

APPENDIX 4: WATERBIRD SPECIES ACCOUNTS

COMMON LOON, COLIMBO COMÚN (*Gavia immer*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	na
Threats to non-breeding:	3
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America: Worldwide population 500,000–700,000 (most in Canada). Following declines in the early to mid-twentieth century, numbers have been relatively stable in recent decades, as indicated by a non-significant BBS trend (1966–2009) of 0.8%/yr.

Abundance and population trend in BCR 32: Does not breed in BCR, and data on size or trends of its wintering or migrant populations are lacking.

Percent of continental population (wintering) in BCR 32: Unknown, but estimated $\leq 20\%$.

Global Distribution

Breeds mostly in North America, where occurs throughout most of Alaska and Canada (except extreme northern regions, part of southern Canadian Prairies) and in parts of the extreme northern United States (n. Washington, nw. Montana, nw. Wyoming; n. Great Lakes region; and n. New England). Winters mainly on the Pacific Coast from s. Alaska south to Baja California, the Gulf of California, and the west coast of Mexico to at least Colima; the Atlantic Coast from the Maritime Provinces south to Florida; and along the Gulf Coast of the United States south to n. Vera Cruz, Mexico. Smaller numbers winter inland on large water bodies, at least as far north as Great Lakes, but by mid-winter most in northern areas (or at higher elevations) are forced south by the freezing of lakes.

Occurrence in BCR 32

Occurs locally throughout the region in migration (mainly Apr–May, Oct–Nov) and winter with many fewer non-breeders remaining through summer.

Habitat Requirements

Most numerous on coastal estuaries, lagoons, and larger bays with fewer inland, mainly on larger lakes and reservoirs. Whether Common Loons exhibit between-year site fidelity is unknown. The main requirements are abundant prey and clear water. The diet is dominated by fish—mainly tapered, soft-scaled species, particular those most readily available and susceptible to capture—but also includes amphibians, crustaceans (crabs, crayfish), mollusks, annelids, aquatic insects and, occasionally, vegetable matter.

Issues in BCR 32

- Concern exists for potential overharvest of fish (e.g., herring) that are important prey of loons.
- Increasing human disturbance on estuaries and reservoirs potentially may reduce the fitness of loons by limiting their foraging time.
- Contaminants may pose problems for loons, particularly if re-suspended by dredging or scouring of estuarine sediments by flood events.
- Poor management of upland habitats may lead to erosion and high turbidity when runoff enters bays and reservoirs thereby hindering the foraging efficiency of loons.
- Oil spills in coastal estuaries and bays potentially may cause extensive mortality of loons.

Existing Actions

- A continental status assessment and conservation plan is available (http://alaska.fws.gov/mbasp/mbm/loons/pdf/Common_Loon_Status_Assessment.pdf).

Research and Monitoring Needs

- Study the potential impacts of contaminants (pesticides, mercury, lead) concentrated in loons via their fish prey.
- Study the impacts of human disturbance on foraging loons and potential ways to regulate human uses that substantially interfere with loons' ability to forage.

Needed Management Actions

- Regulate the use of various types of watercraft or other forms of human disturbance in important foraging areas for loons.
- Regulate fish harvest in coastal estuaries and large inland water bodies to maintain sustainable prey resources for loons.
- Limit erosion near shorelines and drainages into water bodies to maintain clear water suitable for loon foraging.
- Maintain readiness, training, and equipment to contain any oil spills in coastal estuaries and bays.

Primary regional contact(s): John Kelly, Audubon Canyon Ranch; Dave Shuford, PRBO Conservation Science.

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Account author: W. David Shuford

EARED GREBE, ZAMBULLIDOR OREJUDO (*Podiceps nigricollis*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	2
Threats to non-breeding:	4
Percent of population in BCR:	1

BCR 32 conservation priority: Moderate concern.

Abundance and population trend in North America: Population estimated from aerial photography at staging areas (fall 1997) at 3.56 million. North American population has shown marked declines followed by rapid rebounds, but data from key fall staging area at Mono Lake suggests a declining trend. Non-significant increasing BBS trend of 4.8%/yr (1966–2009; data with an important deficiency).

Abundance and population trend in BCR 32: Winter-spring surveys on the San Francisco Bay in 2006 averaged ~10,000 Eared Grebes (USGS and SFBBO, unpubl. data); counts from 2000-1 on a subset of salt ponds counted up to 27,000 indicating a possible recent decline.

Percent of continental population in BCR 32: Of the roughly 20,000 counted on the 2006 CBC, about 55% (~11,500) were counted within BCR 32.

Global Distribution

Eared Grebes breed locally from British Columbia to sw. Manitoba, south to c. Mexico, and west to ne. California. Their wintering range is more restricted, with tens of thousands around islands in n. and c. Gulf of California, Baja California Sur, and the Salton Sea. Smaller groupings occur in coastal bays and inland lakes from sw. British Columbia south to El Salvador, to c. Texas and inland Mexico. In Oct. >99% of North American breeding adults undergo molt migration to hypersaline lakes (Great Salt Lake, Utah and Mono Lake, California) where they remain for months before continuing on to wintering grounds. Outside the Americas, occurs from British Isles south to South Africa, to se. Russia, and sw. and s. Asia east to India and Pakistan.

Occurrence in BCR 32

Eared Grebes occur throughout BCR 32. Thousands winter and/or migrate through on salt evaporator ponds in San Francisco Bay and along the Channel Islands. Breed locally, somewhat sporadically, and in small numbers throughout the region on appropriate waters from the San Francisco Bay inland to Fresno and San Bernardino Counties, and s. to San Diego County.

Habitat Requirements

Breeding locations vary from year to year depending on water levels. Colonial breeder on shallow lakes with floating vegetation, from sea level to over 6000 ft. The disappearance of historical colonies due to drying of lakes somewhat compensated for with the establishment of colonies on reservoirs and sewage treatment ponds. Wintering habitats include coastal bays, freshwater marsh, and seasonal wetlands. In San Francisco Bay, birds found on medium to high-salinity salt evaporator ponds where they roost and forage on brine shrimp (*Artemia salina*), water boatmen (*Corixidae* spp.), and brine flies (*Ephydra* spp.)

Issues in BCR 32

- A decrease in the amount of hypersaline salt-pond habitat due to tidal restoration in San Francisco Bay is a concern.
- Increasing demand for fresh water in urban areas limits nesting sites and threatens saline lakes in the region where Eared Grebes winter.

- Contaminants, including selenium in the Central Valley, pose a threat to breeding birds.

Existing Actions

No known specific actions currently target this species in BCR 32. The Eared Grebe is a “salt pond specialist” included in project planning for salt pond restoration in the San Francisco Bay estuary.

Research and Monitoring Needs

- Conduct focused studies on foraging ecology in the San Francisco Bay estuary.
- Determine how catastrophic events including disease, contaminants, and El Niño–related starvation affect the long-term health of the population.

Needed Management Actions

Maintain high salinity ponds within the San Francisco Bay estuary for wintering and migratory use. To maintain breeding colonies throughout the region, provide undisturbed open water habitat with appropriate vegetation for nest construction.

Primary regional contact(s):

Nicole Athearn, USGS Western Ecological Research Center, San Francisco Bay Estuary Field Station; Dave Shuford, PRBO Conservation Science; and Cheryl Strong, Don Edwards San Francisco Bay National Wildlife Refuge..

References

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Account author: Cheryl Strong

WESTERN GREBE, ACHICHILIQUE PIQUIAMARILLO (*Aechmophorus occidentalis*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	4
Threats to breeding:	5
Threats to non-breeding:	5
Percent of population in BCR:	1

BCR 32 conservation priority: High concern.

Abundance and population trend in North America: >110,000 breeders. BBS data (Western/Clark's combined) show a non-significant declining trend of -2.0%/yr (1968–2009; data deficient).

Abundance and population trend in BCR 32: Size of breeding and (larger) wintering populations are unknown. BBS data (Western/Clark's combined) show a (non-significant) increasing trend of 8.9%/yr (1968–2009; data with a major deficiency).

Percent of continental population in BCR 32: Unknown and varies by season.

Global Distribution

Breeds broadly but locally in western North America from s.-central British Columbia east to s. Manitoba and south to n. Baja California, Arizona (except sw.), s. Colorado, w. Minnesota, and e.-central Wisconsin; resident at some sites in interior north at least to n.-central California west of Sierra Nevada. Also resident and breeding in interior Mexico south to Guerrero and w. Puebla. Winters mainly from se. Alaska, coastal s. British Columbia, s. Utah, Colorado, New Mexico, and w. and (rarely) s. Texas south through Baja California, the Gulf of Mexico, and the west coast of Mexico in Sonora and Sinaloa.

Occurrence in BCR 32

A year-round resident throughout the region. Locally common at scattered inland breeding colonies. Non-breeders occur locally throughout the region, and the species is most numerous and widespread in fall and winter when birds concentrate mainly along the coast but also at some inland sites (particularly Clear Lake, Lake Co.).

Habitat Requirements

Breeds at colonies inland at large lakes, marshes, sloughs, and reservoirs with extensive areas of open water usually bordered by emergent vegetation; winters at a greater number of freshwater sites inland, but largest numbers then in coastal bays, estuaries, and lagoons. The main requirements appear to be emergent or other aquatic vegetation for nest building and attachment and abundant prey and clear water for foraging. Differences in habitat requirements between Western and Clark's grebes are subtle but the former tends to forage in shallower water and closer to shore than the latter. The diet is primarily a wide variety of fish but also includes salamanders, crustaceans, polychaete worms, and insects (grasshoppers, variety of aquatic forms).

Issues in BCR 32

- Disturbance can flush adults from nests causing loss of eggs and chicks to exposure or predation. Adults and chicks are sometimes killed directly by boats, and chicks separated from parents may die of exposure. Grebes may die of entanglement in discarded fishing line or plastic six-pack rings.
- Fluctuating or declining water levels can lead to abandonment or heightened predation at low water levels; low and declining water levels also can result in mortality of flightless molting grebes.
- Contaminants (DDT, mercury) have caused mortality and lowered reproductive success in the past and remain of concern, particularly with respect to sublethal effects.
- Oil spills in bays or estuaries can cause extensive mortality.

- Diseases (e.g., botulism, avian cholera) have caused grebe mortality but may increase as a problem with the recent spread of West Nile virus, Newcastle disease, and avian influenza.

Existing Actions

- Recommended actions for breeding Western and Clark's grebes are included in a conservation assessment and management plan for these species in California (Ivey 2004); their needs also are addressed in a worldwide conservation plan for grebes (O'Donnel and Fjeldsá 1997).

Research and Monitoring Needs

- Conduct studies at major colonies to identify the life stages or factors limiting breeding success and those controlling substantial year-to-year variation in numbers of nest initiations.
- Establish a broad-scale monitoring program for breeding colonies, taking into account the great year-to-year variation in nesting numbers at some sites. Evaluate the effectiveness of the CBC in monitoring winter numbers, and, if found lacking, consider alternative approaches.
- Initiate color-marking or radio-telemetry studies to determine the degree of individuals' fidelity to nest sites and the connectivity of breeding, migration staging, and wintering areas.

Needed Management Actions

- Post educational materials to encourage those engaged in boating or shoreline activities to avoid colonies and to clean up discarded fishing line or plastic. If voluntary measures are ineffective, initiate closures of areas near colonies during the breeding season.
- Where feasible, maintain relatively stable water levels during the breeding season.
- Restrict recreational development or expansion along shorelines adjacent to known or potential colony sites.
- As needed, establish no-wake zones for power boats to reduce flooding or destruction of nests.

Primary regional contact(s):

Dan Anderson, University of California Davis; Gary Ivey; Floyd Hayes, Pacific Union College; Dave Shuford, PRBO Conservation Science.

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Account author: W. David Shuford

CLARK'S GREBE, ACHICHIQUE PIQUIANARANJA (*Aechmophorus clarkii*)

Status Summary

Continental conservation priority: Low concern.

BCR 32 conservation scores:

Population trend:	4
Threats to breeding:	5
Threats to non-breeding:	5
Percent of population in BCR:	1

BCR 32 conservation priority: High concern.

Abundance and population trend in North America: 10,000–20,000 individuals. BBS data (Western/Clark's combined) show a non-significant declining trend of -2.0%/yr (1968–2009; data deficient).

Abundance and population trend in BCR 32: Size of breeding and (larger) wintering populations are unknown. BBS data (Western/Clark's combined) show a (non-significant) increasing trend of 8.9%/yr (1968–2009; data with a major deficiency).

Percent of continental population in BCR 32: Unknown and varies by season.

Global Distribution

Breeds broadly but locally in western North America from s.-central British Columbia east to sw. Manitoba and south to n. Baja California, Arizona (except sw.), sw. and ne. New Mexico, and s. Colorado; resident at some sites in interior at least to n.-central California west of Sierra Nevada. Also resident and breeding in interior Mexico south to Guerrero and w. Puebla. Winters along the coast and near coastal lowlands from s. British Columbia (rare to casual north of c. California) south through Baja California and probably the Gulf of Mexico.

Occurrence in BCR 32

A year-round resident throughout the region. Locally uncommon at scattered inland breeding colonies. Nonbreeders occur locally throughout the region, and the species is most numerous and widespread in fall and winter when birds concentrate mainly on the coast but also at some inland sites.

Habitat Requirements

Breeds at colonies inland at large lakes, marshes, sloughs, and reservoirs with extensive areas of open water usually bordered by emergent vegetation; winters at a greater number of freshwater sites inland, but largest numbers then in coastal bays, estuaries, and lagoons. The main requirements appear to be emergent or other aquatic vegetation for nest building and attachment and abundant prey and clear water for foraging. Differences in habitat requirements between Clark's and Western grebes are subtle but the former tends to forage in deeper water and farther from shore than the latter. The diet is primarily a wide variety of fish but also includes salamanders, crustaceans, polychaete worms, and insects (grasshoppers, variety of aquatic forms).

Issues in BCR 32

- Disturbance can flush adults from nests causing loss of eggs and chicks to exposure or predation. Adults and chicks are sometimes killed directly by boats, and chicks separated from parents may die of exposure. Grebes may die of entanglement in discarded fishing line or plastic six-pack rings.
- Fluctuating or declining water levels can lead to abandonment or heightened predation at low water levels; low and declining water levels also can result in mortality of flightless molting grebes.
- Contaminants (DDT, mercury) have caused mortality and lowered reproductive success in the past and remain of concern, particularly with respect to sublethal effects.
- Oil spills in bays or estuaries can cause extensive mortality.

- Diseases (e.g., botulism, avian cholera) have caused grebe mortality but may increase as a problem with the recent spread of West Nile virus, Newcastle disease, and avian influenza.

Existing Actions

- Recommended actions for breeding Western and Clark's grebes are included in a conservation assessment and management plan for these species in California (Ivey 2004); their needs also are addressed in a worldwide conservation plan for grebes (O'Donnel and Fjeldsá 1997).

Research and Monitoring Needs

- Conduct studies at major colonies to identify the life stages or factors limiting breeding success and those controlling substantial year-to-year variation in numbers of nest initiations.
- Establish a broad-scale monitoring program for breeding colonies, taking into account the great year-to-year variation in nesting numbers at some sites. Evaluate the effectiveness of the CBC in monitoring winter numbers, and, if found lacking, consider alternative approaches.
- Initiate color-marking or radio-telemetry studies to determine the degree of individuals' fidelity to nest sites and the connectivity of breeding, migration staging, and wintering areas.

Needed Management Actions

- Post educational materials to encourage those engaged in boating or shoreline activities to avoid colonies and to clean up discarded fishing line or plastic. If voluntary measures are ineffective, initiate closures of areas near colonies during the breeding season.
- Where feasible, maintain relatively stable water levels during the breeding season.
- Restrict recreational development or expansion along shorelines adjacent to known or potential colony sites.
- As needed, establish no-wake zones for power boats to reduce flooding or destruction of nests.

Primary regional contact(s):

Dan Anderson, University of California Davis; Gary Ivey; Floyd Hayes, Pacific Union College; Dave Shuford, PRBO Conservation Science.

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Account author: W. David Shuford

DOUBLE-CRESTED CORMORANT, CORMORÁN BICRESTADO (*Phalacrocorax auritus*)

Status Summary

Continental conservation priority: Lowest concern.

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	4
Threats to non-breeding:	2
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America: 700,000 to 740,000 breeders. Significant increasing BBS trend of 4.7%/yr (1966–2009), and colony data show significant increases in many regions of North America since the late 1970s.

Abundance and population trend in BCR 32: About 5000 breeders. Significant increasing BBS trend (1968–2009) of 12.9%/yr (data deficient); after historical declines, numbers at coastal colonies have increased since the 1970s, but data for the interior are inadequate for trend assessment., though also suggestive of increasing trend. Numbers in south San Francisco Bay have increased from a few dozen at one nesting site to >500 pairs at eight sites.

Percent of continental population (breeding) in BCR 32: <1%

Global Distribution

Breeds widely in North America: on the Pacific Coast from s. Alaska to Baja California, the Gulf of California, and adjacent mainland Mexico; the Atlantic Coast from the Maritime Provinces to Florida, in the Caribbean, and coastal Yucatán Peninsula and n. Belize; and in the interior mainly from the Prairie Provinces south locally to northern Mexico. In winter, occupies most of coastal and near-coastal breeding range but retracts from most of northern interior and north Atlantic coast to seasonally occupy coastal lowlands from mid-Atlantic States southward; the U.S. and Mexican Gulf Coast south to Belize; and the southern U.S. and northeastern Mexican interior. In southern areas, migrants from the north mix with resident birds. Nonbreeders can be found widely in the general breeding range, including far from colonies, and some birds remain to oversummer in the wintering range.

Occurrence in BCR 32

A year-round resident throughout the region. Locally common at and near scattered breeding colonies mainly in San Francisco Bay and the Central Valley but also in the Coast Ranges or on the coastal slope. Nonbreeders occur locally throughout the region, and the species is most numerous and widespread in fall and winter when birds concentrate mostly in coastal estuaries and at some inland reservoirs.

Habitat Requirements

Regionally, forages in coastal estuaries and an array of freshwater habitats, including lakes, large open-water marshes, reservoirs, floodwater impoundments, ponds, and large rivers. Also requires suitable daytime loafing areas, nighttime roosts, and nest sites secure from ground predators and close (typically <10 km) to foraging areas. Nest sites in estuaries have mainly been on artificial structures, such as large bridges, large power towers, and dredges, but also on islands or levees in salt ponds. Inland in the region, nests typically are built in live or dead trees with their bases in water, on islands, or on the shores of lakes or rivers; nesting trees are typically shared with breeding herons and egrets. These cormorants are opportunistic foragers that take a wide variety of prey depending on availability; birds typically feed close (<5 km) to shore in shallow (<8 m deep), open water. At most sites the diet is almost entirely fish but infrequently may include aquatic insects, crustaceans, and amphibians.

Issues in BCR 32

- Greatest threats to inland breeders are a lack of high quality water at wetlands and potential human disturbance at nesting colonies.
- Bridge-nesting cormorants are at risk from disturbance from routine bridge maintenance activities.
- Contaminants have caused reproductive failures in the past and continue to be a potential threat to the species.
- Although cormorants have been killed under permits issued to fish farmers in the San Joaquin Valley in the early 1990s, conflicts with commercial and recreational fishermen currently do not appear to be a substantial problem in California as is the case in many regions of North America.

Existing Actions

- Continental status assessment available (www.fws.gov/migratorybirds/issues/cormorant/status.pdf).

Research and Monitoring Needs

- Identify source and sink populations and determine which population parameters contribute the most to population limitation in estuarine- and inland-nesting cormorants.
- Use color-marked or radio-tagged birds to study the foraging, dispersal, and migratory movements of cormorants to better understand the suite of habitats they use, the linkages among them, and how habitat use patterns change with fluctuating environmental conditions.
- Use marked birds to elucidate the extent of interchange between inland and coastal breeding populations and if the degree or timing of mixing is influenced by climatic or oceanic conditions, breeding failures, or other factors.

Needed Management Actions

- Minimize human disturbance by restricting public access and limiting colony entry to researchers unless absolutely necessary.
- Schedule bridge maintenance activities for the non-breeding season.
- Provide or maintain nesting islands of suitable size, substrate, and isolation, and maintain water levels within a range that avoids flooding or connecting islands to the mainland.

Primary regional contact(s): Mark Rauzon; Dave Shuford, PRBO Conservation Science; Cheryl Strong, Don Edwards San Francisco Bay National Wildlife Refuge.

References

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Account author: W. David Shuford

AMERICAN WHITE PELICAN, PELÍCANO BLANCO AMERICANO (*Pelecanus erythrorhynchos*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	na
Threats to non-breeding:	3
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America: ~134,000 breeders in 1998–2001, and combined numbers at a subset of all colonies counted in both periods have more than doubled from 1979–1981 to 1998–2001. Non-significant increasing BBS trend of 5.1%/yr (1966–2009; data with an important deficiency).

Abundance and population trend in BCR 32: Non-significant increasing BBS trend of 21.2%/yr (1968–2009; data with an important deficiency) but these data really not applicable as species has not bred in BCR 32 during the BBS survey period. Total numbers in BCR in winter and migration are unknown.

Percent of continental population in BCR 32 (in winter or migration): Unknown, but estimated $\leq 20\%$.

Global Distribution

Breeds primarily in the interior of North America from the Canadian and U.S. Prairies patchily south and west through the Intermountain West, reaching its southwestern limit in s. Oregon, ne. California, and w. Nevada. Can be separated into two groups, one breeding and migrating east, the other west, of the continental divide; additional small non-migratory groups breed irregularly on the central Texas coast, on the n. Gulf coast of Mexico, and, in winter, in n.-central Mexico. Winters primarily on the Pacific Coast and lowlands from central California and s. Arizona south through Baja California and west Mexico to Nicaragua, and from Florida and the Gulf States south through the Gulf coast and central plateau of Mexico to the n. Yucatán Peninsula. Post-breeders from western colonies may disperse widely (many north and east) before migrating south; small numbers of nonbreeders may summer, or disperse to, nearly anywhere in the normal migrant and winter ranges.

Occurrence in BCR 32

Formerly bred in the Central Valley but has not done so since the early 1950s. Currently is common locally throughout the region during migration or in winter, with largest numbers apparently in the San Francisco Bay region. Non-breeders and perhaps returning early-season failed breeders may occur within the migratory or winter range in spring and summer months.

Habitat Requirements

American White Pelicans typically forage, often cooperatively in flocks, in shallow (0.3–2.5 m) inland waters, such as open areas in marshes and along lake or river edges, and in coastal estuaries and lagoons. During less frequent foraging in deep water, they steal prey brought to the surface by other birds, particularly Double-crested Cormorants; pelicans also may rob gulls or other pelicans trying to swallow large fish. These pelicans are adapted to shift foraging sites in response to cycles of drought and flood, and long-distance movements to forage have been documented during breeding; little appears to be known about winter site fidelity. The diet is mainly “rough” fish of low economic value—predominately small schooling fish but also larger sluggish bottom feeders—as well as salamanders and crayfish. Additional requirements during the non-breeding season are suitable daytime loafing areas and nighttime roosts free from disturbance and ground predators.

Issues in BCR 32

- Documented die-offs from disease to date have been limited in this BCR but are cause for concern because of large die-offs from Type C botulism elsewhere where pelicans concentrate in the non-breeding season and from West Nile virus and possibly Newcastle disease virus at breeding colonies.
- Although the effects of contaminants (reproductive failure and mortality on the breeding grounds, mortality at wintering sites or migratory staging areas) have declined in recent decades, they still remain of concern.
- Water availability and quality are of concern at wetlands in the Central Valley, and sustainable healthy fish populations are at risk at interior and coastal sites because of diversions of water and contaminants in runoff.

Existing Actions

- Recent published summary of status and conservation issues.

Research and Monitoring Needs

- Initiate detailed studies of the winter foraging ecology at various sites and couple these with studies of fish populations and water quality.
- Periodically evaluate pesticides and contaminants in pelicans, and study disease events at sites where they concentrate in the nonbreeding season.
- Conduct radio- and satellite-telemetry studies to determine foraging movements and dispersal patterns during the non-breeding season.

Needed Management Actions

- Investigate the possibility of restoring potential nesting habitat in the southern San Joaquin Valley, where the species last bred in the BCR.
- Maintain or enhance nongame fish populations for pelicans, restoring prey species at pelican foraging areas as necessary. Ensure prey availability by maintaining shallow (1–2 m) water depths and, when feasible, drawing down levels to provide foraging opportunities.
- Provide and maintain isolated loafing and roosting areas.

Primary regional contact(s):

Dan Anderson, University of California Davis; Dave Shuford, PRBO Conservation Science.

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Author: W. David Shuford

AMERICAN BITTERN, AVETORO AMERICANO (*Botaurus lentiginosus*)

Status Summary

Continental conservation priority: High concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	3
Threats to non-breeding:	3
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern

Abundance and population trend in North America: No data on overall numbers but abundance in favorable habitat may reach 40 calling birds per 100 ha. Non-significant declining BBS trend of -1.1%/yr (1966–2009; data deficient).

Abundance and population trend in BCR 32: No data on overall numbers or densities in favorable habitats within this region. Non-significant increasing BBS trend of 1.2%/yr (1968–2009; data deficient).

Percent of continental population in BCR 32: Unknown but varies seasonally.

Global Distribution

Breeds in North America from extreme se. Alaska, central interior British Columbia, s. Mackenzie, n. Manitoba, n. Ontario, central Quebec, and Newfoundland south locally to coastal s. California, central Arizona (formerly), s. New Mexico, Texas, central Arkansas, central and w. Tennessee, w. Kentucky, central Ohio, s. Pennsylvania, ne. West Virginia, e. Maryland, and e. Virginia; at least formerly, bred also in Louisiana, Florida, Puebla, and México. Winters from e.-central British Columbia, w. Washington, w. Oregon, n. Nevada, n. and central Utah, n. Arizona, central New Mexico, n. Texas, the Gulf states and s. New England (casual farther north), south to s. Mexico and Cuba, rarely (or formerly) to Costa Rica and Panama, and to the central Caribbean.

Occurrence in BCR 32

Occurs year round and breeds locally but widely in suitable habitat throughout the California portion of BCR 32 and winters (perhaps formerly bred) in Baja California Norté. Largest numbers in California's Central Valley, and particularly numerous (or visible?) in the extensive rice fields of the Sacramento Valley during the breeding season. Occurs more widely in winter when resident populations apparently are swelled by migrants.

Habitat Requirements

Occupies a variety of mainly freshwater (rarely brackish or tidal) wetlands with tall emergent vegetation and abundant prey. More numerous in larger than smaller wetlands, and, where studied in the Midwest and East, found only or mainly at wetlands >4–10 ha in size. Uses habitats with relatively shallow water: <10 cm in some areas, mean 10 cm in others. Typically nests solitarily in dense marsh vegetation over water 5–20 cm in depth but sometimes over dry ground in structurally comparable herbaceous cover in uplands surrounding a wetland basin; birds foraging in rice fields likely nest in denser and taller vegetation in nearby canals or weedy upland fields. The diet consists mainly of insects (mostly aquatic, also grasshoppers), frogs and salamanders, fish, crayfish, snakes (mainly garter and water), small mammals (mainly voles) and a few crabs, spiders, and other invertebrates.

Issues in BCR 32

- Loss and degradation of historic wetlands, which surely caused major population declines in bitterns, have been offset to an unknown degree by the planting of extensive rice fields (160,000–200,000 ha annually) in the Sacramento Valley and recently by the creation more widely of new wetlands to meet waterfowl needs.

- Recent wetland gains have been primarily in fall and winter, though, leaving shallowly flooded dense emergent wetlands in short supply during the breeding season.
- Pesticides and other contaminants may have effects on bitterns or their aquatic prey but no studies are available.
- Invasive plants, such as Purple Loosestrife (*Lythrum salicaria*), may reduce habitat suitability but such effects have not been rigorously documented.

Existing Actions

No known specific actions currently target this species in BCR 32.

Research and Monitoring Needs

- Conduct studies of all aspects of the species' biology and ecology, particularly to identify the life stages and factors limiting its populations.
- Identify the features of wetland habitats that support high densities of bitterns and sustain high reproductive success.
- Develop a monitoring program and protocol, aligned with national schemes, to obtain data on relative abundance and to track population trends at the BCR level or finer.
- Evaluate the effects, if any, of pesticides and other contaminants on the reproductive success of bitterns and on their prey populations.

Needed Management Actions

- Preserve large shallow wetlands with dense emergent vegetation and create additional habitat that is available during the breeding season.
- Manage available wetlands to provide robust emergent vegetation for nesting and concealment and relatively shallow water (10–15 cm) for foraging.

Primary regional contact(s): Fritz Reid, Ducks Unlimited.

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Account author: W. David Shuford

SNOWY EGRET, GARZA NIVEA (*Egretta thula*)

Status Summary

Continental conservation priority: High concern.

BCR 32 conservation scores:

Population trend: 2

Threats to breeding: 4

Threats to non-breeding: 2

Percent of population in BCR: 1

BCR 32 conservation priority: Low concern

Abundance and population trend in North America: Nesting population >143,000 individuals (159,000 in 1970s), subject to considerable flux since the mid-twentieth century and substantial uncertainty about recent population trends. Non-significant increasing BBS trend of 1.9%/yr (1966–2009).

Abundance and population trend in BCR 32: Nesting population >2500 individuals, based on subregional estimates in 2003–2005 and Central Valley survey in 1982; estimates include considerable annual variation and substantial uncertainty about trends; significant but marginal increase in San Francisco Bay area 1994–2005. Significant increasing BBS trend of 6.4%/yr (1968–2009; data deficient).

Percent of continental population in BCR 32: >1.7% of continental breeding population; “key” continental wintering areas with >5% of winter band recoveries include (1) the San Francisco Bay area and Central Valley and (2) San Diego County (and area eastward to Colorado River).

Global Distribution

In United States, breeds principally along the Atlantic and Gulf coasts, in extensive inland areas along the Mississippi and Arkansas rivers, and in a block from Louisiana to east Texas; in the western U.S., breeds primarily in the Central Valley and coastal areas of California, the Salton Sea, along the lower Colorado River, and in pockets throughout western states. Breeding extends down both coasts of Mexico, through the Caribbean islands, and south to Chile and Argentina. Key wintering areas are the Atlantic Coast, Bahamas, Cuba, Greater Antilles, and Gulf and Pacific coasts south to Central America.

Occurrence in BCR 32

Colony sites are incompletely known; widely scattered throughout the Central Valley and the San Francisco Bay area, sporadically in small colonies along coastal lowlands (primarily, San Diego County), and uncommonly in higher areas of the outer Coast Ranges. Coastal occurrences south of San Francisco are more widespread in winter than during the nesting season.

Habitat Requirements

Primarily a species of coastal wetlands and large wetland basins. Nests in trees or shrubs on islands; in trees within suburban areas near coastal lagoons, bays, or other large wetland systems; and in tule or *Typha* sp. beds of brackish or freshwater marshes. Usually nests in mixed-species heronries, often with Black-crowned Night-Herons; typically builds nests below the vegetation canopy. Forages in salt marsh pools and along shorelines of bays, lagoons, lowland streams, marshes, and swamps; also forages in rice fields, irrigation ditches and canals, and in diked, managed wetlands. Prefers open pools in dense marshes or swamps, the confluences or mouths of tidal creeks, channels that connect managed wetlands, and open shallows (5–25 cm) on the edges of rivers, lakes, reservoirs, bays and lagoons. Most feeding areas have tidal or seasonal fluctuations in water level. Prey consist primarily of small fish (60%–87% in Texas and East Coast), variable amounts of crustaceans (including crayfish), and small proportions of invertebrates and amphibians; 94% of prey <2 cm in San Francisco Bay.

Issues in BCR 32

- Nesting disturbance by humans or individual nest predators, including human commensals (e.g., raccoons, feral cats, or Common Ravens), can result in nest failure or colony site abandonment.

- Declines in foraging habitat suitability related to water quality, nutrient enrichment, or management of seasonal water depth, can lead to colony relocation and reduced use of wetlands.
- Declining availability of isolated islands or other safe areas for nesting within reasonable distances (<10 km) of important feeding areas may limit populations.
- Pesticides and other contaminants (e.g., DDT, PCBs, mercury, selenium) have caused mortality and can impair reproductive success.

Existing Actions

- Infrequent efforts by local planning departments and the State Coastal Commission to limit nest disturbance; some protective management of heronries in state and federal refuges.

Research and Monitoring Needs

- Conduct surveys to assess region-wide nesting abundance and trends; surveys are especially needed in the Central Valley.
- Determine the relative use of feeding areas within major wetland subregions.
- Determine patterns of foraging dispersion near important colony sites.
- Evaluate seasonal differences in regional and subregional abundance and distribution.
- Measure variation in natal dispersal and inter-annual movements of adults between colony sites.

Needed Management Actions

- Protect existing heronries from major increases in human activity, including direct human disturbance, land development, and nearby construction activities.
- Prevent destruction of heronries during non-breeding periods, when sites are unoccupied.
- Reduce the occurrence of nest predators, especially human commensals, near existing heronries.
- Integrate appropriate water-level regimes and habitat objectives into wetland management plans.
- Limit recreational use of important shallow-water feeding areas.
- Promote collaborative management of habitat needs across wetland subregions.

Primary regional contact(s): John Kelly, Audubon Canyon Ranch; Cheryl Strong, Don Edwards San Francisco Bay National Wildlife Refuge; Philip Unitt, San Diego Museum of Natural History.

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Account author: John P. Kelly

WHITE-FACED IBIS, IBIS CARIBLANCO (*Plegadis chihi*)

Status Summary

Continental conservation priority: Low concern.

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	3
Threats to non-breeding:	2
Percent of population in BCR:	2

BCR 32 conservation priority: Lowest concern

Abundance and population trend in North America: >100,000 breeders. Major declines in 1960s and 1970s but subsequently numbers have increased greatly and the range has expanded. Significant increasing BBS trend of 4.5%/yr (1968–2009; data deficient).

Abundance and population trend in BCR 32: Roughly XXX breeders 2000–2005. Declining numbers in California reached their nadir in the 1970s, but both breeding and wintering numbers have increased greatly since the mid-1980s. Non-significant BBS trend of 31.2%/yr (1968–2009; data with a important deficiency).

Percent of continental population in BCR 32: XX-XX%

Global Distribution

Breeds in North America locally from n. California, e. Oregon, se. Washington (rarely), s. Idaho, Montana, s. Alberta (rarely), n.-central North Dakota, and (formerly) sw. Minnesota south to Durango, Jalisco (perhaps elsewhere on Mexican Plateau), s. and e. Texas, s. Louisiana, coastal Alabama (rarely), and occasionally (or formerly) in nw. Iowa and possibly Florida. Also breeds in central and s. South America both east and west of the Andes. Winters from n.-central California, sw. Arizona, and the Gulf coast of Texas and s. Louisiana south through Mexico (including Baja California) to the Pacific lowlands of Guatemala; also in general breeding range in South America.

Occurrence in BCR 32

Occurs year round, but numbers generally greater and distribution broader in winter coincident with an influx of migrants. Currently breeds very locally in the Central Valley and (in very small numbers) on the coastal slope of southern California. Key breeding areas (≥ 500 breeders) since the 1980s include Colusa NWR, Sutter NWR, Delevan NWR (Rennick Unit), Natomas Basin, and Yolo Bypass WA in the Sacramento Valley, and Mendota WA, Kern NWR, and private wetlands in the Tulare Basin, in the San Joaquin Valley. Colonies may be ephemeral and change size rapidly. Key wintering concentrations in the Central Valley have been in rice fields around refuges in the trough of the Sacramento Valley and at wetlands and agricultural fields in the Grasslands Ecological Area near Los Banos in the San Joaquin Valley. On the coastal slope, core areas of most regular occurrence in winter are near Pt. Mugu, Ventura County; the Prado Basin and adjacent Santa Ana River Valley area, western San Bernardino and Riverside counties; and lowlands of northwestern San Diego County.

Habitat Requirements

Typically breeds inland in shallow freshwater marshes in tall emergent vegetation (in early stages of succession) or in stands of flooded low-stature tamarisk (*Tamarix* spp.) trees. Colonies are generally isolated from ground predators and human disturbance. Foraging habitats include shallow managed wetlands, ephemeral wetlands, rice fields, flood-irrigated crops (particularly alfalfa) and pastures, and the margins of lakes and coastal lagoons. The diet is mainly aquatic and moist-soil invertebrates (especially earthworms and larval insects) but also leeches, spiders, snails, crayfish, small fish, frogs, and bivalves.

Issues in BCR 32

- Ibis are losing foraging areas in the Central Valley from conversion of alfalfa and pastures to other unsuitable agricultural (such as vineyards) or to urban expansion.
- An ever tightening water supply from rapid human population growth may reduce the future availability of water for wetlands and for flood irrigation of agricultural fields.
- Remaining agricultural foraging habitat on the coastal slope is being lost to ongoing development.
- Ibis are at risk from pesticides and other contaminants concentrated in their prey.

Existing Actions

- A status assessment with conservation recommendations for White-faced Ibis in the West is in preparation.

Research and Monitoring Needs

- Study the causes of rapid shifts in colony locations and sizes.
- Identify the life stages and factors (at both local and landscape scales) limiting ibis populations.
- Investigate in the Central Valley if pesticides and other contaminants are being concentrated in ibis and their eggs and whether there are adverse effects on reproductive success.
- Continue annual monitoring of colonies on refuges and, if possible, expand this to include all large colonies on private lands. Evaluate whether ongoing Christmas Bird Counts are effective in monitoring winter numbers in California, and, if needed, develop alternative methods.

Needed Management Actions

- Preserve or secure habitat and water rights for all known colony sites, major foraging areas, and key roosting areas.
- Manage known colony sites, as feasible, to maintain emergent nesting habitat and shallow foraging areas (both on wetlands and in surrounding agricultural landscapes).
- Work with agricultural interests, providing incentives as needed, to maintain flood-irrigated crops and pastures and to promote (e.g., organic) practices that favor earthworms or other key ibis prey.
- Work with national and international partners to reduce pesticide use, particularly in wintering areas where currently unregulated.

Primary regional contact(s): Mike Wolder, Sacramento NWR Complex; Steve Bruggemann, Mendota WA; Pam Williams, Kern NWR.

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Account author: W. David Shuford

YELLOW RAIL, POLLUELA AMARILLA (*Coturnicops noveboracensis*)

Status Summary

Continental conservation priority: High concern.

BCR 32 conservation scores:

Population trend:	4
Threats to breeding:	na
Threats to non-breeding:	4
Percent of population in BCR:	1

BCR 32 conservation priority: High concern

Abundance and population trend in North America: No information.

Abundance and population trend in BCR 32: Thirty-five records document occurrence in the coastal zone and the Central Valley with most of these dated prior to 1937. Currently, very small numbers winter along the coast and in the Suisun Marsh (over 20 records for the region since 1970). There are no recent records from the Central Valley.

Percent of continental population in BCR 32: Negligible.

Global Distribution

Current North American breeding range extends from Great Slave Lake, Northwest Territories, east to James Bay and Gaspé Peninsula, Quebec, south to ne. Montana and east through n. Michigan and n. Maine. Disjunct population in s. Oregon; possible breeding in n. California. Historic breeding range extended further south to n. Illinois and central Ohio and included ne. California. Winters in coastal North Carolina south to Florida and west to s. Texas. Also occurs in coastal and central California.

Occurrence in BCR 32

Rare winter visitor to coastal marshes from Sonoma County south to San Diego County with most records from the San Francisco Bay region. Recent coastal records include Tomales Bay and elsewhere in Marin County (about a dozen records); Alameda, Alameda County; Palo Alto Baylands, Santa Clara County; Harkins Slough, Santa Cruz County; Pt. Pinos, Monterey County; Santa Barbara, Santa Barbara County; Manhattan Beach, Los Angeles County; and Santee, San Diego County (last three records were of birds found in urban areas). Two birds were captured at Grizzly Island Wildlife Area in the Suisun Marsh, Solano County, during January/February 2002 and single birds were detected there in December 2002. Historically, also occurred at several inland locations including Los Banos, Merced County; Shandon, San Luis Obispo County; and Corona, Riverside County

Habitat Requirements

Poorly known. Occupies wet meadows, freshwater marsh, brackish marsh and coastal tidal marshes. In general, diet includes small snails, earthworms, insects and other invertebrates. Additionally, seeds of sedges and other marsh plants are consumed in fall and winter.

Issues in BCR 32

- Habitat loss.
- In tidal marshes, barriers to high tide refugia increase threat of predation from herons, egrets, raptors, the introduced red fox (*Vulpes fulva*), feral cats, and other predators.
- Because poorly known and difficult to study, not taken into consideration when marsh restoration projects are planned or land management activities undertaken.

Existing Actions

No known specific actions currently target this species in BCR 32.

Research and Monitoring Needs

- Develop techniques to survey and monitor wintering populations of this silent and secretive species.
- Perform annual monitoring at locations with recent rail records (e.g., Tomales Bay, Grizzly Island).
- Describe habitat needs on wintering grounds.
- Identify all known or potential wintering habitat in BCR 32, focusing attention on historical locations.
- Understand migrational patterns.

Needed Management Actions

- Prioritize key wintering habitats and develop management plans that incorporate Yellow Rail needs into management schemes.
- Evaluate current management practices on public lands to determine if they conflict with providing adequate habitat for Yellow Rails.
- Avoid construction-related and other activities that could disturb Yellow Rails.
- Provide high-tide refugia for Yellow Rails at key wintering areas.
- Study the effects of predation on Yellow Rails and other sensitive marsh species (e.g., Black Rail, Clapper Rail); develop and implement management strategies to reduce impacts to all these species.

Primary regional contact(s): John Sterling.

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Account author: Lyann A. Comrack

BLACK RAIL, POLLUELA NEGRA (*Laterallus jamaicensis*)

Status Summary

Continental conservation priority: Highest concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	4
Threats to non-breeding:	4
Percent of population in BCR:	4

BCR 32 conservation priority: High concern

Abundance and population trend in North America: Few baseline data. Population declines must have occurred from the massive habitat destruction in the last century. Evidence of range contraction for the East Coast, Midwest, and California.

Abundance and population trend in BCR 32: Over 90% of California's Black Rails occur in the n. San Francisco Bay area. Population estimates in 2001 were: San Pablo Bay, 15,000 individuals (range 11,000–19,000); Suisun Bay, 12,000 (6700–17,200); and Bolinas Lagoon and Tomales Bay, 280 (2–606). Apparently no longer breeds in south San Francisco Bay but occurs in winter. Population estimates for the Sacramento–San Joaquin River Delta (Delta) are unavailable. Recently found at 90 sites in the Sierra Nevada foothills, where deemed “locally common,” but population and trend data unavailable. Historical records exist from Santa Cruz (probable migrant) south to San Diego (nesting confirmed at several San Diego locations), and at a few inland sites, including Chino and San Bernardino, San Bernardino Co., and Riverside, Riverside, Co.; now extirpated from this part of California.

Percent of continental population in BCR 32: Unknown.

Global Distribution

Of five subspecies, two occur in North America: *L. j. jamaicensis* of the East, *L. j. coturniculus* of California and Baja California. Birds found in Peru, Chile, and Argentina represent several other subspecies. Broad but patchy and irregular distribution across North American range. *L. j. jamaicensis* breeding/summer records on Atlantic coast from Connecticut south to New Jersey; resident from North Carolina south to s. Florida; on Gulf coast, resident in Florida, se. Alabama, and se. Texas. Winters along Gulf coast from Mississippi west to ne. Texas. Inland breeding/summer records for s. Pennsylvania; North Carolina south to central Georgia; s. Michigan, Wisconsin, and Minnesota south to n. Ohio, Indiana, central Illinois, n. Missouri, Kansas, and central Oklahoma. Breeding-season records for Mexico (Veracruz), Belize, Cuba, Jamaica, and Panama. *L. j. coturniculus* is resident in California (Bodega Bay, San Francisco Bay area, Suisun Marsh, Sierra foothills, Morro Bay, Salton Sea and vicinity, lower Colorado River); breeding-season records for ne. Baja California.

Occurrence in BCR 32

Year-round resident. Patchy along the coast from Tomales Bay, Marin Co., south to Morro Bay, San Luis Obispo Co. The greater San Francisco Bay estuary (including Suisun Marsh, Solano Co.) is the species' population center for the BCR. Found sparsely in the Delta (White Slough, Lodi, San Joaquin Co.). Recently discovered in the Sierra foothills of Yuba, Butte, Placer, and Nevada counties up to about 250 m in elevation.

Habitat Requirements

Tidal salt, brackish, and freshwater marshes. In tidal habitat, rails prefer high marsh at the upper limit of tidal flooding with dense cover, usually pickleweed (*Salicornia virginiana*) or sedges <10 cm tall; freshwater inflow may be important. The marsh's age, size, degree of channelization, soil, and water salinity are also important. May avoid habitats dominated by salt grass (*Distichlis spicata*). In freshwater marshes, found in dense stands dominated by cattails (*Typha* sp.), rushes (*Juncus* sp.), or bulrushes

(*Scirpus* sp.); **vegetation tends to be <3 cm high**. Shallow, perennial water usually associated with seeps and springs also important. Nest variable but usually well-concealed in marsh vegetation; built on ground (rarely) or up to ~30 cm above ground, with a thin platform to flat or deeply cupped; often with a domed top for concealment, with a side entrance. Diet (poorly studied) includes small (<1 cm) insects, other arthropods, and seeds. In tidal marshes, Black Rail occurrence is correlated positively with insects and spider abundance, negatively with amphipod abundance. Probably uses runways of mice and other rodents to move through marsh. Where overlap, may avoid areas with dense populations of California Clapper Rails (*Rallus longirostris levipes*), which may prey on young.

Issues in BCR 32

- Habitat loss, fragmentation, and degradation.
- Water-management practices for agriculture; flood control projects.
- Salt production in coastal areas.
- Urban development.
- In tidal marshes, barriers to high-tide refugia increase threat of predation from herons, egrets, raptors, introduced red foxes (*Vulpes fulva*), feral cats, and other predators.
- Contaminants and oil spills.
- Diversion of freshwater inflow into the north San Francisco Bay.
- Lining irrigation fixtures, which eliminates shallow wetlands fed by seepage.

Existing Actions

- Listed as a threatened species under the California Endangered Species Act. Considered a “fully protected” species under California Fish and Game Code Section 3511.
- Included on the U.S. Fish and Wildlife Service’s 2008 list of Birds of Conservation Concern.
- South San Francisco Bay wetland restoration progressing; Black Rail included as focal species.
- University of California’s Black Rail Project continues to study the species’ ecology and habitat preferences in the Sierra Nevada foothills.

Research and Monitoring Needs

- Despite recent gains, the species is poorly known and difficult to study; undertake studies of basic biology, especially population parameters and ecology.
- Conduct nest monitoring to better estimate nesting success.
- Identify sink and source populations and the factors that influence them.
- Further study potential contaminant impacts.
- Assess potential impact on the rails’ food supply of spraying wetlands for mosquito abatement as part of a West Nile Virus eradication campaign.
- Periodically survey for presence of Black Rails in restored marshes in coastal southern California that have benefited Light-footed Clapper Rails (*R. l. obsoletus*).

Needed Management Actions

- Create suitable upland habitat buffers in tidal areas to provide high-tide refugia.
- Ensure that south San Francisco Bay wetland restoration improves nesting habitat and high-tide refugia for Black Rails.
- Preserve large shallow wetlands with dense, short emergent vegetation; create additional suitable breeding habitat in historic range.
- Manage lands during breeding season to maintain shallow water and emergent vegetation of suitable height and cover.

- Study impacts to habitat quality of non-native, invasive plants (e.g., *Spartina alterniflora*, tamarisk, *Arundo*, *Lepidium latifolium*); as appropriate, control and replace with suitable native vegetation at key Black Rail marshes.
- Eliminate or carefully manage grazing in occupied Black Rail habitat.
- Assess practicality of re-establishing Black Rails within historic range (s. San Francisco Bay, southern California).

Primary regional contact(s):

Jules Evens, Avocet Research Associates; Jerry Tecklin, U.C. Sierra Foothill Research & Extension Center/The Black Rail Project.

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Account author: Lyann A. Comrack

GREATER SANDHILL CRANE, GRULLA CANADIENSE MAYOR (*Grus canadensis tabida*)

Status Summary

Continental conservation priority (full species): Low concern.

BCR 32 conservation scores (subspecies):

Population trend:	2
Threats to breeding:	na
Threats to non-breeding:	4
Percent of population in BCR:	5

BCR 32 conservation priority (subspecies): High concern

Abundance and population trend in North America (full species): Significant increasing BBS trend of 5.3%/yr (1966–2009).

Abundance and population trend in BCR 32 (subspecies): estimated 8000–10,000; increasing

Percent of continental population in BCR 32 (subspecies): Approximately 12%, but 100% of the Central Valley Population of the Greater Sandhill Crane winters in the Central Valley.

Global Distribution

North America, Cuba

Occurrence in BCR 32

Present during the non-breeding season (early Sep to mid-Mar) in **specific regions** of the Sacramento Valley, Sacramento–San Joaquin River Delta, and San Joaquin Valley.

Habitat Requirements

Occupies agricultural regions that have extensive cereal and other small grain crops, with associated grasslands and wetlands used for foraging and larger wetlands used for night roosting. Diet consists of grain, grass and sedge roots, invertebrates, crayfish, and rodents. Use areas are site-specific and limited in discrete regions of the Central Valley; use is perpetuated by the species' strong philopatry to wintering sites.

Issues in BCR 32

- Loss of habitat in traditional wintering sites to encroachment of orchards, vineyards, and urbanization.
- Major mortality factor is powerline collisions; lines should be marked or buried at major crane wintering sites.
- Need for expansion of roost site options and foraging range.

Existing Actions

- Listed as a threatened species under the California Endangered Species Act.
- Management plan completed for Central Valley Population.

Research and Monitoring Needs

- Monitor population status.
- Investigate the taxonomic classification of the various “large cranes” wintering in California.
- Evaluate effects of agricultural changes in the Central Valley on crane use and distribution.
- Mark individuals to determine migration paths and important wintering sites of certain population segments.
- Develop more accurate estimates of size of various populations of Pacific Flyway cranes.

Needed Management Actions

- Complete draft state recovery plan.
- Mitigate habitat loss in important crane use areas of Cosumnes/Stone Lakes Floodplains, east Sacramento–San Joaquin River Delta region, northern Sacramento Valley (Butte Creek drainage west of Hwy 99), and San Joaquin River NWR region.
- Manage foraging habitat by providing seasonal wetlands, cereal grain food plots, and crop residues in harvested cereal grain fields.
- Protect important traditional night roost sites and provide additional roost sites to expand cranes' foraging range.
- Minimize disturbance at roost and foraging sites during the wintering period (mid-Sep to mid-Mar).
- Reduce mortality by marking or burying problem powerlines in crane use areas.
- Detailed recommendations are provided in Pacific Flyway Council 1997, Littlefield and Ivey 2000, and Ivey and Herziger 2003.

Primary regional contact(s):

Ron Schlorff, Calif. Dept. Fish & Game; Carroll D. Littlefield; Gary L. Ivey

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Account author: Gary L. Ivey

LESSER SANDHILL CRANE, GRULLA CANADIENSE MENOR (*Grus canadensis canadensis*)

Status Summary

Continental conservation priority (full species): Low concern.

BCR 32 conservation scores (subspecies):

Population trend:	3
Threats to breeding:	na
Threats to non-breeding:	3
Percent of population in BCR:	4

BCR 32 conservation priority (subspecies): Moderate concern.

Abundance and population trend in North America (full species): Significant increasing BBS trend of 5.3%/yr (1966–2009).

Abundance and population trend in BCR 32 (subspecies): estimated 35,000; stable, possibly increasing.

Percent of continental population in BCR 32 (subspecies): Approximately 10%, but >95% of Pacific Flyway Population (PFP) of the Lesser Sandhill Crane winters in this BCR.

Global Distribution

Northern Hemisphere.

Occurrence in BCR 32

Present during the non-breeding season (early Sep to mid-Mar) in specific regions of the Sacramento Valley, Sacramento–San Joaquin River Delta, San Joaquin Valley, and Carrizo Plain.

Habitat Requirements

Occupies agricultural regions that have extensive cereal and other small grain crops, with associated grasslands and wetlands used for foraging and larger wetlands used for night roosting. Diet consists of grain, grass and sedge roots, invertebrates, crayfish, and rodents. Use areas are site-specific and limited in discrete regions of the Central Valley; use is perpetuated by the species' strong philopatry to wintering sites.

Issues in BCR 32

- Loss of habitat in traditional wintering sites to encroachment of orchards, vineyards, and urbanization.
- Major mortality factor is powerline collisions; lines should be marked or buried at major crane wintering sites.
- Need for expansion of roost site options and foraging range.

Existing Actions

- Management plan completed for the Pacific Flyway Population of the Lesser Sandhill Crane.

Research and Monitoring Needs

- Monitor population status.
- Mark individuals to determine their breeding and wintering patterns and to delineate population bounds.
- Develop more accurate estimates of various populations of Pacific Flyway cranes.

Needed Management Actions

- Mitigate habitat loss in important crane use areas of Cosumnes/Stone Lakes Floodplains, east Sacramento–San Joaquin Delta region, northern Sacramento Valley (Butte Creek drainage west of Hwy 99), and San Joaquin River NWR region.

- Identify and catalog the habitats used by PFP sandhill cranes.
- Manage foraging habitat by providing seasonal wetlands, cereal grain food plots, and crop residues in harvested cereal grain fields.
- Protect important traditional night roost sites and provide additional roost sites to expand cranes' foraging range.
- Minimize disturbance at roosts and foraging sites during the wintering period (mid-Sep to mid-Mar).
- Reduce mortality by marking or burying problem powerlines in crane use areas.
- Detailed recommendations are provided in Pacific Flyway Council (1997), Littlefield and Ivey (2000), Ivey and Herziger (2003), and Littlefield (undated).

Primary regional contact(s): Ron Schlorff, Calif. Dept. Fish & Game; Carroll D. Littlefield; Gary L. Ivey

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Account author: Gary L. Ivey

WESTERN GULL, GAVIOTA OCCIDENTAL (*Larus occidentalis*)

Status Summary

Continental conservation priority: Low concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	3
Threats to non-breeding:	2
Percent of population in BCR:	3

BCR 32 conservation priority: Low concern

Abundance and population trend in North America: >70,000 breeders. The overall population trend is likely driven by that in California, where numbers at known colonies in 1975–1980 increased 31% by 1989–1991. Numbers may currently be at an all-time high in response to garbage and fish offal provided by an expanding human population. Non-significant declining BBS trend of -1.5%/yr (1968–2009; data deficient).

Abundance and population trend in BCR 32: ~3600 (90% in San Francisco Bay estuary). Non-significant increasing BBS trend of 1.3%/yr (1968–2009; data with important deficiency); the BBS likely includes birds on the outer coast, which is not considered part of this BCR under the regional waterbird plan. Closures of many dumps may be reducing gull numbers in highly urbanized estuaries, such as San Francisco Bay, though no data are available. No extensive data on size of estuarine colonies in California prior to 1989–1991 and no rangewide surveys since.

Percent of continental population in BCR 32: ~5% (exclusive of outer coast).

Global Distribution

Breeds along the Pacific coast of North America from sw. British Columbia south to w.-central Baja California (Isla Asunción) and Guadalupe Island; hybridizes extensively with the Glaucous-winged Gull (*Larus glaucescens*) from Coos Bay, Oregon, northward. Consists of two subspecies: *L. o. occidentalis* (breeding north of Monterey Bay) and *L. o. wymani* (Monterey Bay southward). Winters from south-coastal British Columbia south to the tip of Baja California.

Occurrence in BCR 32

Although occurs widely on the outer coast (outside the BCR 32 boundary), within the BCR found year round mainly in coastal estuaries, where numbers (at least at some) increase in fall. Birds may range a few kilometers inland to bathe or drink at lakes and reservoirs or to forage at dumps (rarely to Central Valley). Within the BCR, breeds in only a few coastal estuaries, including Bodega Harbor, San Francisco Bay estuary, Elkhorn Slough–Moss Landing Harbor area, and San Diego Bay and vicinity. In the San Francisco Bay estuary, breeds as far as Suisun Bay in the northeast and Alviso in the south.

Habitat Requirements

A marine species that forages in estuaries, bays, lagoons, tidal reefs, beaches, and ocean waters mostly within 50 km (few to 95 km) of shore. On the outer coast (outside the BCR 32 boundary), breeds mainly on islands, offshore rocks, and sea cliffs but in coastal estuaries also breeds extensively on artificial habitats, such as breakwaters, wharfs, piers, light poles, and bridges. Like most gulls, the species is a generalist forager. The primary items in the diet are a variety of fish, marine invertebrates (euphausiids, barnacles, bivalves, crabs, starfish), and human refuse; also eggs, young, and adults of other seabirds.

Issues in BCR 32

- The relatively small population size and restricted distribution increase the species' vulnerability, though it is of limited immediate conservation concern.

- The species is potentially at risk from introduced predators, human disturbance, oil pollution, pesticides and other contaminants, and avian diseases, though none of these individually or in combination currently pose population-level threats.
- Perhaps the greatest conservation concern is the potential effects that the gulls may be having in preying on, disturbing, or displacing other declining or vulnerable bird species; this is unstudied but likely a much smaller potential problem than that posed by the more numerous California Gull (*Larus californicus*) in San Francisco Bay.

Existing Actions

- Included in regional seabird conservation plans.

Research and Monitoring Needs

- Study the biology of this species in San Francisco Bay to determine if it is causing adverse effects on other species of waterbirds.
- Study the diet of San Francisco Bay breeders to estimate the proportion of food obtained from human versus natural sources and whether this has changed with the closure of many bayside dumps.

Needed Management Actions

- Maintain and protect known colonies, considering other management options if problems with other species are detected.

Primary regional contact(s): Cheryl Strong, Don Edwards San Francisco Bay National Wildlife Refuge; Russ Bradley, PRBO Conservation Science.

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Account author: W. David Shuford

CALIFORNIA GULL, GAVIOTA CALIFORNIANA (*Larus californicus*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	2
Threats to non-breeding:	2
Percent of population in BCR:	2

BCR 32 conservation priority: Lowest concern

Abundance and population trend in North America: >414,000 breeders. Numbers increased in the 20th century. Non-significant declining BBS trend of -0.4%/yr (1968–2009; data deficient).

Abundance and population trend in BCR 32: San Francisco Bay colony monitoring has documented exponential growth from 412 breeding individuals in 1982 to 46,000+ in 2009. Non-significant increasing BBS trend of 2.2%/yr (1968–2009; data with an important deficiency). Many more occur in migration and winter but count data are lacking.

Percent of continental population (breeding) in BCR 32: ~10%.

Global Distribution

California Gulls breed at scattered locations in the interior of North America, primarily from the s.-central taiga of Canada south through the Great Plains to s. Colorado and west and south through the Columbia Plateaus and Great Basin desert to e.-central California. Winters primarily along the Pacific Coast and slope from s. British Columbia (sparingly) south to s. Baja California, the Gulf of California, and, less commonly, to the s.-central Pacific coast of mainland Mexico. Many nonbreeding birds remain in the wintering range in summer, and small numbers occur throughout the breeding range.

Occurrence in BCR 32

Nests at various sites in central and (mainly) south San Francisco Bay, the only coastal breeding region for the species. Small numbers recently attempted to nest offshore on Southeast Fallon Island; attempts to at the Davis Wastewater Treatment Plant are the first in the Central Valley in many decades. Occurs year-round, but numbers in the Central Valley and coastal lowlands swell greatly during migration and winter.

Habitat Requirements

In San Francisco Bay, gulls have nested on earthen islands and levees in salt ponds, a dry salt pond (largest colony), a tidal island, larger islands (Brooks, Alcatraz), and a bare high marsh habitat (no longer active). As generalist foragers, these gulls obtain prey or scavenge in numerous habitats, including the open ocean, coastal estuaries, lagoons, beaches, salt ponds, freshwater ponds and marshes, plowed fields, pastures, playing fields, parking lots, and, particularly, dumps. Like other gulls, omnivorous and opportunistic, hence the diet is broad and variable, including small mammals, fish, frogs and toads, various invertebrates and insects (brine shrimp, brine and alkali flies, damselflies, grasshoppers, cicadas, earthworms, etc.), garbage, and the eggs and young of their own or other species.

Issues in BCR 32

- Because of ongoing increases in nesting California Gulls, conservation concern in San Francisco Bay is focusing not on the gulls themselves but rather on the potential effects that the gulls may be having in preying on, disturbing, or displacing other declining or vulnerable bird species.

Existing Actions

- Planning meetings in San Francisco Bay are discussing potential options for limiting the effect of increasing “nuisance” species, including California Gulls, on the nests, chicks, and adults of

shorebirds and terns. General options being discussed include manipulation of current habitat, design of future habitat restoration projects, harassment, and lethal control.

- Hazing at one of two major landfills in the south bay has greatly reduced gull use at this site.
- Breaching of dikes for saltmarsh restoration displaced gulls at the largest colony in the south bay. Gulls shifting to attempt to nest at a nearby Snowy Plover breeding site were successfully discouraged from breeding by repeated hazing.

Research and Monitoring Needs

- Conduct focused studies of the factors influencing reproductive success and population size of bird species suspected of being negatively affected by California Gulls. Particularly valuable would be experimental studies examining the differences in success between control study sites and ones at which habitat is manipulated in manners likely to reduce gull problems.
- Continue ongoing monitoring of the size and location of gull colonies in San Francisco Bay. If possible, monitor reproductive success, as the effect of management actions on a long-lived species like this one may take a long time to detect by just counting nests.
- Conduct studies of gull movements and foraging patterns during the nesting season, particularly at landfills in the south bay suspected of maintaining gull populations.

Needed Management Actions

- Reduce human food sources (e.g., open dumps) that are exploited by California Gulls on a region-wide basis throughout the San Francisco Bay area.
- Consider the necessity of reducing nesting habitat for California Gulls while maintaining it for other colonial or solitary ground-nesting birds.

Primary regional contact(s): Caitlin Robinson-Nilsen, San Francisco Bay Bird Observatory; Cheryl Strong, Don Edwards San Francisco Bay National Wildlife Refuge; Josh Ackerman, U.S. Geological Survey

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Account author: W. David Shuford

LEAST TERN, GOLONDRINA-MARINA MÍNIMA (*Sternula antillarum*)

Status Summary

Continental conservation priority: High concern.

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	5
Threats to non-breeding:	na
Percent of population in BCR:	4

BCR 32 conservation priority: High concern.

Abundance and population trend in North America (full species): Estimated 60,000–100,000 breeders.

Non-significant declining BBS trend of -4.3% per year (1966–2009; data with an important deficiency).

Abundance and population trend in BCR 32: With the exception of birds breeding in Mexico, the entire population of the California Least Tern (*S. a. browni*) breeds within BCR 32; estimated population of subspecies is 13,700–14,700 breeders. The California breeding population has increased approximately 10-fold since being listed as federally endangered in 1970 and has increased by about 60% from 1995 to reach a period of relative stability from 2003 to 2010.

Percent of continental population in BCR 32: The California breeding population is approximately 14%–25% of the North American population.

Global Distribution

Five sub-species described breeding in various areas of North, Central, and South America. Breeders widely distributed throughout the coastal U.S., on the Atlantic coast (s. Maine to s. Florida), the Gulf Coast (s. Florida west to s. Texas), and the Pacific coast (San Francisco Bay to Mexican border). Also breeds locally inland from the Ohio, Missouri, and Mississippi rivers west throughout Great Plains to e. Montana, e. Colorado, and e. New Mexico.. In Mexico, breeds on both coasts of Baja California and the Pacific (Sonora south to Oaxaca) and Atlantic coasts (n. Tamaulipas and n. and e. Yucatan Peninsula). Also in Belize and w. Honduras, throughout the Caribbean islands, and on islands off the coast of Venezuela. The winter distribution is not well known, but Least Terns have been found along the Pacific and Atlantic coasts of Mexico and eastern coasts of Central and South America as far south as n. Argentina and s. Brazil.

Occurrence in BCR 32

California Least Terns breed along the coast from San Francisco Bay south to the Mexican border, with the bulk in southern California. In 2010, the vast majority were in San Diego County (60%) and Los Angeles/Orange counties (22%), the remainder in Ventura County (11%), San Luis Obispo/Santa Barbara counties (1%), and the San Francisco Bay area (6%).

Habitat Requirements

Non-vegetated substrates (i.e. beaches, dried mudflats, levees, shell islands, sand pits, etc.) near water sources (i.e. lagoon, estuary, ocean, etc.). Preferably, substrates should be soft enough to allow birds to scrape nest cups, and habitat should be high enough to avoid flooding at high tide. Due to development and increased use of coastal areas, Least Terns have resorted to nesting in other habitats, such as agricultural fields, sparsely vegetated lands near airports, parking lots, and rooftops (only documented in inland subspecies).

Issues in BCR 32

- Predators, suspected food shortages, contaminants, habitat destruction, and disturbance at breeding sites (researchers and non-researchers).

Existing Actions

- California Least Tern listed as an endangered species under both the California and federal endangered species acts.
- Population estimates and monitoring of reproductive success of existing sites continues through the collective efforts of federal, state, and non-governmental agencies.

Research and Monitoring Needs

- Conduct long-term studies on inter-colony movements, migration routes, and important wintering areas.
- Gather capture-recapture data to better understand current vital rates.
- Determine the amount of habitat needed for full recovery of the species and subspecies.
- Determine levels of various heavy metal and chemical contaminants (e.g., Hg, DDT, PCB) and their effects on reproductive success and survival.
- Obtain a more quantified measure of predation and its effects on terns in both urban and undeveloped habitats.
- Conduct research on diet, chick provisioning rates, and important foraging areas near breeding colonies.
- Understand how tern prey availability is related to colony attendance and defense against predators.
- Determine the extent to which various management measures are increasing nesting and productivity.
- Evaluated each colony to identify its role and influence in the metapopulation.

Needed Management Actions

- A comprehensive management plan that incorporates existing data and identifies areas where information is lacking.
- Management actions should be focused on the colonies that have the greatest influence on the metapopulation to maximize management effectiveness.

Primary regional contact(s): Charles Collins, California State University, Long Beach; Kathy Keane, Keane Biological Consultants; Dan Robinette and Meredith Elliott, PRBO Conservation Science.

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Account authors: Meredith Elliott and Dan Robinette

GULL-BILLED TERN, GOLONDRINA-MARINA PIQUIGRUESA (*Gelochelidon nilotica*)

Status Summary

Continental conservation priority: High concern.

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	5
Threats to non-breeding:	na
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America (full species): About 8700 breeders. Numbers erratic locally but overall probably stable at least in most parts of the United States. Non-significant increasing BBS trend of 1.1%/yr (1966–2009; data with an important deficiency).

Abundance and population trend in BCR 32: One pair colonized the San Diego saltworks in 1986. Since, the overall trend, with an intervening dip, has been one of increase to 57 pairs in 2009.

Percent of continental population in BCR 32: <2%.

Global Distribution

A cosmopolitan species with perhaps six subspecies, two described (validity uncertain) in North America. *S. n. aranea* breeds locally along the Atlantic Coast from Long Island, New York, or (more regularly) s. New Jersey south to Florida, the Bahamas, and Virgin Islands and west on the Gulf Coast to se. Texas and (presumably) south in Mexico to central Veracruz (probably also coastal Yucatan); winters from North Carolina or (more regularly) sw. Florida across the Gulf Coast to Mexico and on to Honduras. *S. n. vanrossemi* (total 1500–1600 breeders) nests very locally from s. California (San Diego, Salton Sea) south to the central Baja California peninsula and the west coast of Mexico in Sinaloa, Nayarit, and Colima (perhaps Sonora); winters in n. Gulf of California and along the west coast of Mexico locally from s. Sonora south to Nayarit and Oaxaca, perhaps to Honduras and Costa Rica.

Occurrence in BCR 32

A very local summer resident and breeder from early or mid-March to mid-September. The only breeding site in BCR 32 at the San Diego Bay saltworks is one of only two in the western United States (other at Salton Sea) and one of 14 known in western North America. After establishment in 1986, the San Diego colony increased to 30 pairs in 1992, dipped to 8–20 pairs for the rest of the 1990s, then increased to an average of 54 pairs from 2006–2009.

Habitat Requirements

The San Diego colony is located on isolated, mostly barren, sections of earthen dikes of salt evaporation ponds in proximity to other colonial waterbirds, particularly other species of larids. Gull-billed Terns feed mainly by dipping to capture prey from the surface of shallow aquatic and sparsely vegetated terrestrial substrates, rarely landing on or plunging to the surface, and may pursue aerial prey, such as swarming, insects. At San Diego Bay, terns forage up to 8–9 km (likely farther) from the colony, most often in a narrow band of intertidal wet sand and shallow water along bay- and ocean-fronting beaches. Less often, terns feed on the upper beach (including sparsely vegetated dunes) and over upland scrub but avoid open water away from the bay or ocean shores. The diet includes fish, insects, marine invertebrates, reptiles, small mammals, and chicks of small birds. The diet at San Diego is largely small marine invertebrates (primarily mole crabs) and fish, and infrequently lizards, crabs, dragonflies, various insects, and very small chicks (rarely eggs) of shorebirds and terns. Many of the fish are taken by kleptoparasitizing Forster's Terns (*Sterna forsteri*).

Issues in BCR 32

- Though currently suspended, there is concern that lethal control of Gull-billed Terns at San Diego Bay, for their predation on chicks of the federally listed California Least Tern (*Sternula antillarum browni*) and Western Snowy Plover (*Charadrius alexandrinus nivosus*), could be re-implemented or replaced by other methods, such as nest removal.
- Despite a modest increasing trend, the small size of the San Diego colony leaves the species vulnerable to extirpation as a breeder in the BCR; potential threats in this regard include human disturbance and predation by large numbers of feral and domestic pets from adjacent urban areas.
- Concern exists for the potential effects on nesting and foraging habitat of Gull-billed Terns from proposed plans for habitat restoration on refuge lands in south San Diego Bay.
- Although levels of contaminants in sampled eggs are below those thought to cause reproductive impairment, they still are of conservation concern.

Existing Actions

- A status assessment completed, and petition to list under the federal Endangered Species Act is under review (currently designated a California Bird Species of Special Concern).

Research and Monitoring Needs

- Conduct demographic studies to determine survival, fecundity, and the degree of mixing among breeding at sites in southern California and western Mexico.
- Monitor known colonies and search for new ones in the California–Baja–west Mexico region.
- Conduct studies of the potential effects of contaminants on terns breeding in San Diego Bay.
- Determine the validity of the distinction between the subspecies *aranea* and *vanrossemi*.

Needed Management Actions

- Maintain protection for current nesting and foraging habitat in San Diego Bay and, if possible, increase or enhance these as part of plans to restore habitats on refuge lands.
- Place a permanent moratorium on lethal or other control measures on terns at San Diego Bay.
- Protect the San Diego colony from predation by feral or domestic pets.

Primary regional contact(s): Brian Collins, San Diego Bay NWR Complex; Erick Mellink and Eduardo Palacios, Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE); Kathy Molina, Natural History Museum of Los Angeles County; Robert Patton.

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Account author: W. David Shuford

CASPIAN TERN, GOLONDRINA-MARINA CASPICA (*Hydroprogne caspia*)

Status Summary

Continental conservation priority: Low concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	3
Threats to non-breeding:	na
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America: 64,000 to 68,000 breeders. Following historical declines, since the late 1970s colony numbers have increased in four of five major breeding regions in North America. Non-significant increasing BBS trend of 0.9%/yr (1966–2009; data deficient).

Abundance and population trend in BCR 32: ~3400 breeders. Historical declines and shift from interior to coastal colonies, with overall colony numbers relatively stable in the last thirty years. Significant increasing BBS trend of 4.4%/yr (data deficient).

Percent of continental population in BCR 32: $\leq 1\%$

Global Distribution

A (nearly) cosmopolitan, monotypic species that occurs widely in the Old and New worlds. In North America, it breeds at scattered sites across the continent and migrates south to winter primarily on the Pacific Coast from s. California south through w. Mexico and (locally) Central America; inland in the Central Volcanic Belt and Atlantic (Gulf) Slope of Mexico; along the southern U.S. Atlantic Coast, the U.S. and Mexican Gulf Coast, (locally) along the Caribbean/Atlantic coast of Central America and northern South America; and locally in the West Indies.

Occurrence in BCR 32

Locally fairly common at and near scattered breeding colonies mainly in coastal estuaries from San Francisco Bay southward and irregularly in the Tulare Basin of the southern San Joaquin Valley and at one site on the coastal slope of southern California. Migrants (and some non-breeders) occur locally throughout the region, and small numbers currently winter regularly on the southern coast north to Morro Bay and casually inland in central and southern California.

Habitat Requirements

Caspian Terns nest in colonies (rarely as single pairs) usually near or adjacent to other colonial nesting waterbirds and close to abundant prey resources. They formerly nested mainly in the interior at freshwater lakes and marshes but now primarily on human-created habitats on the coast. Nests are typically in open, barren to sparsely vegetated areas. Coastal nest sites include salt pond levees, dredge spoil islands, islands created for salt marsh restoration or to enhance nesting sites for endangered Least Terns, and, infrequently, natural islands or depressions scraped bare for dredge materials; one recent colony is on an insular, dilapidated pier. In the Tulare Basin, nest sites include intact or broken levees of agricultural evaporation ponds, sewage ponds, floodwater storage basins, and flooded agricultural fields. The diet is almost entirely small fish but may include crayfish and insects. Being generalist foragers, Caspians tend to prey on the fish most available locally, thus key species in the diet vary by colony and year.

Issues in BCR 32

- Limited in the interior by a lack of high quality nesting and foraging habitat. Colonies on the highly (human) populated coast are at risk from encroaching development, disturbance, and non-native predators.

- Because of their fish-dominated diet, these terns remain at risk from the concentration of contaminants via their prey.

Existing Actions

- Continental status assessment with conservation recommendations completed.
- A plan to reduce fisheries conflicts in the Columbia River estuary includes managing habitat to redistribute a portion of the very large colony there to up to seven sites in the Pacific Coast/Western region (including three in California in San Francisco Bay) identified on the basis of an initial assessment of known and potential nesting sites within that region.
- Clearing or thinning of vegetation has been conducted at some coastal sites to maintain suitable nesting habitat as has predator control to avoid colony abandonment.

Research and Monitoring Needs

- Study population demography to identify which breeding sites are sources or sinks for the overall population and the life history stages at which populations are most limited.
- Continue research on the possible effects of contaminants on this species in San Francisco Bay and expand such work to other breeding areas in the region.
- Use color- or radio-marked birds to study tern movements in response to changing conditions, possible interchange between inland and coastal colonies, and migratory pathways and wintering areas of locally produced terns.

Needed Management Actions

- Restore, enhance, and provide long-term protection for suitable wetlands and maintain isolation of nesting sites from encroaching development, human disturbance, and ground predators.
- In the Tulare Basin, consider enhancing tern habitat primarily in years of exceptional runoff, when it will do the most good. Make some nesting habitat available annually and maintain additional incipient habitat that when flooded in wet periods will provide suitable nesting islands.

Primary regional contact(s): Caitlin Robinson-Nilsen, San Francisco Bay Bird Observatory; Dave Shuford, PRBO Conservation Science; Cheryl Strong, Don Edwards San Francisco Bay NWR.

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Account author: W. David Shuford

BLACK TERN, GOLONDRINA-MARINA NEGRA (*Chlidonias niger*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	3
Threats to breeding:	4
Threats to non-breeding:	na
Percent of population in BCR:	1

BCR 32 conservation priority: Moderate concern.

Abundance and population trend in North America: 100,000 to 500,000 breeders. Non-significant declining BBS trend of -3.5%/yr (1966–2009; data with an important deficiency).

Abundance and population trend in BCR 32: 4000 to 5000 breeders. Non-significant increasing BBS trend 0.4%/yr (1968–2009; data with an important deficiency).

Percent of continental population in BCR 32: <1%.

Global Distribution

Comprised of two subspecies: *C. n. niger* in the Old World, *C. n. surinamensis* in the New World. In North America, the species breeds widely across central and southern Canada and the northern United States, reaching its southwestern breeding limit in California's Central Valley; birds migrate broadly across North and Middle America to wintering grounds mainly in marine and marine-coastal areas of Middle and northern South America. Also occurs in these habitats in summer outside the breeding range, mainly from the Gulf Coast south to northern South America and at the Salton Sea in southern California.

Occurrence in BCR 32

Locally fairly common in scattered breeding colonies in Central Valley rice fields; breeds irregularly (mainly in very wet years) in other shallow-water habitats in this region. More widespread during migration, when a few birds reach the coast; formerly more numerous on the southern coast during migration.

Habitat Requirements

Nests in shallow, highly productive emergent wetlands or their equivalents. In BCR 32, most birds now breed in cultivated rice fields. Breeding is infrequent in managed marshes in the Sacramento Valley, and, mainly in very wet years, in flooded agricultural fields with residual crops or weeds or other low stature wetlands in the San Joaquin Valley. Diet of breeding terns typically is mainly insects, particularly damselflies and dragonflies, but also includes spiders, amphipods, crayfish, small mollusks, and small fish. Fish sometimes may dominate the diet by mass and provide an important source of calcium.

Migrants in the interior may concentrate on swarming insects.

Issues in BCR 32

- Very few terns breed in habitat managed mainly for wildlife, and a corresponding concentration of terns in agricultural lands of uncertain (long-term) reliability and quality is risky.
- High competition and cost for water may limit the ability to manage for species using ephemeral shallow-water wetlands in the Central Valley, where evaporation rates are high.
- Contaminants may be of concern given the species' insectivorous feeding habits and concentration for breeding in cultivated rice fields.

Existing Actions

- Continental status assessment and conservation plan completed, and designated a California Bird Species of Special Concern.

Research and Monitoring Needs

- Assess whether the value of rice fields to terns equals that of ephemeral overflow habitat or natural marshes.
- Conduct studies to examine concerns about the potential effects on terns of agricultural pesticides and crop cultivation practices in rice fields.
- Study what conditions in rice fields are correlated with the establishment of tern colonies.
- Conduct research on the foraging and nesting ecology of terns in rice fields, on movements of banded birds with changing water conditions or other agricultural practices, and on population demography to identify if reproductive rates are high enough in rice to maintain long-term population stability.
- Design and implement a monitoring program in the Central Valley based on a set of standardized roadside transects in rice fields in the Sacramento Valley run in early June.

Needed Management Actions

- Restore, enhance, and protect suitable wetlands, and maintain isolation of colonies from humans and ground predators.
- Consider enhancing tern habitat primarily in years of exceptional runoff, when it will do the most good and is most feasible.
- When possible, flood fields containing residual vegetation or crop stubble for use as breeding habitat. Explore retiring fields with marginal crop yields and putting them in a conservation bank to be flooded when water is available. Weigh such flooding against possible mortality of waterbirds from botulism disease outbreaks, which might be reduced by rotating fields to be flooded and choosing areas with no prior evidence of disease.

Primary regional contact(s): Dave Shuford, PRBO Conservation Science.

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Account author: W. David Shuford

FORSTER'S TERN, GOLONDRINA-MARINA DE FORSTER (*Sterna forsteri*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	4
Threats to breeding:	3
Threats to non-breeding:	2
Percent of population in BCR:	1

BCR 32 conservation priority: Moderate concern.

Abundance and population trend in North America: 47,000–51,500 breeders. Non-significant declining BBS trend of -1.7%/yr (1966–2009; data with an important deficiency).

Abundance and population trend in BCR 32: About XXXX-XXXX breeders. Non-significant declining BBS trend of -1.1%/yr (1968–2009; data deficient). Declining trend in San Francisco Bay (1982–2003) difficult to interpret because of some missing data and potential regional interchange of breeders, e.g., lowest total for 21 years in SF Bay in 1998 coincided with exceptional breeding numbers in the San Joaquin Valley that year in response to greatly enhanced nesting conditions following an El Niño winter. Since the 1960s, numbers generally have increased in San Diego Bay.

Percent of continental population in BCR 32: XXX%.

Global Distribution

Breeds locally coast to coast in North America and from s.-central Canada south to n. Baja California Norte and the Gulf Coast of Tamaulipas, Mexico. Largest fairly contiguous breeding areas are in an arc across the prairies of s. Canada and the n. United States and in the Intermountain West of ne. California, se. Oregon, n. Nevada, s. Idaho, and n. Utah. Winters on the Pacific Coast from n. California (mainly SF Bay area) south through Baja California and west Mexico to El Salvador; on the Atlantic Coast from s. New Jersey south through Florida; along the Gulf Coast States and Mexico south to the Yucatán; from Honduras south (rarely) to Costa Rica and Panama; and inland in s. California, portions of the Gulf Coast States and Florida, and in Mexico in Baja, on the Atlantic and Pacific slopes, and the central interior.

Occurrence in BCR 32

Occurs year round in the Sacramento–San Joaquin River Delta, along the outer coast, and locally inland on the coastal slope from s. California southward; occurs throughout the BCR in migration. Breeds locally in the Central Valley (formerly s. Sacramento Valley, currently only in San Joaquin Valley) and along the coast from the San Francisco Bay estuary south to Mexican border. Largest breeding numbers are in San Francisco Bay estuary, Bolsa Chica Ecological Reserve, San Diego Bay, and in (some years) the San Joaquin Valley.

Habitat Requirements

In coastal California, most terns nest on dredge spoil islands or degraded insular levees in current or former salt ponds, but also in slough channels, diked marshes, and muted tidal wetlands. In the Central Valley in 1998, following an El Niño winter, most terns nested on former nest mounds of coots or on island fragments of levees in flooded agricultural fields with residual crops or weeds; also on islands in a large open-water reservoir and a compensation wetland, on the edges of emergent marsh or on former grebe or coot nest mounds at small open-water reservoirs, and on an internal levee of an agricultural evaporation basin. Forster's Terns typically forage by plunge-diving, often from hovering flight, into the shallow waters (or upper surface) of marshes, lakes, reservoirs, streams, salt ponds, estuaries, and inshore marine areas. Overall diet is primarily small fish and some arthropods. The dominant fish in the diet at Elkhorn Slough, Monterey County, in July were mostly juveniles of shiner perch (*Cymatogaster aggregata*), northern anchovy (*Engraulis mordax*), and arrow goby (*Clevelandia ios*).

Issues in BCR 32

- In most years, lack of suitable habitat in the Central Valley is limiting to this species.
- Terns nesting at evaporation ponds and alternative wetlands in the San Joaquin Valley have very high rates of predation from native predators, and those nesting in coastal areas adjoining extensive urbanization are at risk from predation by large numbers of feral and domestic pets.
- Human disturbance is an issue at some coastal and interior sites.
- Pesticides and other contaminants have been found at elevated levels in eggs of this species in San Francisco Bay, though no reproductive effects have been documented there (currently under study).
- Forster's Terns in San Francisco Bay are at risk from direct displacement or egg and chick predation by a rapidly expanding population of nesting California Gulls (*Larus californicus*).

Existing Actions

- This species, along with other colonial nesters, is included in planning for the South Bay Salt Pond Restoration Project in San Francisco Bay.

Research and Monitoring Needs

- Continue to study the effects of California Gulls on nesting Forster's Terns in San Francisco Bay.
- Conduct demographic studies to determine factors or life stages that limit the species, and investigate the degree of interchange between coastal and interior colonies.
- Conduct a regionwide survey of the breeding population about every 10 years, during typical climatic and habitat conditions, to document potential range shifts and calibrate long-term monitoring data; continue annual monitoring at key coastal sites.

Needed Management Actions

- Maintain protection for nesting and foraging habitats, and increase or enhance these during restoration on refuge lands in San Francisco and San Diego bays
- Increase nesting habitat in the Central Valley by securing additional water supplies and by designing wetlands with features attractive to the terns (e.g., barren nesting islands, abundant small fish).

Primary regional contact(s): Josh Ackerman, U.S. Geological Survey; Brian Collins, San Diego Bay NWR Complex; Charles Collins, Calif. State Univ., Long Beach; Caitlin Robinson-Nilsen, San Francisco Bay Bird Observatory; Robert Patton; Dave Shuford, PRBO Conservation Science.

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Account author: W. David Shuford

ROYAL TERN, GOLONDRINA-MARINA REAL (*Thalasseus maxima*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	4
Threats to non-breeding:	2
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America: 100,000–150,000 breeders. Overall, numbers generally appear to be holding constant, though few systematic population data for colonies in most of range. Non-significant declining BBS trend of -1.9%/yr (1966–2009; data deficient).

Abundance and population trend in BCR 32: Breeding numbers have increased from two (one pair) in 1959 to presently an average of <100 (numbers variable year to year). Post-breeding and winter numbers have declined historically but still today substantially exceed current breeding numbers.

Percent of continental population (breeding) in BCR 32: <0.1%

Global Distribution

Two subspecies: *S. m. albididorsalis* in the Old World (w. Africa), *S. m. maxima* in the New World. In North America, breeds locally on Pacific Coast from s. California south to n. Baja California Sur, Gulf of California (south to Isla Raza), n. Sinaloa, and Islas Tres Marias; on Atlantic Coast from Virginia (irregularly se. Maryland) south to Florida and on Gulf Coast west to s. Texas; on islets off Yucatán, Mexico, and (possibly) Belize; and in West Indies. In South America, breeds locally on north coast and austral region (Argentina, perhaps Uruguay and Brazil). Post-breeding dispersal north on Pacific Coast to s.-central California, on Atlantic Coast to Massachusetts (rarely to Maritime Provinces), and north from West Indies to Bermuda. Winters mainly on Pacific Coast from s.-central California south to Peru, Atlantic and Gulf coasts from n. North Carolina south to Panama and the Guianas, and in West Indies.

Occurrence in BCR 32

Breeds very locally. First recorded (one pair) nesting at south San Diego Bay in 1959; colonies initiated at Bolsa Chica, Orange Co., in 1988 and at the Port of Los Angeles, Los Angeles Co., in 1998. Although timing and abundance was variable, post-breeders from Mexican waters formerly ranged north to the San Francisco Bay and Pt. Reyes area (exceptionally Humboldt Bay) in all months (peak numbers Sep–Mar, when formerly “fairly common”). Considered less regular after about 1912, at least north of southern California, and since the 1950s post-breeding and wintering numbers much diminished with birds now regular north only to the Morro Bay area, San Luis Obispo Co. Declining numbers and range retraction coincided with a drastic reduction in Pacific Sardines (*Sardinops sagax*) in central and southern California while Elegant Tern numbers and their Northern Anchovy (*Engraulis mordax*) prey were increasing.

Habitat Requirements

In California, has nested in association with dense aggregations of Elegant Terns in barren to sparsely vegetated habitat; like the latter species, appears to require a prior nucleus of other larid species that are more aggressive in attacking intruders. Colonies are on isolated earthen dikes of salt ponds or dredge-formed islands in estuaries and harbors close to feeding areas. Flocks of resting terns form on beaches (particularly at estuary mouths) and mudflats. Birds forage in shallow marine waters of bays, estuaries, lagoons, and inshore ocean waters, though apparently also (rarely?) on the open ocean far from shore. Diet in California poorly known but appears to be mainly close inshore schooling fish of the families Atherinidae (probably largely Topsmelt, *Atherinops affinis*) and Engraulidae.

Issues in BCR 32

- Integrity of nesting sites at risk from elevated human disturbance and predation from feral or domestic animals spilling over from the adjacent densely populated cities of southern California.
- The colony site at Port of Los Angeles likely will be lost, as created with the intent to develop it as a shipping-container port. Loss may reduce BCR breeding numbers, though population may be limited more by food supply than by available nesting habitat, as breeding numbers vary greatly annually despite the extent of nesting habitat remaining relatively stable.
- Habitat restoration at San Diego Bay and Bolsa Chica potentially could impact the species, but difficult to evaluate given preferred management options have not yet been selected.
- Contaminants have not been studied in the small California breeding population but likely are not a threat on the basis of knowledge gained from Elegant Terns nesting at the same sites.
- Oil spills and pollution (urban runoff, industrial wastes) may degrade important foraging areas.

Existing Actions

- Receives de-facto protection because of proximity to breeding colonies of the Endangered California Least Tern (*Sternula antillarum browni*) and other species of colonial waterbirds..

Research and Monitoring Needs

- Conduct ecological and demographic studies to determine factors and life stages limiting the species.
- Investigate the relationship between prey abundance and numbers of nesting terns and their reproductive success.

Needed Management Actions

- Protect and enhance nesting habitat at San Diego Bay and Bolsa Chica, and offset the expected loss at the Port of Los Angeles by creating alternative habitat there, expanding habitat at the other colonies, or creating new habitat elsewhere in southern California.

Primary regional contact(s):

Brian Collins, San Diego Bay NWR Complex; Charles Collins, Calif. State Univ., Long Beach; Kathy Keane, Keane Biological Consulting; Robert Patton.

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Account author: W. David Shuford

ELEGANT TERN, GOLONDRINA-MARINA ELEGANTE (*Thalasseus elegans*)

Status Summary

Continental conservation priority: Moderate concern.

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	4
Threats to non-breeding:	2
Percent of population in BCR:	2

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America: 34,000–60,000 breeders (no recent precise data).

Long-term trend uncertain. Overall number of colonies reduced by losses in Mexico but offset to an unknown degree by new colonies in southern California. Few recent or precise data from Mexican colonies, so unclear if rapid increase in California (two-fold since mid-1990s) is representative of the entire North American breeding population.

Abundance and population trend in BCR 32: Exponential increase from 62 breeders in 1959 to about 22,400–26,600 in 2003–2004; size of larger post-breeding population unknown but variable.

Percent of continental population in BCR 32: Uncertain and varies by season.

Global Distribution

Breeds locally on the Pacific coast from s. California south to c. Baja California and in the Gulf of California south to Isla Raza (holding, at least formerly, 90%–97% of global breeding population). After breeding, birds disperse north along the Pacific Coast mainly as far as c. or n. California, less frequently (years of warm water intrusion, such as El Niño) to Oregon, s. Washington, and (rarely) British Columbia. Summer non-breeders occur mainly from c. California south to Costa Rica. Winters mainly in South America south to Puerto Montt, Chile; local and irregular from Nayarit, Mexico, south through Panama, and common south of Ecuador.

Occurrence in BCR 32

Increasing anchovy stocks in 1953–1954 that peaked in 1959–1960 (1957–1958 El Niño) seem to explain the upswing in numbers of post-breeding terns in California in the 1950s and the formation of the state's first breeding colony in south San Diego Bay in 1959; colonies initiated at Bolsa Chica, Orange Co., in 1987 and at the Port of Los Angeles, Los Angeles Co., in 1998. Prior to the 1950s, post-breeders ventured rarely and irregularly north only to San Francisco Bay (Aug–Oct). Currently large numbers (thousands in peak years) regularly reach the north-central coast (mainly late Jun–Oct); birds now tend to arrive earlier and remain later, and the regular post-breeding range extends north (beyond BCR 32) to Humboldt County. Marked variation in timing of arrival (and abundance) appears to reflect anchovy abundance and oceanographic conditions, with arrival generally progressively later with increasing latitude.

Habitat Requirements

Nests in dense aggregations in low, flat and barren to sparsely vegetated habitat, but appears to require prior nucleus of other larid species that are more aggressive in attacking intruders. California colonies are on isolated earthen dikes of salt ponds or dredge-formed islands in estuaries and harbors. Roosts on isolated coastal mudflats, sandy beaches, islands, and artificial structures. Birds forage in estuaries, bays, harbors, lagoons, and inshore ocean waters mostly within 4 km of shore; breeding birds forage mainly >8 km (up to 25 km) from colony. Diet is usually schooling fishes and very rarely includes crustaceans. Northern Anchovy (*Engraulis mordax*) is the principal prey at two California colonies, but other species comprising >5% of the diet in a given year are Topsmelt (*Atherinops affinis*), Longjaw Mudsucker (*Gillichthys mirabilis*), Anchovies (*Anchoa* spp.), California Grunion (*Leuresthes tenuis*), Jack Mackerel (*Trachurus symmetricus*), Surfperch (Embiotocidae), and Pacific Sardine (*Sardinops sagax*).

Issues in BCR 32

- Integrity of nesting sites at risk from elevated human disturbance and predation from feral or domestic animals spilling over from the adjacent densely populated cities of southern California.
- The colony site at Port of Los Angeles likely will be lost, as created with the intent to develop it as a shipping-container port; loss may reduce BCR breeding numbers, though population may be limited more by food supply than by available nesting habitat given two-fold increase in breeding numbers in the late 1990s to early 2000s when extent of nesting habitat was relatively stable.
- Habitat restoration at San Diego Bay and Bolsa Chica potentially could impact the species, but difficult to evaluate given preferred management options have not yet been selected.
- Contaminants have been detected in terns and eggs but not considered a threat to population.
- Oil spills and pollution (urban runoff, industrial wastes) may degrade important foraging areas.

Existing Actions

- Receives de-facto protection because of proximity to breeding colonies of the Endangered California Least Tern (*Sternula antillarum browni*) and other species of colonial waterbirds.

Research and Monitoring Needs

- Conduct standardized, regular censuses at all of the colonies in the entire range, as it is difficult to manage in BCR 32 without knowledge of overall trends for the species.
- Conduct ecological and demographic studies to determine factors and life stages limiting the species.

Needed Management Actions

- Protect and enhance nesting habitat at San Diego Bay and Bolsa Chica, and offset the expected loss at the Port of Los Angeles by creating alternative habitat there, expanding habitat at the other colonies, or creating new habitat elsewhere in southern California.

Primary regional contact(s):

Brian Collins, San Diego Bay NWR Complex; Charles Collins, Calif. State Univ., Long Beach; Kathy Keane, Keane Biological Consulting; Robert Patton.

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Account author: W. David Shuford

BLACK SKIMMER, RAYADOR AMERICANO (*Rynchops niger*)

Status Summary

Continental conservation priority: High concern

BCR 32 conservation scores:

Population trend:	1
Threats to breeding:	4
Threats to non-breeding:	2
Percent of population in BCR:	1

BCR 32 conservation priority: Low concern.

Abundance and population trend in North America: 65,000–70,000 breeders. Non-significant declining BBS trend of -4.4%/yr (1966–2009; data deficient).

Abundance and population trend in BCR 32: On average, about 1800–2000 breeders from 1995 to the present, with high variability in abundance and reproductive success at individual sites.

Percent of continental population in BCR 32: <3%.

Global Distribution

One subspecies recognized in North America, *R. n. niger*. On the Atlantic coast, breeds from s. Massachusetts to s. Florida and along the Gulf Coast west to Texas and south to the Yucatan Peninsula. In the West, breeds primarily in coastal s. California and the Salton Sea, but a few pairs now nest in central and n. California. In western Mexico, breeds very locally from Baja California Norte south to Sinaloa, Nayarit, and Colima. On the Atlantic coast, winters from North Carolina south to Florida and along the Gulf Coast west to Texas and south to e. Mexico and the West Indies. On the Pacific coast, winters from s. California south to Baja California and the Gulf of California, and from Sonora on the west coast of Mexico south to El Salvador and Nicaragua.

Occurrence in BCR 32

A year-round resident in coastal Los Angeles, Orange, and San Diego counties, and more recently in Santa Clara County. Although the breeding range has expanded north along the Pacific coast to San Francisco Bay, in BCR 32 the majority of the breeding population occurs in coastal southern California. Winters locally in substantial numbers on the coast of southern California from Santa Barbara to San Diego counties. Small numbers at Morro Bay, San Luis Obispo County, appear to be mainly spring and fall migrants.

Habitat Requirements

For nesting requires large areas of bare earth sufficiently isolated from terrestrial predators and other disturbances. Colonies most often form on small constructed islands or on isolated sections of eroded impoundment levees. In winter, flocks commonly roost on urban beaches well above the tide line or on mud flats in estuaries. Beach sites that are habitually used by skimmers are often associated with estuaries or protected harbors and are near the mouths of rivers or other drainage channels. Skimmers forage for small fish and possibly crustaceans by cutting or “skimming” the water’s surface with the lower mandible in the calm shallows of harbors, lagoons, bays, estuaries, ponds, and river channels in fresh as well as estuarine and marine waters.

Issues in BCR 32

- Nest attempts and success may be negatively affected by large aggregations of roosting and breeding waterbirds (e.g., American White Pelicans, Elegant Terns, California Gulls).
- Increased disturbance by humans, pets, and feral animals and the associated increased predation opportunities by avian predators can disrupt nesting attempts of entire colonies and significantly reduce annual nesting success.

- Mortality of chicks and eggs from natural elements are potential threats if exacerbated by human disturbance or other activities that compromise habitat suitability.
- Ingestion of oil during preening of feathers may have deleterious effects.
- Catastrophic oil spills on large sections of shoreline habitat could adversely affect important loafing and foraging areas.

Existing Actions

- Designated a California Bird Species of Special Concern.

Research and Monitoring Needs

- Conduct studies of diet, foraging, provisioning behavior, and nest attendance to elucidate factors that influence the low apparent reproductive success in some years.
- Conduct demographic studies to determine fledging success, juvenile survival, adult longevity, recruitment, and the degree of mixing among breeders at sites within the southern California–Baja California region.
- Monitor population size and trend using standardized protocols across colonies.
- Develop standardized indices of reproductive success since some colony sites demonstrate poor productivity which cannot be explained by predation alone.

Needed Management Actions

- Protect and maintain the extent and integrity of all existing nesting habitats and incorporate such protections in developing restoration plans.
- Modify existing nesting habitat by augmenting problematic substrates with sand, shell, or fine gravel, and enhance the isolation of sites from terrestrial predators and humans.
- Establish additional colony sites at coastal locations where crowding and interference by large flocks of breeding terns or resting waterbirds may reduce nest success.
- Protect productive foraging areas that may be especially vulnerable to contamination, such as protected inlets, bays, and lagoons.

Primary regional contact(s): Kathy Molina, Natural History Museum of Los Angeles County; Charles Collins, Calif. State Univ., Long Beach.

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