

**Appendix H3. Federal Endangered Species Act Biological
Assessment: Impacts of the Delta Wetlands
Project on Wildlife Species**

**Federal Endangered Species Act
Biological Assessment: Impacts of
the Delta Wetlands Project
on Wildlife Species**

Prepared for:

California State Water Resources Control Board
Division of Water Rights
and
U.S. Army Corps of Engineers
Sacramento District

Prepared by:

Jones & Stokes Associates, Inc.
2600 V Street
Sacramento, CA 95818
Contact: Marcus P. Rawlings
916/737-3000

September 1995

This document should be cited as:

Jones & Stokes Associates, Inc. 1995. Federal Endangered Species Act biological assessment: impacts of the Delta Wetlands project on wildlife species. (JSA 87-119.) Sacramento, CA. Prepared for California State Water Resources Control Board and U.S. Army Corps of Engineers, Sacramento, CA.

Table of Contents

	Page
Section 1. Introduction	1-1
BACKGROUND	1-1
PROJECT DESCRIPTION	1-1
OBJECTIVES OF THE BIOLOGICAL ASSESSMENT	1-2
Section 2. Selection of Species to Be Addressed	2-1
Section 3. Bald Eagle	3-1
BACKGROUND	3-1
Status, Distribution, and Habitat Requirements	3-1
Reasons for Decline	3-1
ASSESSMENT METHODS	3-1
STATUS IN THE PROJECT AREA	3-1
Habitat Quality	3-1
Populations	3-1
PROJECT IMPACTS AND BENEFITS	3-1
Section 4. American Peregrine Falcon	4-1
BACKGROUND	4-1
Status, Distribution, and Habitat Requirements	4-1
Reasons for Decline	4-1
ASSESSMENT METHODS	4-1
STATUS IN THE PROJECT AREA	4-1
Habitat Quality	4-1
Populations	4-1
PROJECT IMPACTS AND BENEFITS	4-1
Section 5. Aleutian Canada Goose	5-1
BACKGROUND	5-1
Status, Distribution, and Habitat Requirements	5-1
Reasons for Decline	5-1
ASSESSMENT METHODS	5-1
STATUS IN THE PROJECT AREA	5-1
Habitat Quality	5-1
Populations	5-1
PROJECT IMPACTS AND BENEFITS	5-1
Section 6. Valley Elderberry Longhorn Beetle	6-1
BACKGROUND	6-1
Status, Distribution, and Habitat Requirements	6-1
Reasons for Decline	6-1
ASSESSMENT METHODS	6-1

STATUS IN THE PROJECT AREA	6-1
PROJECT IMPACTS AND BENEFITS	6-1
Section 7. Giant Garter Snake	7-1
BACKGROUND	7-1
Status, Distribution, and Habitat Requirements	7-1
Reasons for Decline	7-1
ASSESSMENT METHODS	7-2
STATUS IN THE PROJECT AREA	7-2
Habitat Quality	7-2
Populations	7-2
PROJECT IMPACTS AND BENEFITS	7-2
Section 8. Citations	8-1
PRINTED REFERENCES	8-1
PERSONAL COMMUNICATIONS	8-2

List of Figures

Figure

1-1 DW Project Islands

Section 1. Introduction

BACKGROUND

Delta Wetlands Properties (DW) has applied to the U.S. Army Corps of Engineers (Corps) for permits necessary under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act to discharge dredged or fill materials and to construct facilities in navigable waters of the United States. These federal permit applications have triggered the requirement to prepare an environmental impact statement (EIS) under the National Environmental Policy Act (NEPA). DW has applied to the California State Water Resources Control Board (SWRCB), Division of Water Rights, for the permits necessary to seasonally store unappropriated surface water. SWRCB will prepare an environmental impact report (EIR) on the proposed project under the California Environmental Quality Act (CEQA). In the interest of avoiding duplication of effort, SWRCB and the Corps are preparing a joint EIR/EIS that satisfies both CEQA and NEPA.

Because the DW project would require federal permits, the Corps, as the federal permitting agency, must consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that the project would not jeopardize the continued existence of terrestrial species protected under the federal Endangered Species Act. The procedures for this consultation between federal agencies are governed by Section 7 of the Endangered Species Act.

To facilitate the consultation regarding federally protected species, Section 7 requires that the permitting agency request from USFWS a list of protected species or species proposed for protection (see Appendix H5, "Agency Correspondence regarding the Federal and California Endangered Species Acts", of the EIR/EIS). If species on that list may be present in the project area, a biological assessment (BA) must be prepared to evaluate whether the proposed project may adversely affect those species. This report constitutes the BA for wildlife species that may be affected by the DW project as required by Section 7 of the Endangered Species Act.

A BA for wildlife species, dated October 27, 1989, analyzed the impacts of the DW project, as proposed in

1987 and analyzed in the Corps' and SWRCB's 1990 draft EIR/EIS. This BA was submitted to USFWS in 1990 and USFWS issued a letter concurring with the BA's conclusion that the DW project would not likely jeopardize the continued existence of the federally listed species analyzed.

In 1993, DW revised the proposed project; therefore, the Corps determined that preparation of a new BA for wildlife species was required. Separate BAs are also being prepared in compliance with the federal Endangered Species Act for analysis of DW project effects on federally listed fish species and with the California Endangered Species Act for analysis of DW project effects on wildlife species that are only state listed (Swainson's hawk and greater sandhill crane).

This BA summarizes information contained in the wildlife chapter and associated appendices of the EIR/EIS for the Delta Wetlands project. Refer to the following sections of the EIR/EIS for additional information:

- Chapter 3G, "Vegetation and Wetlands";
- Chapter 3H, "Wildlife";
- Appendix G2, "Prediction of Vegetation on the Delta Wetlands Reservoir Islands";
- Appendix G3, "Habitat Management Plan for the Delta Wetlands Habitat Islands"; and
- Appendix H5, "Agency Correspondence regarding the Federal and California Endangered Species Acts".

PROJECT DESCRIPTION

DW proposes to divert and store flows of water on two islands (Bacon Island and Webb Tract) in the Sacramento-San Joaquin Delta (Delta). Two additional islands (Bouldin Island and Holland Tract) would be dedicated primarily to management for wetland and wildlife habitat values to offset biological impacts result-

ing from project operations. Details of the proposed project are described in Chapter 2, "Delta Wetlands Project Alternatives", of the EIR/EIS. The water storage islands, hereafter referred to as reservoir islands, encompass approximately 11,000 acres of agricultural land in the central Delta (Figure 1-1). The wetland and wildlife management islands, hereafter referred to as habitat islands, encompass approximately 9,000 acres of primarily agricultural land.

Stored water would be pumped from the reservoir islands into the Delta for sale and/or release for Delta export or to meet water quality or flow requirements. Although reservoir islands would be operated primarily for water storage, the reservoir bottoms would include inner levee systems and would be managed during some periods of nonstorage for shallow-water wetland values.

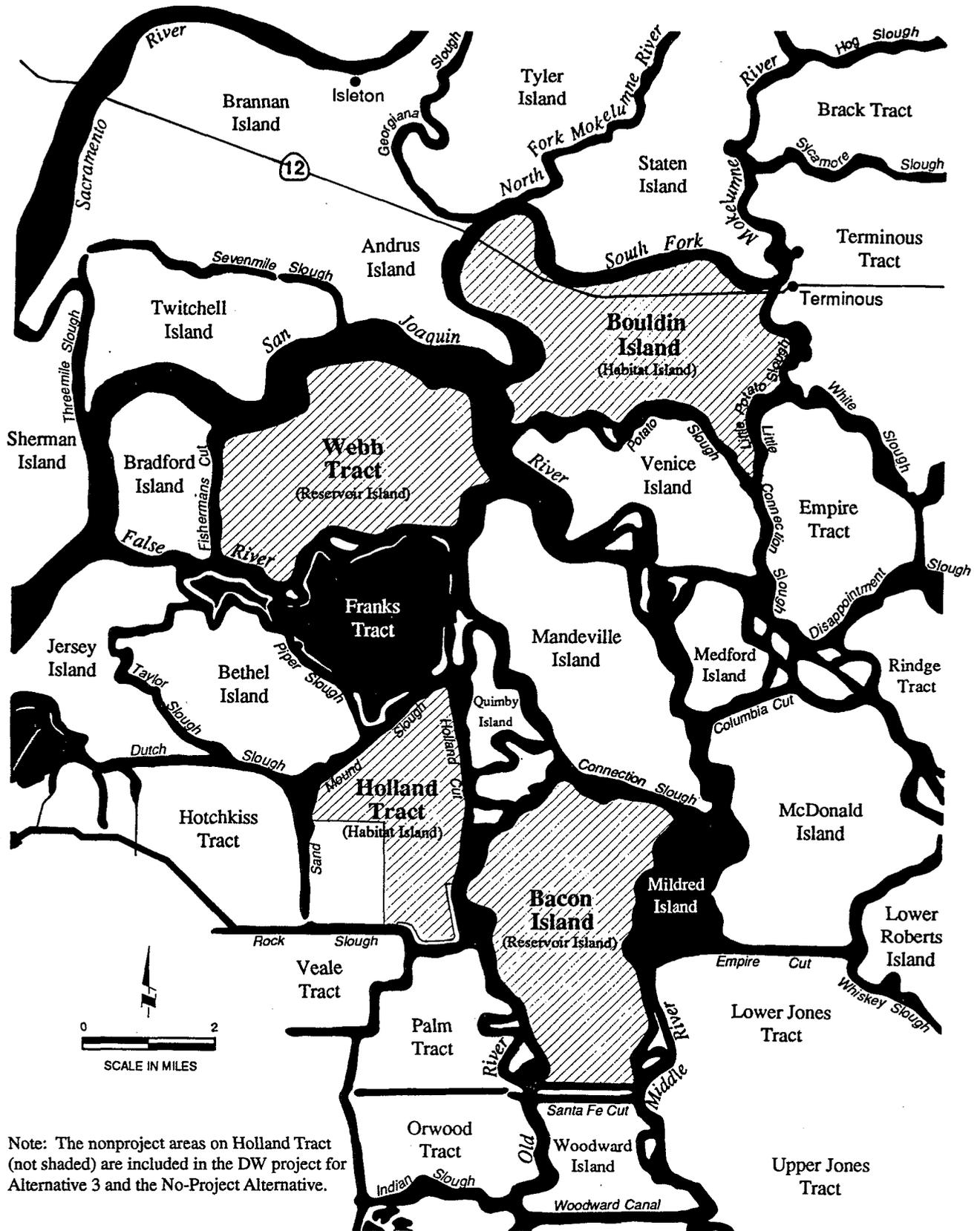
Habitat islands would be managed primarily for wetland and wildlife values. The islands would be developed into a mosaic of habitat types for a variety of wildlife, with an emphasis on offsetting project impacts on state-listed wildlife species.

OBJECTIVES OF THE BIOLOGICAL ASSESSMENT

The objectives of this BA are to:

- identify federally listed species and species proposed for listing that may occur in the proposed DW project area;
- document the occurrence of these species and their habitats in the DW project area;
- evaluate the potential impacts of the proposed DW project on the species and their habitats; and
- if adverse impacts of the proposed project are predicted, evaluate mitigation measures or alternative actions that could avoid or reduce the impacts.

By meeting these objectives, this assessment will allow the Corps and USFWS to determine whether formal consultation is needed under Section 7 of the Endangered Species Act. Such consultation would seek to ensure that the DW project would not jeopardize the continued existence of any federally protected species.



Note: The nonproject areas on Holland Tract (not shaded) are included in the DW project for Alternative 3 and the No-Project Alternative.

Figure 1-1.
DW Project Islands

**DELTA WETLANDS
PROJECT**
Prepared by: Jones & Stokes Associates

Section 2. Selection of Species to Be Addressed

The USFWS Sacramento Endangered Species Office (SESO) identified six wildlife species that are federally listed as endangered or threatened or have been proposed for federal listing that have distributions that might include the DW project area (USFWS 1994). The accuracy of the species list was verified through consultation with the SESO (Nagano pers. comm.), California Department of Fish and Game (DFG) (Brode pers. comm.), and species specialists (Fisher, Powell, Thorpe, and Wasbauer pers. comms.).

Three species listed as endangered are considered to have potential to occur on the DW islands: bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus anatum*), and Aleutian Canada goose (*Branta canadensis leucopareia*). The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB), listed as threatened, also has potential to occur on the DW islands. Potential habitat for the giant garter snake (*Thamnophis gigas*) exists on Bacon Island, Webb Tract, Bouldin Island, and Holland Tract, but these islands are probably outside the species' current range (Littlefield pers. comm.).

The California red-legged frog (*Rana aurora draytoni*), currently proposed for listing, probably does not occur on the DW islands because bullfrogs, a major predator of red-legged frogs, are common on the islands. Red-legged frogs usually do not inhabit ponds containing bullfrogs (Moyle 1973).

This BA describes the potential for occurrence of the five species listed as endangered or threatened and discusses potential effects (adverse and beneficial) of the proposed project and suggested mitigation measures, if appropriate.

Section 3. Bald Eagle

BACKGROUND

Status, Distribution, and Habitat Requirements

Bald eagles winter throughout most of California at lakes, reservoirs, river systems, and coastal wetlands. They breed mainly near lakes, reservoirs, and rivers in the mountainous northern portion of the state. The winter population appears to be stable, and the breeding population is slowly increasing in numbers and range (DFG 1992). Bald eagles feed mainly on dead or dying fish and water birds, and require perches overlooking foraging areas (DFG 1980).

Reasons for Decline

Bald eagle populations began to decline in California during the 19th century as a result of shooting, poisoning, and habitat loss. Exposure to organochlorine pesticides caused further declines in reproduction after World War II (Detrich 1985). The California bald eagle population is now stable or increasing in numbers because of legal protection, the banning of DDT, and habitat management (Detrich 1985, Henny and Anthony 1989).

ASSESSMENT METHODS

Biologists searched for bald eagles during systematic ground surveys for general wildlife species and aerial waterfowl surveys on the four DW project islands. Eight systematic ground surveys were conducted during February-May 1988 on Bacon and Bouldin Islands and Holland Tract. Only five surveys were conducted on Webb Tract because of a breakdown in the island ferry. During 1987-1989, 21 aerial waterfowl surveys covering all four project islands were conducted.

STATUS IN THE PROJECT AREA

Habitat Quality

The DW project islands currently support low-quality foraging habitat and little perching habitat for bald eagles. Major sloughs outside the islands probably provide foraging habitat that is of low quality because turbidity inhibits foraging success. The islands are mostly unsuitable as foraging habitat because they lack extensive open water. Perching sites are also limited.

Populations

Bald eagles do not occur regularly in the Delta (Madrone Associates 1980), and no eagles were observed on the DW project islands during ground or aerial surveys in 1987-1989.

PROJECT IMPACTS AND BENEFITS

During fall and winter, wetland habitat management on the habitat islands would attract many ducks, including birds injured by hunters, which would be potential prey for the bald eagle. Establishing riparian trees on the habitat islands would provide suitable perching sites for winter use. During water storage periods, the reservoir islands would provide low-quality foraging habitat in the shoreline areas.

On balance, impacts of the DW project on the bald eagle would be beneficial because the species uses the islands irregularly, existing habitat is of low quality, and the project would improve habitat quality on the islands.

Section 4. American Peregrine Falcon

BACKGROUND

Status, Distribution, and Habitat Requirements

Peregrine falcons occur throughout California during fall migration and in winter, except in the desert. The breeding range includes coastal California and the inland mountains. The birds typically nest on cliff ledges and tall city buildings. During migration, peregrine falcons forage in wetlands, agricultural areas, cities, and coastal habitats (DFG 1992). In the western United States, the peregrine falcon population appears to be increasing, and reproduction is good in most areas (Platt and Enderson 1989).

Reasons for Decline

The decline of the peregrine falcon in California has resulted from DDT-caused reproductive failure. Human disturbance, shooting, and habitat loss have also contributed to the falcon's decline. (DFG 1980.)

ASSESSMENT METHODS

Biologists searched for peregrine falcons during aerial and ground surveys of the DW project islands in 1987-1989.

STATUS IN THE PROJECT AREA

Habitat Quality

The DW project islands support low- to moderate-quality foraging habitat and little perching habitat for peregrine falcons. The blowout ponds on Holland and Webb Tracts attract ducks, which are potential prey for

falcons. Shallow flooding on agricultural lands in fall and winter also attracts ducks and provides moderate-quality foraging habitat.

Populations

Peregrine falcons do not occur regularly in the Delta (Madrone Associates 1980), and no falcons were observed on the DW project islands during ground or aerial surveys in 1987-1989.

PROJECT IMPACTS AND BENEFITS

During fall and winter, wetland habitat management on the habitat islands would attract many ducks, shorebirds, and blackbirds, all of which would be potential prey for the peregrine falcon. Riparian forest development would provide additional perches on the habitat islands. During water storage periods, reservoir islands would attract diving ducks and would provide low- to moderate-quality foraging habitat. Shallow-water wetlands on the reservoir island bottoms during some non-storage periods would provide moderate-quality foraging habitat.

On balance, impacts of the DW project on the peregrine falcon would be beneficial because the species uses the islands irregularly, if at all; existing foraging habitat is of low to moderate quality; and habitat quality should improve under the proposed project.

Section 5. Aleutian Canada Goose

BACKGROUND

Status, Distribution, and Habitat Requirements

The Aleutian Canada goose is one of 11 Canada goose subspecies and has the smallest population size. This subspecies nests in the western Aleutian Islands and traditionally migrates along coastal Oregon and Del Norte County in northern California (Gregg et al. 1988). Aleutian Canada geese generally winter in two localized areas near Modesto and Colusa in central California where they forage in agricultural fields that support pasture, corn, wheat, and rice crops (Nelson et al. 1984). They roost at artificially impounded waters, such as farm ponds, sewage ponds, and duck clubs (Nelson et al. 1984). The overall population has increased in recent years (Yparraguirre pers. comm.). The Aleutian Canada goose was recently reclassified from endangered to threatened because of a significant increase in the species' population since its listing in 1967.

Reasons for Decline

The decline of the Aleutian Canada goose has resulted from predation by arctic foxes introduced to the Aleutian Islands. Habitat loss and hunting have also contributed to the species' decline. (Springer et al. 1978.)

ASSESSMENT METHODS

Biologists surveyed for Aleutian Canada geese during aerial and ground surveys at the DW project islands in 1987-1989. All Canada geese observed during the aerial surveys were flying and could not be identified to subspecies. All Canada geese observed during the ground surveys were identified to subspecies, if possible.

STATUS IN THE PROJECT AREA

Habitat Quality

The DW project islands support moderate-quality foraging habitat for Aleutian Canada geese. Harvested fields of corn and wheat and pastures provide suitable foraging habitat for these geese.

Populations

DFG and USFWS have conducted annual Aleutian Canada goose surveys since 1975 (Gregg et al. 1988). Surveys in the Delta have been sporadic and have been concentrated primarily in areas where banded geese have been recovered during the hunting season and areas where geese have previously been observed. Aleutian Canada geese are considered transitory and occur in low numbers in the Delta. (Yparraguirre pers. comm.)

On December 7, 1983, 30-40 Aleutian Canada geese were reported to be foraging in a harvested cornfield on Bouldin Island (Nelson et al. 1984); no other observations on the DW project islands have been reported.

No Aleutian Canada geese were observed by JSA biologists during aerial or ground surveys on the DW project islands in 1987-1989, although other subspecies of Canada geese were observed.

PROJECT IMPACTS AND BENEFITS

Wetland habitat and corn management would provide moderate- to high-quality foraging habitat for these geese on the DW habitat islands during winter, but little or no suitable foraging habitat would be available on the reservoir islands. Suitable habitat, which now exists on the DW project islands throughout winter, would be lost on reservoir islands during water storage periods. Impacts on the Aleutian Canada goose would not be significant,

however, because the species does not occur regularly at the project islands, the existing habitat is of only moderate quality, and habitat islands will be managed to offset wetland losses on reservoir islands.

Section 6. Valley Elderberry Longhorn Beetle

BACKGROUND

Status, Distribution, and Habitat Requirements

VELB occurs in riparian habitats in the Central Valley from Bakersfield to Redding (Barr 1991). VELB is a pith borer in elderberry shrubs (*Sambucus* spp.) in riparian habitats. Adult beetles may be found on elderberry shrubs from mid-March until early June. VELB probably has always been rare (USFWS 1984).

VELB is more abundant in native plant communities with a mature overstory and mixed understory, and is less abundant in areas with a young or sparse overstory and low understory (USFWS 1993). Many of the elderberry shrubs in the Delta are in poor condition (Barr 1991); accidental applications of herbicides from crop dusters may adversely affect the health of elderberry shrubs (Barr 1991), and levee maintenance activities may also reduce habitat quality of elderberry shrubs for VELB by eliminating overstory and understory vegetation.

The distribution of elderberry shrubs in the Delta appears patchy, and elderberry stands are often isolated from one another (Barr 1991). Many of these isolated stands of elderberries may not support VELB. During a USFWS study of VELB distribution and abundance in 1991, 10 elderberry shrub locations within 6 miles of the reservoir and habitat islands were surveyed for the presence of VELB. No VELB exit holes or adult beetles were observed during these surveys (Barr 1991).

The nearest known VELB population is along the Middle River approximately 17 miles south of Bacon Island (Barr 1991, JSA 1987). VELB adults and exit holes were reported in 1984 and 1985 at the Middle River site. These VELB locations were revisited by Barr in 1991, but no evidence of VELB was present and the shrubs were in poor condition (Barr 1991).

Reasons for Decline

The decline of VELB is attributed to the loss of riparian habitat caused by conversion of open land to agricultural uses, grazing, levee construction, stream channelization, removal of riparian vegetation, riprapping of shoreline, and urban development (USFWS 1984).

ASSESSMENT METHODS

Surveys for VELB on the DW reservoir and habitat islands consisted of intensive surveys for elderberry shrubs during regular ground wildlife surveys and during special searches. Each elderberry plant detected was inspected for VELB exit holes and adult beetles.

STATUS IN THE PROJECT AREA

One large cluster of elderberry shrubs was located on the eastern levee of Holland Tract along Old River. No VELB exit holes or adult beetles were detected in that shrub cluster. This cluster of elderberry shrubs lacks overstory and understory vegetation. The cluster is also isolated from other elderberry shrubs. Therefore, VELB probably does not occur on Holland Tract. No other elderberry shrubs were found on reservoir or habitat islands.

PROJECT IMPACTS AND BENEFITS

Possible disturbance of the existing elderberry shrub on Holland Tract during levee maintenance or project construction would not adversely affect VELB because the habitat is considered marginal and the species is not known to occur on the island.

Under the proposed project, elderberry shrubs will be planted in riparian woodland habitat to be established as a component of the Section 404 jurisdictional mitigation

program, thereby producing potential VELB habitat. Beetles may not colonize this habitat, however, because the DW project islands are isolated from the nearest known VELB population. Long-term effects on VELB would be potentially beneficial.

Section 7. Giant Garter Snake

BACKGROUND

Status, Distribution, and Habitat Requirements

The giant garter snake is one of the largest garter snake species (DFG 1980). This species is endemic to the wetlands of the Central Valley. Historically, the giant garter snake ranged from Sacramento and Contra Costa Counties south to Buena Vista Lake in Kern County (Fitch 1940). The distribution of this snake species was associated with the presence of large flood basins, freshwater marshes, and associated streams.

In 1992, giant garter snake surveys were conducted in preparation for USFWS's proposal to list the giant garter snake as a threatened or endangered species. Currently, this snake's distribution is limited to 13 population clusters associated with historical riverine flood basins and tributary streams throughout the Central Valley. These population clusters are in the Butte Basin, Colusa Basin, Sutter Basin, American Basin, Yolo Basin-Willow Slough, Yolo Basin-Liberty Island, Sacramento Basin, Badger Creek-Willow Creek, Coldani Marsh, East Stockton Diverting Canal and Duck Creek, North and South Grasslands, Mendota, and Burrel-Lanare.

The giant garter snake is absent from the northern portion of the San Joaquin Valley, where the floodplain of the San Joaquin River is restricted to a narrow area. Suitable giant garter snake habitat that once existed in the Sacramento-San Joaquin River Delta has been eliminated.

The known population of giant garter snakes nearest to the project area is at Coldani Marsh (i.e., White Slough), approximately 5 miles east of Bouldin Island. Approximately 280 acres of this habitat were eliminated during the construction of Interstate 5 in 1978 and 1979. About 50 acres of suitable giant garter snake habitat remain at Coldani Marsh.

The giant garter snake is one of the most aquatic of all garter snakes and inhabits marshes, sloughs, ponds, small

lakes, low-gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields (DFG 1980).

Giant garter snakes require emergent wetland vegetation, including cattails and bulrushes, for escape cover and foraging habitat during their active season (i.e., March-October). They also require grassy banks and openings in waterside vegetation for basking, and upland areas adjacent to wetlands for cover and refuge from winter floodwaters during hibernation. During their inactive period (from November through mid-March), giant garter snakes use small burrows and cracks in the ground above the winter floodwater levels for hibernation sites.

Reasons for Decline

Giant garter snake populations have declined for several reasons, including loss of stream and wetland habitats, fragmentation of habitats (wetlands, streams, and adjacent uplands), and increased predation because of the introduction of exotic fish and wildlife species.

Habitat alteration has contributed substantially to the decline of giant garter snake populations. Construction of water storage and flood control facilities has altered the patterns of water flow in downstream habitats, eliminating stream and wetland habitats or reducing their quality. The fragmentation of giant garter snake habitat has eliminated movement corridors and created barriers hindering normal dispersal. The introduction of non-native fish species has increased predation of giant garter snakes, especially in narrow wetland habitats (e.g., water conveyance channels) or other wetland habitats with minimal cover.

Urban development, including housing, commercial, industrial, and recreational developments, has eliminated wetlands and adjacent upland habitats. Agricultural practices and activities also kill giant garter snakes, eliminate habitat, or decrease habitat quality. Wetland vegetation and adjacent upland vegetation are eliminated by disking, mowing, and the application of herbicides. Hibernation

sites are eliminated by disking, grading, and soil compaction. (Ellis 1987.)

ASSESSMENT METHODS

All suitable giant garter snake habitat (i.e., wetland habitats along ditches and canals and along the margins of blowout ponds) was surveyed on foot for 4 hours at midday for basking snakes. Surveys were conducted on 6 days during May and July 1988.

STATUS IN THE PROJECT AREA

Habitat Quality

The Delta islands near the DW reservoir and habitat islands are considered poor- to marginal-quality habitats for giant garter snakes for a variety of reasons. These habitats are fragmented and isolated from known populations of giant garter snakes; suitable overwintering sites (e.g., levee slopes) are lacking or of low quality; suitable foraging habitat and cover are scarce, particularly on Bouldin and Bacon Islands; and aquatic (e.g., predatory fish) and terrestrial predators (e.g., great egrets, great blue herons, and black-crowned night-herons) are abundant.

Bacon Island contains approximately 5 miles of ditches that are considered marginal habitat for the giant garter snake because emergent or bank vegetation is lacking. Bouldin Island contains 7 miles of ditches and canals that are marginal habitat for the giant garter snake. Holland Tract supports approximately 2 miles of moderately suitable habitat and 4 miles of marginal habitat along ditches and canals. Webb Tract supports approximately 3 miles of moderately suitable giant garter snake habitat and less than 1 mile of marginal habitat along ditches and canals.

Populations

The giant garter snake is not expected to occur on DW reservoir or habitat islands (Brode and Littlefield pers. comms.). The nearest recorded observation of giant garter snake is at White Slough, approximately 4 miles east of Bouldin Island (Hansen and Brode 1980).

No giant garter snakes were observed on the proposed DW reservoir or habitat islands during field surveys.

PROJECT IMPACTS AND BENEFITS

The giant garter snake is not expected to occur on the proposed DW reservoir or habitat islands; therefore, no adverse impacts on this species are expected to occur.

If giant garter snake reoccupied the project area, the habitat islands would support suitable foraging habitat, cover, and hibernation sites.

The reservoir islands would probably be unsuitable for giant garter snake.

Section 8. Citations

PRINTED REFERENCES

- Barr, C. B. 1991. The distribution, habitat, and status of the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) Fisher (Insecta: Coleoptera: Cerambycidae). U.S. Fish and Wildlife Service. Sacramento, CA.
- California. Department of Fish and Game. 1980. At the crossroads: a report on the status of California's endangered and rare fish and wildlife. Sacramento, CA.
- _____. Department of Fish and Game. 1992. 1991 annual report on the status of California state-listed threatened and endangered plants and animals. Sacramento, CA.
- Detrich, P. J. 1985. The status and distribution of the bald eagle in California. California State University, Chico. Chico, CA.
- Ellis, S. R. 1987. Five year status report: giant garter snake. California Department of Fish and Game. Sacramento, CA.
- Fitch, H. S. 1940. A biogeographical study of the *Ordinoides artemkris* of giant garter snakes (genus *Thamnophis*). University of California Publications in Zoology 44:1-150.
- Gregg, M. A., T. M. Eckhardt, and P. F. Springer. 1988. Population, distribution, and ecology of Aleutian Canada geese on their migration and wintering areas, 1986-87. California Department of Fish and Game. Sacramento, CA.
- Hansen, G. E., and J. M. Brode. 1980. Status of the giant garter snake (*Thamnophis couchi gigas*). (Inland Fisheries Endangered Species Program, Special Publication 80-5.) California Department of Fish and Game. Sacramento, CA.
- Henny, C. J., and R. G. Anthony. 1989. Bald eagle and osprey. Pages 66-82 in B. G. Pendleton (ed.),
- Proceedings of the Western Raptor Management Symposium and Workshop. (National Wildlife Federation Scientific and Technical Series No. 12.) National Wildlife Federation. Baltimore, MD.
- Jones & Stokes Associates, Inc. 1987. Survey of habitat and populations of the valley elderberry longhorn beetle along the Sacramento River. (JSA 87-004.) Prepared for U.S. Fish and Wildlife Service, Sacramento, CA.
- Madrone Associates. 1980. Sacramento/San Joaquin Delta wildlife habitat protection and restoration plan. Sacramento, CA. Prepared for California Department of Fish and Game and U.S. Fish and Wildlife Service, Sacramento, CA.
- Moyle, P. B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California. Copeia 1973(1):18-22.
- Nelson, E. T., P. F. Springer, and D. R. Yparraguirre. 1984. Population, distribution, and ecology of Aleutian Canada geese on the migration and wintering areas, 1983-84. U.S. Fish and Wildlife Service. Arcata, CA.
- Platt, S. W., and J. H. Enderson. 1989. Falcons. Pages 111-117 in B. G. Pendleton (ed.), Proceedings of the Western Raptor Management Symposium and Workshop. (National Wildlife Federation Scientific and Technical Series No. 12.) National Wildlife Federation. Baltimore, MD.
- Springer, P. F., G. V. Byrd, and D. W. Woolington. 1978. Reestablishing Aleutian Canada geese. Pages 331-338 in S. A. Temple (ed.), Endangered birds: management techniques for preserving threatened species. University of Wisconsin Press. Madison, WI.
- U.S. Fish and Wildlife Service. 1984. Valley elderberry longhorn beetle recovery plan. Portland, OR.

_____. 1993. General compensation guidelines for the valley elderberry longhorn beetle. Sacramento, CA.

_____. 1994. Updated species list for the proposed Delta Wetlands' Delta island project, Lafayette, Contra Costa County, California. October 24, 1994. (1-1-94-TA-1671.) Ecological Services. Sacramento, CA.

PERSONAL COMMUNICATIONS

Brode, John. Associate fisheries biologist. California Department of Fish and Game, Rancho Cordova, CA. July 13, 1989 - telephone conversation.

Fisher, Eric. Entomologist. California Department of Food and Agriculture, Sacramento, CA. July 13, 1989 - telephone conversation.

Littlefield, Mark. Wildlife biologist. U.S. Fish and Wildlife Service, Sacramento, CA. February 2, 1994 - telephone conversation.

Nagano, Christopher. Entomologist. U.S. Fish and Wildlife Service, Sacramento, CA. August 3, 1989 - meeting.

Powell, Jerry. Professor of entomology. University of California at Berkeley, Berkeley, CA. July 18, 1989 - telephone conversation.

Thorpe, Robin. Professor of entomology. University of California at Davis, Davis, CA. July 13, 1989 - telephone conversation.

Wasbauer, Marious. Entomologist. California Department of Food and Agriculture, Sacramento, CA. July 18, 1989 - telephone conversation.

Yparraguirre, Dan. Wildlife biologist. California Department of Fish and Game, Sacramento, CA. November 21, 1988, and September 29, 1989 - telephone conversations.