

Section 3. Analysis of Impacts of the Delta Wetlands Project on the Greater Sandhill Crane

SPECIES DESCRIPTION

The greater sandhill crane is the largest of four recognized subspecies of sandhill crane (Walkinshaw 1949). The greater sandhill crane is a wetland-associated bird, requiring marsh and meadow habitats during the breeding season and shallow, wet habitats for roosting during winter. This subspecies feeds primarily on invertebrates, roots, tubers, and certain cereal grains during winter (Schlorff and Bloom 1983).

Four populations of greater sandhill crane are recognized: Eastern, Rocky Mountain, Lower Colorado River Valley, and Central Valley. The Central Valley population nests from northeastern California to British Columbia (USFWS 1978, Pogson and Lindstedt 1988). The entire Central Valley population, estimated at 3,400-6,000 individuals (DFG 1989), winters in the Central Valley, along with the entire Pacific Flyway population of lesser sandhill crane (*Grus canadensis canadensis*) (Pogson and Lindstedt 1988).

Seven locations in the Central Valley are considered important wintering sites for the greater sandhill crane: the Delta, Chico, Butte Sink, Angel Slough, Modesto, Merced, and Pixley (Figure 3-1). The most important of these sites is the Delta, which supports as much as 75% of the Central Valley population during late winter (Pogson and Lindstedt 1988).

Winter Habitat Requirements

Both roosting and foraging habitat are essential to the Central Valley population during winter. Greater sandhill cranes congregate in communal roosts at night and fly off each morning to forage in suitable fields, pastures, or other shallow wetland habitats. Most traditional foraging areas are near (within 2-3 miles of) communal roost sites. Thus, the proximity of foraging habitat to communal roost sites is an important determinant of suitable wintering habitat.

Communal roost sites are typically large fields (100+ acres), flooded with 2-25 cm of standing or slowly moving water, and with relatively low-relief shorelines (Pogson and Lindstedt 1988). Most roost sites in the Central Valley are on private duck clubs and have been created to attract wintering waterfowl.

Foraging habitat for the Central Valley population varies at different locations in the Central Valley. The primary source of carbohydrates is cereal grains: waste corn in the Delta and Modesto regions and waste rice in the Sacramento Valley. Cranes also forage on wheat sprouts in newly planted winter wheat fields and on sprouts, shoots, tubers, invertebrates, and seeds in fallow fields and in uncultivated habitats (field borders, levees, canal and irrigation ditch banks). (Pogson and Lindstedt 1988.)

Reasons for Decline and Threats to the Population

The decline in the breeding population in California is attributable primarily to the loss and degradation of important wetland breeding sites in northeastern California (DFG 1989). Conversion of native meadows and marshes to agriculture, mowing of meadow grasses during the breeding season, and damage to meadow habitats and active nests resulting from cattle grazing have contributed to the population decline in the state.

The conversion of wetland habitats in the Central Valley may also have contributed to population declines by eliminating important wintering habitat. Pogson and Lindstedt (1988) suggest that the distribution of wintering cranes may have been more widespread throughout the Central Valley, but destruction of wetland habitats caused the Central Valley population to concentrate onto the several remaining key winter sites.

Management activities to prevent further population declines in the state include acquiring important breeding sites in northeastern California (e.g., DFG acquisition of Ash Creek Wildlife Area) and key roosting sites in the

Central Valley (e.g., Woodbridge Ecological Reserve). Other activities include working with landowners to continue to maintain wetland habitats on private lands in key wintering habitat areas (DFG 1989).

STATUS OF THE GREATER SANDHILL CRANE IN THE SACRAMENTO- SAN JOAQUIN DELTA

Distribution and Abundance

Greater sandhill cranes begin arriving in the Central Valley in October. During winter, the distribution of the Central Valley population shifts as cranes move between the major wintering sites. Records from Pogson and Lindstedt (1988) and DFG crane surveys indicate that populations in the Delta are relatively small in October (from zero to about 1,500 cranes) and begin increasing in mid-November to late November. The Delta population peaks in January and February (4,000-5,000 cranes) and declines sharply by March as cranes begin their northward migration.

The increased abundance of cranes in the Delta during January and February coincides with a decline in abundance in the Chico and Butte sink areas. Pogson and Lindstedt (1988) suggest that movement of the population from the northern Sacramento Valley to the Delta may be a traditional occurrence, possibly brought on by changes in food resources or roosting habitat availability. Thus, although greater sandhill cranes winter in the Delta from October through March, their abundance in the Delta is greatest toward the latter portion of the wintering season.

The central Delta and the Cosumnes and Mokelumne River floodplains provide habitat for the entire Delta wintering population (Pogson and Lindstedt 1988). For this analysis, the Cosumnes and Mokelumne River floodplains east of Interstate 5 are also included in the Delta region (Figure 3-2). Delta islands considered important greater sandhill crane winter foraging and roosting habitat include Staten Island, Tyler Island, Brack Tract, and Canal Ranch. Other Delta islands considered crane winter foraging areas include Grand Island, Terminous Tract, New Hope Tract, and Bouldin Island (Pogson and Lindstedt 1988). Isolated records of cranes suggest that cranes may also forage on adjacent Delta islands occasionally. DFG has recently expanded the area in the Delta designated by Pogson and Lindstedt (1988) as a greater sandhill crane wintering area. This expansion is based on crane sightings made during waterfowl survey

flights, fowl cholera monitoring, and routine environmental review and wildlife management activities from 1983 to 1993 (Wernette pers. comm.).

Cranes are found primarily in suitable roosting habitat and adjacent suitable foraging areas. Roost sites are limited in the central Delta, although cornfields and wheat fields and other crane foraging habitats are abundant. Thousands of lesser and greater sandhill cranes converge each evening on the few available roost sites in the Delta provided by private duck clubs. Two important roost sites, Woodbridge Ecological Reserve and the Robin Bell property, are owned by DFG solely for the management of greater sandhill cranes. Thus, although suitable winter foraging habitat is abundant in the Delta, only a small portion near roost sites is regularly used by cranes.

Use of the Delta Wetlands Project Islands by Greater Sandhill Cranes

Information presented in this section is based on surveys prepared in 1987-1990. No change has occurred since that time regarding circumstances on the DW islands or land use management decisions; therefore, this information generally reflects current conditions on the DW islands unless otherwise noted.

Bouldin Island

Greater sandhill cranes were regularly observed on Bouldin Island in surveys conducted between October 1987 and March 1988; the frequency of use apparently increased from November through February and declined sharply by March as cranes began their northward migration toward their breeding grounds. This pattern corresponds with DFG counts of sandhill cranes on Bouldin Island made between 1983 and 1989 (Table 3-1) and with the overall increase in abundance of greater sandhill cranes in the Delta during December and January noted by Pogson and Lindstedt (1988). Comparison of monthly greater sandhill crane populations at Bouldin Island with estimates for the entire Delta (Pogson and Lindstedt 1988) indicate that Bouldin Island supports an estimated 0.8%-5.0% of the monthly crane population in the Delta during November to January.

Cranes were observed feeding in harvested cornfields and winter wheat, and on herbaceous habitats on levee slopes on Bouldin Island in 1988. Bouldin Island supported 5,625 acres of suitable crane foraging habitat, mostly under intensive agriculture in 1987. The nearest important winter foraging areas are the adjacent Staten

and Tyler Islands to the north and Brack Tract to the northeast, which support up to 4,000 wintering cranes (Pogson and Lindstedt 1988).

Bouldin Island is the only DW project island that receives substantial use by wintering greater sandhill cranes or that is within the area designated as a crane wintering area by Pogson and Lindstedt (1988). DFG has recently designated all of Bouldin Island as a greater sandhill crane wintering area based on additional sightings through 1993.

Webb Tract

One sandhill crane (subspecies not identified) was observed on Webb Tract during an aerial survey in December 1987; no other cranes were seen here during aerial and ground surveys during this period. A flock of nine cranes (subspecies also not identified) was also seen on an incidental visit to Webb Tract on January 19, 1991. Although Webb Tract was not considered an important greater sandhill crane wintering area by Pogson and Lindstedt (1988), it supports suitable foraging habitat (e.g., nearly 2,700 acres of corn and wheat and more than 800 acres of herbaceous upland habitat in 1987) and is only about 3 miles from important roost sites on Tyler and Staten Islands. DFG has recently designated Webb Tract as a greater sandhill crane wintering area based on additional sightings through 1993.

Bacon Island

Most crops on Bacon Island are not suitable as foraging habitat for greater sandhill cranes. Cranes have not traditionally used Bacon Island, and none were observed during surveys of the island in 1987 and 1988. DFG, however, reports a recent isolated record of a greater sandhill crane on Bacon Island (Wernette pers. comm.). Bacon Island is approximately 8 miles from important greater sandhill crane wintering areas (Pogson and Lindstedt 1988).

Holland Tract

No cranes were observed on Holland Tract during field surveys. The only record of greater sandhill crane use of Holland Tract found was a recent isolated record reported by DFG. Holland Tract is approximately 7 miles from the nearest important greater sandhill crane wintering areas (Pogson and Lindstedt 1988). Although portions of the island provide suitable foraging habitat, the island is not expected to support regular use by

greater sandhill cranes because of the distance to important wintering areas.

IMPACT OF THE PROJECT ON GREATER SANDHILL CRANES

Suitable wintering habitat in the Delta is confined to a small, clearly identifiable region of the central Delta. Therefore, the loss of traditional wintering sites from this area could adversely affect the Central Valley population.

Methods

There are no established mechanisms or guidelines for assessing or mitigating impacts on the greater sandhill crane. DFG recommends a conservative mitigation approach using an acre-for-acre compensation ratio for all lands known to be used by the greater sandhill crane, including lands with only isolated records of crane use (Wernette pers. comm.). The rationale for this is DFG's interpretation of the California Endangered Species Act and the determination that loss of any suitable foraging habitat for wintering cranes may affect the species. Although surveys indicated that only Bouldin Island receives substantial use by cranes, this assessment uses the DFG recommendation for assessment and mitigation.

DFG further recommends that impacts on greater sandhill cranes in the south Delta (i.e., Bacon Island) be mitigated in the south Delta (i.e., Holland Tract) and that impacts in the north Delta (i.e., Webb Tract) be mitigated in the north Delta (i.e., Bouldin Island).

Results

Small numbers of greater sandhill cranes make irregular use of the DW reservoir islands; therefore, the DW project is expected to have a negligible impact on current crane use patterns in the Delta. However, the development of the reservoir islands (Bacon Island and Webb Tract) would remove 1,751 acres of potential crane habitat in the south Delta (Bacon Island) and 4,850 acres of potential crane habitat in the north Delta (Webb Tract) (Table 3-2).

Additional crane habitat would be lost on Bouldin Island and Holland Tract as a result of implementation of the comprehensive HMP that includes compensating on the habitat islands for losses of wetland habitats (i.e.,

riparian forest, riparian scrub, and pond) on the reservoir islands. A total of 418 acres on Bouldin Island would be used to compensate for losses of wetland habitats on Webb Tract, and a total of 9 acres on Holland Tract would be used to compensate for losses on Bacon Island (Table 3-3).

A total of 7,028 acres is required to mitigate all loss of greater sandhill crane foraging habitat (Table 3-3).

An additional feature of the project is the management of a waterfowl hunting program on the habitat islands during winter. Because cranes are known to be sensitive to hunting and other human disturbances, the hunting program could have the effect of forcing cranes off the islands during hunt times or preventing cranes from establishing traditional foraging use patterns. Therefore, in addition to offsetting foraging habitat acreages, greater sandhill crane protection measures would also ensure that cranes will use the habitat islands within the framework of a hunting program. Therefore, to fully offset impacts of foraging habitat loss, a minimum of 14% of the habitat islands would be closed to hunting disturbances on the habitat islands.

Mitigation

DW would use habitat island sites to offset greater sandhill crane impacts of the DW project. A minimum of 7,028 acres is required to be managed during fall and winter as high-quality habitat for the greater sandhill crane to compensate for project impacts. Implementation of the HMP, however, would provide 7,673 acres of suitable crane habitat.

Under the HMP, a total of 10 habitat types would be developed on each island, seven of which are suitable for greater sandhill crane habitat (Table 3-4). Although some habitats would be co-managed for waterfowl, they will be managed in a manner to provide moderate to high crane foraging values. In addition, the proposed juxtaposition of seasonal managed wetland, corn-wheat rotation, uplands, and pasture habitats would provide extensive potential crane roosting habitat adjacent to crane foraging habitat.

To offset the potential effect of the hunting program on the habitat islands, three no-hunting zones (closed zones) would initially be established. The sizes, locations, and habitat juxtapositions of the closed zones were based on mitigation requirements for cranes and waterfowl. Thus, the sizes of closed zones established in the

HMP exceeds the minimum mitigation requirement for cranes.

Two closed zones, totaling 1,279 acres (21% of Bouldin Island), are proposed for Bouldin Island, and one closed zone, totaling 728 acres (24% of Holland Tract), is proposed for Holland Tract. Crane roosting habitat, as described above, has been incorporated into the closed-zone areas. In addition, some mixed agriculture/seasonal wetland habitat type is also included within each closed zone to evaluate crane use of this experimental habitat type. The types of human disturbances in and adjacent to closed zones would also be restricted. Use of the airstrip located in the east Bouldin Island closed zone also would be restricted. All flights related to habitat management activities would be restricted to nonhunt days to reduce disturbance. Flights related to recreation may occur on hunt days, but landings and takeoffs may only occur between 12:00 p.m. and 2:00 p.m. DW will monitor the effects of airstrip use on greater sandhill cranes to determine whether existing use restrictions are sufficient to satisfy mitigation requirements.

Crane use of hunted portions of the islands will be influenced by the density of hunters and the level and frequency of disturbance. Hunt days will occur on Wednesdays, Saturdays, and Sundays. Free-roam and spaced-blind hunting areas have been established on both habitat islands in a ratio of approximately 50:50. Hunter density will not exceed one hunter per 60 acres in the free-roam zone and one blind per 50 acres in the spaced-blind zone. The spaced-blind zones have been designed to surround the closed zones to limit hunter movement and disturbances near the closed zones. Fixed spaced blinds will be at least 200 feet from the closed-zone boundaries. The free-roam hunting areas have been established in the remaining portions of the habitat islands. Potential crane use of hunted areas is unknown; however, it is anticipated that hunted areas will receive limited crane use during nonhunt days and infrequent incidental use during hunt days.

Table 3-5 outlines management objectives and specific strategies for managing the habitat islands as suitable habitat for greater sandhill cranes.

Conclusions

Impacts of the DW project on the greater sandhill crane are assessed using DFG's recommendation of an acre-for-acre compensation ratio. Using this approach, the proposed project would replace 7,028 acres of potential crane foraging habitat on Bacon Island and Webb

Tract with a minimum of 7,028 acres of suitable habitat on Bouldin Island and Holland Tract (7,673 acres of suitable crane habitat will be provided under the HMP. The typical cropping pattern of corn and wheat on the habitat islands would be converted to a mosaic of 10 habitat types, seven of which are suitable greater sandhill crane habitat. Management of these cover types (corn/wheat, wheat, managed agriculture-wetland, seasonal managed wetland, pasture, upland, and summer seasonal pond) during fall and winter would maximize crane foraging and roosting habitat suitability. Establishment of closed zones will ensure that approximately 22% of the habitat islands would be free of hunting and other disturbances.

Implementation on the habitat islands of the HMP and of mitigation measures identified in the EIR/EIS would offset adverse impacts resulting from habitat loss on reservoir islands and reduce impacts on greater sandhill cranes to a level of less than significant. Overall, the DW project would have a substantial beneficial impact on the greater sandhill crane by enhancing foraging and roosting habitat conditions in the north and south Delta regions.

Table 3-1. Sandhill Cranes Observed on Bouldin Island during Aerial Surveys Conducted by DFG between 1983 and 1989

Date of Survey	Number of Sandhill Cranes
October 1986	0
November 1986	0
November 1985	3
November 1983	115
November 1983	117
December 1985	65
December 1985	79
January 1989	318
January 1987	250
January 1986	250
March 1987	0

Table 3-2. Acreages of Suitable Greater Sandhill Crane Habitat Types on the DW Reservoir Islands

Habitat	Suitable for Sandhill Crane	Bacon Island	Webb Tract	Total
Riparian woodland		0.0	47.7	47.7
Riparian scrub		3.4	58.0	61.4
Emergent marsh		2.7	172.0	174.7
Exotic marsh	X	30.4	783.3	813.7
Annual grassland	X	260.8	534.6	795.4
Exotic perennial grassland	X	267.6	304.2	571.8
Corn	X	775.8	2,222.9	2,998.7
Wheat	X	0.0	445.0	445.0
Milo	X	83.6	0.0	83.6
Potato		1,882.6	0.0	1,882.6
Sunflower		190.7	0.0	190.7
Asparagus		1,069.1	0.0	1,069.1
Vineyard		278.4	0.0	278.4
Pasture	X	0.0	61.0	61.0
Unknown agricultural	X	158.8	26.8	185.6
Fallow*	X	355.3	637.9	993.2
Sloughs and ditches		91.8	49.7	141.5
Ponds		1.5	105.7	107.2
Structures		12.6	1.5	14.1
Roads and landfills		<u>73.1</u>	<u>18.7</u>	<u>91.8</u>
Total		5,538.2	5,469.0	11,007.2
Total suitable for greater sandhill crane		1,751.3	4,849.7	6,601.0

* Fallow habitat consists of three separate types: fallow/sparse, fallow/dense, and fallow/levee slope. Fallow/levee slope habitat type was considered unsuitable for cranes and was subtracted (181 acres from Bacon Island and 166 acres from Webb Tract) from the total suitable habitat.

Table 3-3. Greater Sandhill Crane Compensation Acreage Required
for Losses of Habitat on the DW Project Islands

Island	Compensation Acreage
Bacon Island	1,751.3
Webb Tract	4,849.7
Bouldin Island	417.7
Holland Tract	<u>9.0</u>
Total	7,027.7

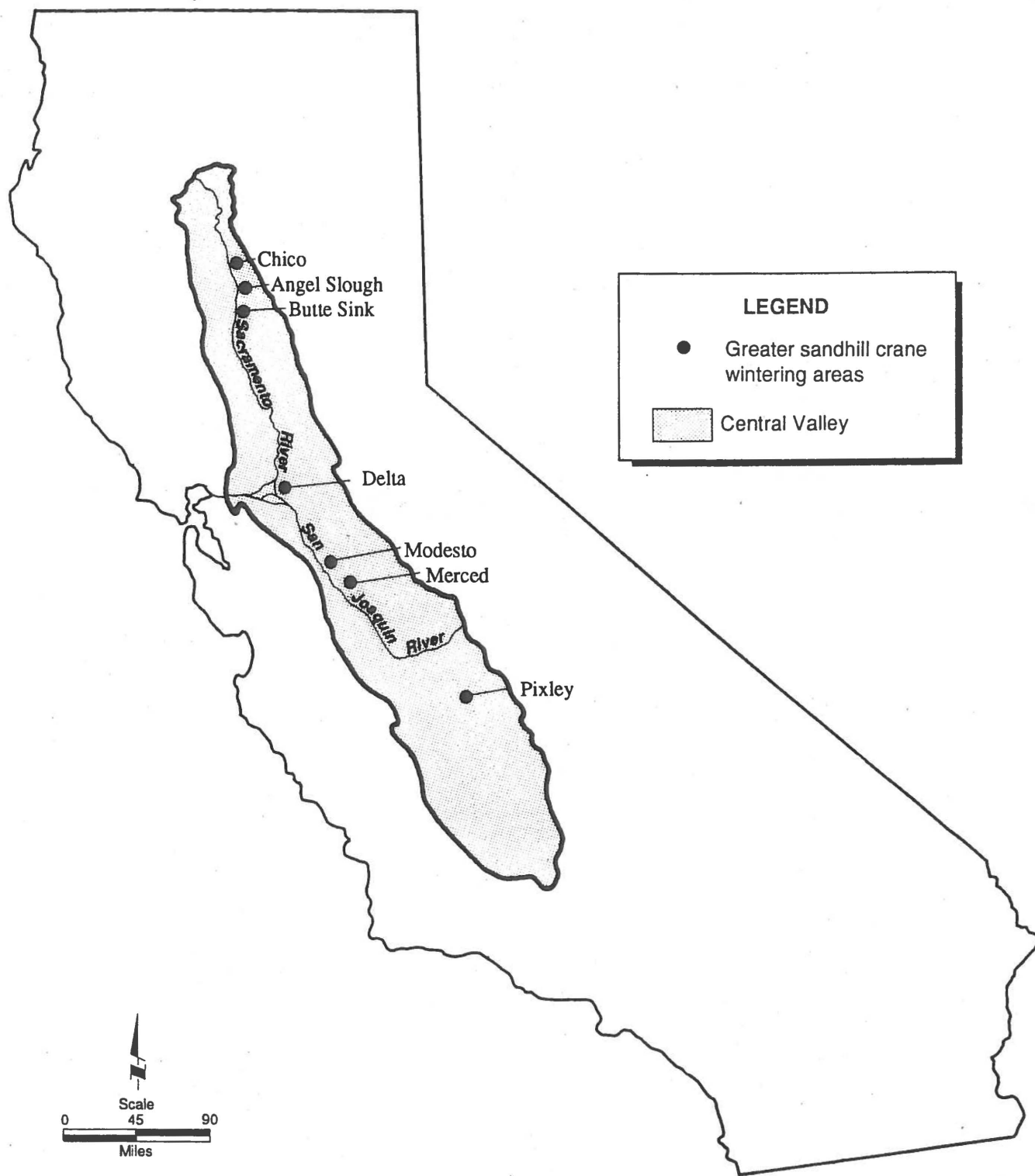
Table 3-4. Greater Sandhill Crane Foraging Habitat Types Available on the DW Habitat Islands with Implementation of the HMP

Habitat Type ^a	Bouldin Island	Holland Tract	Total Acres
Corn/wheat	1,629	955	2,584
Small grains	106	152	258
Mixed agriculture/seasonal wetland	1,014	631	1,645
Seasonal managed wetland	1,723	393	2,116
Seasonal pond	66	68	134
Pasture/hay	132	72	204
Herbaceous upland	<u>479</u>	<u>253</u>	<u>732</u>
Total	5,149	2,524	7,673

^a Emergent marshes, seasonal ponds, and riparian woodland and scrub habitats, which provide little or no forage value for greater sandhill cranes, will also be developed on the habitat islands.

Table 3-5. Greater Sandhill Crane HMP Strategies for the DW Habitat Islands

Management Goal	Management Objectives	Habitat Management Strategies
1. Provide suitable foraging habitat for wintering populations	A. Manage portions of harvested corn and wheat fields to provide optimal seed crop foraging conditions	1. Portions of each corn and wheat field, and mixed agricultural/seasonal wetland and seasonal wetland cells flooded to attract waterfowl should remain in a dry or shallow flooded condition (i.e., soil saturated to 2-inch depth) to provide suitable crane foraging habitat
	B. Manage portions of mixed agricultural wetland and seasonal wetland habitat to provide invertebrate, vegetative, and non-agricultural seed crop foraging areas	2. Portions of mixed agricultural/seasonal wetland and seasonal wetland cells and surrounding berms should be mowed prior to flooding to remove vegetative cover to create suitable foraging conditions
	C. Manage pastures to provide invertebrate foraging areas	3. Portions of pastures should be mowed prior to the arrival of wintering cranes and shallow-flooded to create suitable foraging conditions
2. Establish traditional wintering crane use areas	A. Attract cranes by managing a portion of suitable foraging and roosting habitats to minimize human disturbance	1. Close a portion of suitable foraging and roosting habitats to hunting to minimize human disturbance
	B. Manage some seasonal wetlands to provide suitable crane roosting habitat	2. Create suitable roost sites within closed zones by completely mowing selected seasonal wetland cells to reduce vegetation height and flooding the cells to depths of less than 4 inches



Source: Pogsdon and Lindstedt 1988.

Figure 3-1.
Winter Distribution of the Central Valley Population
of the Greater Sandhill Crane

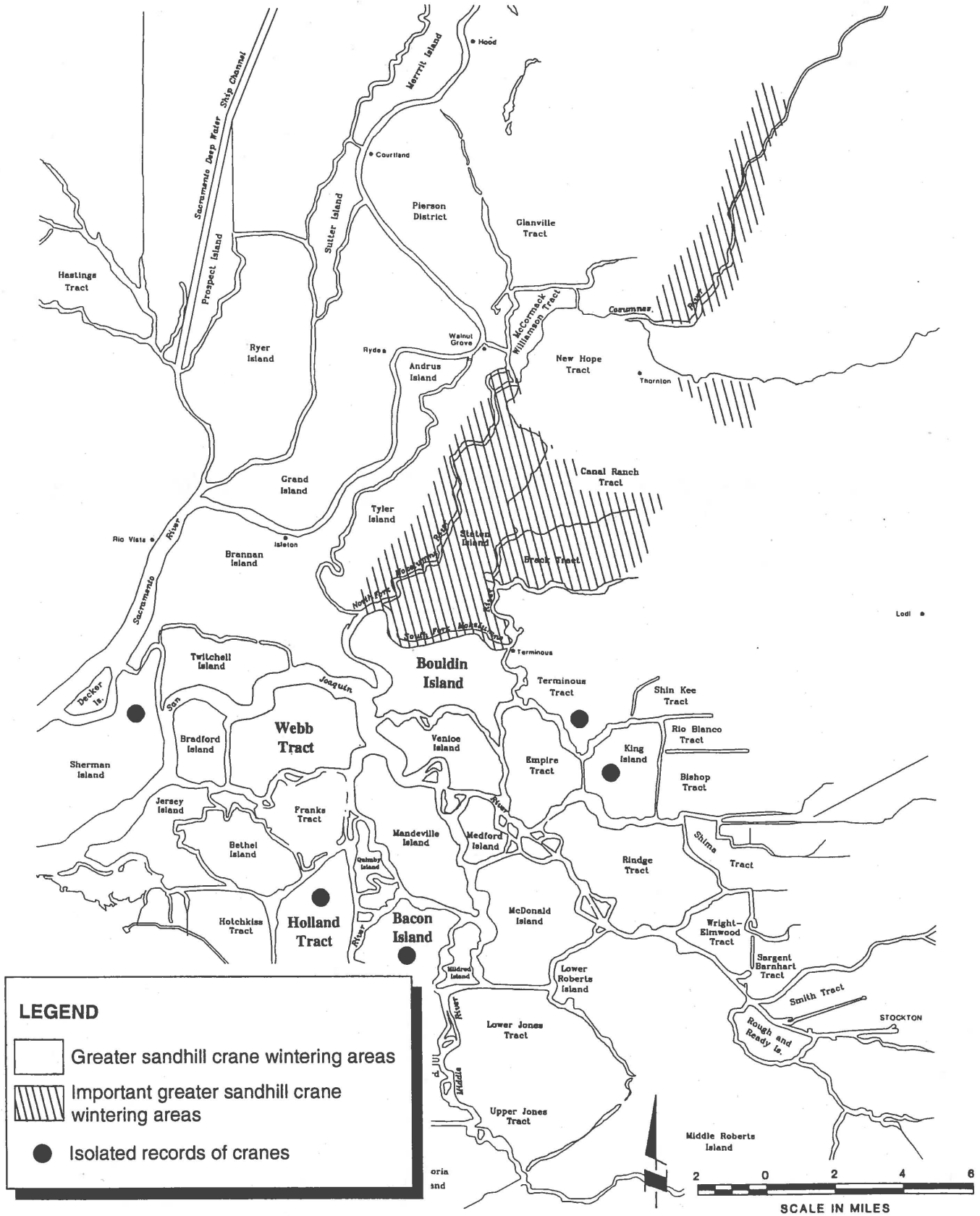


Figure 3-2.
 Distribution of Greater Sandhill Cranes
 in the Delta Region

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