

American White Pelican
- Mercury contamination study.
- Foraging ecology in relation to endangered cui-ui populations.
- Food habits study at Blackfoot Reservoir, to assess impact of pelicans on endangered Yellowstone Cutthroat Trout (IDFG-Fisheries).
- Satellite telemetry study to relate the population dynamics of Anaho Island breeding cohort to potential threats associated with their local and seasonal movements.

Black tern
- Determine population dynamics; identify limiting factors.

California Gull
- Determine the relationship of nesting success in local populations of California Gulls to regional population dynamics.

Common Loon
- Document contaminant levels and sources of contaminants.
- Explore philopatry and interchange between regional populations.
- Define subpopulation relationships through genetic studies.

Double-crested Cormorant
- Food habits study.

Eared Grebe
- Study how birds respond to particular water regimes, such as drought and meromixis. Use staging surveys from Mono and Great Salt Lake as an index to population fluctuations in all NA grebe species.

Sandhill Crane
- Assess the quality of resources needed by RMP cranes in the San Luis Valley, Colorado (Central Flyway Webless Migratory Game Bird Technical Committee 2001).
- Develop and test techniques that will reduce or eliminate crop damage by Rocky Mountain Sandhill Cranes (Pacific and Central Flyway Councils 2001).
- Develop more accurate estimates of various populations of Pacific Flyway cranes (Flyway plans).
- Assess the relative importance of different habitats (palustrine marsh, riparian meadows, etc.) to breeding Sandhill Cranes under different moisture regimes.
- Assess the impacts of predation upon nesting cranes and recruitment of young birds into the CVP (Pacific Flyway Council 1997).
- Assess subadult survival and distribution by radio-marking a sample of greater sandhill cranes (Pacific Flyway Council 1997).
- Develop more accurate population estimates for the various populations of sandhill cranes in the Pacific Flyway (Pacific Flyway Council 1983, 1997).
- Assess the impact of mortality factors, such as powerlines, predation, and disease on sandhill crane populations.

White-faced Ibis (from Ivey et al. *in prep* b)
- Quantify parameters that will facilitate improved design of monitoring protocols and increase the precision of population estimates.
  - Estimate detection rates by calibrating aerial counts of adults with nest counts from intensive ground studies.
  - Quantify the mean and variation in proportion of time that zero, one, and two parents are at the nest during each stage of nesting. Identify factors that cause variation in number of parents present (e.g., weather, time of day). Knowledge of daily colony attendance patterns is an important factor in estimating breeding pair numbers from surveys, as the number of adults in a colony varies with the time of day, the stage of nesting and other environmental factors.
  - Identify roosting areas of non-breeders and their movements in relation to that of off-duty parents.
- Identify patterns in reproductive success and other factors that affect success.
  - Identify conditions that facilitate nesting at new sites (or infrequently used sites) and quantify the success of such nesting attempts.
  - Compare success of various colonies within and among years. Investigate the possibility that some colonies are consistently more productive than others, or that the location of the most productive colonies varies among years depending on local and regional wetland conditions.
  - Quantify demographic parameters such as age at first breeding, juvenile survival, adult survival, and average proportion of adults that attempt to breed in a given year. Consider using large-scale color-marking and radio telemetry studies at a regional scale to

determine these parameters.

- Quantify the rate and identify the causes of within- and between-year movements among colonies to help identify the appropriate scale at which to maintain a mosaic of available wetlands.
  - Identify the type and extent of events that cause a colony to be abandoned between years. Estimate average colony longevity, and relate longevity to colony size, wetland size, depth, persistence, and other relevant factors.
  - Identify the probability that an individual breeder will change colonies between years, and determine if shifting is related to nesting success in the previous year.
  - Determine degree of interchange between Great Basin colonies, those in peripheral states (Colorado, Montana, the Dakotas, and eastern Wyoming) and Canada, and southern colonies (Texas, Louisiana, Mexico, and South America).
- Identify important wintering sites for White-faced Ibises from various Great Basin colonies.
  - Use color-marking or radio telemetry to determine migration and wintering sites for individual birds from various colonies and quantify wintering site fidelity.
  - Investigate whether spatial (e.g., a given colony) or temporal (e.g., late-breeders) segments of the breeding population tend to winter in a given area.
- Investigate contaminant loads of ibises on wintering grounds and at major breeding colonies.
  - Quantify contaminant loads in breeding colonies, and attempt to understand the origin of contamination (breeding, wintering or migratory) and the uptake pathway.
  - Continue to investigate the effects of contaminants on hatchability, nestling growth, and survivorship.
  - Investigate wintering site fidelity of segments of the breeding population with known contaminant loads by marking birds at breeding colonies with satellite or traditional telemetry.
  - Investigate the availability of environmental DDT at known ibis wintering sites.
  - Complete determination of source(s) of DDE loading in Caron Lake, NV cohort.

Table K-1 is a partial list of recent and current waterbird research projects in the Intermountain West.

Table K-1. A summary of current and recent waterbird research in the Intermountain West Region.

Species-specific research:		
Yellow Rail	1995-2000 study in Klamath County, Oregon	Lundsten and Popper 2001
Black Tern	Studied at Sycan Marsh, Oregon Eagle Lake, California	Stern 1987, Stern and Jarvis 1991 Gould 1974, Shuford et al. 2001
Eared Grebe	Research on the effects of brine shrimp harvest on Eared Grebes is being conducted at Great Salt Lake in Utah for 5 years. A fall diet study and an energetics study of Eared Grebes have been completed on Great Salt Lake. Eared Grebes studied extensively at Mono Lake and through most of the range. Mortality of migrants landing on trona ponds in Wyoming	D. Paul pers. comm. D. Paul pers. comm. J. Jehl, Jr. pers. comm. Bjorling 2004, Sladky et al. 2004
Western/Clark's Grebe	Breeding biology, nesting ecology at Eagle Lake Comparison of breeding behavior of Western and Clark's Grebes Mercury levels, productivity at Eagle Lake and Tule Lake, California Annual productivity at Eagle Lake, California Conservation strategy for northern California	Gould 1974, Shaw 1998, Sardella 2002 Ratti 1977 Elbert and Anderson 1998 D. Anderson pers. comm. Ivey 2004
White-faced Ibis	Breeding ecology in the Carson Sink, Nevada Telemetry study in Lahontan Valley, Nevada to identify wintering areas as possible sources of DDE contamination which has affected their productivity.	Kelchlin 2000 Raptor Research Center 2004a
American White Pelican	Satellite telemetry study of Nevada birds provided insights into soaring bird flight patterns (as a threat to aircraft) and migration, producing a model using weather forecasts to predict flight altitudes of pelicans. Food habits study conducted in Wyoming. A Ph.D. study of white pelicans in the Klamath Basin was conducted in the early 1990's. A study of the effects of pelican predation on populations of endangered cui-ui.	Yates 1999, Shannon et al. 2002a,b Findholt and Anderson 1995 D. Anderson pers. comm. D. Withers pers. comm.
Common Loon	Telemetry study on loons staging at Walker Lake, Nevada in to identify wintering areas and determine the effects of mercury contamination. Blood samples are being collected from Common Loons in Montana to monitor heavy metals as part of a nationwide assessment	Raptor Research Center 2004b Casey 2000
Idaho	Mercury contamination in waterbirds on the Little Pend Oreille River in northern Idaho. Lake Lowell contaminants	R. Sallabanks pers. comm.
Nevada	Effects of mercury on aquatic birds nesting along the Carson River.	Henny et al. 2002, Hoffman et al. *in prep*

Table K-1. Continued.

General or multiple species research by state:		
Utah	A red fox food habits study and a predator exclusion study are underway at Bear River MBR	D. Paul pers. comm.
Washington	BOR has ongoing water quality research in Washington.	R. Friesz pers. comm.
	The Soap Lake Conservancy is studying Soap Lake's water chemistry in Washington	R. Friesz pers. comm.
Wyoming	A long term study of gulls was conducted at Bamforth Lake.	A. Cerovski pers. comm.
	Contaminants levels are being monitored at Soda Lake (owned by BP) near Casper.	

APPENDIX L. A Summary of Outreach Recommendations for Waterbirds in the Intermountain West Region from Various Sources.

Arizona

American Bittern (Latta et al. 1999)

- Coordinate with refuge managers, Bureau of Reclamation biologists, and land managers, etc. to better manage for American Bittern.
- Work with wastewater plant managers to plan for American Bittern management (create ponds and habitat adjacent to flood plain).

California

Western Grebes and Clark's Grebes (Ivey 2004)

- Mortality from boat strikes and fishing line entanglements could be reduced by providing an interpretive sign or poster at boat ramps to educate the general public, boaters, and fishermen about grebe conservation, and encourage them to steer clear of grebes and clean up discarded fishing lines.
- To further a conservation ethic for nesting grebes, an interpretive program should be developed for use at agency facilities, campfire talks, and meetings of recreation groups and other interests.

Montana

Black Tern (Casey 2000)

- Provide managers with information on the specific habitat needs of Black Terns.
- Protect tern colonies by implementing a public education and signing program, similar to the program for Common Loon nesting areas.

Common Loon (Casey 2000)

- Minimize development and recreational activities on known nesting lakes, at least during critical portions of the breeding cycle, is perhaps the best means of managing loon habitat in northwestern Montana.
- Posting of nesting or nursery areas on those lakes most susceptible to disturbance has been shown to be effective.
- Floating signs have been built by MFWP and conservation groups for use on high conflict lakes.
- Floating signs and posters at boating access sites have been most effective when used in combination.
- Personal contact with the recreating public improves compliance with signs and builds local support for loon conservation. It should occur before, during and after the deployment of floating signs or posters. The best option is personal contact at boat ramps, by non-agency volunteers.
- The USFS Management Plan for the species outlines both appropriate management activities and a public information strategy, including use of the media and slide-show presentations to the public at large as well as landowners at nesting lakes.

Nevada

Sandhill Crane (Nevada PIF 1999)

- Encourage landowners, through incentives and conservation easements if necessary, to keep meadows wet through July; closely control, limit, or restrict livestock grazing on nesting areas through the nesting period; and postpone mowing until August.
- Through incentives or conservation easements, encourage conservation plantings of grain crops for staging and breeding Sandhill Cranes on private lands, state wildlife management areas, and National Wildlife Refuges.
- Organize affected landowners into a task force to investigate cooperative strategies to maximize Sandhill Crane production—i.e., nest protection from predation, livestock grazing deferrals during the nesting season, irrigation strategies, etc.
- Increase the economic value of Sandhill Cranes to rural communities and businesses by encouraging more nonconsumptive interest in Sandhill Crane staging and summering sites.
- Through a variety of media, including television, newspapers, and magazines, promote staging areas such as White River Valley as "adventure destinations" that combine Sandhill Crane viewing with other birding opportunities as well as other local sightseeing and historical study opportunities. Promote weekend trips that patronize local restaurants and motels.

Black Tern (Nevada PIF 1999)

- Purchase of water rights from willing sellers for the Lahontan Valley wetlands to increase land managers' ability to provide the freshwater marshes necessary to facilitate Black Tern nesting.

American White Pelican (Nevada PIF 1999)

- Continue to consult with Fallon Naval Air Station regarding low altitude jet training routes. Keep training routes out of heavy pelican commuter lanes.
- Work with salt industries to eliminate, reduce, or mitigate impacts to the Gunnison Island colony in the north arm and foraging sites in Bear River Bay.
- Work with the Division of State Lands to protect American White Pelican habitats within state land holdings.
- Work with wetland managers within the greater Great Salt Lake ecosystem to manage for pelican habitat as part of their comprehensive management plans.

Utah

American White Pelican (Parrish et al. 2002)

- Educate public to the importance of rough fish fisheries to pelicans and other piscivorous birds.
- Tell the story of Gunnison Island and its value to colonial nesting birds at the Great Salt Lake, Utah, and for the continent.
- Educate the public at large, lake industries, agencies, and NGO's as to the value of the Great Salt Lake ecosystem for western colonial waterbirds.

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