Public Notices

Notice of Preparation
Environmental Impact Report/Environmental Impact Statement
for the IID/San Diego County Water Authority
Water Conservation and Transfer Project,
Imperial Irrigation District, Imperial, California

To:
State of California
State Clearinghouse
Office of Planning and Research
1400 10th Street, Room 121
Sacramento, CA 95814

From:
Imperial Irrigation District
333 East Barioni Blvd.
P.O. Box 937
Imperial, CA 92251

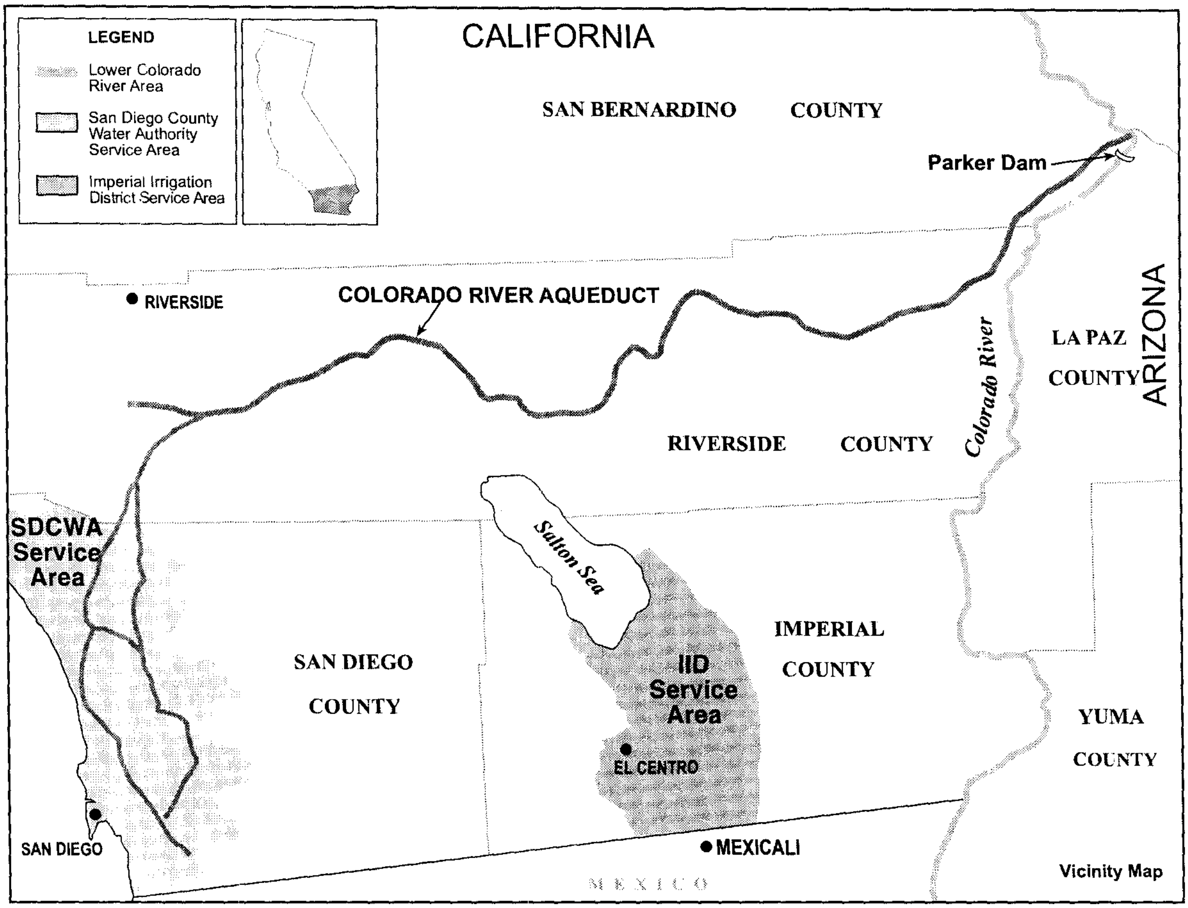
INTRODUCTION:

Pursuant to section 102 (2) (c) of the National Environmental Policy Act (NEPA) and the State of California Environmental Quality Act (CEQA), the Bureau of Reclamation (Reclamation) and Imperial Irrigation District (IID or District) will prepare a joint Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) to assess the impacts of the proposed IID/San Diego County Water Authority (SDCWA) Water Conservation and Transfer Project. The proposed project consists of the conservation by IID of up to 300,000 acre-feet of Colorado River water per year (af/yr), and the subsequent transfer of all or a portion of the diverted water to the SDCWA and, under certain circumstances, other designees (See Map). IID and Reclamation are holding public scoping meetings soliciting input from the public on the types of issues and extent of analysis that should be contained in the EIR/EIS.

Reclamation will serve as the Federal lead agency for the preparation of the EIR/EIS under NEPA. IID is the Lead Agency for CEQA purposes. As required by Section 15082 of the CEQA Guidelines, IID is submitting this Notice of Preparation (NOP) to responsible agencies, trustee agencies, other key agencies, private organizations, and individuals. The draft EIR/EIS is expected to be completed by a target date of April 3, 2000. Availability of the draft EIR/EIS for public review and comment will be announced and noticed in the local media.

DESCRIPTION OF THE PROPOSED PROJECT:

IID was organized in 1911 to deliver Colorado River water to lands within the Imperial Valley, California for agricultural, domestic, industrial, and other beneficial uses. Water is delivered via the All American Canal and flows through the Colorado River at Imperial Dam based upon water rights obtained prior to the beginning of this century under state law, pursuant to a 1932 water delivery contract for permanent service, for potable and irrigation purposes within the boundaries of the District, with the Secretary of the Interior under the Boulder Canyon Project Act of 1928 [45 Stat. 1057, as amended, 43 U.S.C. 617 et seq.], and pursuant to appropriations applications filed with the state between 1933 and 1936. Water flows through the Imperial Valley in a complex system of delivery canals, laterals, and drains serving over 450,000 acres of some of the most intensively farmed land in the nation. Agricultural drainage water flows into the New and Alamo Rivers and into the Salton Sea, a designated reservoir for irrigation drainage.



IID seeks to develop a long-term program for the conservation of up to 300,000 af/yr. IID proposes to transfer all or a portion of the conserved water to SDCWA and, under certain circumstances, other designees for beneficial use and to meet current and projected water supply needs. The proposed conservation program will include the participation of Imperial Valley landowners and tenants in order to implement on-farm conservation methods, such as improved or alternative water management techniques and revised irrigation methods. The program may also include system-based conservation methods implemented by IID, which improve distribution and drainage facilities.

IID intends that the transferred water will retain IID's priority among Colorado River water users and that the transfer will not affect IID's historic water rights. IID, the Department of Interior, and other potentially affected water rights holders are engaged in quantification discussions regarding Colorado River water.

On April 29, 1998, IID and SDCWA executed an Agreement for Transfer of Conserved Water (Agreement). The Agreement provides parameters for the water conservation and transfer transaction. The Agreement calls for IID to conserve and transfer an annual amount of water (the "primary" transfer) not to exceed 20,000 af in the first year. The primary transfer would increase in quantity in subsequent years until a stabilized annual primary quantity is established by IID, which shall be not less than 130,000 af/yr or more than 200,000 af/yr. After at least 10 years of primary transfers, an additional discretionary component not to exceed 100,000 af/yr may be transferred to SDCWA or, at IID's option, to the Metropolitan Water District of Southern California or Coachella Valley Water District in connection with the settlement of water rights

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disputes between IID and these agencies. The initial term of the project is 45 years after transfers first commence. Each party has the option to extend the term for an additional 30 years.

The Water Conservation and Transfer Project is the result of a collaboration between IID and SDCWA. The purpose and need for the proposed project is to advance objectives of both agencies, consistent with the Law of the River for the Colorado River, relating to water availability and management. IID has identified specific objectives for the proposed project. The District proposes to sell the conserved water in a market-based transaction in order to provide IID with sufficient funds to implement a water conservation program, including the cost of on-farm and system improvements, environmental mitigation costs, and other implementation costs. IID intends to implement a conservation program which includes participation of Imperial Valley landowners and tenants so that on-farm, in addition to system-based conservation methods, can be implemented efficiently. IID seeks to maintain its historic senior priority water rights in a manner consistent with state and federal law during project implementation and operation. Additional IID objectives include providing an economic stimulus to Imperial Valley's agricultural economy and the surrounding community and lessen increased demand for water for southern California from the State Water Project.

SDCWA has also identified specific project objectives. SDCWA seeks to acquire an independent, reliable alternate long-term water supply to provide drought protection and to accommodate current and projected demand for municipal, domestic, and agricultural water uses. In order to enhance the reliability of its water supply, SDCWA intends to diversify its sources of water supply and decrease its current dependence on a single source. Through the establishment of a stabilized source, SDCWA seeks to pay a fair, competitive price for its water supply and in the process lessen increased demand for water for southern California from the State Water Project.

A water transfer from IID to SDCWA is a key element of the "California Plan" which is being developed by the Colorado River Board of California and the California State Department of Water Resources, at the request of the Secretary of the Interior and the other Colorado River basin states. This Plan is intended to address the need for California reduce its reliance on Colorado River water to its legal entitlement of 4.4 million acre-feet of Colorado River water. California currently is diverting approximately 5.2 million acre-feet of Colorado River water per year.

Implementation of the proposed project will require certain state approvals, including approval by the State Water Resources Control Board and compliance with CEQA and the California Endangered Species Act. Implementation will also require certain federal approvals, including approval of the proposed transfer between IID and SDCWA, compliance with NEPA, the federal Endangered Species Act and other related federal environmental laws, statutes, Executive Orders, and regulations. Reclamation will act as the federal lead agency pursuant to NEPA because certain actions taken to facilitate the transfer will require approval by the Secretary of the Interior. Such actions could potentially include amendments to IID's contract with the Secretary, change in point of diversion of Colorado River water, change in type of use, change in place of use, verification or concurrence in the amount of water conserved by this Project, and verification of beneficial use of Colorado River water. Reclamation is therefore seeking comments from the comments from the public on the scope of issues and extent of analysis that should be evaluated in this EIR/EIS.

Additional information can be obtained from the project website at http://www.is.ch2m.com/iidweb.

ALTERNATIVES:

The EIR/EIS will evaluate other feasible project alternatives, including a range of alternative conservation measures, water supply and transfer alternatives, and various alternative measures in addition to the No Project/No Action Alternative.

Potential water supply alternatives that will be considered in the EIR/EIS include the following:

- Additional water conservation in the San Diego service area
- Additional water repurification and recycling
- Desalination
- Additional water transfers from Northern California
- Transfer of water conserved in another agricultural region with conveyance through the State Water Project and Metropolitan Water District system

POTENTIAL ENVIRONMENTAL EFFECTS:

The full range of environmental impacts has not been quantified temporally and spatially. Until specific conservation alternatives have been developed, potential environmental effects could include the following:

<u>Lower Colorado River Area</u>

- Reduction in Colorado River water flows between Parker and Imperial Dams
- Impacts to Colorado River water quality
- Impacts to wildlife, protected species and their habitats
- Cumulative impacts to water quality

<u>San Diego County</u>

- Growth-inducing impacts

<u>Salton Sea</u>

- Effects on water levels, salinty, and water quality
- Effects on fisheries habitat
- Impacts to wildlife, protected species and their habitats
- Impacts to recreational uses

<u>Imperial Valley</u>

- Impacts to water flow and quality
- Effects on selenium, boron, and pesticide concentrations
- Impacts to wildlife, protected species and their habitats
- Socio-economic impacts
- Air quality impacts

PUBLIC AGENCY AND SCOPING MEETINGS:

Six public scoping meetings will be held to discuss the project and scope of the EIR/EIS. The purpose of these meetings is to identify issues that should be addressed in the EIR/EIS. The public meetings will be open to all interested members of the public, and both written and oral comments will be accepted at the meetings. These scoping meetings will be held at the following locations and times:

1)	Northern Imperial Valley	Elks Lodge #1420 161 South Plaza Brawley, CA 92227 Tuesday, October 12, 1999 7 PM to 9 PM
2)	Salton Sea Area	Salton Sea Community Service District 2098 Frontage Road Salton City, CA 92275 Wednesday, October 13, 1999 7 PM to 9 PM
3)	Southern Imperial Valley	IID Board Room 1285 Broadway El Centro, CA 92243 Thursday, October 14, 1999 7 PM to 9 PM
4)	Lower Colorado River Region	Clark County Library 1401 East Flamingo Road Las Vegas, NV 89119 Monday, October 18, 1999 7 PM to 9 PM
5)	Northern San Diego County	Carlsbad Senior Center 799 Pine Avenue Carlsbad, CA 92008 Tuesday, October 19, 1999 7 PM to 9 PM

6) Southern San Diego County

SDCWA Building
3211 Fifth Avenue
San Diego, CA 92103
Wednesday, October 20, 1999
7 PM to 9 PM

Hearing impaired, visually impaired, and/or mobility impaired persons planning to attend the meeting(s) may arrange for necessary accommodations by calling Ms. Molly Sweat at (702) 293-8415 no later than September 27, 1999.

A public involvement program has been initiated and will be implemented throughout the EIR/EIS process. The goal is to keep the public and affected parties informed and actively involved in the environmental assessment of the project.

RESPONSES TO NOTICE:

In responding to this NOP, responsible agencies and other agencies having jurisdiction over the project or natural resources that may be affected by the project are requested to provide specific detail as to the scope and content of the environmental information related to that agency's statutory responsibilities which should be included in the draft EIR/EIS. Responding agencies are also asked to provide any quantitative, qualitative, or performance standards applicable to project activities that will be subject to review and/or approval of the responding agency. This information will be used to assist in the development of thresholds of significance to be used to evaluate the significance of environmental effects and in the development of mitigation measures to address any significant impacts. Responding agencies should identify a contact person for their agency.

Responses to this notice must be received no later than October 25, 1999. Please send your written comments or questions to:

Mr. Steven R. Knell
Special Projects Coordinator, Imperial Irrigation District
333 E. Barioni Boulevard.
P.O. Box 937
Imperial, CA 92251
(760) 339-9266

[Federal Register: September 27, 1999 (Volume 64, Number 186)]
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[DOCID:fr27se99-77]

DEPARTMENT OF THE INTERIOR

Bureau of Reclamation

Imperial Irrigation District/San Diego County Water Authority Water Conservation and Transfer Project

AGENCY: Bureau of Reclamation, Interior.

ACTION: Notice of Intent to prepare an Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS) and notice of public scoping meetings on the **Imperial Irrigation District**/San Diego County Water Authority Water Conservation and Transfer Project.

SUMMARY: Pursuant to section 102 (2) (c) of the National Environmental Policy Act (NEPA) and the State of California Environmental Quality Act (CEQA), the

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Bureau of Reclamation (Reclamation) and **Imperial Irrigation District** (IID or **District**) will prepare a joint EIR/EIS to assess the impacts of the proposed IID/San Diego County Water Authority (SDCWA) Water Conservation and Transfer Project. The proposed project consists of the conservation by IID of up to 300,000 acre-feet of Colorado River water per year (af/yr), and the subsequent transfer of all or a portion of the diverted water to the SDCWA and, under certain circumstances, other designees. IID and Reclamation are holding public scoping meetings soliciting input from the public on the types of issues and extent of analysis that should be contained in the EIR/EIS.

DATES: Written comments on the NOI will be accepted until October 25, 1999. Public scoping meetings will be held at the following locations (both written and oral comments will be accepted at the public scoping meetings):

1. Northern **Imperial** Valley--Elks Lodge #1420, 161 South Plaza, Brawley, CA 92227, Tuesday, October 12, 1999, 7 PM to 9 PM.
2. Salton Sea Area--Salton Sea Community Service **District**, 2098 Frontage Road, Salton City, CA 92275, Wednesday, October 13, 1999, 7 PM to 9 PM..
3. Southern **Imperial** Valley--IID Board Room, 1285 Broadway, El Centro, CA 92243, Thursday, October 14, 1999, 7 PM to 9 PM.
4. Lower Colorado River Region--Clark County Library, 1401 East Flamingo Road, Las Vegas, NV 89119, Monday, October 18, 1999, 7 PM to 9 PM.
5. Northern San Diego County--Carlsbad Senior Center, 799 Pine

Avenue, Carlsbad, CA 92008, Tuesday, October 19, 1999, 7 PM to 9 PM.

6. Southern San Diego County--SDCWA Building, 3211 Fifth Avenue, San Diego, CA 92103, Wednesday, October 20, 1999, 7 PM to 9 PM.

Hearing impaired, visually impaired, and/or mobility impaired persons planning to attend the meeting(s) may arrange for necessary accommodations by calling Ms. Molly Sweat at (702) 293-8415 no later than October 6, 1999.

ADDRESSES: Written comments should be sent to: Bureau of Reclamation, Lower Colorado River Region, Boulder Canyon Operations Office, P.O. Box 61470, Boulder City, NV 89006-1470, Attn: William Rinne, BC-00-1000; or to: **Imperial Irrigation District,** 333 East Barioni Boulevard, P.O. Box 937, **Imperial** CA, 92251, Attn: Steven R. Knell.

FOR FURTHER INFORMATION CONTACT: Mr. William Rinne, at the Bureau of Reclamation (702) 293-8414; or Mr. Steven Knell, Special Projects Coordinator, **Imperial Irrigation District,** at (760) 339-9266. Further information can also be obtained on the website at http:// www.is.ch2m.com/iidweb.

SUPPLEMENTARY INFORMATION: IID was organized in 1911 to deliver Colorado River water to lands within the **Imperial** Valley, California for agricultural, domestic, industrial, and other beneficial uses. Water is diverted via the All American Canal and flows through the Colorado River at **Imperial** Dam based upon water rights obtained prior to the beginning of this century under state law, pursuant to a 1932 water delivery contract for permanent service, for potable and **irrigation** purposes within the boundaries of the **District,** with the Secretary of the Interior under the Boulder Canyon Project Act of 1928 [45 Stat. 1057, as amended, 43 U.S.C. 617 et seq.], and pursuant to appropriations applications filed with the state between 1933 and 1936. Water flows through the **Imperial** Valley in a complex system of delivery canals, laterals, and drains serving over 450,000 acres of some of the most intensively farmed land in the nation. Agricultural drainage water flows into the New and Alamo Rivers and into the Salton Sea, a designated reservoir for **irrigation** drainage.

IID seeks to develop a long-term program for the conservation of up to 300,000 af/yr. IID proposes to transfer all or a portion of the conserved water to SDCWA and, under certain circumstances, other designees for beneficial use and to meet current and projected water supply needs. The proposed conservation program would include the participation of **Imperial** Valley landowners and tenants in order to implement on-farm conservation methods, such as improved or alternative water management techniques and revised **irrigation** methods. The program may also include system-based conservation methods implemented by IID, which improve distribution and drainage facilities.

IID intends that the transferred water will retain IID's priority among Colorado River water users and that the transfer will not affect IID's historic water rights. IID, the Department of Interior, and other potentially affected water rights holders are engaged in quantification discussions regarding Colorado River water.

On April 29, 1998, IID and SDCWA executed an Agreement for Transfer of Conserved Water (Agreement). The Agreement provides parameters for the water conservation and transfer transaction. The Agreement calls for IID to conserve and transfer an annual amount of water (the ``primary'' transfer) not to exceed 20,000 af in the first year. The primary transfer would increase in quantity in subsequent years until a stabilized annual primary quantity is established by IID, which shall be not less than 130,000 af/yr or more than 200,000 af/yr. After at least 10 years of primary transfers, an additional discretionary component not to exceed 100,000 af/yr may be transferred to SDCWA or, at IID's option, to the Metropolitan Water **District** of Southern California or Coachella Valley Water **District** in connection with the settlement of water rights disputes between IID and these agencies. The initial term of the project is 45 years after transfers first commence. Each party has the option to extend the term for an additional 30 years.

The Water Conservation and Transfer Project is the result of a collaboration between IID and SDCWA. The purpose and need for the proposed project is to advance objectives of both agencies, consistent with the Law of the River for the Colorado River, relating to water availability and management. IID has identified specific objectives for the proposed project. The **District** proposes to sell the conserved water in a market-based transaction in order to provide IID with sufficient funds to implement a water conservation program, including the cost of on-farm and system improvements, environmental mitigation costs, and other implementation costs. IID intends to implement a conservation program which includes participation of **Imperial** Valley landowners and tenants so that on-farm, in addition to system-based conservation methods, can be implemented efficiently. IID seeks to maintain its historic senior priority water rights in a manner consistent with state and federal law during project implementation and operation. Additional IID objectives include providing an economic stimulus to **Imperial** Valley's agricultural economy and the surrounding community and lessen increased demand for water for southern California from the State Water Project.

SDCWA has also identified specific project objectives. SDCWA seeks to acquire an independent, reliable alternate long-term water supply to provide drought protection and to accommodate current and projected demand for municipal, domestic, and agricultural water uses. In order to enhance the reliability of its water supply, SDCWA intends to diversify its

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sources of water supply and decrease its current dependence on a single source. Through the establishment of a stabilized source, SDCWA seeks to pay a fair, competitive price for its water supply and in the process lessen increased demand for water for southern California from the State Water Project.

A water transfer from IID to SDCWA is a key element of the ``California 4.4 Plan'' which is being developed by the Colorado River Board of California and the California State Department of Water Resources, at the request of the Secretary of the Interior and the other Colorado River basin states. This Plan is intended to address the need for California to reduce its reliance on Colorado River water to its legal entitlement of 4.4 million acre-feet of Colorado River water. California currently is diverting approximately 5.2 million acre-feet of Colorado River water per year.

Implementation of the proposed project will require certain state approvals, including approval by the State Water Resources Control Board and compliance with CEQA and the California Endangered Species Act. Implementation will also require certain federal approvals, including approval of the proposed transfer between IID and SDCWA,

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compliance with NEPA, the federal Endangered Species Act and other related federal environmental laws, statutes, Executive Orders, and regulations. Reclamation will act as the federal lead agency pursuant to NEPA because certain actions taken to facilitate the transfer will require approval by the Secretary of the Interior. Such actions could potentially include amendments to IID's contract with the Secretary, change in the point of diversion of Colorado River water, change in type of use, change in place of use, verification or concurrence in the amount of water conserved by this Project, and verification of beneficial use of Colorado River water. Reclamation is therefore seeking comments from the public on the scope of the issues and extent of analysis that should be evaluated in the EIR/EIS.

Additional information can be obtained from the project website at http://www.is.ch2m.com/iidweb.

Alternatives

The EIR/EIS will evaluate other feasible project alternatives, including a range of alternative conservation measures, water supply and transfer alternatives, and various alternative measures in addition to the No Project/No Action Alternative.

Potential water supply alternatives that will be considered in the EIR/EIS include the following:

<bullet> Additional water conservation in the San Diego service area
<bullet> Additional water repurification and recycling
<bullet> Desalination
<bullet> Additional water transfers from Northern California
<bullet> Transfer of water conserved in another agricultural region with conveyance through the State Water Project and Metropolitan Water **District** system

Potential Environmental Effects

The full range of environmental impacts has not been quantified temporally and spatially. Until specific conservation alternatives have been developed, potential environmental effects could include the following:

Lower Colorado River Area

<bullet> Reduction in Colorado River water flows between Parker and **Imperial** Dams
<bullet> Impacts to Colorado River water quality
<bullet> Impacts to wildlife, protected species and their habitats
<bullet> Cumulative impacts to water quality

San Diego County

<bullet> Growth-inducing impacts
<bullet> Salton Sea
<bullet> Effects on water levels, salinity, and water quality
<bullet> Effects on fisheries habitat
<bullet> Impacts to wildlife, protected species and their habitats
<bullet> Impacts to recreational uses

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<bullet> Impacts to water flow and quality
<bullet> Effects on selenium, boron, and pesticide concentrations
<bullet> Impacts to wildlife, protected species and their habitats
<bullet> Socio-economic impacts
<bullet> Air quality impacts

The draft EIR/EIS is expected to be completed by a target date of April 3, 2000. Availability of the draft EIR/EIS for public review and comment will be announced and noticed in the local media and by a Federal Register Notice.

Dated: September 23, 1999.
Steven Richardson,
Chief of Staff, Bureau of Reclamation.
[FR Doc. 99-25187 Filed 9-24-99; 8:45 am]
BILLING CODE 4310-94-P

[Federal Register: November 6, 2000 (Volume 65, Number 215)]
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DEPARTMENT OF THE INTERIOR

Bureau of Reclamation

Notice of **Intent** to prepare an Environmental Impact Report (EIR)/ Environmental Impact Statement (EIS) on the Imperial Irrigation District/San Diego County Water Authority Water Conservation and Transfer Project

AGENCY: Bureau of Reclamation, Interior.

ACTION: Amended **Notice** of **Intent** to Prepare a Joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS).

SUMMARY: The Fish and Wildlife Service (Service) intends to be a cooperating agency (pursuant to 40 CFR section 1501.6) in the Bureau of Reclamation's (Bureau) preparation of a joint EIR/EIS pursuant to the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The joint EIR/EIS will be developed for: (1) the conservation and transfer of water from Imperial Irrigation District (IID) to the San Diego County Water Authority (SDCWA), the Coachella Valley Water District (CVWD) and/or the Metropolitan Water District of Southern California (MWD) and (2) approval of a Habitat Conservation Plan, and issuance of an incidental take permit, pursuant to section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended, including consideration of conservation measures or plans addressing State-listed species.

This **notice** is being furnished pursuant to the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR section 1501.22). Pursuant to regulations at 40 CFR (sections 1501.7 and 1508.22), the Bureau, as lead agency pursuant to NEPA, and the Service, as the Federally authorized permitting agency, are seeking suggestions and information from other agencies and the public on the scope of issues and alternatives to be considered in preparation of the joint EIR/EIS pertaining to possible issuance of a Federal incidental take permit. To satisfy both NEPA and CEQA, the Service, as a cooperator, with the Bureau as the Federal lead agency and IID as the State lead agency are conducting this additional scoping process for the preparation of the environmental documents.

DATES: In order to expedite the planning process, the above agencies request all scoping comments on this **notice** be received by December 6, 2000.

ADDRESSES: You should address written comments to Ms. Nancy Gilbert,

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Assistant Field Supervisor, Fish and Wildlife Service, 2730 Loker Avenue West, Carlsbad, California 92008. You may also send comments by facsimile to (760) 431-9618.

FOR FURTHER INFORMATION: Contact Ms. Carol Roberts, Salton Sea Coordinator, or Mr. Pete Sorensen, Division Chief, at the above Carlsbad address or by telephone at (760) 431-9440. Persons wishing to obtain background material may contact Mr. Steve Knell of the Imperial Irrigation District at 333 E. Barioni Blvd., P.O. Box 937, Imperial California 92251, or by telephone at (760) 339-9266.

SUPPLEMENTARY INFORMATION: The Bureau is publishing this **notice** to amend the September 27, 1999 **Notice** of **Intent** (see 64 FR 52102) to provide public **notice** that the project EIR/EIS will include an evaluation of the impacts associated with the potential issuance of an incidental take permit. This was not specifically addressed in the initial **Notice** of **Intent** provided for the project. The Habitat Conservation Plan will cover a broad array of activities including: water conservation, water conveyance and drainage, operation and maintenance, system improvements, miscellaneous activities, and third party activities required to achieve the conservation and transfer of up to 300,000 acre-feet of water per year from IID to the SDCWA and to meet the voluntary cap on IID's water use of 3.1 million acre-feet per year from the Colorado River. Up to 100,000 acre-feet of the water conserved by IID may be transferred to the CVWD and/or MWD, instead of SDCWA, as part of the proposed Quantification Settlement Agreement on the Colorado River. The EIR/EIS will evaluate transfer volumes up to 400,000 acre-feet per year. The IID (Applicant) intends to request an incidental take permit for up to 96 listed (Federal and State) and unlisted species of concern (fish, wildlife, and plants) under specific provisions of the permit. In the case of unlisted species, the permit will provide coverage should these species be listed in the future. The Plan will cover all areas of IID's water delivery and collection system from the Imperial Dam on the Colorado River throughout the Imperial Valley (approximately 470,000 acres) into the Salton Sea.

Availability of Documents

During the comment period the documents will be available for public inspection by appointment during normal business hours (8 a.m. to 5 p.m.,

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Monday through Friday) at the Service's Carlsbad Fish and Wildlife Office, the Imperial Irrigation District headquarters in Imperial, and the San Diego County Water Authority office in San Diego. Availability of the draft EIR/EIS for public review and comment will be announced and noticed in the local media and by a Federal Register **notice**.

Background

IID is an irrigation district formed under California law which provides irrigation water and power to the lower southeastern portion of the California desert. IID was established in 1911 to deliver Colorado River water to lands within the Imperial Valley, California for agriculture, domestic, industrial and other beneficial uses. IID

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maintains a complex system of delivery canals, laterals, and drains which serve approximately 470,000 acres of intensive agriculture. The project area is approximately bounded by the All-American Canal to the south, the East Highline Canal to the east, the Westside Main Canal to the west, and the Salton Sea to the north. Agricultural drainage flows into the New and Alamo Rivers and into the Salton Sea, a designated repository for agricultural drainage.

On April 29, 1998, IID and SDCWA executed an agreement for the conservation and transfer of up to 300,000 acre-feet of Colorado River water per year from IID to SDCWA. As part of the project, IID intends to implement a conservation program that includes the participation of Imperial Valley land owners and tenants so that on-farm as well as system based conservation can be implemented to achieve the required level of conservation. This transfer is a key part of the California 4.4 Plan that will result in California water agencies using only their 4.4 million acre-foot apportionment of the Colorado River. California is currently diverting up to 5.2 million acre-feet of Colorado River water per year. Subsequent negotiations with other Colorado River water rights holders in California have resulted in a proposed Quantification Settlement Agreement among IID, MWD, and CVWD which would reduce the maximum amount of conserved water transferred to SDCWA to 200,000 acre-feet per year and would provide for the transfer of the additional 100,000 acre-feet to the CVWD and the MWD.

A joint EIR/EIS is being prepared by the Bureau and the IID with the Service as a cooperating agency to address the impacts associated with the project and with permit issuance for the project. Additional information on the project can be found in the original **Notice** of **Intent** published at 64 FR 52102. Scoping meetings were held in response to that **Notice** of **Intent** on October 12-20, 1999, and no additional scoping meetings are planned in response to this **notice**.

Section 9 of the Endangered Species Act and the Service regulations prohibit the ``take'' of threatened or endangered wildlife. Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect listed animal species, or attempt to engage in such conduct (16 U.S.C. 1538). Harm may include significant habitat modification that actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding and sheltering [50 CFR 17.3(c)]. The Service, however, may issue permits to take endangered and/or threatened wildlife incidental to, and not the purpose of, otherwise lawful activities. Regulations governing permits for endangered and threatened species are found at 50 CFR 17.22 and 17.32.

In anticipation of applying for an incidental take permit the IID is developing a Habitat Conservation Plan. Accordingly, under section 10 of the Endangered Species Act, the Service may issue a permit to the IID authorizing the take of listed and unlisted species incidental to the otherwise lawful conservation and transfer of up to 300,000 acre-feet of Colorado River water per year to the SDCWA, the CVWD, and the MWD, and additional conservation necessary to achieve the IID's voluntary cap of 3.1 million acre-feet/year on their use of Colorado River water.

The permit application will include a Habitat Conservation Plan (Plan) and an Implementation Agreement that define the responsibilities of all parties under the Plan. IID's Plan will cover roughly the area along the length of the All-American Canal and north of the All-American Canal to the Salton Sea bounded on the east by the East Highline Canal and on the west by the Westside Main Canal. The Plan will identify the species proposed for coverage under the Plan including federally-listed species for which take would be granted at the time of permit issuance as well as other species of concern for which take would be granted should those species be listed in the future. The Plan also describes alternatives to the action and includes measures to minimize and mitigate impacts to species covered in the Plan. The Plan will address minimization and mitigation using both a habitat based and a species by species approach. The joint EIR/EIS will consider IID's proposed project (Proposed Action Alternative) along with other alternatives and the No Action Alternative. Under the Proposed Action Alternative the Service would review IID's incidental take permit application under section 10(a)(1)(B) of the Endangered Species Act.

Environmental review of the Plan will be conducted in accordance with the requirements of the 1969 National Environmental Policy Act as amended (42 U.S.C. 4321 et seq.), National Environmental Policy Act regulations (40 CFR parts 1500-1508), other appropriate regulations, and Service procedures for compliance with those regulations. This **notice** is being furnished in accordance with section 1501.7 of the National Environmental Policy Act to obtain suggestions and information from other agencies and the public on the scope of issues to be addressed in the joint EIR/EIS.

The Service will utilize the joint EIR/EIS in its evaluation of the permit application, the Habitat Conservation Plan, Implementing Agreement, associated documents, and comments submitted thereon to determine whether the application meets the requirements of section 10(a) of the Endangered Species Act. If the Service determines that the requirements have been met, the Service will issue a permit for the incidental take of the covered listed species.

Dated: October 30, 2000.
Robert W. Johnson,
Regional Director.
[FR Doc. 00-28431 Filed 11-3-00; 8:45 am]
BILLING CODE 4310-MN-P

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Scoping Summary Report

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Final

IID/SDCWA
Water Conservation and Transfer Project
EIR/EIS

Scoping Summary Report

Prepared by

CH2MHILL

3 Hutton Centre Drive
Suite 200
Santa Ana, California 92707

March 10, 2000

Approved

IID____

Reclamation ____

SDCWA_____

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Acronyms

AF	acre feet
af/yr	acre-feet per year
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	State of California Environmental Quality Act
CVWD	Coachella Valley Water District
Draft EIR/EIS	Draft Environmental Impact Report/Environmental Impact Statement
IID	Imperial Irrigation District
Key Terms	Key Terms for Quantification Settlement Among the State of California, IID, CVWD, and MWD
MWD	Metropolitan Water District
NEPA	National Environmental Policy Act
NOI/NOP	Notice of Intent/Notice of Preparation
proposed Project	IID/SDCWA Water Conservation and Transfer Project
Reclamation	U.S. Bureau of Reclamation
SDCWA	San Diego County Water Authority
SWRCB	State Water Resources Control Board
TDS	total dissolved solids

SECTION 1

Introduction and Background

The U.S. Bureau of Reclamation (Reclamation) and the Imperial Irrigation District (IID) are preparing a joint Draft Environmental Impact Report/ Environmental Impact Statement (Draft EIR/EIS) to assess the potential environmental impacts of the IID/San Diego County Water Authority (SDCWA) Water Conservation and Transfer Project (proposed Project). The Project Vicinity Map is shown in Figure 1-1. The Draft EIR/EIS is being prepared in accordance with the National Environmental Policy Act (NEPA) and the State of California Environmental Quality Act (CEQA). The proposed Project consists of the conservation by IID of up to 300,000 acre-feet per year (af/yr) of Colorado River water and the subsequent transfer of all or a portion of the conserved water to SDCWA, and under certain circumstances, other designees. Reclamation is the federal Lead Agency under NEPA, and IID is the state Lead Agency under CEQA.

The purpose of this Scoping Summary Report is to provide a summary of the proposed scope of the environmental analysis to be included in the Draft EIR/EIS, which is based, in part, on input received during the scoping process. This report also includes a summary of the comments received during the scoping process and presents responses to the comments that, among other things, identify how the issues raised will be addressed in the Draft EIR/EIS.

This report includes an introduction (Section 1), an overview of the purpose of the scoping process (Section 2), and a summary of the number and nature of comments received (Section 3). It also includes a section identifying how the issues raised in the scoping comments will be addressed in the Draft EIR/EIS and provides general responses to commonly raised issues (Section 4). In some cases, a determination has been made that the issues raised by certain comments are beyond the proposed scope of the environmental assessment required for the proposed Project; therefore, those issues will not be addressed in the Draft EIR/EIS. Issues of this type can generally be characterized by one of the following designations:

(1) The issue does not identify an "environmental impact" associated with the proposed Project;

(2) The issue identifies a potential environmental impact, but the Lead Agencies have determined that it is not "potentially significant;"

(3) The issue refers to a separate, unrelated project; or

(4) The issue makes a general information request.

For each issue determined to be outside the scope of the Draft EIR/EIS, an explanation is provided in Section 4.3 and Appendix K.

This report also provides the following supporting information, included as appendixes to this report:

Appendix A:	Notice of Intent/Notice of Preparation (NOI/NOP) Notification
Appendix B:	Notices of Public Scoping Meetings
Appendix C:	Public Scoping Meeting Sign-In Sheets
Appendix D:	Public Scoping Meeting Transcripts
Appendix E:	Scoping Meeting Handouts and Materials
Appendix F:	Speaker Cards
Appendix G:	Written Comments and Letters
Appendix H:	Methodology for Categorizing Scoping Comments
Appendix I:	Scoping Comments Database
Appendix J:	Draft EIR/EIS Outline
Appendix K:	Summary of Issues Determined to be Outside the Proposed Scope of the Draft EIR/EIS

Figure 1-1 Project Vicinity

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SECTION 2

Scoping Process

This section presents the purpose of the scoping process for the proposed Project, identifies the notification process that was implemented for the scoping meetings, the details of the meeting locations, and meeting attendance.

2.1 Purpose and Notification

The scoping process for the proposed Project was designed to solicit input from the public; from federal, state, and local agencies; and from other interested parties on the scope of issues that should be addressed in the Draft EIR/EIS and to identify significant issues related to the proposed Project. The scoping meetings were attended by groups interested in potential water delivery system and on-farm conservation methods, and other aspects of the proposed Project, including potential impacts to the Lower Colorado River, the Salton Sea, and the SDCWA and IID service areas.

The NEPA NOI was published in the *Federal Register* on September 27, 1999, and the CEQA NOP was distributed by the State Clearinghouse on September 29, 1999. Copies of the NOI and NOP are in Appendix A. Additional notification was provided by publishing public notices in newspapers of general circulation. The public scoping meetings were advertised in six local newspapers: *Imperial Valley Press, Desert Sun, San Diego Union Tribune, Los Angeles Times, El Sol del Valle,* and *Las Vegas Review-Journal/Sun.* Appendix B contains the public scoping meeting notices published in each newspaper.

In accordance with NEPA and CEQA guidelines, a 30-day comment period on the NOI/NOP was established that would end on October 27, 1999. The purpose of this 30-day comment period is to provide ample opportunity for the public, agencies, and other interested parties to evaluate and comment on environmental issues related to the proposed Project, while providing a definitive time frame for the Lead Agencies to receive public reactions to the issues raised. This schedule facilitates the Lead Agencies' efforts to evaluate and respond to the comments in an efficient manner and to identify the proposed scope of the Draft EIR/EIS. A 30-day extension to the comment period was requested and granted, which extended the official comment period to November 27, 1999. The Lead Agencies will continue to coordinate with the public, agencies, and other interested parties to consider comments throughout the environmental review process.

2.2 Scoping Meetings

The Lead Agencies conducted six public scoping meetings between October 12 and October 20, 1999, to solicit input from the public on potential environmental impacts, the significance of impacts, the appropriate scope of the environmental assessment, proposed mitigation measures, and potential alternatives to the proposed Project. In general, the scoping process resulted in good participation by a cross section of the general public, including local business communities and special interest and environmental groups, as well as federal, state, and local agencies. The meetings were held at the following locations on the following dates. The number of attendees at each meeting is noted in parentheses.

1) Northern Imperial Valley
(27 attendees)
Elks Lodge #1420
161 South Plaza
Brawley, CA 92227
Tuesday, October 12, 1999

2) Salton Sea Area
(88 attendees)
Salton Sea Community Service District
2098 Frontage Road
Salton City, CA 92275
Wednesday, October 13, 1999

3) Southern Imperial Valley
(28 attendees)
Board of Supervisors' Board Room
640 West Main Street
El Centro, CA 92243
Thursday, October 14, 1999

4) Lower Colorado River Region
(8 attendees)
Clark County Library
1401 East Flamingo Road
Las Vegas, NV 89119
Monday, October 18, 1999

5) Northern San Diego County
(13 attendees)
Carlsbad Senior Center
799 Pine Avenue
Carlsbad, CA 92008
Tuesday, October 19, 1999

6) Southern San Diego County
(22 attendees)
SDCWA Building
3211 Fifth Avenue
San Diego, CA 92103
Wednesday, October 20, 1999

According to sign-in sheets, approximately 186 people attended the scoping meetings. Appendix C contains sign-in sheets from the scoping meetings. All six scoping meetings were recorded by a certified court reporter who provided written transcripts of the proceedings. Appendix D contains copies of the transcripts from the scoping meetings. In addition, for the two scoping meetings held in the Imperial Valley (Brawley and El Centro, California), a certified Spanish interpreter was present to provide simultaneous interpretation. The following documents were also made available as handouts at each scoping meeting.

- Scoping meeting agenda
- Project schedule
- NOI/NOP (in English and Spanish)
- Proposed Project map
- Written comment card
- Speaker card

Appendix E contains copies of the scoping meeting handouts and materials.

SECTION 3

Scoping Comments Received

This section presents a summary of the number and general content of the comments received during the scoping process. The majority of comments received will be addressed or considered in the Draft EIR/EIS.

3.1 Number of Comments

Of the 186 persons who attended the six scoping meetings, 49 provided oral testimony. Those who chose to speak at the scoping meetings were asked to fill out speaker cards to document the oral comments received during the scoping process. While not all oral commenters submitted speaker cards, Appendix F presents the 36 speaker cards that were received. In addition, a total of 44 written comment forms and letters were also received during the scoping comment period. See Appendix G for copies of the written comments. A breakdown of the number of commenters who provided written and/or oral testimony is presented in Table 3-1.

TABLE 3-1
Number of Commenters[1] Submitting Oral or Written Comments

	Federal Agency	State Agency	Local Agency	Special Interest/ Environmental Group	Individual	Local Business	Total
Public Scoping Meeting Commenters	0	1	8	4	33	3	49
Written Comments and Letters	3	6	12	8	15	0	44
Total	**3**	**7**	**20**	**12**	**48**	**3**	**93**

[1] Each comment letter or oral comment received from an agency, individual, or other interested party was counted as one, although numerous issues within one letter or oral comment may have been raised.

A review of the comment letters and meeting transcripts indicated that some of the commenters raised multiple issues during their testimony and/or in their written comments and letters. As a result, a total of 341 issues were identified during the scoping process. After reviewing the 341 issues, it was determined that many of them could be combined into overlapping comment categories because of the common issues raised. See Appendix H for a discussion of the methodology for categorizing and combining scoping comments. As a result of combining like comments, 122 issues were identified. See Appendix I, Scoping Comments Database, for a detailed discussion of the 122 issues.

The Lead Agencies received three comment letters from federal agencies during the scoping process. Five California state agencies and one Arizona state agency participated in the scoping process, submitting six comment letters and one oral comment on issues ranging from biological and air resources to recreation. Eleven local agencies submitted written comment letters, and eight local agencies submitted oral comments on various issues. Special interest/environmental groups submitted 12 comments primarily concerned with impacts to biological resources. Forty-eight individual comments raised issues on socioeconomic impacts and the health of the Salton Sea. Local businesses contributed three oral comments on the impact of the proposed Project on the local economy.

To facilitate the assessment of comments, those comments with common themes that raised similar issues or questions were organized and combined. Comments have been organized in the following categories: Water Quantity/Quality, Water Rights, Water Use, Groundwater, Air Quality, Biological Resources, Land Use, Recreation, Energy, Socioeconomics, Cost, Growth-Inducing Impacts, Cumulative Impacts, Mitigation/Monitoring, Alternatives, and Miscellaneous. The number of comments in each category is summarized in Table 3-2.

TABLE 3-2
Number of Comments by Resource Category

Resource Category	Total Number of Comments Received	Number of Issues
Water Quantity/Water Quality	63	17
Water Rights	26	13
Water Use	35	18
Groundwater	14	4
Air Quality	9	1
Biological Resources	46	8
Land Use	12	3
Recreation	7	3
Energy (Public Services and Utilities)	4	2
Socioeconomics	35	11
Cost	22	10
Growth-Inducing Impacts	9	3
Cumulative Impacts	13	3
Mitigation/Monitoring	12	6
Alternatives	11	4
Miscellaneous	23	16
Total	**341**	**122**

3.2 Summary of Comments

This section summarizes the content of the written and oral comments submitted during the scoping process. The first part of this section presents a summary of the comments organized by the applicable resource category. For each resource category, a summary of the commenters' concerns is presented. This is followed by a discussion of the ways in which the comments were combined to account for common issues within each resource category. The comment responses reflect the Lead Agencies' preliminary direction for how to address the issues in the Draft EIR/EIS.

The combined comments for each resource category are presented in detail in Appendix I, Scoping Comments Database. Comments raising issues that have been determined to fall outside the scope of the Draft EIR/EIS are addressed in Section 4.3.

Generally, commenters were primarily concerned with impacts to hydrology and water quality, biological resources, and socioeconomics. The letters from federal agencies raised issues with respect to impacts to hydrology, water quality, biological resources, and the ways in which the proposed action could affect various federal regulations, treaties, and water rights. State agency comments from California and Arizona raised issues covering impacts to biological resources, air quality, recreation, and growth. State agencies were also concerned about cumulative impacts and the plans of the proposed Project for mitigation and monitoring. Local agencies expressed concern about the impact of the proposed Project on the local economy and the cost of both cumulative impacts and mitigation and monitoring. Special interest and environmental groups primarily commented on impacts to biological resources. Oral comments and written letters from individuals of the general public raised a variety of issues. Concerns about the impact of the proposed Project to socioeconomic conditions in the Imperial Valley and biological impacts to the Salton Sea were commonly raised. Impacts to the local economy were of great concern to local businesses.

3.2.1 Water Quantity/Water Quality

Sixty-three water quantity/water quality comments that raised common issues or concerns were combined to identify 17 issues. These issues primarily concerned the effect of the proposed Project on the water quality and quantity of the Salton Sea, Colorado River, the Delta in Mexico, and other potentially affected streams and watercourses.

Overall, commenters stated that the EIR/EIS must contain an appropriate level of environmental analysis for impacts to water quality and quantity. It was requested that all beneficial uses of Colorado River water be analyzed by addressing the compliance of the proposed Project with surface and instream water quality standards established by federal, state, tribal, and local agencies. Several commenters asked that the EIR/EIS address the impacts of the proposed Project at different levels of water transferred (i.e., at 100,000 af/yr, 200,000 af/yr, and 300,000 af/yr) in order to adequately identify all potential impacts. A comparative water quality analysis was requested to evaluate the current water supply received by SDCWA (a combination of State Water Project and Colorado River Water) and the anticipated supply from the proposed Project, which the commenter suggested could contain a higher level of total dissolved solids (TDS) and affect current treatment and distribution practices in the San Diego area.

A number of commenters requested clarification on the relationship of the proposed Project to the Salton Sea Restoration Project and whether the proposed Project would be beneficial to the Salton Sea (i.e., whether the Salton Sea would receive fresh water as a direct result of the proposed Project to reduce salinity levels). Several commenters suggested providing SDCWA with desalinated ocean water as an alternative to the water transfer from IID. Concerns were raised about whether sufficient water supplies for cities and districts in both the Imperial County and SDCWA service area could be guaranteed after the proposed Project is implemented.

3.2.2 Water Rights

Twenty-six water rights comments that raised common issues or concerns were combined to identify 13 issues. These issues expressed concern primarily over present and future water rights allocation and the relationship of the proposed Project to the California 4.4 Plan. Commenters requested clarification of relevant water rights laws, the Colorado River allocation process and regulations, and the history of water rights and the water supply allocation within the Project area. The desire to maintain IID's current and historic Colorado River priorities and water rights was expressed. It was also requested that the proposed Project description be revised to ensure conformance with the results of the recently announced "Quantification Settlement."

3.2.3 Water Use

Thirty-five water use comments that raised common issues or concerns were combined to identify 18 issues. These issues were primarily concerned with on-farm conservation methods and the assessment and monitoring of water management once the transfer to SDCWA occurs. Commenters stressed that the proposed Project should be in compliance with existing urban and agricultural water conservation plans. A few commenters suggested that SDCWA obtain needed water through a conservation plan within San Diego County rather than from the Imperial Valley. Overall, the majority of comments received asked for clarification on how the water would be conserved both on-farm and within the irrigation delivery system in Imperial Valley. Some commenters suggested the reuse of seepage and return flows and the use of unused gates in the Imperial Valley drainage system to conserve water. Additional comments received concerned Coachella Valley Water District (CVWD) water rights, importing sea water from the Gulf of Mexico, obtaining water supplies from central California to serve SDCWA, and the relationship of the proposed Project to the All American and Coachella Canals Lining Project.

3.2.4 Groundwater

Fourteen groundwater comments that raised common issues or concerns were combined to form four issues. These issues primarily concerned the impacts of the proposed Project on the availability of groundwater in the vicinity of the Salton Sea, near the Colorado River, in San Diego County, and in Mexico. Commenters from the Imperial Valley are interested in the impact to their aquifer after the water transfer to SDCWA occurs.

3.2.5 Air Quality

Eight air quality comments that raised common issues or concerns were combined to identify one issue concerning potential impacts to air quality. Commenters stated that potential increases in particulate matter could be caused by the decreasing elevation of the Salton Sea, land fallowing and other agricultural activities, and the increased use of desert landscape to conserve water. Commenters remarked on the importance of monitoring to establish baseline conditions and health risk studies. The need for integration of findings from the California Air Resources Control Board and the Salton Sea Science Subcommittee was also stressed.

3.2.6 Biological Resources

Forty-six biological resources comments that raised common issues or concerns were combined to identify eight issues. The majority of these issues were raised by federal and state agencies and environmental groups. The main concerns of these commenters were the potential impact of the proposed Project on rare, threatened, and endangered species; on wetland habitats; and on proposed mitigation measures to reduce the impacts to a level of insignificance. Particular species of concern include black rail (*Laterallus jamaicensis*), Yuma clapper rail (*Rallus longirostris yumanensis*), desert pupfish (*Cyprinodon macularius*), brown pelican (*Pelicanus occidentalis*), razorback sucker (*Xyrauchen texanus*), Coachella Valley fringe-toed lizard (*Uma inornata*), Coachella Valley milk vetch (*Astragalus lentiginosus* var. *coachellae*), flat-tailed horned lizard (*Phyrnosoma mcalli*), Palm Springs ground squirrel (*Spermophilus teritaudus chlorus*), Palm Springs pocket mouse (*Perognathus longimembris bangsi*), crissal thrasher (*Toxostoma crissale*), LeConte's thrasher (*Toxostoma lecontei*), burrowing owl (*Speotyto cunicularia*), and Peninsular bighorn sheep (*Ovis canadensis cremnobates*). Commenters raised concerns over inflows of high TDS entering the Salton Sea, resulting in impacts to fish and wildlife. Commenters also remarked on potential impacts to the rate of succession and conversion of wetland habitat to upland terrestrial habitat. The relationship and resulting cumulative impacts to other water supply and ecosystem restoration projects in the region seemed of particular importance.

3.2.7 Land Use

Twelve land use comments that raised common issues or concerns were combined to identify three issues. These issues primarily concerned the impact of the proposed Project on the productivity of Imperial Valley cropland and on agricultural resources and operations. Commenters expressed concern about the use of crop rotation and land fallowing to meet conservation requirements for the proposed Project. Interest in the evaluation of impacts to agricultural resources and operations as a result of the use of these methods was high. Commenters stressed the importance of compliance of the proposed Project with existing regional and local land use plans.

3.2.8 Recreation

Seven recreation comments that raised common issues or concerns were combined to identify three issues. These issues primarily concerned the impact of the proposed Project to navigation and boating (recreation) on the Colorado River and in the Salton Sea area. A potential reduction in the elevation of the Salton Sea level caused concerns about impacts to recreation in the Salton Sea area. Concern over the construction of new canals or pipelines through state park or wilderness lands was also expressed.

3.2.9 Energy (Public Services and Utilities)

Four energy comments that raised common issues or concerns were combined to identify two issues. These issues requested the Draft EIR/EIS to address potential impacts to energy resources. Commenters raised concern over the potential incompatibility of the proposed Project with existing energy conservation plans as a result of increasing the amount of energy required for groundwater pumping as water levels decline. Commenters stated that the diversion of water upstream of hydroelectric power facilities along the Colorado River could result in a reduction of hydropower generation at Parker Dam. One comment suggested the use of solar-powered sodium removal and sodium hypochlorite generation facilities to reduce impacts to energy resources and reduce salt levels in the Salton Sea.

3.2.10 Socioeconomics

Thirty-five socioeconomic comments that raised common issues or concerns were combined to identify 11 issues. These issues primarily concerned the impact of the proposed Project on the residents and local economy of the Salton Sea and Imperial Valley. However, one comment requested an analysis of impacts on cities such as Mecca, Thermal, Indio, Palm Desert, and La Quinta. It was requested that impacts to residents of Imperial Valley and the Salton Sea area be treated with equal concern as impacts to individual or corporate water rights holders. Numerous commenters asked that the potential impacts to the agricultural economy of the Imperial Valley be addressed in the EIR/EIS. Specifically, impacts to farm workers' jobs and labor skills, and on-farm-related businesses such as impacts to fertilizer, pesticides, seeds, equipment, and mechanic companies were emphasized. Also of concern were impacts to Indian Tribes and environmental justice issues affecting minority communities and low-income populations.

3.2.11 Cost

Twenty-two comments that raised common issues or concerns on Project costs were combined to identify 10 issues. These issues focused on the distribution of economic incentive benefits for conservation efforts and distribution of the revenue generated from the proposed Project. Comments pertaining to the cost of environmental mitigation and increases to SDCWA water rates were also raised. One comment requested a reduction in the cost of litigation associated with past and future water transfers in the Imperial Valley.

3.2.12 Growth-Inducing Impacts

Nine comments on growth-inducing impacts that raised common issues or concerns were combined to identify three issues. These issues concerned the impact of the proposed Project on growth in San Diego County and the Salton Sea area. Commenters requested that the EIR/EIS analyze the potential impact on growth in the Salton Sea area if sea levels drop and more land becomes available for development.

3.2.13 Cumulative Impacts

Thirteen comments on cumulative impacts that raised common issues or concerns were combined to identify three issues. These issues primarily concerned the relation of the proposed Project to the Salton Sea Restoration Project and potential direct, indirect, third-party, and cumulative impacts. One commenter emphasized the importance of the evaluation of the effects of similar, cumulative actions in addition to the proposed Project that would reduce Colorado River flows.

3.2.14 Mitigation/Monitoring

Twelve mitigation/monitoring comments that raised common issues or concerns were combined to identify six issues. These issues suggested that appropriate mitigation measures be developed and monitored and that mitigation responsibilities be appropriately assigned. Commenters emphasized that mitigation measures and mitigation monitoring and reporting for the proposed Project should fulfill requirements set by the California Department of Fish and Game (CDFG). The commenters also requested that the selected mitigation measures emphasize the evaluation and selection of alternatives that avoid or otherwise minimize impacts of the proposed Project. It was suggested that additional work might be needed to develop appropriate measures to mitigate adverse air quality effects resulting from the proposed Project. One commenter asked that specific mitigation measures be developed to address increasing salinity concentrations in agricultural soils.

3.2.15 Alternatives

Eleven comments on alternatives that raised common issues or concerns were combined to identify four issues that will be addressed in the Draft EIR/EIS. These issues generally requested that reasonable alternatives to the proposed Project, including alternative feasible water transfer mechanisms, be addressed in the Draft EIR/EIS. Commenters suggested that the Draft EIR/EIS consider the following alternatives to the proposed Project:

- No Action Alternative
- No Project Alternative
- Providing water to SDCWA from an alternate water supplier
- Water rationing
- Water conservation in the SDCWA service area
- Growth control in San Diego County
- Return of recycled water to the Colorado River by a canal or aqueduct
- Desalination of ocean water

In addition, one commenter requested that the Draft EIR/EIS consider a range of water transfer mechanisms to transport the water from the Imperial Valley to SDCWA, including tunneling or installing a pipeline or canal.

3.2.16 Miscellaneous

Twenty-three miscellaneous comments were received that raised common issues or concerns that could not be categorized under the first 15 resource issues. These 23 comments were combined to identify 16 general issues. In general, these issues requested: (1) extensions to the official comment period, (2) copies of the Public Notice, and (3) proper referencing of environmental documentation within the Draft EIR/EIS. In addition, commenters requested that public meetings concerning the proposed Project also be held in Calexico, California, and Yuma, Arizona. In addition, Salton Sea area residents requested additional opportunities to participate in the proposed Project environmental review process. One commenter was concerned that despite the terms of years written into the proposed Project definition, a water transfer of the magnitude of the proposed Project will become a permanent and irreversible transfer but not be assessed as such in the Draft EIR/EIS. Another commenter requested that after the Draft EIR/EIS is issued, the reviewing public be given definition of the exact purposes for which the Lead Agencies and other responsible agencies will use the assessment.

SECTION 4

Proposed Scope of the Draft EIR/EIS and General Responses to Comments

As discussed above in Section 3.1, comments received during the scoping process identified 122 issues that federal, state, and local agencies; special interest and environmental groups; individuals; and businesses felt should be addressed in the Draft EIR/EIS. After thorough consideration of these issues, an initial determination concerning the scope of the Draft EIR/EIS has been made. The categorization of comments facilitated the identification of potentially impacted resource categories and helped to determine the scope of the Draft EIR/EIS. A detailed discussion of the proposed scope of the Draft EIR/EIS is presented in Section 4.1, and an outline of the Draft EIR/EIS is included as Appendix J.

The Lead Agencies' initial responses to the issues raised by the comments received are set forth below and in Appendix I. General responses addressing the following resources include water rights issues, socioeconomics issues, transboundary issues, the State Water Resources Control Board (SWRCB) proceeding in connection with the proposed Project, other projects related to the proposed Project, and alternatives to the proposed Project. In addition, issues that are not answered by the general responses have been responded to on an individual basis in Appendix I, Scoping Comments Database. The responses are intended to provide the public with a greater understanding of how specific issues will be addressed in the Draft EIR/EIS.

4.1 Proposed Scope

The proposed scope of the Draft EIR/EIS has been determined after review and consideration of the written and oral comments received during the scoping process. These comments, in addition to feedback that will be received during agency consultation and coordination, will help determine the final scope of the Draft EIR/EIS. The preliminary scope of the Draft EIR/EIS is discussed below.

Chapter 1 of the Draft EIR/EIS will present a general introduction and overview of the proposed Project including background information. Chapter 1 will cover the consultation and coordination process, including the scoping process conducted with the public and the consultation and coordination conducted with Responsible, Cooperating, and Trustee Agencies, and Indian Tribes. The purpose and need for the proposed Project will also be presented in Chapter 1.

Chapter 2 of the Draft EIR/EIS will provide a detailed description of the proposed Project, including Project location and study area and identification of Project components. A discussion of Project alternatives will be presented, including the screening process for selection of alternatives according to the NEPA and CEQA requirements for alternatives.

Chapters 3 and 4 will present the environmental setting and the environmental impacts and subsequent mitigation measures for the following resources: Hydrology and Water Quality, Geology and Soils, Transportation and Traffic, Noise, Air Quality, Biological Resources, Aesthetics, Land Use and Planning, Agricultural Resources, Recreational Resources, Public Services and Utilities, Socioeconomics, Public Health and Environmental Hazards, Cultural Resources, Indian Trust Assets, and Transboundary Effects. The resources to be addressed in Chapters 3 and 4 were identified and refined after considering issues raised during the scoping process.

Chapter 3 presents the environmental setting for each resource category. This includes a description of the environmental baseline conditions and characteristics of the study region and Project area as they relate to each resource. Chapter 4 will identify potential environmental impacts and proposed mitigation measures. Unavoidable significant impacts of the proposed Project and alternatives, including the No Project/No Action Alternative, will be addressed. The methods of assessment, significance criteria, and regulatory setting of each resource will also be presented.

Chapter 5 will discuss other CEQA and NEPA topics, such as the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity. Chapter 6 will analyze the cumulative impacts of the proposed Project and alternatives. The analysis will include a listing of the projects considered for the cumulative analysis. A detailed outline of the table of contents proposed for the Draft EIR/EIS is included as Appendix J of the scoping summary report on the Project web site.

4.2 General Responses

The Lead Agencies have developed the following general responses to issues raised by questions and comments on the following issues: water rights issues, socioeconomic issues, transboundary issues, the SWRCB proceeding in connection with the proposed Project, other projects related to the proposed Project, and alternatives to the proposed Project. These general responses were developed to address these issues because they were commonly raised during the scoping process. Comments or questions that raised other issues are responded to in Appendix I, Scoping Comments Database.

4.2.1 Water Rights

Several comments received during the scoping process requested clarification on the nature of the Colorado River water rights held by IID and others, and the effects of the proposed Project on those rights. The following background information is provided in response to those comments.

IID holds very senior rights to Colorado River water, which are respected under both state and federal law, known as the "Law of the River." Beginning in 1885, IID's predecessor started acquiring rights to Colorado River water under state law. Then, under the 1922 Colorado River Compact and the 1928 Boulder Canyon Project Act, California, Nevada, and Arizona (referred to as the Lower Basin States) were apportioned a total of 7.5 million acre feet (AF) of Colorado River water per year. This allocation is apportioned among those states as follows:

California	4,400,000 AF
Nevada	300,000 AF
Arizona	2,800,000 AF

The 7.5 million-AF allocation to the Lower Basin States does not include surplus water, which is apportioned 50 percent to California, 4 percent to Nevada, and 46 percent to Arizona.

California's apportionment of Colorado River water is divided among entitlement holders in accordance with a schedule of priorities agreed to in the 1931 Seven-Party Agreement. Each holder can divert Colorado River water, in priority order, up to the maximum amount stated for that priority, to the extent water is available. The apportionments and priorities are presented in Table 4-1 below.

TABEL 4-1
Colorado River Rights Apportionment and Priorities

Priority	Holder	Maximum Amount (Af/Yr)
1	Palo Verde Irrigation District—gross area of 104,500 acres	3,850,000
2	Yuma Project (Reservation District)—not exceeding a gross area of 25,000 acres	
3a	IID and lands in Imperial and Coachella Valleys to be served by the All American Canal	
3b	Palo Verde Irrigation District—16,000 acres of mesa lands	
4	Metropolitan Water District and/or City of Los Angeles and/or others on coastal plain	550,000
	SUBTOTAL	**4,400,000**
5a	Metropolitan Water District and/or City of Los Angeles and/or others on coastal plain	550,000
5b	City and/or County of San Diego	112,000
6a	IID and lands in Imperial and Coachella Valleys	300,000
6b	Palo Verde Irrigation District—16,000 acres of mesa lands	
7	Agricultural use	all remaining water
	TOTAL	**5,362,000**

This schedule shows that the holders of Priorities 1 through 3 (referred to as the "agricultural users") can divert, in priority order, up to an aggregate maximum amount not to exceed 3,850,000 af/yr. The historical average annual use for Priorities 1 and 2 is approximately 420,000 af/yr. CVWD's entitlement under Priority 3 is subordinated to IID's Priority 3 entitlement, pursuant to a 1934 agreement between the parties. This schedule does not reflect the entitlement of Indian or miscellaneous present perfected right holders to the Colorado River.

The proposed Project includes a voluntary commitment by IID to limit its Priority 3 Colorado River water diversions to 3.1 million af/yr during the term of the Project. IID intends, by this limitation, to ensure that the proposed water transfers will not adversely impact junior water rights holders. In particular, when Priorities 1 and 2 use their historical average, this limitation would make available 330,000 af/yr of Priority 3 water to CVWD, an amount equal to CVWD's recent historical average use of Colorado River water. State and federal water regulators will consider impacts on such junior water rights holders in connection with various federal and state implementation agreements and/or approvals required for the proposed Project.

The proposed Project, if viewed under state law, involves a transfer of conserved water, not a transfer of IID's water rights. The transfer is contingent upon the confirmation of all state regulatory authorities that the conserved water will retain its character as water diverted by IID and that the transfer will not change IID's Priority 3 right to the water (subject to the 3.1 million-AF limitation described above). The proposed Project, if viewed under federal law, involves the temporary limitation of IID's Priority 3 right to 3.1 million AF, and the agreement of IID to refrain from ordering an amount of water equivalent to that conserved by IID in accordance with the IID/SDCWA transfer agreement. The Secretary will, under federal law, deliver that water for SDCWA's use at the Colorado River Aqueduct and account for it accordingly during the term of the IID/SDCWA agreement and in accordance with an Implementation Agreement pursuant to the Quantification Settlement Agreement. It is an important objective of IID to retain its historic and senior water rights. The Secretary will agree that IID's right to the delivery of Priority 3 water will survive the termination of the IID/SDCWA transfer agreement. It is also an important objective of SDCWA that the transferred water be Priority 3 water in order to gain the benefit of seniority and reliability in times of shortage.

4.2.2 Socioeconomics

Several questions and comments were received concerning the impact of the proposed Project on the agricultural resources and socioeconomic attributes of the Imperial Valley. The following is provided in response to those comments.

The number of farmable acres in the Imperial Valley has remained relatively constant at approximately 480,000 acres, with total acreage in cultivation during any given year ranging from 450,000 to 470,000. Cropping patterns and frequencies within the valley have remained fairly constant over the past 10 years, with annual fluctuations being driven by anticipated changes in market prices based on short-term projections. The proposed Project assumes that the historic patterns of total irrigated acres in production, cropping patterns, and cropping frequencies will remain within the range of historical fluctuation. A discussion of the data used to identify the historic patterns will be included in the Agricultural Resources section of the EIR/EIS.

The Draft EIR/EIS will assess the potential socioeconomic impacts of the proposed Project in conformance with NEPA and CEQA requirements. Potential impacts to the regional economy will be identified at the County level. The County-level unit of analysis is used because this is generally the smallest unit of measurement for which economic data are collected and reported. Overall economic impacts of the proposed Project will be identified and assessed for aggregated sectors such as Agriculture, Manufacturing and Government (in terms of changes in employment), and personnel income and economic output for each aggregated sector. A full disclosure of the sources of data used and assumptions employed in the analysis will be provided in the EIR/EIS.

As an intermediate step in identifying the County-level regional economic impacts, changes in the costs of production and farm-level revenue streams will be identified. The Agricultural Resources section will provide a description of the assumptions used to identify impacts to farm-level economics, including the costs of production, values used for anticipated crop yields and prices, and any revenues received from the sale of conserved water. An analysis of the impact of the proposed Project on farm and nonfarm land values will be included in the EIR/EIS, including a qualitative discussion regarding the impacts to future nonagricultural economic development.

The potential impacts of the proposed Project on the Torres-Martinez Tribe and the trust responsibilities of the Department of Interior will be addressed within the Indian Trust Assets section of the EIR/EIS. An analysis of the potential Project impacts on low-income and minority populations will be conducted as part of the Socioeconomics section of the EIR/EIS.

4.2.3 Transboundary Issues

Within the context of the Draft EIR/EIS, transboundary issues refer to effects to Mexico caused by the proposed Project. The Council on Environmental Quality (CEQ), a branch of the Executive Office of the United States President, issued a recommendation stating that to be consistent with NEPA, transboundary effects to the environment resulting from proposed federal actions taking place in the United States should be considered. The guidance pertains to all federal agency actions that are normally subject to NEPA, whether covered by an international agreement or not. This guidance is a result of negotiations with the governments of Mexico and Canada to develop an agreement on transboundary environmental impact assessment authorized in Section 10.7 of the North American Agreement on Environmental Cooperation. The analysis should include reasonably foreseeable transboundary effects of federal actions. Impacts in Mexico are subject to Mexican laws and regulations. The federal actions for the Project are related to the change in the point of diversion on the Lower Colorado River. Direct and indirect effects of the federal action will be evaluated in the Draft EIR/EIS.

Transboundary effects may occur in any of the resource areas considered in the Draft EIR/EIS. The Draft EIR/EIS will address potential transboundary effects. Transboundary effects will also be cross referenced, as appropriate, to other resource sections that assess specific environmental resource issues (e.g., migratory birds, socioeconomic effects, water quality, and air quality).

4.2.4 SWRCB Proceeding

Several comments received during the scoping process requested information about the purpose of the SWRCB proceeding in connection with the proposed Project. IID believes the SWRCB proceeding is necessary under state law in order to implement the proposed Project. IID and SDCWA have requested SWRCB, among other things: (1) to approve the water transfer under Section 1011 of the California Water Code, (2) to confirm that the conserved water retains the same priority as IID's senior water rights, and (3) to make a determination that the transfer establishes reasonable and beneficial use of Colorado River water by IID. SWRCB's determination of these matters, as requested, must be obtained before IID and SDCWA will proceed with the proposed Project.

In reviewing this request, SWRCB will assess the impact of the transfer on the holders of Colorado River rights, which are junior to those of IID. As described in Section 4.2.1, Water Rights, the proposed Project includes a commitment by IID to limit its annual Priority 3 Colorado River water diversion to 3.1 million AF, for the benefit of junior rights holders, in order to facilitate SWRCB's approval.

4.2.5 Other Projects Related to the Proposed Project

Several commenters remarked on agreements, transfers, and other projects related to the proposed Project, including the Salton Sea Restoration Project, the California 4.4 Plan, the Quantification Settlement between IID, CVWD, and Metropolitan Water District (MWD), the All American and Coachella Canal Lining Projects, and Coachella Valley Resources. General responses that address these are discussed in more detail below.

Salton Sea Restoration Project. The Salton Sea Restoration Project is a separate project from the proposed Project and is authorized by 1998 legislation passed by Congress. The Salton Sea Reclamation Act directs Reclamation and the Salton Sea Authority to study potential solutions to improve the current conditions at the Salton Sea. The Salton Sea Authority is the state lead agency, and Reclamation is the federal lead agency. IID is a member of the Salton Sea Authority. A joint EIR/EIS is being prepared for the Salton Sea Restoration Project, and the Draft EIR/EIS was released in January 2000. The Lead Agencies for the proposed Project are coordinating with the project team for the Salton Sea Restoration Project in an effort to coordinate scientific analyses and to ensure that the EIR/EIS for the proposed Project includes an appropriate assessment of related and cumulative impacts to the Salton Sea.

California 4.4 Plan. The schedule of priorities and apportionments among California users of Colorado River water, which is shown Table 4-1, indicates that if the holders of Priorities 1 through 4 diverted their total entitlement (a total of 4.4 million af/yr), then California's nonsurplus allocation (also 4.4 million af/yr) would be exhausted, and no further water would be available to holders of lower priorities, including the holder of Priority 5, whose use is on the southern California coastal plain.

For many years, California has been diverting approximately 5.2 million af/yr, which was possible because Nevada and Arizona were not using their total apportionments and because surplus water has been available. Arizona and Nevada are now approaching the diversion of their full apportionments, and the future availability of surplus water is uncertain. Thus, there is a serious risk of a water shortage to California as a result of California's diversions declining from 5.2 to 4.4-million af/yr. The Colorado River Board of California, the agency comprised of California Colorado River water right holders, is preparing a framework plan called the "California 4.4 Plan," which is designed to bring California water use within the state's 4.4 million-AF apportionment. The California 4.4 Plan includes the Quantification Settlement, which provides for the satisfaction of miscellaneous and Indian present perfected right entitlements within California's 4.4 million-AF apportionment. The proposed conservation and transfer by IID of up to 300,000 af/yr for a substantial time period is a key component of the proposed Plan. By conserving water used in the IID area and transferring it for use to more urban areas, which previously depended on the availability of surplus water above 4.4 million af/yr, California is able to more easily live within its legal allocation.

Quantification Settlement. On October 15, 1999, the negotiating teams for IID, CVWD, and MWD executed a document titled "Key Terms for Quantification Settlement Among the State of California, IID, CVWD, and MWD" (Key Terms), which sets forth the key material terms of a proposed settlement relating to use of Colorado River water. The Key Terms will be used as the basis for drafting the legal documents that will set forth all of the definitive terms and conditions of the Quantification Settlement. The parties currently anticipate that the complete legal documents will not be available until April 2000.

Based upon the Key Terms, the settlement, to which the United States is not a party if written in terms of state law, would provide for, among other things: (1) IID's voluntary commitment to limit its annual Priority 3 water diversions to 3.1 million AF (a commitment that is also included in the proposed Project); (2) the transfer of 130,000 to 200,000 af/yr of the water conserved by IID as part of the proposed Project to SDCWA; (3) the transfer of up to 100,000 af/yr of the water conserved by IID, as part of the proposed Project, to CVWD and/or MWD; and (4) various other transfers and allocations of Colorado River water among other right holders. The Quantification Settlement will be contingent upon the Secretary of the Interior's contractual agreement under federal law to deliver Colorado River water in accordance with the terms of the settlement.

As the terms of the Quantification Settlement become more defined, the Lead Agencies for the proposed Project will coordinate with the parties to the proposed Quantification Settlement in order to ensure consistent and comprehensive environmental review of both projects, including related and cumulative impacts.

All American and Coachella Canal Lining Projects. The All American and Coachella Canal Lining Projects are separate projects that are not included in the proposed Project but are components of the overall water delivery network. An EIR/EIS has been prepared for the All American Canal Lining Project by Reclamation. A separate EIR/EIS is also being prepared for the Coachella Canal Lining Project. Environmental impacts of both canal lining projects, and any mitigation measures required, will be fully evaluated in the respective joint environmental documents.

The potential effects of the proposed Project on the operation of the All American and Coachella Canals will be addressed in the Draft EIR/EIS.

Coachella Valley Resources. Impacts of the proposed Project to the resources of the Coachella Valley will be addressed at a programmatic level within the Draft EIR/EIS. Project-level impacts of the proposed Project will be addressed separately in an EIR being prepared by CVWD.

4.2.6 Alternatives to the Proposed Project

Several comments received during the scoping process suggested providing SDCWA with water supplies from sources other than the Imperial Valley. Suggested alternatives to the proposed Project received during the scoping process include providing SDCWA with desalinated ocean water, water supplies from central California, or through the implementation of a water conservation program within San Diego County.

As set forth in the IID/SDCWA Water Conservation and Transfer EIR/EIS Public Participation Plan, which is available on the Project web site (http://www.is.ch2m.com.iidweb), the next step in the EIR/EIS process is to identify a reasonable range of alternatives to the proposed Project. The Draft EIR/EIS will assess and compare the environmental impacts of these alternatives, as well as those of the proposed Project. Comments received during the public scoping process relating to alternatives, such as comments on various conservation methods/programs and alternative water supplies for San Diego, will be considered during the alternatives development process. The public will be kept informed as alternatives are identified and evaluated. An Alternatives Report will be prepared that summarizes the process, meetings, and methodology used to arrive at the final set of alternatives that will be evaluated in the EIR/EIS. At least one public meeting will be conducted to review the Alternatives Report.

4.3 Issues not to be Considered in the Draft EIR/EIS

A small number of comments during the scoping process raised issues that have been determined to fall outside the proposed scope of the Draft EIR/EIS. These include: issues that do not identify an "environmental impact" associated with the proposed Project; issues that identify a potential environmental impact, but the Lead Agencies have determined that it is not "potentially significant;" issues regarding a separate, unrelated project; and comments that requested general information. These issues, and the explanations of why they are outside the scope of the proposed Project, are presented in Appendix K.

APPENDIX A

Species Covered by the HCP

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APPENDIX A

Species Covered by the HCP

Invertebrates

Cheeseweed Moth Lacewing (*Oliarces clara*)

Range and Distribution

The cheeseweed moth lacewing has been documented from Yuma County in western Arizona; Imperial, Riverside, and San Bernardino Counties in Southern California; and Clark County, Nevada. Collections of the moth lacewing have been made from sea level in Imperial County to 100 meters (m) (328 feet) elevation in Riverside County (Faulkner, 1990; Faulkner personal communication). The range of the species may be much more extensive than its documented range, correlating to some extent with the range of its larval host plant, creosote bush (*Larrea tridentata*) (Faulkner personal communication).

Population Status

This species is rarely observed in the field. However, in 1964, a massive emergence occurred near Palm Springs, with hundreds of individuals present (Faulkner, 1990). The cheeseweed moth lacewing is a federal species of concern (former category 2 candidate for federal listing). Although infrequently observed, the moth lacewing may exist at many undocumented sites throughout the arid southwest region of the United States. The fleeting, localized nature of adult emergence complicates efforts to assess the population status of this species.

Habitat Requirements

The larval stage is associated with creosote bush, a desert shrub found throughout much of the southwestern United States and northwestern Mexico (Faulkner, 1990). All collections of mature larvae and egg cases have produced specimens that were found inhabiting the root mass of this plant (USBR, 1996). Adult emergence from soils near creosote bushes often follows winters of high precipitation, and is fleeting and localized, lasting no longer than 4 days (Faulkner personal communication). On the first day, adult males emerge early in the morning and form large aggregations at the highest natural or manmade landmark. This landmark may be a cliff, rock outcropping, or telephone pole. Flight is weak and many individuals are observed walking to the landmark rather than flying. Adult male activity on the first day ceases at noon with individuals taking shelter in the cracks of cliff walls, under rocks, and under vegetation. Females emerge on day two and mating occurs. Activity decreases throughout the third day with the increased occurrence of mortality, and ceases by the fourth day with nearly complete mortality (Faulkner, 1990).

Habitat in the Proposed Project Area

The creosote bush scrub community is widespread throughout the unirrigated areas of the Sonoran Desert. This habitat type surrounds the Salton Sea between the higher rock hillsides and the more saline desert saltbrush community. In the Habitat Conservation Plan (HCP) area, creosote scrub also occurs with the right-of-way of Imperial Irrigation District (IID) along the AAC.

Proposed Project Area Occurrence

The occurrence and distribution of the cheeseweed moth lacewing in the proposed project area are unknown. Suitable habitat likely exists in the HCP area in desert habitats adjacent to the AAC. A single moth lacewing was attracted to a light near Parker, California, in 1949 (Belkin, 1954); however, no emergence sites have been documented for this area (USBR, 1996).

Andrew's Dune Scarab Beetle (*Pseudocatalpa andrewsi*)

Range and Distribution

The Andrew's dune scarab beetle is endemic to the creosote bush scrub habitats of the Algodones Dunes and Sand Hills in Imperial County, California, and may occur in portions of the sand dune system in Baja California Norte, Mexico.

Population Status

Detailed population information is not available for this species. However, its limited distributional range and endemisim to the area make this beetle a federal species of concern. No current threats have been identified; however, offroad vehicle traffic on the dunes could potentially impact this species.

Habitat Requirements

Andrew's dune scarab beetle primarily occurs at elevations between 98 and 492 feet (30 and 150 meters) in desert dune and Sonoran desert scrub habitats. This species inhabits both surface and subsurface sand, utilizing the wet sand interface as protection from heat of the day. This beetle specifically inhabits troughs of loose drifting sand between the dunes. They have been observed buried 12 inches deep in the sand.

Habitat in the Proposed Project Area

Suitable habitat for Andrew's dune scarab beetle in the proposed project area occurs where the AAC traverses the Sand Hills and Algodones Dunes.

Proposed Project Area Occurrence

Andrew's dune scarab beetle is endemic to the Algodones Dunes and Sand Hills areas in Imperial County. Distribution of this species is apparently widespread across the main dune mass, and it could potentially occur within the right-of-way of IID along the AAC. There is no evidence that it inhabits desert areas other than the main dunes (Hardy and Andrews, 1980).

Fish

Razorback Sucker (*Xyrauchen texanus*)

Range and Distribution

Historically, the razorback sucker inhabited the Colorado River and its tributaries from Wyoming to the Gulf of California. Razorback suckers were found in the Gila, Salt, and Verde Rivers, which are all tributaries of the Lower Colorado River (LCR). Upper basin tributaries containing historic populations of razorback suckers included the Gunnison River upstream to Delta, Colorado; the Green River from its confluence with the Colorado River upstream to Green River, Wyoming (Vanicek et al., 1970); the Duchesne River (Tyus, 1987); the lower White River near Ouray, Utah (Sigler and Miller, 1963); the Little Snake River and lower Yampa River, Colorado (McAda and Wydoski, 1980); and the San Juan River, New Mexico. Most razorback suckers in the LCR basin are currently restricted to Lake Mohave with smaller populations occurring in the Colorado River below Davis Dam, Lake Mead, and Senator Wash Reservoir (Bradford and Vlach, 1995). Razorback suckers have also been captured sporadically from the mainstream Colorado River, impoundments, and canals (Marsh and Minckley, 1989). Valdez and Carothers (1998) indicate that a small population also exists in the Grand Canyon section of the Colorado River. The current distribution of razorback suckers in the Upper Colorado River basin is confined to small groups of fish in several widely distributed locations. Most fish occur in an area including the lower 6.4 kilometers (km) (4 miles) of the Yampa River and the Green River from the mouth of the Yampa River downstream to the confluence with the Duchesne River (USFWS, 1997a). Small populations may also occur in the Colorado River at Grand Valley and in the San Juan River upstream from Lake Powell.

Population Status

The largest extant population of razorback suckers in the LCR basin occurs in Lake Mohave; however, this population is declining rapidly. The Lake Mohave population was estimated to contain 60,000 individuals in 1988 (Minckley et al., 1991) but by 1995, only 25,000 razorback suckers were thought to exist there (Marsh, 1995). Although razorback sucker spawning has been successful and larval fish have been observed (more than 20,000 wild razorback sucker larvae were collected in 1995 from Lake Mohave [USBR, 1996b]), virtually no recruitment has been detected. Combined data from 1990 to 1997 suggest that the total population of razorback suckers in Lake Mead during 1997 was between 400 and 450 individuals (Holden et al., 1997). Recent population estimates from 1998 indicate that this population may have decreased to less than 300 fish (Holden et al., 1999). Successful spawning has been identified at two locations in Lake Mead. Thousands of larvae were collected during the spring of 1997, but no juveniles were found during May and June of the same year (Holden et al., 1997). The occurrence of some relatively young razorback suckers in recent surveys indicates there may be some recruitment in Lake Mead.

In the upper basin, razorback sucker populations are smaller and more widely distributed. The largest concentration occurs in the middle Green River, but Modde et al. (1996) report that the mean razorback sucker population from 1980 to 1992 in the middle Green River was only 524 individuals.

During the past few decades, the population dynamics of razorback suckers at different locations in the LCR basin have exhibited similar trends. Adult fish were observed in each population; however, juveniles were rare. Although wild populations of razorback suckers had been observed spawning in various locations in the lower basin, recruitment was never successful enough to replenish the adult populations. Eventually, the adult fish die of old age, and populations become reduced or extirpated. The lack of recruitment in these populations is thought to be primarily a result of predation by non-native fish on early life stages of razorback suckers.

Water resource development and interactions with non-native fish species currently threaten razorback suckers (Pacey and Marsh, 1998). The limiting factors resulting from these two major threats include altered temperature and flow regimes, habitat loss, habitat fragmentation, predation, competition, and an increased risk of disease and parasitism. The primary limiting factor for razorback suckers in the lower basin is probably the direct effect of predation by non-native fish on early life stages of razorback suckers (Johnson, 1997; Pacey and Marsh, 1998).

The presence of impoundments in the LCR represents another major threat to razorback suckers. The unnatural temperature and flow regimes created by impoundments may inhibit spawning and reduce growth of razorback suckers. Daily fluctuations in the river may result in mortality from fish stranded in flooded areas. Another limiting factor that is directly related to the flow regime is loss of habitat. The comparatively stable flows that occur downstream of impoundments during the spring and early summer do not allow the river to flood and maintain low-lying areas. Historically, high spring and summer flows created large backwater areas and off-channel habitat that may have been important habitat for early life-stages of razorback suckers. The dams and impoundments also act as barriers to larval drift, species expansion, and migration.

Habitat Requirements

Adult razorback sucker habitat utilization can vary depending on season and location. Adult razorback suckers are adapted for swimming in swift currents, but they may also be found in eddies and backwaters away from the main current (Allan and Roden, 1978). Ryden and Pfeifer (1995) observe that subadult razorback suckers use eddies, pools, backwaters, and other slow water habitats during spring runoff, and move into swifter habitats associated with the main channel during summer. Tyus and Karp (1990) report that during spring runoff, adults also use flooded lowlands and areas of low velocity. Tyus (1987) indicates that mid-channel sandbars represent a common summer habitat. Bradford et al. (1998) conclude that adult razorback suckers in the lower Imperial Division area of the Colorado River actively selected backwater habitats for use; however, many of these habitats had become unavailable to fish due to the effects of regulated flows. In clear reservoirs, adults of this species are considered pelagic, and can be found at various depths, except during the spawning period when they use more shallow shoreline areas. Little is known about juvenile habitat requirements because very few juveniles have been captured in the wild. Larval razorback suckers have been observed using nearshore areas in Lake Mohave (Marsh and Langhorst, 1988). In riverine environments, young razorback suckers use shorelines, embayments, and tributary mouths (Minckley et al., 1991).

During the spawning season, adult razorback sucker migrations have been documented in Lake Mohave (Marsh and Minckley, 1989), the Green River, and the lower Yampa River (Tyus, 1987). Razorback sucker adults have demonstrated fidelity for spawning locations (Tyus and Karp, 1990). Spawning in lakes and streams takes place over loosely packed gravel or cobble substrate, and always at velocities less than 1.5 m/second (4.9 feet/second) (Bradford and Vlach, 1995). In the lower basin reservoirs, spawning occurs from January through April/May (Langhorst and Marsh, 1986). In Lake Mead, spawning has been observed from mid-February until early May (Holden et al., 1997). In the upper basin, spawning occurs later in the year; but the temperature range is similar to lower basin spawning times (USFWS, 1997a). The final thermal preferendum for the adult razorback sucker is estimated to lie between 22.9 degrees Celsius (°C) and 24.8°C (73.2 and 76.6 degrees Fahrenheit [°F]) (Bulkley and Pimental, 1983).

The razorback sucker is an omnivorous bottom feeder. Its diet is dependent on location and life stage (Bradford and Vlach, 1995; Valdez and Carothers, 1998). Larval razorback suckers were reported to feed on diatoms, rotifers, algae, and detritus (Wydoski and Wick, 1998). Stomach contents of adult individuals collected in riverine habitat consist of algae and dipteran larvae, while adults examined from Lake Mohave were found to feed primarily on planktonic crustaceans (Minckley, 1973).

Habitat in the Proposed Project Area

Razorback suckers are associated with large river systems and, within those systems, prefer low-velocity backwater areas. The high-water velocities and sparse vegetation associated with the irrigation canals in Imperial Valley do not provide these conditions, and habitat quality is low for razorback suckers. While it is possible that adult razorback suckers entrained in the canal system persist for some time, they are not likely to establish a self-sustaining population.

Proposed Project Area Occurrence

Razorback suckers are known to occur in the All American and East Highline canal systems. The species has also been found in an IID reservoir near Niland. The population in Imperial County is believed to be composed of old members of a dwindling, nonreproductive, remnant stock (Tyus, 1991; Minckley et al., 1991). No recruitment of wild-spawned fish occurs, probably because of predation by introduced fishes and poor habitat conditions (Tyus, 1991).

Desert Pupfish *(Cyprinodon macularius)*

Range and Distribution

Desert pupfish historically occupied the Gila River basin below about 1,500 meters elevation in Arizona and Sonora, including the Gila, Santa Cruz, San Pedro, and Salt Rivers; the LCR in Arizona and California downstream from the vicinity of Needles to the Gulf of California and onto its delta in Sonora and Baja California; the Rio Sonoyta of Arizona and Sonora; Puerto Penasco, Sonora; and the Laguna Salada basin of Baja California. (Marsh and Sada, 1993). Suitable habitat was available, and the species probably occurred in the Agua Fria, Hassayampa, and Verde Rivers of Arizona as well. Distribution of desert pupfish was widespread but probably not continuous within its historic range.

There are currently two recognized subspecies of the desert pupfish, *Cyprinodon macularius macularius* and *C. m. eremus*. Both subspecies are included in the federal listing of the desert pupfish as endangered. Only the *macularis* subspecies occurs in the proposed project area. Historically, *C. m. macularius* occurred in the Gila River basin, mainstream Colorado River from Needles to the Gulf of California, Rio Sonoyta, Puerto Peñasco, and Laguna Salada (Minckley, 1973 and 1980; Miller and Fuiman, 1987). Currently, in California, the *macularius* subspecies is restricted to San Felipe Creek and the adjacent wetland, San Sebastian Marsh, upper Salt Creek, and a small portion of the Salton Sea (Miller and Fuiman, 1987). In California, the San Felipe Creek system, including San Sebastian Marsh and Salt Creek, provides natural habitat for the desert pupfish populations. *C. m. eremus* was historically found only in Quitobaquito Spring, Arizona. This species still contains a natural population. Reintroductions of *C. m. macularius* (15 populations) and *C. m. eremus* (6 populations) have occurred at many different locales in Arizona. Pupfish are also thought to inhabit the Rio Sonoyta and Santa Clara Slough in Sonora, Mexico (*Federal Register*, 1986).

Population Status

Although remarkably tolerant of extreme environmental conditions, the desert pupfish is threatened throughout its native range primarily because of habitat loss or modification, pollution, and introductions of exotic fishes (USFWS, 1986). The introduction of non-native species is the greatest future threat and current limiting factor affecting the desert pupfish. Introduced species, such as the mosquitofish (*Gambusia affinis*) and largemouth bass, supplant pupfish as a result of predation and aggression while cichlids (*Tilapia* spp.) and mollies interfere with reproductive behavior (USFWS, 1993a). The non-native bullfrog (*Rana catesbiana*) is also a predator of the desert pupfish (USFWS, 1993a).

Although desert pupfish have very high tolerances for adverse environmental conditions, severe conditions can reduce this species' ability to survive. Improper grazing can increase turbidity by increasing erosion and reducing riparian vegetation. Water pollution from the application of pesticides in proximity to desert pupfish habitat is also an important factor, contributing to the decline of the Quitobaquito subspecies (Miller and Fuiman, 1987).

Desert pupfish habitat quality can be a limiting factor. Droughts can cause the springs and headwaters that this species inhabits to dry up. Water development proposed projects can degrade desert pupfish habitat by removing water through groundwater pumping, diversion, and irrigation. The reduction of the amount of water in these habitats can create situations where the desert pupfish are at a competitive disadvantage with exotic fish species.

Habitat Requirements

Desert pupfish use a variety of different habitats, including cienagas, springs, headwater streams, and margins of large rivers. It prefers shallow, clear water, with either rooted or unattached aquatic plants, restricted surface flow, and sand-silt substrates (Black, 1980; Marsh and Sada, 1993; and Schoenherr, 1990). They have the ability to withstand extreme water temperatures up to 45°C (113°F), dissolved oxygen concentrations down to 0.1 to 0.4 parts per million (ppm) (USFWS, 1986), and salinity twice that of seawater (68 parts per trillion [ppt], Lowe et al., 1967). Barlow (1958) reported that adult desert pupfish survived salinity as high as 98,100 milligrams per liter (mg/L) in the laboratory. They can also survive 10 to 15 ppt changes in salinity as well as daily temperature fluctuations of 22 to 26° C (Kinne, 1960; Lowe and Heath, 1969). In less harsh environments where a greater diversity of fishes are found, pupfish tend to occupy water shallower than that inhabited by adults of most other species (Marsh and Sada, 1993).

Spawning at the Salton Sea takes place between late March and late September when water temperatures exceed 20° C (Moyle, 1976; UCLA, 1983). Pupfish can spawn several times during this period. Adult male desert pupfish are very territorial during the spawning season such that schools consist either entirely of adult females or entirely of juveniles. Desert pupfish usually set up territories in water less than 1 m (3 feet) deep and associated with structure (Barlow, 1961). Territoriality is highest in locations with large amounts of habitat, high productivity, high population densities, and limited spawning substrate (USFWS, 1993a). Desert pupfish prefer water 18 to 22 centimeters (cm) deep for egg deposition (Courtois and Hino, 1979). Depending on size, a female pupfish may lay 50 to 800 eggs or more during a season (Crear and Haydock, 1971). The eggs hatch in 10 days at 20° C, and the larvae start feeding on small invertebrates within a day after hatching (Crear and Haydock, 1971). Larvae are frequently found in shallow water where environmental conditions are severe.

Desert pupfish are omnivorous and consume a variety of algae, plants, insects, and crustaceans (USFWS, 1993a; Cox,1972; and Naiman, 1979). Walters and Legner (1980) found that pupfish foraged mostly on the bottom, consuming midge larvae, detritus, aquatic vegetation, and snails. Desert pupfish is an opportunistic feeder whose diet varies seasonally with food availability (Naiman, 1979). In general, when invertebrates are available, they are the preferred food of foraging pupfish. In the Salton Sea, ostracods, copepods, and occasionally insects and pile worms are taken (Moyle, 1976). As invertebrates become less available, pupfish adjust their feeding behavior and their gut usually contains large amounts of algae and detritus, as well as invertebrates (Cox, 1972). The desert pupfish is not considered an important food for wading birds and other fish because of its low numbers (Walker et al., 1961; Barlow, 1961).

Habitat in the Proposed Project Area

Desert pupfish prefer backwater areas, springs, streams, and pools along the shoreline of the Salton Sea. Desert pupfish habitat occurs in pools formed by barnacle bars located in near-shore and shoreline areas of the Salton Sea and in Salt Creek. Barnacle bars are deposits of barnacle shells on beaches, near-shore, and at the mouths of drains that discharge to the Salton Sea. The bars form pools that provide habitat for desert pupfish (IID, 1994). Habitat for desert pupfish also occurs in the mouths of drains discharging directly to the Salton Sea and in the desert washes at San Felipe Creek and Salt Creek.

Proposed Project Area Occurrence

Desert pupfish were abundant along the shore of the Salton Sea through the 1950s (Barlow, 1961). During the 1960s, the numbers declined; by 1978, they were noted as scarce and sporadic (Black, 1980). Declines are thought to have resulted from the introduction and establishment of several exotic tropical species into the Salton Sea (Bolster, 1990; Black, 1980). These introduced species prey on or compete with desert pupfish for food and space. The sailfin molly (*Poecilia latipinna*) was discovered in irrigation drains in the late 1950s

(Black, 1980) and has become established in the Salton Sea (Moyle, 1976). The Mozambique mouthbrooder (*Tilapia mossambicus*) and Zill's cichlid (*T. zillii*) were introduced into the Salton Sea in the late 1960s and early 1970s to control aquatic weed growth in the irrigation canals and drains (Black, 1980). Interactions with the introduced mosquitofish (*Gambusia affinis*) have contributed to the decline of pupfish (Evermann, 1930; Jennings, 1985). Other factors responsible for declines in desert pupfish populations around the Salton Sea include habitat modification due to water diversions and groundwater pumping for agriculture (Pister, 1974; Black, 1980). There is also concern that introduced saltceder (tamarisk) near pupfish habitat may cause a lack of water at critical times due to evapotranspiration (Marsh and Sada, 1993). Aerial pesticide application is a common practice around the Salton Sea that may also affect pupfish populations (Marsh and Sada, 1993).

Historical accounts indicate that desert pupfish was once widespread and abundant around the Salton Sea. Surveys conducted by the USFWS to determine their distribution around the Salton Sea indicated that desert pupfish were present in more than 50 localities in canals and shoreline pools on the southern and eastern margins of the Salton Sea (Lau and Boehm, 1991) and in small pools in San Felipe Creek, Carrizo Wash, and Fish Creek Wash near the Salton Sea. Localities also include agricultural drains in the Imperial and Coachella Valleys, shoreline pools around the Salton Sea, the mouth of Salt Creek in Riverside County, lower San Felipe Creek and its associated wetlands in Imperial County, and eight artificial refuge ponds (Bolster, 1990; USFWS, 1999). Designated critical habitat for desert pupfish includes San Felipe Creek, Carrizo Wash, and Fish Creek in Imperial County, California (USFWS, 1986). The distribution of pupfish around the Salton Sea and designated critical habitat are shown on Figure A-1.

In surveys conducted by the California Department of Fish and Game (CDFG) in 1978-1979, desert pupfish accounted for 3 percent of the total catch in irrigation drains, 5 percent of the catch in shoreline pools, and less than 1 percent of the catch from three natural permanent tributaries and the Salton Sea proper (Black, 1980). However, desert pupfish accounted for 70 percent of the total catch from San Felipe Creek.

Dunham and Minckley (1998) reported a rebound of pupfish populations in the Salton Sea paralleling recent declines in non-native fishes, presumably in response to increasing salinity. However, surveys in the various habitats around the Salton Sea indicate a general decline in desert pupfish abundance and distribution since 1991 (Table A-1). In 1991, 41 irrigation drains contained pupfish; this number was reduced to 33 in 1993 (Remington and Hess, 1993). Only 11 irrigation drains contained pupfish in 1998, and the numbers of desert pupfish also declined from the earlier surveys (Sutton, 1999).

Extreme annual variability in catch has occurred at individual sample sites (e.g., Trifolium 12 and County Line drains) (Table A-1). Variability in catch also occurs within a season and some drains that did not yield pupfish during one trap set often produced pupfish in subsequent trappings (Nicol et al., 1991). This suggests that desert pupfish may move among habitats for various reasons. A variety of other factors may also influence trapping results, including numbers of traps, trap location, bait types, timing, water level fluctuations, and vegetation removal (Nicol et al., 1991).

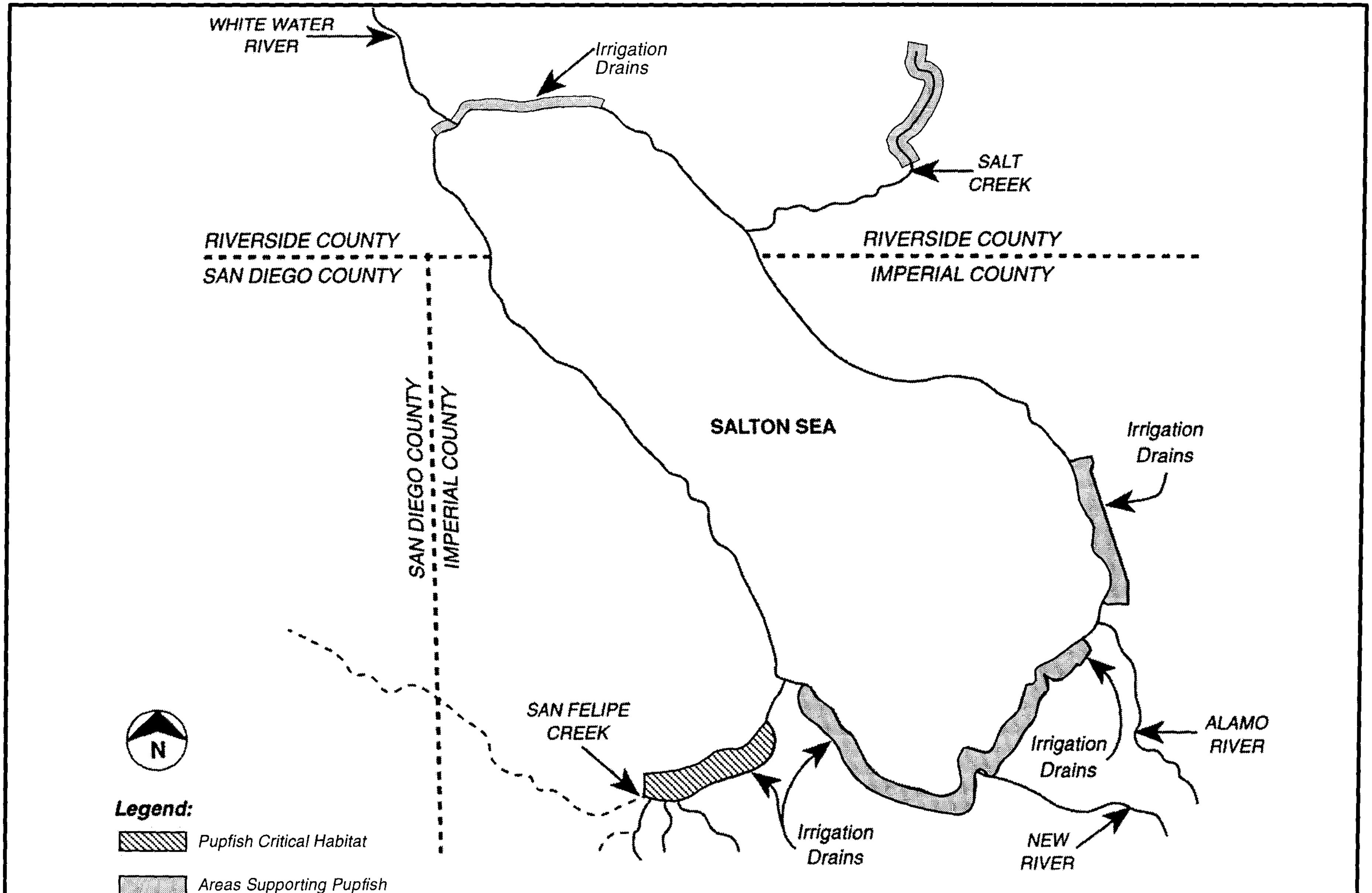

Figure A-1
Areas Sampled During 1993
CDFG/IID Desert Pupfish Survey
IID Water Conservation and Transfer Project Draft HCP

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TABLE A-1
Numbers of Desert Pupfish Collected During Various Surveys at the Salton Sea

	Year						
Drains	**1991[1]**	**1993[2]**	**1994[3,4]**	**1995[1]**	**1996[4]**	**1997[4,5]**	**1998[4]**
North End							
County Line	*				490	6	4
Oasis Grant	7						
Ave 84	38	27			*		1
Ave 83	5	1			27		1
Ave 82	*	4			*		1
Ave 81	3	5			6	6	8
Ave 80	80						
Ave 79	22	35	7				
Ave 78	155	84	1				
Ave 76	1	8	16		1		
Ave 74			1		3		
Ave 73			6				
Ave 68			2				
King Street	67		12		8	14	3
McKinley 0.5	*						
McKinley	17	51					
Cleveland 0.5	10	12					
Cleveland	18	29					
Arthur 0.5	18	6					
Arthur 4	4	8					
Garfield 0.5	2						
Garfield	*	1			1		
Hayes 0.5	9						
Hayes	2	79					
Grant 0.5	7						
Grant	92	5					
Johnson 0.5	37	17			1		
Lincoln		1					
Buchanon			*				

TABLE A-1
Numbers of Desert Pupfish Collected During Various Surveys at the Salton Sea

	Year						
Drains	**1991[1]**	**1993[2]**	**1994[3,4]**	**1995[1]**	**1996[4]**	**1997[4,5]**	**1998[4]**
South End							
Niland 4	19						
Niland 3		1					
Niland 2	2						
Niland 1		1	2				
Z		1	3				
W		11	356				1
T			2				
S		4	1				1
R		2	1			1	
Q			10				
P			10				
O			1				
Vail 4A	1						
Vail 56	44		53				
Vail 5A	26						
Vail 6	1						
Vail cut-off		1	2				
Vail 7		4	3				
Trifolium 12		261	3		1		
Trifolium 13		38	1				1
Trifolium 14A			1				1
Trifolium 1	9		1		1		
Tri Storm	1	2	3		16		2
Trifolium 18	2		2				
Poe	13	1	3		1		
Lone Tree Wash	8						
3W of Lone Tree	6						
Trifolium 19	8		3		1		
Trifolium 20		50	7				1
Trifolium 20A					13		

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TABLE A-1
Numbers of Desert Pupfish Collected During Various Surveys at the Salton Sea

	Year						
Drains	**1991[1]**	**1993[2]**	**1994[3,4]**	**1995[1]**	**1996[4]**	**1997[4,5]**	**1998[4]**
Trifolium 22		34	47				
Trifolium 23	13	64	22		1		
Trifolium 23N	2						
WP-10 SS-11	1						
S. Felipe Wash	5	3	1		31		
Pools							
S. of Bombay	23						
N. of Niland 4	30						
N. of Niland 3	9						
N. of Niland 1	4						
"U" drain pool							1
W. of New River	7						
S. of New River	1						
E. of Tri 22	6						
By Tri 23	4						
By Tri 23N	*						
N. of Tri 20A							70
N. of Grant 0.5							2
N. of Hayes 0.5					2		
S. of Salt Creek				3			
Tributaries							
S. Felipe Creek	*	224	195	115	*	388	*
Upper Salt Creek		9	15	45	18	102	
Lower Salt Creek	1			12			
* - observed							

Source: Sutton (1999)
[1] Nicol, Lau, and Boehm (1991)
[2] Remington and Hess (1993)
[3] Schoenherr (1994) – Only surveyed north end drains
[4] CDFG, unpublished data
[5] No drain surveys in 1995; only north end drains surveyed in 1997

In a study of pupfish distribution and movement, Sutton (1999) found that physical habitat conditions appeared to influence the distribution and abundance of desert pupfish. While most irrigation drains were characterized by high densities of non-native fishes and low numbers of pupfish, one drain (Drain C) was unique because of a large, healthy population of desert pupfish coexisting with a high density of young tilapia. The habitat in Drain C was different from the other drains in having a high density of emergent vegetation (e.g., cattails) along both banks combined with a large portion of open, slow-moving water. The rooted aquatics acted to reduce the flow of water and provided cover and shelter for the pupfish (Sutton, 1999).

Sutton (1999) observed desert pupfish movement between the Salton Sea and nearby drains. Pupfish were observed moving from both irrigation drains and Salt Creek downstream into shoreline pools. The reverse movement from shoreline pools upstream into both drains and Salt Creek was also observed. The best evidence of movements was observed in the southwestern area between Drain C and a connected shoreline pool. Decreases in the size of shoreline pools during seasonal fluctuations in water levels may affect fish health and/or force pupfish to seek other habitat. Thus, the connectivity between habitat types may be necessary to prevent pupfish from becoming stranded in habitats that cannot sustain them for prolonged periods (Sutton, 1999). These observations indicate the importance of agricultural drains as pupfish habitat and the potential for pupfish to use shoreline aquatic habitats as corridors. This potential movement may be important in providing genetic mixing between various populations.

Based on the trapping studies conducted to date, desert pupfish populations are known from or expected in drains directly discharging to the Salton Sea, in shoreline pools of the Salton Sea, and in desert washes at San Felipe Wash and Salt Creek. Desert pupfish are not known to occur nor are they expected to occur in the New or Alamo Rivers because of the high sediment loads, excessive velocities, and presence of predators. Drains in the HCP area where pupfish have been found are shown on Figure A-2.

Amphibians

Couch's Spadefoot Toad (*Scaphiopus couchii*)

Range and Distribution

The Couch's spadefoot toad occurs from southeastern California eastward through Arizona, New Mexico, Texas, and Oklahoma, and southward into San Luis Potosí, Nayarit, and the southern tip of Baja California, Mexico. An isolated population of the species also occurs near the Petrified Forest National Monument in Colorado (Jennings et al., 1994).

Population Status

Despite an apparent tolerance for agricultural habitat modification and other disturbances, the Couch's spadefoot toad seems to be declining throughout its range (Jennings et al., 1994). Factors responsible for the decline of this species are not well known, but may include noise disturbances from offroad vehicles and disturbances that alter the percolation characteristics of temporary rain pools (Jennings et al., 1994).

Habitat Requirements

Couch's spadefoot toad frequents arid and semiarid habitats of the southwest, occurring along desert washes, in desert riparian, palm oasis, desert succulent shrub, and desert scrub habitats. It is also found in cultivated cropland areas. This toad requires friable soil for burrowing. Burrowing sites are often selected beneath desert plants to reduce exposure to lethal maximum temperatures during the hottest part of the summer (Dimmitt and Ruibal, 1980). Logs, and other debris, are also used as shelter from the heat.

Temporary pools and potholes with water lasting longer than 10 to 12 days are required as breeding sites. Runoff basins at the base of sand dunes are also sites of reproduction (Mayhew, 1965). The water temperature of these potential breeding sites must be above 17° C (63°F) for normal embryonic development to occur (Hubbs and Armstrong, 1961). Soil temperatures above 20° C (68°F) are also required to initiate breeding. Still, standing water is required for reproduction.

Habitat in the Proposed Project Area

In the proposed project area, native desert habitats are restricted to along the AAC. Spadefoot toads could use these desert areas, particularly in areas near the seepage communities where they may be able to breed. As spadefoot toads are also known to use agricultural areas, they may occur throughout the proposed project area in association with agricultural drains.

Proposed Project Area Occurrence

The proposed project area occurs within the range of this species; however, no populations have been reported from the Imperial Valley. The nearest known populations have been reported from the neighboring Conchise County in Arizona (AGFD, 1995), and Sonora, Mexico (Flores-Villela, 1993).

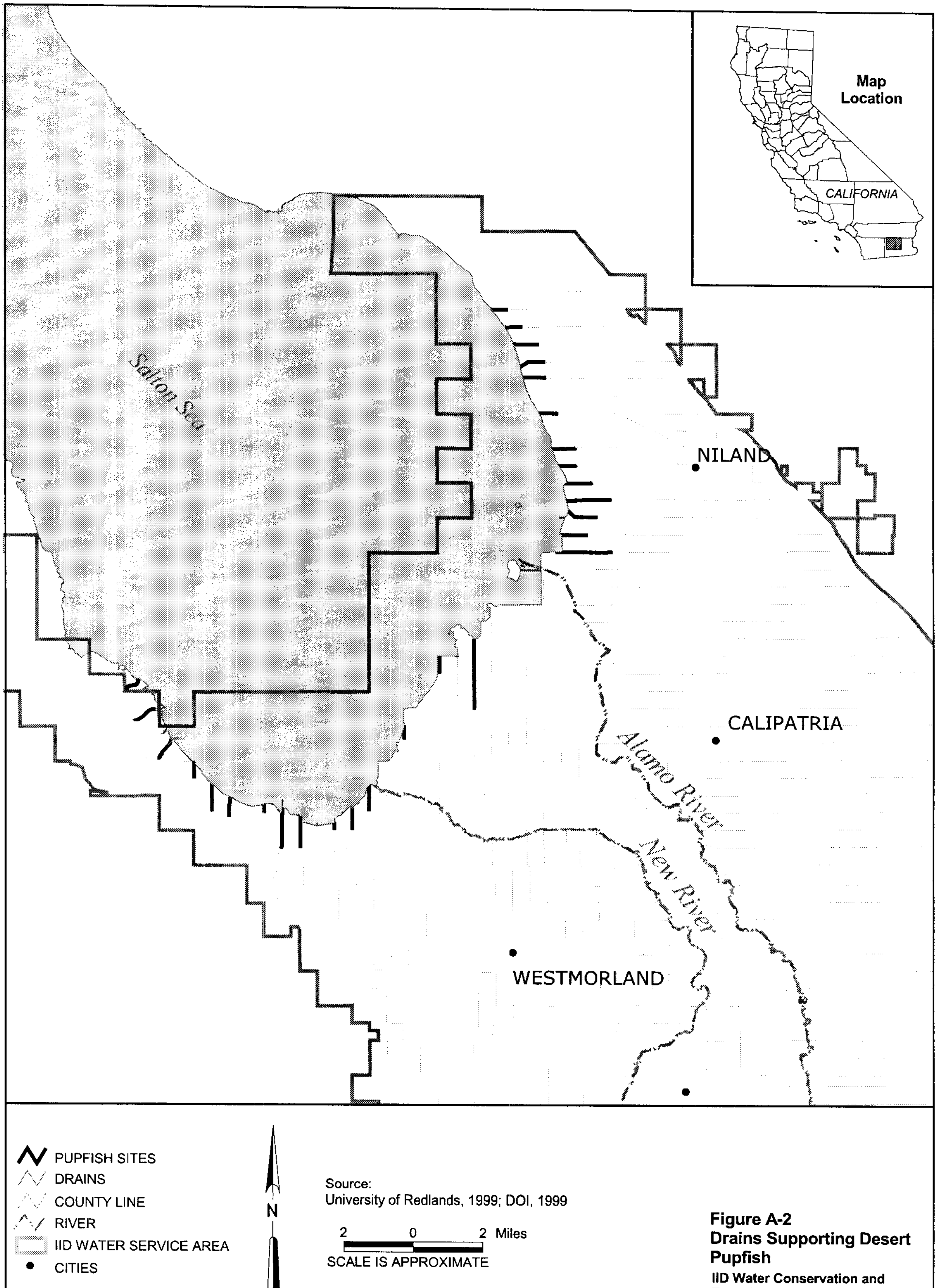
Colorado River Toad (*Bufo alvariu*)

Range and Distribution

The Colorado River toad ranges from southeast California across lowland Arizona to southwestern New Mexico, and southward through most of Sonora to northern Sinaloa, Mexico (Fouquette, 1970). Historically, the species likely extended northward along the bottomlands of the Colorado River to extreme southern Nevada near Fort Mohave (Jennings et al., 1994). In the main part of its range, it can be found from sea level to 1,600 m (5,300 feet).

Population Status

The overall status of the Colorado River toad is uncertain. The New Mexico Department of Game and Fish (NMDGF, 1997) describes the status of this species as probably fairly secure, while other investigators have suggested the species is imperiled throughout much of its range (Jennings et al., 1994). In California, the species is probably extirpated over most of its range due to habitat destruction and use of pesticides (Jennings et al., 1994). Although habitat alteration along the LCR has adversely affected this species, the specific factors responsible for declines in this region are uncertain. Isolation of small, vulnerable populations caused by channelization and damming of the Colorado River, and the introduction of the spiny softshell turtle and bullfrog in the early 1900s may also be partly responsible for the species' decline along the LCR (King and Robbins, 1991).



Source:
University of Redlands, 1999; DOI, 1999

Figure A-2
Drains Supporting Desert Pupfish
IID Water Conservation and Transfer Project HCP

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Habitat Requirements

Colorado River toads are found in a variety of desert and semiarid habitats including brushy desert with creosote bush and mesquite washes, semiarid grasslands, and woodlands. It is semiaquatic and usually associated with large, permanent, or semipermanent streams. It is occasionally found near small springs, temporary rain pools, human-made canals, and irrigation ditches. When not on the surface, this species uses the burrows of other animals as refugia. Colorado River toads have also been found underneath watering troughs (Wright and Wright, 1949; Stebbins, 1985). Primary breeding habitat for the Colorado River toad is moderately large streams, but it is also known to breed in temporary rain pools, and human-made watering holes and irrigation ditches (Blair and Pettus, 1954; Stebbins, 1954 and 1985; Savage and Schuierer, 1961). This species needs permanent or semipermanent water sources for breeding.

Habitat in the Proposed Project Area

In the proposed project area, native desert habitats are restricted to along the AAC. These toads could use these desert areas, particularly in areas near the seepage communities where they may be able to breed. Agricultural drains have the potential to be used by these toads, and the toads could use areas adjacent to the New and Alamo Rivers, although their use of tamarisk has not been determined.

Proposed Project Area Occurrence

The known extant populations in the U.S. have been reported from southeastern Arizona and southwestern New Mexico (Rosen et al., 1996). While populations have been reported to occur in Sonora, Mexico (Flores-Villela, 1998), this species is presumably extinct in California (Jennings et al., 1994). No populations have been reported from the HCP area.

Lowland Leopard Frog (*Rana yavapaiensis*)

Range and Distribution

The lowland leopard frog historically occurred from the Virgin River near Littlefield, Arizona, into northern Sonora, Mexico, and in southeastern California and western New Mexico (Platz and Frost, 1984; NMDGF, 1997). It now occurs mostly in central Arizona, below 1,676 m (5,500 feet), south and west of the Mogollon Rim (NMDGF, 1997). In California, the CDFG recently reintroduced lowland leopard frogs into San Felipe Creek, which empties into the Salton Sea north of the proposed project area on the west side of the Sea.

Population Status

With the exception of the population re-established in San Felipe Creek, the lowland leopard frog has been extirpated from southeastern California. It is also believed to have been extirpated from southwestern Arizona and New Mexico (AGFD, 1997). The species has not been found in surveys in California since 1965 (Clarkson and Rorabaugh, 1989; USFWS, 1999). The species is considered stable in central Arizona, but declining in southeast Arizona (AGFD, 1997).

Potential reasons for regional declines include water manipulations; water pollution (including human use of aquatic habitat); introduced species (e.g., fish, bullfrogs, and crayfish); heavy grazing; and habitat fragmentation (Clarkson and Rorabaugh, 1989; AGFD, 1996 and 1997). In addition, in Arizona where the species still occurs, it may face future threats from competition with the Rio Grande leopard frog, an introduced species that is expanding into the range of the lowland leopard frog (AGFD, 1996).

Habitat Requirements

The lowland leopard frog is generally restricted to permanent waters associated with small streams and rivers, springs, marshes, and shallow ponds. It is normally found at elevations below 1,500 m (4,921 feet) and is often concentrated near deep pools in association with the root masses of large riparian trees (NMDGF, 1997). In Arizona, lowland leopard frogs show a strong preference for lotic habitats, with 82 percent of known localities being natural lotic systems and 18 percent lentic habitats, primarily stock tanks (Sredl, 1997). Historic accounts from the Imperial Valley reported the species occurring in slack water habitats, such as canals and roadside ditches with abundant aquatic vegetation (Storer, 1925; Klauber, 1934). Emergent or submergent vegetation, such as bulrushes or cattails, is probably necessary for cover and as substrate for oviposition (Jennings et al., 1994). Both aquatic habitat and adjacent moist upland or wetland soils with a dense cover of grasses or forbs and a canopy of cottonwoods or willows are important components of leopard frog habitat. Large pools may be essential for adult survival and reproductive efforts, while smaller pools and marshy habitats probably enhance juvenile survival (NMDGF, 1997). Studies of microhabitat use by differing age classes of lowland leopard frogs suggest that management practices that create or maintain a variety of aquatic habitats may be important to this species. The primary food source for adults is small invertebrates, while larvae eat algae, plant tissue, organic debris, and probably small invertebrates (AGFD, 1997).

Leopard frogs may be especially vulnerable to catastrophic events, such as floods and drought. Tadpoles are susceptible to predation by introduced predators, such as catfish and bullfrogs. Removal of vegetation may result in increased predation by both aquatic and terrestrial predators (NMDGF, 1997). Because local populations of leopard frogs are prone to extinction, it is also important to facilitate recolonization through the maintenance of adequate dispersal corridors (Sredl, 1997).

Habitat in the Proposed Project Area

Lowland leopard frogs are generally associated with small streams and marshes that support emergent vegetation. In the HCP area, suitable habitat could occur in the wetlands on the state and federal refuges and wetlands adjacent to the Salton Sea. The New and Alamo Rivers probably do not provide suitable habitat conditions due to their large size. However, portions of the agricultural drainage system that support cattails could provide suitable conditions.

Proposed Project Area Occurrence

Lowland leopard frogs are not known to currently inhabit the proposed project area. However, as noted above, lowland leopard frogs were recently reintroduced into San Felipe Creek, a west side tributary to the Salton Sea just north of the proposed project area.

Lowland leopard frogs have the potential to occur in the proposed project area in the future as a result of additional introductions or migration from reintroduced populations.

Reptiles

Desert Tortoise (*Gopherus agassizi*)

Range and Distribution

The desert tortoise is found in many Mojave and Sonoran Desert habitats in a range that covers southeastern California, southern Nevada, and northern Mexico. Suitable tortoise habitat includes sandy washes, canyons, and gravel beds dominated by creosote bush scrub with ocotillo, cactus, and yucca, usually between elevations from 500 to 2,700 feet (Reclamation, 1993). In the Salton Trough, desert tortoise occur near San Gorgonio Pass and on the alluvial fans of Coachella Valley.

The Colorado River has been an effective geographic barrier, separating the Mojave and the Sonoran populations of desert tortoise for millions of years. The Mojave population is found to the west and north of the Colorado River, and the Sonoran population is found to the east and south. The Mojave population may be further divided into two subpopulations, western and eastern. A low sink that generally runs from Death Valley to the south may be used to separate the western and eastern subpopulations.

Population Status

Analysis of study plot data from sites in the western Mojave Desert indicates that subpopulations (both adults and especially juveniles) have declined over the last decade. Populations are threatened by a combination of human activities (i.e., urbanization, agricultural development, off-highway vehicle use, grazing, and mining) and from direct vandalism, collections, and raven predation of young. Luckenbach (1982) concluded that human activity is the most significant cause of desert tortoise mortality. In addition, a virus is spreading through the natural population.

Data recently collected on the Mojave population of the desert tortoise indicate that many local desert tortoise subpopulations have declined precipitously. The apparent distribution of Upper Respiratory Disease Syndrome, not identified before 1987 in wild desert tortoises, has suggested the possibility of an epizootic condition and thus may be a significant contributing factor to the current high level of desert tortoise losses documented for certain localities.

Habitat Requirements

The species inhabits desert scrub, desert wash habitats, and Joshua tree woodland (Zeiner et al., 1988). Optimal habitat has been characterized as creosote bush scrub in which precipitation ranges from 5 to 20 cm (2 to 8 inches), the diversity of perennial plants is relatively high, and production of ephemerals is prominent (Luckenback, 1982; Turner, 1982, Turner and Brown, 1982; Schamberger and Turner, 1986). Tortoises feed primarily on spring annual grasses and forbs, as well as perennial grasses. They are most active in the spring and fall months, and escape extreme temperatures of summer and winter by remaining in underground burrows, hibernating in the winter months. Soil conditions must be firm, but soft sandy loams are suitable for burrow construction. Desert tortoise burrows have been found in a variety of locations, such as along the banks of washes, at the base of shrubs, in the open on flat ground, under rocks, on steep hill sides, in caleche caves, and in berms along rail lines.

Habitat in the Proposed Project Area

In the HCP area, creosote bush scrub only occurs in the right-of-way of IID along the AAC. Outside the HCP area, creosote bush scrub surrounds the Salton Sea between the higher rock hillsides and the more saline desert saltbrush community. It also occurs adjacent to the irrigated portions of the valley.

Proposed Project Area Occurrence

Desert tortoise populations are known from areas northeast of the Imperial Valley, particularly in the Chocolate Mountains and the Chuckwalla Valley where high densities have been recorded. Areas adjacent to the Coachella Canal were surveyed in 1981, but no animals were found; and the area was considered poor habitat because of rocky soils and sparse vegetation (USBR, 1993). Populations have also been reported from the Pinto Drainage in the far southwestern part of Imperial County. It is unlikely that desert tortoise would be found in most of the HCP area because most of the HCP area is at or below sea level (IID, 1994).

Flat-Tailed Horned Lizard (*Phrynosoma mcalli*)

Range and Distribution

The flat-tailed horned lizard occurs only in sparsely vegetated, sandy areas of the deserts of extreme southwestern Arizona; southeastern California; northeastern Baja California; and extreme northwestern Sonora, Mexico. In Arizona, the species occurs in the Yuma Desert west of the Tinaja Altas and Gila Mountains, and south of the Gila River. In California, it is found in the Coachella Valley, then south toward the head of the Gulf of California (AGFD, 1997c). The original range of the species has diminished in recent years due to human activities (Turner et al., 1980).

Population Status

The flat-tailed horned lizard was proposed as threatened in November 1993 (FR 58 [227]: 62624-62629). The species was withdrawn from proposed status on July 15, 1997. Habitat loss and other impacts have fragmented this species' distribution. Agricultural and urban development in the Imperial Valley have isolated populations in East Mesa from those west of the Salton Sea, in the Yuma desert, and in the Superstition Mountain area. Flat-tailed horned lizards in the Coachella Valley may be geographically isolated from flat-tailed horned lizards in the Imperial Valley by the Salton Sea and conversion of habitat to croplands. The All American and Coachella Canals are likely barriers to movement, and major highways, such as Interstate 8 in Imperial County and Interstate 10 in Riverside County, further fragment populations. Habitat loss to development and recreation, such as off-highway vehicle use, are the principal threats to species persistence (Zeiner et al., 1988).

Human impacts have resulted in the loss of roughly 34 percent of the historic flat-tailed horned lizards habitat. In the Imperial and Coachella valleys, a large portion of the flat-tailed horned lizard's habitat has been converted to urban or agricultural use or was flooded by the filling of the Salton Sea from 1905 to 1907. The precise extent of this species' historic habitat cannot be quantified because filling of the Salton Sea and much of the agricultural development predates most collections of flat-tailed horned lizards.

Habitat Requirements

Flat-tailed horned lizard habitat is characterized by areas of low relief with surface soils of fine, packed sand, or pavement overlain with loose, fine, windblown sand (Turner et al., 1980). This species requires fine sand substrates that allow subsurface burrowing to avoid extreme temperatures. Shrubs and clumps of grass are also used for thermal cover when soil surface temperature is very high. Within its range, the flat-tailed horned lizard typically occupies sandy, desert flatlands with sparse vegetation and low plant species diversity, but is occasionally found in low hills or areas covered with small pebbles or desert pavement. Optimal habitat is found in the desert scrub community; however, the species is also known to occur at the edges of vegetated sand dunes, on barren clay soil, and in sparse saltbush communities. Flat-tailed horned lizards are occasionally found on blacktop roads. The flat-tailed horned lizard shares habitat with the fringe-toed lizard.

Habitat in the Proposed Project Area

Suitable habitat for flat-tailed horned lizards in the proposed project area occurs along the AAC and along the western side of the Westside Main Canal in the West Mesa. Extensive habitat for this lizard also occurs to the east of the East Highline Canal (BLM, 1990).

Proposed Project Area Occurrence

Flat-tailed horned lizards are known to occur in the HCP area. Lizards have been observed near Gorden Wells where the Coachella Canal branches off the AAC. Field surveys have detected lizards in the East Mesa south of Highway 78 east of the East Highline Canal (BLM, 1990). Surveys for the flat-tailed horned lizard were conducted in May 1984 and again in June 1993 (Reclamation and IID, 1994; 1996b). Results of the two surveys were similar. Flat-tailed horned lizards were observed along the AAC between Drops 1 and 3; however, scat was also observed east of the eastern Interstate 8 crossing of the Algodones Dunes. USFWS (1996b) surmised that the species is probably absent from the high dunes between Drop 1 to about the eastern Interstate 8 crossing. Although this species is well distributed along the AAC, this area has not been identified as a key area for the species (Turner and Medica, 1982). The area is isolated from other flat-tailed horned lizard habitat by the AAC, Interstate 8 on the north, and agricultural development in the Mexicali Valley to the south.

Western Chuckwalla *(Sauromalus obesus obesus)*

Range and Distribution

The chuckwalla is found throughout the deserts of the southwestern U.S. and northern Mexico (Stebbins, 1985). Chuckwallas are found in a variety of desert scrub and woodland habitats from sea level to 3,750 feet in the Mojave and Colorado deserts.

Population Status

The chuckwalla is a widespread species, but is regionally limited by its requirement for rock outcrops. Under ideal conditions, it can be quite common locally. Urban expansion (e.g., construction of roads and utilities, inundation by reservoirs, and agriculture) has reduced the available habitat for this species. Overcollection by collectors or shooters can cause local declines in this long-lived species. Collection also leads to habitat destruction when collectors use tools to pry open crevices and break up rockpiles resulting in further declines in chuckwalla populations (NMDGF, 1997).

Habitat Requirements

Western chuckwallas are most abundant in the Sonoran Creosote Bush Scrub plant community, but only occur in areas with large rocks, boulders, or rocky outcrops, usually on slopes. Warm rock surfaces are used for basking and as lookout positions for predators. Typical habitat includes rocky hillsides and talus slopes, boulder piles, lava beds, or other clusters of rock, usually in association with desert scrub habitat. Burrows are dug between rocks for dwelling and breeding (NMDGF, 1997). Chuckwallas feed entirely on plant material, especially the flowers, leaves, and fruits of the creosote bush. Nests are dug in sandy, well-drained soils. Chuckwallas are generally active only from mid-spring to mid-summer, and occasionally in fall, though they can be active year-round in warm areas.

Habitat in the Proposed Project Area

The creosote bush scrub community is widespread throughout the nonirrigated areas of the Sonoran Desert. This habitat type surrounds the Salton Sea between the higher rock hillsides and the more saline desert saltbrush community. In the HCP area, creosote scrub only occurs within the right-of-way of IID along the AAC. However, most of the habitat along the AAC consists of sandy soils, lacking significant amounts of rocky habitat. IID operates two quarries adjacent to the Salton Sea. These quarries could provide suitable habitat conditions for chuckwallas, but chuckwallas are unlikely to inhabit these quarries because they are surrounded by agriculturals and wetlands and are isolated from desert habitats.

Proposed Project Area Occurrence

This species is known to occur on lava flows and craters of the LCR Valley, but has not been observed in the HCP area. Lack of suitable habitat makes the occurrence of this species unlikely. The right-of-way of IID along the AAC is the only location where chuckwallas might occur.

Colorado Desert Fringe-toed Lizard (*Uma notata notata*)

Range and Distribution

The range of this species is extreme southeastern California west to extreme eastern San Diego County, and northeastern Baja California. In California, this species is found south of the Salton Sea in the Colorado Desert Region in northeast San Diego County and the majority of Imperial County. It is restricted to areas containing fine, loose sand.

Population Status

While the distribution of this species is limited, populations in areas without disturbance appear healthy and stable. The current primary threat to this species is off-road vehicle use.

Habitat Requirements

The Colorado desert fringe-toed lizard is highly adapted to living in areas of windblown sand and is not known to occur elsewhere (Smith, 1971). Distribution is restricted to fine, loose, windblown sand of dunes, flats, riverbank, and washes (Stebbins, 1985). It is most abundant on well-developed dunes, but does occur on level or undulating sand with very low vegetation. The species is a habitat specialist and is restricted to the distribution of sand particles no coarser than 0.375 millimeters (mm).

Colorado desert fringe-toed lizards often seek cover under shrubs at the foot of dunes. They burrow in sand during hot or cold weather and go into torpor in winter. The lizards usually hibernate on the lee side of the dunes and can tolerate being buried by up to 12 feet of wind-deposited sand. Fringe-toed lizards often burrow 5 to 6 cm below the sand surface, using rodent burrows or the bases of shrubs for cover and thermoregulation.

Habitat in the Proposed Project Area

Suitable habitat for the Colorado desert fringe-toed lizard occurs in the proposed project area, specifically, where the AAC traverses the Sand Hills and Algodones Dunes.

Proposed Project Area Occurrence

The Colorado desert fringe-toed lizard is found in areas with fine, loose, windblown sand in habitats such as desert wash or sparse desert scrub south of the Salton Sea in San Diego and Imperial Counties. It could potentially occur throughout the study area wherever aeolian sand is found (Norris, 1958). During Reclamation surveys for the flat-tailed horned lizard, approximately 100 Colorado desert fringe-toed lizards were sighted in the Sand Hills along a 600-foot-wide transect immediately adjacent to the north side of the AAC.

Banded Gila Monster *(Heloderma sespectum cinctum)*

Range and Distribution

The Gila monster is distributed from southwestern Utah and Southern Nevada south to Southern Sonora, Mexico, and from the Colorado River east to extreme southwestern New Mexico (AGFD, 1998b). The banded Gila monster, which is the subspecies potentially occurring in the study area, ranges from the Vermilion Cliffs, Utah, south through the LCR basin, including extreme Southern Nevada, southeastern California, and Arizona west of the Central Plateau to Yuma (Jennings et al., 1994).

Population Status

The Gila monster has declined in heavily urbanized and agricultural areas throughout its range, but remains locally common elsewhere. Because the Gila monster is only one of two poisonous lizards in the entire world, the species is highly prized as a pet. Demand as a collectors item may have created a black market for this species and contributed to its decline (Jennings et al., 1994; Zeiner et al., 1988).

Habitat Requirements

The banded Gila monster is uncommon in a variety of desert woodland and scrub habitats, principally in desert mountain ranges. This lizard prefers the lower slopes of rocky canyons and arroyos but is also found on desert flats among scrub and succulents. It seems to prefer slightly moist habitats in canyons, arroyos, and washes. The Gila monster utilizes the burrows of other animals and may construct its own. Rock crevices and boulder piles are also used for shelter (Shaw, 1950; Stebbins, 1954; Bogert and Del Campo, 1956). Little is known about reproductive requirements. Eggs are laid in the soil in excavated nests, so the soil must be sandy or friable. Gila monsters may also require areas with exposure to the sun and moisture (Stebbins, 1954; Bogert and Del Campo, 1956). This species seems to occur in areas that are moister than surrounding areas.

Habitat in the Proposed Project Area

Most of the proposed project area is agricultural land or urban area and offers no habitat for the banded Gila monster. Desert scrub occurs along the AAC. However, this area is near major highways and areas heavily utilized for off-highway recreation and are unlikely to support this species. There are no desert mountain ranges in the proposed project area. The nearest suitable habitat likely occurs in the Chocolate Mountains to the northeast of the proposed project site and in the rocky areas along the LCR.

Proposed Project Area Occurrence

The banded Gila monster is not known to occur in the proposed project area, and lack of suitable habitat makes the presence of this species unlikely.

Birds

American White Pelican (*Pelecanus erythrorhynchos*)

Range and Distribution

American white pelicans once nested throughout inland North America on isolated islands in rivers, lakes, and bays that were free of mammalian predators. Breeding colonies were distributed from British Columbia and the prairie provinces of Canada south across the southern U.S. from California to Florida. This species now breeds in scattered locations in the prairie provinces and in the western U.S. (Washington to Texas). Most white pelicans winter in central California, along the Pacific Coastal lowlands south to Guatemala and Nicaragua, along the Gulf Coast, and throughout most of Florida (Terres, 1980; Ehrlich et al., 1988).

Population Status

The American white pelican has declined in numbers since presettlement times due primarily to the loss and degradation of breeding and foraging habitats and from human persecution, especially by fishermen who mistakenly believed that the pelican competed for game fishes. Eggshell thinning caused by the use of insecticides may also have played a significant role in the decline of this species (Terres, 1980).

Nesting American white pelicans have declined in California in the last century because of degradation and loss of nesting habitat; the only remaining nesting colonies are at large lakes in the Klamath Basin. The white pelican population is vulnerable to decline because of its low annual reproductive output, colonial nesting, and dependence on isolated nesting sites. Drought, water diversion proposed projects, and disruptive human activities at nesting colonies have adversely affected this species. Lowering water levels in lakes allows predators to destroy nesting colonies as nesting islands become connected to mainland shorelines. American white pelicans also are susceptible to persistent pesticides that pollute the watershed. An estimated 10 percent of the white pelican western population died from avian botulism in 1996 (Rocke, 1999).

Habitat Requirements

White pelicans are usually associated with large freshwater marshes and shallow lakes at lower elevations 853 to 1,676 m [2,800 to 5,500 feet]) that support a rich supply of fish. They are also frequently found in coastal estuaries (Garrett and Dunn, 1981; Terres, 1980). Large expanses of open water appear to be a major stimulus in attracting these birds to an area, with the nearby vegetation seemingly an unimportant factor (NMDGF, 1997). Fish are the primary diet of the white pelican, but salamanders, frogs, crayfish, and a variety of aquatic invertebrates are also consumed. This species can catch prey only in shallow water or within about 1 m (3 feet) of the surface of the water. The white pelican has the ability to disperse widely and locate new food supplies.

The white pelican is a colonial species that is often found nesting and foraging in association with several species of waterbirds, particularly the double-crested cormorant. White pelicans breed synchronously and due to brood reduction (i.e., starvation of smaller chicks because of harassment by the larger sibling), only one juvenile is usually raised per successful nesting attempt. Sexual maturity is reached at age three (NMDGF, 1997).

Habitat in the Proposed Project Area

Suitable habitat for white pelicans in the proposed project area occurs mainly at the Salton Sea. Pelicans congregate at the mouths of the New and Alamo Rivers, where prey items are generally abundant (IID, 1994). Lakes in the valley (e.g., Fig, Lagoon, and Finney Lakes) also provide suitable habitat for white pelicans.

Proposed Project Area Occurrence

The Salton Sea is an important migratory stopover for American white pelicans. The pelicans appear to use the Salton Sea for a few weeks to a few months before continuing on their migration to Mexico (Shuford et al., 1999). As many as 33,000 American white pelicans have been counted at the Salton Sea during migration and during the winter (USFWS, 1999). From the early 1900s to the late 1950s, this species also nested at the Salton Sea. Currently, it is unlikely that there is sufficient undisturbed habitat at the Salton Sea to support nesting colonies of American white pelicans.

In radio-telemetry studies during 1991, individual pelicans migrating south from northern California (e.g., Clear Lake National Wildlife Refuge) were documented as using the Salton Sea (Anderson, 1993). The large populations of white pelicans at the Salton Sea in the early- to mid-1980s were likely associated initially with extensive flooding in the LCR Delta area from the late 1970s through the mid-1980s, when many white pelicans came to reside in the region for a substantial portion of the wintering period, using Salton Sea/Laguna Salada/Rio Hardy wetlands as wintering habitat. Most recent censuses of the Salton Sea white pelicans (Anderson, 1993) indicate that use may be declining in recent years, but that the area still supports several thousand white pelicans for significant periods during the winter (Anderson, 1993; Setmire et al., 1993). Although accurate data are not available to compare relative numbers of white pelicans at the Salton Sea with those found at other typical habitats in the region, the population at the sea is probably much larger than at the other areas (Anderson, 1993). Data collected by the USFWS (USFWS, 1993d) also indicate that smaller numbers of white pelicans have used the Salton Sea and adjacent wetlands in recent years as compared to the peak numbers reported in 1985. Overall, the USFWS counts in combination with data summarized above indicate that 2,000 to 17,000 white pelicans use the Salton Sea as overwintering habitat for up to about 6 months.

California Brown Pelican *(Pelecanus occidentalis californicus)*

Range and Distribution

Brown pelicans occur in marine habitats along the Pacific, Atlantic, and Gulf Coasts in North America and range southward through the Gulf and Caribbean areas to Central and South America. The California subspecies nests on islands off the coast of Southern California, south along the coast of Baja California and the Gulf of California, to Guerrero, Mexico (CDFG, 1992). After the breeding season, California brown pelicans disperse from breeding areas and can be found as far north as British Columbia, Canada, and as far south as South America.

Population Status

Brown pelican populations declined greatly in the mid-20th century because of human persecution, disturbance of nesting colonies, and reproductive failure caused by eggshell thinning and the adverse behavioral effects of pesticides (Palmer, 1962; Terres, 1980). Most North American populations of this species were extirpated by 1970. Since the banning of dichlorodiphenyl-trichloroethane (DDT) and other organochlorine use in the early 1970s, brown pelicans have made a strong recovery and are now fairly common and perhaps still increasing on the southeast and west coasts (Kaufmann, 1996). The endangered Southern California Bight population of the brown pelican grew to 7,200 breeding pairs by 1987, but has experienced considerable population fluctuations in recent years and has not, as yet, been considered sufficiently stable for delisting (CDFG, 1992). In 1992, there were an estimated 6,000 pairs in Southern California and about 45,000 pairs on Mexico's west coast (Ehrlich et al., 1992).

Habitat Requirements

Brown pelicans are found primarily in warm estuarine, marine subtidal, and marine pelagic waters (Zeiner et al., 1990; NMDGF, 1997). They occur mostly over shallow waters along the immediate coast, especially near beaches and on salt bays (Kaufmann, 1996). Brown pelicans roost on water, rocks, rocky cliffs, jetties, piers, sandy beaches, and mudflats, and forage in open water. Brown pelicans are plunge divers, often locating fish from the air and diving into the water to catch them. They feed almost exclusively on fish. The brown pelican is a colonial nester. It nests on islands in trees, bushes, and on the ground. This species first breeds at 2 or 3 years of age with only one brood raised per year (Kaufmann, 1996; Terres, 1980; Zeiner et al., 1990). For roosting, brown pelicans congregate at selected roosting locations that are isolated from human activity.

Habitat in the Proposed Project Area

Because brown pelicans are associated with large open waterbodies, habitat for brown pelicans in the proposed project area principally occurs at the Salton Sea where abundant fish populations provide foraging opportunities for brown pelicans. Nesting habitat is present at the Alamo River Delta, where brown pelicans have nested since 1996 (Shuford et al., 1999). In addition to the Salton Sea, brown pelicans are known to use Finney Lake in the Imperial Wildlife Area (Corps, 1996).

Proposed Project Area Occurrence

Brown pelicans probably had little historical use of the Salton Sea (Anderson, 1993). Some visiting postbreeding pelicans were documented at the Salton Sea in the late 1970s, but overwintering was not confirmed until 1987. Use of the Salton Sea by brown pelicans subsequently increased. The Salton Sea currently supports a year-round population of California brown pelicans, sometimes reaching 5,000 birds, although more typically numbering 1,000 to 2,000 birds. In 1996, the brown pelican was first found to nest successfully at the Salton Sea and several pairs have attempted to nest annually since then (Shuford et al., 1999).

Other than the small number of breeding birds at the Salton Sea, the closest breeding colonies of brown pelicans are located in the Gulf of California on San Luis Island (about 220 miles southeast of the Salton Sea). On San Luis Island, breeding populations vary between 4,000 and 12,000 pairs. The Puerto Refugio area contains about 1,000 to 4,000 breeding pairs, and the Salsipuedes/Animas/San Lorenco area supports 3,000 to 18,000 pairs. Birds from these breeding areas may visit the Salton Sea after the breeding period.

Double-crested Cormorant (*Phalacrocorax auritus*)

Range and Distribution

The double-crested cormorant is a year-round resident along the Pacific Coast of Canada and the U.S. During the summer, it may occur in the north-central U.S. and central provinces of Canada. Wintering birds are found in coastal states along the Gulf of Mexico (Kaufman, 1996). Double-crested cormorants are found year-round along the California coast. About 7,500 individuals nest in Northern California, with lesser numbers in Southern California, Oregon, and Washington (Tyler et al., 1993).

Population Status

The population of double-crested cormorants declined considerably during the 1960s and early 1970s. This decline was attributed to pesticide residues in the marine food chain, principally DDT (Small, 1994). The population began recovering in the late 1970s and 1980s, but has not yet achieved historic levels. Kaufman (1996) reports that the population is currently increasing and expanding its range. In some locations, cormorant populations have increased to levels that some consider them a competition with recreational fishing. The USFWS is considering implementing control measures in some locations.

Habitat Requirements

The double-crested cormorant is a year-round resident along the entire coast of California and on inland lakes and rivers of fresh, salt, or brackish quality (Zeiner et al., 1990). They feed mainly by diving for fish in water less than 30 feet deep, but will also prey on crustaceans and amphibians. The species requires undisturbed nest sites beside water on islands or on the mainland, including offshore rocks, cliffs, rugged slopes, and live and dead trees. In the midwest, they typically nest in flooded dead timber (snags) and on rocky islands, often in mixed colonies with great blue herons and black-crowned night herons (Meier, 1981).

Habitat in the Proposed Project Area

Suitable habitat for double-crested cormorants in the proposed project area occurs at the Salton Sea and at lakes in the valley, such as Finney and Ramer Lakes on the Imperial Wildlife Area. At the Salton Sea, cormorants nest on rocky ledges such as occur on Mullet Island or on accumulations of dead vegetation that occur at the deltas of the New and Alamo Rivers. Snags in the Salton Sea are important for providing protected roost sites for double-crested cormorants. Cormorants regularly move between the Salton Sea and the lakes at the Finney-Ramer Unit of the Imperial Wildlife Area where they forage. In addition to suitable habitat found at the Salton Sea and on the refuges, double-crested cormorants occasionally forage in open water areas of the New and Alamo Rivers. They may also use larger agricultural drains for foraging on occasion.

Proposed Project Area Occurrence

Double-crested cormorants occur as a common year-round resident at the Salton Sea, with counts of up to 10,000 individuals (IID, 1994). Small numbers of cormorants have nested at the Salton Sea in the past, and small nesting colonies were documented at the north end of the Salton Sea in 1995 (USFWS, 1996a), the first time since 1989 (USFWS, 1993d). Over 7,000 double-crested cormorants and 4,500 nests were counted on Mullet Island in 1999. This represents the largest breeding colony on the West Coast (Point Reyes Bird Observatory, 1999).

Least Bittern *(Ixobrychus exilis hesperis)*

Range and Distribution

Least bitterns nest throughout much of the U.S. and southeast Canada south to most of tropical and subtropical South America east of the Andes. The northern populations of this species winter in California, south Texas, and central Florida (Terres, 1980). Most of the California population winters in Mexico and migrates in the spring and the summer to scattered locations in the western U.S., including the Colorado River, Salton Sea, Central Valley, and coastal lowlands of Southern California.

Population Status

This species is believed to have declined in many locales, but it is still abundant in parts of North America (Kaufman, 1996). Although no trend data are available for western populations of the least bittern, population trends probably reflect the availability of suitable freshwater marsh habitats (Sauer et al., 1997). Marsh habitats been declined throughout the 20th century due to channelization, dredging, flood control, grazing, stream diversion, recreational activities, and wildfires (NMDGF, 1997). Pesticides are also considered a threat to least bitterns (Zeiner et al., 1990a).

Habitat Requirements

Least bitterns inhabit fresh and brackish water marshes, and desert riparian habitats (Zeiner et al., 1990a). It is a secretive bird usually found in densely vegetated marshes. This long-distance migrant can also inhabit saltwater and brackish marshes near the coast in the southern portion of its range (Kaufmann, 1996; Terres, 1980). In the LCR Valley, the largest breeding populations of least bitterns are found in extensive cattail and bulrush marshes like those found near Topock and Imperial Dam. Smaller populations of least bitterns are found throughout the LCR Valley at a variety of marshy areas, including ponds and agricultural canals (Rosenberg et al., 1991). Rosenberg et al. (1991) estimated the breeding density of this species to be 40 birds per 40 hectares (ha) (100 acres [ac]) in some marshy areas along the LCR. The least bittern builds its nest in tall marsh vegetation, usually cattails. It occasionally nests in loose colonies, but nests are generally scattered throughout the appropriate marsh vegetation.

The least bittern is a carnivorous species that primarily eats small fish, such as catfish, minnows, eels, sunfish, killifish, and perch. Other food items consumed by this species include frogs, tadpoles, salamanders, leeches, slugs, crayfish, small snakes, aquatic insects, and, occasionally, shrews, and mice (Terres, 1980; Kaufmann, 1996).

Habitat in the Proposed Project Area

Least bitterns nest in wetlands adjacent to the Salton Sea that provide dense emergent vegetation, such as cattails or tules. They forage for fish, aquatic and terrestrial invertebrates, and small vertebrates in shallow waters and mudflats along the Salton Sea shoreline or in adjacent freshwater marshes. Dense salt cedar stands adjacent to marshes are often used as roost sites (Garrett and Dunn, 1981). Agricultural drains with emergent vegetation and areas of the New and Alamo Rivers are likely to also provide foraging habitat for least bitterns. Portions of the drains support cattail stands that could be used by least bitterns for nesting. Whether least bitterns nest in the drain vegetation is unknown. In addition, marsh communities supported by seepage from the AAC and the main canals in Imperial Valley are also expected to provide suitable habitat.

Proposed Project Area Occurrence

Least bitterns occur in the proposed project area throughout the year although they are more common in the summer. At the Salton Sea, the least bittern population has been estimated at about 550 individuals (IID, 1994).

Reddish Egret *(Egretta rufescens)*

Range and Distribution

In the U.S., reddish egrets breed along the Gulf Coast and Florida coast. Outside the U.S., breeding occurs in Baja California and along the Pacific and Atlantic coasts of Mexico and south to Guatemala. The species also breeds in the Caribbean. It overwinters from southern Florida to Colombia and Venezuela (DeGraaf and Rappole, 1995).

Population Status

The population of reddish egrets was substantially reduced in the late 1800s by feather collectors. Since then, the population has increased. Currently, the U.S. population is estimated at about 2,000 pairs (Kaufman, 1996).

Habitat Requirements

Reddish egrets are associated with coastal tidal flats, salt marshes, ocean shores, and lagoons. For foraging, it prefers calm shallow waters close to shore such as in marshes or protected bays and lagoons. Small fish comprise most of the reddish egret's diet; but frogs, tadpoles, and crustaceans are also taken. Occasionally, reddish egrets will feed on aquatic invertebrates (Kaufman, 1996).

Habitat in the Proposed Project Area

In the proposed project area, reddish egrets are mainly expected to occur at the Salton Sea where suitable foraging habitat exists along the margins of the Salton Sea. Mudflats and marsh habitats adjacent to the Salton Sea may provide suitable foraging conditions for this species. Reddish egrets could also find suitable foraging conditions at the wetlands and lakes of the state and federal refuges and duck clubs. Reddish egrets could forage in agricultural drains like other wading birds (e.g., great blue herons) in the proposed project area.

Proposed Project Area Occurrence

The reddish egret is a rare visitor to the proposed project area in the summer and fall. Only seven records of this species exist at the Salton Sea NWR (USFWS, 1997b). It is not known to breed in the area.

White-faced Ibis (*Plegadis chihi*)

Range and Distribution

The white-faced ibis formerly nested from Minnesota west to Oregon and south into California, Utah, and Colorado, and locally down to the Gulf Coast and Mexico (Terres, 1980). Breeding colonies are now isolated, with the greatest abundance of breeding birds occurring in Utah, Texas, and Louisiana. The winter range extends from California and along the Gulf Coast south into Mexico, Central America, and Costa Rica.

Population Status

Breeding white-faced ibis populations declined in distribution and abundance during the 1960s and 1970s, especially in the western U.S. (Ryder and Manry, 1994; Shuford et al., 1996). Since the 1980s, however, there has been an increase in western white-faced ibis populations due to improved nesting habitat management, increased planting of alfalfa, and a ban on DDT and other pesticide use in the early 1970s. Unlike some other western states, however, the breeding population in California has decreased substantially, and the species is no longer a regular breeder in the state (Remsen, 1978; Zeiner et al. 1990).

The winter population in California appears to have increased especially since the 1970s (Shuford et al., 1996). This may be due to changes in agricultural practices that provide more ibis winter habitat or because the species was overlooked and not surveyed adequately in the early part of the century. During the winter of 1994 to 1995, the California population of the white-faced ibis was estimated at 27,800 to 28,800 individuals.

The primary reason for the decline of the white-faced ibis as a nesting species in California is the loss of extensive marsh habitats (Remsen, 1978; Shuford et al., 1996). Allowing wetlands to dry up in the spring and summer for mosquito and cattail control adversely impacts this species (Remsen, 1978). White-faced ibis populations also declined dramatically during the 1960s and 1970s, due to the impacts of pesticides on reproductive success, and loss of habitat due to drought and flood control proposed projects (Ryder and Manry, 1994). Pesticides (e.g., dieldrin) were documented in the 1970s as causing large-scale nesting failures at breeding colonies in Utah, Texas, and Nevada and may be an additional cause of the decline of this species in California (Remsen, 1978; Terres, 1980). Decreasing reproductive success of ibis nesting at Carson Lake, Nevada, in the mid-1980s (Henny and Herron, 1989) and at Colusa, California, from 1989 to 1991 (Dileanis et al., 1992) was attributed to DDT. These birds appear to have been exposed to pesticides on their wintering grounds (Henny and Herron, 1989). However, limited testing for persistent organochlorine pesticides in ibises from several locations in Mexico indicated that concentrations of DDE, a metabolite of DDT, are the same for Mexican birds as for those in the southwestern U.S. (Mora, 1997). Although there are some areas in Mexico from which birds were not tested that have the potential for higher DDT accumulation, there is also the possibility that ibises are acquiring DDE during migration stopovers and winter residency in the southwestern U.S.

Habitat Requirements

The white-faced ibis is gregarious throughout the year, foraging in flocks in perennial marshes, wet fields and croplands, and shallow open water (Grinnell and Miller, 1944; Palmer, 1962; Cogswell, 1977; Burger and Miller, 1977). Most wintering ibises in the Salton Sea/Imperial Valley area foraged in irrigated agricultural lands, especially alfalfa and wheat (Shuford et al., 1996). Along the Colorado River, the ibis also forages primarily in alfalfa fields, but uses other flooded agricultural fields, marshes, and along lake shores (Rosenberg et al., 1991; Shuford et al., 1996). White-faced ibis probe for invertebrates and small vertebrates in freshwater marshes, in shallow waters along lakeshores, in wet agricultural fields and meadows, and occasionally in salt marshes.

The white-faced ibis nests near the ground or over water in colonies located in extensive, undisturbed marshes with large stands of tall marsh plants such as bulrushes (Palmer, 1962; Burger and Miller, 1977; Terres, 1980). Egg laying is from April to July, with incubation lasting 3 weeks and young remaining at the nest for about 5 weeks after hatching (Cogswell, 1977; Terres, 1980). It can establish new colonies in areas with extensive marshes and other conditions that are suitable for breeding. Several factors may affect establishment of new breeding colonies, including population age structure and breeding site fidelity. In addition, the white-faced ibis is able to shift nesting areas in response to changing availability of marsh habitat (Ryder, 1967). However, this species may need other ibises and other waders, such as herons, gulls, and ducks, present to initiate a new colony (Palmer, 1962; Burger and Miller, 1977).

Habitat in the Proposed Project Area

For nesting, white-faced ibis typically use areas of extensive marsh. However, in the proposed project area, they nest predominantly in tamarisk and mesquite snags that are over water. In the proposed project area, the state and federal wildlife refuges and naturally occurring marshes along the Salton Sea are the only areas known to support nesting white-faced ibis. Agricultural drains support limited amounts of cattails and bulrushes in small patches within the confines of the drain. These patches are not likely to provide suitable nesting habitat for white-faced ibis.

Nighttime roosts in the Imperial Valley are found in managed wetlands, such as Ramer Lake and local duck club wetlands, where birds roost in open ponds or in marsh vegetation. The Salton Sea also supports roosting birds (Salton Sea Authority and Reclamation, 2000).

Agricultural fields are used extensively by white-faced ibis for foraging. Alfala is one of the primary crops of the Imperial Valley, and white-faced ibis typically congregate in these fields foraging on insects displaced as the field is flood irrigated. Wheat fields are also commonly used for foraging.

Proposed Project Area Occurrence

White-faced ibis occur year-round in the proposed project area although the greatest numbers occur during winter. The Salton Sea provides habitat for the second largest wintering population of this species in California (USFWS, 1999) and more than 24,000 were recorded at the Salton Sea in 1999 (Point Reyes Bird Observatory, 1999). These numbers represent more than 50 percent of the white-faced ibis in California (Shuford et al., 1999). Small numbers of white-faced ibis nest at the Salton Sea (USFWS, 1996a). At Finney Lake on the Imperial Wildlife Area, recent breeding estimates indicate 370 breeding pairs using this lake (Shuford et al., 1999).

Wood Stork *(Mycteria americana)*

Range and Distribution

Wood storks have a limited distribution in the U.S. They occur as year-round residents in Florida, Mexico, and parts of South America where they breed (Kaufman, 1996; DeGraaf and Rappole, 1995). They also breed at scattered locations elsewhere in the southeastern U.S. (DeGraaf and Rappole, 1995). After the breeding season, wood storks occur throughout their breeding range as postbreeding visitors but also wander outside their breeding range to locations in Texas, Louisiana, and Southern California (DeGraaf and Rappole, 1995).

Population Status

The population of wood storks in the southeastern U.S. was reportedly greater than 150,000 at one time. By the early 1990s, the population declined to about 10,000 (Kaufman, 1996). Numbers in California appear to have declined since the 1950s (CDFG, 1999a). The decline of this species is attributed to loss of breeding and foraging habitat in Florida.

Habitat Requirements

Wood storks are associated with marshes, lagoons, and ponds. The species primarily feeds on fish, small vertebrates, and aquatic invertebrates. They forage while wading by moving their open bill in the water until contacting a prey item, and then quickly snapping the bill closed (CDFG, 1999a). Thus, foraging is restricted to shallow water areas. Wood storks appear in California as early as May after the breeding season and remain as late as October (Small, 1994).

Habitat in the Proposed Project Area

Suitable habitat for wood storks in the proposed project area principally occurs at the Salton Sea and adjacent wetland areas. Shallow shoreline areas and pools formed by barnacle bars provide appropriate foraging conditions for wood storks. Most wood storks at the Salton Sea occur at the southern end (CDFG, 1999a).

Proposed Project Area Occurrence

The wood stork is a common postbreeding visitor to the Salton Sea, generally occurring at the Salton Sea between July and September (IID, 1994). It is also known to occur at the Salton Sea during the spring, fall, and winter although less frequently and in fewer numbers (USFWS, 1997b). In the 1950s, as many as 1,500 wood storks occurred at the Salton Sea (Shuford et al., 1999). In recent years, up to 275 individuals have been counted at the Salton Sea (IID, 1994).

Aleutian Canada Goose *(Branta canadensis leucopareia)*

Range and Distribution

The Aleutian Canada goose once nested in the outer two-thirds of the Aleutian Islands in Alaska and in the Commander and Kuril Islands of the former Soviet Union. Currently, they nest on six islands of the Aleutian archipelago and on one island of the Semidi Island group, southward of the Alaska peninsula. Most Aleutian Canada geese migrate from breeding grounds in Alaska during September, arriving at wintering grounds in California in mid-October. Most Aleutian Canada geese winter in the Central Valley from Los Banos to just north of Sacramento.

Population Status

The Aleutian Canada goose is a federally listed endangered species. Predation by arctic foxes introduced during 1920 to 1936 to many of the Aleutian Islands was primarily responsible for reducing the population to about 800 birds. Aleutian Canada geese were also hunted recreationally and for food until 1975. Chronic outbreaks of avian cholera and avian botulism are present threats to wintering Aleutian Canada geese. The Aleutian Canada goose population has increased in recent years to more than 5,000 (Small, 1994), and the USFWS is considering delisting this species.

Habitat Requirements

In winter, Aleutian Canada geese are associated with lakes, fresh emergent wetlands, moist grasslands, croplands, pastures, and meadows (CDFG, 1990). Geese feed on a wide variety of marsh vegetation, including algae, seeds of grasses and sedges, grain (especially in winter), and berries.

Habitat in the Proposed Project Area

Aleutian Canada geese do not breed in the proposed project area, and their use of the proposed project area is restricted to over wintering. Habitat for Aleutian Canada geese consists of wetlands adjacent to the Salton Sea, managed wetlands on the state and federal refuges, and wetlands on private duck clubs. In addition, Aleutian Canada geese often forage in agricultural fields during the winter.

Proposed Project Area Occurrence

Aleutian Canada geese occur only as rare fall migrants and winter residents in the proposed project area where they forage in the wetland areas around the Salton Sea in the agricultural fields throughout the Imperial Valley (Small, 1994; USFWS, 1997b). The 1998 Christmas Bird count reported two Canada Geese (Small Races) in the south Salton Sea area.

Fulvous Whistling-Duck (*Dendrocygna bicolor*)

Range and Distribution

The fulvous whistling-duck is a tropical/subtropical species that breeds in widely separated populations in all hemispheres. This goose-like duck is found in the southern U.S. and Mexico, northeast and southeast South America, east Africa, and India. In the Western Hemisphere, it ranges from Mexico north into the Gulf States and California and along the Atlantic and Pacific Coasts to New Brunswick and British Colombia, respectively (Terres, 1980). Breeding birds in the southern U.S. winter in southern Mexico (Ehrlich et al., 1988).

Population Status

In recent decades, the fulvous whistling-duck has declined in the southwestern U.S. while increasing in numbers in the Southeast. At the Lake Okeechobee area in southern Florida the population was estimated at 6,000 ducks in the late 1980s (Turnbull et al., 1989). The decline of this species in the Southwest has been primarily attributed to the draining of permanent marshes for agricultural use and the diversion of lakes and rivers for irrigation. The destruction of nests by farmers in other parts of North America, susceptibility to hunting due to its unwary behavior, and poisoning by crop pesticides have also contributed to this species' decline (Kaufmann, 1996; Ehrlich et al., 1988; Zeiner et al., 1990).

Fulvous whistling-duck historically occurred as a regular summer visitor in small numbers along the Southern California coast north to Los Angeles and in greater numbers in the Central Valley (Garrett and Dunn, 1981). In California, the range and population size of fulvous whistling-ducks have declined, particularly on the coastal slope and in the San Joaquin Valley. By the 1970s, the fulvous whistling-duck was thought to breed only in the

Imperial Valley (Shuford et al., 1999). It also has declined along the Colorado River and at the Salton Sea and is now considered a rare summer visitor that may sporadically breed at the Salton Sea (USFWS, 1997b). Reasons for decline of the fulvous whistling-duck are draining and development of marsh habitats and hunting. Pesticides have been shown to cause declines in fulvous whistling-duck populations in other states and also may have adversely affected the California population (Zwank et al., 1988).

Habitat Requirements

The fulvous whistling-duck inhabits shallow wetlands, preferring freshwater and brackish marshes on the coastal plain. Although marshy shallows are preferred, roving flocks of whistling-ducks wander widely and occasionally occur at most wetland habitats. Ponds, lakes, and irrigated agricultural fields, particularly flooded rice fields, are commonly used by this species (Terres, 1980; Kaufmann, 1996; and Ehrlich et al., 1988). The fulvous whistling-duck usually builds its nest in freshwater marshes among dense stands of cattails or bulrushes. The nest is frequently built on a marsh hummock or on the ground at the water edge. Occasionally, nests are placed among tall grasses in wet meadows and rarely in tree cavities (Terres, 1980; Kaufmann, 1996; and Ehrlich et al., 1988). They form long-term pair bonds and raise one brood per year (Ehrlich et al., 1988).

The diet of the fulvous whistling-duck consists mostly of plant material, including a wide variety of greens and seeds. It often forages in agricultural fields for alfalfa, rice, and corn. A few aquatic insects are also eaten (Terres, 1980; Kaufmann, 1996; and Ehrlich et al., 1988).

Habitat in the Proposed Project Area

Habitat for fulvous whistling-ducks primarily occurs on the state and federal wildlife refuges at Finney and Ramer Lakes, which support dense stands of cattails and bulrushes as well as the freshwater impoundments above the mouth of the Alamo River (Garrett and Dunn, 1981). Freshwater marshes at the Salton Sea National Wildlife Refuge also potentially provide habitat for this species. Fulvous whistling-ducks nest in dense freshwater wetlands consisting of cattails near the south end of the Salton Sea and forage on wetland plants and submerged aquatic vegetation in freshwater habitats (Salton Sea Authority and Reclamation, 2000). Agricultural drains and seepage communities along the water delivery canals may provide foraging habitat for fulvous whistling-ducks but are unlikely to be used for nesting due to their small size. Agricultural fields of alfalfa and wheat are used for foraging in addition to marsh habitats.

Proposed Project Area Occurrence

The Salton Sea has supported a population of up to about 200 individuals during the spring and summer (IID, 1994). Most of these birds are postbreeders arriving in June and July (Small, 1994). The species rarely occurs in the HCP area during the winter (USFWS, 1997b). Christmas bird surveys in 1999 reported only 5 birds in the south Salton Sea area and 17 birds from the Martinez Lake area near Yuma Arizona. The 1999 breeding bird surveys for the Southern California population reported an average of less than 1 where in other parts of its range average counts ranged between 3 and 30.

Cooper's Hawk *(Accipter cooperii)*

Range and Distribution

The Cooper's hawk breeds from Southern Canada south throughout much of the U.S. and into northern Baja California, Mexico, and northern mainland Mexico (Johnsgard 1990). It breeds throughout most of California (Zeiner et al., 1990). Outside of the breeding season, it disperses widely from southern Canada south into Central America. Cooper's hawks are usually year-round residents in the Southwest, with some migrants from more northern areas arriving in winter (Zeiner et al., 1990).

Population Status

Cooper's hawk populations have declined historically with an estimated decrease of 13.5 percent between 1941 and 1945 and with rates as high as 25 percent a year after 1948 with the widespread use of DDT (Henny and Wright, 1972). Since the late 1960s, however, there has been an increase in some populations, especially in the northeast (Evans, 1982). A conservative estimate based on Christmas Bird Count data is that there were 19,400 individuals in the U.S. and Canada (Johnsgard, 1990). The largest populations were in Arizona and California. An additional but unknown number of individuals that breed in the U.S. but winter south to Central America were not included in this estimate.

Historically, Cooper's hawks nested in lowland riparian woodlands in the Central Valley and coastal valleys. Cooper's hawks declined as a breeding species in California in the 1950s and 1960s (Remsen, 1978). Major factors in the decline of Cooper's hawk populations include pesticide-induced reproductive failures, especially in the eastern U.S., and loss of riparian nesting habitat, especially in the Southwest (Remsen, 1978). Other threats include human disturbance at the nest and illegal taking of nestlings.

Habitat Requirements

Cooper's hawks are associated with open and patchy deciduous and mixed forests, riparian woodlands, and semiarid woodlands in the Southwest (Johnsgard, 1990; Zeiner et al., 1990). The Cooper's hawk most often nests in deciduous riparian forest, oak woodland, or young- to mid-seral stage, even-aged conifer forest (30 to 70 years old), usually near streams or other open water (Reynolds, 1983). Eucalyptus woodlands may also be used. These forests range from extensive wilderness to smaller forest fragments, woodlots, deciduous riparian groves, small conifer plantations, and suburban habitats (Reynolds, 1983; Bosakowski et al., 1992; and Rosenfield and Bielefeldt, 1993). In central California oak woodlands, Asay (1987) found the majority of nests to be in closed canopy forests, but noted two nests that occurred in lone trees. Cooper's hawks appear to be tolerant of fragmented forest conditions, and forest edge is generally included within their home range (Rosenfield and Bielefeldt, 1993). Even in heavily wooded areas, Cooper's hawk nests were found significantly closer to forest openings than random sites (Bosakowski et al., 1992).

In the western U.S., Cooper's hawks' diet includes about 50 percent birds, with the remainder consisting of mammals, amphibians, and reptiles. They hunt from perches with short flight attacks or extended searching flights, often relying on stealth to capture their prey. These hawks prefer hunting in broken woodland and along habitat edges, catching prey on the ground, in the air, or on vegetation (Zeiner et al., 1990).

Habitat in the Proposed Project Area

Cooper's hawks primarily forage on small birds and often hunt along woodland edges. In the proposed project area, Cooper's hawks can find suitable foraging conditions in and adjacent to tamarisk stands that occur along the New and Alamo Rivers and agricultural drains. Wetlands and tamarisk scrub along the Salton Sea are known to be used by Cooper's hawks (Salton Sea Authority and Reclamation, 2000). Similarly, wetland and riparian habitats on the state and federal refuges provide suitable foraging habitat, as do habitats supported by seepage from the AAC.

Proposed Project Area Occurrence

Cooper's hawks are winter visitors to the proposed project area (USFWS, 1997b). About 300 migrants occur in Imperial Valley during winter (IID, 1994). Several Cooper's hawks were observed along the Holtville Main Drain during surveys of selected drains in Imperial Valley (Hurlbert et al., 1997). This drain had the greatest amount of vegetation, predominantly tamarisk, of all of the drains surveyed.

Sharp-shinned Hawk (*Accipiter striatus*)

Range and Distribution

Sharp-shinned hawks nest in north-central North America and in Central and South America. Their breeding range extends from west and central Alaska south through much of Canada and into the upper Great Plains. Breeding populations also extend south along the Pacific Coast to central California and along the northern Atlantic Coast southwest to South Carolina. There is a large disjunct breeding area that includes Arizona, Utah, New Mexico, and Colorado. The winter range is south of the breeding range and includes most of the U.S. except Alaska, where it is found only along the southwest coast.

Population Status

The Canadian and U.S. wintering populations of sharp-shinned hawks were conservatively estimated to be more than 30,100 individuals (Johnsgard, 1990). Highest densities were from Massachusetts to Virginia on the Atlantic Coast and in California and Arizona in the west. The size of the population that breeds in the U.S. and winters to the south is unknown, but is expected to be substantial.

Earlier declines in sharp-shinned hawk populations were likely the result of decreased reproductive success due to pesticides introduced following World War II (Johnsgard, 1990). Populations increased after DDT was banned in the U.S. in the early 1970s; however, there has been a decline recently in the number of sharp-shinned hawks passing through traditional migratory paths in the eastern U.S. (Viverette et al., 1996). The continued use of pesticides in Central and South America, the wintering grounds for many sharp-shinned hawks that breed in North America and for many of their avian prey species, is also a concern (Johnsgard, 1990). Forest management practices in the western U.S. that produce monoculture forest habitats may be detrimental to this hawk species as well. This species was historically shot in large numbers during migration, which also contributed to its historic decline in abundance.

Habitat Requirements

Sharp-shinned hawks' breeding habitat is typically boreal forest, where up to 80 percent of the North American breeding population is found (Johnsgard, 1990). In winter, sharp-shinned hawks use a wider variety of habitats. While it is typically associated with woodland habitats, the sharp-shinned hawk will use open or young forests with a variety of plant life supporting abundant avian prey. Along the Colorado River, sharp-shinned hawks forage in mesquite and willow groves and along the brushy borders of agricultural fields and canals. They forage by darting out from a perch or by hunting in low gliding flights to capture unwary avian prey (Zeiner et al., 1990).

Habitat in the Proposed Project Area

Sharp-shinned hawks typically use woodland habitats. In the proposed project area, woodland habitats are relatively rare and consist mainly of tamarisk scrub along the Salton Sea, the New and Alamo Rivers, and agricultural drains. Tamarisk, as well as some cottonwoods, willows, and mesquite, are supported by seepage from the AAC between Drops 3 and 4 and may provide habitat for sharp-shinned hawks. Tamarsik and eucalyptus trees bordering agricultural fields may also be used as perch sites for foraging.

Proposed Project Area Occurrence

Sharp-shinned hawks occur in the proposed project area as migrants and winter visitors (USFWS, 1997b). About 250 sharp-shinned hawks occur in Imperial Valley during migration or winter (IID, 1994). Ten drains were surveyed in the Imperial Valley during 1994 to 1995. Two sharp-shinned hawks were observed along the Trifolium 2 Drain, and one was observed along the Holtville Main Drain (Hurlbert et al., 1997). These two drains had the greatest vegetation coverage of the 10 drains surveyed.

Golden Eagle *(Aquila chrysaetos)*

Range and Distribution

The golden eagle is found throughout the U.S. and Canada, ranging from Southern Alaska to central Mexico. It is a widely distributed resident throughout western North America, except for the recent extirpation in the Central Valley of California (Harlow and Bloom, 1989).

Population Status

Approximately 500 breeding pairs of golden eagles nest in California (CDFG, 1985). Golden eagle populations declined in Southern California primarily because of the loss of large, unfragmented habitat areas as well as lead toxicosis (Harlow and Bloom, 1989). Human disturbance of nest areas may have also contributed to earlier statewide declines (Thelander, 1974).

Habitat Requirements

Golden eagles occupy primarily mountain, desert, and canyon habitats, usually avoiding dense forested areas where hunting is difficult due to their large wingspan (Johnsgard, 1990). Golden eagles construct their nests on cliff ledges and high rocky outcrops, in large trees, on top of telephone poles, and on the ground (Bruce et al., 1982; and Knight et al., 1982). Golden eagles hunt over open country for hares, marmots, rodents, snakes, birds, and sometimes newborn ungulates and carrion. In California, golden eagles forage on wintering waterfowl. Grassland, oak savannah, alpine tundra, meadows, open woodland, chaparral, and wetland habitats provide foraging habitat.

Habitat in the Proposed Project Area

Much of the proposed project area could potentially be used by golden eagles for foraging; however, golden eagles are most likely to concentrate foraging activities in areas of high prey concentrations. In the proposed project area, the Salton Sea and managed wetlands at the state and federal wildlife refuges, as well as private duck clubs, attract abundant waterfowl populations during winter. Agricultural fields also attract waterfowl. Golden eagles may exploit the seasonally abundant prey of these areas.

Proposed Project Area Occurrence

Golden eagles occur at the Salton Sea only as accidentals during the winter and spring (USFWS, 1997b).

Ferruginous Hawk (*Buteo regalis*)

Range and Distribution

Ferruginous hawks breed from southeastern Washington; southern Alberta and Saskatchewan, Canada; and western North Dakota south to Texas, northern New Mexico, and Arizona (Johnsgard, 1990). They winter primarily from the central part of their breeding range in Nevada, Colorado, and Kansas south to northern Mexico (Johnsgard, 1990). There are no breeding records from California, but they are a fairly common winter resident in the southwestern part of the state (Zeiner et al., 1990). Important wintering locales for ferruginous hawks in California include Fish Lake Valley, Owens Valley, Carrizo Plain, Cuyama Valley, Antelope Valley, Lucerne Valley, Lakeview-Perris area (Riverside), and Lake Henshaw (Garrett and Dunn, 1981).

Population Status

The ferruginous hawk has declined as a breeding resident in parts of its range, including Oregon, Arizona, and Kansas. It is now considered a sparse breeder in northern Arizona and no longer nests in southeastern Arizona (AGFD, 1996). The estimated breeding population of ferruginous hawks in the U.S. and Canada in the early 1980s was 3,000 to 4,000 breeding pairs (Schmutz, 1984). In 1986, the estimated wintering population of ferruginous hawks north of Mexico was about 5,500 individuals based on Christmas Bird Count data (Johnsgard, 1990). Most wintering birds were concentrated in Arizona and Colorado. From 1973 to 1984, there was a substantial increase in the abundance of wintering ferruginous hawks in the U.S. based on Christmas Bird Count data (Warkentin and James, 1988). The largest regional increases in wintering populations were in California and the eastern portion of the range.

The decline of the ferruginous hawk is attributed to the loss of large, open tracts of grasslands and desert scrub habitats used for nesting to agriculture and urban development (Schmutz, 1984 and 1987; AGFD, 1996). This species is also vulnerable to prairie dog control programs, illegal hunting, and human disturbance at nesting sites (Schmutz, 1984; AGFD, 1996). Habitat loss and illegal hunting may threaten populations of this species in the study area (Schmutz, 1984; AGFD, 1996).

Habitat Requirements

Ferruginous hawks are adapted to breeding and wintering in large expanses of semiarid grasslands of the Great Plains with scattered trees, rock outcrops, and tall trees along streams and rivers (Johnsgard, 1990). They also use agricultural lands in winter for foraging in both California (Zeiner et al., 1990) and the LCR Valley (Rosenberg et al., 1991). Ferruginous hawks forage on rabbits, jackrabbits, and grassland rodents, such as ground squirrels and prairie dogs (Johnsgard, 1990; Plumpton and Andersen, 1997). They forage mostly from perches and the ground but also capture prey via long, low, overhead flights. They may steal prey from other raptors and scavenge for food.

Habitat in the Proposed Project Area

Ferruginous hawks are associated with arid open habitats. In the HCP area, they could use agricultural fields or desert habitats adjacent to the AAC.

Proposed Project Area Occurrence

Ferruginous hawks regularly occur in the Imperial Valley in small numbers during the winter. In the Colorado River Valley, most winter migrants and residents are observed from mid-October to mid-March, although they can occur in the valley from late September to early April (Rosenberg et al., 1991). Similar periods of occurrence are assumed for the Imperial Valley. They are not known to breed in the HCP area.

Swainson's Hawk (*Buteo swainsoni*)

Range and Distribution

Swainson's hawks nest in disjunct areas of central Alaska and from western Canada, east as far as Minnesota and south through Texas to Baja California, Mexico, and north-central Mexico (Johnsgard, 1990). This species migrates in large flocks between breeding areas in North America and wintering areas in South America (Terres, 1980). In California, this formerly widespread hawk is now restricted to portions of the Central Valley and the Great Basin region of the state (CDFG, 1991).

Population Status

The geographic range and abundance of the Swainson's hawk have decreased in the western U.S. (Zeiner et al., 1990). Swainson's hawks have declined in parts of their range (e.g., southeastern Oregon and California) since the 1940s, whereas in the Great Plains, there was no evidence of decline by the mid-1980s except in peripheral populations (Johnsgard, 1990). As of the mid-1980s, an estimated 500,000 birds were in North America; however, more recently, there is thought to have been a nationwide decline (AGFD, 1996). Detailed information is lacking on the historical and current abundance of breeding Swainson's hawks in Arizona (AGFD, 1996). In California, it is estimated that the breeding population around 1900 may have exceeded 17,000 pairs (CDFG, 1991). As of the early 1990s, the statewide population was estimated to be only about 550 pairs. The population is still declining, and the species has disappeared from Southern California, except as a spring and fall transient during migration.

The major reason for the substantial decline of this species in the western U.S. is the loss of nesting and foraging habitat due to urban expansion into rural areas (Zeiner et al., 1990; CDFG, 1991). There has also been considerable foraging habitat loss due to the trend in planting agricultural crops unsuitable for foraging (e.g., vineyards, orchards, and rice); grassland losses due to grazing practices; fire control; and shrub invasion (CDFG, 1991; AGFD, 1996). Another major threat to Swainson's hawks has been pesticide use in South America, with an estimated 20,000 to 30,000 individuals killed in 1996 (AGFD, 1996). Additional threats to Swainson's hawks include nesting habitat loss due to flood control proposed projects, shooting, pesticide poisoning of prey animals, competition with other raptors, and human disturbance at nest sites (CDFG, 1991).

Habitat Requirements

Swainson's hawks nest in mature riparian forests; oak groves; or in lone trees adjacent to foraging areas, such as agricultural fields (Johnsgard, 1990; Zeiner et al., 1990; and CDFG, 1991). Nests are built from 1.2 to 30.5 m (4 to 100 feet) high with an average nest tree height of nearly 18 m (58 feet) in the Central Valley of California (Zeiner et al., 1990; CDFG, 1991). Swainson's hawks nest from late March to late August. Spring migration occurs from March through May, and fall migration occurs from September through October.

Swainson's hawks are unusual among most large birds of prey in that they feed largely on insects during the nonbreeding season (e.g., dragonflies, grasshoppers, and crickets) and often congregate in large flocks to forage (Jaramillo, 1993; Rudolph and Fisher, 1993). Because they depend on insect prey in the winter, they are highly migratory (Johnsgard, 1990). During the breeding season, they feed on small mammals and, to a lesser degree, on birds, lizards, and amphibians (Terres, 1980; Johnsgard, 1990). These hawks often soar in search of prey, catching insects and bats in flight, and will also walk on the ground to capture prey (Zeiner et al., 1990). Swainson's hawks forage during migration in grasslands, agricultural fields (including alfalfa and other hay crops), and lightly grazed pastures (CDFG, 1991). Unsuitable foraging areas are crops in which prey is scarce or inaccessible, such as vineyards, orchards, rice, corn, and cotton.

Habitat in the Proposed Project Area

Agricultural fields provide the primary foraging habitat for Swainson's hawks in the proposed project area. Swainson's hawks often visit alfalfa fields for foraging in other parts of its range and would be expected to forage in alfalfa, wheat, and sudangrass fields in the Imperial Valley. Trees, such as tamarisk or eucalyptus that occur adjacent to agricultural fields, provide perch and roost sites.

Proposed Project Area Occurrence

Swainson's hawks are occasional visitors to the Salton Sea area during the spring and fall (USFWS, 1997b). No breeding occurs in the proposed project area.

Northern Harrier (*Circus cyaneus*)

Range and Distribution

The northern harrier is a widespread species that can be found distributed from Alaska in the spring and summer as far south as South America. It is distributed across the U.S. with populations that exist year-round throughout the central states to the west coast (Kaufman, 1996). In California, the harrier is a year-round resident that is commonly found throughout the state in low-lying areas of agricultural lands, estuaries, and marshes (Zeiner et al., 1990).

Population Status

Northern harriers are generally declining throughout their range, and southern breeding limits are retracting northward (Johnsgard, 1990). Breeding populations have been reduced in most parts of the harrier's range due to the loss and degradation of wetland, meadow, and grassland habitats and burning and plowing of nesting areas during early stages of the breeding cycle (Remsen, 1978; Johnsgard, 1990). Habitat destruction and exposure to pesticides are the primary threats to northern harriers (Ehrlich et al., 1992). In addition, northern harriers nest on the ground and are vulnerable to nest destruction from agricultural and other human activities; nest predation; and heavy grazing, which reduces nesting cover and also can result in trampling of nests (Zeiner et al., 1990a).

Based on CBC data, there was an estimated population of 111,500 northern harriers in North America (MacWhirter and Bildstein, 1996). Highest densities in the U.S. were reported from the Chesapeake Bay Area, Texas, California, and Arizona.

Habitat Requirements

The northern harrier is an open country species, nesting at low elevations up to about 900 feet (Johnsgard, 1990). They feed mostly on voles and other small mammals; birds; frogs; reptiles; and insects that inhabit low-lying wetland marshes, swamps, bogs, fields, pastures, cropland, and meadows (Johnsgard, 1990). In the LCR Valley, harriers forage primarily in alfalfa or grass fields and over sparse riparian vegetation or marshes and occasionally over open desert. The harrier usually hunts with low, coursing flights over the ground (3 to 30 feet), making quick plunges onto prey. Harriers use tall grasses and wetland forbs as cover. The harrier nests on the ground in tall grasses, sedges, reeds, rushes, cattails, willows, or shrubby vegetation, usually on marsh edges (Brown and Amadon, 1968; Johnsgard, 1990). Grasslands, cultivated fields, and pastures are used for nesting in addition to native habitats. Harriers breed from April to September, with most egg laying between mid-April and July (Johnsgard, 1990; Zeiner et al., 1990).

Habitat in the Proposed Project Area

Throughout California, northern harriers commonly use agricultural fields. In the proposed project area, habitat for northern harriers is abundant. Alfalfa, wheat, and sudangrass are currently the principal crops in the valley, all of which provide suitable forage for harriers. Additional foraging and roosting habitat are available in the managed wetlands of the state and federal wildlife refuges and private duck clubs and wetlands in the vicinity of the Salton Sea.

Proposed Project Area Occurrence

Northern harriers are common fall and winter residents in the proposed project area, but only occasionally occur in the area during the spring and summer (USFWS, 1997b). Small (1994) states that nesting of harriers has been significantly reduced in the southern part of California. No recent breeding pairs have been confirmed in Imperial Valley, but, given the occasional occurrence of northern harriers in the project area during summer, breeding is possible. Ten drains were surveyed in the Imperial Valley during 1994 to 1995 (Hurlbert et al., 1997). One to nine individuals were observed along eight of the drains. Surveys conducted in 1999 reported 33 northern harriers at the Salton Sea (Salton Sea Authority, 2000).

White-tailed Kite (*Elanus leucurus*)

Range and Distribution

The white-tailed kite's range extends from coastal zones in western Oregon south to Baja California, Mexico. The white-tailed kite is a common to uncommon, year-long resident in coastal and valley lowlands and rarely found away from agricultural areas. It inhabits herbaceous and open stages of most habitats, primarily in cismontane California.

Population Status

Population declines were noted nationwide during the 1980s and 1990s (Dunk, 1995). However, Small (1994) reports a general population increase in California in recent years following declines in several portions of the state (e.g., southern and west-central areas) during the 1980s.

Habitat Requirements

The white-tailed kite uses herbaceous lowlands with variable tree growth and dense populations of voles (Waian and Stendell, 1970). The preferred foraging habitat of the white-tailed kite consists of farmlands, open grasslands, meadows, emergent wetlands, clearcuts, and lightly wooded areas (Johnsgard, 1990). Lightly grazed or ungrazed fields provide the best foraging habitat (Dunk, 1995). Specific associations with plant species for foraging or nesting seem unimportant; rather vegetation structure and prey base are thought to be the primary determinants of foraging and nesting habitat quality. Substantial groves of dense, broad-leafed deciduous trees are used for nesting and roosting. This species uses trees with dense canopies for cover. In Southern California, it also roosts in saltgrass and Bermudagrass.

The white-tailed kite makes a nest of loosely piled sticks and twigs and lined with grass, straw, or rootlets. Nests are placed near top of dense oak, willow, or other tree stand; usually 6 to 20 m (20 to 100 feet) above ground (Dixon et al., 1957). Nest trees range from 10 to 170 feet tall and can occur as single, isolated trees or in large stands greater than 250 acres. Most nests are placed near forest/grass edges in the upper one-third of the tree (Dunk, 1995).

Habitat in the Proposed Project Area

Agricultural fields and managed wetlands associated with the state and federal wildlife refuges provide foraging areas for the white-tailed kite. Tamarisk and eucalyptus bordering agricultural fields provide potential roosting and nesting sites.

Proposed Project Area Occurrence

White-tailed kites may occur in the proposed project area throughout the year. Although not common, they are regularly observed (USFWS, 1997b). Breeding status is uncertain. They have bred in the HCP area previously, but have not been verified to breed there recently (USFWS, 1997b). White-tailed kites were observed during general avian surveys of several drains in the Imperial Valley (Hurlbert et al., 1997).

Bald Eagle *(Haliaeetus leucocephalus)*

Range and Distribution

Bald eagles occur in North America from central Alaska and Canada south to northern Mexico (USFWS, 1995b). They are found primarily along coasts, inland lakes, and large rivers, but may also be found along mountain ranges during migration. Although the bald eagle is greatly reduced in abundance from historical levels, the current distribution is essentially the same (USFWS, 1976). Many bald eagles withdraw in winter from northern areas, migrating north again in spring and summer to breed (Terres, 1980).

Population Status

Historically, bald eagles are believed to have nested throughout North America on both coasts and along major rivers and large lakes (Gerrard and Bortolotti, 1988). By the mid-1800s, bald eagle populations had declined radically throughout most of the U.S. because of widespread shooting, reductions in the species' prey base, and secondary poisoning as a result of predator control programs. The introduction of DDT for agricultural purposes in the 1940s furthered the decline of this species, resulting in widespread reproductive failure due to eggshell thinning. Efforts to save the bald eagle, including passing of the Bald Eagle Protection Act in 1940, listing the bald eagle as a federally endangered species in 1967, and banning DDT in the U.S. and Canada in the early 1970s, have resulted in a slow recovery of the species. Between 1982 and 1990, the number of occupied bald eagle territories in the lower 48 U.S. doubled from 1,482 to 3,014. Reintroduction programs have also contributed to the species' recovery (Hunt et al., 1992). Due to population increases, the USFWS has proposed to delist the bald eagle (FR 64 36454-36464).

Habitat Requirements

Bald eagles are associated with aquatic ecosystems, including large rivers, major lakes, reservoirs, estuaries, and seacoasts. They require open water habitats that support an adequate food base. Bald eagles forage on fish and waterfowl from perch sites adjacent to foraging areas. Thus, perch sites near open water or marshes are an essential habitat feature. Bald eagles acquire food in a diversity of ways. They catch live prey, steal prey from other predators, and find carrion. Fish, small mammals, and waterfowl make up the majority of eagles' diet (Terres, 1980).

Habitat in the Proposed Project Area

Suitable foraging habitat occurs at the Salton Sea and adjacent wetlands where eagles may prey on fish and waterfowl. The state and federal wildlife refuges as well as private duck clubs that support abundant waterfowl populations during the winter may also attract bald eagles. In addition, some waterfowl species forage in agricultural fields of the valley, and bald eagles probably exploit this food source where trees are present to provide roost sites.

Proposed Project Area Occurrence

Bald eagles are a rare and occasional winter visitor to the proposed project area. A few winter migrants (one to three birds) have been regularly observed at the Salton Sea, but are rarely observed during the fall (IID, 1994). They are not known to breed in the proposed project area.

Osprey *(Pandion haliaetus)*

Range and Distribution

The osprey is a cosmopolitan species, found on every continent except Antarctica (Terres, 1980). In North America, ospreys breed from northwest Alaska and Canada south to Baja California, Mexico, and Florida (Johnsgard, 1990). In the U.S., it occurs close to coastal waters on the east and west coasts and inhabits inland areas around the Great Lakes, Utah, Arizona, and Nevada. Ospreys winter on the Gulf Coast and Southern California south into Central and South America (Terres, 1980). This species breeds throughout Northern California from the Cascade Range south to Marin County and throughout the Sierra Nevada (Zeiner et al., 1990).

Population Status

Ospreys have declined in abundance, especially since the 1960s (Terres, 1980). There were an estimated 8,000 pairs in the contiguous U.S. in the early 1980s with Florida having the largest numbers, followed by Chesapeake Bay and Maine (Johnsgard, 1990). Based on Christmas Bird Count data, the U.S. winter population was estimated at 7,080 individuals in 1986, with over half in Florida. Since DDT was banned in the U.S., osprey populations have increased considerably in many parts of the country (Kaufman, 1996). The North American breeding population has been estimated at 17,000 to 20,000 individuals (Poole, 1989).

The decline in osprey numbers is largely attributed to the adverse effects of DDT and other pesticides on reproduction (Johnsgard, 1990). Some areas still have greatly reduced osprey populations that may be due to residual effects of these now banned pesticides. Over half of the North American population may winter in Latin America and the West Indies where pesticide use is not as controlled as in the U.S. and Canada. Human encroachments on breeding areas and shooting have also adversely affected osprey populations.

Habitat Requirements

Ospreys are found only in association with lakes, reservoirs, coastal bays, or large rivers. They feed predominantly on fish, although some mammals, birds, reptiles, and amphibians are also eaten. Ospreys require open, clear water for foraging and swoop down while in flight or from a perch to catch fish at the water's surface. Large trees and snags near the water are used for roosting and nesting. During the breeding season, ospreys generally restrict their movements to activities in and around the nest site, and between the nest and foraging sites.

Habitat in the Proposed Project Area

Habitat for ospreys in the proposed project area principally occurs at the Salton Sea, where abundant fish populations provide foraging opportunities. Snags and trees along the margins of the Salton Sea provide important perch sites that osprey use for foraging and eating captured prey. Ospreys may also forage along the New and Alamo Rivers and lakes in the Imperial Valley, such as Finney Lake and Fig Lagoon.

Proposed Project Area Occurrence

At the Salton Sea, ospreys occur in small numbers as a nonbreeding visitor throughout the year (IID, 1994).

Harris' Hawk *(Parabuteo unicinctus)*

Range and Distribution

Historically, Harris' hawks were residents of semiopen habitats from northern Baja California, Mexico, east through central and southern Arizona, southern New Mexico, and southern Texas; and south through Central America and South America. This species has also occurred infrequently in Kansas, Louisiana, Colorado, Utah, and Nevada (Johnsgard, 1990). Historically, Harris hawk occurred year-round in the LCR Valley from near Needles to the Imperial National Wildlife Refuge, with a small disjunct breeding population at the south end of the Salton Sea (Small, 1994; Bednarz, 1995).

Population Status

Although Harris' hawks are still located throughout most of its historic range, they were believed to be extirpated from southeastern California and southwestern Arizona by the early 1970s. Small numbers of Harris' hawks are once again present in California due to accidental releases and recent attempts at reestablishing a breeding population along the LCR. Attempts to reintroduce the Harris' hawk occurred in the 1980s, when nearly 200 birds were released along the LCR (Walton et al., 1988). A few nests have been found incidentally since (Bednarz, 1995).

Habitat Requirements

Harris' hawks occur in desert scrub dominated by saguaro, paloverde (*Cercidium spp.*), and ironwood (*Olneya tesota*); cottonwood-mesquite forests; and semidesert prairies. Saguaro cacti, paloverde, mesquite, and riparian trees, especially cottonwoods, are used as nest sites. This species also occurs in some urban environments where it takes advantage of washes, vacant lots, and areas of undeveloped desert (Rosenberg et al., 1991; Johnsgard, 1990). In urban situations, nests have been placed in pine trees, palm trees, and transmission towers. The diet of the Harris' hawk consists mainly of small- to medium-sized rodents, but it is also known to take birds, lizards, and mammals up to the size of rabbit.

Habitat in the Proposed Project Area

Little potential habitat for Harris' hawk exists in the HCP area. Cottonwood and mesquite trees that Harris' hawks could use for nesting occur only in a few isolated seepage areas along the AAC, principally between Drops 3 and 4. In the remainder of the HCP area, Harris' hawks could use landscape trees and trees on the state and federal refuges. Agricultural fields throughout the HCP area could be used for foraging.

Proposed Project Area Occurrence

Harris' hawks have been observed at the Imperial National Wildlife Refuge and are known to forage in mesquite and willow groves along the LCR (Bednarz and Ligon, 1988). Although they apparently bred at the Salton Sea, historically, they have not been observed recently.

Merlin *(Falco columbarius)*

Range and Distribution

Merlins breed in summer in the northern forests of Europe, Asia, and North America. In North America, their breeding range extends from northwestern Alaska and northern Canada to the southern limits of the boreal coniferous zone. In winter, most merlins migrate south of their breeding range to the western U.S., the Gulf Coast, and south to northern South America (Johnsgard, 1990; Terres, 1980).

Population Status

The status of this species is somewhat uncertain. Some merlin populations apparently declined significantly during the 1960s as a result of pesticide contamination and the loss of native grassland habitats. More recent analyses suggest population increases on the northern prairies of the U.S. and southern Canada, possibly resulting from banning DDT. In other areas, merlin numbers are now probably stable.

Habitat Requirements

Wintering habitats of the merlin are extremely diverse, ranging from deserts to tropical forests and including prairies, open farmland, and even urban areas. Along the California coast, they often concentrate their foraging in areas supporting abundant shorebird populations. The merlin is a predator that catches and eats a wide variety of avian prey, often consuming locally abundant species like doves and house sparrows. Although birds often comprise over 90 percent of the merlins' diet, they occasionally feed on large insects, rodents, bats, and reptiles (Ehrlich et al., 1988; Kaufmann, 1996; and Johnsgard, 1990).

Habitat in the Proposed Project Area

Much of the proposed project area could be used by merlins. Along the Salton Sea, merlin may forage on shorebirds that congregate along the mudflats and shallows. Wetlands and riparian habitats on the state and federal wildlife refuges also support abundant bird populations that would be attractive to foraging merlins. In the LCR Valley, the merlin prefers open habitats, such as agricultural lands and wetlands with scattered trees or shrubs such as along canals and drains (Rosenberg et al., 1991). Similar habitats are probably used in the Imperial Valley as well.

Proposed Project Area Occurrence

Merlins are rare visitors to the Salton Sea area in the fall and winter (USFWS, 1997b). They are not known to breed in the area.

Prairie Falcon (*Falco mexicanus*)

Range and Distribution

Prairie falcons breed from southeastern British Columbia, southern Alberta, and southern Saskatchewan south through the western U.S. to southern Arizona, southern New Mexico, and Baja California, Mexico. It winters from its breeding range in southern Canada south to central Mexico, expanding its range eastward after the nesting season onto the Great Plains and westward to the California coast (Johnsgard, 1990; Terres, 1980; and Kaufmann, 1996). In California, the prairie falcon can be found year-round in the southern half of the state and in the Klamath Basin in Northern California (Zeiner et al., 1990).

Population Status

The North American population of prairie falcons has been estimated at 7,800 birds (Johnsgard 1990). The species is believed to be declining in Utah, western Canada, and agricultural areas of California. In California, local problems, such as the effects of agricultural chemicals on reproduction and the conversion of grassland to cropland, are thought to be responsible for the species' decline.

Habitat Requirements

Prairie falcons typically inhabit open and treeless terrain, such as arid plains, hills, mountains, and deserts. Throughout their range, they prefer habitats with nearby cliffs and escarpments that provide suitable nesting sites. Wintering prairie falcons in the desert Southwest are commonly found in low and moderate elevation habitats, including agricultural fields, lakes, and reservoirs. In summer, higher elevation communities, such as desert grassland and chaparral, are frequently occupied. Breeding prairie falcons nest on sheer cliffs overlooking vast foraging areas. Most nests are built in "potholes" on cliff ledges, but old stick nests that other raptors built are also commonly used. Less frequently, nests are placed in caves, holes, and other rocky crevices (Johnsgard, 1990; Ehrlich et al., 1988).

The prairie falcon's diet consists mostly of small birds and mammals. Seasonal shifts in diet tend to reflect changes in the abundance of easily caught prey species. Mourning doves, western meadowlarks, ground squirrels, horned larks, black-tailed, and Gambel's quail may all be seasonally important prey animals for the prairie falcon in the study area. Other species, including various lizards and insects, are also eaten regularly (Johnsgard, 1990; Kaufmann, 1996).

Habitat in the Proposed Project Area

Habitat for prairie falcons in the proposed project area consists mainly of agricultural fields and the shoreline of the Salton Sea. Prairie falcons may also forage in desert areas adjacent to the irrigated portions of the valley. In addition, small areas that have not been cultivated in many years occur within the valley and support more natural vegetation. Prairie falcons may also exploit these areas for foraging.

Proposed Project Area Occurrence

Prairie falcons are rare migrants at the Salton Sea and in the Imperial Valley. About 30 migrants occur in the valley each year (IID, 1994). Prairie falcons may also occur along the AAC.

Peregrine Falcon (*Falco peregrinus*)

Range and Distribution

Peregrine falcons breed throughout much of North America, as well as South America, Eurasia, Australia, Africa, and Oceania. The American peregrine falcon, which is the most southerly subspecies of peregrine falcon in North America, breeds south of the arctic tundra of Canada and Alaska to Mexico. In winter and during migration, the American peregrine falcon extends its range southward to the Caribbean and parts of South America.

Population Status

The American peregrine falcon began its decline in North America in the late 1940s, when DDT and other chlorinated hydrocarbon pesticides were being used in large quantities (Johnsgard, 1990; NMDGF, 1997). Approximately 600 to 800 pairs nested in the western U.S. before 1940 (NMDGF, 1997). By 1965, the species was extirpated from east of the Mississippi, and fewer than 20 breeding pairs still occurred west of the Great Plains (Johnsgard, 1990; NMDGF, 1997). In the early 1970s, the U.S. and Canada banned DDT; subsequently, the nesting success of wild peregrine falcons began to rise. At the same time, captive breeding and reintroduction programs were being implemented, with the known number of pairs in the West estimated at nearly 200 by 1987 (NMDGF, 1997). The peregrine falcon was previously listed as a federal endangered species. However, with the known number of territorial pairs at approximately 1,400 and a total population of more than 3,000 pairs, the USFWS has recently delisted the species.

Habitat Requirements

Peregrine falcons occur in a wide range of open country habitats from desert mountains to seacoasts (Kaufman, 1996). The presence of tall cliffs is the most characteristic feature of the peregrine's habitat and is considered a limiting factor for this species. Cliffs provide the peregrine with both nesting and perching sites and an unobstructed view of the surrounding area. Where cliffs are lacking, manmade structures, such as tall buildings and bridges, can be used as substitutes.

Nearby waterbodies or wetlands that support abundant prey of small- to medium-sized birds, particularly waterfowl, are another common feature of peregrine habitat that influences their distribution and abundance (Johnsgard, 1990). Highly mobile, flocking, and colonial-nesting birds, such as pigeons, shorebirds, and waterfowl, are the peregrine falcon's primary prey. River canyons that offer a large number of potential nest sites, abundant prey, and ideal hunting conditions are frequently inhabited by this species (Skaggs et al. 1988).

Habitat in the Proposed Project Area

No cliffs or tall buildings that could provide nesting sites for peregrine falcons occur in the proposed project area; thus, use of the proposed project area by peregrine falcons is limited to foraging. Much of the proposed project area could provide foraging opportunities for peregrine falcons, given this species' association with open habitats. Peregrine falcons are most likely to concentrate foraging activities in areas with high concentrations of shorebirds and waterfowl. In the proposed project area, managed wetlands on the state and federal wildlife refuges as well as private duck clubs attract large numbers of wintering waterfowl and may also attract peregrine falcons. The Salton Sea also provides suitable foraging habitat as large numbers of waterfowl and shorebirds inhabit this area. In addition, some waterfowl and shorebirds forage in agricultural fields and peregrine falcons may also exploit this foraging opportunity.

Proposed Project Area Occurrence

Peregrine falcons are rare visitors to the Salton Sea area although they may occur at any time during the year (USFWS, 1997b). Small numbers of migrant peregrine falcons (one to three birds) are regularly observed over Salton Sea marsh areas, particularly at the Salton Sea National Wildlife Refuge (IID, 1994). One peregrine falcon was observed during surveys of selected drains in Imperial Valley (Hurlbert et al., 1997).

California Black Rail *(Laterallus jamaicensis coturniculus)*

Range and Distribution

The California subspecies of the black rail occurs in western North America from San Francisco Bay and the Sacramento/San Joaquin Delta south along the California coast into northern Baja California, Mexico. In California, it also occurs in the San Bernardino/ Riverside area and at the Salton Sea (CDFG, 1991). Along the LCR, the California black rail is a permanent resident in the vicinity of Imperial Dam and Bill Williams Delta (Snider, 1969; Repking and Ohmart, 1977). Black rails are also thought to breed in the Cienega de Santa Clara, one of only three breeding localities for this species in Mexico and one of the few for the subspecies anywhere (Piest and Campoy, 1998).

Population Status

California black rail populations declined substantially between the 1920s and 1970s due to the loss and degradation of coastal salt marsh and inland freshwater marsh habitats (Eddleman et al., 1994; CDFG, 1991). Along the LCR, black rail populations declined an estimated 30 percent between 1973 and 1989, with the majority of birds shifting from north of Imperial Dam to Mittry Lake during the same period (Eddleman et al., 1994). Currently, black rails appear to be stable along the LCR, with approximately 100 to 200 individuals estimated to occur from Imperial National Wildlife Refuge south to Mittry Lake (Rosenberg et al., 1991). This population and the small population at the Salton Sea represent the only stable inland population of this subspecies (Eddleman et al., 1994; Rosenberg et al., 1991).

The California black rail's decline throughout its range is attributed to the loss of saltwater and freshwater wetlands to urban and agricultural development (Wilbur, 1974). The effect of selenium on black rails remains unknown, but toxic levels of this heavy metal may also threaten black rail populations in the study area (AGFD, 1996; Eddleman et al., 1994; and Flores and Eddleman, 1991). These factors continue to threaten the California black rail.

Habitat Requirements

Preferred habitat of the California black rail is characterized by minimal water fluctuations that provide moist surfaces or very shallow water, gently sloping shorelines, and dense stands of marsh vegetation (Repking and Ohmart, 1977). Studies conducted along the LCR suggest that habitat structure and water depths are more important factors than plant composition in determining black rail use of wetland habitats. Unsuitable water and structural conditions appear to restrict the California black rail to only a fraction of the emergent vegetation available within an entire wetland (Flores and Eddleman, 1995). In general, Flores and Eddleman (1995) found that black rails used marsh habitats with high stem densities and overhead coverage that were drier and closer to upland vegetation than randomly selected sites. Marsh edges with water less than 1 inch deep dominated by California bulrush and three-square bulrush are used most frequently. Areas dominated by cattail are also used regularly, but only in a small proportion to their availability and generally within 165 feet of upland vegetation where water depth is 1.2 inches. Telemetry studies at Mittry Lake found black rails to be sedentary, with home ranges averaging 1.2 acres or less (Flores and Eddleman, 1991). The erratic movements recorded for some juvenile and unmated birds during this research were consistent with the "wandering" behavior attributed to this subspecies and supports the idea that black rails may be capable of quickly occupying newly created habitats (Flores and Eddleman, 1991).

Flores and Eddleman (1991) also studied black rail diets and food availability at Mittry Lake and found that black rails consume a wide variety of invertebrates throughout the year, including beetles, earwigs, ants, grasshoppers, and snails. When invertebrate availability drops during the winter months, a larger portion of cattail and bulrush seeds is consumed. Lower resource availability in winter causes black rails to experience a significant weight loss, indicating they are more vulnerable to stress during this time.

Nesting biology of the California black rail is poorly understood. Double clutching and renesting may be fairly common in this subspecies. These behaviors, combined with a relatively large clutch size, long breeding season, apparently low predation rates, and aggressive nest defense, suggest that the black rail has a high reproductive potential that is likely limited by the availability of shallow water environments (Eddleman et al., 1994; Flores and Eddleman, 1991).

Habitat in the Proposed Project Area

California black rails are associated with dense wetland vegetation consisting of cattails and bulrushes in shallow water. In the proposed project area, these characteristics are found primarily in the managed wetlands on the state and federal wildlife refuges, in wetland areas adjacent to the Salton Sea, and in marsh habitats supported by seepage from the AAC between Drops 3 and 4 and adjacent to the East Highline Canal. Black rails may use agricultural drains in the valley, although they have not been found to make extensive use of agricultural drains in previous surveys. Vegetation along agricultural drains mainly consists of common reed and tamarisk, species that are not generally used by black rails. Areas of cattails and bulrushes do exist along the drains. However, these areas are small and narrow and often interspersed with other vegetation, such as common reed. The habitat value of marsh vegetation supported by agricultural drains is probably limited and may only support foraging by black rails.

Proposed Project Area Occurrence

The species is known to use marsh habitats at Finney Lake on the Imperial Wildlife Area, seepage communities along the All-American, Coachella, and East Highline Canals; and wetland areas adjacent to the Salton Sea, including the New River Delta (Evans et al., 1991; Jurek, 1975; Garrett and Dunn, 1981; and Jackson, 1988).

Few surveys for the California black rail have been conducted in the proposed project area. A study by Jurek (1975) and other investigators in 1974 and 1975 identified eight marsh areas with black rails between the Coachella and East Highline Canals south of Niland. The Coachella Canal south of Niland was concrete-lined in 1981, and all black rail habitat supported by canal seepage was dessicated (Evans et al., 1991). Subsequent surveys of seepage communities along unlined portions of the Coachella Canal north of Niland detected rails at another eight sites (Jackson, 1988; Evans et al., 1991).

Along the AAC, Kasprzyk et al. (1987) recorded 30 to 50 California black rails in the marsh located between Drops 3 and 4 during surveys in April and May 1984. More recently, California black rails were censused along the AAC during April and May 1988, in conjunction with surveys for Yuma clapper rails. A minimum population of three black rails was recorded for the area between Drops 3 and 4.

In the only systematic survey for the species at the Salton Sea and surrounding areas in 1989, 23 birds were recorded. Thirteen were located at the mouth of the New River, 8 were in seepage communities along the Coachella Canal, and 1 was found at Finney Lake. Up to seven rails have been observed at Finney Lake on other occasions (Shuford et al., 1999). The reproductive status of these birds is uncertain, although some locations have had numerous calling birds over periods of several weeks in the spring, suggesting a breeding population (Salton Sea Authority and Reclamation, 2000).

Yuma Clapper Rail *(Rallus longirostris yumanensis)*

Range and Distribution

The Yuma clapper rail is one of seven North American subspecies of clapper rails. It occurs primarily in the LCR Valley in California, Arizona, and Mexico and is a fairly common summer resident from Topock south to Yuma in the U.S., and at the Colorado River Delta in Mexico. There are also populations of this subspecies at the Salton Sea in California, and along the Gila and Salt Rivers to Picacho Reservoir and Blue Point in central Arizona (Rosenberg et al., 1991). In recent years, individual clapper rails have been heard at Laughlin Bay and Las Vegas Wash in southern Nevada (NDOW, 1998). Population centers for this subspecies include Imperial Wildlife Management Area (Wister Unit), Salton Sea National Wildlife Refuge, Imperial Division, Imperial National Wildlife Refuge, Cibola National Wildlife Refuge, Mittry Lake, West Pond, Bill Williams Delta, Topock Gorge, and Topock Marsh.

Population Status

In 1985, Anderson and Ohmart (1985) estimated a population size of 750 birds along the Colorado River north of the international boundary. The USFWS (1983) estimated a total of 1,700 to 2,000 individuals throughout the range of the subspecies. Between 1990 and 1999, call counts conducted throughout the species range in the U.S. have recorded 600 to

1,000 individuals. These counts are only estimates of the minimum number of birds present. The population is probably higher than these counts show, since up to 40 percent of the birds may not respond in call surveys (Piest and Campoy, 1998). Based on the call count surveys, the population of Yuma clapper rail in the U.S. appears stable (USFWS, unpublished data). The range of the Yuma clapper rail has been expanding over the past 25 years, and the population may increase (Ohmart and Smith, 1973; Monson and Phillips, 1981; Rosenberg et al., 1991; and McKernan and Brandon, 1999).

A substantial population of Yuma clapper rail exists in the Colorado River Delta in Mexico. Eddleman (1989) estimated that 450 to 970 rails inhabited this area in 1987. Piest and Campoy (1998) reported a total of 240 birds responding to taped calls in the Cienega. Accounting for nonresponding birds, they estimated a total population of about 5,000 birds in cattail habitat in the Cienega.

The Yuma clapper rail is threatened by river management activities that are detrimental to marsh formation, such as dredging, channelization, bank stabilization, and other flood control measures. Another threat is environmental contamination due to selenium. High selenium levels have been documented in crayfish, a primary prey of clapper rails, and some adult birds and eggs. Other threats to the Yuma clapper rail include mosquito abatement activities, agricultural activities, development, and the displacement of native habitats by exotic vegetation (CDFG, 1991). The large population of Yuma clapper rails at the Cienega de Santa Clara is threatened by the loss of the source of water that maintains the wetland habitat. This threat is significant, given that the recent population estimate of approximately 5,000 individuals suggests the majority of Yuma clapper rails found in North America inhabit this area.

Habitat Requirements

The Yuma clapper rail is associated primarily with freshwater marshes with the highest densities of this subspecies occurring in mature stands of dense to moderately dense cattails and bulrushes. Dense common reed and sparse cattail-bulrush marshes may support the rail at lower densities (Rosenberg et al., 1991). A mosaic of uneven-aged marsh vegetation and open water areas of variable depths appear to provide optimal habitat for Yuma clapper rails (Conway et al., 1993). Similarly, Anderson (1983) found the highest densities of clapper rails in stands of cattails dissected by narrow channels of flowing water.

Anderson and Ohmart (1985) found home ranges of single or paired birds in the LCR Valley encompassed up to 100 acres, with an average home range of 18.5 acres. Home ranges were found to overlap extensively. Estimates of rail densities vary widely, ranging from 0.06-rail/acre to 1.26 rails/acre (Table A-2).

TABLE A-2
Reported Densities of Yuma Clapper Rails

Location	Density rails/acre[a]	Source
Lower Colorado River	0.1	Anderson and Ohmart (1985)
Cienega de Santa Clara	0.36	Piest and Campoy (1998)
Cienega de Santa Clara	0.60[b]	Piest and Campoy (1998)

TABLE A-2
Reported Densities of Yuma Clapper Rails

Location	Density rails/acre[a]	Source
Topock Marsh	0.06	Smith (1975, reported in Piest and Campoy [1998])
Mittry Lake Wildlife Area	0.39	Todd (1980, reported in Piest and Campoy [1998])
Hall Island	1.26	Todd (1980, reported in Piest and Campoy [1998])

[a] acres of cattail habitat
[b] estimated density, taking into account nonresponding birds

Food primarily consists of crayfish, but they will also feed on small fish, isopods, insects, spiders, freshwater shrimp, clams, and seeds when available (Ohmart and Tomlinson, 1977; CDFG, 1991; and Rosenberg et al., 1991). Crayfish have been found to constitute up to 95 percent of the diet of Yuma clapper rails in some locations (Ohmart and Tomlinson, 1977). The availability of crayfish has been suggested as a factor limiting clapper rail populations (Rosenberg et al., 1991).

Yuma clapper rails begin courtship and pairing behavior as early as February, with nesting and incubation beginning as early as mid-March. Most nesting starts between late April and late May (Eddleman, 1989; Conway et al., 1993). Young hatch in the first week of June and suffer high mortality from predators in their first month of life (Rosenberg et al., 1991). The majority of rail chicks fledge by August.

Nests are constructed on dry hummock or under dead emergent vegetation and at the bases of cattail/bulrush vegetation. Nests may be located throughout a marsh over shallow or deep water, near the marsh edge, or in the interior of the marsh (Eddleman, 1989). Usually, nests have no overhead canopy because the dense marsh vegetation surrounding the nest provides protective cover. Occasionally, nests are located in small shrubs over shallow water areas.

Habitat in the Proposed Project Area

In the proposed project area, habitat for Yuma clapper rails consists mainly of managed wetlands on the state and federal wildlife refuges. Yuma clapper rails will use agricultural drains dominated by common reed for foraging, but these areas do not provide suitable nesting habitat. Clapper rails are strongly associated with cattail stands for nesting, and few areas of cattails exist along the agricultural drains and the New and Alamo Rivers. Areas of cattails that do exist along these waterways are small and narrow and often interspersed with vegetation, such as common reed and offer suboptimal habitat conditions. Seepage from the AAC supports a wetland community between Drops 3 and 4, where clapper rails have been reported.

Proposed Project Area Occurrence

In the proposed project area, the principal concentrations of Yuma clapper rails are at the south end of the Salton Sea near the New and Alamo River mouths, at the Salton Sea Wildlife Refuge, at the Wister Waterfowl Management Area, and at Finney Lake in the Imperial Wildlife Area. Since 1990, an average of 365 ± 106 rails have been counted around the Salton Sea, which represents an estimated 40 percent of the entire U.S. population of this species (Point Reyes Bird Observatory, 1999; USFWS, 1999). Results of surveys conducted at the Salton Sea since 1994 are summarized in Table A-3.

TABLE A-3
Number of Yuma Clapper Rails Found at Traditional Survey Locations at the Salton Sea and Surrounding Areas from 1994 to 2000

Location	1994	1995	1996	1997	1998	1999	2000
Salton Sea NWR Unit 1							
Trifollium 1 Drain	4	3	1	1	1	0	1
A-1 Pond	2	N/S	6	4	3	6	6
B-1 Pond	N/S	N/S	4	9	11	10	10
Reidman 3	7	8	17	N/S	N/S	2	1
Reidman 4	9	8	N/S	N/S	1	3	7
Bruchard Bay	7	6	3	5	3	0	0
New River Delta	7	0	1	0	0	0	N/S
Salton Sea NWR Unit 2 and Hazard							
HQ 'B' Pond	5	3	4	2	2	2	3
Union Pond	9	9	12	15	15	9	6
Barnacle Bar Marsh	N/S	0	0	2	0	2	1
McKindry Pond	N/S	N/S	N/S	0	0	2	N/S
Hazard 5	3	N/S	N/S	N/S	N/S	N/S	N/S
Hazard 6	23	22	18	11	11	12	10
Hazard 7	6	3	10	7	5	6	10
Hazard 8 (east) (south)	2	N/S	N/S	N/S	N/S	2	1
Hazard 9 and Ditch	3	4	3	3	3	2	4
Hazard 10	7	7	N/S	N/S	2	6	6
Alamo River (east and delta)	5	4	4	4	4	3	4
Imperial Wildlife Area Wister Unit	309	307	239	211	185	191	N/A
Off-Refuge Areas							
Lack and Grumble	2	3	3	2	2	2	0
'T' Drain Marsh	N/S	N/S	10	15	10	6	6
Walt's Club (McDonald Rd.)	N/S	N/S	N/S	N/S	N/S	2	N/S
Barnacle Beach	N/S	20	20	7	8	3	N/S
Holtville Main Drain	N/S	12	10	5	6	5	1
Boyle and Martin Road	1	N/S	N/S	N/S	N/S	N/S	N/S

TABLE A-3
Number of Yuma Clapper Rails Found at Traditional Survey Locations at the Salton Sea and Surrounding Areas from 1994 to 2000

Location	1994	1995	1996	1997	1998	1999	2000
Total On-Refuge	408	384	322	274	246	258	N/A
Total Off-Refuge	3	35	43	29	26	18	7

Source: USFWS unpublished data
N/S: No surveys
N/A: Not available

Rails are also known to occur in the seepage community along the AAC between Drops 3 and 4 and in other seepage areas associated with the Coachella and East Highline Canals (Gould, 1975; Jurek, 1975; Bennett and Ohmart, 1978; Kasprzyk et al., 1987). Surveys conducted between Drops 3 and 4 on April 30 and May 1, 1981, detected 17 clapper rails (Reclamation and IID, 1994). Ten birds were detected during a May 20, 1982, survey. Additional surveys along the AAC were conducted in spring 1984. The area surveyed was the same as was surveyed in 1981. These surveys indicated a population of at least three clapper rails. The area was surveyed again in 1988, again indicating a population of three clapper rails in the marsh habitat between Drops 3 and 4 (Reclamation and IID, 1994).

Yuma clapper rails have also been found using agricultural drains and the Alamo River. Surveys conducted by the USFWS (Steve Johnson, pers. comm.) found Yuma clapper rails in the Trifolium 1 drain and the Alamo River. Hurlbert et al. (1997) surveyed 10 drains in the Imperial Valley and found 1 clapper rail along the Holtville Main Drain in the southeastern part of the valley. Previous surveys by the USFWS of the Holtville Main Drain reported as many as 12 Yuma clapper rails (5 pairs and 2 individuals) using this drain.

Greater Sandhill Crane (*Grus canadensis tabida*)

Range and Distribution

With the exception of those that nest in Siberia or Cuba, sandhill cranes are restricted to North America. Six subspecies are currently known. The lesser (*G. c. canadensis*), Florida (*G. c. pratensis*), and greater (*G. c. tabida*) are migratory. Historically, the migratory subspecies nested in wetland habitats over much of eastern Siberia, Alaska, Canada, and the northern U.S. as far south as northern Arizona, Utah, western Colorado, central Nebraska, northern and eastern Iowa, southern Illinois, central Indiana and Ohio, and the southern borders of Lake St. Claire and Lake Erie (Sanderson, 1977; Drewien and Lewis, 1987).

Several populations of greater sandhill cranes (*G. c. tabida*) are now recognized in North America. The eastern population nests in Minnesota, Michigan, and Wisconsin and migrates through Illinois, Indiana, Ohio, Tennesee, Kentucky, and Georgia. The Rocky Mountain population nests from northwestern Colorado and northeastern Utah northward through eastern Idaho, western Wyoming, and southwestern Montana, wintering in New Mexico. The Central Valley population nests in eastern and central Oregon and northeastern California and winter in the Central Valley of California south to Tulare County. The LCR Valley population nests in northeastern Nevada and northwestern Utah and southwestern

Idaho. This population winters along the Colorado River with a major wintering site near Poston, Arizona.

Population Status

The eastern population of greater sandhill cranes contains some 15,000 birds and is increasing (Lovvorn and Kirkpatrick, 1982). The Rocky Mountain population consists of about 16,500 birds (Drewien and Lewis, 1987), and its future seems secure because considerable portions of the nesting grounds are in publicly owned national forests, parks, and wildlife refuges. The Central Valley population is estimated at more than 3,000 birds and has been static for some time (Drewien and Lewis, 1987). The LCR Valley population is small at about 1,500 birds and appears to be increasing (Drewien and Lewis, 1987).

Habitat Requirements

Greater sandhill cranes breed in open, isolated wetlands surrounded by shrubs or forestland. Diverse structural and compositional vegetation, including species such as bulrush, cattails, and burreed, are used for nesting sites (Tacha et al., 1992). Habitats such as meadows, irrigated pastures and fields, bogs, fens, and marshes are used as foraging areas. Wintering populations roost in shallow open water, marshes, rivers, and lakes where they flock together at night for safety (Johnsgard, 1975a; Eckert and Karalus, 1981). Wintering populations feed primarily in irrigated croplands and pastures (Walker and Schemnitz, 1987). Moist sites are commonly used, but this species also feeds on dry plains far from water. Food items include crops such as wheat, sorghum, barley, oats, corn, and rice as well as insects, snails, reptiles, small mammals, seeds, and berries (Tacha et al., 1992).

Habitat in the Proposed Project Area

In the proposed project area, sandhill cranes find suitable roosting habitat in the managed wetlands of the state and federal wildlife refuges and private duck clubs. Sandhill cranes are known to winter at roost sites located in shallow flooded ponds of a private duck club near Imperial (Radke, 1992). Sandhill cranes have also been observed at other private ponds in the Imperial Valley, sometimes in association with white-faced ibis. Wheat and sudangrass fields as well as other agricultural crops may be used for foraging.

Proposed Project Area Occurrence

Both the greater and lesser subspecies have been detected in Imperial Valley, with most observations being of the greater subspecies. Greater sandhill cranes regularly winter in the Imperial Valley although in small numbers of 200 to 300 individuals (IID, 1994). A flock of about 100 to 200 birds regularly winters in the area between Brawley and El Centro, primarily in the area east of Highway 86 (IID and BLM, 1987).

Western Snowy Plover *(Charadrius alexandrinus nivosus)*

Range and Distribution

The western snowy plover is one of two subspecies of snowy plover recognized in North America. It breeds on the Pacific Coast from southern Washington to southern Baja California, Mexico, and the interior areas of Oregon, California, Nevada, Utah, New Mexico, Colorado, Kansas, Oklahoma, north-central Texas, coastal areas of extreme southern Texas, and possibly, extreme northeastern Mexico (USFWS 1993c). The western snowy plover is a resident throughout most of its range, except populations on the northern Pacific Coast that withdraw south in winter (Terres, 1980). In California, the inland wintering populations are concentrated in the San Joaquin Valley and at the Salton Sea, with small numbers of birds occurring at alkali lakes and sewage ponds in the Great Basin, Mojave, and Colorado Deserts (Shuford et al., 1995).

Population Status

The Pacific Coast population of the western snowy plover is considered demographically isolated from populations of the western snowy plover breeding in interior regions (USFWS, 1993c). The Pacific Coast population of western snowy plovers has declined precipitously and is listed as federally threatened. The decline of this population is attributed to the loss of suitable breeding habitat and by disturbance and destruction of nests in the species' remaining habitat (USFWS, 1993c; Ehrlich et al., 1992). The coastal population in the U.S. is estimated at 1,900 birds (Shuford et al., 1995). The coastal population in Mexico was determined to be 1,344 birds occurring along barrier beaches and salt flats along the peninsula in Baja California (Palacious et al., 1994). The interior population of western snowy plovers has also declined, but not as severely as the coastal populations. It is estimated that the interior populations in Washington, Oregon, and California is 7,900 birds (Page et al 1991). The inland snowy plover population in California is estimated at between 300 and 500 birds (Shuford et al., 1995).

Habitat Requirements

Western snowy plovers are found on beaches; open mudflats; salt pans and alkaline flats; and sandy margins of rivers, lakes, and ponds. Interior populations favor shores of salt or alkaline lakes, evaporation ponds, and sewage ponds (Shuford et al., 1995; Terres, 1980; Kaufmann, 1996; and Ehrlich et al., 1988). Western snowy plovers forage in plowed agricultural fields and on exposed mudflats and shorelines (Rosenberg et al., 1991). At inland sites, snowy plovers forage on the ground primarily for insects, including various flies and beetles (Ehrlich et al., 1988; Kaufmann, 1996). Western snowy plovers nest on undisturbed flat, sandy, or gravelly beaches. Snowy plovers tend to be site faithful, with the majority of birds returning to the same breeding locations in subsequent years (USFWS, 1993c).

Habitat in the Proposed Project Area

- Nesting habitat for the western snowy plover in the proposed project area is limited to the shoreline of the Salton Sea where they are known to nest on undisturbed, flat, sandy, or gravelly beaches (Salton Sea Authority and Reclamation, 2000). For foraging, snowy plovers use the shoreline of the Salton Sea but may also forage in agricultural fields in the valley.

Proposed Project Area Occurrence

Western snowy plover are year-round breeding residents and winter migrants at the Salton Sea. The Salton Sea supports the largest wintering population of snowy plovers in the interior western U.S. and is one of only a few key breeding populations in interior California

(Shuford et al., 1999). The summer breeding population typically consists of more than 200 individuals (IID, 1994 and Shuford et al., 1995).

Mountain Plover *(Charadrius montanus)*

Range and Distribution

Mountain plovers breed from the high plains and plateaus of the central U.S., south through eastern New Mexico and western Oklahoma to western Texas. They winter from central California, western and southern Arizona, and southern Texas south to Baja California, Mexico, and central Mexico. Currently, northeast Colorado is the breeding stronghold of this species with only small breeding populations remaining in Montana, Wyoming, Oklahoma, and New Mexico (Knopf, 1996; Terres, 1980; and Kaufmann, 1996).

In California, they are fairly common but very local winter visitors, with the largest numbers occurring in grasslands and agricultural areas of the interior California. Winter flocks regularly occur on the Carrizo Plain in San Luis Obispo County, the western San Joaquin Valley, Antelope Valley, and Imperial Valley. This species also occurs along the Colorado River mainly near Blythe (Garrett and Dunn, 1981).

Population Status

Although once abundant throughout its range, the mountain plover is believed to have suffered a 61 percent population decrease between 1966 and 1987. Mountain plovers have disappeared from much of their former breeding range because of agricultural conversion of former shortgrass prairie. Populations of this species now appear to be relatively small and highly restricted in a patchy distribution. In 1995, the North American population of this species was estimated at 8,000 to 10,000 birds (Knopf, 1996). The decline of the mountain plover is primarily attributed to human-related disturbances on breeding grounds, including the loss of native habitat to agriculture and urbanization, hunting, range management, gas and oil development, mining, prairie dog control, environmental contamination, and vehicle disturbance (Leachman and Osmundson, 1990; Knopf, 1996).

Habitat Requirements

Mountain plovers are associated with dry, open plains. They nest primarily on shortgrass prairie and grazed grassland. In winter, they occur in flocks of 15 to several hundred individuals, feeding on desert flats, alkaline flats, grazed pastures, plowed ground, and sprouting grain fields (Knopf, 1996; Hayman et al., 1986; Kaufmann, 1996; and Terres, 1980). Mountain plovers eat mostly insects, including grasshoppers, beetles, flies, and crickets (Kaufmann, 1996). A sample of six plover stomachs contained beetles and larva, weevils, earwigs, and maggots (Rosenberg et al., 1991). On their wintering grounds, mountain plovers have been successfully attracted to burned grasslands for use as night roost sites (Knopf, 1996).

Habitat in the Proposed Project Area

In the Imperial Valley, wintering flocks of mountain plovers frequent bare plowed agricultural fields that have not been irrigated. Bermuda grass crops are also used (Reclamation and IID, 1994).

Proposed Project Area Occurrence

Mountain plover is a common winter visitor to the Salton Sea Basin. The Imperial Valley has one of the mountain plover's largest wintering populations in the Pacific Flyway, with between 700 and 1,000 individuals (USFWS, 1999). During February 1999 surveys, 2,486 individuals were counted in the valley. This number represents about half of the California population and about one-quarter of the North American population (Point Reyes Bird Observatory, 1999).

Long-billed Curlew (*Numenius americanus*)

Range and Distribution

The long-billed curlew nests from southern Canada south to Utah, New Mexico, and Texas, and formerly in Kansas, Iowa, Minnesota, Wisconsin, and Illinois. The species winters in California, western Nevada, Arizona, Texas, and Louisiana south to Baja California and Guatemala, returning north in March to April. In California, the long-billed curlew is an uncommon to fairly common breeder from April to September in wet meadow habitat in Siskiyou, Modoc, and Lassen Counties. There is one recent nesting record for Owens Valley, Inyo County (CDFG, 1999a). This species is uncommon to locally very common as a winter visitor along most of the California coast and in the Central and Imperial Valleys, where the largest flocks occur. Small numbers of nonbreeders remain on the coast in summer, and larger numbers remain in some years in the Central Valley (Cogswell, 1977; Page et al., 1979; and Garrett and Dunn, 1981).

Population Status

The long-billed curlew is currently on the Audubon Society's Blue List because of declining numbers, probably caused by agricultural practices (Tate, 1981). This species once nested throughout the grasslands of the west, east to the prairies of southern Wisconsin and Illinois, but disappeared from many places with the plowing of plains and prairies for agriculture in the 1930s. The species was also decimated by hunters along the Atlantic coast in the fall. The long-billed curlew is a proposed candidate for federal endangered status. Breeding range has retracted considerably in the last 80 years, but western populations have not decreased as much as those in the eastern U.S.

Habitat Requirements

The long-billed curlew breeds on grazed, mixed-grass, and shortgrass prairies. Habitats on gravelly soils and gently rolling terrain are favored over others (Stewart, 1975). Nests are usually located in relatively flat areas with grass cover 4 to 8 inches high. The nest is a sparsely lined depression, often remote from water (Palmer, 1967). Nests are often placed close to cover such as a grass clump, rock, or soil mound (Johnsgard, 1981). In California, the long-billed curlew nests on elevated interior grasslands and wet meadows, usually adjacent to lakes or marshes (Grinnell and Miller, 1944). Upland shortgrass prairies and wet meadows are used for nesting; coastal estuaries, open grasslands, and croplands are used in winter. When migrating, the curlew frequents shores of lakes, rivers, salt marshes, and sandy beaches.

Habitat in the Proposed Project Area

The Salton Sea and adjacent wetlands, state and federal wildlife refuges, private duck clubs, and areas along the New and Alamo Rivers may provide suitable habitat for this species. Agricultural fields of alfalfa, wheat, and sudangrass may also provide habitat and foraging areas for the long-billed curlew.

Proposed Project Area Occurrence

The long billed curlew is a common, year-round resident at the Salton Sea with large flocks of as many as 1,000 birds observed during the winter. Summer numbers are lower, with flocks of around 150 birds (CDFG, 1970).

Black Tern *(Childonias Niger)*

Range and Distribution

In Canada, the black tern breeds from southwestern and east-central British Columbia and the southwestern portion of the Northwest Territories southward to Southern Quebec and New Brunswick (DeGraaf and Rappole, 1995). Its breeding range extends to California, Utah, Nebraska, Illinois, and Maine in the U.S. (DeGraaf and Rappole, 1995). Nonbreeding birds may occur along the Pacific Coast and in eastern North America to the Gulf Coast. In winter, black terns migrate to Central and South America. In California, nesting populations occur only in the northeastern part of the state (Ehrlich et al., 1992).

Population Status

Black terns were once a very common spring and summer visitor to fresh emergent wetlands of California (Grinnell and Miller, 1944). Numbers have declined throughout its range, especially in the Central Valley (Cogswell, 1977). Currently, it is a fairly common migrant and breeder on wetlands of the northeastern plateau area but is absent from some historic nesting localities, such as Lake Tahoe (Cogswell, 1977). Despite the presence of apparently suitable habitat in rice farming areas, breeding is questionable in the Central Valley (Gaines, 1974). It remains fairly common in spring and summer at the Salton Sea, but evidence of nesting there is lacking (Garrett and Dunn, 1981).

Populations in North America have declined sharply since the 1960s. Contributing factors are believed to include loss of wetland habitat, runoff of farm chemicals into wetlands resulting in reduced hatching success, and loss of food supply on wintering grounds due to overfishing (Kaufman, 1996). Campgrounds and marinas on the shorelines of large lakes and wetlands also may be partially responsible for population declines (Marcot, 1979).

Habitat Requirements

For breeding, black terns are associated with freshwater marshes and lakes, but favor coastal waters during migration. They prefer freshwater marshes with extensive marsh vegetation intermixed with open water. Black terns typically nest in small, scattered colonies (CDFG, 1999a). The nest site is situated low in the marsh on a floating mat of vegetation or debris, or on the ground close to the water (Kaufman, 1996). The terns may also take over coot and grebe nests for nesting.

Black terns forage primarily on insects and fish, but tadpoles, frogs, spiders, earthworms, and crustaceans are also taken. Their diet shifts seasonally with insects forming a greater portion of the diet during the breeding season, and small fish become the predominant prey during migration and in winter (Kaufman, 1996). Black terns forage by hovering above wet meadows and fresh emergent wetlands. Insects are captured in the air or are plucked from the water surface or vegetation (CDFG, 1999a). They also frequent agricultural fields for foraging.

Habitat in the Proposed Project Area

Potential nesting habitat occurs in the proposed project area in the wetlands along the Salton Sea and in the managed wetlands of the state and federal wildlife refuges such that nesting could be supported in the future. Beaches or mudflats of the Salton Sea and agricultural fields in the valley are known foraging areas in the proposed project area.

Proposed Project Area Occurrence

Black terns are common at the Salton Sea during the spring, summer, and fall; they rarely occur at the sea during the winter (USFWS, 1997b). In the Imperial Valley, black terns are common residents and migrants with up to about 10,000 individuals inhabiting the valley at some times (IID, 1994). Although they occur at the Sea throughout the summer, there is no evidence that nesting takes place (CDFG, 1999a). The Salton Sea watershed is thought to be the most important staging area for black terns in the Pacific Flyway (Shuford et al., 1999).

Laughing Gull (*Larus atricilla*)

Range and Distribution

In the U.S., laughing gulls range along the Atlantic coast from Nova Scotia south to Florida and along the Gulf Coast. In the western U.S., the species generally occurs along the coast in the extreme southwest, with its range extending southward into Baja California and Mexico through Central America and the northern coast of South America. Laughing gulls also inhabit the West Indies (DeGraaf and Rappole, 1995).

Population Status

The National Biological Survey shows laughing gulls to be increasing in most locations along the Gulf and Atlantic Coasts. Kaufman (1996) considers the current population of laughing gulls in North America to be stable. DeGraaf and Rappole (1995) consider the species common and showing a long-term increase.

Habitat Requirements

Laughing gulls are typically associated with coastal areas, frequenting salt marshes, coastal bays, beaches, and piers. They may also move farther inland and use rivers, fields, dumps, and lakes. The species nests in colonies on beaches in areas supporting grasses or shrubs. Nests are on the ground and consist of a scrape with a sparse lining or a shallow cup lined with grasses, sticks, and debris. Migration is primarily along the coast where birds roost on inland lakes, bays, estuaries as well as the open ocean. Optimal habitat is sparse to dense vegetation that provides protection from predators as well as some protection from inclement weather (Burger, 1996). Laughing gulls exploit a variety of food resources, but their diet primarily consists of crustaceans, insects, and fish.

Habitat in the Proposed Project Area

In the HCP area, laughing gulls are expected to principally occur at the Salton Sea. The shoreline of the Salton Sea provides suitable habitat for roosting and foraging. Nesting opportunities for laughing gulls have largely been eliminated due to rising water levels of the Salton Sea, resulting in the loss of islets used as nesting sites (Small, 1994). Laughing gulls concentrate feeding along the water edge of the Salton Sea but may also use agricultural fields and managed wetlands in the valley as additional foraging areas (Burger 1996).

Proposed Project Area Occurrence

Laughing gulls are a common postbreeding visitor (up to 1,000 individuals) at the Salton Sea and previously nested in the area (USFWS, 1997b; IID, 1994). Most laughing gulls occur along the shoreline at the south end of the Salton Sea and occasionally in adjacent wetland habitats. The average seasonal population at the Salton Sea is around 400 to 500 birds (Small, 1994).

Black Skimmer (*Rhynchops niger*)

Range and Distribution

Black skimmers range from about Massachusetts on the Atlantic Coast south through the Gulf Coast and Central and South America to Argentina (DeGraaf and Rappole, 1995). On the Pacific Coast, skimmers occur as far north as the Los Angeles, with breeding documented at the Salton Sea and in San Diego (Kaufman, 1996). Its range in the west is currently expanding (Kaufman, 1996).

Population Status

The population of black skimmers declined on the Atlantic Coast in the late 19th century as eggs were harvested and adults were killed for their feathers. Their numbers subsequently have recovered. Black skimmers have been expanding in the west, but nesting colonies are still sensitive to disturbance (Kaufman, 1996). In California, nesting distribution is limited. Nesting colonies are located only at the Salton Sea, San Diego Bay, and the Bolsa Chica Refuge in Orange County (Salton Sea Authority and Reclamation, 2000).

Habitat Requirements

Skimmers typically occur in coastal areas protected from open surf, such as lagoons, estuaries, inlets, and sheltered bays (Kaufman, 1996). They nest in single-species colonies, often near nesting gulls or terns. This is evident at the Salton Sea where nesting colonies are almost always near nesting gull-billed terns or Caspian terns (Molina, 1996). Nest sites are on gravel bars, low islands, or sandy beaches. Dredge spoils and dikes are also used for nesting. Skimmers use similar habitats for roosting. Because skimmers are sensitive to human disturbance, suitable nesting areas must be free from human disturbance (CDFG, 1999a). The nest itself is simple scrape located above high water (Terres, 1980).

Black skimmers begin arriving from wintering grounds in Mexico in April with numbers increasing through June. Upon arrival, skimmers form loose aggregations and often roost in areas that are subsequently used for nesting (Molina, 1996). Nesting at the Salton Sea generally starts in June or later; rarely it has continued into October. Nesting dates are probably a function of the level of the sea since this determines the availability of nest sites (Garrett and Dunn, 1981).

Skimmers forage on small fish, crustacean, and aquatic insects. Prey are captured by skimming low over the surface of the water, scooping up fish and aquatic invertebrates. As skimmers never dive for fish, only prey that occurs in surface waters are accessible. Skimmers concentrate foraging activities in calm shallow waters and commonly forage in groups.

Habitat in the Proposed Project Area

In the proposed project area, habitat for the black skimmer is restricted to the Salton Sea and Ramer Lake. At the Salton Sea, black skimmers forage over open water and along beaches and mudflats (Salton Sea Authority and Reclamation, 2000). Often, they concentrate foraging where the New and Alamo Rivers as well as agricultural drains empty into the Salton Sea (Garrett and Dunn, 1981). Skimmers nest on bare earthen slopes, terraces, and levees along the Salton Sea. Often nests are placed upslope of barnacle bars, 3 to 4 meters from the edge of the water to avoid inundation by wave action (Molina, 1996).

Proposed Project Area Occurrence

Black skimmer is a breeding resident at the Salton Sea, with a population of 600 individuals (IID 1994). In some years, the breeding population of skimmers at the Salton Sea may constitute 40 percent of the breeding population in California (Shuford et al., 1999). Skimmer colonies form at the north and south end of the Salton Sea in most years (Shuford et al., 1999). Molina (1996) monitored nesting success of skimmers at the Salton Sea during 1993 and 1995. Hatch rate was found to vary substantially among these years. Nesting success was lowest in 1994 when only 27 percent of the nests were successful as compared to 1993 when 71 percent of the nests were successful.

Between 1991 and 1995, skimmers nested at seven sites. Locations of nesting colonies are Mullet Island, the Whitewater River delta, Morton Bay, Rock Hill, Obsidian Butte, Ramer Lake, and Elmore Ranch (Molina, 1996). The Rock Hill site occurs on the Salton Sea National Wildlife Refuge and is the only nesting site under active management. However, the suitability of nesting habitat at Rock Hill may be compromised by the heavy recreational use this area receives (Molina, 1996). Many of the nesting sites are susceptible to wave action, erosion, and inundation; the past and continuing increase in the elevation of the Salton Sea may have inundated suitable nesting areas (Molina, 1996).

California Least Tern (*Sterna antillarum browni*)

Range and Distribution

The discontinuous breeding range of the California least tern extends from Baja California, Mexico, to San Francisco Bay. The majority of the population apparently nests in coastal Southern California. Two nesting colonies are also known in the San Francisco Bay area.

Population Status

The California least tern was formerly widespread and "common to abundant" (Grinnell and Miller, 1944) along the central and Southern California coast. Human use of beaches for recreational, residential, and industrial development has severely diminished the availability of suitable nesting areas in California (Grinnell and Miller, 1944; Garrett and Dunn, 1981; and Ehrlich et al., 1992) and has led to isolated, small colony sites that artificially concentrate breeding terns. Episodic losses in least terns have occurred due to cold, wet weather; extreme heat; dehydration and starvation; unusually high surf or tides; the El Niño warm sea current; and human disturbance of least tern colonies (Massey, 1988). California least terns may also be susceptible to pesticide contamination and bioaccumulation (Boardman, 1987a and 1987b).

The California least tern population declined to a known low of between 623 and 763 breeding pairs in the early 1970s (Bender, 1974). Because of a variety of management efforts, the California least tern population has increased to an estimated California breeding population of about 2,160 pairs in 1992.

Habitat Requirements

California least terns nest in open sand, salt pans, or dried mudflats near lagoons or estuaries. They feed almost exclusively on small fish captured in shallow, nearshore areas, particularly at or near estuaries and river mouths (Massey, 1974; Collins et al., 1979; Massey, and Atwood, 1981; Atwood and Minsky, 1983; Atwood and Kelly, 1984; Minsky, 1984; and Bailey, 1984). California least terns are opportunistic in their foraging strategy and known to take many different species of fish. They also take crustaceans and insects (Ehrlich et al., 1988).

Habitat in the Proposed Project Area

In the proposed project area, California least terns are known to occur only at the Salton Sea. Use of the sea is likely limited to foraging in the open water and resting on the shore (USFWS 1999). Mudflats along the shore of the Salton Sea may provide suitable resting areas and could be suitable for nesting, although nesting by California least terns is unknown at the Salton Sea. Shallow nearshore areas as well as shoreline pools formed by barnacle bars may be used for foraging.

Proposed Project Area Occurrence

The California least tern occurs at the Salton Sea only accidentally. Less than 10 records of this species exist at the Salton Sea NWR (USFWS, 1997b). Nesting has not been, reported, and based on the low level of use of the Salton Sea by California least terns, nesting is not currently expected.

Elegant Tern (*Sterna elegans*)

Range and Distribution

The elegant tern breeds along both coasts of Baja California, Mexico, and intermittently in northwestern Mexico and extreme southwestern California (DeGraaf and Rappole, 1995). The elegant tern's range in North America is extremely limited; it occurs only in a few places in California, including the Salton Sea and San Diego Bay. In winter, it migrates to the west coast of South America (DeGraaf and Rappole, 1995).

Population Status

Formerly, elegant terns were a rare and irregular postnesting visitor to coastal California (Grinnell and Miller, 1944). During the 1950s, numbers increased; large flocks now can be seen in most years off the southern coast (Cogswell, 1977). Elegant terns breed primarily in Mexico, but a nesting colony was established at San Diego Bay in 1959 (Cogswell, 1977). This colony persisted and may have facilitated the recent range extension of nonbreeders northward to the coast of central California (Cogswell, 1977). More recently, in 1987, another breeding colony became established in Orange County (Kaufman, 1996). However, the elegant tern is considered vulnerable in the U.S. due to the limited number of breeding sites (Kaufman, 1996).

Habitat Requirements

The elegant tern typically inhabits inshore coastal water, bays, estuaries, and harbors. It forages for fish in shallow water areas (CDFG, 1999a). Fish are captured by diving into the water (Ehrlich et al., 1988; Scott, 1987). When not foraging, elegant terns often congregate on beaches and mudflats (CDFG, 1999a). Roosting occurs on high beaches.

The elegant tern nests in colonies often in association with other terns. In California, nesting colonies are often near Caspian tern colonies that may help deter predators (Kaufman, 1996). Nest sites are a simple scrape typically located on upper beaches (about 60 feet from the water line), although the San Diego colony nests on dikes between salt ponds (CDFG, 1999a). Elegant tern colonies are sensitive to disturbance, and nesting locations need to be free from human intrusion.

Habitat in the Proposed Project Area

In the proposed project area, elegant terns would be expected to occur only at the Salton Sea. Elegant terns are rarely found at inland locations, but the Salton Sea and adjacent mudflats provide potentially suitable foraging and roosting areas for elegant terns. Breeding has not been reported at the Salton Sea, but potentially suitable conditions exist along the Salton Sea.

Proposed Project Area Occurrence

Elegant terns occur only accidentally at the Salton Sea during spring. Only three records of the species exist at the Salton Sea National Wildlife Refuge (USFWS, 1997b).

Van Rossem's Gull-billed Tern (*Sterna nilotica vanrossemi*)

Range and Distribution

The breeding range of Van Rossem's gull-billed tern extends from the extreme southwestern U.S. to Sonora, and Baja California, Mexico. During winter, it migrates to coastal areas of Central and South America (DeGraaf and Rappole, 1995). The species colonized Southern California, apparently from Mexico, and began nesting at the Salton Sea in the 1920s (Kaufman, 1996). Breeding occurred in San Diego in the 1980s (Kaufman, 1996). These two locations are the only known breeding areas of Van Rossem's gull-billed tern in the U.S.

Population Status

This species as a whole was once common in the eastern U.S. and Gulf States but was nearly exterminated in the early 1900s because of egg and feather collection (DeGraaf and Rappole, 1995; Zeiner et al., 1990a), and the populations have not recovered. The status of the Van Rossem subspecies is uncertain, but its limited breeding locations and requirement for undisturbed nesting sites suggest the population may be vulnerable.

Habitat Requirements

Gull-billed terns are typically associated with salt marshes and coastal bays but also frequent open habitats such as pastures and farmlands for foraging. They primarily feed on insects, such as grasshoppers and beetles but will also prey earthworms, fish, frogs, lizards, small mammals, eggs, and young of other birds (CDFG, 1999a). Prey are captured on the ground, in the air, or off the surface of water. Foraging is typically concentrated over marshes (Kaufman, 1996). Rarely, gull-billed terns will dive for fish.

This species breeds in small colonies on open sandy flats, often near nesting colonies of other terns (CDFG, 1999a). Dredge spoils, shell mounds, and mudflats may also be used for nesting. Nests are a shallow depression in soft sand, soil, or dry mud (CDFG, 1999a).

Habitat in the Proposed Project Area

At the Salton Sea, gull-billed terns nest on sandy flats amid shells and debris around the south end (CDFG, 1999a; Shuford et al., 1999). Foraging likely occurs at the mudflats along the sea as well as in adjacent wetland areas and agricultural fields.

Proposed Project Area Occurrence

Van Rossem's gull-billed tern is an uncommon summer breeding resident at the Salton Sea, with up to 160 pairs nesting at the Salton Sea each year (USFWS, 1997b; Shuford et al., 1999). The largest breeding colonies are at the southeast corner of the Salton Sea and to the south of Salton City (CDFG, 1999a). Numbers of nesting birds at the Salton Sea have declined from earlier estimates of about 500 as the rising sea has flooded nests (CDFG, 1999a).

Western Yellow-billed Cuckoo *(Coccyzus americanus occidentalis)*

Range and Distribution

Historically, the western yellow-billed cuckoo was a fairly common breeding species throughout the river bottoms of the western U.S. and southern British Columbia (Gaines and Laymon, 1984). Because of the loss of riparian woodland habitat, particularly cottonwood-willow habitat, the cuckoo has become an uncommon to rare summer resident in scattered locations throughout its former range. In California, remnant populations breed along sections of seven rivers, including the Colorado River in the southern part of the state.

Population Status

Yellow-billed cuckoos were fairly common and widespread in riparian systems throughout the western U.S. until the early 1900s. Since then, this species has decreased substantially in abundance. Surveys conducted in California during 1986 and 1987 found 31 to 42 breeding pairs along the Upper Sacramento River, the Feather River, the south fork of the Kern River, and along the Santa Ana, Amargosa, and LCRs (CDFG, 1991). This represents a 66 to 81 percent decline from 1977 surveys when there were an estimated 122 to 163 pairs. Along the LCR, there was a 93 percent decline in cuckoos between the 1976 surveys, which documented 242 individuals, and the 1986 survey in which only 18 individuals were found (Rosenberg et al., 1991). At Bill Williams Delta, cuckoos decreased about 75 percent during the same surveys, with only 50 to 60 cuckoos remaining in 1986.

The population trend for the western yellow-billed cuckoo is considered to be declining primarily due to the continued loss of cottonwood-willow riparian habitats (CDFG, 1991; Rosenberg et al., 1991). Major threats to this habitat type include reclamation, flood control, and irrigation proposed projects; habitat loss due to urbanization and agricultural activities; and the continued invasion of non-native salt cedar into riparian areas. Exposure to pesticides and other contaminants on wintering and breeding grounds, as well as livestock grazing and offroad vehicle use in riparian habitats, also continue to threaten this species' survival (Rosenberg et al., 1991; CDFG 1991; and Gaines and Laymon, 1984).

Habitat Requirements

Mature stands of cottonwood-willow provide the primary habitat for this species. Willows or isolated cottonwoods mixed with tall mesquites are used to a lesser extent (Rosenberg et al., 1991). Monotypic stands of salt cedar are generally uninhabited by cuckoos. The cuckoo arrives on its breeding grounds in mid- to late-June and departs by the end of August, spending only about one-quarter of its annual cycle on its breeding territory. As a midsummer breeder, the cuckoo faces extremely high temperatures that could easily kill eggs not protected by behavioral or physiological cooling mechanisms. To counter these midsummer temperatures, the cuckoo is a nest-site specialist, choosing stands of mature cottonwoods that have a subcanopy layer of willows that provide thermal refuge for the nest. Cuckoos maintain larger territories than many birds of comparable size (Platt, 1975). Gaines (1974) found very few cuckoos where suitable habitat was less than 330 feet wide and patch size was less than 25 acres. Galli et al. (1976) found cuckoos were rarely present in patches of suitable habitat less than 60 acres.

The restriction of this species' breeding to the midsummer period is thought to be in response to a seasonal peak in large insect abundance (e.g., cicadas, which dominate the cuckoo's diet). Mantids, grasshoppers, and caterpillars are also important food resources for the cuckoo. Cuckoos will occasionally consume lizards and tree frogs (Rosenberg et al., 1991).

Habitat in the Proposed Project Area

The cottonwood-willow habitat that yellow-billed cuckoos require is largely absent from the proposed project area. Riparian areas in the proposed project area are dominated by tamarisk, which yellow-billed cuckoos are not known to use. Seepage areas along the AAC supports localized areas of cottonwoods and willows; however, these areas are limited in size and distribution. While these areas provide potential habitat, the small size of these patches and fragmented distribution are unlikely to support any breeding population of yellow-billed cookoos.

Proposed Project Area Occurrence

Most occurrences are from eastern Imperial County near the LCR near Laguna Dam, Winterhaven, and Bard. Yellow-billed cuckoos have been observed along the AAC across from the mission wash flume, 3 miles north-northeast (NNE) of Bard in stands of mature cottonwoods with a dense understory of cattails and introduced palm trees. Two records of yellow-billed cuckoos exist for the Salton Sea National Wildlife Refuge (USFWS, 1997b).

Short-eared Owl (*Asio flammeus*)

Range and Distribution

The short-eared owl breeds from northern Alaska south through most of Canada and the central U.S., and from northern Ohio west to central California. It also breeds in Eurasia, South America, and Cuba. In North America, northern populations of the short-eared owl are strongly migratory, wintering in the Southern U.S. and south to Guatemala (Johnsgard, 1988; Terres, 1980). In California, the short-eared owl is a year-round resident commonly found in low-lying areas of agricultural lands, estuaries, emergent wetlands, and marshes (Zeiner et al., 1990).

Population Status

The short eared-owl is currently thought to be declining in most portions of its range, especially in the prairie provinces of Canada, along the Pacific Coast, and in parts of the Southeast (Ehrlich et al., 1988). The range of short-eared owls has decreased over the recent decades. It has disappeared from many locations in the southern U.S. where it previously nested (Kaufman, 1996). The loss and fragmentation of grassland and wetland habitats due to agricultural expansion, increased grazing, and urbanization have been implicated as contributors to this range reduction (Remsen, 1978). Pesticides may have contributed to declines as well (Marti and Marks, 1989). Small (1994) reports the breeding population has declined in California and attributes this decline to a combination of shooting and habitat loss due to marsh drainage, agriculture, recreational development, and expansion of urban development.

Habitat Requirements

Short-eared owls breed in open habitats, such as prairies, marshes, grassy plains, and tundra, that support high numbers of small mammals and provide opportunities to roost, nest, and forage. In winter, stubble fields, coastal dunes, meadows, marshes, and pastures are commonly occupied (Johnsgard, 1988; Terres, 1980; Ehrlich et al., 1988; and Kaufmann, 1996). Dense nonwoody vegetation (grasses, reeds, sedges, rushes), brush, and open wetlands are required for roosting and nesting.

Short-eared owls eat mostly rodents, preferring voles over smaller mice. A variety of open-country and marsh-associated birds, such as western meadowlarks, horned larks, and red-winged blackbirds, are also commonly eaten by this species. Other prey includes rabbits, gophers, rats, shrews, insects, and bats (Johnsgard, 1988; Terres, 1980; Ehrlich et al., 1988; and Kaufmann, 1996). It searches by flying low (3 to 20 feet) over the ground, hovering, and swooping down on prey. They use large mounds and fence posts as perches. Where prey is abundant, large aggregations of short-eared owls often roost and hunt communally.

Habitat in the Proposed Project Area

In the LCR Valley, the short-eared owl is most often associated with agricultural fields (primarily, tall alfalfa); marshes; and grassy edge habitats (Rosenberg et al., 1991). They most likely use similar habitats in the Imperial Valley, such as the managed wetlands of the state and federal wildlife refuges, wetlands adjacent to the Salton Sea, and agricultural fields throughout the valley.

Proposed Project Area Occurrence

Short-eared owls are rare winter visitors to the Salton Sea area (USFWS, 1997b; Garrett and Dunn, 1981) but are more common in the fall (USFWS, 1997b). Short-eared owl have been observed along the Alamo River, and Hurlbert et al. (1997) observed one owl during surveys of selected drains in the Imperial Valley. Short-eared owls have also been observed near the towns of Calipatra and Westmorland.

Long-eared Owl (*Asio otus*)

Range and Distribution

Long-eared owls are widely distributed throughout Eurasia, North Africa, and North America. In North America, the species breeds from central Canada south to northern Baja California, Mexico. Although it is a resident species in most of its breeding range, some populations of long-eared owls withdraw from northern areas and winter from Southern Canada south to southern Mexico (Johnsgard, 1988; Terres, 1980; and Kaufmann, 1996).

Population Status

Although the status of this species is not well known, there is evidence that the overall population of long-eared owls in North America is declining, probably as a result of forest cutting and the destruction of grovelands and riparian habitats, especially in the western states (Kaufmann, 1996; Johnsgard, 1988).

Habitat Requirements

Long-eared owls live in a variety of habitats that contain dense trees for nesting and roosting, and open areas for foraging. Coniferous and mixed coniferous forests containing extensive meadows, prairies supporting groves of trees, and streamside woodlands in desert areas are some of this species' preferred habitats (Kaufmann, 1996; Ehrlich et al., 1988; Terres, 1980; and Johnsgard, 1988). In the southwest, long-eared owls can be found in dense stands of tall cottonwood or tamarisk and in densely vegetated desert washes (Rosenberg et al., 1991). During the breeding season, long-eared owls are territorial and widely dispersed throughout the landscape. The normal breeding density of this species is 10 to 50 pairs per 60 square miles (Johnsgard, 1988). Long-eared owls nest in trees, usually in the abandoned nests of corvids. The nests of other large birds, such as herons and hawks, are also commonly used. When nest sites are scarce, long-eared owls occasionally nest in tree cavities or on the ground in heavy cover (Ehrlich et al., 1988; Kaufmann, 1996; Johnsgard, 1988; and Terres, 1980). During the nonbreeding season, aggregations of long-eared owls will often cluster at favored roosting sites (Bent, 1938).

The diet of the long-eared owl overwhelmingly consists of rodents, but they will also eat small birds, bats, insects, snakes, and other small animals, with prey size being the most important factor in food selection (Ehrlich et al., 1988; Kaufmann, 1996; Johnsgard, 1988; and Terres, 1980).

Habitat in the Proposed Project Area

Long-eared owls are associated with forested habitats, particularly adjacent to a stream or meadow. In the proposed project area, tamarisk scrub is the only potential habitat. Long-eared owls are known to use tamarisk in the southwest. Potential habitat for long-eared owls in the proposed project area consists mainly of tamarisk scrub habitat along the New and Alamo Rivers, Salton Sea, agricultural drains, and in areas receiving seepage from water delivery canals. Long-eared owls could use the agricultural fields throughout the Imperial Valley for foraging.

Proposed Project Area Occurrence

Long-eared owls are occasional winter visitors to the Salton Sea area (USFWS, 1997b). They are not known to breed in the area.

Western Burrowing Owl (*Athene cunicularia*)

Range and Distribution

The breeding range of the western burrowing owl extends south from southern Canada into the western half of the U.S. and down into Baja California, and central Mexico. The winter range is similar to the breeding range, except most owls from the northern areas of the Great Plains and Great Basin migrate south (Haug et al. 1993).

Population Status

Burrowing owls have declined in abundance throughout most of their range (Haug et al., 1993). In the western states, 54 percent of 24 jurisdictions reported burrowing-owl populations decreasing; there were no reported increases. Local populations are especially prone to extinction in this species (Haug et al., 1993). The species is listed as endangered or sensitive in 14 states in the U.S. and as threatened or endangered in four provinces in Canada. In California, the burrowing owl is currently considered a federal sensitive and a state species of special concern.

Burrowing owls were once a common, locally abundant species throughout much of California, although a decline in abundance was noticed by the 1940s (Grinnell and Miller, 1944). This decline has rapidly continued throughout most of California (Remsen, 1978). However, breeding bird surveys between 1980 and 1989 indicate the burrowing owl is increasing in southeastern California, the lower Sonoran deserts, and LCR Valley of western Arizona (Haug et al., 1993).

DeSante and Ruhlen (1995) reported the results of surveys for burrowing owls conducted throughout California, except for the Great Basin and desert areas during 1991 to 1993. During the 3-year census period, 9,450 breeding pairs of burrowing owls were estimated to occur in the area surveyed (95 percent confidence limits for this estimate are 7,206 and 11,695 pairs). This survey also found a 37 to 60 percent decrease in the number of breeding groups since the early 1980s, with the burrowing owl being extirpated from several counties (Marin, San Francisco, Santa Cruz, Napa Ventura, and coastal San Luis Obispo) and nearly extirpated from several additional counties (Sonoma, Orange, and coastal Monterey). Development is believed to have been the primary cause of the extirpation and decline of burrowing owls in these counties. In agricultural regions, removal of ground squirrels, use of chemical herbicides on levees and irrigation canals, and use of chemical insecticides and rodenticides on agricultural fields may have contributed to declines in burrowing owls (DeSante and Ruhlen, 1995). Gervais et al. (2000) found low but detectable levels of DDE ($n = 7$; range = 0.20 - 3.4; mean = 0.62 milligrams per kilogram [mg/kg] DDE, fresh weight) and no eggshell thinning in eggs collected from areas around the Salton Sea. In this same study, selenium concentrations in burrowing owl eggs ($n = 7$; range = 1.6 - 2.4; mean = 1.8 mg/kg Se, dry weight) were below background levels (less than 3 mg/kg Se, dry weight; Skorupa et al., 1996).

Burrowing owls have declined through much of their range because of habitat loss associated with urbanization, agricultural conversion, and rodent control programs (Remsen, 1978; Johnsgard, 1988). Pesticides, predators, and vehicle collisions have also contributed to their decline (Haug et al., 1993; James and Espie, 1997). Survival and reproductive success are adversely affected by spraying insecticides over nesting colonies (James and Fox, 1987). Burrowing owls also have been incidentally poisoned and their burrows destroyed during eradication programs aimed at rodent colonies (Collins, 1979; Remsen, 1978; and Zarn, 1974). Although burrowing owls are relatively tolerant of lower levels of human activity, there are human-related impacts, such as shooting, burrow destruction, and the introduction of non-native predators, that adversely affect the owls (Zarn, 1974; Haug et al., 1993). Populations of native predators (e.g., gray foxes and coyotes) artificially enhanced by development (i.e., availability of artificial food sources and shelter) and introduced predators (e.g., red foxes, cats, and dogs) near burrowing owl colonies adversely impact this species (Zeiner et al., 1990).

Habitat Requirements

Burrowing owls inhabit open areas, such as grasslands, pastures, coastal dunes, desert scrub, and the edges of agricultural fields. They also inhabit golf courses, airports, cemeteries, vacant lots, and road embankments or wherever there is sufficient friable soil for a nesting burrow (Haug et al., 1993). In the Imperial Valley, burrowing owls typically inhabit agricultural fields with extensive dirt embankments. Burrowing owls eat a variety of different prey items, including rodents, frogs, small birds, terrestrial and aquatic invertebrates, and carrion (Zarn, 1974; Johnsgard, 1988; and Gervais et al., 2000).

Burrowing owls use burrows created by other animals for nesting and shelter. The most commonly used rodent burrow in California is that of the California ground squirrel (Collins, 1979). In other locations, burrows of badgers, prairie dogs, tortoises, and other animals may be used (Haug et al., 1993).

Burrowing owl nesting is strongly dependent on local burrow distribution. Nesting densities in the LCR Valley vary from eight pairs per 0.6-square mile in optimal habitat to one pair per 36 square miles in poor quality habitat (Johnsgard, 1988). Home range and foraging area may overlap between different pairs, with only the burrow being actively defended (Coulombe, 1971; Johnsgard, 1988). Telemetry studies of foraging ranges of nesting burrowing owls conducted at three California sites (including Salton Sea) showed a mean range of 300 acres around the burrow (Gervais et al., 2000). Not all individuals capable of breeding do so every year. Breeding is initiated in early March (Coulombe, 1971). Eggs are laid from late March to July (Terres, 1980). Young fledge in the late summer to fall (Coulombe, 1971).

DeSante and Ruhlen (1995) investigated the relationship between various habitat characteristics and the probability that a burrowing owl population at a particular locale significantly increased or decreased over surveys conducted during 1991 to 1993. No habitat characteristics were associated with the probability of the population decreasing. However, the probability that a population would increase was significantly related to several habitat characteristics. Populations with a high probability of increasing were generally associated with undisturbed habitat types, particularly pastures, large distances to the nearest irrigation canal, and the occurrence of a large number of ground squirrels. Populations with a low probability of increasing were associated with linear habitat types (e.g., roadsides and ditches), areas subject to soil disturbance, proximity to irrigation canals, and low numbers of ground squirrels. Crop type was not related to the probability that a population would increase.

Habitat in the Proposed Project Area

In the proposed project area, burrowing owls commonly inhabit the earthen banks of agricultural canals and drains. They concentrate along the edges of agricultural fields, especially where the banks of irrigation ditches provide suitable nesting burrows. Canal embankments are more commonly used for nesting than drains because vegetation is maintained at lower levels in the canals. Burrowing owls at the Salton Sea National Wildlife Refuge also use artificial nest burrows placed along roadsides and forage in the surrounding agricultural fields both on and off the refuge (Gervais et al., 2000).

Proposed Project Area Occurrence

Burrowing owls are a common year-round resident adjacent to the Salton Sea and in the Imperial Valley (Garrett and Dunn, 1981; USFWS, 1997b). Burrowing owls occur at a very high density in the Imperial Valley, and the density of burrowing owls in Imperial County surpasses that of any other single county (Sturm, 1999). The Institute of Bird Populations estimated that 6,429 pairs of burrowing owls inhabit the Imperial Valley representing 69 percent of the estimated total population in California (Shuford et al., 1999). This population level translates into a density of about 236 pairs per 60 square miles (DeSante and Ruhlen, 1995). For comparison, the average density of burrowing owls in other lowland areas in California was estimated at 11.9 pairs per 60 square miles (DeSante and Ruhlen, 1995).

Elf Owl *(Micrathene whitneyi)*

Range and Distribution

The elf owl breeds in the southwestern U.S.; Baja California, Mexico; and northern mainland Mexico (Terres, 1980). In the U.S., it is found in extreme southern Nevada, central Arizona, southwestern New Mexico, western Texas, and the southeastern corner of California (Johnsgard, 1988). In winter, it migrates south to Baja California, Mexico; mainland Mexico; and the Rio Grande Valley in Texas. In California, it is a very rare and local summer resident in riparian habitats along the LCR, which lies at the western edge of its range (Rosenberg et al. 1991). Small numbers of elf owls can be found at Bill William's Delta, near Needles, near Blythe, the Fort Mohave area, and at Cibola National Wildlife Refuge. It used to be present south of Yuma. West of the Colorado River, there are records at the oases of Cottonwood Springs and Corn Springs, in Riverside County.

Population Status

Once more numerous along the length of Colorado River, elf owls have been nearly extirpated from loss of habitat. The population status of the elf owl is directly dependent on available nesting holes made by woodpeckers and on sufficient insects during the breeding season (Johnsgard, 1988). In California, at the extreme northwest edge of its range, the elf owl is likely declining in the few desert riparian habitats that it occupies (Johnsgard, 1988). There may also be a general decline in Arizona, although it may be increasing its range in north-central Arizona and western New Mexico. It is difficult to determine the species' overall status in the southwest. The elf owl was never a common or widespread species along the LCR, where 1987 surveys of riparian habitats reported between 17 and 24 owls at 10 different sites (CDFG, 1991). Population estimates in California for the early 1990s were 17 to 25 breeding pairs (CDFG, 1991; Rosenberg et al., 1991).

Although the elf owl has probably never been common, it has declined due to the loss of mature riparian and saguaro habitats (CDFG, 1991; Rosenberg et al., 1991). The habitat loss is attributed to agricultural development, river channeling, and flooding (CDFG, 1991). The elf owl is a California state endangered species.

Habitat Requirements

The elf owl occupies desert riparian habitat of moderate to open canopy, often with a moderate to sparse shrub understory, and typically bordering desert wash, desert scrub, or grassland habitats. Taller trees with a shrub understory seem to be required (Grinnell and Miller, 1944). This owl uses perches overlooking open ground or grassland (Marshall, 1956). Foraging perches are typically in moderately tall cottonwood, sycamore, willow, mesquite, and saguaro cactus. Moderately tall trees and snags, such as cottonwood, sycamore, willow, mesquite, and saguaro cactus, afford perches and woodpecker-excavated or other cavities. Elf owls are dependent on woodpecker-excavated holes for nest sites, usually 15 to 20 feet from the ground (Bent, 1938). In California, elf owls have nested in cottonwood (Miller, 1946) and saguaro (Brown, 1903); this owl is also known to nest in willow, sycamore, and mesquite trees or snags of moderate height.

Habitat in the Proposed Project Area

Little potential habitat for elf owls occurs in the HCP area. Most riparian habitats are dominated by dense stands of tamarisk that are not suitable for elf owls. Cottonwood/willow habitat and mesquite habitats are primarily restricted to a scattered and isolated seepage areas adjacent to the AAC.

Proposed Project Area Occurrence

Since 1970, elf owls have been reported only north of Needles, San Bernardino County, 22 miles north of Blythe, Riverside County, and at Corn Springs (Gaines, 1977a; Garrett and Dunn, 1981). They have not been reported in the HCP area. The general lack of habitat makes it unlikely that elf owls would occur in any portion of the HCP area.

Vaux's swift (*Chaetura vauxi*)

Range and Distribution

The Vaux's swift breeds in western North America and winters in Mexico and Central America. In California, they primarily nest in the Coast Ranges south to Monterey County but are also likely breed in low densities in Lake, Butte, Tehama, Plumas, and other interior California counties.

Population Status

Significant population declines of the Vaux's swift have been documented in Oregon and Washington (Sharp, 1992), and most populations are believed to be declining throughout the species' range (Bull and Collins, 1993). The removal of large, broken-top trees and large, hollow snags, most of which are found in late-seral stage forests, has been suggested as contributing to population declines (Sharp, 1992).

Habitat Requirements

The Vaux's swift nests in coniferous forests along the central and northern California coast, and mixed oaks and conifers in the interior mountain ranges. Natural cavities and burned-out hollow trees are preferred nest sites (Small, 1994). Nests are typically built on the inner wall of a large, hollow tree or snag, especially those charred by fire (Bent, 1940). Large-diameter, hollow trees or snags are also important for roosting nonbreeders, recently fledged young, and postbreeding adults. Vaux's swifts feed primarily on insects and spiders (Bull and Collins, 1993). Foraging occurs above the forest canopy and at lower levels in meadows, over lakes, rivers and ponds, and above burned areas (Grinnell and Miller, 1944; Bull and Collins, 1993; and Small, 1994).

Habitat in the Proposed Project Area

There is no suitable nesting habitat in the proposed project area. Migrating birds may forage over the Salton Sea, wetlands, streams, agricultural fields, and in residential areas. While less desirable, the desert scrub habitat may also provide some foraging habitat for this species (Sanders and Edge, 1998; Zeiner, et al., 1990).

Proposed Project Area Occurrence

Vaux's swifts occur in the HCP area as a migrant during the spring and fall. It is relatively common at the Salton Sea during the spring but considered uncommon in the fall (USFWS 1997b). Thousands of migrating birds have been reported at the north end of the Salton Sea during the spring but are relatively uncommon elsewhere in the Salton Basin during spring migration (Garrett and Dunn, 1981).

Black Swift *(Cypseloides niger)*

Range and Distribution

The black swift occurs in western North America, breeding from southeastern Alaska, through western Canada and the U.S. and into Mexico (DeGraaf and Rappole, 1995). It ranges as far east as Colorado (Kaufman, 1996). The black swift's winter range is poorly known, but it may be found in northern South America and in the West Indies (DeGraaf and

Rappole, 1995). In California, black swifts breed very locally in the Sierra Nevada and Cascade Range, the San Gabriel, San Bernardino, and San Jacinto Mountains and in coastal bluffs and mountains from San Mateo County south probably to San Luis Obispo County (CDFG, 1999a).

Population Status

The current status of black swifts is uncertain. Kaufman (1996) characterized the population as probably stable, but DeGraaf and Rappole (1995) consider the species to be experiencing a long-term decline.

Habitat Requirements

Black swifts are associated with mountainous country and coastal cliffs. This association reflects their use of cliffs, often behind waterfalls, for nesting (Kaufman, 1996). Foraging, however, occurs over a wide variety of habitats (CDFG, 1999a). Like other swifts, black swifts are insectivores that capture insects in flight and foraging locations reflect the occurrence and availability of insect prey. Common prey items include wasps, flies, mayflies, caddisflies, beetles, leafhoppers, and beetles. When available, black swifts will also feed on emerging swarms of winged adult ants and termites (Kaufman 1996).

Habitat in the Proposed Project Area

The proposed project area does not support nesting habitat for black swifts. However, much of the proposed project area could be used by black swifts for foraging, given this species' preference for open habitats. The Salton Sea—as well as—other waterbodies, such as managed wetlands, the New and Alamo Rivers, and major canals are likely to provide abundant insect prey for foraging black swifts. Agricultural fields may also provide suitable foraging habitat depending on the abundance of flying insects.

Proposed Project Area Occurrence

Black swifts occur accidentally in the proposed project area during the spring. Only two records of this species exist for the Salton Sea National Wildlife Refuge (USFWS, 1997b).

Gilded Flicker *(Colaptes chrysoides)*

Range and Distribution

The gilded flicker occurs along the LCR Valley in southern Arizona and southeastern California (Rosenberg et al., 1991). In California, the gilded flicker is an uncommon resident along the Colorado River north of Blythe (Garrett and Dunn, 1981; CDFG, 1991). It was historically widespread in riparian habitat all along the Colorado River Valley. It also used to inhabit saguaro deserts near Laguna Dam, above Yuma (CDFG, 1991). Until the late 1970s, a small number of gilded flickers were resident in Joshua Tree woodlands of the eastern Mojave Desert near Cima Dome in California (Garrett and Dunn, 1981; CDFG, 1991).

Population Status

The gilded flicker was historically common throughout the LCR Valley. In 1983, however, the entire population along the LCR Valley in Arizona and California was estimated to be about 270 individuals. In the Arizona Sonoran desert east of the Colorado River, the gilded about 270 individuals. In the Arizona Sonoran desert east of the Colorado River, the gilded flicker is still common. In California, there were an estimated 40 individuals along the LCR in 1984 (Hunter, 1984; CDFG, 1991); however, during 1986 surveys, there were no gilded flickers observed in this area. Rosenberg et al. (1991) reported "scattered pairs" between Imperial and Laguna Dams. Gilded flickers were last observed in the eastern Mojave Desert at Cima Dome in 1978.

The decline of the gilded flicker in the LCR Valley is attributed to the loss of upland saguaro habitats and mature riparian forests (CDFG, 1991). Other threats to the flicker include water and flood control proposed projects, agricultural operations, livestock grazing, the introduction of exotic plants into native systems, and offroad vehicle activity.

Habitat Requirements

The desert-dwelling gilded flicker is found in saguaro habitats, mature cottonwood-willow riparian forests, and occasionally in mesquite habitats with tall snags during the breeding season (CDFG, 1991; Rosenberg et al., 1991). They forage primarily on the ground for ants and termites (Rosenberg et al., 1991). They will also eat mistletoe berries, cactus fruits, and other wild berries but seldom forage in trees for insects as other woodpecker species often do (Terres, 1980; Rosenberg et al., 1991). Breeding begins in February, and two broods are usually raised in a year, with fledglings in late May and in July (Rosenberg et al., 1991). Cavities for nesting are usually excavated in saguaros, cottonwoods, and willows. Saguaros are preferred nesting sites, and riparian trees are usually used only when saguaros are unavailable. Gilded flickers rarely nest near human dwellings.

Habitat in the Proposed Project Area

The proposed project area does not contain areas supporting saguaros, the preferred nesting substrate of gilded flickers. Suitable habitat for gilded flickers is generally lacking in the Imperial Valley because most of the riparian habitat is dominated by tamarisk. Large trees potentially suitable for nesting principally occur in urban areas that gilded flickers generally avoid for nesting. The scattered patches of cottonwoods and willows supported by seepage adjacent to the AAC are likely to provide only minimal habit value because of their small size and limited distribution.

Proposed Project Area Occurrence

In California, gilded flickers are generally restricted to rare occurrences along the LCR (CDFG, 1999a) and are not known to occur in the Imperial Valley.

Gila Woodpecker *(Melanerpes uropygialis)*

Range and Distribution

Gila woodpeckers occur in the extreme southwestern U.S. and south into Baja California and central Mexico (Terres, 1980). In the U.S., they occur in Arizona, southeastern California, southwestern Nevada, and southwestern New Mexico. In California, Gila woodpeckers are a common year-round resident in mature riparian forest in the LCR Valley (Rosenberg et al., 1991). They also occur in groves and ranch yards having tall trees south of the Salton Sea and near Brawley, Imperial County (Garrett and Dunn, 1981). Along the LCR, they are now limited to several localities between Needles and Yuma (CDFG, 1991).

Population Status

The Gila woodpecker was formerly widespread and abundant but now is primarily found in remnant native riparian habitats with tall trees in the LCR Valley (Rosenberg et al., 1991). In 1984, an estimated 200 individuals occurred in California along the LCR (CDFG, 1991). Relatively low reproductive success was documented for 27 monitored pairs during this time. The total population along the LCR is estimated at about 1,000 individuals (Rosenberg et al., 1991).

The Gila woodpecker is declining in California due to the loss and degradation of mature riparian habitats and saguaro habitats in the LCR Valley (Garrett and Dunn, 1981; CDFG, 1991; and Rosenberg et al., 1991). Other potential threats faced by this species include water and flood control proposed projects, agricultural operations, introduced predators, livestock grazing, and the introduction of exotic plants into riparian systems (CDFG, 1991).

Habitat Requirements

Gila woodpeckers are closely associated with saguaros or large trees that they use for nesting (Rosenberg et al., 1991). They are most common in the desert mesas of Arizona (Terres, 1980). In California, they are found primarily in mature riparian habitats, although they also use mesquite stands, orchards, and tall cultivated trees and utility poles for nesting (Garrett and Dunn, 1981; Rosenberg et al., 1991; and Tierra Madre Consultants, 1998). Gila woodpeckers appear to need large blocks of riparian habitat for nesting; isolated patches of riparian habitat less than 50 acres do not support this species (Rosenberg et al., 1991). Although a number of the woodpeckers may occur in residential and park areas with tall trees, they have low reproductive success in these areas because of competition for nesting cavities with the introduced European starling.

Nesting cavities are excavated high in trees or saguaros and may be used for more than one season unless taken over by owls or European starlings. Breeding begins in February with pairing and territorial chasing. Young are dependent on parents for an extended period of time after fledging, although two to three broods can be raised in a season (Rosenberg et al., 1991). Pairs in riparian areas tend to successfully raise more than one brood, each with three to four young. In other habitats, Gila woodpeckers tend to have high rates of nest failure because of the eviction of adults and eggs from nesting cavities by aggressive starlings.

The Gila woodpecker forages by using its sharp bill to search for and chisel prey items from tree trunks and branches. Gila woodpeckers eat mostly insects, such as grasshoppers, beetles, ants, and grubs (Terres 1980). They also eat bird eggs, fruit from orchards, mistletoe berries, cactus pulp, saguaro fruits, and corn (Ehrlich et al., 1988; Scott, 1987; and CDFG, 1991).

Habitat in the Proposed Project Area

The proposed project area does not contain areas supporting saguaros, a commonly used nesting substrate of Gila woodpeckers. Cottonwoods and willows supported by seepage adjacent to the AAC are limited in size and distribution but may provide suitable habitat for Gila woodpeckers. Gila woodpeckers may use telephone poles as nesting substrates (Tierra Madre Consultants, Inc., 1998); these occur throughout the proposed project area. Garrett and Dunn (1981) reported Gila woodpeckers also using groves and ranch yards having tall trees south of the Salton Sea and near Brawley, Imperial County. Although Gila woodpeckers use these areas for nesting, reproductive success may be poor due to competition with European starlings.

Proposed Project Area Occurrence

Gila woodpeckers may breed locally but are listed as rare to very uncommon on the Salton Sea Wildlife Refuge, occupying habitats near houses and towns where larger trees are found (USFWS, 1997b). They have also been observed in areas near Brawley and along the Alamo River. Gila woodpeckers are also known to occur between the Laguna and Imperial Dams along the LCR. Gila woodpeckers have been observed at two locations along the AAC; across from the mission wash flume in a mature stand of cottonwoods and 6.5 miles to the northeast of Yuma in an area dominated by salt cedar, mesquite, and palo verde. A biological survey that Tierra Madre Consultants, Inc., conducted along the south side of the AAC in 1998 noted several Gila woodpeckers, including one pair nesting in a cottonwood (Tierra Madre Consultants, Inc., 1998). None of the Gila woodpeckers were seen using holes in powerline poles, rather they appeared to use poles as song perches and foraging sites (Tierra Madre Consultants, Inc., 1998).

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Range and Distribution

The southwestern willow flycatcher is recognized as one of five subspecies of the willow flycatcher. Willow flycatchers were once widespread and locally common throughout the southwest, and were distributed across southern California, southern Nevada, southern Utah, Arizona, New Mexico, and western Texas (Hubbard, 1987; Unitt, 1987; and Browning, 1993). At present, the willow flycatcher is believed to be extirpated as a breeding species along the lower reaches of most southwestern riverine systems. The largest breeding populations of southwestern willow flycatcher in California occur along the San Luis Rey and Santa Margarita Rivers in San Diego County and along the south fork of the Kern River at the southwest end of the Sierra Nevada Mountains (Salton Sea Authority and Reclamation, 2000). Although historical records indicate this species was once abundant along the LCR, recent surveys have found breeding willow flycatchers persisting very locally in small, widely scattered locations, including Grand Canyon National Park, Lake Mead Delta, Adobe Lake, Topock Marsh, the Virgin River Delta, and Mormon Mesa (USFWS, 1995a; Sogge et al., 1997; McKernan, 1997; McKernan and Braden, 1999; and AGFD, 1997e). Large numbers of willow flycatcher pass through Southern California deserts during spring and fall migration (Garrett and Dunn, 1981).

Population Status

Since the 1800s, the willow flycatcher has experienced extensive population reductions throughout its range (USFWS, 1995a; AGFD, 1997e). Based on recent censuses and population estimates throughout the range of the southwestern willow flycatcher, the USFWS (1995a) estimated the total number of remaining flycatchers at approximately 300 to 500 pairs. The population of southwestern willow flycatcher in Southern California was estimated at fewer than 80 pairs in the early 1980s (Unitt, 1984). Declines are continuing in most populations that have been monitored since that time (USFWS, 1995a). The primary factors responsible for the decline of the southwestern willow flycatcher are the loss and degradation of native riparian habitats, particularly cottonwood-willow associations (USFWS, 1995a; AGFD, 1997e). Related factors contributing to the decline of this species include brood parasitism by brown-headed cowbirds, increased predation, salt cedar invasion, urban and agricultural development, livestock grazing, water diversion and impoundment, channelization, offroad vehicle use and recreation, floods, pesticides, forest practices, and possible gene pool limitations (USFWS, 1995a; AGFD, 1997e). The small size of remaining flycatcher populations (most populations contain fewer than five pairs) suggests that environmental stochasticity, demographic stochasticity, and genetic deterioration may also be playing an increasing role in the species' decline. Recent observations of physical deformities, including crossed bills and missing eyes, in conjunction with the discovery of high levels of several toxic chemicals (e.g., lead, arsenic, and selenium) in or near breeding sites, suggest that environmental contamination may also be threatening this species (Paxton et al., 1997). The willow flycatcher is a California state endangered species.

Habitat Requirements

The southwestern willow flycatcher is a neotropical migrant that is strongly associated with riparian habitats. It is considered a partial obligate on cottonwood-willow riparian systems throughout southwestern riverine systems. Its association with cottonwood-willow habitats is strongest at low elevations (Hunter et al., 1987). Invasion of cottonwood-willow habitats by exotic species, principally tamarisk, may reduce habitat value for southwestern willow flycatchers. In particular, tamarisk may not provide the thermal cover necessary for the southwestern willow flycatcher to nest successfully. At higher elevations, willow flycatchers often use tamarisk stands (Hunter et al., 1987), suggesting that under some circumstances, these altered riparian habitats may support this species.

Breeding habitat consists of dense stands of intermediate-size shrubs or trees, such as willow, Coyote bush, ash, boxelder, and alder, with an overstory of larger trees, such as cottonwood. Exotic species, such as Russian olive and tamarisk, may also be present in composition. Both even- and uneven-aged sites are utilized by this subspecies for nesting habitat. Typically, nesting habitat for the willow flycatcher has extensive canopy coverage and is structurally homogenous (USFWS, 1995a). Occupied habitat is generally associated with surface water or saturated soil (Sogge et al. 1997) and dominated by shrubs and trees 10 to 30 feet tall that provide dense lower and mid-story vegetation, with small twigs and branches for nesting. Apparently, habitat structure and the presence of surface water or saturated soils may be more important than plant species composition in defining suitable flycatcher habitat (USFWS, 1995a).

The willow flycatcher is present and singing on its breeding territory by mid-May, and young are fledged by early to mid-July (USFWS, 1995a). Territory sizes for the willow flycatcher are not well known due to the subspecies' rarity and variable habitat utilization. However, habitat patches as small as 1.2 acres have been found to support one or two nesting pairs (USFWS, 1995a). Nesting success rates for the willow flycatcher appear to be affected by habitat fragmentation, resulting in increased rates of predation and high levels of brood parasitism by the brown-headed cowbird (USFWS, 1995a; AGFD, 1997e).

This species is insectivorous and forages for insects both within and above dense riparian vegetation. Prey items are taken on the wing and gleaned from foliage. This species also forages along water edges, backwaters, and sandbars adjacent to nest sites.

Habitat in the Proposed Project Area

Cottonwood-willow habitat is largely absent from the proposed project area. Between Drops 3 and 4, seepage from the AAC supports a localized area of cottonwood/willow habitat. Tamarisk also occurs in areas receiving seepage from the AAC and is dominant along the New and Alamo Rivers. Because of the lower structural diversity of tamarisk stands and poor thermal cover, these low-elevation riparian areas are likely to provide marginal nesting habitat at best for willow flycatchers. Tamarisk and common reed supported along the agricultural drains may be used by migrating willow flycatchers.

Proposed Project Area Occurrence

The occurrence and distribution of southwestern willow flycatchers in the proposed project area is poorly known. Willow flycatchers of an undetermined subspecies have been reported at the Salton Sea National Wildlife Refuge and are considered an uncommon spring migrant and common fall migrant (USFWS, 1997b). These birds may include other subspecies of willow flycatchers that migrate through the area between northern breeding areas and wintering grounds in South America. Willow flycatchers have been reported in the Imperial Valley in residential areas near Niland, in riparian and desert scrub habitats, and along agricultural drains. In addition, 10 agricultural drains were surveyed in the Imperial Valley during 1994 to 1995. Single willow flycatchers were observed along the Holtville Main, Trifolium 2, and Nettle Drains (Hurlbert et al., 1997). Willow flycatchers are also known to use seepage communities along the AAC near the mission wash flume 3 miles NNE of Bard.

These observations show a low but consistent use of the area by willow flycatchers during migration. Nesting has not been reported in the proposed project. However, recent surveys have found willow flycatchers along on the Whitewater River (a tributary to the Salton Sea) during the breeding season, suggesting that nesting could occur in the proposed project area in the future (B. McKernan, pers. comm).

Brown-Crested Flycatcher (*Myiarchus tyrannulus*)

Range and Distribution

The brown-crested flycatcher is a fairly common summer resident (May to July) in desert riparian habitat along the Colorado River. A few nest at Morongo Valley, San Bernardino County; birds may nest very locally at other desert oases and riparian habitats northwest to Mojave River near Victorville, San Bernardino County. Vagrants have been recorded west to the South Fork Kern River near Weldon, Kern County, north to Furnace Creek Ranch, Death Valley, Inyo County, and on the Farallon Islands (Gaines, 1977a; Garrett and Dunn, 1981; and McCaskie et al., 1988).

Population Status

Numbers have declined in recent decades, apparently in response to destruction of desert riparian habitat and to competition for nest cavities from European starlings (Remsen, 1978).

However, DeGraaf and Rappole (1995) still consider the species common throughout its range.

Habitat Requirements

Brown-crested flycatchers are most numerous in riparian groves of cottonwood, mesquite, and willow, which afford suitable nest sites, but often forage in adjacent desert scrub or tamarisk (Garrett and Dunn, 1981). This species requires riparian thickets, trees, snags, and shrubs for foraging perches, cavities, and other cover. Brown-crested flycatchers also require woodpecker-excavated cavities for nesting and are thus secondarily dependent on snags; trees with rotten heart-wood; utility poles; and fence posts, in which ladder-backed and Gila woodpeckers, and other primary excavators, dig nesting cavities.

Habitat in the Proposed Project Area

Nesting habitat is minimal in the proposed project area, because cottonwood/willow habitat is rare, occurring only in small isolated patches along the AAC. Where nest sites are present, saltcedar and creosote shrubs provide suitable foraging habitat. Wetland areas on the state and federal refuges and agricultural drains may provide suitable foraging habitat for migrating brown-crested flycatchers.

Proposed Project Area Occurrence

The brown-crested flycatcher is known to occur in riparian areas along the LCR between the Laguna and Imperial Dams and has been observed along the AAC in scattered mature cottonwoods across from the mission flume 3 miles NNE of Bard. Birds have also been observed along the northern shoreline of the Salton Sea.

Vermilion Flycatcher (*Pyrocephalus rubinus*)

Range and Distribution

Vermilion flycatchers occur in the southwestern U.S., southern portions of New Mexico, Arizona, and western Texas (Kaufman, 1996). In California, the vermilion flycatcher is a rare, local, year-long resident along the Colorado River, especially in the vicinity of Blythe in Riverside County. A few still breed sporadically in desert oases west and north to Morongo Valley and the Mojave Narrows in San Bernardino County (CDFG, 1999a). Outside the U.S., they occur throughout much of Central and South America (DeGraaf and Rappole, 1995).

Population Status

Surveys have shown declines in the population in Texas (Kaufman, 1996), although the species remains common throughout most of its range (DeGraaf and Rappole, 1995). In California, it was formerly much more common and widespread and is now rare in the Imperial and Coachella Valleys. Numbers have declined drastically along the Colorado River, primarily the result of habitat loss; the species faces extirpation in California if the present trend continues (Grinnell and Miller, 1944; Gaines, 1977b; Remsen, 1978; and Garrett and Dunn, 1981).

Habitat Requirements

Vermilion flycatchers are closely associated with water and inhabit streamside habitats in arid regions. Breeding birds use riparian habitats consisting of cottonwood, willow, mesquite, and other riparian plant species. The use of tamarisk is restricted to high-elevation riparian systems only (Hunter et al., 1987). Often nest sites are adjacent to irrigated fields, irrigation ditches, pastures, or other open and mesic areas (CDFG, 1999a). Nests are located in large trees or shrubs, generally 8 to 20 feet above the ground (CDFG, 1999a).

Vermilion flycatchers forage on insects, particularly beetles, flies, wasps, bees, and grasshoppers. They forage by sallying from perch sites. Foraging is concentrated over water in other mesic habitats.

Habitat in the Proposed Project Area

The proposed project area supports little cottonwood/willow/mesquite habitat. Seepage from the AAC supports a small amount of this habitat between Drops 3 and 4. Tamarisk scrub habitat is widespread in the proposed project area and may provide suitable habitat for vermilion flycatchers. Tamarisk scrub occurs along the New and Alamo Rivers, Salton Sea, agricultural drainage canals, and in areas receiving seepage from water delivery canals. Wetland areas on the state and federal refuges and agricultural drains could be used for foraging and nesting.

Proposed Project Area Occurrence

Vermilion flycatchers are known to occur in the proposed project area but are considered rare (Shuford et al., 1999). While breeding populations presumably occurred in the proposed project area at one time, no nesting populations are currently known (USFWS, 1997b).

Purple Martin (*Progne subis*)

Range and Distribution

The purple martin nests west of the Cascade Range and Sierra Nevada from southwestern British Columbia south to Baja California, Sonora, and Arizona. Nesting occurs east of the Rocky Mountains from northeastern British Columbia and central Alberta east through northern Minnesota, Wisconsin, southern Ontario to central Nova Scotia and south to the Gulf coast and central Florida. In fall, it migrates to and winters in South America.

Population Status

Purple martins began to decline in California in the late 1950s (Small, 1994). Observed declines have been attributed to nest site competition, with the introduced European starling and the loss of suitable nest and roost trees (Remsen, 1978). Currently, the purple martin is a California state species of special concern.

Habitat Requirements

Purple martins are not strongly associated with a particular habitat type. Factors influencing their occurrence and distribution appear to be insect abundance and diversity, presence of open water, humidity, wind speed, and visibility around nest sites. Only the nest substrate itself appears to strongly affect where they occur during the breeding season (Williams, 1996). Purple martins typically nest along rivers, estuaries, and other large water bodies and sometimes in old burns or urban situations (Marshall, 1992). This species usually nests in old woodpecker cavities, often in tall, large-diameter trees and snags but also uses nest boxes, cornices of old buildings, and occasionally rock cavities (Marshall, 1992). In some locations (e.g., Sacramento), hollow box bridges are used for nesting (Williams, 1996).

Purple martins forage by capturing insects in flight. Foraging can occur over any habitat type where insects are abundant.

Habitat in the Proposed Project Area

Purple martins could use most of the proposed project area for foraging. Purple martins will forage in most areas with abundant flying insects. In the proposed project area, the Salton Sea as well as other waterbodies, such as managed wetlands, the New and Alamo Rivers, and major canals, may provide these conditions. Agricultural fields may also provide suitable foraging habitat, depending on the abundance of flying insects.

Proposed Project Area Occurrence

Purple martins are occasional visitors to the Salton Sea area as spring and fall migrants (USFWS, 1997b). No published records exist of purple martins nesting in the southeastern portion of California (Williams, 1996), and purple martins are not expected to nest in the proposed project area.

Bank Swallow (*Riparia riparia*)

Range and Distribution

Bank swallows are a migratory species that range throughout much of the U.S. and Canada during the spring and summer. In California, the majority of its habitat is concentrated along the Upper Sacramento River and several tributaries (CDFG, 1990). Some small, isolated populations occur at a few sites in northwestern California (CDFG, 1990). In winter, it migrates to South America.

Population Status

In California, the bank swallow's population and range have been declining (Small, 1994). Historically, the bank swallow was found throughout the state, but the current distribution is primarily limited to areas along the Upper Sacramento River and several tributaries (CDFG, 1990). Garrison et al. (1987) reported a total breeding population in California of about 16,000 pairs in 1987. In 1990, the estimated breeding population was 4,500 pairs (Small, 1994). Erosion and flood control measures are considered the primary causes of observed declines (Garrison et al., 1987). In other portions of the species' range, population numbers are high and appear stable (Kaufman, 1996).

Habitat Requirements

The bank swallow is usually found foraging over or near open water and open land areas. While considered a riparian species, the bank swallow does not have specific associations with riparian plant communities (Garrison et al., 1987). Foraging takes place during coursing flights over grasslands, along rivers, and other open areas (Sharp, 1992).

Habitat in the Proposed Project Area

Bank swallows do not breed in the proposed project area, and their use of habitats in the proposed project area is restricted to foraging. Bank swallows could use most of the proposed project area for foraging since they will forage in any habitat with abundant flying insects. In the proposed project areas, the Salton Sea—as well as—other waterbodies, such as managed wetlands, the New and Alamo Rivers, and major canals, may provide these conditions. Agricultural fields may also provide suitable foraging habitat, depending on the abundance of flying insects.

Proposed Project Area Occurrence

The bank swallow migrates through the Salton Sea area in April and again in September on its way between wintering areas in South America and its nesting areas in Northern California. It is considered a casual visitor to the proposed project area with only a few records (Garrett and Dunn, 1981).

Crissal Thrasher (*Toxostoma crissale*)

Range and Distribution

The crissal thrasher is a resident of southeastern deserts. It is found from southeastern California to southern Nevada, southwestern Utah to west-central Texas, and Baja California south to central Mexico. In California, it occurs in the eastern Mojave Desert of San Bernardino and southeastern Inyo counties up to 5,900 feet in elevation. It is also a resident in Imperial, Coachella, and Borrego Valleys.

Population Status

The crissal thrasher appears to be localized and uncommon throughout much of its range. While it is still fairly common in Colorado River Valley, population numbers have declined markedly in recent decades (Grinnell and Miller, 1944; Remsen, 1978; and Garrett and Dunn, 1981). Removal of mesquite brushland for agricultural development and introduction of tamarisk are the primary causes of the population reductions (Remsen, 1978). Offroad vehicle activity also may degrade habitat and disturb these thrashers.

Habitat Requirements

The crissal thrasher occupies dense thickets of shrubs or low trees in desert riparian and desert wash habitats. It also occurs in dense sagebrush and other shrubs in washes in juniper and pinyon-juniper habitats. Cover for this species is provided by thickets of dense, shrubby vegetation along streams and in washes and frequently, mesquite, screwbean mesquite, ironwood, catclaw acacia, and arrowweed willow. Crissal thrashers forage mostly on the ground, especially between and under shrubs. The crissal thrasher nests in thickets of desert shrubs or on forked branches of a small trees.

Habitat in the Proposed Project Area

Dense thickets of tamarisk along canals, drainages, agricultural fields and rivers in the proposed project area may provide suitable nesting and foraging habitat for this species. Limited stands of mesquite, willow, and cottonwoods found in seepage areas of the AAC may also provide suitable habitat for the crissal thrasher.

Proposed Project Area Occurrence

The crissal thrasher is a resident of the Imperial, Coachella, and Borrego Valleys. Breeding pairs have been observed along the Alamo River and near the towns of Niland and Brawley. Birds have also been observed across from the mission wash flume 3 miles NNE of Bard and in areas around the Laguna Dam.

Le Conte's Thrasher (*Toxostoma lecontei*)

Range and Distribution

The Le Conte's thrasher is a year-round resident throughout its range (Sheppard, 1996). The species can be found from central California to southwestern Utah, south to western Arizona, and Baja California and northwestern Mexico (Terres, 1980). Specifically, it is found in the San Joaquin Valley and Mojave and Colorado Deserts of California and Nevada southward into northeast Baja California, Mexico, and farther south into central and coastal Baja California. It is found in the Sonoran Desert from extreme southwest Utah and western Arizona south into west Sonora, Mexico. Within its range, its distribution is patchy with the southernmost occurrence in Mexico at about 26 N and northernmost in northwestern Sonora, Colorado (Sheppard, 1970). In California, the species occurs in southern California deserts and in western and southern San Joaquin Valley (Garret and Dunn, 1981). The species may have historically extended north to Fresno and Mono Counties (Ziener et al., 1990).

Population Status

Numbers of Le Conte's thrasher have declined in recent decades. The species is vulnerable to offroad vehicle activity and other mechanical disturbances, including agriculture and development (Ziener et al., 1990). Shooting may be a factor in human-related deaths (Sheppard, 1996). Habitat loss due to degradation, fragmentation, agricultural conversion, irrigation, urbanization, oil and gas development, fire, and over-grazing are the primary reasons for the decline of the species (Brown, 1996).

Habitat Requirements

Le Conte's thrasher occurs in open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats on sandy and often alkaline soils (Ziener et al., 1990; Unitt 1984; and Sheppard 1970). Desert shrubs and cacti are frequently used for cover (Sheppard, 1970). This species often inhabits areas where soil is fine alluvium or sandy and topography is flat and open, including dunes and gently rolling hills (Sheppard, 1996; Miller and Stebbins 1964). Le Conte's thrasher requires areas with an accumulated leaf litter under most plants as diurnal cover for its mostly arthropod prey. Surface water rarely exists anywhere within several miles of most of its territories except temporarily following infrequent rains. Le Conte's thrashers nest in dense, spiny shrubs or densely branched cactus. Typical nest sites are characterized by shade above the nest and may be located in an arroyo in relatively deep shade from overhanging branches and roots (Sheppard, 1996). Nests are known to persist for several years and are often easier to find than the birds (Miller and Stebbins, 1964).

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Habitat in the Proposed Project Area

The creosote bush scrub community is widespread throughout the nonirrigated areas of the Sonoran Desert. In the HCP area, the occurrence of this community is limited to the right-of-way of IID along the AAC.

Proposed Project Area Occurrence

The USFWS (1997) reports LeConte's thrasher as an extirpated breeder at the Salton Sea National Wildlife Refuge with no recent breeding records. Breeding pairs have been observed in desert scrub habitat east of the Coachella Canal, suggesting the potential for them to occur in desert scrub habitat adjacent to the AAC as well.

Loggerhead Shrike (*Lanius ludovicianus*)

Range and Distribution

Loggerhead shrikes formerly nested throughout much of North America, from Canada south through the Great Basin, along the Gulf Coast, and south to Florida and Mexico (Terres, 1980; Cade and Woods, 1997). Their range is currently more restricted, encompassing mainly the southern portions of the historic range.

Population Status

The loggerhead shrike underwent northeastern and north-central range expansions in the late 1800s and early 1900s that were attributed to deforestation and expansion of agriculture (Cade and Woods, 1997). Since the 1940s, there has been a contraction of the range, especially in the north, and an overall decrease in abundance that is associated with reforestation, loss of pasture lands, and expansion of intensive row crop agriculture. Christmas Bird Count and breeding bird survey data show that since 1966, there has been an overall decreasing trend in the abundance of loggerhead shrikes across North America, although some locations have stable or increasing populations. Loggerhead shrikes have always been most abundant in the southern and western parts of their range. They appear to be increasing, especially as a winter resident, in the LCR Valley (Rosenberg et al., 1991). The increase in abundance during the winter is attributed to the expansion of agriculture in the valley, which provides suitable wintering habitat.

The primary reasons loggerhead shrikes are thought to have declined are loss and degradation of breeding habitat (Cade and Woods, 1997). The pattern of historical range expansion and contraction indicates that natural successional changes in vegetation and human-caused landscape changes have made habitat suitable or unsuitable and that loggerhead shrike populations have tracked these habitat suitability changes. With the decreasing availability of farmland in the Northeast, there has been a decline in the range and abundance of breeding loggerhead shrike. Pasture lands, which have declined even more than other types of farmlands, are especially important to shrikes. Certain types of agriculture do not produce suitable loggerhead shrike habitat, such as intensive, chemically treated row crop monocultures. In the West, localized declines are usually attributed to habitat loss from urbanization and intensive modern agriculture practices.

Other causes of decline that have been suggested include possible adverse effects from pesticides, especially organochlorines that can cause eggshell thinning and reduced reproductive success (Cade and Woods, 1997). However, at this time, there is no evidence for a direct impact from pesticides; rather, it may be that pesticides have a stronger indirect effect by reducing insect prey abundance. Other factors contributing to the decline of loggerhead shrike populations include collisions with automobiles and predation by domestic and feral cats.

Habitat Requirements

Loggerhead shrikes prefer open country, such as grasslands, meadows, scrublands, deserts, pastures, and certain ruderal or agricultural lands (Terres, 1980; Cade and Woods, 1997). For nesting, they require suitable nesting shrubs or small trees and hunting perches in an open area with grassy or herbaceous ground cover and bare areas where food is often found (Cade and Woods, 1997). Loggerhead shrikes breed in sparse riparian woodland and desert washes in the Colorado River area. Loggerhead shrikes nest in shrubs or trees, and eggs are laid from February to July.

Shrikes are carnivorous, eating a variety of prey including mice, small birds, reptiles, insects (e.g., grasshoppers, crickets, and beetles), and spiders (Terres, 1980; Rosenberg et al., 1991). Prey is hunted from perches, the ground, or in aerial pursuit. Thorny trees and bushes or barbed wire are used to impale and store prey.

Recommended management strategies for the loggerhead shrike include providing a mosaic of disturbed grassland patches or pasture lands the size of typical territories within monocultures of row crops (Gawlik and Bildstein, 1993; Cade and Woods, 1997). Habitat should be managed away from major roads, given the propensity for shrikes to be killed by automobiles (Cade and Woods, 1997). Other recommendations include fencing shrub patches from livestock to provide nesting sites and increasing the number of hunting perches where they are scarce (Yosef, 1996).

Habitat in the Proposed Project Area

In the proposed project area, habitat for loggerhead shrikes consists mainly of agricultural fields. Vegetation along agricultural drains may be used as perch sites from which loggerhead shrikes forage in adjacent agricultural fields. Nesting may also occur in these habitats. Loggerhead shrikes use urban areas with trees in the Imperial Valley.

Proposed Project Area Occurrence

The loggerhead shrike is a year-round resident at the Salton Sea and Imperial Valley known to occur near the town of Clipatria and areas south of the Salton Sea. The species is known to breed in the vicinity (USFWS, 1997b). Ten drains were surveyed in the Imperial Valley during 1994 to 1995. Loggerhead shrikes were detected along 7 of the 10 drains. Numbers recorded ranged from 1 to 11 individuals.

Arizona Bell's Vireo (*Vireo bellii arizonae*)

Range and Distribution

The Arizona Bell's vireo is distributed throughout the river systems of the desert Southwest from the Colorado River in southeastern California to the Grand Canyon. It is a summer resident along the LCR.

Population Status

Since 1900, populations of this subspecies of Bell's vireo have declined along the lower reaches of the Colorado River where it is now a rarity to locally uncommon summer resident from Needles south to Blythe (Brown et al., 1983; Zeiner et al., 1990; and Rosenberg et al., 1991). This subspecies has also declined along the lower reaches of the Gila, Santa Cruz, and Salt Rivers. At higher elevations, it has remained common throughout its range (Hunter et al., 1987). Since the completion of Glen Canyon Dam in 1963, the Arizona Bell's vireo has been expanding its range eastward along the Colorado River into Grand Canyon National Park (Brown et al., 1983). Construction of Glen Canyon Dam has prevented seasonal flooding that formerly scoured the banks of the river and has allowed an extensive riparian scrub to develop in the old high-water zone. This newly created habitat is largely composed of salt cedar and willow species and supports significant populations of Arizona Bell's vireo (Brown et al., 1983). Grand Canyon populations of the Arizona Bell's vireo are regionally significant due to the substantial decline of this subspecies at lower elevations. Elsewhere along the LCR, the Arizona Bell's vireo is now a rare to locally uncommon summer resident from Needles south to Blythe (Zeiner et al., 1990; Rosenberg et al., 1991).

The decline of this subspecies is primarily due to extensive habitat loss and degradation and heavy nest parasitism by brown-headed cowbirds (Rosenberg et al., 1991; CDFG, 1992). Current threats to this subspecies include the continued loss and degradation of habitat due to urbanization, water and flood control proposed projects, agriculture, livestock grazing, introduced competitors, exotic invasive plants, offroad vehicles, and nest parasitism by brown-headed cowbirds (Brown, 1993; CDFG, 1992; and Rosenberg et al., 1991). Populations of the Arizona Bell's vireo appear to be regulated primarily by the availability of suitable nesting habitat and secondarily by the rate of cowbird parasitism (Brown, 1993). The Arizona Bell's vireo is a California state endangered species.

Habitat Requirements

The Arizona Bell's vireo is an insectivorous, neotropical migrant that breeds in summer in riparian scrub habitats (Brown, 1993; Rosenberg et al., 1991; and CDFG, 1992). Bell's vireos are insectivorous, gleaning insects from foliage and branches close to the ground (CDFG, 1999a). At low elevations, this subspecies is largely associated with early successional cottonwood-willow. Serena (1986) found that Goodding willow was the most important plant contributing to cover around vireo nest sites in the LCR Valley. The near dependence of this subspecies on cottonwood-willow habitats at low elevations may be due to the extremely high mid-summer temperatures that exist outside these habitats (Walsberg and Voss-Roberts, 1983; Hunter et al., 1987). At higher elevations (above 427 m [1,400 feet]), the Arizona Bell's vireo utilizes tamarisk and honey mesquite, as well as cottonwood-willow habitats (CDFG, 1992; Hunter et al., 1987; and Rosenberg et al., 1991). The elevational differences this subspecies exhibits in its breadth of habitat use is typical of many southwestern riparian birds and appears to be related to the availability of appropriate nest-site environments that may be constrained by restricted thermal tolerances (Hunter et al., 1987). Most nests are located 1.5 to 4.5 feet above ground and are generally suspended from small, lateral, or terminal forks of low branches in dense bushes; small trees; and, occasionally, herbaceous vegetation. In the Grand Canyon, 77 (64 percent) of 121 vireo nests were located in shrub salt cedar and 29 (24 percent) in honey mesquite (Brown, 1993).

The Arizona Bell's vireo is a frequent host of the brown-headed cowbird. Although the percentage of cowbird eggs hatched relative to the number laid in vireo nests is low, cowbird parasitism significantly reduces vireo productivity through nest abandonment, the destruction or removal of both eggs and young, and nestling competition (Brown, 1993; CDFG, 1992; and Rosenberg et al., 1991).

Habitat in the Proposed Project Area

Cottonwood-willow habitat is largely absent from the proposed project area. Seepage from the AAC supports a small area of this habitat between Drops 3 and 4. Tamarisk is also common in this area and other areas receiving seepage from the AAC and along the New and Alamo Rivers. In addition to these areas, tamarisk stands develop along agricultural drains and in areas receiving seepage from unlined canals in the Imperial Valley. While tamarisk provides habitat in parts of the Arizona Bell's vireo range, the extreme temperatures that occur in summer months in the proposed project areas likely preclude extensive utilization of this habitat.

Proposed Project Area Occurrence

Arizona Bell's vireo are not known to occur in the Imperial Valley, and the potential for this species to occur in the Imperial Valley in the future is low (IID, 1994). Arizona Bell's vireos have been observed in eastern Imperial County near Bard Lake and Laguna Dam. In the proposed project area, Arizona Bell's vireo is most likely to occur in habitats supported by seepage from the AAC.

Least Bell's Vireo (*Vireo bellii pusillus*)

Range and Distribution

Least Bell's vireo migrate from their wintering ground in Southern Baja California to Southern California between mid-March and early April to Southern California, where they remain until July or August.

Population Status

The breeding populations north of the U.S.-Mexico border now numbers only about 400 pairs. Least Bell's vireo currently breeds in only a few scattered areas of riparian habitat in Southern California along the coast and western edge of the Mojave Desert. The decline in least Bell's vireo is related to the loss of riparian habitat. As much as 90 percent of the original extent of riparian woodlands in California has been eliminated, and most of the remaining 10 percent is in a degraded condition. Additionally, widespread habitat losses have fragmented most remaining populations into small, disjunct, widely dispersed subpopulations (Franzreb, 1980). The spread of agriculture, excessive livestock grazing, recreational activities, and brown-headed cowbirds continue to put pressure on the remaining population.

Habitat Requirements

For breeding, least Bell's vireos are associated with riparian woodlands consisting of willows, cottonwoods, and wild blackberry, and, in desert locations, mesquite. Dense thickets of willow and other low shrubs are used for nesting and roosting sites (CDFG, 1999a). Areas containing a high proportion of degraded habitat result in lower reproductive success than areas with high quality riparian woodlands (Pike and Hays, 1992). Least Bell's vireos glean insects from foliage and branches, and usually forage close to the ground (CDFG, 1999a). Least Bell's vireos are highly territorial and sensitive to many forms of human disturbance including noise, night lighting, and consistent human presence in an area. Excessive noise can cause least Bell's vireo to abandon an area.

Habitat in the Proposed Project Area

High quality breeding habitat for Least Bell's vireo does not occur in the proposed project area. Tamarisk thickets along the New and Alamo Rivers and irrigation canals and drains could be used by least Bell's vireo during migration. Habitats used while migrating are not well known, but least Bell's vireos are assumed to use riparian habitats similar to those used for breeding during migration, if such habitats are available. In addition, small wetland areas that support some willows and cottonwoods along the AAC could also be used temporarily by least Bell's vireo but are not expected to support breeding pairs.

Proposed Project Area Occurrence

The least Bell's vireo is a rare and local summer resident in lowland riparian woodlands along the LCR (Garrett and Dunn, 1981). In the proposed project area, the subspecies is known to occur accidentally only during migration. Only two records of the least Bell's vireo exist at the Salton Sea National Wildlife Refuge (USFWS, 1997b). Breeding has not been reported at the Salton Sea or elsewhere in the proposed project area.

Tricolored Blackbird (*Agelaius tricolor*)

Range and Distribution

The tricolored blackbird occurs primarily in California's Central Valley in coastal districts from Sonoma County south. In this portion of its range, it is a year-round resident. In northeastern California, where the species is present only during summer, it occurs regularly only at Tule Lake; but breeding pairs have been observed in some years as far south as Honey Lake. In southern deserts, tricolored blackbirds are found regularly only in Antelope Valley, Los Angeles County (CDFG, 1999a). In winter, tricolored blackbirds become more widespread along the central coast and San Francisco Bay area (Grinnell and Miller, 1944; McCaskie et al., 1979; and Garrett and Dunn, 1981).

Population Status

Tricolored blackbird populations have declined in recent decades, probably due to habitat loss (Kaufman, 1996; DeHaven et al., 1975). Because tricolored blackbirds nest in large, dense colonies, they are vulnerable to nest destruction by mammalian and avian predators (Bent, 1958). Currently, the tricolored black bird is a federal sensitive species and a California state species of special concern.

Habitat Requirements

Tricolored blackbirds roost in large flocks in areas with emergent wetland vegetation, especially cattails and tules, and in trees and shrubs adjacent to wetland areas (Terres, 1980). Tricolored blackbirds forage on the ground in croplands, grassy fields, flooded lands, and along edges of ponds (CDFG, 1999a). In California, insects and spiders composed 86 to 91 percent of the nestling and fledgling diet, and 28 to 96 percent of adult diet in spring and summer (Skorupa et al., 1980). The fall and winter diet is composed primarily of seeds and cultivated grains, such as rice and oats.

Tricolored blackbirds nest near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. The nest is usually located a few feet over, or near, fresh water or may be hidden on the ground among low vegetation (CDFG, 1999a). This species is highly colonial often nesting in a minimum colony of about 50 pairs (Grinnell and Miller, 1944).

Habitat in the Proposed Project Area

Potentially suitable habitat for tricolored blackbirds occurs in the managed wetlands of the state and federal wildlife refuges, in other wetlands adjacent to the Salton Sea, along agricultural drains, and in marsh communities supported by seepage from the main water delivery canals. The wetlands on the state and federal refuges probably provide the greatest habitat value since these areas support more cattails and bulrushes in larger patches than other areas of marsh vegetation in the proposed project area. The agricultural drains support only limited amounts of cattails and bulrushes in small patches. More commonly, vegetation along the agricultural canals consists of common reed and tamarisk. Red-winged blackbirds and yellow-headed blackbirds are common and abundant in common reeds along drains in Imperial Valley (Hurlbert et al., 1997), and tricolored blackbirds may similarly find suitable habitat conditions in these areas. Agricultural fields in the area provide suitable foraging habitat.

Proposed Project Area Occurrence

Tricolored blackbirds are rare in the proposed project area. They are not known to breed in the proposed project area, but may occur during spring and winter (USFWS, 1997b; Garrett and Dunn, 1981). Two records for this species exist for the Salton Sea National Wildlife Refuge (USFWS, 1997b; Reclamation and IID, 1994), and one tricolored blackbird was observed along the Holtville Main Drain during surveys of selected drains in the Imperial Valley in the mid-1990s (Hurlbert et al., 1997).

Yellow Warbler *(Dendroica petechia)*

Range and Distribution

During its summer breeding season, the yellow warbler can be found throughout the U.S., into Canada and Alaska (Kaufman, 1996). Yellow warblers migrate to Central and South America where they winter. Their current breeding range in California includes the Great Basin, Sierra Nevada, Cascade Ranges, Klamath Mountains, Coast Ranges, and northern Sacramento Valley (Zeiner et al., 1990). The yellow warbler is locally common in the central and northern Coast Ranges (Remsen, 1978).

Population Status

Small (1994) reports that the breeding population of yellow warblers in California has been declining since the 1930s. The two primary reasons for declines in yellow warbler populations are the loss of riparian forests, particularly in the Sacramento and San Joaquin

Valleys, and nest parasitism by the introduced brown-headed cowbird (Remsen, 1978). Along the north coast and Cascade region, populations are thought to be relatively stable, not having experienced similar declines as those in the interior lowlands. A negative trend (nonsignificant) in abundance was noted in the western states by Robbins et al. (1986). The yellow warbler has declined considerably in the coastal lowlands and may be extirpated as a breeder from the Colorado River (Garrett and Dunn, 1981). Pesticide use and habitat loss on wintering grounds in South America may have also played a role in the observed declines of this species.

Habitat Requirements

Yellow warblers nest in riparian scrub and riparian forest habitats from lowland riparian areas up to the mixed north-slope forest zone. Breeding birds are closely associated with alder-cottonwood-willow stands (Harris, 1991), but they will apparently also nest in the shrub-sapling stage of Douglas-fir forest (Meslow and Wight, 1975). Nests are typically placed low (3 to 6 feet) in shrubs and trees in deciduous riparian habitat (Beedy and Granholm, 1985; Zeiner et al., 1990). The species forages mainly in deciduous riparian habitat, but also in adjacent stands of woodlands and conifer forests (Marcot, 1979). On the Colorado River, transients are found in any dense riparian vegetation including salt-cedar, as well as other exotic trees (Rosenberg et al., 1991). Insects are the primary food item, but yellow warblers will occasionally eat berries.

Habitat in the Proposed Project Area

Cottonwood/willow habitat is largely absent in the proposed project area. It is primarily limited to a seepage area between Drops 3 and 4 along the AAC. Agricultural drains support tamarisk as well as dense stands of common reed that potentially provide suitable habitat for yellow warblers. Tamarisk scrub habitat along the Salton Sea and the New and Alamo Rivers could similarly support yellow warblers. In addition to these areas, chats may use tamarisk and common reed thickets that have invaded areas of the state and federal refuges.

Proposed Project Area Occurrence

The yellow warbler is a common spring and fall migrant and a rare winter visitor to the Salton Sea area (USFWS, 1997b). Small numbers regularly winter in the Imperial Valley (Garrett and Dunn, 1981) and have been observed near the towns of Niland and Calexico. Yellow warblers were detected along 6 of the 10 drains surveyed in the Imperial Valley during 1994 to 1995, where numbers recorded ranged from 1 to 20 individuals (Hurlbert et al., 1997).

Yellow-breasted Chat (*Icteria virens*)

Range and Distribution

The yellow-breasted chat's range extends throughout most of the western U.S. and into Mexico (Kaufman, 1996). The winter range of this migratory species extends south into Central and South America. This species is a summer resident in Imperial County.

Population Status

Small (1994) reports that the species has declined throughout California. The loss of riparian forests and nest parasitism by the introduced brown-headed cowbird have been implicated as the primary contributors to this decline (Small, 1994). Both these factors have affected populations in the interior lowlands and southern coast of California. Along the north coast, populations are thought to be relatively stable, not having suffered from similar declines (Remsen, 1978). Habitat loss on wintering grounds in South America may have also played a role in the observed decline of this species.

Habitat Requirements

In Northern California, the yellow-breasted chat occurs in well-developed riparian habitats (Harris, 1991). Nesting habitat consists of very dense scrub; brushy thickets; and briery tangles (usually willows, blackberry, and grapevines), which are generally adjacent to streams, ponds, or swamps (Zeiner et al., 1990; Kaufman, 1996). This species prefers various types of edge habitat, including grass-shrub, shrub-forest, and water-shrub. Occasionally, they will nest in dry overgrown pastures and in upland thickets along the margins of wooded areas (Kaufman, 1996). Hunter et al. (1988) found that chats will use the exotic saltcedar; however; they do not report the frequency of nest placement in saltcedar. Brown and Trosset (1989) report that chats nest in tamarisk and native shrubs in proportion to the occurrence of the different types of vegetation. Territory size is up to 4 acres (Brown, 1985). Dennis (1958) noted that nesting chats never occupied habitat patches less than 3 acres. Up to half of their diet may be berries and fruit, which explains their preference for shrubby thickets in nonforested areas (Kaufman, 1996).

Habitat in the Proposed Project Area

Well developed riparian habitat is largely absent from the proposed project area. Willows and mesquite occur in seepage areas adjacent to the AAC and in a few areas adjacent to the Salton Sea. Agricultural drains and areas along the New and Alamo Rivers support tamarisk as well as dense stands of common reed that potentially provide suitable habitat for yellow-breasted chats. In addition to these areas, chats may use tamarisk and common reed thickets that have invaded areas of the state and federal refuges.

Proposed Project Area Occurrence

Yellow-breasted chats are occasional migrants and summer residents in the proposed project area. They are known to breed in riparian and wetland areas around the Salton Sea (Salton Sea Authority and Reclamation, 2000). The species also occurs in Eastern Imperial County near Bard and the Laguna Dam. The species has been observed along the AAC across from the mission wash flume, 3 miles NNE of Bard in scattered mature cottonwoods with a dense understory of cattails and introduced palm trees, surrounded by salt cedar and agricultural fields (CNDDB).

Large-billed Savannah Sparrow *(Passerculus sandwichensis rostratus)*

Range and Distribution

The large-billed savannah sparrow is a Mexican subspecies of savannah sparrow that breeds in marshes around the head of the Gulf of California, particularly in the delta of the

Colorado River (Unitt, 1984). It was formerly common in winter along the California coast, primarily from Santa Barbara south, and was recorded as far north as San Luis Obispo County. Its winter range also included the Channel Islands. In California, this subspecies is now a rare to uncommon postbreeding visitor to the Salton Sea and Southern California coast from mid-July through March or April, when it returns to the Colorado River Delta to breed (Garrett and Dunn, 1981).

Population Status

The large-billed savannah sparrow was once widespread in salt marshes and on beaches along the coast of Southern California. The decline of the large-billed Savannah sparrow is attributed to breeding habitat alterations in the Gulf of California and the lower reaches of the Colorado River (Unitt, 1984; Garrett and Dunn, 1981). The status of the large-billed Savannah sparrow in California is uncertain. It has been stated that "many" of these birds migrate to Southern California marshes (Zink et al., 1991), but also that the migrating portion of that population is "reduced or extinct" (Wheelwright and Rising, 1993). Its decline may be partially caused by the drying up of marshes at the mouth of the Colorado River.

Habitat Requirements

In winter, large-billed Savannah sparrows are generally associated with saltmarsh, mudflats, and low coastal strand vegetation. At the Salton Sea, they are found primarily in tamarisk scrub (Garrett and Dunn, 1981). Like other Savannah sparrows, the large-billed Savannah sparrow is omnivorous and probably eats mostly insects, seeds, tiny crustaceans, and mollusks. Grasses and other weeds are also likely consumed (Kaufmann 1996; Rosenberg et al., 1991).

Habitat in the Proposed Project Area

In the proposed project area, large-billed savannah sparrows are known to use only tamarisk scrub near mouths of the New and Alamo Rivers at the Salton Sea (Garrett and Dunn, 1981). However, given this association with tamarisk at the Salton Sea, large-billed Savannah sparrows may also use tamarisk scrub throughout the proposed project area.

Proposed Project Area Occurrence

This subspecies of Savannah sparrow is a rare to uncommon postbreeding and winter visitor to the Salton Sea area. It occurs in the proposed project area from mid-July through the winter, migrating to the Colorado River Delta and Mexico to breed (Garrett and Dunn, 1981).

Summer Tanager (*Piranga rubra*)

Range and Distribution

The summer tanager is a neotropical migrant that breeds throughout most of the southeastern and southwestern U.S., including New Mexico, Arizona, southern Nevada, and southeast California. This species winters from Southern Baja California and central Mexico south to South America (Terres, 1980; Robinson, 1996).

Population Status

Although summer tanagers are still common and widespread in many areas, their range may be contracting in the eastern U.S.; they have experienced sharp declines along the LCR (Ehrlich et al., 1988; Kaufmann, 1996; and Robinson, 1996). Elsewhere in the Southwest, summer tanagers are believed to have been extirpated from the lower Gila, Santa Cruz, and Salt Rivers (Hunter et al., 1987). Along the LCR, the severe decline of this species since the 1970s is attributed to the continuing loss of mature cottonwood-willow habitat. Summer tanagers were still fairly abundant in the area until the early 1980s, when severe flooding at Bill Williams Delta and along the Colorado River mainstream resulted in a 36 percent population decrease. After the flooding, only 138 individuals were estimated to occur in the entire valley, while population densities at Bill Williams Delta dropped from 16 to 24 birds per 100 acres to 6 to 10 birds per 100 acres (Rosenberg et al., 1991). Based on these trends, it appears that the summer tanager may become extirpated as a breeding species along the LCR (Rosenberg et al., 1991). The continuing loss of structurally well developed stands of cottonwood-willow riparian forest is the primary threat to this species in the Southwest (Rosenberg et al., 1991; Hunter et al., 1987). However, the summer tanager is still common and abundant elsewhere within its range (Kaufman, 1996). The summer tanager is a California state species of special concern.

Habitat Requirements

In the southwestern U.S., summer tanagers occur primarily in cottonwood-willow forests along rivers and streams but can also occur in tamarisk stands along the Colorado River. The species is generally found in association with tall riparian trees, suggesting that canopy height may be a more important factor than species composition in the tanager's selection of foraging and nesting habitats (Rosenberg et al., 1991). Summer tanagers forage mainly in the tops of tall riparian trees for insects. In the Southwest, this species feeds heavily on cicadas, bees, and wasps. They also eat a variety of other insects (e.g., caterpillars, beetles, spiders, and flies) and berries and small fruits (Kaufmann, 1996; Terres, 1980; and Rosenberg et al., 1991).

Habitat in the Proposed Project Area

Cottonwood/willow habitat is of limited size and distribution in the proposed project area, occurring primarily in the seepage areas along the AAC between Drops 3 and 4. Most riparian areas in the proposed project area are dominated by tamarisk, which may provide suitable habitat along the New and Alamo Rivers, adjacent to the Salton Sea, and along agricultural drains.

Proposed Project Area Occurrence

Summer tanagers are rare in the proposed project area during summer and winter. They are more common in winter but are still considered only occasional visitors (USFWS, 1997b). The summer tanager breeds along the Colorado River and has been observed between the Laguna and Imperial Dams in areas with willow, mesquite, and salt cedar (CDFG, 1999b). Known or suspected nesting localities outside the Colorado River are Brock Ranch (Imperial County), Borrego Springs (San Diego), Thousand Palms Oasis (Riverside), Palm Springs (Riverside), Whitewater Canyon (Riverside), Morongo Valley (San Benito), Tecopa (Inyo), Mohave River, and Valyermo (Lassen) (Garrett and Dunn, 1981). These reports of breeding in arid regions outside the Colorado River indicate that summer tanagers could breed in the proposed project area.

Mammals

Mexican Long-tongued Bat (*Choeronycteris mexicana*)

Range and Distribution

The Mexican long-tongued bat reaches the northern limit of its range in southeastern U.S. In New Mexico and Arizona, long-tongued bats have been found at elevations ranging from sea level to 6,000 feet, occupying desert and montane riparian, desert succulent shrub, desert scrub, and pinyon-juniper habitats. In California, the long-tongued bat is known only from San Diego County. An invasion in 1946 provided most of the California records for long-tongued bats (Olson, 1947). California records largely have been in urban habitat in San Diego (Olson, 1947).

Population Status

Mexican long-tongued bats are considered rare in Mexico, and fewer than 400 individuals have been observed in the U.S. since 1906. Threats include recreational caving; natural and intentional mine closures; renewed mining activity; mine reclamation; and loss of food plants as a result of development, agriculture, and grazing (Noel, 1998).

Habitat Requirements

The Mexican long-tongued bat occurs in a variety of habitats, ranging from arid scrub habitats to mixed oak-conifer forests (Arroyo-Cabrales et al., 1987). It favors desert canyons with riparian vegetation. In Mexico, New Mexico, and Arizona, this bat occupies deep canyons of desert mountain ranges. A variety of roost sites is used, including caves, mines, buildings, and trees. Caves, mines, and probably buildings are used as nursery sites. This species forages in desert and montane riparian, desert scrub, desert succulent shrub, and pinyon-juniper habitats. The long-tongued bat feeds mainly on nectar, fruit, and pollen.

Habitat in the Proposed Project Area

Desert scrub is widespread throughout the nonirrigated areas of the Sonoran Desert. This habitat type surrounds the Salton Sea between the higher rock hillsides and the more saline desert saltbrush community. Succulent shrubs comprise a minor component of the vegetation community and foraging habitat may be limited. The only portion of the HCP area that supports desert scrub habitat is in the right-of-way of IID on the AAC.

While mining activity has occurred throughout Imperial County, the nearest abandoned mine shafts are located near Hedges at the southwestern tip of the Cargo Muchacho Mountains, well outside of the proposed project area. Areas along the AAC supporting cottonwoods, landscape trees, and buildings may provide roosting sites.

Proposed Project Area Occurrence

This species has not been reported to occur in Imperial County; however, the area is within the distributional range of the species. The limited availability of roosting sites and potentially sparse forage makes the occurrence of this species unlikely in the proposed project area.

California Leaf-nosed Bat (*Macrotus californicus*)

Range and Distribution

California leaf-nosed bats range from coastal and eastern California to western New Mexico, and from southeastern Nevada south into Baja California and northwestern mainland Mexico (Hall, 1981).

Population Status

The status of this bat remains unknown (USFWS, 1994). In Southern California, this species has disappeared from most coastal basins and declined in many other areas. In Nevada, no recent sightings of this species have been reported (NNHP, 1997). Like many cave dwelling bats, loss of foraging habitat and disturbances at roost sites are thought to be responsible for the declines (Williams, 1986). Filling or plugging of cave and abandoned mine entrances, intrusion by explorers, and renewal of historic mining sites may also be contributing factors.

This species is particularly susceptible to human disturbance that may cause abandonment of roosts during the breeding season. The impact of human disturbance on roost sites may be significant due to the specific thermal regime required for maternity roosts. Closing of mines and caves or improper gating of entrances can also affect colonies (AGFD, 1996). The AGFD (1997b) describes modification of cave conditions, including changes in air movement, humidity, and temperature, as potentially serious concerns for this species. In some situations, roosting sites remain intact, but nearby foraging habitat is lost due to development, agriculture, or grazing.

Habitat Requirements

California leaf-nosed bats occur in arid regions, using habitats such as desert scrub, alkali scrub, desert washes, riparian associations, and palm oases (Zeiner et al., 1990). Like most bats, this species often forages near open water where greater quantities of insects are available. The species uses separate daytime and nighttime roosts. During winter months, the California leaf-nosed bat forms large colonies in only a few geothermally heated mines in the deserts of the Southwest (Brown and Berry, 1991). Day roosts are often in deeper caves or mines and occasionally in abandoned structures (Zeiner et al., 1990). This species requires warm roosts with temperatures of 80.6°F or more due to its inability to lower its body temperature and become torpid (Bell, 1985). Maternity colonies are generally located in mines with temperatures that reach 80.6 to 89.6°F. California leaf-nosed bat roost sites typically have high ceilings and room for flight. Roosting takes place far enough from the entrance (30 to 80 feet) to take advantage of the humidity and moderate temperatures of the cave (Vaughan, 1959). Night roosts are in bridges, mines, buildings, overhangs, or other structures with overhead protection (Zeiner et al., 1990). The species may form colonies of up to 500 individuals (Zeiner et al., 1990).

California leaf-nosed bats forage for insects within 3 feet of the ground by hovering and picking prey off vegetation or the ground. This species feeds on large flying insects, such as grasshoppers, moths, and beetles (AGFD, 1997b). Foraging ranges are small, with most activity within a mile of day roosts in winter months and up to 5 miles during summer months (Brown, pers. comm.). The presence of woody riparian vegetation, such as mesquite, ironwood, and palo verde, is required in foraging areas. California leaf-nosed bats do not hibernate, and some populations migrate south for the winter.

Habitat in the Proposed Project Area

California leaf-nosed bats use caves and mines as day roosts. The only mine shafts in the area occur near Hedges, at the southwestern tip of Cargo Muchacho Mountains. Plant species preferred for foraging (mesquite, palo verde, ironwood) are rare in the proposed project area and restricted to scattered patches along the AAC. It is unknown whether they forage in riparian areas dominated by tamarisk.

Proposed Project Area Occurrence

Leaf-nosed bats are known to feed on grasshoppers, beetles, cicadas, and moths in various places along the Colorado River (Hoffmeister, 1986). Roost sites have been reported several abandoned mines in the Chocolate and Carago Muchacho Mountains. However, the lack of daytime roost sites along with the scarcity of suitable foraging habitat makes the occurrence of this species in the proposed project area unlikely.

Pallid Bat *(Antrozous pallidus)*

Range and Distribution

The pallid bat has a wide range extending from southern British Columbia and Montana into Central Mexico and east to Texas, Oklahoma, and Kansas (Sherwin, 1998). It is a year-round resident of grassland and desert habitats in the southwestern U.S. (Hermanson and O'Shea, 1983). The pallid bat is a locally common species of low elevations in California where it occurs throughout most of the state, except the high Sierra Nevada from Shasta to Kern Counties and the northwestern corner of the state from Del Norte and western Siskiyou Counties to northern Mendocino County.

Population Status

The pallid bat is a California state species of concern due to limited population numbers. Current threats include mine closure proposed projects; human disturbance of roost sites; extermination in buildings; pesticides; and loss of foraging areas due to urban development, logging activities, and vineyard development (Sherwin, 1998).

Habitat

The pallid bat typically roosts in rock crevices but will also use caves, mines, buildings, and trees. It primarily forages on ground-dwelling arthropods, such as scorpions, crickets, and grasshoppers (Hermanson and O'Shea, 1983).

The pallid bat is most often found in arid, low-elevation habitats, including grasslands, shrublands, woodlands, and forests. These bats are nocturnal and emerge up to an hour after sunset. Day roosts include caves, crevices, mines, trees, and buildings. Night roosts are generally in more open sites and are near day roosts. Horizontal crevices with stable temperatures are preferred day roosts in summer; vertical crevices with fluctuating temperatures are preferred during cooler periods. Palled bats are relatively inactive during the winter and may hibernate. Migrational patterns include local movements to hibernacula and a postbreeding season dispersal.

Habitat in the Proposed Project Area

Pallid bats are well adapted to human environments and frequently use buildings, bridges, and trees as roosts. Thus, they could roost throughout the proposed project area. Foraging may also occur throughout the proposed project area in any habitat where insect prey is abundant, including agricultural areas, wetlands, riparian areas, canals drains, and desert scrub.

Proposed Project Area Occurrence

While specific populations have not been identified in the proposed project area, roosts have been identified in the general proposed project vicinity at the Mary Lode Mine in the Chocolate Mountains and in the Queen Incline and the Mesquite Adit near the Tumco wash in the Carago Muchacho Mountains.

Pale Western Big-eared Bat *(Corynorhinus townsendii pallescens)*

Range and Distribution

The big-eared bat occurs throughout the western U.S., from southern British Columbia southward to southern Mexico. Isolated, relict populations of this species are found in the southern Great Plains and Ozark and Appalachian Mountains (AGFD, 1998a). The pale western subspecies (*C. t. pallescens*) occurs in Washington, Oregon, California, Nevada, Idaho, Arizona, Colorado, New Mexico, Texas, and Wyoming (Handley, 1959).

Population Status

The results of a survey performed by Pierson and Rainey (1994) suggest that drastic population declines for the pale western big-eared bat have occurred in California throughout the last 40 to 60 years. Among these declines are a 52 percent loss in the number of maternity colonies, a 44 percent decline in the number of roosts, a 55 percent decline in the number of animals, and a 32 percent decrease in the average size of remaining colonies in the state. The lower Colorado desert along the Colorado River, an area that experiences heavy recreational use, is one of three areas in California in which marked declines in the numbers of pale western big-eared bat colonies have taken place. The overall population trend appears to be declining in Arizona, as well. Currently, there are only 13 verified maternity roosts in the state, representing 10 separate colonies, with a total population of about 1,000 adult females (Pierson and Rainey, 1994). More than half of the known maternity roosts are in mines, and only 4 of these roosts contain 200 or more individuals. There may be losses or reductions of maternity colonies, which are easily disturbed; these disturbances often result in abandonment (AGFD, 1996). In the absence of human disturbance, maternity colonies tend to remain stable over time (Pierson and Rainey, 1994).

This species is threatened by human disturbance at major maternity roosts; renewed mining; closure and sealing of abandoned mines naturally or for hazard abatement; and, possibly, the use of nontarget pesticides (AGFD, 1996). Pale western big-eared bats are extremely sensitive to human disturbance, and simple entry into a maternity roost can result in the abandonment of the site (Pierson et al., 1991). This bat feeds heavily on noctid moths, which require wetland habitats. The significant loss of wetlands has resulted in a decrease in prey base for the pale western big-eared bat (ISCE, 1995).

Habitat Requirements

Pale western big-eared bats can be found in a variety of habitats but are most commonly associated with Mohave mixed scrub (e.g., sagebrush, sagebrush-grassland, blackbrush, and creosote-bursage) and lowland riparian communities. Separate day and night roosts are used. Day roosts are in caves, mines, or tunnels. Hibernation roosts are cold, but stay above freezing (Zeiner et al., 1990) and must be quiet and undisturbed. Pale western big-eared bats usually hibernate singly or in small groups and are almost always found in ceiling pockets (Pierson et al., 1991). In climatically moderate areas, this species appears to arouse from torpor frequently on warm nights to feed and changes roost locations often. In these areas, roosts are often L-shaped, with both a vertical and a horizontal entrance that creates a cold sink and generates a strong airflow (Pierson et al., 1991). Maternity roosts are generally located in mines and caves, with the favored roost for clusters of mothers and young often in a ceiling pocket or along the walls just inside the roost entrance, well within the twilight zone (Pierson et al., 1991). The determining factor for maternity roost site selection may be temperature related. In California, maternity roosts are generally warm; the species appears to select the warmest available sites, some of which reach 30°C (86°F) (Pierson et al., 1991). Night roosts may be in buildings or other structures. Separate hibernation and maternity roosts are often used.

Foraging takes place over desert scrub, riparian habitats, or open water with 15 miles of the roost sites. Small moths are the primary food of this species, but other insects are also sometimes eaten (AGFD, 1998a). This species has poor urine concentrating abilities compared to other bats of the region and, therefore, requires access to a nearby water supply (Zeiner et al., 1990).

Habitat in the Proposed Project Area

Pale western big-eared bats use caves and mines for roosting. The only mine shafts in the area occur near Hedges, at the southern extent of the Cargo Muchacho Mountains, which are well outside the proposed project area. Pale western big-eared bats could forage throughout the proposed project area, although they probably would concentrate foraging activities along the LCR, Salton Sea, New and Alamo Rivers, agricultural drains, and water conveyance canals, given this species' association with water. Tall tress, bridges, and buildings could be used as night roosting sites.

Proposed Project Area Occurrence

The species has been observed in eastern Imperial County near Bard. It has been reported to roost in the Senator Mine and Picacho Mine in the Chocolate Mountains. This species is known to occur in the project area.

Spotted Bat *(Euderma maculatum)*

Range and Distribution

The spotted bat has been reported from scattered locations from southern British Columbia to Montana and from coastal California, Texas, and northern Mexico (Hall, 1981). In

California, it is found primarily in foothills, mountains, and deserts in the southern part of the state (Zeiner et al., 1990a and 1990b). It is generally considered widespread, but rare.

Population Status

The population status of the spotted bat is not well known because of the low number of sightings reported. The spotted bat is considered one of the rarest North American mammals. The species appears linked to riparian habitats in many areas, which are generally declining throughout the species' range. The spotted bat is a federal and California state species of special concern.

Habitat Requirements

The habitat requirements and preferences of this species are varied and not well understood. It is known to occur in the openings of conifer forests in montane habitats, riparian woodlands, and desert scrub (Hoffmeister, 1986; NMDGF, 1997; and AGFD, 1998b). Roost site localities are poorly known. This species is thought to use crevices and cracks in cliff faces, and occasionally caves and buildings for roost sites. Roots are often in the vicinity of open water (AGFD, 1998b). Moths seem to be the primary food item of this species, although other insects may be consumed (AGFD, 1998b).

Habitat in the Proposed Project Area

The types of habitats potentially used by spotted bats in the proposed project area are uncertain because this species' ecology is poorly known. Spotted bats could use much of the proposed project area since this species appears to be associated generally with open habitats. Foraging may be concentrated along waterways, such as the Salton Sea, New and Alamo Rivers, large canals, and agricultural drains. Potentially, spotted bats could roost at gravel quarries, highway bridges, or in buildings.

Proposed Project Area Occurrence

No information is available on the occurrence of spotted bats specifically in the proposed project area. Male spotted bats are often observed foraging near the Colorado River in and near the Grand Canyon; however, females are usually observed at higher elevations (Herder, pers. comm.). Occurrences have also been reported from the Yuma area (Hoffmeister, 1986).

Western Small-footed Myotis (*Myotis ciliolabrum*)

Range and Distribution

The small-footed myotis ranges from southern Canada south to central Mexico and from California eastward to west Texas. It is a year-round resident in California, occurring in a variety of habitat types.

Population Status

In 1996, this species was delisted as threatened by the U.S. Fish and Wildlife Department. It remains a federal species of concern. Threats to this species include loss of suitable roosting sites habitat, including destruction and disturbance, and pesticide use.

Habitat Requirements

The small-footed myotis is a common bat of arid uplands in the upper Sonoran Desert. It occurs in a wide variety of habitats, primarily in relatively arid, open stands in forests, woodlands, and brushy uplands near water. The small-footed myotis feeds on a variety of small flying insects, including moths, flies, and beetles, while flying over water and among trees. It requires more water than most other bats and can be found drinking shortly after night emergence. The small-footed bat can be found roosting in caves, buildings, crevices, and under loose bark. Occasionally, it will also roost under bridges (Zeiner, 1990).

Hibernation takes place in caves and mines. Summer roosts are in crevices, cracks, holes, under rocks, and in buildings (AGFD, 1997k). Colonies can be as large as 50 or more individuals (Zeiner et al., 1990).

Habitat in the Proposed Project Area

Areas adjacent to the Salton Sea and along the New and Alamo Rivers, agricultural drains, and possibly the water conveyance canals may be used for foraging. Because this species uses a wide variety of natural and man-made structures for roosts, suitable roost sites could occur throughout the proposed project area.

Proposed Project Area Occurrence

Historic records indicate this species has been present in the Salton Sea area (SSA and Reclamation, 2000). However, the only known roost in the vicinity of the proposed project area is the Mary Lode Mine, located in the Chocolate Mountains to the northeast of the Algodones Dunes (CDFG, 1999b). Still, because this bat will use buildings for roosts and forages in a diversity of habitats, it may occur throughout the HCP area.

Occult Little Brown Bat (*Myotis lucifugus occultus*)

Range and Distribution

The occult little brown bat occurs locally throughout most of the U.S. and Canada, as far north as Alaska and as far south as central Mexico. The subspecies *M. l. occultus* (identified as a separate species, *M. occultus*, by Hoffmeister [1986]) occurs throughout Arizona and into eastern California, western New Mexico, and central Mexico.

Population Status

This species is declining due to using pesticides, destructing nesting colonies, collecting by researchers, humans disturbing hibernating individuals, and harvesting timber that removes mature or dead trees and snags (Williams, 1986; Fenton and Barclay, 1980). Disturbance of hibernating colonies can cause mortality due to use of remaining fat reserves; disturbance to maternity roosts may cause abandonment. Increased exploration of caves and mines has probably caused a decrease in population numbers. Pesticide use has also caused drastic declines in some areas (Kunz et al., 1977; Clark et al., 1978). One and possibly two of the three or four known maternity roosts of this species in Arizona have been eliminated. The status of a third colony on the Verde River is unknown (AGFD, 1997g). The occult little brown bat is a federal and California state species of special concern.

NEXT

Habitat Requirements

In the southwest, the occult little brown bat occurs in a variety of habitats, including ponderosa pine forests, oak-pine woodlands (near water), and along permanent water or in riparian forests in some desert areas (AGFD, 1997g). It is usually closely associated with open water sources, such as rivers, ponds, or reservoirs, and it flies low along shorelines while foraging (Hoffmeister, 1986). It often feeds over open water habitats (Zeiner et al., 1990). This species generally hunts low over water for flying insects, including mosquitoes and midges (AGFD, 1997g). It roosts in hollows in living or dead trees, under rocks or wood, or sometimes in buildings or mines (NMDGF, 1997). This species seems to prefer human structures to natural ones for maternity roosts, and may use mines or caves for hibernation (AGFD, 1997g). Separate day, night, hibernation, and nursery roosts are used. Seasonal movement of several hundred miles between summer roosts and winter hibernacula have been recorded (NMDGF, 1997). Site fidelity is correlated to the permanence of the roost (e.g., cave verses foliage roosts). Colonies can be very large with up to 300,000 individuals (Cockrum, 1956).

Habitat in the Proposed Project Area

The Salton Sea, lakes, wetlands, rivers, canals, and agricultural drains may provide suitable foraging habitat for this species. Because this species uses a wide variety of natural and man-made structures for roosts, suitable roost sites could occur throughout the proposed project area.

Proposed Project Area Occurrence

The occult little brown bat has been known to use riparian areas along the LCR (Reclamation and IID, 1994); however, no recent records exist for this species in this area, and it may be extirpated in this portion of its range (Brown, pers. comm.).

Southwestern Cave Myotis (*Myotis velifer brevis*)

Range and Distribution

In the U.S., the cave myotis is found in the southwestern half of Arizona and immediately adjacent areas of California, Nevada, and New Mexico (AGFD, 1997c). It is also found in west and south Texas and Oklahoma, then southward through Mexico to Guatemala. In California, the southwestern subspecies is restricted to lowlands of Colorado River and adjacent mountain ranges and in San Bernardino, Riverside, and Imperial Counties, although it is more common farther east.

Population Status

Population trends for this species are not well understood, but populations of cave myotis appear to be declining. Large colonies, each containing approximately 1,000 individuals, have been observed in the past in the Riverside Mountains of Riverside and San Bernardino Counties; however, more recent examinations in this area suggest a significant decline in population size (Williams, 1986). Like many other cave-dwelling bats, declines in populations of this species are probably due to pesticide use, mining, and loss of riparian habitats, as well as disturbances to roost sites by humans exploring caves or mines or by the filling or plugging of cave and abandoned mine entrances (Williams, 1986). The species is particularly vulnerable at maternity roosts, where they congregate in large numbers (AGFD, 1997c). The southwestern cave myotis is a federal and California state species of special concern.

Habitat Requirements

This species prefers arid habitats dominated by creosote bush, palo verde, brittlebrush, cactus, and desert riparian. Roosts are typically in caves or mines, but buildings and bridges have also been used. The diet of the southwestern cave myotis consists primarily of moths and beetles that are taken over open washes and near vegetational boundaries. Dense, linear stands of mesquite, salt cedar, and catclaw acacia bordering the still water of oxbow ponds are considered optimal foraging areas (Vaughan, 1959; Hoffmeister, 1986). The southwestern cave myotis is a colonial cave-dweller, occurring in colonies of several thousand individuals in most of its range. Mines, buildings, and bridges may also be used as roosting sites. Hibernation caves have high humidity, often with standing or running water and little air movement. Hibernating cave myotis may form clusters. This species uses temporary night roosts. Nursery colonies are in the hibernation cave or another cave. Occasionally, other sites, such as bridges, are used. Optimal sites are relatively warm, with little human disturbance.

Habitat in the Proposed Project Area

The extensive stands of salt cedar bordering the Alamo and New Rivers could provide foraging habitat for this species. Some agricultural drains that support dense tamarisk and common reed could also provide suitable foraging habitat. Bridges and buildings throughout the area could be used as temporary roosting sites.

Proposed Project Area Occurrence

This species may have been extirpated from the proposed project area by agricultural practices and habitat conversion (USFWS, 1999). No recent surveys have been conducted in the area to determine the occurrence of this species.

Yuma Myotis *(Myotis yumanensis)*

Range and Distribution

The range of the Yuma myotis extends across western North America from British Columbia to central Mexico, and from the West Coast to as far east as Idaho and west Texas. It is thought to migrate seasonally throughout much of its range. The Yuma myotis is known to roost in caves, abandoned buildings, and other structures. The Yuma myotis is uncommon in Mojave and Colorado Desert regions, except for the mountain ranges bordering the Colorado River Valley. Found in a wide variety of habitats ranging from sea level to 11,000 feet, it is uncommon to rare above 8,000 feet. It is not known where the Yuma bat goes for winter, but it has been captured in Arizona in February.

Population Status

Breeding has not been studied, except for a couple of isolated sites in Colorado. At that site, the colony was estimated to number around 100 adult individuals and is the first western record of a breeding site for this species. Elsewhere throughout its range, this species is known to form maternity colonies upwards of several thousand individuals in caves or attics (Hoffmeister, 1986; Hall, 1981; Findley et al., 1975). Threats include mine closure, human disturbance to roost sites, and pesticides.

Habitat Requirements

The Yuma myotis prefers cliffs and rocky walls near desert scrub, pinyon-juniper woodlands, and other open woodlands and forests. Like many bat species, it is closely tied to an open water source for foraging and drinking (Zeiner et al., 1990) and tends to be found near permanent watercourses (AGFD, 1997j). Small moths, midges, termites, and other insects that fly over water are preferred food items of this species. Insects are caught while foraging low over rivers, irrigation canals, permanent ponds, streams, or creeks (AGFD, 1997j). The Yuma myotis roosts in narrow crevices in rock; bridges; buildings; and, occasionally, mines (Hoffmeister, 1986). Preferred roosting habitats, however, are buildings and abandoned cliff swallows' mud nests (AGFD, 1997j). This species is somewhat tolerant of human activity, as evidenced by roosts in attics of inhabited houses or other human-occupied structures (Hoffmeister, 1986). Colonies can be as large as several thousand individuals (Zeiner et al., 1990). Separate daytime and night roosts are used.

Habitat in the Proposed Project Area

The canals, rivers, lakes, and streams throughout the proposed project area offer suitable foraging habitat for the Yuma myotis. This species is relatively tolerant of human activity and may roost in houses, under bridges, or in other natural and manmade structures throughout the proposed project area.

Proposed Project Area Occurrence

This species is known to occur in Imperial County and has historically been reported to occur in the proposed project area (Hall, 1981). No recent surveys have been conducted for this species in the proposed project area, but suitable roosting and foraging habitats are present.

Western Mastiff Bat *(Eumops perotis californicus)*

Range and Distribution

The greater western mastiff bat ranges from San Francisco Bay east to Arizona and Texas, then south to northwestern and central Mexico (AGFD, 1997e). The majority of the western mastiff bats in California are year-round residents; however, some are believed to migrate in the winter to warmer, lowland climates (Williams, 1986).

Population Status

Threats to this species reportedly include human disturbances at roost sites, limited numbers of adequate watering sites, cultivation of major foraging areas, and poisoning and reduction of insects by insecticide use (AGFD, 1996; Williams, 1986). Populations in California are believed to have undergone significant declines in recent years, primarily due to extensive loss of habitat and the widespread use of insecticides (Williams, 1986). Populations in Arizona may also be declining, and some roost sites are no longer occupied (AGFD, 1996 and 1997e). In other areas, greater western mastiff bat populations appear fairly stable (NMDGF, 1997). This western mastiff bat is a federal and California state species of special concern.

Habitat Requirements

Mastiff bats favor rugged, rocky areas in Sonoran Desert scrub habitats, where suitable crevices are available for day roosts (AGFD, 1996). They inhabit crevices in cliff faces, high buildings, trees, and tunnels (Zeiner et al., 1990). Colonies prefer deep crevices up to 10 feet or more (AGFD, 1997e). Because of their large size and long wings, these bats require considerable space to launch themselves into flight, so roosting sites are usually situated to permit a free downward fall for at least 6.5 to 10 feet.

Western mastiff bats forage in open areas, generally over mesquite as far as 25 miles from roost sites (Vaughan, 1959; Jameson and Peeters, 1988). They require long or unobstructed waterways for drinking and feed on moths, bees, wasps, and flying ants that get caught in thermal currents (AGFD, 1996). Mastiff bats roost singly or in small colonies, sometimes with other bat species; several alternate day roosts may be used (Zeiner et al., 1990). Movement among different roost sites is thought to be influenced by temperature, as well as human disturbance (AGFD, 1996). Colonies often support 2 to several dozen individuals but typically number fewer than 100 individuals (AGFD, 1996).

Habitat in the Proposed Project Area

Western mastiff bats are generally associated with open desert habitats near unobstructed waterways. In the proposed project area, these types of habitats occur adjacent to the Salton Sea and along the All American, East Highline, and Westside Main Canals. The availability of suitable roost sites in the proposed project area is unknown. Gravel quarries near the Salton Sea could provide roost sites. Other types of potential roost sites in the proposed project area include bridges, buildings, and trees.

Proposed Project Area Occurrence

Western mastiff bats are known to occur in Imperial County, and roost sites have been found in several abandoned mine sites in the Carago Muchacho Mountains; occurrences in the proposed project have not been reported. Because of the extensive foraging range and availability of habitat in the proposed project area, the western mastiff bat could potentially occur there.

Pocketed Free-Tailed Bat (*Nyctinomops femorosacca*)

Range and Distribution

The pocketed free-tailed bat occurs in western North America, from Southern California, central Arizona, southern New Mexico, and western Texas south into Mexico, including Baja California (Navo, 1998). The pocketed free-tailed bat is found in Riverside, San Diego, and Imperial Counties. This species is rare in California, but is more common in Mexico.

Population Status

The pocketed free-tailed bat is currently a California state species of special concern due to limited population size and rarity of occurrences. No known threats have been identified for this species; however, human disturbance to roosting sites, loss of foraging habitat, and pesticides could pose potential threats to this species (Navo, 1998).

Habitat Requirements

The pocketed free-tailed bat prefers arid lowlands, especially desert canyons, dominated by creosote bush or chaparral vegetation. Habitats used include pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis. This species prefers rock crevices in cliffs as roosting sites. It must drop from the roost to gain flight speed. The pocketed free-tailed bat reproduces in rock crevices, caverns, or buildings and primarily feeds on moths and beetles.

Habitat in the Proposed Project Area

Creosote scrub habitat is found in areas adjacent to the Salton Sea and along the All American, Coachella, and Westside Main Canals. Areas along the New and Alamo Rivers and along larger drainages and canals may also provide foraging habitat. The availability of suitable roost sites in the proposed project area is unknown. Gravel quarries near the Salton Sea may provide suitable roost sites.

Proposed Project Area Occurrence

The pocketed free-tailed bat is known to occur in Imperial County, but this species has not been reported in the proposed project area. Foraging habitat occurs in the proposed project area, but roosting sites may limit the occurrence of this species.

Big Free-tailed Bat (*Nyctinomops macrotis*)

Range and Distribution

The big free-tailed bat is a migratory species. It ranges from most of South America northward to include Mexico, Arizona, New Mexico, southern and western Texas, Southern California, southeastern Nevada, northeastern Utah, and as far north as central Colorado (Navo, 1998; Hall, 1981).

Population Status

This species is a California state species of special concern due to its rarityhere. While the big free-tailed bat is common in parts of its range and does not appear to be threatened, impacts such as human disturbance to roosting sites, loss of forage habitat, and pesticides are likely to have negative impacts on this species (Navo, 1998).

Habitat Requirements

Big free-tailed bats generally inhabit rugged rocky habitats, although a wide range of habitats—including desert scrub, woodlands, and evergreen forests—are visited during foraging and migration (Navo, 1998). Roosts are usually in buildings, caves, and rock crevices. This bat feeds almost exclusively on moths, but crickets, grasshoppers, flying ants, and stinkbugs are occasionally taken (Easterla, 1973; Easterla and Whitaker, 1972).

Habitat in the Proposed Project Area

The preferred rocky habitat of the big free-tailed bat does not occur in the proposed project area. Desert scrub, agricultural fields, wetlands, lakes, rivers, canals, and drainages where insects are abundant could provide suitable foraging habitat for migrating bats.

Proposed Project Area Occurrence

Big free-tailed bats are known to migrate through the proposed project area during the spring and fall (USFWS, 1997). No roost sites are known to occur in the proposed project area.

Jacumba Little Pocket Mouse *(Perognathus longimembris internationalis)*

Range and Distribution

The range of the Jacumba little pocket mouse is restricted to the deserts of extreme Southern California and northern Mexico. Its range extends from Jacumba, California, approximately 62 miles south of the U.S.-Mexican border.

Population Status

This subspecies has an extremely limited range and is endemic to Southern California. The population status of this subspecies is unknown at this time. Current threats have not been identified but may include habitat and offroad vehicle activities and predation by introduce species.

Habitat Requirements

Habitat requirements are not well understood, but it is known to occupy sandy habitats on the desert floor. Preferred habitats include desert riparian, desert scrub, desert wash, and sagebrush. Little pocket mice generally dwell in burrows and may stay underground for up to 5 months in winter. Burrow systems are rarely occupied by more than one mouse, and some animals may use more than one burrow (Kenagy, 1973). Sandy soils are preferred for burrowing (Hall, 1946), but burrows are also found on gravel washes and on stony soils (Beatley, 1976b; Miller and Stebbins, 1964).

Habitat in the Proposed Project Area

Desert scrub habitats occur in the proposed project area only within the right-of-way of IID on the AAC. No native desert riparian habitat occurs in the HCP area because tamarisk has invaded riparian areas of the New and Alamo Rivers. It is uncertain whether Jacumba little pocket mice would use these areas.

Proposed Project Area Occurrence

While potential habitat does occur in the area, the known range of the Jacumba little pocket mouse does not extend into the proposed project area.

Colorado River Hispid Cotton Rat (*Sigmodon arizonae plenus*)

Range and Distribution

The Colorado River hispid cotton rat occurs in the vicinity of the Colorado River and its tributaries in southeastern California. In Arizona, it occurs along the Colorado River from Parker to Ehrenberg (Hoffmeister, 1986). One additional locality has been reported in Nevada, along the Nevada-California border (Hall, 1946); however, populations once occurring in Nevada are now thought to be extinct (Hall, 1946; Bradley 1966). The distributional limits of the Colorado River cotton rat have not been established, and the southern limits of its range are not known (Hafner et al., in press). McKernan (unpublished data) has provided records for this species at Topock Marsh, Parker Dam, near Parker, Arizona; on the Colorado River Indian Tribe (CRIT) Reservation north of the Palo Verde Division Dam, near Blythe, California; and on and near Cibola National Wildlife Refuge. The dates of these observations range from 1974 to 1998.

Population Status

The population status and reasons for decline of this species are not well understood. The Colorado River hispid cotton rat has a limited range and occurs along an area of the river that is subject to a number of human disturbances. Agricultural and urban development, draining of wetlands, livestock grazing, and water diversion proposed projects have probably all contributed to the species' decline. The Colorado River hispid cotton rat is a federal and California state species of concern.

Habitat Requirements

This species primarily occurs in grassland and mixed grassland/scrub habitats but may also occur in agricultural fields. It is most common in grassland and cropland habitats near water (Fleharty and Mares, 1973; Kaufman and Fleharty, 1974), including grass-forb understories in early successional stages of other habitats (McClenaghan and Gaines, 1978). Tall, dense grass is preferred. The species also occurs in overgrown clearings and herbaceous borders of fields and brushy areas (Hall and Dalquest, 1963). Trapping success for this subspecies occurs most often in areas dominated by common reed (Zimmerman, pers. comm.). Runways are made through dense herbaceous growth and are similar in appearance to vole runways but much larger. The hispid cotton rat sometimes feeds on sugar beets, citrus, and other crops. Nests of woven grass are constructed either in burrows or on the surface (Baar et al., 1974).

Habitat in the Proposed Project Area

Habitat for this species is widespread throughout the proposed project area. Irrigated agricultural fields of alfalfa, wheat, sudangrass, and sugar beets provide suitable habitat for the cotton rat. Many drainages and ditches adjacent to agricultural fields include dense patches of common reed, a habitat known to be used by this species.

Proposed Project Area Occurrence

Habitat and historical records for this species occur in the proposed project area (SSA and Reclamation, 2000). Populations have also been reported near the Colorado River, a few miles above the Laguna Dam and near Bard. Establishment of cotton rats in the Imperial Valley was apparently in response to agricultural irrigation practices (Dixon, 1922).

Yuma Hispid Cotton Rat *(Sigmodon hispidus eremicus)*

Range and Distribution

The Yuma hispid cotton rat is known from Yuma County, Arizona; Imperial County, California; and northern Baja California, Mexico (Hall, 1981; Hoffmeister, 1986). The distributional range of the Yuma hispid cotton rat has increased as agricultural development has expanded along the LCR (Hafner et al., in press).

Population Status

The status of Yuma hispid cotton rat populations is unknown. It is believed this species has adapted to agricultural conditions along the LCR and expanded its range. The Yuma hispid cotton rat is a federal and California state species of special concern.

Habitat Requirements

Hispid cotton rats occupy moist, grassy habitats where they cut runways through the grass. Hoffmeister (1986) indicates that cotton rats in Yuma County have been found mostly along the Colorado River and adjacent sloughs in brushy areas. Cotton rats have been reported from habitats vegetated with common reed, arrowweed, and cattails. Agricultural fields, especially Bermuda grass farms, also provide habitat (Hoffmeister, 1986). Hispid cotton rats eat many grasses and forbs and are more vegetarian than most native mice (Jameson and Peeters, 1988). The Yuma hispid cotton rat has benefited from the expansion of irrigated fields and shown success in utilizing agricultural areas. (Zimmerman, pers. comm.). Yuma hispid cotton rats prefer tall, dense grasses close to water. The AAC may serve as a dispersal corridor for cotton rats to move from the LCR into the Imperial Valley.

Habitat in the Proposed Project Area

Potentially suitable habitat for the Yuma hispid cotton rat is abundant throughout the proposed project area. Irrigated agricultural fields of Bermuda grass, alfalfa, wheat, sudangrass, and sugar beets provide suitable habitat for the cotton rat. Many drainages and ditches adjacent to agricultural fields include dense patches of cattails, arrowweed, and common reeds.

Proposed Project Area Occurrence

Dixon (1922) reported this species in the Imperial Valley earlier this century, and the subspecies is commonly found along roadsides adjacent to alfalfa and clover fields (Zimmerman, pers. comm.).

Nelson's Bighorn sheep (*Ovis canadensis nelsoni*)

Range and Distribution

Bighorn sheep are well distributed in the mountainous regions of North America from Canada to Mexico. The desert subspecies (*O. c. nelsoni*) is found in the mountainous desert regions of Utah, Nevada, Arizona, and California south into Mexico.

Population Status

Historic hunting, disease introduced from domestic sheep, and competition from domestic livestock resulted in dramatic declines in big horn sheep populations throughout the 1800s. While hunting was banned in the early 1900s, poaching continues to threaten the survival of this species. It is estimated that 90 percent of the historic population has been eliminated, and recovery has been slow (Banfield, 1974; Darymple, 1985; Geist, 1979; and Nowak and Paradiso, 1983). The Nelson's big horn sheep is a federal species of concern.

Habitat Requirements

Habitats used by bighorn sheep include alpine dwarf-shrub, low sage, sagebrush, bitterbrush, pinyon-juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian (DeForge, 1980; Monson and Sumner, 1980; Wehausen, 1980). Bighorn sheep graze and browse on a wide variety of plant species; green, succulent grasses and forbs are preferred; and browse is important all year, especially for populations in arid habitats. Some populations use mineral licks, and some may be limited by phosphorus. Bighorn sheep feed in open habitats, such as rocky barrens, meadows, and low, sparse brushlands (Dunaway, 1972; Monson and Sumner, 1980; Wehausen, 1980; Ginnett and Douglas, 1982; and Lawson and Johnson, 1982); they use rocky, steep terrain for escape and bedding. Steep, rugged slopes and canyons are used for lambing areas (Wehausen, 1980). Water is critical in arid regions.

Habitat in the Proposed Project Area

No suitable habitat occurs in the proposed project area. While desert scrub habitat does occur, there are no adjacent mountainous regions to offer escape and breeding habitat. In addition, the desert scrub habitat in the proposed project areas occurs in proximity to significant human activity, such as offroad vehicle recreation sites and major highways.

Proposed Project Area Occurrence

Approximately 120 Nelson's bighorn sheep are known to inhabit area the Chocolate Mountains (CDFG, 1999b). There is, however, no suitable habitat in the proposed project area for bighorn sheep, and, given the sensitivity of this species to human disturbance, their occurrence is unlikely.

Plants

Algodones Dunes Sunflower (*Helianthus niveus* ssp. *tephrodes*)

Range and Distribution

The Algodones Dunes sunflower occurs in southwestern Arizona, the Southern Sonoran Desert of Imperial County, California, and northern Mexico. In California, it is restricted to the Algodones Dunes. The main distribution of this species is in the Algodones Dunes system in California and, secondarily, in the Yuma dunes in Arizona. Although these stands may not be large in terms of numbers of individuals, they are potentially significant in maintaining genetic flow between populations of this subspecies in California and Arizona.

Population Status

This subspecies is naturally limited throughout its range by the availability of suitable dune habitat and is considered rare throughout its range. It occurs on the Barry M. Goldwater Air Force Range in Arizona (USFWS, 1992), where it may be threatened by military activities. In California, this species is threatened primarily by offroad vehicles (Skinner and Pavlik, 1994).

Habitat Requirements

The Algodones Dunes sunflower is restricted to active sand dunes or sandy desert areas, typically below 700 feet in elevation, and is also found in association with creosote bush scrub.

Habitat in the Proposed Project Area

Potential habitat occurs where the AAC traverses the Sand Hills and Algodones Dunes.

Proposed Project Area Occurrence

On the Sand Hills, it is generally found only on the central axis of the dunes. During the 1984 surveys, a total of 885 plants was found evenly distributed along the survey area between Interstate 8 and Drop 1 along the north side of the AAC (Reclamation and IID, 1994). No plants were observed along the AAC corridor to the east of Interstate 8.

Giant Spanish Needle (*Palafoxia arida* var. *gigantea*)

Range and Distribution

The giant Spanish needle occurs in southwestern Arizona, southeastern California, and northeastern Baja California, Mexico. In Arizona, this variety is currently known only in the vicinity of Yuma. In California, it is restricted to southeastern Imperial County, where it is found primarily in the Algodones Dunes system. In Baja California, it has been noted in sand dunes along or near the international border with California.

Population Status

The giant Spanish needle is naturally limited throughout its range by the availability of suitable dune or sandy habitat. While it is not considered endangered, potential threats to the populations include military activities; offroad vehicle use; habitat degradation; and direct impacts resulting from highway improvements, utility corridors, and quarry and stockpile operations.

Habitat Requirements

The giant Spanish needle is restricted to active or stable sand dunes or sandy desert areas, typically below 350 feet, and is also found in association with creosote bush scrub.

Habitat in the Proposed Project Area

Potential habitat occurs where the AAC traverses the Sand Hills and the Algodones Dunes.

Proposed Project Area Occurrence

The giant Spanish needle occurs primarily in the Algodones Dunes system. As part of the AAC Lining Proposed Project, a 600-foot-wide corridor along the portion of the AAC that passes through the Algodones Dunes was surveyed for special-status plant species (Reclamation and IID, 1994). These surveys identified 2,908 individuals in the corridor to the west of Interstate 8, and 787 individuals were found east of Interstate 8.

Orcutt's Aster *(Xylorhiza orcuttii)*

Range and Distribution

Orcutt's aster occurs in Imperial, Riverside, and San Diego Counties in California and Baja California, Mexico.

Population Status

Orcutt's woody aster is considered extremely rare because of limited populations. The plant is considered endangered in parts of its range; however, many of the known populations lie within Anza-Borrego State Park boundaries and are well protected. Populations are presumed stable on the southern deserts.

Habitat Requirements

Orcutt's aster occurs primarily in Sonoran creosote scrub habitats in rocky canyons and sandy washes at elevations between 65 and 1,200 feet. Generally, this species has been observed in areas with little shrub cover.

Habitat in the Proposed Project Area

This species is associated with creosote scrub. The only portion of the HCP area that supports this plant community is the right-of-way of IID along the AAC.

Proposed Project Area Occurrence

No plants have been observed in the proposed project area, although potential habitat exists. The nearest known populations are in Anza-Borrego Desert State Park to the west of the HCP area.

Foxtail Cactus *(Escobaria vivipara var. alversonii)*

Range and Distribution

The foxtail cactus occurs in the Sonoran and southern Mojave deserts of Arizona and California. In California, it occurs along the border between the Mojave and Colorado Deserts in Riverside, San Bernardino, and Imperial Counties.

Population Status

The current population status of the foxtail cactus is not definitively known, although it has been reported as occurring in "large, healthy populations" throughout much of its range (Warren and Laurenzi, 1987). It appears to have a relatively restricted geographic distribution, and populations have been affected primarily by horticultural collecting.

Habitat Requirements

The foxtail cactus occurs in both sandy and rocky areas but seems to prefer heavy, rocky soils with decomposing granite or basalt and is often found on basalt between 250 and 5,000 feet in elevation. It may also occur in association with creosote bush scrub.

Habitat in the Proposed Project Area

Potential habitat occurs in the creosote scrub habitat along the AAC and Coachella Canal and potentially in scrub habitat adjacent to the Salton Sea between the higher rock hillsides and the more saline desert saltbrush community.

Proposed Project Area Occurrence

While no plants have been observed in the proposed project area, this variety is known from upland habitats primarily west of the LCR. At least one population occurs in the vicinity of the Palo Verde Dam quarry site.

Munz's Cactus (*Opuntia munzii*)

Range and Distribution

Munz's cactus occurs in the Sonoran Desert where the species occurrences are primarily from the Chocolate and Chukwalla Mountains in Riverside and Imperial Counties.

Population Status

This species is endemic to California and considered extremely rare, with only a few known small populations. Due to the general inaccessibility of the habitats, the plant is not considered endangered, and no current threats have been identified.

Habitat Requirements

Munz's cactus grows at elevations between 500 and 2,000 feet in sandy or gravelly soils found in washes and along canyon walls associated with creosote scrub.

Habitat in the Proposed Project Area

This species is associated with creosote scrub. The only portion of the HCP area that supports this plant community is the right-of-way of IID along the AAC.

Proposed Project Area Occurrence

No plants have been reported to occur in the proposed project area. Known locations for this species are primarily washes below the Chocolate Mountains along the eastern edge of the Imperial Valley.

Flat-Seeded Spurge *(Chamaesyce platysperma)*

Range and Distribution

The flat-seeded spurge is generally restricted to Southern California occurring in Imperial, San Diego, Riverside, and San Bernardino Counties. Rare occurrences outside California have been reported from Arizona and Sonora, Mexico.

Population Status

The present status of this species is poorly known. Population occurrences are typically highly restricted, but presumably stable. The Coachella Valley has been heavily impacted in recent years; however, lack of sufficient collection data precludes determination of the effects on this species (Reiser, 1994).

Habitat Requirements

The flat-seeded spurge is an annual herb found on sandy flats, dunes, and in creosote bush scrub. It flowers from February to September and is undetectable during other times of the year or in years when environmental conditions are less than optimum.

Habitat in the Proposed Project Area

This species is associated with creosote scrub. The only portion of the HCP area that supports this plant community is the right-of-way of IID along the AAC.

Proposed Project Area Occurrence

While potential habitat is present in the proposed project area, no plants have been observed.

Wiggin's Croton (*Croton wigginsii*)

Range and Distribution

Wiggin's croton occurs in the southwest portion of Imperial County, Arizona, and Baja California and Sonora, Mexico.

Population Status

Occurrences of Wiggin's croton in California are confined to several populations, some of which may be endangered. Outside California, the plant is more common and widespread.

Habitat Requirements

Wiggin's croton is a woody shrub that occurs primarily in stable and active dunes, and sandy washes at elevations ranging from 160 to 350 feet. Although less common, it also occurs on sandy sites in the Sonoran Desert creosote scrub habitat. Like all croton species, Wiggin's croton prefers areas with sandy and/or loose soils.

Habitat in the Proposed Project Area

Potential habitat for Wiggin's croton in the HCP area occurs in the creosote scrub and dune habitats along the AAC.

Proposed Project Area Occurrence

In California, Wiggin's croton occurs in the Algodones Dunes in the Sand Hills system. As part of the AAC Lining Proposed Project, a 600-foot-wide corridor along the portion of the AAC that passes through the Algodones Dunes was surveyed for special-status plant species (Reclamation and IID, 1994). These surveys identified 1,447 individuals in the corridor to the west of Interstate 8, and 43 individuals were found east of Interstate 8.

Results of the 1993 surveys indicated occurrences of this species in the high dune system as well as isolated populations in the smaller dunes. A total of 338 individuals was observed in the proposed canal right-of-way. Wiggin's croton was also observed south of Power Drop Station No. 1 between transmission poles 8191 and 8178 (Reclamation and IID, 1994).

Peirson's Milk-Vetch *(Astragalus magdalenae var. peirsonii)*

Range and Distribution

The current distribution of Peirson's milk vetch is thought to be restricted to the Algodones Dunes in Imperial County, California; northeastern Baja California; and the Gran Desierto in Sonora, Mexico. The historic occurrence reported from the Borrego Valley in San Diego County, California, has not been observed for several decades and is presumed to have been extirpated (USFWS, 1998).

Population Status

Peirson's milk-vetch is currently state and federally listed as endangered. The species' population is believed to be declining (CDFG, 2000). Approximately 25 percent of the known populations are in the North Algodones Dunes Wilderness, managed by the Bureau of Land Management. The remaining populations continue to be threatened by offroad vehicles, grazing and trampling by livestock and feral burros, trampling by recreational users, competition from non-native plants, urban development, construction related to fisheries development, and alteration of soil hydrology.

Habitat Requirements

Peirson's milk-vetch is a short-lived perennial that occurs on the slopes and hollows of well developed dune systems at elevations between 150 and 800 feet. It is adapted to habitats with specific substrate or hydrologic conditions that occur as inclusions within creosote bush scrub or sagebrush dominated communities.

Habitat in the Proposed Project Area

Potential habitat occurs in the creosote scrub and dune habitats along the AAC.

Proposed Project Area Occurrence

In the Algodones Dunes area, Peirson's milk-vetch tends to grow in the west and central portions of the dunes. During the 1984 surveys, 1,422 plants were found in the sand dune habitat between Interstate 8 and Drop 1 of the AAC (Reclamation and IID, 1994). Results of the 1993 surveys found more than 1,300 individuals within a 1-mile reach of the proposed canal right-of-way in the high dunes area (USFWS, 1996b).

Sand Food *(Pholisma sonorae)*

Range and Distribution

The sand food occurs scattered in a roughly 3,900-square-mile area that includes habitat surrounding the Gulf of Mexico in southwestern Arizona, the Sonoran Desert of California, northeastern Baja California, and northwestern Mexico. In Arizona, the species occurs in Southern Yuma County along the U.S.-Mexico boundary. In California, it occurs in southeastern Imperial County, in or near the Algodones Dunes. Its southernmost extent is Bahia Adair on the Sea of Cortez coast of Sonora, Mexico.

Population Status

Considered rare throughout its range, this species is naturally limited by the availability of suitable habitat and host plants. Both habitat and host plants have been reduced in extent or degraded by a variety of land uses, including military maneuvers, recreational vehicles, agriculture, bulldozing and clearing of native dune vegetation, litter, and invasion of dunes by nondune species, (AGFD, 1998d; CDFG, 1999b; Yatskievych, 1994; and Nabhan, 1980).

Habitat Requirements

The sand food is a perennial root parasite that lacks chlorophyll and occurs on sand dunes or in sandy areas in association with creosote bush scrub below 650 feet. It is parasitic on dune buckwheat, Palmer coldenia, plicate coldenia, white bursage, and arrowweed (Yatskievych, 1994; Hickman, 1993; and Yatskievych and Mason, 1986).

Habitat in the Proposed Project Area

Potential habitat occurs in the creosote scrub and dune habitats along the AAC.

Proposed Project Area Occurrence

Major populations of this species are found in the Algodones Dunes system. As part of the AAC Lining Proposed Project, a 600-foot-wide corridor along the portion of the AAC that passes through the Algodones Dunes was surveyed for special-status plant species (Reclamation and IID, 1994). These surveys identified 208 individuals in the corridor to the west of Interstate 8, and 363 individuals were found east of Interstate 8.

Orocopia Sage (*Salvia greatae*)

Range and Distribution

Endemic to southeastern California, orocopia sage occurs in San Bernardo, Riverside, and Imperial Counties. The largest known populations occur in the Orocopia Mountains to the Chocolate Mountains, in Riverside County.

Population Status

Orocopia sage is a federal species of concern and is considered extremely rare throughout its range but not endangered. Threats to this species have not been identified.

Habitat Requirements

Orocopia sage occurs in creosote bush scrub, in desert dry washes, on alluvial fans, and woodlands below 590 feet.

Habitat in the Proposed Project Area

Potential habitat occurs only in the creosote scrub and dune habitats along the AAC.

Proposed Project Area Occurrence

There are no known occurrences of this species in the proposed project area. Most of the suitable habitat is found north and east of the proposed project area.

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APPENDIX B

Methodology for Characterizing Vegetation in the IID Drainage System

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APPENDIX B

Methodology for Characterizing Vegetation in the IID Drainage System

A comprehensive survey of vegetation in the IID drainage system will be conducted. The survey will collect data necessary to quantify the amount and type of vegetation supported in the drainage system. The survey will be conducted by teams of two people. Prior to initiating the surveys, field personnel will be instructed in field techniques and data collection to ensure consistent characterization among crews.

Standard Methodology

The entire drainage system will be surveyed. For each drain, vegetation will be characterized starting at the upstream end of the drain and moving downstream. Crossings occur at regular intervals of about 0.5 miles along every drain (Figure B-1). Vegetation will be characterized by drain segment, with a segment defined as that portion of the drain between two crossings.

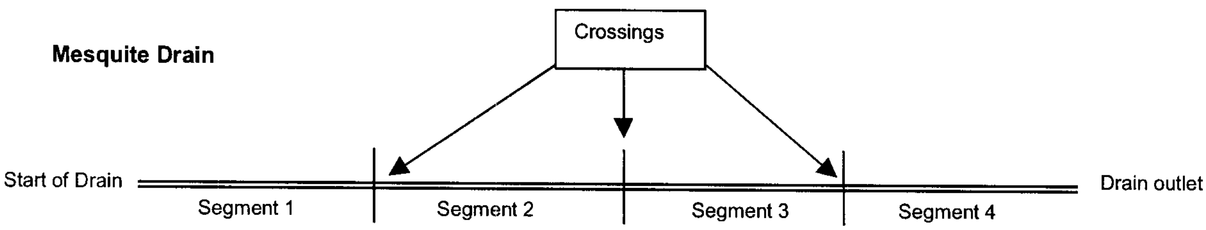


FIGURE B-1
Schematic of Drain Showing Crossings and Designations of Segments for Vegetation Characterization

In each segment, the following measurements, indicated on Figure B-2, will be taken:

- The top width of the drain, including overburden
- The projected (i.e., horizontal) width of the vegetation in the drain, including the width of the water surface
- The width of the water surface

The actual width of the vegetation will be developed from these measurements after field data collection. Because the width of the vegetation can vary along the length of the drain segment, the vegetation width measurement will reflect where the vegetation is concentrated and will not include small "pockets" of vegetation that occur sporadically on the banks of the drain. In addition, the height of the overburden will be estimated.

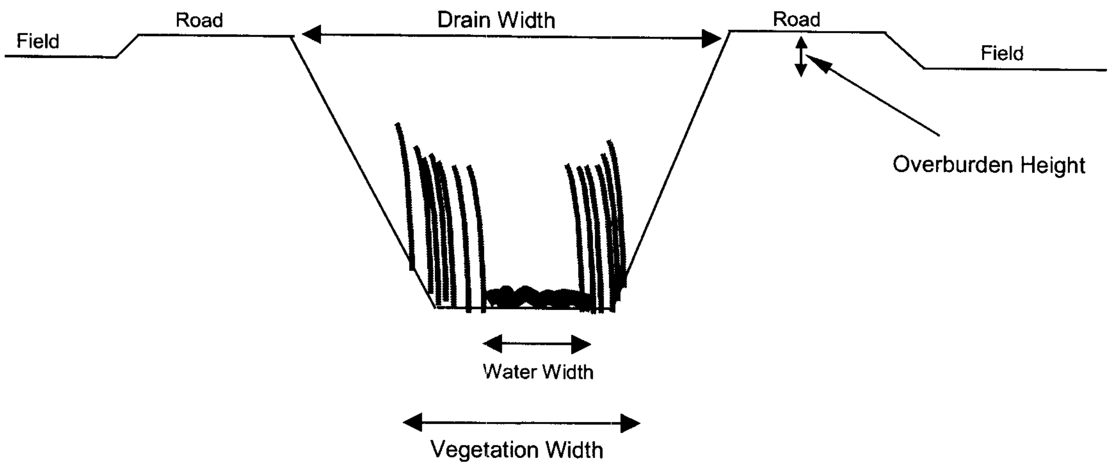


FIGURE B-2
Schematic of Drain Showing Data to be Collected

Vegetation can occur on the drain banks, in addition to the bottom of the drain. The vegetation width will be measured as the horizontal distance or projection rather than the slope distance covered by vegetation. Measuring vegetation width as the slope distance covered by vegetation was considered but not pursued for the following reasons. First, habitat created under the HCP would be higher quality than the habitat in the drains, thus, compensating for any underestimation in the amount of vegetation resulting from using the horizontal distance rather than the slope distance to estimate the amount of habitat. Second, some portions of the drains could be inaccessible and may require using aerial photography to determine the amount of vegetation. If aerial photography is used, the acreages generated would reflect a horizontal distance rather than a slope distance. To ensure consistency in the event that aerial photography is necessary to delimit certain areas of vegetation for this survey (or future surveys), vegetation width will be measured as the horizontal distance.

The total percent coverage of vegetation will be classified, according to the California Native Plant Society system (Table B-1). In estimating the percent coverage, the area covered by water will be excluded so the estimate reflects the density of the vegetation along the banks. Within the vegetated area (i.e., that portion of the drain covered by vegetation [vegetation width - water width]), the plant species composition will be characterized by identifying the plant species present and assigning a vegetation cover class, according to Table B-1. Plant species likely to occur in the drains that will be individually identified are listed in Table B-2. The percent coverage of herbaceous plants not listed in Table B-2 will be addressed collectively as "Herbaceous." Additional plant species of importance to wildlife could be encountered during the field surveys; such species will be individually identified and added to Table B-2. Dead or senescent vegetation will be included in estimating the total percent coverage and species composition.

TABLE B-1
Vegetation Cover Classes

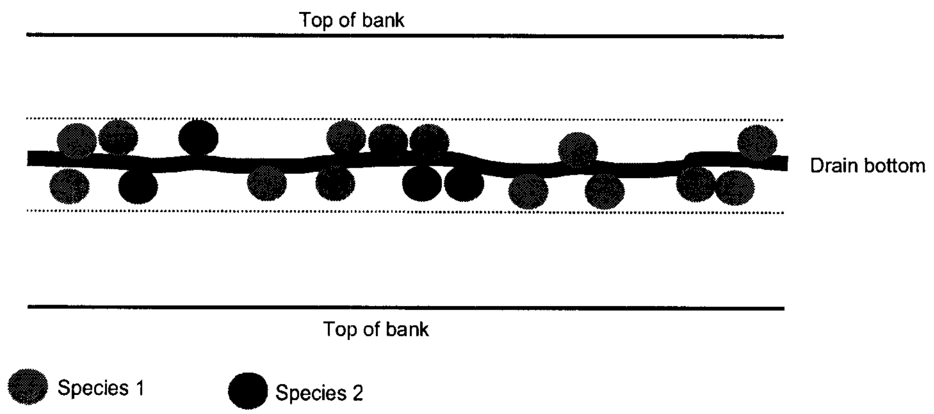
Class	Percent Coverage
1	≤ 1
2	> 1 – 5
3	> 5 – 25
4	> 25 – 50
5	> 50 – 75
6	> 75 – 100

TABLE B-2
Plant Species for Which Percent Coverage Will Be Individually Classified

Atriplex spp. (saltbush)	*Prosopis* spp. (mesquite)
Carex spp. (sedge)	*Rumex crispus* (curly dock)
Juncus spp. (rush)	*Salix* spp. (willow)
Larrea tridentata (creosote bush	*Scirpus* spp. (bulrush)
Phragmites communis (common reed)	*Suaeda torreyana ramosissima* (iodine bush)
Pluchea sericea (arrowweed)	*Tamarix* spp. (salt cedar)
Polygonum spp. (smartweed)	*Typha* spp. (cattail)

EXAMPLE

Total percent coverage: Class 5 (>50 – 75%)
Plant Species 1: Class 6 (>75–100%)
Plant Species 2: Class 3 (>5-25%)



In addition to the quantitative information on vegetation, the field crew will note the following information:

- Presence of aquatic vegetation
- Dead vegetation
- Indication of recent maintenance activities (e.g., herbicide application, mechanical cleaning)

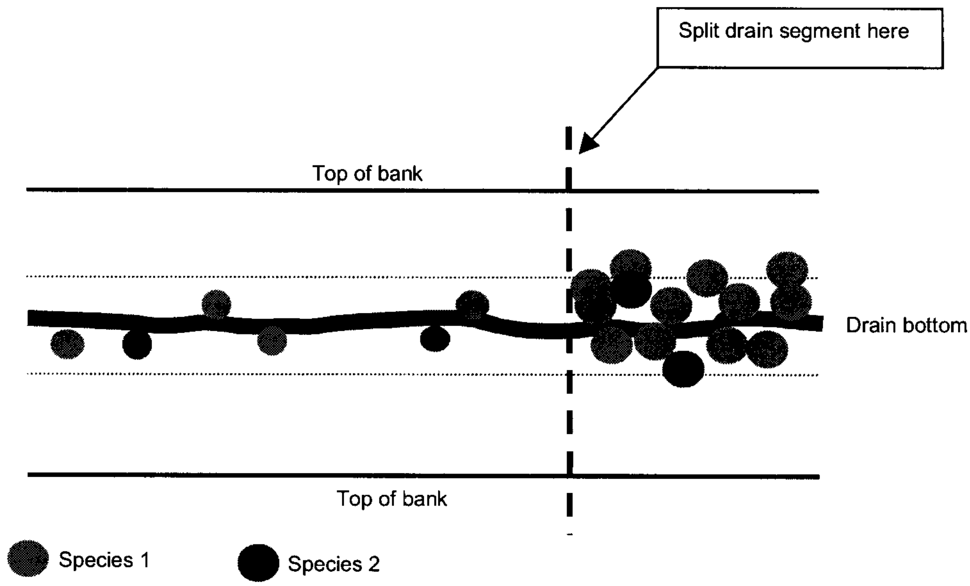
Although the focus of the survey is to characterize the vegetation, the field crews also will note covered species in or along the drains.

Special Conditions Methodologies

Most of the drains have vegetation consisting of one or two plant species in a narrow band along the water's edge for most of the length of the segment. However, some drains have a more complex vegetation pattern. Two special conditions were identified during a field visit to develop the survey protocol. First, along some drains, the type and extent of vegetation can vary substantially along the segment length. Second, vegetation in the drain can exist as two distinct bands, with dense emergent vegetation on the bottom of the drain and more xeric species on the drain banks. The following describes the approach to characterizing vegetation in these two circumstances. These techniques will be used only where there are clear, distinct, and large differences in plant species composition or percent coverage.

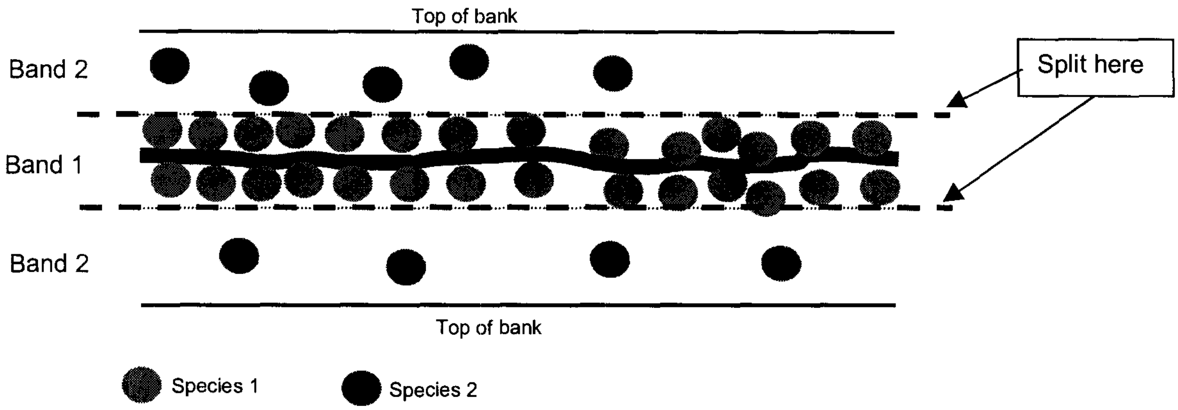
Condition 1: Variable Vegetation Along Segment Length

Along some drains, the density or width of the vegetation can change abruptly, as shown schematically. In this case, the drain segment will be split into two subsegments and the vegetation characteristics quantified individually for each subsegment. The subsegments will be distinguished with a letter (e.g., Mesquite Drain Segment 1a and 1b). The location of the split will be designated through Global Positioning System coordinates or as a distance from the nearest crossing.

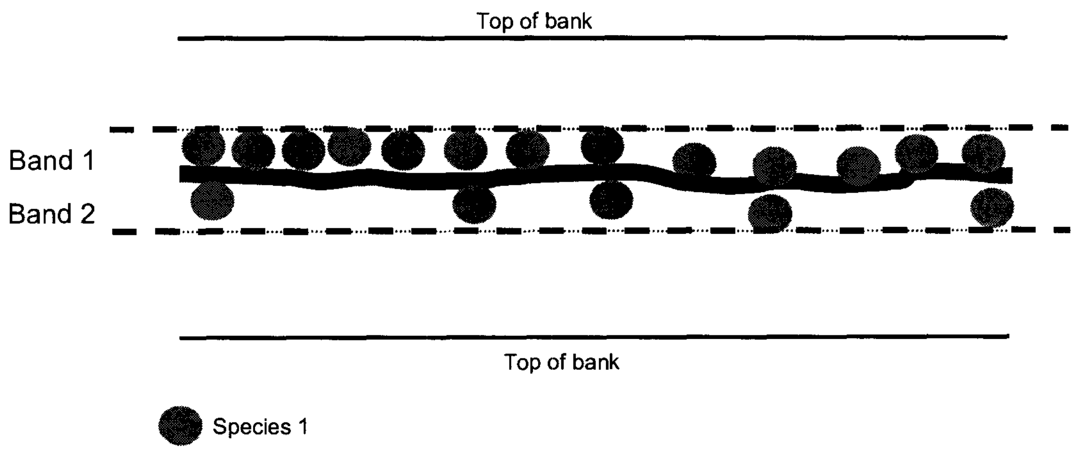


Condition 2: Two or More Distinct Vegetation Bands

Along some drains, two distinct bands of vegetation with different species composition and percent coverage occur. This condition is illustrated subsequently. In this case, the vegetation will be split into two bands and the vegetation characteristics quantified. The band flanking the water will be referred to as Band 1, with the band occurring higher on the drain bank referred to as Band 2. Typically, the vegetation characteristics of Band 2 will be the same on both sides of the drain and; therefore, will be combined in estimating the width and percent coverage.



Vegetation flanking the water, but on opposite sides of the water, could substantially differ in terms of percent coverage as illustrated below. If the percent coverage of the vegetation differs by more than 50 percent between the two sides, the vegetation flanking the water will be split into two bands as shown. The side with the highest percent coverage will be designated Band 1, and vegetation width will be measured as the width of the vegetation in Band 1 plus the water width. The vegetation on the opposite bank will be designated Band 2, and its width and percent coverage estimated as described previously.



APPENDIX C

Species-Specific Avoidance and Minimization Measures for Construction Activities in Desert Habitat

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APPENDIX C

Species-Specific Avoidance and Minimization Measures for Construction Activities in Desert Habitat

Desert Tortoise

- If a tortoise occurs on the project site during construction, construction activities adjacent to the tortoise's location will be halted and the tortoise allowed to move away from the construction site. If the tortoise is not moving, the biological monitor will relocate it to nearby suitable habitat outside the construction area. The tortoise will be placed in the shade of a shrub.
- Prior to construction, the construction area and adjacent areas within 100 feet of the construction site will be searched for burrows that could be used by desert tortoise. When burrows are found, they will be checked for desert tortoise. Both occupied and unoccupied burrows will be flagged and avoided (employing a 50-foot buffer) during construction. If an occupied burrow cannot be avoided, it will be excavated and the tortoise relocated to an unoccupied burrow outside the construction area that is approximately the same size as the one from which it was removed. If an existing burrow is unavailable, the biologist will construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original burrow. Desert tortoises moved during inactive periods will be monitored for at least two days after placement in the new burrows to ensure their safety. All desert tortoise handling and burrow excavation will be in accordance with handling procedures developed by the USFWS and conducted by an authorized biologist.
- Any construction pipe, culverts, or similar structures with a diameter of 3 to 12 inches that are stored on the construction site for one or more nights will be inspected for tortoises before the material is moved, buried, or capped. Alternatively, all such structures may be capped before being stored on the construction site.
- Trench segments or other excavations will be fenced with temporary tortoise-proof fencing, covered at the close of each working day, or provided with tortoise escape ramps. All excavations will be inspected for tortoises prior to filling.
- Construction activities will be conducted only between dawn and dusk.
- A clearance survey will be conducted within 48 hours prior to the start of construction activities. Desert tortoise found on the construction site will be relocated to nearby suitable habitat outside the construction area.

Colorado Desert Fringe-toed Lizard and Flat-tailed Horned Lizard

- A clearance survey will be conducted within 48 hours prior to the start of construction activities. Colorado Desert Fringe-Toed Lizards (CDFLs) and Flat-Tailed Horned Lizards (FTHL) found on the construction site will be relocated to nearby suitable habitat outside the construction area.
- Construction areas will be examined hourly for the presence of CDFLs and FTHLs when surface temperatures exceed 30 degrees Celsius and construction activities are occurring.
- If a CDFL or FTHL occurs on the project site during construction, construction activities immediately adjacent to the lizard's location will be halted and the lizard allowed to move away from the construction site. If the lizard is not moving, the biological monitor will capture and relocate the lizard. Relocated lizards will be placed in the shade of a shrub. If the surface temperature in the sun is less than 30 degrees Celsius or greater than 50 degrees Celsius, the lizard will be held for later release. Initially captured CDFLs or FTHLs will be held in a cloth bag, cooler, or other appropriate clean dry container. Lizards will be maintained at temperatures between 25 and 35 degrees Celsius and will not be exposed to direct sunlight. Release will occur as soon as possible after capture and during daylight hours when the surface temperatures range from 32 to 40 degrees Celsius.
- Trenches, holes, or other excavations will be examined for these two lizards prior to filling. If lizards are found, they will be relocated by the biological monitor to nearby suitable habitat.

Western Chuckwalla

- A clearance survey will be conducted within 48 hours prior to the start of construction activities. Western Chuckwallas found on the construction site will be relocated to nearby suitable habitat outside the construction area.
- If a chuckwalla occurs on the project site during construction, construction activities adjacent to the individual's location will be halted and the individual allowed to move away from the construction site. If the individual is not moving, the biological monitor will relocate it to nearby suitable habitat outside the construction area. It will be placed in the shade of a shrub.
- Prior to construction, the construction area and adjacent areas within 100 feet of the construction site will be searched for burrows that could be used by western chuckwalla. If potentially suitable burrows are found, they will be checked for occupancy. Occupied burrows will be flagged and avoided (employing a 50-foot buffer) during construction. If the burrow cannot be avoided, it will be excavated and the occupant relocated to an unoccupied burrow outside the construction area and of approximately the same size as the one from which it was removed. If an existing burrow is unavailable, the biologist will construct or direct the construction of a burrow of similar shape, size, depth, and orientation as the original.

- Trenches, holes, or other excavations will be examined for these species prior to filling. If individuals are found, the biological monitor will relocate them to nearby suitable habitat.

Couch's Spadefoot Toad

- Based on the baseline habitat and species surveys and the preconstruction surveys, water sources used by Couch's Spadefoot Toad will be identified. If construction activities occur within 0.6 miles of water sources used by Couch's Spadefoot Toads, construction activities will be conducted only between dawn and dusk.
- If water sources used by Couch's Spadefoot Toads occur on or within 500 feet of the construction site, a 500-foot buffer will be established around the water source. The buffer will be staked and flagged. No construction activities will be permitted within the buffer.
- If the water source cannot be avoided and would be permanently lost as a result of construction, IID will mitigate in accordance with Desert Habitat – 5.

Harris Hawk

- Prior to the start of construction activities, potential nesting habitat on the construction site and within 0.25 mile of the construction site will be surveyed to determine if Harris Hawks are nesting. If nesting Harris Hawks are found, a 0.25-mile buffer will be established around the nest site. The buffer will be staked and flagged. No construction activities will be permitted within the 0.25-mile buffer during February 1 to October 15 or until young have fledged. Vegetation within the 0.25-mile buffer may be removed after the young have fledged.

Elf Owl

- Prior to the start of construction activities, potential nesting habitat on the construction site and within 0.25 miles of the construction site will be surveyed to determine if Elf Owls are nesting. If nesting Elf Owls are found, a 0.25-mile buffer will be established around the nest site. The buffer will be staked and flagged. No construction activities will be permitted within the 0.25-mile buffer during April 1 to July 31 or until young have fledged. Vegetation within the 0.25-mile buffer may be removed after the young have fledged.

Loggerhead Shrike, Le Conte's Thrasher, and Crissal Thrasher

- Prior to the start of construction activities, potential nesting habitat for these species on the construction site and within 500 feet of the construction site will be surveyed to determine if any are nesting. If nesting shrikes or thrashers are found, a 500-foot buffer will be established around the nest site. The buffer will be staked and flagged. No construction activities will be permitted within the buffer during the species-specific breeding periods as follows:

- Loggerhead shrike: February 1 through July 31 or until young have fledged
- Crissal thrasher: February 1 through June 30 or until young have fledged
- Le Conte's thrasher: January 15 through June 15 or until young have fledged

Vegetation within the 500-foot buffer may be removed after the young have fledged.

Pierson's Milk-vetch, Algodones Dunes Sunflower, Wiggin's Croton, Giant Spanish Needle, and Sand food

- Prior to the start of construction activities, the construction area will be surveyed for the presence of covered plant species. Surveys will be conducted during the time period necessary to identify these species but will be conducted within one year of initiating construction activities.

If covered plant species occur on the construction area, an activity exclusion zone, 25 feet in radius, will be established around each individual. Exclusion zones will be flagged and staked in the field prior to the start of the construction. No surface disturbing activity will occur within the exclusion zones. If a 25-foot-radius exclusion zone cannot be established, IID will confer with the USFWS and CDFG regarding the best configuration of the exclusion zone, given the location of the plants and construction area requirements. If the plants cannot be avoided, IID will confer with USFWS and CDFG. The USFWS and CDFG will determine if the plants can be transplanted. If the plants can be transplanted, IID will work with USFWS and CDFG to identify a location and the appropriate procedures for transplanting those plants that cannot be avoided. If USFWS and CDFG determine that the plants would not survive transplanting, IID will acquire land that is occupied by the impacted plant species at a 1:1 ratio for the acreage impacted.

APPENDIX D

Procedures for Removing Burrowing Owls

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APPENDIX D

Procedures for Removing Burrowing Owls

Part of the Burrowing Owl Conservation Strategy includes ensuring that burrowing owls are absent from burrows prior to conducting specific activities that would fill or collapse the burrow. The HCP Implementation Biologist will follow one of the following four procedures to ensure that owls are absent from burrows that will be impacted.

Option 1

Prior to conducting the activities, the biologist will use a scope to determine if an owl is present in a burrow.

- If the burrow is unoccupied, the burrows will be made inaccessible to owls, and the activities may proceed.
- If the burrow is occupied, the biologist will install a one-way door to remove the owl from the burrow. The biologist will scope the burrow to confirm that the owl has vacated. After confirming that the owl has vacated the burrow, the burrow will be made inaccessible to owls.

Option 2

Prior to conducting the activities, the biologist will install a one-way door with a trap in burrows that would be impacted. The biologist will check the trap approximately every 4 hours until the owl is trapped. The owl will be relocated to suitable habitat; the burrows will be made inaccessible to owls.

Option 3

At least 3 days before conducting the activities, the biologist will install a one-way door in burrows that would be impacted. Prior to conducting the activities, the biologist will use a scope to verify that burrows are vacant. After confirming that the owl has vacated the burrow, the burrow will be made inaccessible to owls.

Option 4

The HCP Implementation Biologist may use any other procedure approved by the HCP Implementation Team for ensuring that owls are not present in burrows.

APPENDIX E

Cropping Patterns in the Imperial Valley 1974-2000

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Table E-1

Acreages of Crops in the Imperial Irrigation District During 1974 - 2000

Crops with Less than 1,000 Acres Not Shown

Crop	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Broccoli	710	773	1,302	1,860	2,359	2,756	2,368	2,466	2,306	4,427	5,050	5,560	3,409	9,020	9,106	11,343	10,484
Cabbage	1,429	319	198	230	405	754	938	510	444	63	359	653	392	802	867	866	1,225
Carrots	6,385	5,988	7,572	4,394	6,489	9,211	7,666	6,755	8,917	7,402	10,053	13,361	8,736	12,976	11,678	11,874	12,682
Cauliflower	-	5	94	-	-	152	211	179	84	151	942	1,506	1,886	3,928	5,964	6,673	7,334
Ear Corn	273	4	273	297	1,052	620	127	2	658	510	809	1,238	364	1,639	3,006	1,724	1,822
Garbanzo B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Garlic	708	1,395	499	380	658	584	840	159	306	376	523	411	339	-	-	42	353
Lettuce	48,376	44,912	44,420	39,230	41,499	43,629	43,728	36,772	31,086	26,086	26,807	28,063	30,964	24,842	28,477	32,628	38,929
Cantaloupes	8,888	7,559	9,169	10,446	13,196	10,427	11,047	14,587	14,020	13,263	15,326	23,213	21,211	32,407	30,104	28,858	33,335
Honeydews	148	842	655	985	1,470	1,362	755	1,804	2,917	1,434	2,325	1,160	920	2,562	1,430	2,150	2,948
Watermelon:	1,573	2,472	1,964	3,146	1,022	3,136	3,215	3,917	5,354	4,972	4,656	5,057	2,757	4,786	4,113	3,830	3,234
Onions	6,273	7,509	4,539	4,605	6,917	6,970	5,498	5,739	10,013	7,248	7,887	6,802	8,192	9,133	10,217	8,903	10,125
Onions (See	1,469	1,248	1,701	1,769	1,866	2,449	2,440	3,232	2,371	2,886	1,715	1,382	1,853	1,736	1,483	2,261	3,339
Potatoes	-	-	-	-	-	-	-	-	-	-	-	-	-	20	80	152	177
Rapini	280	259	189	110	149	170	90	305	156	184	123	46	46	146	191	505	479
Spinach	-	-	-	-	-	-	-	30	-	16	48	55	55	-	-	85	191
Squash	970	1,287	1,272	971	1,105	1,112	1,358	1,471	1,286	797	1,009	549	391	694	467	206	216
Tomatoes	2,909	5,736	3,621	4,355	3,281	3,215	1,713	3,433	3,071	2,822	4,604	4,441	3,194	3,482	5,128	13,208	11,416
Vegetables,	122	212	232	41	26	10	18	121	4	402	687	813	266	911	1,463	1,350	1,382
Alfalfa	155,608	158,784	168,637	176,328	178,120	187,609	187,205	171,745	202,180	205,138	216,687	208,498	218,890	190,250	183,462	166,732	190,808
Alfalfa (Seec	2,383	627	738	1,524	2,356	3,362	2,082	2,515	833	2,685	4,516	5,394	3,069	2,594	5,030	3,070	4,523
Alicia Grass	2,797	2,900	1,961	821	965	325	168	62	52	50	14	14	13	-	71	-	-
Barley	5,358	3,481	3,585	6,761	7,735	4,098	1,895	382	232	259	259	311	464	325	-	-	203
Bermuda Gr.	2,403	2,158	2,344	3,047	2,351	2,215	2,315	3,745	3,684	2,816	2,786	2,077	1,763	5,680	4,083	4,249	4,498
Bermuda Gr.	964	1,046	1,362	1,349	2,837	4,939	5,019	5,929	7,849	16,428	13,175	17,402	20,238	2,966	3,926	3,778	13,410
Cotton	78,808	43,000	66,792	138,118	61,740	82,757	83,376	80,076	42,217	18,079	27,316	20,744	18,977	22,791	20,760	9,568	11,014
Field Corn	-	-	-	-	484	-	-	-	-	294	388	1,232	471	223	272	142	210
Kleingrass	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oats	1,002	275	148	780	182	511	271	39	717	274	464	372	533	1,046	472	4,806	2,602
Rape	46	-	-	-	-	-	-	-	-	267	-	-	-	-	-	-	-
Rye Grass	8,875	8,766	6,978	5,571	8,294	2,438	1,065	2,332	4,892	2,540	6,717	3,306	3,172	5,727	7,369	8,205	8,876
Sorghum Gr.	31,610	24,271	16,961	7,164	15,060	8,497	3,807	2,300	2,335	1,616	1,572	598	485	3	70	50	-
Soy Beans	-	-	-	87	3,338	3,092	38	91	181	-	5	-	78	120	-	144	-
Sudan Grass	14,450	13,047	26,155	6,566	11,761	23,732	20,587	22,122	8,013	10,410	24,311	15,202	10,527	24,914	34,509	48,792	41,482
Sudan Grass	-	-	-	-	75	-	-	-	-	228	115	76	-	153	-	342	1,055
Sugar Beets	69,108	71,425	73,813	59,789	36,459	47,784	36,861	43,929	37,607	39,525	38,102	37,340	34,048	41,504	41,099	29,163	41,508
Wheat	101,499	155,575	146,744	67,503	135,488	99,952	142,073	164,463	175,047	99,507	97,043	77,057	92,831	68,199	60,290	99,891	56,833
Asparagus	5,066	4,426	4,423	3,719	3,565	3,473	3,308	2,568	2,459	2,992	3,541	5,049	3,928	4,478	5,039	5,376	6,145
Citrus - Grap	657	600	546	442	368	295	295	294	444	464	353	520	329	417	690	688	688
Citrus - Lem	967	968	697	660	765	777	776	776	671	710	1,045	870	575	563	580	580	580
Citrus - Mixe	285	292	287	219	220	220	176	191	191	390	203	299	108	104	30	33	33
Citrus - Orar	444	409	401	380	354	334	334	369	353	356	355	355	335	325	402	402	472
Duck Ponds	7,020	6,809	7,106	7,635	7,213	7,178	7,768	8,064	8,169	12,908	8,866	8,904	9,157	7,940	7,763	7,819	7,863
Fish Farms	465	425	448	537	529	529	624	684	754	1,196	784	724	664	671	771	721	908
Guar Beans	-	-	-	-	-	-	-	299	1,892	-	-	18	-	-	-	-	-
Jojoba	-	-	-	2	2	2	2	508	3,062	3,005	3,005	3,005	2,844	2,119	2,117	2,117	2,117
Pasture, Per	556	997	1,802	729	277	457	300	312	386	449	473	550	545	527	498	501	599

Table E-1
Acreages o
Crops with ,

Crop	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Broccoli	9,543	8,889	64,069	6,406	5,926	6,311	6,480	9,589	12,305	10,916
Cabbage	1,431	1,077	1,511	1,483	757	710	966	1,126	1,441	877
Carrots	14,635	15,557	16,312	16,312	14,959	16,469	16,014	16,416	16,995	18,167
Cauliflower	6,087	6,237	3,755	3,755	2,762	2,776	2,553	3,313	3,960	3,642
Ear Corn	2,973	3,830	2,879	4,491	3,896	4,372	5,500	6,088	6,790	5,921
Garbanzo B(	-	-	-	-	75	1,211	1,034	51	1,057	108
Garlic	464	414	85	457	335	437	165	104	308	76
Lettuce	31,292	22,959	21,847	22,143	20,516	19,299	20,172	19,046	22,558	18,089
Cantaloupes	21,236	12,304	13,582	14,339	14,931	13,337	13,535	14,087	14,030	11,270
Honeydews	792	232	335	782	550	998	868	863	1,459	1,421
Watermelon:	2,326	2,485	2,596	3,498	2,619	2,822	2,419	1,635	2,158	1,143
Onions	11,862	10,126	10,767	12,004	11,258	13,324	10,176	9,757	11,526	12,377
Onions (See	2,540	2,790	2,315	1,929	1,317	1,882	3,573	2,256	3,541	3,812
Potatoes	621	604	970	1,304	1,923	2,538	2,784	2,622	3,159	2,775
Rapini	520	520	589	546	744	704	722	1,150	1,323	1,505
Spinach	222	169	451	366	345	372	646	950	1,229	485
Squash	201	187	102	220	223	59	150	114	191	108
Tomatoes	6,385	3,483	2,850	3,486	1,985	2,022	862	655	2,024	798
Vegetables,	1,635	1,178	2,059	2,134	1,663	803	1,761	1,711	2,162	1,961
Alfalfa	202,145	186,205	182,910	188,309	185,512	152,834	160,982	174,363	168,271	177,854
Alfalfa (Seec	17,397	7,099	7,949	6,675	13,423	13,238	14,248	19,781	24,362	18,223
Alicia Grass	1	71	1	1	1	1	1	1	1	1
Barley	145	92	182	239	606	58	91	337	868	109
Bermuda Gr:	5,776	15,359	17,367	17,056	21,704	20,952	24,301	31,774	31,731	41,918
Bermuda Gr:	15,890	19,098	20,494	17,535	17,854	22,636	20,613	21,865	23,448	22,185
Cotton	9,401	4,227	7,255	6,891	6,881	4,601	3,970	4,640	7,131	5,641
Field Corn	35	178	477	405	734	453	1,683	579	844	824
Kleingrass	-	-	-	135	135	452	567	1,623	3,113	6,998
Oats	3,750	1,981	1,262	1,539	2,063	1,267	1,753	2,411	212	850
Rape	-	-	45	558	919	773	778	5,098	3,034	621
Rye Grass	9,091	9,591	6,227	5,867	4,685	2,978	4,600	4,968	3,034	2,860
Sorghum Gr:	-	68	98	113	20	2,536	255	40	82	205
Soy Beans	-	-	-	80	-	-	-	-	-	-
Sudan Gras:	64,513	53,352	57,850	78,878	77,383	81,896	83,562	66,568	62,286	53,446
Sudan Gras:	167	72	273	266	151	300	310	391	595	148
Sugar Beets	41,591	39,703	41,492	34,802	31,612	33,980	39,327	34,258	33,997	31,475
Wheat	32,552	69,180	59,283	58,247	62,117	106,513	90,005	80,184	42,464	49,868
Asparagus	6,445	6,466	6,111	6,136	5,265	4,919	5,337	5,574	6,166	5,922
Citrus - Grar	864	920	1,036	1,078	1,157	1,200	1,194	1,337	1,412	1,384
Citrus - Lem	660	691	789	799	811	1,161	1,834	1,914	2,094	2,357
Citrus - Mixe	33	33	29	29	29	78	278	944	1,004	872
Citrus - Orar	1,060	525	632	632	667	667	780	840	947	927
Duck Ponds	8,099	8,244	8,243	8,070	7,994	8,798	8,837	8,979	9,105	10,025
Fish Farms	908	903	1,175	1,173	1,173	1,173	1,263	1,293	1,293	1,293
Guar Beans	-	-	-	-	20	276	104	153	-	-
Jojoba	2,117	2,117	2,017	2,017	1,943	400	202	2	2	2
Pasture, Per	607	610	695	798	728	696	722	684	701	546

APPENDIX F

General Survey Methods for Covered Species

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APPENDIX F

General Survey Methods for Covered Species

As described in Chapter 4, IID will conduct baseline surveys for covered species and periodic ongoing surveys. This appendix describes the general methods that IID will use to survey for covered species. Because the number of sample points and location of sample points for the covered species surveys will be influenced by results of the drain and desert habitat surveys, the HCP IT will finalize procedures for the covered species surveys following completion of the habitat surveys.

Covered Species Surveys

Drain Habitat

Covered species potentially using drain habitat includes birds and amphibians. However, the amphibians associated with drain habitat are the lowland leopard frog and Colorado River toad. These two species are addressed separately and individually under Other Species - 1 and 2. Therefore, the covered species surveys for drain habitat focus on birds. Two different survey methods will be used for birds in drain habitat: (1) call surveys and (2) point counts. These two survey methods are described below.

Call Surveys

Call surveys will be used to survey for Yuma clapper rails, California black rails, and least bitterns. Standard survey protocols have been developed for Yuma clapper rails and California black rails. The protocols are similar and combined here into one protocol. The HCP IT may modify the survey protocol for local conditions or in response to new information.

For surveys of the drains, survey points will be randomly distributed in vegetated areas of the drains. Within the created managed marsh, survey points will be distributed on a 100 m (328 ft) grid system (Conway et al. 2001). In drains, survey points will be distributed linearly. Survey points will be spaced about 100 m [328 ft] apart (Conway et al. 2001). The number of survey points will depend on the acreage of drain vegetation and the created managed marsh. Conway et al. (2001) recommend one point per one hectare of habitat (i.e., 1 point per 2.47 acres). This recommended density will be used to determine the number of survey points with modification as necessary to maintain adequate spacing among points. The location of the survey points will be recorded so they can be incorporated into a GIS and plotted on a map.

Surveys will be initiated 30 minutes before sunrise and completed no later than 3 hours after sunrise. Surveys will not be conducted if the wind speed is greater than 10 mph. Three surveys will be conducted in a year, one each during March, April, and May. For black rails, Conway et al. (2001) recommend conducting the first survey during March 21 - 30, the second survey during April 21 - 30, and the third survey during May 21 - 30. These timings are also appropriate for Yuma clapper rails and will be used unless the HCP IT identifies a more appropriate site-specific survey schedule.

Following the protocol developed by Conway et al. (2001), at each survey point, the observers will first wait quietly for 3 minutes, recording all birds seen or heard. Following this quiet period, observers will broadcast recorded calls of rails and bitterns over a 3-minute period. The tape used to broadcast calls will include 30 seconds of calls interspersed with 30 seconds of silence. The 30 seconds of calls will consist of calls interspersed with 5 seconds of silence. Conway et al. (2001) provide additional information on the broadcast call period of the surveys. Observers will record each individual detected and indicate when each individual is detected during the initial 3-minute passive period and/or during any of the 1-minute broadcast periods. Observers also will estimate whether the response is within or beyond 50 m of the survey point.

Point Counts

Point counts will be used to detect the remaining covered bird species associated with drain habitat. The point counts will be conducted following the protocol of Ralph et al. (1993, 1995) with modifications based on Guers and Flannery (2000). Based on these protocols, counts at each point will last 5 minutes. The species and number of individuals of all birds seen or heard during this period will be recorded. Birds detected within a 50-m radius of the point will be recorded separately from those that are detected farther away and those that are observed flying overhead. In addition to recording birds observed, the surveyors will indicate whether a bird was observed using the drain vegetation. The survey points established for the call surveys will be used for the point counts with the additional constraint that points must be at least 250 m apart (Guers and Flannery 2000). Counts will be conducted three times during each of the three seasons (spring: March - June; fall: October - November; and winter: December - February). Counts will be separated by at least 2 weeks.

Desert Habitat

Covered species potentially occurring in desert habitat in the HCP area include birds, amphibians, reptiles, mammals, and insects. However, nine of the species potentially occurring in desert habitat are addressed separately and individually under Other Species—1 and 2. These species are:

- Cheeseweed moth lacewing
- Andrew's scarab beetle
- Banded gila monster
- Jacumba little pocket mouse
- Flat-seeded spurge
- Foxtail cactus
- Munz's cactus
- Orocopia sage
- Orcutt's aster

Because these species are addressed separately, they were not considered in developing the survey methods. The survey protocols that will be used to detect covered birds, amphibians, and mammals associated with desert habitat are described subsequently.

Birds

Point counts will be used to detect birds in desert habitat following the same protocol as described for drain habitat. The location and number of points will be determined based on the desert habitat survey. A stratified random sampling approach will be used to distribute points among the various habitats identified during the habitat surveys. Points will be located at least 250 m apart (Guers and Flannery, 2000).

The point counts will be conducted three times during each of the three seasons (spring: March - June; fall: October - November; and winter: December - February). Counts will be separated by at least 2 weeks.

Amphibians

The only amphibian covered by this HCP with the potential to occur in desert habitat is the Couch's spadefoot toad. Surveys for Couch's spadefoot toad will be conducted following rainstorms when these toads breed in pools formed by rain. Following heavy rainstorms, IID will survey the rights-of-way of the AAC and East Highline Canal. Pools that could be used by Couch's spadefoot toads will be identified and mapped. The presence/absence of Couch's spadefoot toads also will be noted for each pool.

Reptiles

Four different survey methods will be used to survey for reptiles in desert habitat: (1) pitfall traps, (2) area searches, (3) desert tortoise protocols, and (4) flat-tailed horned lizard protocols. The HCP IT may modify survey methods as appropriate to most effectively and efficiently survey for the covered reptile species.

Pitfall Traps

Pitfall traps will be used to survey for western chuckwalla and Colorado Desert fringe-toed lizards. Used with drift fences, pitfall traps are a preferred method for detecting many reptiles. Drift fences intercept animals moving along the ground and direct them into the pitfall trap. Pitfall trap and fences will be established at each of the points used for point count surveys of birds. Traps will be run for 3 consecutive nights at each location. The traps will be checked and closed soon after sunrise each day. Pitfall trapping will be conducted once each month during March, April, May, June, October, and November.

Area Searches

Some reptile species are not sampled effectively with pitfall trapping. Thus, area searches will be used to increase the likelihood of detecting covered reptile species. Area searches consist of systematically searching a specified area for animals (Heyer et al., 1994). Area searches will be conducted in areas of suitable habitat for western chuckwalla and Colorado Desert fringe-toed lizards as determined by HCP IT. Plots 25 m by 25 m will be established in areas considered most likely to contain covered reptiles (Heyer et al., 1994). This area will be intensively searched for covered reptile species or their sign. Area search surveys will be conducted each month during March, April, May, June, October, and November.

Desert Tortoise

Surveys for desert tortoise will be conducted following the standard protocols for this species. The survey protocol for desert tortoise consists of searching specified transects for signs of desert tortoise. Surveys will be conducted between March 25 and May 31. Transects for desert tortoise surveys will be established in areas of suitable habitat for desert tortoise as determined by the HCP IT.

Flat-tailed Horned Lizard

Surveys for flat-tailed horned lizards will be conducted following the standard protocols for this species with any modifications deemed appropriate by the HCP IT. The current survey protocol for flat-tailed horned lizards is as follows. Transects consisting of parallel, linear routes will be evenly spaced in areas of suitable habitat for flat-tailed horned lizards as determined by the HCP IT. The number and distribution of transects will be such that a minimum of 10 hours of survey effort will be expended per 640 acres surveyed. Each transect will be traversed by a single worker. On each transect, either scat or lizards will be surveyed. The location of transects and each flat-tailed horned lizard and scat will be recorded. However, all observations of horned lizards or scat will be noted regardless of whether the transect is a scat or lizard transect. Scat and lizard survey routes will be alternated or randomly assigned to the transects at the HCP IT's discretion. Three surveys will be conducted, spaced at least 2 weeks apart during April through September. Lizard surveys will be conducted when surface temperatures in the sun range from 35 to 50°C. Scat surveys will not be conducted for at least 12 days after heavy rains, hailstorms, or strong winds of an intensity sufficient to move considerable amounts of sand across roads or that damage signs and trees.

In addition, road surveys will be conducted consisting of driving all roads in or near the areas where transects are situated and recording observations of horned lizards. Surveyors will drive very slowly (no faster than 10 mph). Three road survey will be conducted during April through September. Roads will be driven in the morning when substrate temperatures adjacent to the roads and in the sun range from 25 to 50°C. The location of each flat-tailed horned lizard observed will be recorded.

Mammals

Nelson's bighorn sheep is the only covered mammal species potentially occurring in desert habitat in the HCP area. Surveys for Nelson's bighorn sheep will be conducted in conjunction with the desert tortoise and/or flat-tailed horned lizard surveys. During the desert tortoise and flat-tailed horned lizard surveys, the surveyors also will search for and record signs of bighorn sheep presence. Because bighorn sheep could occur near the AAC at times other than March 25 through May 31, when desert tortoise surveys are conducted, surveys for bighorn sheep also will be conducted during the summer (July - September), fall (October - November), and winter (December - February).

References

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Heyer, W. R., M. A. Donnelly, R. W. McDiarmid, L. C. Hayek, and M. S. Foster. 1994. *Measuring and monitoring biological diversity: standard methods for amphibians.* Smithsonian Institution Press, Washington, D.C.

APPENDIX G

California Endangered Species Act, Application for an Incidental Take Permit Under Section 2081 of the Fish and Game Code for Incidental Take of State-Listed Species Along the Lower Colorado River

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APPENDIX G

California Endangered Species Act, Application for an Incidental Take Permit Under Section 2081 of the Fish and Game Code for Incidental Take of State-Listed Species Along the Lower Colorado River

This permit application was prepared to support the Imperial Irrigation District's (IID's) application for an Incidental Take Permit (ITP) in conformance with Section 2081 (b) of the California Endangered Species Act (CESA). This permit application describes management actions that will be implemented to mitigate the impacts of any take of state-listed species associated with IID's implementation of the IID/San Diego County Water Authority (SDCWA) Transfer Agreement and Quantification Settlement Agreement (QSA).

Applicant's Name, Mailing Address, and Telephone Number:

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Operating Headquarters
333 E. Barioni Blvd.
P.O. Box 937
Imperial, CA 92251
Telephone: (760) 339-9831
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Principal Officer:
Registered Agent for the Service of Process:
Point of Contact:

List of Species for Which Coverage Is Requested

IID is seeking authorization under Section 2081 (b) of the CESA for incidental take of state-listed species that could occur along the Lower Colorado River (LCR) (Table G-1).

TABLE G-1
Species to be Covered by the ITP

Common Name	Scientific Name	Federal Status	State Status
Bonytail	*Gila elegans*	Endangered	Endangered
Razorback sucker	*Xyrauchen texanus*	Endangered	Endangered
Arizona Bell's vireo	*Vireo bellii arizonae*		Endangered

TABLE G-1
Species to be Covered by the ITP

Common Name	Scientific Name	Federal Status	State Status
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Endangered
Brown pelican	*Pelecanus occidentalis*	Endangered	Endangered
California black rail	*Laterallus jamaicensis*		Threatened
Elf owl	*Micrathene whitneyi*		Endangered
Gilded flicker	*Colaptes chrysoides*		Endangered
Gila woodpecker	*Melanerpes uropygialis*		Endangered
Peregrine falcon	*Falco peregrinus*		Endangered
Southwestern willow flycatcher	*Empidonax traillii extimus*	Endangered	Endangered
Western yellow-billed cuckoo	*Coccyzus americanus*		Endangered
Yuma clapper rail	*Rallus longirostris yumanesis*	Endangered	Threatened

Description of the Project

The IID/SDCWA Transfer Agreement is a long-term transaction between IID and SDCWA involving the voluntary conservation by IID of up to 300,000 acre-feet/year (300 KAFY) and the subsequent transfer of all or a portion of the conserved water to SDCWA. The transferred, conserved water is intended for use in SDCWA's service area in San Diego County, California. Under certain circumstances, up to 100 KAFY of the water conserved by IID may be transferred to Coachella Valley Water District (CVWD) and/or Metropolitan Water District (MWD). Key aspects of the project are summarized subsequently. A more detailed description of the proposed project is located in Chapter 1 of the Habitat Conservation Plan, and Chapter 1 of the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the IID Water Conservation and Transfer Project.

Subsequent to execution of the IID/SDCWA Transfer Agreement, a settlement agreement was negotiated by and among IID, CVWD, and MWD, with the participation of the State of California and the Department of the Interior (DOI). The proposed terms of the settlement agreement were incorporated in the QSA. The QSA facilitates a number of component agreements and actions, which, when implemented, will enhance the certainty and reliability of Colorado River water supplies available to the signatory agencies and will assist these agencies in meeting their water demands within California's normal-year apportionment of Colorado River water. The QSA establishes water budgets for IID, MWD, and CVWD and sets forth approved parameters of various water transfers and exchanges, including the conservation by IID of up to 300 KAFY for transfer to SDCWA, CVWD, and/or MWD.

The Secretary of DOI, in the role as water master for the LCR, must implement the terms of the QSA by delivering Colorado River water in accord with its terms. The actions required of the Secretary are set forth in a proposed Implementation Agreement (SIA), which is intended to be effective concurrently with the QSA. As a condition precedent to implementation of the QSA, certain other federal actions are required, including the adoption of Interim Surplus Criteria and the adoption of an Inadvertent Overrun Program to facilitate the payback of inadvertent exceedances by IID or CVWD of their respective Priority 3 diversion caps.

If the QSA is approved and implemented, it would change the project described in the IID/SDCWA Transfer Agreement in certain respects. The QSA would limit the amount of conserved water transferable to SDCWA to a maximum of 200 KAFY and would provide for CVWD's option to acquire up to 100 KAFY of water conserved by IID, in lieu of transfer of this increment of conserved water to SDCWA. The QSA also provides for MWD's option to acquire any portion of the 100 KAFY of conserved water available to, but not acquired by, CVWD.

The EIR/EIS for the IID Water Conservation and Transfer Project addresses the environmental impacts of IID's consensual limit on its Priority 3 diversions and the conservation by IID of up to 300 KAFY for transfer pursuant to the IID/SDCWA Water Transfer Agreement and/or the QSA. The accompanying HCP supports the issuance of ITPs under the federal Endangered Species and CESA for this project in Imperial Valley, the Salton Sea, and along the All American Canal. This permit application supports issuance of an ITP under 2081(b) of CESA for take of state-listed species that could occur along the LCR between Imperial Dam and Parker Dam as a result of the conservation by IID of up to 300 KAFY for transfer pursuant to the IID/SDCWA Water Transfer Agreement and/or the QSA. Incidental take of federally listed species was covered in the Biological Opinion issued to the U.S. Bureau of Reclamation (Reclamation) on the *Interim Surplus Criteria (ISC), Secretarial Implementation Agreements (SIAs) for change in point of diversion of up to 400,000 acre-feet of California apportionment waters within California, and implementation of certain conservation measures on the LCR, Lake Mead to the Southerly International Boundary in Arizona, California and Nevada* (USFWS 2001). The EIR/EIS for the IID Water Conservation and Transfer Project will satisfy CEQA requirements for issuance of the Section 2081 permit.

Project Area Location and Affected Environment

The portion of the LCR affected by the proposed project is defined as the mainstem and the 100-year floodplain of the Colorado River from Parker Dam downstream to Imperial Dam. This geographic subregion includes approximately 140 miles. IID currently diverts water from the Colorado River at Imperial Dam, located about 18 miles northeast of Yuma, Arizona.

Habitats supported along the LCR and potentially affected by the proposed project include:

- Riparian communities (e.g., cottonwood-willow, mesquite, salt-cedar)
- Backwaters and marshes
- Mainstem riverine

Table G-2 shows the acreage of the various plant communities comprising riparian communities along the LCR. Table G-3 summarizes the acreage of riparian communities (all plant communities combined), backwaters, and marshes along the LCR between Parker and Imperial Dams. Additional information on habitats along the LCR is provided in Section 3.2.3.1 of the EIR/EIS.

TABLE G-2
Plant Communities in the LCR 100-Year Floodplain

Structure Type	Acres	Percent of Total Vegetation[a]
Cottonwood-willow	1,502	3
Salt cedar-honey mesquite	14,200	24
Salt cedar-screwbean mesquite	5,025	9
Salt cedar	30,840	53
Honey mesquite	3,128	5
Arrowweed	2,773	5
Atriplex	511	<1
Creosote	317	<1
Total	**58,296**	

[a] Excluding 1,723 acres of agriculture
Source: CH2M HILL 1999

TABLE G-3
Acreage of Habitats Along the LCR Between Parker and Imperial Dams

Habitat	Acreage
Riparian communities	58,296
Backwater (open water portions)	3,955
Marsh	6,710

Source: CH2M HILL, 1999
Source: Ogden Environmental and Energy Services Geographic Information System

Project Effects and Proposed Conservation Measures

Effects to Habitats

The conserved water consists of Colorado River water that otherwise would be diverted by IID for use within IID's service area in Imperial County, California. For conserved water transferred to SDCWA or MWD, IID's annual diversions of Colorado River water at Imperial Dam would be reduced by the amount of the conserved water, and this amount would be diverted at MWD's Whitsett Intake at Parker Dam on the Colorado River for delivery through MWD's Colorado River Aqueduct. For conserved water transferred to

CVWD, IID's annual diversions of Colorado River water at Imperial Dam also would be reduced by the amount of the conserved water, and this amount will be diverted into the Coachella Canal from the All American Canal (AAC). The effect of the change in the point of diversion would be to reduce flows in the LCR between Parker and Imperial Dams.

The USFWS (2001) evaluated the impact on federally listed species of changes in points of diversion for 400 KAFY of California allocation water in its Biological Opinion on the *Interim Surplus Criteria (ISC), Secretarial Implementation Agreements (SIAs) for change in point of diversion of up to 400,000 acre-feet of California apportionment waters within California, and implementation of certain conservation measures on the LCR, Lake Mead to the Southerly International Boundary in Arizona, California and Nevada.* Reclamation also is currently preparing a Programmatic EIS addressing these actions. The 300 KAFY of water that IID would conserve and transfer under the IID/SDCWA Transfer Agreement and QSA is encompassed by the 400 KAFY contained in Reclamation's project. Therefore, the analyses conducted for the Biological Opinion and PEIS are used for the analysis of effects of this project on state-listed species.

The change in the points of diversion would reduce flows in the LCR between Parker and Imperial Dams. This flow reduction would decrease the amount of open water habitat and/or change the characteristics (e.g., depth, velocity) of open water habitat in the mainstem and in backwaters. Lower water levels in marsh habitat in backwater areas would be expected to reduce the extent of marsh vegetation or change the plant species composition. Riparian communities in some locales would experience reduced groundwater and surface water levels, which could alter the amount and characteristics of the affected communities. Table 4 summarizes the acreage and potential effects to these habitats as a result of the proposed project, based on analyses conducted for the Biological Opinion and the PEIS. As explained in more detail in the Section 3.2 of the EIR/EIS, the acreages in Table G-4 were derived from the Biological Opinion by assuming the acreage affected was proportional to the amount of water transferred from IID and diverted at Parker Dam.

TABLE G-4
Acreage of Each Habitat Potentially Affected by the Proposed Project

Habitat	Acreage	Comments
Riparian (occupied by Southwestern Willow Flycatcher)	279	Acreage predicted to experience reduced groundwater and surface water levels. Actual changes in acreage, plant species composition, and structure cannot be predicted and are uncertain.
Backwater (open water)	12	
Marsh	21	Acreage predicted to experience reduced groundwater and surface water levels. Actual changes in acreage, plant species composition, and structure cannot be predicted and are uncertain.
Mainstem riverine	26	

Under the Biological Opinion, Reclamation committed to certain actions to mitigate impacts to federally listed species as a result of the change in the points of diversion of 400 KAFY. These conservation measures are as follows.

- Monitor 372 acres of occupied habitat that could be affected by the change in the point of diversion for 400 KAFY of water.
- Restore and maintain 372 acres of new replacement willow flycatcher habitat along the LCR within 5 years of execution of the SIA that provides federal approval for the water transfer actions.
- Restore and maintain additional habitat (up to 744 acres) if monitored habitat is found to be affected.
- Restore 44 acres of backwater habitat (marsh and open water combined) along the LCR between Parker and Imperial Dams.
- Re-introduce and monitor 20,000 sub-adult razorback suckers below Parker Dam.
- Continue the ongoing study on Lake Mead for an additional 4 years to determine reasons for persistence of adult razorback suckers in the reservoir.
- Fund the capture of wild-born or F1 generation bonytail chubs from Lake Mohave to be incorporated into the broodstock for this species.

The first four measures compensate for potential impacts to marsh, backwater (open water), and riparian habitat, while the last three measures address the net reduction in open water in the mainstem. These measures address the impacts associated with the change in the points of diversion for 400 KAFY of water and encompass the impacts associated with IID's proposed project. The following analysis considers impacts to state-listed species in the context of the conservation measures to be implemented by Reclamation.

Effects to Listed Species

Razorback Sucker

Razorback suckers inhabit the mainstem and backwater habitats along the LCR. Detailed information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP, the Biological Assessment for the ISC/SIA (Reclamation 2000), and associated Biological Opinion (USFWS 2001).

Potential effects to razorback suckers attributable to the proposed project consist of projected reductions in backwater habitat (33 acres) and mainstem riverine habitat (26 acres). These reductions have the potential to take a razorback sucker. The construction of 44 acres of backwater habitat by Reclamation would offset the projected reduction in this habitat. Further, Reclamation would reintroduce razorback suckers below Parker Dam and continue funding an ongoing study of this species at Lake Mead. These measures would mitigate potential effects to razorback suckers from the small change in the amount of mainstem riverine habitat. With the conservation measures to be implemented by Reclamation, any take of razorback suckers resulting from a change in the point of diversion of the 300 KAFY of water conserved by IID would be fully mitigated. No additional mitigation is necessary.

Bonytail

Bonytail are presently found in Lakes Mohave and Havasu. Detailed information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP, the Biological Assessment for the ISC/SIA (Reclamation, 2000), and associated Biological Opinion (USFWS, 2001).

The change in the point of diversion for 300 KAFY of water conserved and transferred by IID would not affect the operation of those lakes (Reclamation 2000). Because bonytail do not currently inhabit the LCR between Parker and Imperial Dams, no take of this species is expected over the short-term with implementation of the proposed project. However, efforts are underway to reintroduce bonytail to the LCR below Parker Dam. Depending on when bonytail are reintroduced relative to the ramp up for water conservation by IID, reintroduced fish could experience a small decline in backwater habitat and mainstem riverine habitat. The conservation measures implemented by Reclamation to construct replacement backwater habitat and contribute to maintenance of broodstock for this species would fully mitigate any take caused by a change in the point of diversion. Therefore, no additional mitigation is necessary.

Arizona Bell's Vireo

The Arizona Bell's vireo is a summer breeding resident along the LCR. This species uses riparian habitats similar to the southwestern willow flycatcher. Additional information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP.

A change in point of diversion of 300 KAFY of water under the proposed project could impact 279 acres of riparian habitat occupied by southwestern willow flycatchers. Given their similar habitat associations, this acreage also represents habitat potentially occupied by Arizona Bell's vireo. Thus, impacts to the Arizona Bell's vireo would be generally similar to those described for the southwestern willow flycatcher in the Biological Opinion. No information is available on the number of occupied territories that may be affected by the loss of 372 habitat acres. However, a reduction in riparian habitat could cause take of Arizona Bell's vireo through displacement of adults, reduced productivity, or reduced survivorship of adults and/or young.

Conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 372 acres of riparian habitat and monitoring and restoring up to an additional 744 acres, if monitoring shows an impact to riparian habitat. With these measures, Reclamation would at least replace any impacted riparian habitat. Thus, these measures would encompass and fully mitigate any take of Arizona Bell's vireo potentially resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. No additional mitigation measures are necessary.

Bald Eagle

Information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP and the Biological Assessment for the ISC/SIA (Reclamation 2000). In its Biological Assessment, Reclamation concluded that implementation of the ISC/SIA (including the change in the points of diversion of 400 KAFY) would not likely adversely affect the food resources, foraging opportunities, or nesting habitat of the bald eagle. The USFWS concurred with Reclamation's determination that Reclamation's proposed action is not likely to adversely affect bald eagles (USFWS 2001).

Based on Reclamation's and USFWS' evaluations, no take of bald eagles is expected. Any take that did occur as a result of a change in the point of diversion for the 300 KAFY of water conserved by IID would be fully mitigated by the Reclamation's conservation measures. No additional mitigation measures are necessary.

California Brown Pelican

Along the Colorado River, the brown pelican is a rare but annual post-breeding wanderer from Mexico in late summer and early fall (Reclamation 2000). It is most frequently seen around Imperial Dam, but individuals have occurred north to Davis Dam and Lake Mead. Virtually all records are of lone immature birds, likely dispersing from breeding colonies in the Gulf of California or perhaps via the Salton Sea (Reclamation 2000). Along the river, they prefer large open-water areas near dams. Additional information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP and the Biological Assessment for the ISC/SIA (Reclamation 2000).

In its Biological Assessment for the ISC/SIA project, 4.4. Plan, Reclamation made a finding of no effect for the brown pelican because the action would not change the character of aquatic habitat potentially utilized by this species (Reclamation 2000). The USFWS concurred with this determination. Based on Reclamation's and USFWS' evaluations, no take of brown pelicans is expected. Any take that did occur as a result of a change in the point of diversion for the 300 KAFY of water conserved by IID would be fully mitigated by the Reclamation's conservation measures. No additional mitigation measures are necessary.

California Black Rail

The California black rail is associated with marsh habitats along the LCR. Information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP and the Biological Assessment for the ISC/SIA (Reclamation 2000).

A change in point of diversion of 300 KAFY of water under the proposed project could impact an estimated 21 acres of marsh habitat in backwater areas. Given their similar habitat associations, impacts to the California black rail would be generally similar to those described for the Yuma clapper rail in the Biological Opinion. A reduction in marsh habitat could cause take of California black rails through displacement of adults, reduced productivity, or reduced survivorship of adults and/or young.

Conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 44 acres of backwater habitat (open water and marsh combined). With this measure, Reclamation would replace any impacted marsh habitat. Thus, these measures would encompass and fully mitigate any take of California black rail resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. No additional mitigation measures are necessary.

Elf Owl

The elf owl is a very rare and local summer resident in riparian habitats along the LCR, which lies at the western edge of its range (Rosenberg et al. 1991). Historically, it occurred south of Yuma. Elf owls are not known to use riparian habitats along the LCR for breeding. Additional information on the range, distribution, abundance, and habitat requirements of the elf owl is presented in Appendix A of the HCP.

A change in point of diversion of 300 KAFY of water under the proposed project could impact 279 acres of riparian habitat. Because elf owls are very rare and not known to breed along the LCR, the potential for take of elf owls because of these potential habitat effects is very low. Nonetheless, conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 372 acres of riparian habitat and monitoring and restoring up to an additional 744 acres, if monitoring shows an impact to riparian habitat. With these measures, Reclamation would at least replace any impacted riparian habitat. Thus, these measures would encompass and fully mitigate any take of elf owls resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. No additional mitigation measures are necessary.

Gilded Flicker

The gilded flicker occurs along the LCR Valley in southern Arizona and southeastern California (Rosenberg et al., 1991). In California, there were an estimated 40 individuals along the LCR in 1984 (Hunter, 1984; CDFG, 1991); but during 1986 surveys, there were no gilded flickers observed in this area. Rosenberg, et al. (1991) reported "scattered pairs" between Imperial and Laguna Dams. The preferred nesting substrate for this species is saguaros; however, they also use mature cottonwood-willow riparian forests to a more limited degree Additional information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP.

A change in point of diversion of 300 KAFY of water under the proposed project could impact 279 acres of riparian habitat occupied by southwestern willow flycatchers. This acreage also represents habitat potentially occupied by gilded flicker. Thus, impacts to the gilded flicker would be generally similar to those described for the southwestern willow flycatcher in the Biological Opinion. No information is available on the number of occupied territories that could be affected by changes in the amount or characteristics of 279 acres of riparian habitat. However, a reduction in riparian habitat could cause take of a gilded flicker through displacement of adults, reduced productivity, or reduced survivorship of adults and/or young.

Conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 372 acres of riparian habitat and monitoring and restoring up to an additional 744 acres, if monitoring shows an impact to riparian habitat. With these measures, Reclamation would at least replace any impacted riparian habitat. Thus, these measures would encompass and fully mitigate any take of gilded flicker resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. No additional mitigation measures are necessary.

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Gila Woodpecker

Gila woodpeckers are known to occur between the Laguna and Imperial Dams along the LCR. In 1984, an estimated 200 individuals occurred in California along the LCR (CDFG 1991). The total population along the LCR is estimated at about 1,000 individuals (Rosenberg et al. 1991). While saguaros are a commonly used nesting substrate for the species, in California, they primarily use mature riparian habitat. Gila woodpeckers appear to need large blocks of riparian habitat for nesting; isolated patches of riparian habitat less than 50 acres in size do not support the species (Rosenberg, et al. 1991). Additional information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP.

A change in point of diversion of 300 KAFY of water under the proposed project could impact 279 acres of riparian habitat occupied by southwestern willow flycatchers. This acreage also represents habitat potentially occupied by Gila woodpecker. Thus, impacts to the Gila woodpecker would be generally similar to those described for the southwestern willow flycatcher in the Biological Opinion. No information is available on the number of occupied territories that could be affected by changes in the amount or characteristics of 279 acres of riparian habitat. However, a reduction in riparian habitat could cause take of a Gila woodpecker through displacement of adults, reduced productivity, or reduced survivorship of adults and/or young.

Conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 372 acres of riparian habitat and monitoring and restoring up to an additional 744 acres, if monitoring shows an impact to riparian habitat. With these measures, Reclamation would at least replace any impacted riparian habitat. Thus, these measures would encompass and fully mitigate any take of Gila woodpecker resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. No additional mitigation measures are necessary.

Peregrine Falcon

Peregrine falcons occur in a wide range of open country habitats. The presence of tall cliffs is the most characteristic feature of the peregrine's habitat and is considered a limiting factor for the species. Nearby waterbodies or wetlands that support abundant prey of small to medium-size birds are another common habitat feature and influence the species distribution and abundance (Johnsgard, 1990). These habitat features are present in the project area, and the species may use areas affected by the water diversion for both foraging and nesting. Information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP.

Nesting habitat for this species would not be affected by the proposed project. Potential impacts to 279 acres of riparian habitat and 21 acres of marsh habitat could affect the abundance and distribution of prey species of the peregrine falcon. However, given this species' mobility and the abundant prey base in the river corridor, it is unlikely that any take of peregrine falcons would occur. In the unlikely event that take of peregrine falcons did occur from these habitat changes, the conservation measures implemented by Reclamation would fully mitigate the take.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is associated with riparian habitats. The majority of southwestern willow flycatchers found during the past 5 years of surveys on the LCR have been in saltcedar, or a mixture of saltcedar and native cottonwood and willow, especially Goodings willow, coyote willow, and Fremont cottonwood (Reclamation, 2000). Sixty-four nesting attempts were documented on the LCR from southern Nevada to Needles, California, in 1998 (Reclamation, 2000). Additional information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP, the Biological Assessment for the ISC/SIA (Reclamation, 2000), and the associated Biological Opinion (USFWS, 2001).

A change in point of diversion of the 300 KAFY of water conserved and transferred by IID could degrade or reduce the amount of willow flycatcher habitat by lowering river and groundwater elevations (USFWS, 2001; Reclamation, 2000). An estimated 279 acres of occupied southwestern willow flycatcher habitat could be affected. A reduction in occupied habitat could cause take of a southwestern willow flycatcher through displacement of adults, reduced productivity, or reduced survivorship of adults and/or young.

Conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 372 acres of riparian habitat and monitoring and restoring up to an additional 744 acres, if monitoring shows an impact to riparian habitat. With these measures, Reclamation would at least replace any impacted riparian habitat. These measures would encompass and fully mitigate any take of southwestern willow flycatchers resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. Therefore, no additional mitigation measures are necessary.

Western Yellow-billed Cuckoo

Mature stands of cottonwood-willow provide the primary habitat for western yellow-billed cuckoos. In the LCR area, cuckoos have been detected as far south as Gadsden and Imperial National Wildlife Refuge (Reclamation, 2000). Additional information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP and the Biological Assessment for the ISC/SIA (Reclamation, 2000).

A change in point of diversion of 300 KAFY of water under the proposed project could impact 279 acres of riparian habitat occupied by southwestern willow flycatchers. This acreage also represents habitat potentially occupied by western yellow-billed cuckoos. Thus, impacts to the western yellow-billed cuckoo would be generally similar to those described for the southwestern willow flycatcher in the Biological Opinion. No information is available on the number of occupied territories that could be affected by changes in the amount or characteristics of 372 habitat acres. However, a reduction in riparian habitat could cause take of a western yellow-billed cuckoo through displacement of adults, reduced productivity, or reduced survivorship of adults and/or young.

Conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 372 acres of riparian habitat and monitoring and restoring up to an additional 744 acres, if monitoring shows an impact to riparian habitat. With these measures, Reclamation would at least replace any impacted riparian habitat. These measures would encompass and fully mitigate any take of western yellow-billed cuckoos potentially resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. Therefore, no additional mitigation measures are necessary.

Yuma Clapper Rail

The Yuma clapper rail is associated with marsh habitats along the LCR. Information on the range, distribution, abundance, and habitat requirements of this species is presented in Appendix A of the HCP, the Biological Assessment for the ISC/SIA (Reclamation, 2000), and associated Biological Opinion (USFWS, 2001).

A change in point of diversion of 300 KAFY of water under the proposed project could impact an estimated 21 acres of marsh habitat in backwater areas. A reduction in marsh habitat could cause take of Yuma clapper rails through displacement of adults, reduced productivity, or reduced survivorship of adults and/or young. Conservation measures implemented by Reclamation for the change in the points of diversion for 400 KAFY of water would consist of restoring 44 acres of backwater habitat (open water and marsh combined). With this measure, Reclamation would replace any impacted marsh habitat. These measures would encompass and fully mitigate any take of Yuma clapper rail potentially resulting from the change in the point of diversion of 300 KAFY under IID's proposed project. Therefore, no additional mitigation measures are necessary.

Incidental Take Determinations and Jeopardy Analysis

Razorback Sucker

The USFWS determined that all razorback suckers inhabiting the 44 acres of backwater habitat affected by the change in the points of diversion for 400 KAFY could be taken, but determined that this level of take would not jeopardize the species. IID's proposed project is encompassed by the USFWS' determination and therefore would have a lower level of take and would not jeopardize the species.

Bonytail

No bonytail are present in reach of the LCR from Parker to Imperial Dams. Take of bonytail is not expected in the short term but could occur if bonytail are re-introduced in the LCR in the future. The USFWS determined that implementation of Reclamation's ISC/SIA project, 4.4 Plan would not result in jeopardy to bonytail. IID's proposed project is encompassed by the USFWS' determination on this project and therefore would have a lower level of take if any and would not jeopardize the species.

Arizona Bell's Vireo

This species is not federally listed and was not covered in the Biological Assessment or Biological Opinion for the ISC/SIA. Consistent with the USFWS determination for the southwestern willow flycatcher, all Arizona Bell's vireos inhabiting the 279 acres of riparian habitat potential affected by the proposed project could be taken. With implementation of the conservation measures, this level of take is not likely to result in jeopardy to the species.

Bald Eagle

No take of bald eagles is expected. With implementation of the conservation measures, any take of bald eagles that did occur would not result in jeopardy to the species.

California Brown Pelican

No take of California brown pelicans is expected. With implementation of the conservation measures, any take of brown pelicans that did occur would not result in jeopardy to the species.

California Black Rail

The California black rail is not a federally listed species and was not addressed in the USFWS Biological Opinion. However, Reclamation addressed the species in their Biological Assessment and concluded the project effects on this species would be the same as for the Yuma clapper rail (Reclamation, 2000). Impacts to 21 acres of marsh habitat under the proposed project could result in take of the California black rail inhabiting these areas. However, with implementation of the conservation measures, this potential take is not likely to result in jeopardy to the species.

Elf Owl

Because this species is not federally listed, it was not covered in the Biological Opinion for the ISC/SIA. Take of this species is not expected. Nonetheless, a very low level of take could occur as a result of the potential effects of the proposed project on riparian habitat. With implementation of the conservation measures, the very low level of take potentially occurring is not likely to result in jeopardy to the species.

Gilded Flicker

The gilded flicker is not federally listed and was not covered in the Biological Assessment or Biological Opinion for the ISC/SIA. Consistent with the USFWS determination for the southwestern willow flycatcher, all gilded flickers inhabiting the 279 acres of riparian habitat potentially affected by the IID's proposed project could be taken. With implementation of the conservation measures, this level of take is not likely to result in jeopardy to the species.

Gila Woodpecker

The gila woodpecker is not federally listed and was not covered in the Biological Assessment or Biological Opinion for the ISC/SIA. Consistent with the USFWS determination for the southwestern willow flycatcher, all gila woodpeckers inhabiting the 279 acres of riparian habitat potentially affected by the IID's proposed project could be taken. With implementation of the conservation measures, this level of take is not likely to result in jeopardy to the species.

Peregrine Falcon

No take of peregrine falcons is expected. With implementation of the conservation measures, any take of peregrine falcons that did occur would not result in jeopardy to the species.

Western Yellow-Billed Cuckoo

This species is not federally listed and was not covered in the Biological Opinion for the ISC/SIA. Consistent with the USFWS determination for the southwestern willow flycatcher, all western yellow-billed cuckoos inhabiting the 279 acres of riparian habitat affected by IID's proposed project could be taken. With implementation of the conservation measures, this potential take of yellow-billed cuckoos is not likely to result in jeopardy to the species.

Yuma Clapper Rail

The USFWS determined that impacts to 28 acres of marsh habitat with the change in the points of diversion for 400 KAFY could harm Yuma clapper rails (USFWS, 2001) and could adversely affect the habitat use of approximately 100 clapper rails in the Parker Dam to Imperial Dam reach of the LCR. The level of take that would occur is uncertain. However, with implementation of the conservation measures by Reclamation, the USFWS determined that the potential take was not likely to result in jeopardy to the species (USFWS, 2001). IID's proposed project is encompassed by the USFWS' determination and therefore would have a lower level of take and would not jeopardize the species.

Southwestern Willow Flycatcher

The USFWS determined that all southwestern willow flycatchers inhabiting the 372 acres of riparian habitat affected by the change in the points of diversion for 400 KAFY could be taken, but this take would not jeopardize the species. IID's proposed project is encompassed by the USFWS' determination and therefore would have a lower level of take and would not jeopardize the species.

Compliance Monitoring and Funding Assurances

Responsibility for funding and implementing the conservation measures associated with the ISC/SIA project, 4.4 Plan was assumed by Reclamation and five designated applicants through their consultation with the USFWS under section 7 of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). No additional mitigation is necessary to meet the permit requirements for incidental take authorization of state-listed species on the LCR for IID's proposed project.

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Habitat Conservation Plan IID Water Conservation and Transfer Project

December 2001

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Acronyms and Abbreviations

μg/g dw	micrograms per gram for drinking water
μg/L	micrograms per Liter
AAC	All American Canal
AFY	acre-feet per year
BEPA	Bald Eagle and Golden Eagle Protection Act
BLM	Bureau of Land Management Sensitive Species
CDFG	California Department of Fish and Game
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CRIT	Colorado River Indian Tribe
CSC	California Species of Special Concern
CVWD	Coachella Valley Water District
CWHR	California Wildlife Habitat Relationship
DDD	dichloro-diphenyl-dichloroethane
DDE	dichlorophenyldichloro-ethene
DDT	dichloro-diphenyl-trichlorethane
DOI	Department of Interior
DOQQ	Digital Orthophoto Quarter Quadrangle
E	endangered
EIR/EIS	environmental impact report and environmental impact statement
ESA	Endangered Species Act
FESA	Federal Endangered Species Act of 1973
FP	fully protected
ft/s	foot per second
g/L	grams per liter
GIS	geographic information systems
GM	geometric mean
HCP	habitat conservation plan
IID	Imperial Irrigation District
IT	incidental take
ITP	incidental take permit
KAFY	thousand acre-feet per year

lb/acre	pounds per acre
LCR	Lower Colorado River
MAFY	million acre-feet per year
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MOU	Memorandum of Understanding
msl	mean sea level
MWD	Metropolitan Water District of Southern California
NEPA	National Environmental Policy Act
NNE	north-northeast
NPPA	Native Plant Protection Act
NWR	National Wildlife Refuge
O&M	operation and maintenance
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PCB	polychlorinated biphenyl
PT	proposed threatened
QSA	Quantification Settlement Agreement
R	rare
Reclamation	Bureau of Reclamation
S	federal species of concern
SDCWA	San Diego County Water Authority
T	threatened
TDS	total dissolved solids
TSS	total suspended solids
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
WA	wildlife area

Executive Summary

Imperial Irrigation District Water Conservation and Transfer Project Habitat Conservation Plan

Preface

The Imperial Irrigation District (IID) prepared this Habitat Conservation Plan (HCP) to support its application for issuance of incidental take permits (ITP) under the federal Endangered Species Act of 1973 (FESA) and the California Endangered Species Act (CESA) in order to implement the conservation and transfer of Colorado River water to other California water agencies. Through this HCP, IID commits to certain management and other actions that will minimize and mitigate the potential impact of any *take* of covered species that may occur as a result of IID's implementation of the IID/San Diego County Water Authority (SDCWA) Transfer Agreement (Transfer Agreement) and the proposed Quantification Settlement Agreement (QSA), and related activities. The Transfer Agreement and QSA are, in turn, critical elements of California's Colorado River Water Use Plan (formerly the "4.4 Plan"). California has developed the 4.4 Plan to reduce California's use of water from the Colorado River in accordance with California's 4.4 MAFY apportionment of Colorado River water.

Introduction

IID delivers water from the Colorado River to agricultural and domestic water users within the boundaries of its water service area. This service area covers about 500,000 acres in the Imperial Valley in southeastern California. Irrigated agriculture is the primary economic enterprise within IID's service area and the primary use of water delivered by IID.

California's Colorado River Water Use Plan

The use of Colorado River water is allocated among the seven states that comprise the Colorado River Basin. In accordance with the laws governing use of Colorado River water, including court decree, California's apportionment of Colorado River water is 4.4 MAFY (plus 50 percent of any surplus water). Recent California diversions have been up to 800 KAFY above its normal year (i.e. non-surplus) apportionment. California recently published the Draft California Colorado River Water Use Plan (Water Use Plan) in which the steps necessary to reduce its use to 4.4 MAFY are outlined, including the need for cooperative water conservation and transfers from agricultural to urban use. The IID/SDCWA Water Conservation and Transfer Project is a key component of the Water Use Plan.

IID/SDCWA Transfer Agreement

In 1998, IID and SDCWA executed an Agreement for Transfer of Conserved Water. The IID/SDCWA Transfer Agreement is a long-term (75 years) transaction between IID and SDCWA involving the voluntary conservation by IID of up to 300 KAFY (300,000 acre-feet per year) and the subsequent transfer of all or a portion of the conserved water to SDCWA. The transferred, conserved water is intended for use within SDCWA's service area in San Diego County, California.

The conserved water will consist of Colorado River water that otherwise would be diverted by IID at Imperial Dam for use within IID's service area in Imperial County, California. IID's annual diversions of Colorado River water at Imperial Dam will be reduced by the amount of the conserved water. Water for transfer to SDCWA will be diverted at Parker Dam into the Colorado River Aqueduct operated by the Metropolitan Water District of Southern California (MWD), and SDCWA will receive an equivalent amount of water through MWD's distribution facilities pursuant to an Exchange Agreement between SDCWA and MWD.

Quantification Settlement Agreement

Subsequent to execution of the IID/SDCWA Transfer Agreement, a settlement was negotiated by and among IID, Coachella Valley Water District (CVWD), and MWD, with the participation of the State of California and the Department of Interior. The proposed terms of the settlement agreement are incorporated in a draft QSA, which is intended to settle, for a period of up to 75 years, long-standing disputes among IID, MWD, and CVWD regarding the priority, use, and transfer of Colorado River water. The QSA facilitates a number of component agreements and actions which, when implemented, will enhance the certainty and reliability of Colorado River water supplies available to the signatory agencies and will assist these agencies in meeting their water demands within California's normal-year apportionment of Colorado River water. The QSA thus implements the goals and key programs of the Water Use Plan.

Under the terms of the QSA, up to 100 KAFY of the water conserved by IID may be transferred to CVWD or MWD or both. The QSA also includes a voluntary contractual limitation of IID's total diversions of Colorado River water under its third-priority water right to 3.1 MAFY.

Purpose and Need for the HCP

The purpose and need for the HCP stems from the need to comply with FESA and CESA and also IID's need for long-term regulatory certainty (up to 75 years) in committing to the IID/SDCWA Transfer Agreement and the QSA. Both the IID/SDCWA Transfer Agreement and the QSA establish long-term water supply arrangements designed to implement the Water Use Plan. Implementation of these agreements will require changes in current farming practices and substantial capital investments in water conservation equipment and technologies. Long-term, no-surprises assurances regarding FESA and CESA compliance measures and costs are needed by IID to commit to the long-term obligations set forth in the IID/SDCWA Transfer Agreement and the QSA.

Area Covered by the HCP

IID conveys and delivers water diverted from the lower Colorado River at Imperial Dam to customers in the Imperial Valley in IID's service area via the All-American Canal (AAC). The HCP area includes all lands comprising the approximately 500,000 acres of IID's service area, lands owned by IID outside of its service area that are currently submerged by the

Salton Sea, and IID's rights-of-way along the AAC downstream from the point of diversion at Imperial Dam. In addition, the HCP covers any take of covered species using the Salton Sea that could occur as a result of IID's activities.

Species Covered by the HCP

The HCP covers 96 fish, wildlife, and plant species with the potential to occur in the HCP area. Several of these are federally and/or state listed species, while the remainder represent currently unlisted species that are present or potentially present in IID's service area, the Salton Sea, or along the AAC.

Term of the HCP

IID is proposing a 75-year term (2002 through 2077) for the HCP. This term is consistent with the term of the IID/SDCWA Transfer Agreement and the QSA.

Activities Covered by the HCP

The activities covered by the HCP include:

- Water conservation and water use activities, including irrigation and drainage of lands to which IID delivers water;
- Water conservation activities undertaken by IID, and the farmers, leaseholders or landowners of the Imperial Valley receiving IID water and participating in the conservation program;
- Activities of IID in connection with the diversion, conveyance, and delivery of Colorado River water to users within IID's service area, including the AAC; and
- Activities of IID in connection with the collection of unused irrigation or drainage waters within its service area and conveyance to the Salton Sea.

The covered activities specifically include all conservation and mitigation measures in connection with the conservation and transfer of up to 300 KAFY of Colorado River water pursuant to the IID/SDCWA Transfer Agreement and/or the QSA and compliance with the cap on IID's annual diversions of Colorado River water established by the QSA.

Biological Environment

The HCP area lies within the California Desert. Before European settlement, the area consisted of native desert vegetation and associated wildlife. Periodically, the Colorado River changed course and flowed northward into the Salton Trough forming a temporary, inland sea. These former seas persisted as long as water entered from the Colorado River, but evaporated when the river returned to its previous course. Thus, despite the periodic occurrence of a lake within the Salton Trough, the HCP area consisted predominantly of a desert ecosystem.

The Salton Sea represents the remnants of the most recent occurrence of flooding by the Colorado River, which, in 1905, breached an irrigation control structure and flowed into the Salton Trough, a dry desert basin. By 1920, agricultural production had increased in both

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the Imperial and Coachella valleys and the Salton Sea was receiving agricultural drainage water. In 1924 and 1928, presidential orders withdrew all federal lands below -220 msl "for the purpose of creating a reservoir in the Salton Sea for storage of waste and seepage water from irrigated land in Imperial Valley." Since its formation in 1905, the Salton Sea has been sustained by irrigation return flows from the Imperial, Coachella, and Mexicali valleys.

The availability of a reliable water supply affected by construction of Hoover and Imperial dams and the AAC facilitated sustained intensive cultivation within the Imperial Valley. To support agricultural production in the valley, an extensive network of canals and drains was constructed to convey water from the Colorado River to farms in the valley and subsequently to transport drainage water from the farms to the Salton Sea. The importation of water from the Colorado River and subsequent cultivation of the Imperial and Coachella valleys radically altered the Salton Trough from its native desert condition. The availability of water in the drains and canals supported the development of mesic (marsh-associated) vegetation and, in some locations, patches of marsh-like habitats (e.g., along the Salton Sea and seepage from canals). These mesic habitats, in addition to the productive agricultural fields and the Salton Sea, have attracted and currently support numerous species of wildlife that would be absent or only present in low numbers in the native desert habitat. Today, only isolated remnants of desert habitat remain in the HCP area, which is bounded by the main irrigation water delivery canals on the east and west sides of the IID water service area. The vast majority of the habitat supporting covered species is created and maintained by water imported to the Imperial Valley for agricultural production. Native desert habitat surrounding the IID water service area has not changed as a result of IID's activities and will not change as a result of the water conservation.

Habitat Conservation Plan Components

The draft HCP employs both habitat-based and species-specific approaches. The habitat-based component of the conservation strategy of the HCP focuses on mitigating the potential loss of habitat values (quality and quantity) of each habitat type within the HCP area. The overall conservation strategy for the IID HCP is to maintain or increase the value (amount and/or quality) of each habitat in the HCP area in addition to implementing measures to minimize direct effects to covered species from operation and maintenance (O&M) and construction activities. In addition to the habitat-based conservation approach of the HCP, a species-specific approach is used to address individual species or groups of species (i.e., burrowing owls, desert pupfish, and razorback suckers) that are not easily accommodated by habitat approach. Consistent with the guidance provided by the USFWS, all HCP effects are evaluated on a species-by-species basis.

IID's HCP contains specific conservation strategies for:

- Salton Sea habitat
- Tamarisk scrub habitat
- Drain habitat
- Desert habitat
- Agricultural field habitat
- Burrowing owls
- Desert pupfish
- Razorback sucker

General HCP Commitments

To ensure proper implementation of the HCP measures and the Monitoring and Adaptive Management Program, the HCP includes commitments by IID to:

- Hire a full-time biologist to oversee implementation of the HCP measures, and
- Establish and convene an HCP Implementation Team composed of representatives from the USFWS, CDFG, and IID to guide implementation of the mitigation and adaptive management elements of the HCP.

Salton Sea Conservation Strategy

Water conservation by IID is anticipated to reduce drain water discharge and accelerate the rate at which salinity increases in the Salton Sea. The increase in salinity is expected to eventually lead to conditions in the Salton Sea that would no longer support fish. Although the Salton Sea is projected to become too saline to support fish even in the absence of water conservation, the anticipated acceleration of salinization caused by water conservation would hasten the loss of fish in the Sea and lead to the discontinued use by piscivorous (fish-eating such as pelicans) birds. Current modeling projections suggest that average salinity in the Salton Sea under the IID/SDCWA Water Conservation and Transfer Project could reach a level that would no longer support viable populations of tilapia (the fish species in the Salton Sea that serves as the birds' primary forage base) about 11 years earlier than if the water conservation program were not implemented. The discontinued use of the Salton Sea by piscivorous birds could result in take as defined by the federal Endangered Species Act (ESA) by the U.S. Fish and Wildlife Service.

Minimizing and mitigating the impact of the anticipated take of piscivorous birds is complicated by the time element of the impact (i.e., impact occurring about 11 years earlier) and the magnitude and cost of the actions that would be required to address those impacts. The reduction in drainage water discharged to the Sea resulting from water conservation has an incremental effect on the Sea, but the actions necessary to offset this impact could require a commitment substantially greater than that increment. For example, the cost of constructing replacement habitat to support the current level of use by piscivorous birds would be same regardless of the length of the temporal impact. IID and others have developed and are considering various approaches for minimizing and mitigating the impact of the anticipated take of piscivorous birds. These mitigation approaches include creating replacement habitat, constructing and operating of hatcheries to augment food supplies for piscivorous birds, allowing conserved water to flow to the Sea, and sharing the mitigation responsibility with the state and federal governments.

IID has not identified a preferred approach for addressing piscivorous birds and presents two approaches under consideration in this HCP as means to seek input on which approach or combination of approaches is most appropriate. Approach 1 consists of constructing and operating a fish hatchery to stock fish in the Salton Sea as prey for piscivorous birds until the salinity becomes intolerable. At that point, IID would construct 5,000 acres of ponds and manage the ponds to produce fish through the end of the HCP term. Under Approach 2, IID would conserve sufficient additional water (beyond that conserved for transfer) and allow this water to flow to the Sea such that there would be no change in inflow to the Salton Sea

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as a result of the water conservation and transfer programs. This approach would avoid impacts related to change in salinity or surface water elevation.

Although the specific approach for minimizing and mitigating the impacts associated with increased salinity on piscivorous birds have not been defined, IID has committed to avoiding or mitigating take of other covered species resulting from increased salinity or reduced Sea level. The key elements are:

- Ensure an appropriate level of connectivity among pupfish populations in the drains if an increase in the salinity prevents movement of fish among drains
- Incorporation of nesting islands suitable for use by gull-billed terns and black skimmers into the design and construction of a portion of any ponds created to mitigate impacts to piscivorous birds
- Replace tamarisk scrub habitat lost as a result of reduced Sea levels caused by water conservation with native tree habitat consisting of mesquite bosque or cottonwood-willow habitat

Tamarisk Scrub Conservation Strategy

In the HCP area, tamarisk scrub is found along the New and Alamo rivers, sporadically along some drains, in seepage areas adjacent to the East Highline Canal and All American Canal, adjacent to the Salton Sea, and in other scattered and isolated patches throughout the HCP area wherever water is available. Although tamarisk is an exotic plant species and provides lower habitat value than native vegetation (e.g., mesquite and cottonwood), it dominates the plant community in portions of the HCP area and provides the only available habitat for some covered species. Implementation of water conservation and ongoing O&M activities have the potential to affect tamarisk scrub habitat and the covered species that use it. The biological goal of the Tamarisk Scrub Habitat Conservation Strategy is to maintain the species composition, relative abundance, and life history functions of covered species using tamarisk scrub habitats. The approach to the Tamarisk Scrub Habitat Conservation Strategy entails a combination of minimization and mitigation measures. The key elements are:

- Minimize take, including disturbance, of covered species as a result of construction activities
- Protect or create native tree habitat to mitigate the take of covered species resulting from loss of tamarisk scrub or native tree/shrub habitat permanently removed as a result of construction activities.

Drain Habitat Conservation Strategy

IID operates and maintains agricultural drains in the HCP area, portions of which support vegetation used by covered species. Implementation of water conservation and ongoing O&M has the potential to result in the take of covered species. The biological goal of the Drain Habitat Conservation Strategy is to maintain the species composition, relative abundance, and life history functions of covered species using drain habitat. The approach of the Drain Habitat Conservation Strategy is to create high quality managed marsh habitat to augment existing drain habitats and to implement measures to minimize the direct effects of O&M and construction activities on covered species. The key elements are:

- Create at least 190 acres of managed marsh habitat,
- Create up to an additional 462 acres of managed marsh habitat depending on the actual amount of covered species habitat in the drains determined by surveys
- Minimize disturbance and mortality/injury of covered species during dredging at the mouths of the New and Alamo Rivers

Desert Habitat Conservation Strategy

Desert habitat in the HCP area occurs in the rights-of-way of the AAC, East Highline and portions of the Westside Main, Thistle, and Trifolium Extension canals. IID's maintenance operations rarely affect desert habitat directly, but activities conducted adjacent to desert habitat could result in the take of a covered species. The biological objective of the Desert Habitat Conservation Strategy is to maintain viable populations of covered species that occupy desert habitats in the HCP area. This would be accomplished by avoiding and minimizing the potential for take of covered species, and improving habitat contiguity and persistence to compensate for changes in habitat quality or quantity caused by construction activities. The approach to the Desert Habitat Conservation Strategy is to implement a program to minimize the potential for take of covered species during O&M activities, and to compensate for habitat loss if construction activities impact desert habitat. The key elements are:

- Implement a worker education program
- Implement interim measures to avoid and minimize the potential for take of covered species during O&M activities
- Implement specific measures to avoid and minimize the potential for take of covered species during construction activities along the AAC, East Highline Canal, and portions of the Westside Main, Thistle, and Trifolium Extension canals.
- Conduct surveys to determine the occurrence of covered species
- Acquire and protect off-site desert habitat if construction activities permanently reduce the quality or availability of habitat

Burrowing Owl Conservation Strategy

The agricultural areas of the Imperial Valley support high densities of burrowing owls, particularly along the canal and drain system operated and maintained by IID. Although IID's maintenance activities contribute to the quality of burrowing owl habitat, these activities have the potential to take burrowing owls. The biological goal of the Burrowing Owl Conservation Strategy is to maintain a self-sustaining population of burrowing owls across the current range of the species in the HCP area. The approach consists of a combination of measures to minimize effects of O&M and construction activities on owls and their habitat, and measures to enhance habitat availability. The key elements are:

- Implement a worker education program

- Avoid and minimize the potential for covered activities to take individual owls by modifying maintenance activities in areas occupied by owls or scheduling activities during periods that would avoid the breeding season
- Continue maintenance practices that maintain and create suitable habitat conditions
- Initiate and implement a comprehensive population and demographic study to develop the information necessary to guide adjustments in the burrowing owl mitigation and management program
- Compensate for loss of burrows if construction activities would eliminate suitable burrows by installing replacement burrows
- Implement a farmer and public education program

Desert Pupfish Conservation Strategy

Desert pupfish have become established in many of the drains constructed and maintained by IID that discharge directly via gravity into the Salton Sea. Although IID routinely maintains adequate drainage in these channels by removing vegetation and sediment, these drains provide the habitat conditions necessary to support pupfish. IID's maintenance activities, while likely necessary to maintain the habitat characteristics that support pupfish, have the potential to result in the incidental take of pupfish. In addition, implementation of water conservation projects has the potential to change water quality in the drains occupied by pupfish and to adversely affect pupfish. The biological objective of the desert pupfish conservation strategy is to maintain or increase pupfish habitat in the drains relative to the current levels and to minimize the potential for IID's drain maintenance activities to result in take of pupfish. The key elements are:

- Operate and maintain the drainage system in a manner that will maintain the amount of drain habitat currently available (i.e., no net loss) in the portion of IID drains that flow directly to the Salton Sea
- Operate and maintain drain channels in a manner that minimizes the effects of water conservation on water quality, particularly concentrations of selenium
- Increase the amount of pupfish drain habitat by extending, modifying, or creating drain channels on land exposed if the elevation of the Salton Sea recedes
- Implement a study to evaluate the potential effect of routine drain maintenance on pupfish occupying the drains and to determine the efficacy of modifying current maintenance practices to avoid and minimize the potential for incidental take
- Avoid or minimize the potential for incidental take of pupfish by IID construction activities by implementing procedures for dewatering construction sites and salvaging and relocating pupfish potentially stranded by construction activities

Razorback Sucker Conservation Strategy

Razorback suckers are known to occur in the All-American and East Highline Canal systems as a result of movement by fish from the Colorado River into the system. Because they are isolated from the main population and are not known to be reproducing, razorback suckers in the HCP area are not contributing to the overall razorback sucker population. As a result, loss of these individuals would have no effect on the razorback sucker population. Although incidental take of individual razorback suckers in the IID canals system would not impact the species' population, IID will implement measures to minimize mortality of suckers as a result of canal dewatering. The key element of this approach is:

- Monitor segments of the canal system during dewatering operations and salvage and transport any stranded razorback suckers to the Colorado River.

Agricultural Field Habitat Conservation Strategy

Agricultural fields in the Imperial Valley attract a large variety and number of wildlife species, including some covered species. Foraging is the predominant use of agricultural fields by covered species, although fields also are used as resting habitats. Species that exploit agricultural habitats would benefit under the HCP from IID obtaining incidental take authorization and unlisted species assurances because such assurances would encourage continued agricultural production. The biological objective of the Agricultural Field Habitat Conservation Strategy is to maintain agriculture as the primary enterprise in IID's service area to continue to provide foraging habitat for covered species associated with agricultural field habitat. This objective is facilitated by the IID/SDCWA Water Transfer Agreement, the QSA, and the implementation of this HCP. In addition to the incentives to continue agriculture in the Imperial Valley provided by these actions, the approach includes a measure that will help avoid the potential for incidental take associated with implementation of on-farm water conservation techniques. This measure entails the installation of markers on any new power lines installed in association with the water conservation program (e.g., to serve pumps used for tail-water recovery ponds) to avoid or minimize the potential for collisions with wires by covered species.

Other Covered Species

Of the 96 species covered by this HCP, the USFWS and CDFG identified 25 species for which existing information on the ecology and distribution in the HCP area is limited or that might not occur in the HCP area. The approach to covering these species is to implement a research program to better understand the presence, distribution, and ecological requirements of these species in the HCP area. Based on the results of the research program, IID will implement measures to avoid, minimize, and mitigate the impacts of any take of these activities resulting from the covered activities.

Monitoring and Adaptive Management

Monitoring the effectiveness of the conservation measures and ensuring compliance with the terms of the conservation program are mandatory elements of an HCP. The HCP includes a comprehensive monitoring and adaptive management program to help ensure that compliance with the measures of the HCP is achieved, that the anticipated effectiveness of the measures is assessed, and that adjustments in the species conservation measures, where necessary, are made in response to new information. The monitoring requirements for each of the HCP elements are summarized in the following.

Salton Sea Conservation Strategy

- IID will demonstrate compliance with the measures for this strategy through the reporting requirements and involvement of the HCP IT.
- IID will evaluate the effectiveness of the measures for this strategy by monitoring fish production in the created ponds, fish populations in the Salton Sea, use of constructed nesting/roosting islands by covered bird species, and conducting baseline and periodic surveys to quantify net changes in the total amount of tamarisk in shoreline strand and adjacent wetland dominated by tamarisk.
- Based on the results of the effectiveness monitoring, IID and the HCP IT may recommend changes to one or more of the conservation measures. IID will submit a description of the actions to be implemented to the USFWS and CDFG for approval.

Tamarisk Scrub Habitat Conservation Strategy

- IID will demonstrate compliance with the measures for this strategy through the reporting requirements and involvement of the HCP IT.
- The involvement of the HCP IT and approval requirements from USFWS and CDFG will ensure that any property acquired or habitat created by IID will support use by the covered species associated with tamarisk scrub. IID will monitor use of the created habitat by covered bird species and other bird species. The HCP IT will develop the species requirements for monitoring, including the survey technique, timing of the surveys, and duration of the surveys following creation of the habitat.
- Adaptive management will be incorporated into the plans that address creation of native tree habitat. In the habitat creation plan, success criteria and the corrective actions that IID will take in the event that the success criteria are not met will be specified.

Drain Habitat Conservation Strategy

A baseline survey of the covered species will be conducted during a consecutive 3-year period to determine the presence or absence, distribution, relative abundance, and breeding status of covered species using drains in the HCP area.

- IID will demonstrate compliance with the measures for this strategy through the reporting requirements and involvement of the HCP IT.
- IID will conduct species-specific surveys for Yuma clapper rails and California black rails and conduct general surveys for other covered species in the created managed marsh habitat.
- IID will incorporate the refinements in management implemented on the refuges into management of its created habitat. Also, the HCP IT and HCP Implementation Biologist will work closely with refuge staff to develop and refine habitat management practices for clapper rails over the term of the permit.

Desert Habitat Conservation Strategy

A baseline survey of the covered species will be initiated within 1 year of issuance of the incidental take permit and conducted during a consecutive 3-year period to determine the presence or absence, distribution, relative abundance, and breeding status of covered species along the AAC, East Highline, Westside Main, Thistle and Trifolium Extension canals in the HCP area. Prior to conducting surveys for the covered species along these canals, IID will conduct a habitat survey to identify and map habitat and habitat features.

- IID will demonstrate compliance with the measures for this strategy through the reporting requirements and involvement of the HCP IT. The HCP Implementation Biologist will also periodically conduct random checks (during their routine duties) of workers conducting O&M activities to assess whether workers are following the standard operating procedures.
- Information on the effectiveness of the measures will come from the workers and HCP Implementation Biologist. Workers will be instructed to report any incidences of mortality or injury of a covered species. The biologist will be regularly coordinating with workers, monitoring construction activities, and checking on the effectiveness of the measures.
- The HCP IT will review the measures of the desert habitat conservation strategy annually for the first 3 years and every 3 years thereafter. The HCP IT may adjust the measures based on results of the species and habitat surveys, prevailing practices for avoiding take, observations/recommendations of the HCP Implementation Biologist, among others.

Burrowing Owl Conservation Strategy

- Submission of pre-construction checklists and copies of the worker education manual and updates of the manual to the USFWS and CDFG will serve as compliance monitoring for this strategy. In addition, the HCP Implementation Biologist will periodically conduct random checks (during their routine duties) of workers conducting O&M activities to assess whether workers are following the standard operating procedures for burrowing owls.
- Monitoring to evaluate the effectiveness of the measures for this strategy will include surveys of the drainage and conveyance system in such a manner as to provide a valley-wide perspective of the burrowing owl population each year for the term of the permit and conduct of a study of the burrowing owl population to understand the status of the population and estimate key population parameters.
- The results of the demographic study will be used to determine the population trend of the burrowing owl population. If the burrowing owl population is shown to be in decline, the HCP Implementation Team will have the option to access the Owl Contingency Fund. The contingency fund may be used to conduct focused studies to understand the factors influencing the burrowing owl population, implement management actions to benefit the population (e.g., creating burrows), continue the demographic study, or other actions recommended by the HCP IT.

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Desert Pupfish Conservation Strategy

- IID will demonstrate compliance with the measures for this strategy through the reporting requirements and involvement of the HCP IT.
- The HCP IT will develop an appropriate protocol for monitoring pupfish presence in drains maintained by IID and in drain channels constructed as mitigation. IID will also monitor selenium concentrations in any drains modified as mitigation to determine the effectiveness of the action.
- The detailed plans for pupfish and selenium monitoring developed by the HCP IT will contain an adaptive management element that outlines how information developed by the monitoring will be used to adjust future management and habitat creation activities.

Razorback Sucker Conservation Strategy

- Whenever suckers are salvaged, IID will submit information on location, numbers, ages, and survival of salvaged suckers to the USFWS and CDFG within one week of salvaging the fish. Submission of this information will serve as compliance monitoring for this strategy.
- The reports submitted to USFWS and CDFG of the number of fish salvaged and the number surviving until release will allow an assessment of the effectiveness of the measure in avoiding mortality of razorback suckers.
- Over the term of the permit, the HCP IT may adjust the procedures to improve survival of fish during capture, transport and release. The HCP IT may adjust the procedure if the compliance monitoring shows a high level of mortality or for consistency with standard practices developed by the USFWS or CDFG.

Costs and Funding

The estimated cost of implementing the HCP ranges widely depending on the ultimate amount of habitat creation necessary under the Drain Habitat and Tamarisk Scrub Habitat Conservation Strategies, and for tamarisk adjacent to the Salton Sea under the Salton Sea Habitat Conservation strategy. Per commitments identified in the IID/SDCWA Water Conservation and Transfer Agreement and the QSA, approximately $22.5 million has been allocated for the environmental mitigation required to mitigate project impacts and to minimize the impact of the potential take of covered species. Any mitigation costs in excess of the $22.5 million estimated to minimize and mitigate project impacts could be funded through one or a combination of the following: revenue generated through conservation and transfer of water, additional funds contributed by the water agencies, and grants or funding provided by the federal and state governments.

Response to Emergencies

When an emergency occurs such that IID cannot comply with all of requirements of the HCP, IID will implement the following procedures.

- IID will notify the USFWS and CDFG within 24 hours of initiating emergency activities. In notifying the USFWS and CDFG, IID will describe the nature of the emergency and the actions necessary to correct the problem.

- The HCP Implementation Biologist will visit sites where emergency activities are being implemented as soon as possible. The biologist will take pictures of the damaged areas and note the general extent and species composition of any vegetation impacted by the emergency response activities. IID will use this information to restore or create replacement habitat in accordance with Tree Habitat - 1 and Desert Habitat - 3 and 5.
- For burrowing owls, the HCP Implementation Biologist will estimate the number of burrows impacted during the emergency activities based on the on-going surveys and the emergency action site visit. In accordance with Owl - 8, IID will install two burrows for every burrow permanently lost as a result of the emergency activities.

Changed and Unforeseen Circumstances

IID identified several circumstances under which changes could occur during the term of the ITP that would result in a substantial and adverse change in the status of a species covered by the HCP. These relate primarily to circumstances that influence IID's ability to carry out its obligations 1) on managed marsh and native tree habitats created and managed for mitigation, 2) in habitats supported by IID water (e.g., pupfish drains), and 3) in habitats acquired and managed for mitigation. These circumstances include:

- Seismic activity that affects IID's conveyance and drainage infrastructure and/or its ability to deliver or drain water
- Storm events that result in damage to IID infrastructure and substantial flooding
- Toxic spills that influence operations or directly affect species and habitat
- Introduction and invasion by exotic plant or animal species that affect covered species or their habitat
- Drought conditions in the Colorado River basin that influence the availability of water in the Imperial Valley

IID anticipates that these events could occur during the term of the HCP. Through the combination of implementing the emergency procedures and specific requirements outlined for each of these categories above, IID will ensure that the objectives of the HCP will continue to be met.

Alternatives

Section 10 of the ESA requires an applicant for an ITP to consider and describe "alternative actions to such takings" within the HCP. IID considered three alternatives in the process of developing the HCP that were determined to be inconsistent with its objectives and/or less likely to be successfully implemented. The alternatives to the HCP that were considered are listed below.

No Action Alternative

Under the No Action Alternative, IID would continue to meet the demands of farmers and other water users within its service area in the Imperial Valley using Colorado River water diverted in accordance with IID's existing water rights. IID would not engage in a program to conserve additional water for the purpose of transferring it outside the service area. IID has determined that this alternative could lead to the impairment of its ability to deliver water in the future and result in negative impacts to its customers, the biological resources, and the agricultural economy that depend on water delivery. Therefore, IID considered the No Action Alternative to not be practicable or feasible.

Modification of Water Conservation and Transfer Amounts

Two different levels of water conservation (conservation and transfer of 130 KAF and 230 KAF) were examined as alternative actions to the level of take anticipated under the proposed water conservation programs and the HCP. The underlying premise for considering these alternatives was that the potential for impact and the level of take are related to the amount of water conserved and transferred out of the system. Each of these alternatives was anticipated to have incrementally less impact relative to the Proposed Project. However, IID determined that reduced conservation and transfer amounts would not substantially reduce the level of take or mitigation requirements. For these reasons, a reduced HCP alternative was not adopted. However, reduced levels of conservation are Project Alternatives and HCP alternatives as described in the IID Water Conservation and Transfer Project EIR/EIS and HCP.

CHAPTER 1

Introduction

This Habitat Conservation Plan (HCP) was prepared in support of the Imperial Irrigation District's (IID's) application for Incidental Take Permits (ITPs) in conformance with Section 10 of the Federal Endangered Species Act of 1973 (FESA) and 2081(b) of the California Endangered Species Act (CESA). Through this HCP, IID is committing to certain management actions that will minimize and mitigate the impacts of any take of covered species that may occur as a result of IID's implementation of the IID/San Diego County Water Authority (SDCWA) Transfer Agreement and Quantification Settlement Agreement (QSA), and continuation of its operation and maintenance (O&M) activities.

1.1 Background

The IID was formed under California law to deliver water for irrigation and domestic purposes. IID delivers water from the Colorado River to agricultural and domestic water users within the boundaries of its service area. This service area covers about 500,000 acres in Imperial Valley. Irrigated agriculture is the primary economic enterprise within IID's service area and the primary use of water delivered by IID.

The Imperial Valley is part of the Colorado Desert and is located in the Salton Trough in Imperial County in Southeastern California. The Salton Sea is located in the northern portion of Imperial Valley, with portions of the Sea in both Imperial and Riverside counties. The Salton Sea serves as a drainage repository for agricultural and urban runoff from the Imperial, Coachella, and Mexicali Valleys.

IID's diversion of Colorado River water is based upon water rights obtained pursuant to state law, which were perfected in the early 1900s. IID's diversions from the Colorado River also are accomplished pursuant to a 1932 water delivery contract with the U.S. Bureau of Reclamation (Reclamation) under the Boulder Canyon Project Act of December 21, 1928 [45 Stat. 1057, as amended, 43 U.S.C. § 617 et seq.]. IID's senior water rights are part of California's apportionment of Colorado River water under the 1922 Colorado River Compact, the Boulder Canyon Project Act, and the U.S. Supreme Court decree in Arizona v. California, 373 U.S. 546 (1963).

IID diverts water from the Colorado River at Imperial Dam, located about 18 miles northeast of Yuma, Arizona. Water diverted at Imperial Dam first enters desilting basins, where sediment settles out of the water. IID operates both Imperial Dam and the desilting basins pursuant to a contract with Reclamation. From the desilting basins, the water enters the All American Canal (AAC). The 84-mile-long AAC runs in a westerly direction and conveys water to three main canals within IID's service area. These three canals (East Highline, Central Main, and Westside Main) generally run northerly and deliver water to lateral canal systems and subsequently to farm turnouts. IID owns and operates the canal and turnout system.

After the water is applied to farm fields for irrigation purposes, all unused water is collected in drains. Water may enter the drains as field runoff (tailwater) or through tile drains (tilewater). Tile drains collect salinized subsurface leach flow and convey it to the drains. The drains transport water directly to the Salton Sea or to the New or Alamo Rivers that discharge to the Salton Sea. IID maintains the network of drains. With no outlet, the Salton Sea is a terminal sink for drain water from Imperial Valley.

1.1.1 IID/SDCWA Water Conservation and Transfer Agreement

In mid-1995, IID and SDCWA began discussions regarding a water conservation and transfer agreement. As a result of these discussions, on April 29, 1998, IID and SDCWA executed an Agreement for Transfer of Conserved Water (IID/SDCWA Transfer Agreement; IID and SDCWA 1998). The IID/SDCWA Transfer Agreement is a long-term transaction between IID and SDCWA involving the voluntary conservation by IID of up to 300 KAFY (300,000 acre-feet per year) and the subsequent transfer of all or a portion of the conserved water to SDCWA. The transferred, conserved water is intended for use within SDCWA's service area in San Diego County, California. Under certain circumstances, up to 100 KAFY of the water conserved by IID may be transferred to the Coachella Valley Water District (CVWD), the Metropolitan Water District of Southern California (MWD), or both.

The conserved water will consist of Colorado River water that otherwise would be diverted by IID at Imperial Dam for use within IID's service area in Imperial County, California. For conserved water transferred to SDCWA or MWD, IID's annual diversions of Colorado River water at Imperial Dam will be reduced by the amount of the conserved water, and this amount will be diverted at MWD's Whitsett Intake at Lake Havasu on the Colorado River for delivery through MWD's Colorado River Aqueduct. The Colorado River Aqueduct operated by MWD provides the only existing facilities for conveyance of conserved water from the Colorado River to SDCWA's service area. For conserved water transferred to CVWD, IID's annual diversions of Colorado River water at Imperial Dam will also be reduced by the amount of the conserved water; however, the amount CVWD will divert at Imperial Dam will increase by this same amount. This amount will be diverted into the Coachella Canal from the AAC.

Conservation methods employed to effect the IID/SDCWA Water Conservation and Transfer Agreement may consist of: (1) on-farm measures implemented by landowners and tenants within IID's service area; and/or (2) system-based measures implemented by IID and affecting its distribution and drainage facilities. The IID/SDCWA Transfer Agreement anticipates that on-farm conservation measures will be the principal means of conserving water for transfer to SDCWA and requires on-farm conservation of at least 130 KAFY, unless SDCWA and IID agree on a lower amount. On-farm conservation requires the voluntary cooperation of landowners and tenants within IID's service area. On-farm conservation measures will be developed and managed under contracts between IID and landowners that elect to participate. If a sufficient number of landowners participate to meet the minimum conserved water (130 KAFY unless otherwise agreed) amount from on-farm conservation described above, then IID may elect to transfer additional conserved water using system-based conservation measures, on-farm measures, or a combination of these measures.

The IID/SDCWA Transfer Agreement is described in greater detail in the IID Water Conservation and Transfer Project EIR/EIS (IID 2001).

1.1.2 California's Colorado River Water Use Plan

The Colorado River Compact of 1922 quantified the allocation of Colorado River water among the seven states that comprise the Colorado River Basin. The compact allocates approximately 7.5 MAFY (7.5 million acre-feet per year) to the four Upper Basin states—Colorado, Utah, Wyoming, and New Mexico—and 7.5 MAFY to the three Lower Basin states—California, Nevada, and Arizona. Rapidly growing metropolitan areas and vast irrigated acreage have contributed to a history of contentious relations among the Lower Basin states and individual users in the states, as well as between the Upper and Lower Basins. Because of acrimonious and litigious relations among the Lower Basin states, they have not self-apportioned Colorado River supplies in the same manner as the Upper Basin states. As a result, the Secretary of the Interior (Secretary) acts as water master (typically through actions of Reclamation) for the Lower Colorado River (LCR; Arizona v. California, 1964). The decree of the court set California's apportionment at 4.4 MAF (plus 50 percent of any surplus water); Arizona at 2.8 MAF (plus 46 percent of any surplus); and Nevada at 300 KAF (and 4 percent of any surplus). Recent California diversions have been up to 800 KAF above its normal year (i.e., non-surplus) allocation. California's efforts to reduce its use to 4.4 MAFY were the subject of negotiations among the states and the Secretary.

California recently published the Draft California Water Use Plan (Water Use Plan), formerly known as the "4.4 Plan" in which the steps necessary to comply with the court decree were outlined. The Water Use Plan is a programmatic effort intended to reduce California's use of the Colorado River to comply with its Lower Basin entitlement. The Water Use Plan provides California's Colorado River water users with a framework by which programs, projects, and other activities will be cooperatively implemented to allow California to satisfy its annual water supply needs within its annual normal-year apportionment of Colorado River water. The Water Use Plan will require operational changes in the Colorado River to allow water wheeling and other actions necessary to transfer water among users.

The Water Use Plan identifies a suite of actions that will reduce total Colorado River water use in the state. Finalization of the Water Use Plan will require the four major linchpins:

- Cooperative water conservation and transfers from agricultural to urban use
- Further quantification of the third priority of the Seven-Party Agreement, which established the priority of use for California's 4.4 MAF among the seven major water users: Palo Verde Irrigation District, IID, CVWD, MWD, City of San Diego, City of Los Angeles, and the County of San Diego
- Improved reservoir management and operations
- Water storage and conjunctive use programs

The IID/SDCWA Water Conservation and Transfer project is an example of the first linchpin.

1.1.3

Quantification Settlement Agreement

Subsequent to execution of the IID/SDCWA Transfer Agreement, a settlement agreement was negotiated by and among IID, CVWD, and MWD, with the participation of the State of California and the Department of the Interior (DOI). The proposed terms of the settlement agreement are incorporated in a draft Quantification Settlement Agreement (QSA), which was released for public review in December 2000. [A copy of the draft QSA and a Summary of the QSA are included in Appendix B of the EIR/EIS for the IID Water Conservation and Transfer Project.] The QSA is intended to settle, for a period of up to 75 years, long-standing disputes among IID, MWD, and CVWD regarding the priority, use and transfer of Colorado River water by establishing a consensual sharing of Colorado River water among these agencies. The QSA facilitates a number of component agreements and actions which, when implemented, will enhance the certainty and reliability of Colorado River water supplies available to the signatory agencies and will assist these agencies in meeting their water demands within California's normal-year apportionment of Colorado River water. The QSA thus implements the goals and programs of the Water Use Plan.

In addition to establishing water budgets for IID, MWD, and CVWD, the QSA sets forth the approved parameters of various water transfers and exchanges, including the conservation by IID of up to 300 KAFY for transfer to SDCWA, CVWD, and/or MWD. The QSA allocates the water to be conserved by the AAC and Coachella Canal lining projects. The QSA also incorporates a consensual limit by IID on its total Priority 3 diversions of Colorado River water at 3.1 MAFY. IID's limit is further reduced by the amounts IID conserves and transfers to others under the QSA, by the amount to be conserved by the AAC lining project, and by any Priority 3 water made available by IID to holders of miscellaneous present perfected Colorado River water rights (PPRs) and Indian reserved rights. SVCN limits results in a net Priority 3 diversion of approximately 2.61 to 2.70 MAFY for use within the IID service area. The QSA also includes a consensual cap on CVWD's Priority 3 diversions at 330 KAFY, reduced by the amount to be conserved by the Coachella Canal lining project and by any Priority 3 water made available by CVWD for holders of miscellaneous PPRs and Indian reserved rights. A Program EIR is being prepared by IID, MWD, CVWD, and SDCWA, as joint lead agencies, to identify and assess the environmental impacts of the QSA program.

The Secretary of DOI, in its role as water master for the LCR, must implement the terms of the QSA by delivering Colorado River water in accordance with its terms. The actions required of the Secretary are set forth in a proposed Implementation Agreement (IA), which is intended to be effective concurrently with the QSA. As a condition precedent to implementation of the QSA, certain other federal actions are required, including the adoption of Interim Surplus Criteria and the adoption of an Inadvertent Overrun Program to facilitate the payback of inadvertent exceedances by IID or CVWD of their respective Priority 3 diversion caps. Reclamation has prepared a final EIS for the proposed Interim Surplus Criteria, and a Record of Decision (ROD) was signed in January 2001. Reclamation is preparing an EIS pursuant to NEPA to assess the environmental impacts of the IA and related federal actions.

If the QSA is finally approved and implemented, it would change the project described in the IID/SDCWA Transfer Agreement in certain respects. The QSA would limit the amount of conserved water transferable to SDCWA to a maximum of 200 KAFY, and would provide for CVWD's option to acquire up to 100 KAFY of water conserved by IID, in lieu of transfer of this increment of conserved water to SDCWA. The QSA also provides for MWD's option to acquire any portion of the 100 KAFY of conserved water available to, but not acquired by, CVWD. Under both the QSA and the IID/SDCWA Transfer Agreement, the conserved water transferred by IID to SDCWA, CVWD, and/or MWD retains the priority of IID's senior water rights. However, IID retains ownership of its water rights.

The EIR/EIS for the IID Water Conservation and Transfer Project addresses the environmental impacts of IID's consensual limit on its Priority 3 diversions and the conservation by IID of up to 300 KAFY for transfer pursuant to the IID/SDCWA Water Transfer Agreement and/or the QSA. This HCP is intended to support the issuance of ITPs for that project within the covered area (i.e., Imperial Valley, the Salton Sea, and the area of the AAC).

1.2 Purpose and Need for the HCP

The purpose and need for the HCP stem from IID's requirement for long-term regulatory certainty in committing to the IID/SDCWA Transfer Agreement and the QSA. Both the IID/SDCWA Transfer Agreement and the QSA establish long-term water supply arrangements designed to assist California in meeting its Colorado River entitlement of 4.4 MAFY. The IID/SDCWA Transfer Agreement continues in effect for an initial term of 45 years after transfers have commenced and provides for an optional renewal term of 30 additional years. A substantial term is required by SDCWA, so that it can rely upon the IID conserved water as a key element of its future water supply plans. To implement the transfer, SDCWA must enter into a long-term agreement with the MWD to provide for acceptance of the conserved water at the new point of diversion and conveyance through MWD's Colorado River aqueduct. Similarly, the QSA establishes water budgets for a period of up to 75 years, including long-term obligations on the part of IID to limit its overall Colorado River water diversions and to generate conserved water for transfer to SDCWA, CVWD, and/or MWD. Long-term, no-surprises assurances regarding ESA and CESA compliance measures and costs are needed by IID to commit to the long-term obligations set forth in the IID/SDCWA Transfer Agreement and the QSA.

Whether the IID/SDCWA Transfer Agreement becomes a reality depends largely on whether the IID and its participating farmers can conclude that the benefits of implementing the IID/SDCWA Transfer Agreement project are balanced by the risks and costs to be borne by the IID and farmers. The conservation of up to 300 KAF of water within the IID service area will require changes in current farming practices and substantial capital investments in water conservation equipment and technologies.

Of the initial 200 KAF anticipated to be conserved for transfer to SDCWA, 130 KAF is projected to come from on-farm conservation programs adopted by farmers in the Imperial Valley. The on-farm conservation programs are voluntary. Farmers will enter into agreements with IID ranging from 1 to 75 years, committing to the implementation of conservation measures. These measures, in turn, will require the farmers to make capital investments in various types of water conservation equipment and facilities. In many cases, farmers will be required to obtain financing and pay for construction costs and implement and maintain conservation measures. The farmers will be unable to obtain financing if they can not estimate the direct and indirect costs of implementing the water conservation programs.

As such, farmers may be unwilling to enter into binding agreements to undertake significant costs and risks associated with implementing on-farm conservation measures unless they can determine the total costs of the measures and the additional associated cost of complying with the ESA and CESA. The greater the cost of the mitigation program the fewer funds available for IID to compensate farmers for water conservation measures. In the absence of this certainty, IID and farmers within IID's service area will be at risk and the costs of implementing the water conservation measures could increase substantially in the future to address additional costs associated with (1) the listing of new species as endangered or threatened; (2) the designation of critical habitat for listed species; and (3) the imposition of additional mitigation obligations on IID in the event of changed or unforeseen circumstances. The IID seeks incidental take authorization and no surprises assurances to provide certainty and predictability regarding the habitat conservation measures that IID will be required to implement during the term of the IID/SDCWA Water Conservation and Transfer Agreement and QSA to comply with the state and federal endangered species acts.

The effect of the QSA is to establish obligations and incentives for the long-term conservation by IID of a substantial amount of Colorado River water. The agencies proposing to acquire conserved water from IID need to rely upon the long-term availability of the conserved water for water supply planning purposes. As a result, the QSA allows only very limited flexibility to modify or terminate IID's obligations. Therefore, IID must have certainty regarding the scope, feasibility, and cost of implementing the water conservation and transfer program, including the required environmental mitigation measures, on a long-term basis, prior to committing to implement the QSA. This HCP is intended to establish a definitive program, which will set forth the obligations of IID, and limitations on those obligations, to provide certainty regarding IID's ability to implement the program.

With respect to biological resources, the purpose of the HCP is to minimize and mitigate the effects of implementing the water conservation and transfer programs on covered species. The HCP consists of a combination of measures to minimize the effects of implementing the water conservation and transfer programs as well as measures that will ensure habitat availability for covered species over the term of the HCP. The commitments to create habitat under the HCP will provide a net benefit to covered species by improving habitat availability and quality.

1.3 Relationship to Other ESA Approvals

Implementation of the IID Water Conservation and Transfer Project requires changes in water management that could potentially influence habitats and species over a broad geographic area. In addition to the potential effects in areas (i.e., AAC, Imperial Valley, and the Salton Sea) covered by this HCP, potential effects on listed species could occur along the Lower Colorado River (LCR) between Parker and Imperial dams, in the Coachella Valley, in San Diego County and potentially in MWD's Service Area. To achieve compliance with the ESA and CESA, several regulatory approval processes in addition to this HCP will be required. Reclamation's changed operation in the Colorado River between Parker and Imperial dams, including implementation of the Interim Surplus Criteria and the change in the point of diversion required for the water transfer projects and the AAC and Coachella Canal lining projects pursuant to the QSA, is a federal action that is addressed through a Section 7 consultation. The Biological Opinion was issued by the USFWS on January 12, 2001, and provides incidental take authorization for federally listed species potentially affected by this change in operation. Coverage under CESA for state-listed species potentially affected by the change in the point of diversion on the Colorado River is expected to be obtained through a Section 2081 permit issued by CDFG for the benefit of IID, SDCWA, and MWD. It is anticipated that long-term coverage for state and federally listed species as well as selected unlisted species in the affected reach of the LCR will be provided by the LCR Multi-Species Conservation Plan.

Potential effects on state and federally listed species in the Coachella Valley resulting from use of conserved water transferred from IID will be addressed through separate ESA and CESA processes. Incidental take coverage as necessary for this element of the project will be obtained by CVWD through a regional HCP process or a process specific to the use of the transferred water.

Delivery of conserved water to San Diego County and MWD's Service Area is not anticipated to result in the take of any state or federally listed species. SDCWA has indicated that the conserved water transferred by IID will replace water that it otherwise would acquire from MWD, its primary supplier. Similarly, if water is transferred to MWD, the water would replace other historic supplies. The transferred water will retain IID's high-level Priority 3 status and thus will provide better protection from impacts of drought and increased reliability compared to SDCWA's existing supply. As such, the transfer of water from IID will not result in an increased water supply for SDCWA, although it will increase the reliability of water in the SDCWA service area. No additional ESA/CESA compliance actions are anticipated.

1.4 Area Covered by the HCP

IID conveys and delivers water diverted from the LCR at Imperial Dam to customers in the Imperial Valley in IID's service area via the AAC. The HCP area includes all lands comprising the approximately 500,000 acres of IID's service area (including canal rights-of-way), the Salton Sea, lands owned by IID outside of its service area that are currently submerged by the Salton Sea, and IID's rights-of-way along the AAC downstream from the point of diversion at Imperial Dam. In addition, the HCP covers any take of covered species using the Salton Sea that could occur as a result of IID's activities. Figure 1.4-1 shows the HCP area.

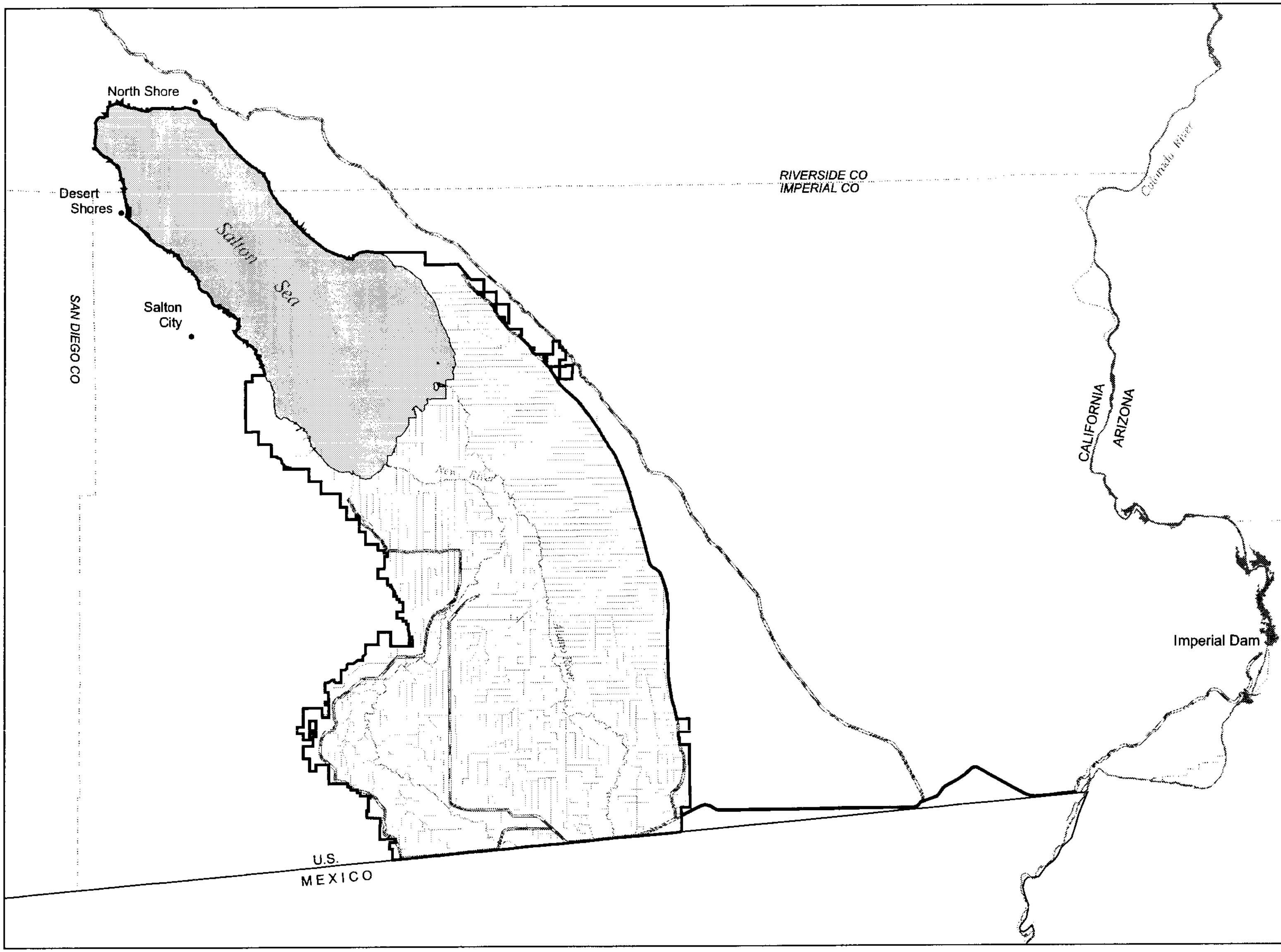

Figure 1.4-1
IID HCP AREA
IID Water Conservation and Transfer Project Draft HCP

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1.5 Species Covered by the HCP

The IID prepared this HCP in support of an application for ITPs from the USFWS and CDFG to cover federally and state listed species and certain unlisted species that are present or potentially present in IID's service area, the Salton Sea, or along the AAC. The HCP covers 96 fish, wildlife, and plant species with the potential to occur in the HCP area. These species and their current federal and state status are shown in Table 1.5-1.

TABLE 1.5-1
Species Covered by the IID HCP

Common Name	Scientific Name	Federal Status	State Status
Invertebrates			
Cheeseweed moth lacewing	*Oliarces clara*	S	-
Andrew's dune scarab beetle	*Pseudocatalpa andrewsi*	S	-
Fish			
Desert pupfish	*Cyprinodon macularius*	E	E
Razorback sucker	*Xyrauchen texanus*	E	E/FP
Amphibians and Reptiles			
Colorado River toad	*Bufo alvarius*	-	CSC
Desert tortoise	*Gopherus agassizi*	T	T
Banded gila monster	*Helodema suspectum cinctum*	-	CSC
Flat-tailed horned lizard	*Phrynosoma mcalli*	PT	CSC
Lowland leopard frog	*Rana yavapaiensis*	S	-
Western chuckwalla	*Sauromalus obesus obesus*	S	-
Couch's spadefoot toad	*Scaphiopus couchii*	-	CSC
Colorado desert fringed-toed lizard	*Uma notata notata*	S	CSC
Birds			
Cooper's hawk	*Accipiter cooperii*	-	CSC
Sharp-shinned hawk	*Accipiter striatus*	-	CSC
Tricolored blackbird	*Agelaius tricolor*	S	CSC
Golden eagle	*Aquila chrysaetos*	-	CSC/FP
Short-eared owl	*Asio flammeus*	-	CSC
Long-eared owl	*Asio otus*	-	CSC
Burrowing owl	*Athene cunicularia*	S	CSC
Aleutian Canada goose	*Branta canadensis leucopareia*	DM	-
Ferruginous hawk	*Buteo regalis*	S	CSC
Swainson's hawk	*Buteo swainsoni*	-	T
Western snowy plover	*Charadrius alexandrinus nivosus*	-	CSC
Mountain plover	*Charadrius montanus*	PT	CSC
Vaux's swift	*Chaetura vauxi*	-	CSC
Black tern	*Chlidonias niger*	S	-
Northern harrier	*Circus cyaneus*	-	CSC
Western yellow-billed cuckoo	*Coccyzus americanus*	-	E
Gilded flicker	*Colaptes chrysoides*	-	E
Black swift	*Cypseloides niger*	-	CSC

TABLE 1.5-1
Species Covered by the IID HCP

Common Name	Scientific Name	Federal Status	State Status
Fulvous whistling-duck	*Dendrocygna bicolor*	S	CSC
Yellow warbler	*Dendroica petechia*	-	CSC
Reddish egret	*Egretta rufescens*	S	-
White-tailed kite	*Elanus leucurus*	-	FP
Southwestern willow flycatcher	*Empidonax trailii extimus*	E	E
Merlin	*Falco columbarius*	-	CSC
Prairie falcon	*Falco mexicanus*	-	CSC
Peregrine falcon	*Falco peregrinus*	DM	E/FP
Greater sandhill crane	*Grus canadensis tadiba*	-	T/FP
Bald eagle	*Haliaeetus leucocephalus*	T	E/FP
Yellow-breasted chat	*Icteria virens*	-	CSC
Least bittern	*Ixobrychus exilis*	S	CSC
Loggerhead shrike	*Lanius ludovicianus*	S	-
Laughing gull	*Larus atricilla*	-	CSC
California black rail	*Laterallus jamaicensis coturniculus*	S	T/FP
Long-billed curlew	*Numenius americanus*	-	CSC
Osprey	*Pandion haliaetus*	-	CSC
Black skimmer	*Rhynchops niger*	-	CSC
Bank swallow	*Riparia riparia*	-	T
Gila woodpecker	*Melanerpes uropygialis*	-	E
Elf owl	*Micrathene whitneyi*	-	E
Wood stork	*Mycteria americana*	-	CSC
Brown-crested flycatcher	*Myiarchus tyrannulus*	-	CSC
Harris' hawk	*Parabuteo unicinctus*	-	CSC
Large-billed savannah sparrow	*Passerculus sandwichensis rostratus*	S	-
American white pelican	*Pelecanus erythrorhynchos*	-	CSC
Brown pelican	*Pelecanus occidentalis*	E	E/FP
Double-crested cormorant	*Phalacrocorax auritus*	-	CSC
Summer tanager	*Piranga rubra*	-	CSC
White-faced ibis	*Plegadis chihi*	S	CSC
Purple martin	*Progne subis*	-	CSC
Vermilion flycatcher	*Pyrocephalus rubinus*	-	CSC
Yuma clapper rail	*Rallus longirostris yumanesis*	E	T/FP
California least tern	*Sterna antillarum browni*	E	E/FP
Elegant tern	*Sterna elegans*	S	-
Van Rossem's gull-billed tern	*Sterna nilotica vanrossemi*	S	CSC
Crissal thrasher	*Toxostoma crissale*	-	CSC
LeConte's thrasher	*Toxostoma lecontei*	-	CSC
Arizona Bell's vireo	*Vireo bellii arizonae*	-	E
Least Bell's vireo	*Vireo bellii pusillus*	E	E
Mammals			
Pallid bat	*Antrozous pallidus*	-	CSC

TABLE 1.5-1
Species Covered by the IID HCP

Common Name	Scientific Name	Federal Status	State Status
Mexican long-tongued bat	*Choeronycteris mexicana*	S	CSC
Pale western big-eared bat	*Corynorhinus townsendii pallescens*	-	CSC
Spotted bat	*Euderma maculatum*	S	CSC
Western mastiff bat	*Eumops perotis californicus*	S	CSC
California leaf-nosed bat	*Macrotus californicus*	S	CSC
Western small-footed myotis	*Myotis ciliolabrum*	S	-
Occult little brown bat	*Myotis lucifugus occultus*	S	CSC
Southwestern cave myotis	*Myotis velifer brevis*	S	CSC
Yuma myotis	*Myotis yumanensis yumanensis*	S	CSC
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	-	CSC
Big free-tailed bat	*Nyctinomops macrotis*	-	CSC
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	BLMSS	
Jacumba little pocket mouse	*Perognathus longimembris internationalis*	S	CSC
Yuma Hispid cotton rat	*Sigmodon hispidus eremicus*	S	CSC
Colorado River hispid cotton rat	*Sigmodon arizonae plenus*	-	CSC
Plants			
Peirson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	T	E
Flat-seeded spurge	*Chamaesyce platysperma*	S	-
Wiggin's croton	*Croton wigginsii*	-	R
Foxtail cactus	*Escobaria vivipara* var. *alversonii*	S	-
Algodones Dunes sunflower	*Helianthus niveus* ssp. *tephrodes*	S	E
Munz's cactus	*Opuntia munzii*	S	
Giant Spanish needle	*Palafoxia arida* var. *gigantea*	S	-
Sand food	*Pholisma sonorae*	S	-
Orocopia sage	*Salvia greatae*	S	-
Orcutt's aster	*Xylorhiza orcuttii*	S	-

Status Codes:
BLMSS: Bureau of Land Management Sensitive Species
CSC: California Species of Special Concern
DM: Delisted – monitored
E: Endangered
FP: Fully protected
PT: Proposed threatened
R: Rare
S: Federal Species of Concern
T: Threatened

1.6 Term of the HCP

IID is applying for ITPs for 75 years (2002 through 2077). This HCP was prepared in support of IID's applications, and will be in effect for the full 75-year term of the ITPs.

The IID/SDCWA Transfer Agreement continues in effect for an initial term of 45 years with an optional renewal term of 30 additional years. The QSA remains in effect for a period of up to 75 years. Long-term assurances regarding ESA and CESA compliance measures and costs are needed by the parties to commit to the obligations required under the IID/SDCWA Transfer Agreement and the QSA. For this reason, IID is seeking coverage under this HCP for a 75-year term.

1.7 Activities Covered by the HCP

The activities covered by this HCP include the following:

- Water conservation and water use activities, including irrigation and drainage of lands to which IID delivers water
- Water conservation activities undertaken by IID
- Activities of IID in connection with the diversion, conveyance, and delivery of Colorado River water to users within IID's service area
- Activities of IID in connection with the collection of unused irrigation or drainage waters within its service area and conveyance to the Salton Sea

The covered activities specifically include all conservation and mitigation measures, whether undertaken by IID or by farmers, tenants, or landowners, in connection with either the conservation and transfer of up to 300 KAFY of Colorado River water pursuant to the IID/SDCWA Transfer Agreement and/or the QSA; or compliance with the cap on IID's annual diversions of Colorado River water established by the QSA.

1.7.1 Overview of Covered Activities

IID is an irrigation district, a limited purpose public agency, formed under the laws of the State of California. IID holds rights to take water from the Colorado River and deliver it to water users in Imperial County. To do so, IID diverts water from the Colorado River at Imperial Dam. After being desilted, this water is conveyed through the AAC to three main canals (Figure 1.7-1). The water is then diverted from the main canals into lateral canals. While a small number of farms take water directly from the AAC or main canals, most take water from lateral canals. Water is diverted out of the lateral canals and into farm fields by turnouts. Most farmers then use flood irrigation techniques after the water flows through the turnout.

The majority of water delivered to a field is absorbed and stored in the soil for use by the crops. The remaining water evaporates or leaves the field in the form of either tailwater or tilewater. Tailwater is surface runoff; tilewater is water that has leached through the soil and has been collected by drain pipes (called tile) installed underneath the field. The brackish tail and tile water are discharged into drains maintained by IID.

The drains carry three kinds of water: tailwater and tilewater discharged from farm fields, and operational discharge. Three kinds of water make up operational discharge: carriage water, lateral fluctuations, and change order. Carriage water is the extra volume of water needed in the laterals to deliver a specific volume of water to a turnout. Because open channel gravity flow water delivery is not exact, additional water is required to ensure deliveries are made in the amounts ordered. Lateral fluctuations are caused by delivery operations and maintenance activities. Laterals may need to be emptied for maintenance activities; the water that was in the lateral at the time must be removed and is discharged into a drain. Finally, a reduction or change by a farmer in his delivery order may not be timed exactly to efficiently implement the change by IID, resulting in extra water being delivered to a lateral or onto a field and then discharged into a drain.

Drains discharge water into one of three locations: the New River, Alamo River, or Salton Sea. Both the New and Alamo Rivers discharge to the Salton Sea. The Alamo River flows in a natural desert dry wash drainage channel, while the New River flows in a channel carved by the Colorado River to the Salton Sea. When the Colorado River flooded its banks in 1906, it flowed north and created the Salton Sea. The New River originates south of the International Boundary in the Mexicali Valley and conveys treated and untreated municipal and industrial wastewater, in addition to agricultural drainage from irrigated areas south of the border.

1.7.2 Water Use and Conservation Activities

As described in Section 1.1.1, IID will implement a water conservation program to generate up to 300 KAFY of conserved water for transfer to SDCWA, CVWD, and MWD. In addition, conservation measures or other water use activities also may be implemented by IID, farmers or landowners to comply with the annual cap on IID's Priority 3 diversions of Colorado River water established by the QSA. All water conservation and use activities by IID, farmers, tenants, and landowners and the effects of those activities are covered by this HCP.

Implementation of water conservation measures and transfer of the water to SDCWA, CVWD, and MWD would occur gradually. The IID/SDCWA Transfer Agreement and the QSA specify the quantities of water to be transferred and the ramp-up schedule for the transfer. The IID/SDCWA Water Conservation and Transfer Agreement requires a ramp-up of the conservation and transfer of water to SDCWA in increments of 20 KAFY. The QSA also specifies the amount and timing of transfers to CVWD and MWD. Based on the schedules in these agreements, a total conservation and transfer of 130 KAFY would be reached about six to seven years after initiation of the conservation and transfer program. About 10 years after initiation of the conservation and transfer program, 200 KAFY of water would be transferred with 300 KAFY of conservation and transfer achieved 24 years after the start of the water conservation and transfer programs.

Water conservation will be accomplished through a combination of on-farm and system-based conservation measures. On-farm measures consist of actions taken by individual farmers or landowners to conserve water under voluntary water conservation agreements with IID. System-based conservation measures consist of actions that would be undertaken by IID to conserve water. The exact mix of conservation methods that would be employed is anticipated to vary over the term of the HCP. The following describes the suite of conservation methods that could be implemented to conserve water.

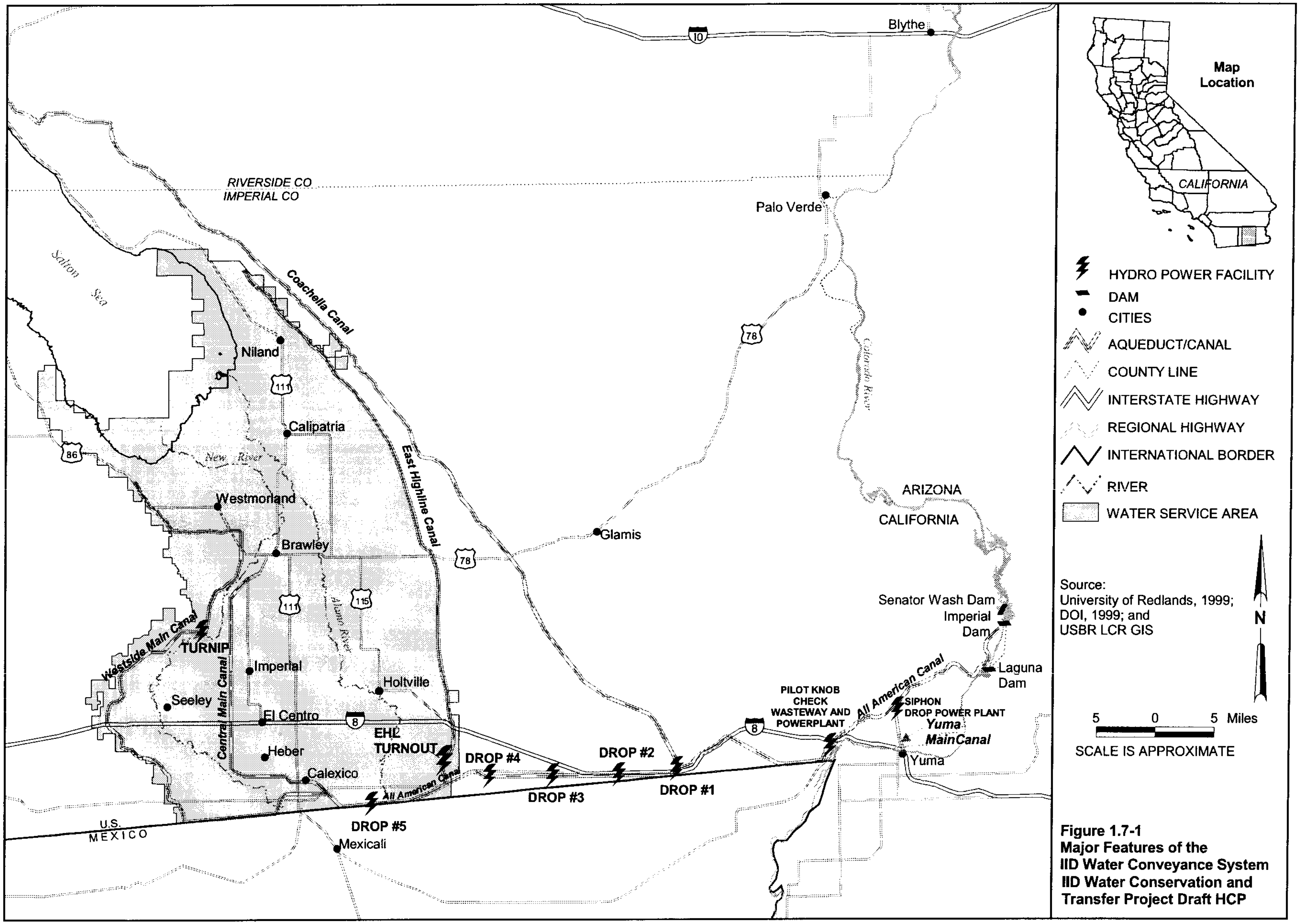


Figure 1.7-1
Major Features of the IID Water Conveyance System
IID Water Conservation and Transfer Project Draft HCP

1.7.2.1 On-farm Water Use and Conservation Activities

To commit to implementing the IID Water Conservation and Transfer Project, IID and participating farmers within the IID service area must be able to conclude that the benefits of the project justify the risks and costs to be assumed by IID and farmers. The conservation of 200 to 300 KAF of water within the IID service area will require changes in current farming practices and substantial capital investments in water conservation equipment and technologies. Thus, covered activities include irrigation practices by farmers and landowners otherwise required by the QSA and water conservation measures undertaken by farmers participating in the water conservation program.

Of the 130 to 200 KAF to be conserved for transfer to SDCWA pursuant to the IID/SDCWA Water Transfer Agreement, at least 130 KAFY is anticipated to come from on-farm conservation programs adopted by farmers in the Imperial Valley. The on-farm conservation programs are voluntary. Farmers will enter into agreements with IID, committing to the implementation of conservation measures. These measures, in turn, will require the farmers to make capital investments in various types of water conservation equipment and facilities. In many cases, farmers will be required to obtain financing for construction costs to implement and maintain conservation measures. The farmers' ability to obtain financing will depend on the estimate of the direct and indirect costs of implementing the water conservation measures.

As such, farmers and lending institutions may be unwilling to enter into binding agreements to undertake significant costs and risks associated with implementing on-farm conservation measures unless they can determine the total costs of the measures and the associated additional cost of complying with the ESA and CESA. In the absence of this certainty, IID and farmers within IID's service area will be at risk that the costs of implementing the water conservation measures will increase substantially in the future. Therefore, incidental take authorization for water use and conservation activities is critical.

Many farmers own their own land within the IID service area. Some lease their land from third parties and others lease their land from IID. This HCP covers water use activities on land in the IID service area irrespective of who owns the land and who conducts the activities. Water use activities include all activities associated with moving water from IID's conveyance system to farm fields, irrigating crops, and draining water from fields into the IID drainage system.

As part of the conservation program described in Section 1.1.1, a portion of the conserved water will be generated by on-farm conservation measures implemented by individual farmers, tenants, and landowners. Participation in the program by farmers will be voluntary and will vary during the term of the permit, probably from year to year. The amount of water conserved and the on-farm conservation techniques used will be at the discretion of the individual farmer. The options for conserving water that are available to farmers generally fall into the following categories:

- Installation of structural or facility improvements, or conversion to irrigation systems that increase efficiency and reduce water losses
- Irrigation management

- Land use practices

Compliance with the cap on IID's Priority 3 diversions of Colorado River water (see Section 1.1.3, Quantification Settlement Agreement) also may result in optional or mandatory conservation by farmers and landowners over the term of the permit. Compliance with the cap also may necessitate water conservation measures to pay back inadvertent overruns. All water conservation practices implemented by individual farmers, tenants, and landowners within the IID service area are covered under this HCP.

Installation of Structures/Facilities and Conversion of Irrigation Systems

On-farm water conservation can be achieved through various techniques using existing technology. On-farm conservation measures may include the following:

- Tailwater return systems
- Cascading tailwater systems
- Level basins
- Shorten furrows and border strip improvements
- Narrow border strips
- Cutbacks
- Laser leveling
- Multi-slope
- Drip irrigation

The techniques for achieving water conservation would be at the discretion of the individual farmer. It is expected that some combination of the techniques listed would be employed. These water conservation techniques are briefly described in Table 1.7-1 and depicted in Figure 1.7-2 Additional information is provided in Chapter 2 of the IID Water Conservation and Transfer EIR/EIS.

TABLE 1.7-1
On-Farm Water Conservation Techniques

Conservation Technique	Brief Description
Tailwater return or pump back systems	Pumps surface irrigation tailwater back to the head ditch reducing both the delivery requirement and the volume of water discharged to the drains.
Cascading tailwater	Allows the tailwater to cascade by gravity to the head ditch of a lower field adjacent to the tailwater ditch. This can be accomplished by placing drainpipes with drop box inlets through the embankment between the fields just upstream of each head ditch check.
Level basins	Dividing a field into basins and flooding each basin at a relatively high flow rate.
Shorten furrows and border strip improvements	The distribution uniformity of furrow and border strip irrigation can be improved by shortening the length of irrigation runs, particularly in soils with higher infiltration rates.
Narrow border strips	Narrowing the width of border strips can improve distribution uniformity both along the length of fields by improving the advance time, and across the width of fields by increasing the depth of flow.
Cutback	Irrigation is initiated with a high flow rate to advance the water down the field as quickly as possible without causing erosion.

TABLE 1.7-1
On-Farm Water Conservation Techniques

Conservation Technique	Brief Description
	When the water reaches a predetermined distance down the field, the flow is reduced to minimize tailwater.
Multi-slope	Distribution uniformity can be improved for furrow and border strip irrigation by varying the slope of the field with the head of the field having a greater slope than the end of the field.
Drip irrigation	Water is run through pipes (with holes in them) either buried or lying slightly above the ground next to the crop. Water slowly drips onto the crop roots and stems. Water can be directed only to the plants that need it, cutting back on tailwater runoff.

In addition, farmers have and continue to experiment with new and/or developing irrigation technology. Additionally, evolving crop technology often requires farmers to grow crops with varying methods to improve production. The activities associated with the installation and conversion of irrigation systems from one technology to another is covered under this HCP.

Irrigation Management

Certain farmers may be able to conserve water and cultivate the same acreage through better irrigation management without constructing facilities or changing irrigation methods. Irrigation management refers to controlling the timing and amount of each irrigation application to provide adequate crop water for maximum yield and to achieve adequate soil leaching. Irrigation management on-farm will continue to evolve as the science of crop/soil water develops and understanding of the farmers to put that knowledge to practical use increases. As greater demands are put on agricultural areas to conserve more water in California, IID expects that irrigation water management will become a more important tool for farmers to conserve water.

Land Use Practices

Fallowing could be used to meet water conservation objectives by reducing IID's requirement to deliver irrigation water in the service area. Fallowing can be described as the reduction or cessation of certain farmland operations for a specified or indefinite period of time. For the purposes of this HCP, fallowing is defined as:

- Long-term land retirement (greater than 1 year), whereby crop production ceases indefinitely or during the term of the water conservation and transfer agreements. A cover crop may be maintained during the period of inactivity or the land is returned to natural vegetation.
- Rotational fallowing, whereby crop production ceases for one calendar year. No water is applied, and no cover crop is grown.
- Single crop fallowing, whereby multiple crops are reduced to a single crop rotation on an annual or longer term basis.

The IID/SDWCWA Transfer Agreement provides that at least 130 KAFY of conserved water must be generated by on-farm conservation measures and fallowing is not an acceptable method of on-farm water conservation under landowner contracts. IID's Board of Directors has also adopted Resolution No. 5-96 stating that IID will not support fallowing programs for purposes of transferring water. However, there is no prohibition of fallowing under the terms of the QSA. Fallowing may be considered a potentially viable method to achieve water conservation to meet IID's obligations under the QSA to produce conserved water for transfer, to comply with the limit on total water diversions by IID and/or to comply with the Inadvertent Overrun Policy (which generally requires IID to make up in subsequent years for inadvertent overruns of the 3.1 MAF cap on annual diversions from the Colorado River). Therefore, this HCP covers take of covered species that could result from the fallowing described above for water conservation purposes by IID or farmers and landowners. In addition, the HCP covers take of covered species associated with returning fallowed land into agricultural production.

1.7.2.2 System-based Water Conservation Activities

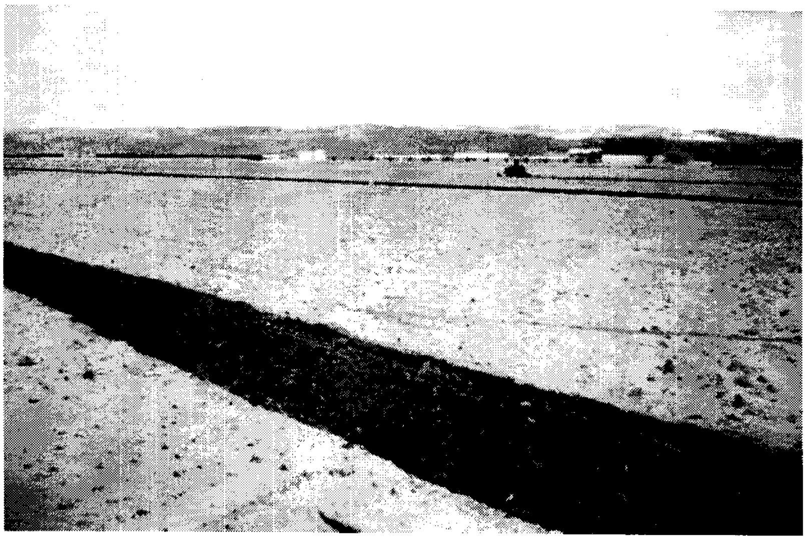
As part of the water conservation and transfer programs, IID will implement operational and structural improvements to conserve water and enhance water delivery and drainage system capabilities and service. The specific improvements to be undertaken are uncertain at this time; however, the types of improvements that IID could pursue include the following:

- Additional lining of canals and laterals
- Replacement of existing canal linings as normal maintenance
- Automation of flow control structures
- Installation of check gates in the laterals that are automated or manually operated
- Installation of nonleak gates
- Installation of additional lateral interceptors
- Installation of additional pipelines
- Installation of additional reservoirs, including small, mid-lateral reservoirs to provide temporary water storage
- Development of water reclamation systems
- Installation of pump or gravity-operated seepage recovery systems

Additional information on system-based conservation measures is provided in the IID Water Conservation and Transfer EIR/EIS. All water conservation practices implemented by IID and within IID's canal and drainage systems are covered under this HCP.

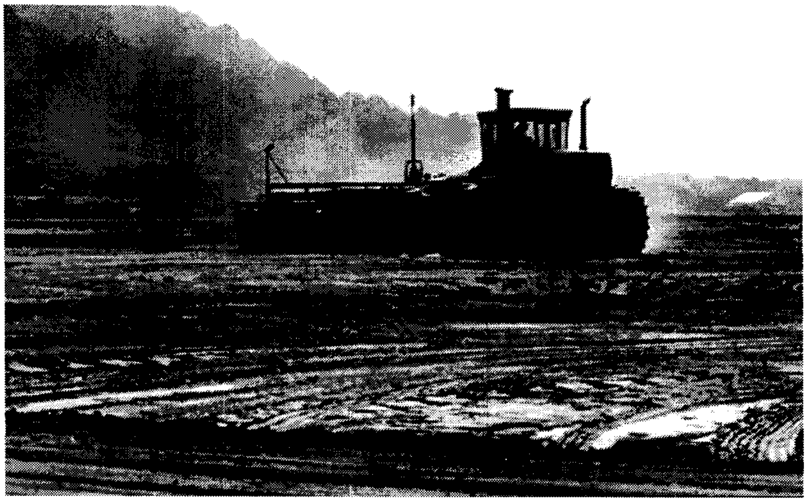
Canal Lining and Piping

Canal lining consists of lining canals with concrete or using pipelines to reduce seepage. About 537 miles of canals are currently unlined. Canal lining is currently contemplated for three canal sections in the IID service area totaling about 1.74 miles (Figure 1.7-3; Table 1.7-2). To line a canal, the existing canal is filled in and then trenched to form a trapezoidal channel. Concrete is then installed on the banks and bottom of the channel using a lining float. Construction activities can be conducted within the canal's right-of-way and affects an area about 70 feet wide centered on the canal. The canal rights-of-way consist of either roads, embankments or other disturbed ground. Table 1.7-2 shows the current anticipated acreage that would be affected under proposed canal lining. About one week is required to



Laser Leveling

USDA NRCS Practice Code 466



Multi-Slope

USDA NRCS Practice Code 464

Drip Irrigation

USDA NRCS Practice Code 441

Figure 1.7-2a
On-Farm Conservation Measures
IID Water Conservation and Transfer Project Draft HCP

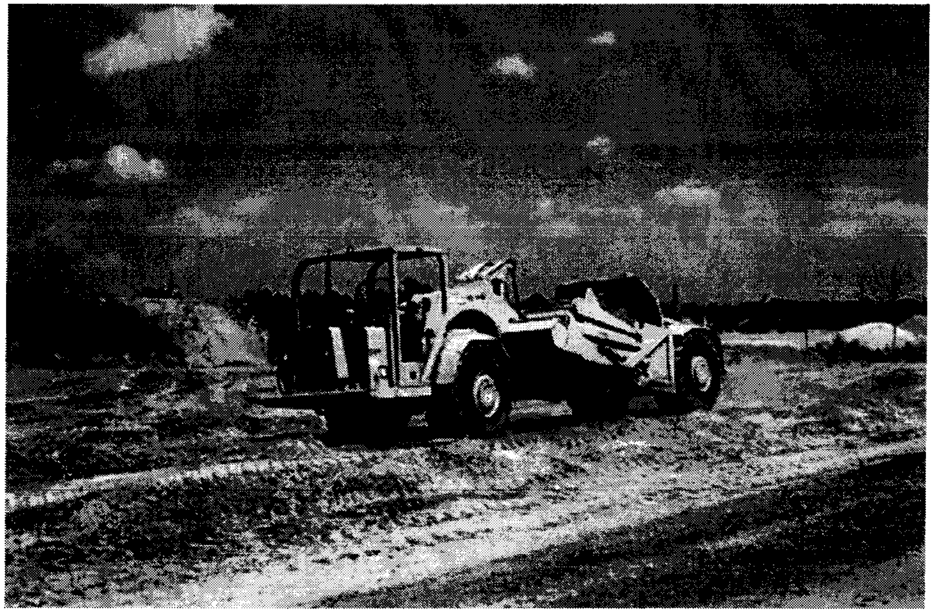
Tailwater Return or Pump Back System

USDA NRCS Practice Code 447

Shorten Furrow or
Border Strips,
Narrow Border Strips

USDA NRCS Practice Code 388

Figure 1.7-2b
On-Farm Conservation Measures
IID Water Conservation and Transfer Project Draft HCP



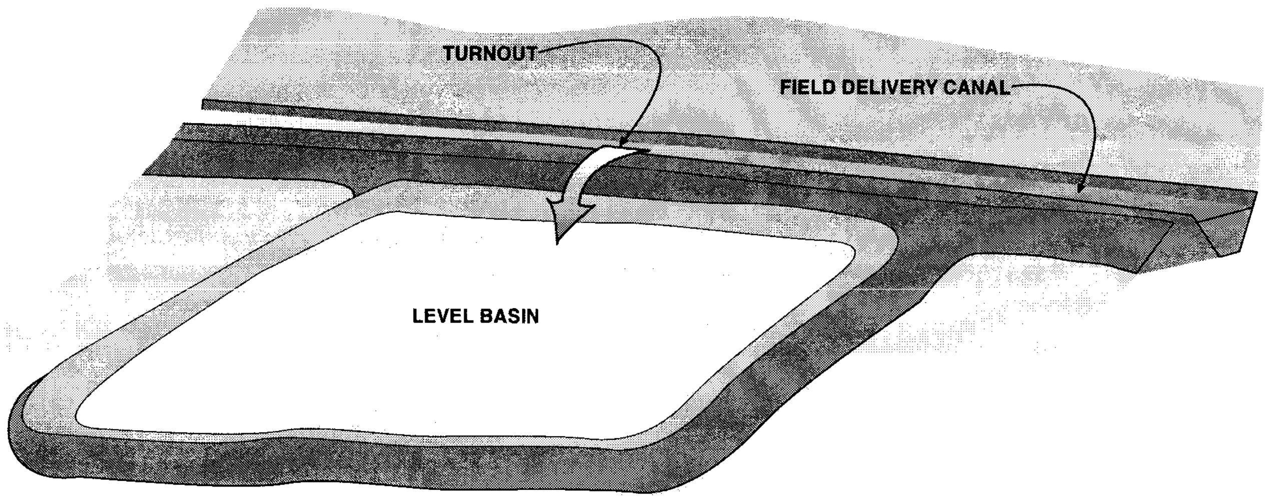
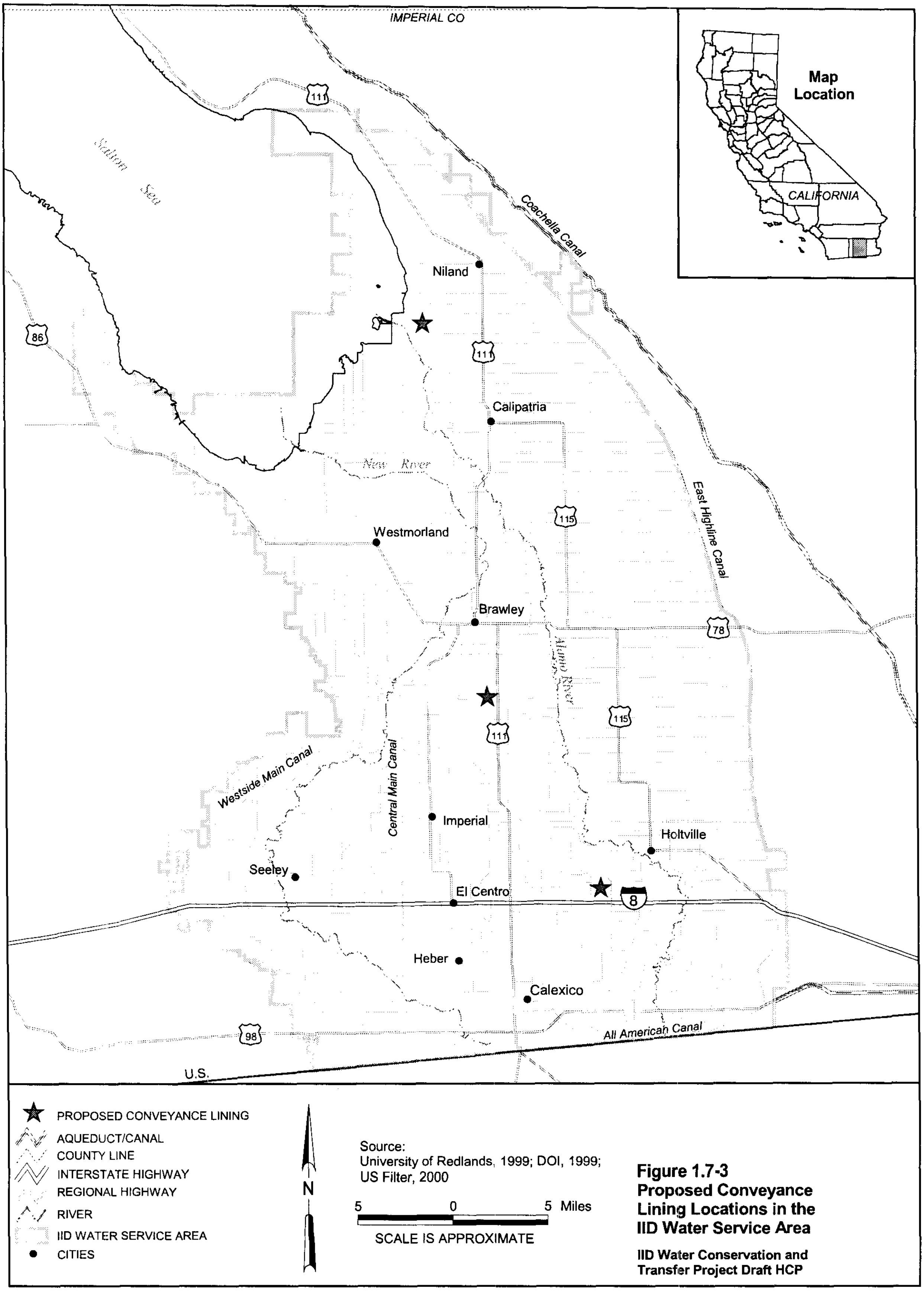


Figure 1.7-2c
Level Basin
IID Water Conservation and Transfer Project Draft HCP



Source:
University of Redlands, 1999; DOI, 1999; US Filter, 2000

Figure 1.7-3
Proposed Conveyance Lining Locations in the IID Water Service Area

IID Water Conservation and Transfer Project Draft HCP

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line a mile of canal. For the canal lining anticipated thus far, this work would be completed within two weeks. In addition, although no additional canals are planned or anticipated, IID may need to construct new canals over the term of the permit and line those as well. The exact location, size, and length of future canals are uncertain at this time; however, any new canals would be within IID's current water service area. To cover the potential for canal lining beyond that amount presently anticipated, IID is seeking coverage for lining the remaining laterals (up to 320 miles) over the term of the HCP. If IID lined these additional laterals, up to 2,700 acres could be temporarily disturbed. The temporarily disturbed area would be within IID's rights-of-way and would consist of previously disturbed areas such as roads and embankments.

TABLE 1.7-2
Canals Potentially Lined to Conserve Water and Area Temporarily Disturbed to Line Canals

Canal	Length (miles)	Acreage Affected
Rose Lateral 9	0.25	2.12
Ash Lateral 43	0.49	4.16
N Lateral	1.00	8.48
Total	**1.74**	**14.76**

Lateral Interceptors

A lateral interceptor system consists of new canals and reservoirs that collect operational spills from lateral canals. Lateral interceptors are lined canals or pipelines that generally run perpendicular to lateral canals at their terminus. The lateral interceptors capture operational spill water, unused water resulting from canal fluctuations, and return water from farmer delivery reductions or changes. The interceptors convey this captured water to regulating reservoirs where the water can be stored and reused in another canal serving another delivery system as needed. IID currently has four systems in operation and potentially could enlarge that to 16 additional systems under the water conservation and transfer programs (Figure 1.7-4; Table 1.7-3).

Installation of a lateral interceptor requires constructing and lining a canal, installing pipelines and constructing a minimum 40-surface-acre reservoir (Figure 1.7-5). An approximately 70-foot-wide area centered on the new interceptor would be affected by the construction. The affected area of the reservoir site would be only slightly larger than the reservoir itself. Table 1.7-3 shows the acreage potentially affected by each of the interceptors. The total acreage potentially affected by construction of lateral interceptors could be about 1,480 acres (i.e., about 840 acres of canals and 640 acres of reservoir).

TABLE 1.7-3
Proposed Lateral Interceptors and Acreage Affected by Construction

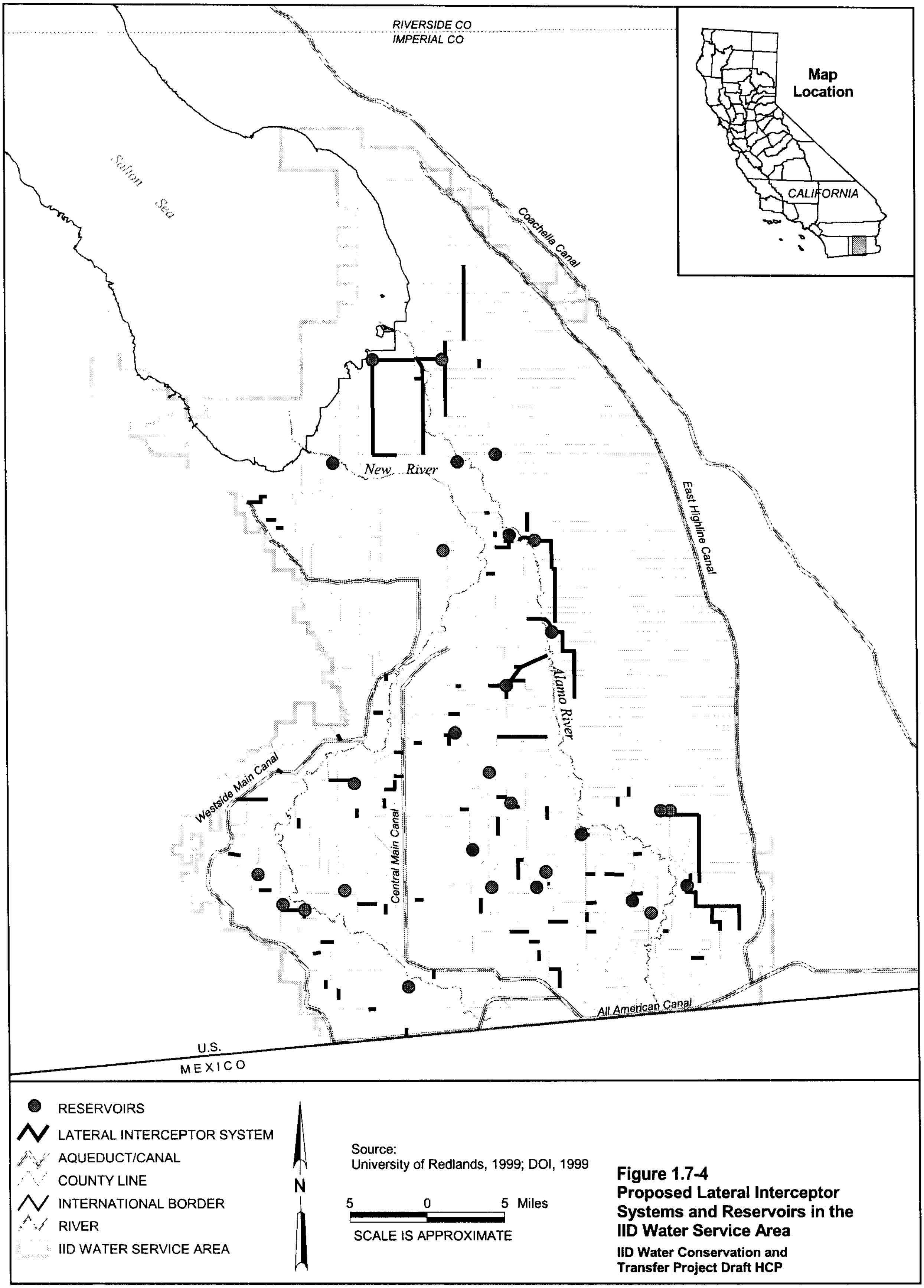
Interceptor	Type	Length (miles)	Acreage Affected
Acacia	Canal	8.62	73.12
Ash	Canal	4.55	38.57
	Pipe	1.00	8.52

TABLE 1.7-3
Proposed Lateral Interceptors and Acreage Affected by Construction

Interceptor	Type	Length (miles)	Acreage Affected
Elder	Canal	7.61	64.60
Fern	Canal Pipe	1.14 2.18	9.64 18.48
Holt	Canal Pipe	5.76 1.02	48.85 8.68
Niland	Canal Pipe	9.28 6.53	78.74 55.44
Orient-Oleander	Canal Pipe	4.17 1.52	35.35 12.86
Orita-Munyon	Canal Pipe	4.92 0.76	41.78 6.43
Peach	Canal	6.63	56.24
Redwood	Canal Pipe	8.52 2.01	72.31 17.03
Rockwood	Canal Pipe	1.00 0.50	8.52 4.26
Thistle	Pipe	0.80	6.75
Tri-City	Canal Pipe	5.00 0.50	42.42 4.26
Tri-Ex	Pipe	2.30	19.52
Vail	Canal Pipe	3.03 5.02	25.71 42.58
Wistaria	Canal Pipe	1.99 2.65	16.87 22.50
Total		**99.02**	**840.02**

Reservoirs

Two types of reservoirs can facilitate water conservation: (1) operational reservoirs (includes mid-lateral reservoirs) and (2) interceptor reservoirs. Operational reservoirs are generally placed in locations to take advantage of delivery system supply and demand needs and in some cases include locations of historical canal spills. These reservoirs are used to regulate canal flows in order to match or optimize demand flows to supply flows. Conservation is achieved by reducing operational spills as a result of this mismatch of flows by storing excess supply water and then releasing this water in times of shortage demand needs.



Source:
University of Redlands, 1999; DOI, 1999

Figure 1.7-4
Proposed Lateral Interceptor Systems and Reservoirs in the IID Water Service Area

IID Water Conservation and Transfer Project Draft HCP

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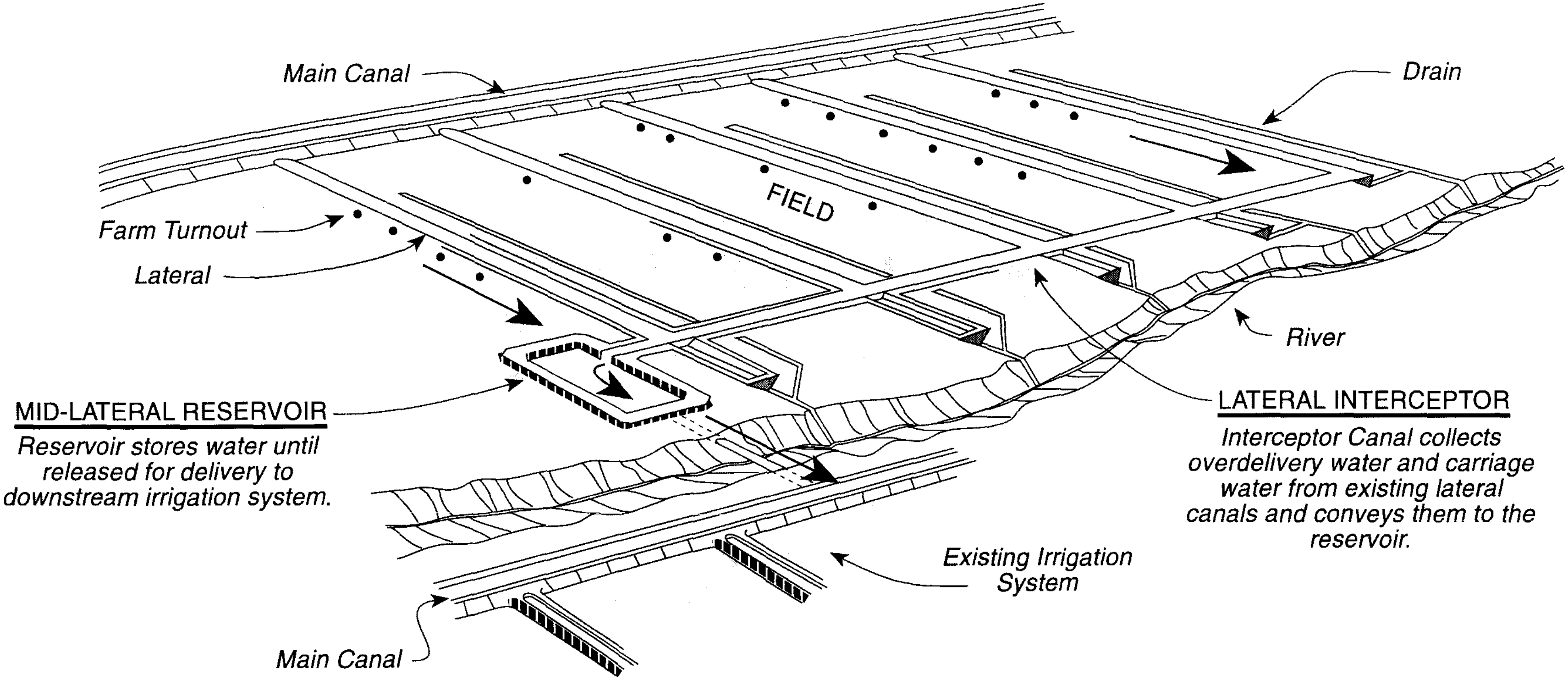

Figure 1.7-5
Conceptual Lateral Interceptor System and Mid-Lateral Reservoir
IID Water Conservation and Transfer Project Draft HCP

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Interceptor reservoirs enhance lateral interceptor system operations. They are typically placed at the end of the lateral interceptor canals to store intercepted flows (operational discharges) for reregulation rather than losing these flows to the drainage system. These stored flows are then later released for use in other delivery system canals as demand is required. These reservoirs would contain automated inlet and outlet structures that would enable the maintenance of the desired water flow. IID currently does not have any reservoirs in design, but anticipates constructing up to 100 reservoirs during the 75-year permit term. These reservoirs would be 1 to 10 acres in size, with a capacity ranging from about 5 to 30 AF. Construction of these reservoirs could encompass up to 1,000 acres.

In addition to reservoirs constructed and operated by IID, many farmers in the Imperial Valley likely will construct small regulating reservoirs to facilitate the conservation of water. These 1 to 2-acre reservoirs would be constructed at the upper end of agricultural fields and are used to better regulate irrigation water applied to fields and to settle suspended solids prior to introduction into drip irrigation systems. These reservoirs would contain water only during irrigation operations and would remain dry during the remainder of the year. IID anticipates that these reservoirs could be used on up to 50 percent of the agricultural land in its service area. A single reservoir services about 80 acres of land. Up to about 5,900 acres of agricultural land could be converted to regulating reservoirs.

Seepage Recovery Systems

To conserve water, IID could install seepage recovery systems adjacent to the East Highline Canal. Existing and proposed locations of seepage recovery systems are shown in Figure 1.7-6. Surface and subsurface recovery systems conserve water by collecting canal leakage in sumps along a canal and pumping the water back into the same canal (Figure 1.7-7).

In a surface drain recovery system, seepage is captured and conveyed through open channels to a concrete sump. From there, it is pumped back into the canal. Construction required to install a surface recovery system is minimal. For a surface recovery system, a small check structure would be constructed in the existing parallel drain to pond water to a depth of about 3 feet. A pump station would return water to the East Highline Canal. These systems are proposed where there is an existing drain that collects seepage and directs the water to the drainage system.

In a subsurface recovery system, canal seepage flows are collected in a perforated pipe that then directs the water to a concrete sump. From there it is pumped back into a canal (Figure 1.7-7). Subsurface systems are proposed in areas lacking an existing parallel open drain. To install these systems, a trench is excavated and a pipe is laid in place. The pipeline outlets to a collection well consisting of an 8-foot-diameter vertical pipe from which the water is pumped back to the delivery canal. Construction disturbs an area about 70 feet wide along the pipeline. Table 1.7-4 shows the area that would be affected by construction of subsurface recovery systems. Following completion of the system, a right-of-way of about 70 feet along the pipeline is maintained free of deep-rooted vegetation.

TABLE 1.7-4
Proposed Seepage Collectors and Acreage Potentially Affected by Construction

Seepage Collector	Type	Length (miles)	Acreage Affected
EHL 14	Surface	0.19	<0.1
Holtville No.3	Surface	0.59	<0.1
Holtville No.6	Surface	0.51	<0.1
Holtville Main	Surface	0.55	<0.1
Magnolia	Surface	0.42	<0.1
Malva	Surface	0.19	<0.1
Maple	Surface	0.35	<0.1
Mesquite	Surface	0.42	<0.1
Moss	Surface	0.42	<0.1
Mulberry	Surface	0.26	<0.1
Munyon	Surface	0.42	<0.1
Myrtle	Surface	0.37	<0.1
Orita	Surface	0.42	<0.1
Oxalis Lateral	Surface	1.19	<0.1
Verde No.2 & 2-D	Surface	1.58	<0.1
Warren No.2	Surface	0.44	<0.1
Total Open Systems		**8.3**	**<1.6**
EHL 16 Lateral	Subsurface	0.48	4.1
Malva 2	Subsurface	0.48	4.1
Mayflower	Subsurface	0.48	4.1
Orchid	Subsurface	0.48	4.1
Palm	Subsurface	0.48	4.1
Pampas	Subsurface	0.48	4.1
Peach	Subsurface	0.48	4.1
Plum	Subsurface	0.48	4.1
Pomelo	Subsurface	0.48	4.1
Rositas Canal	Subsurface	0.48	4.1
Total Subsurface Systems		**4.8**	**41.0**
Total All Systems		**13.2**	**42.6**

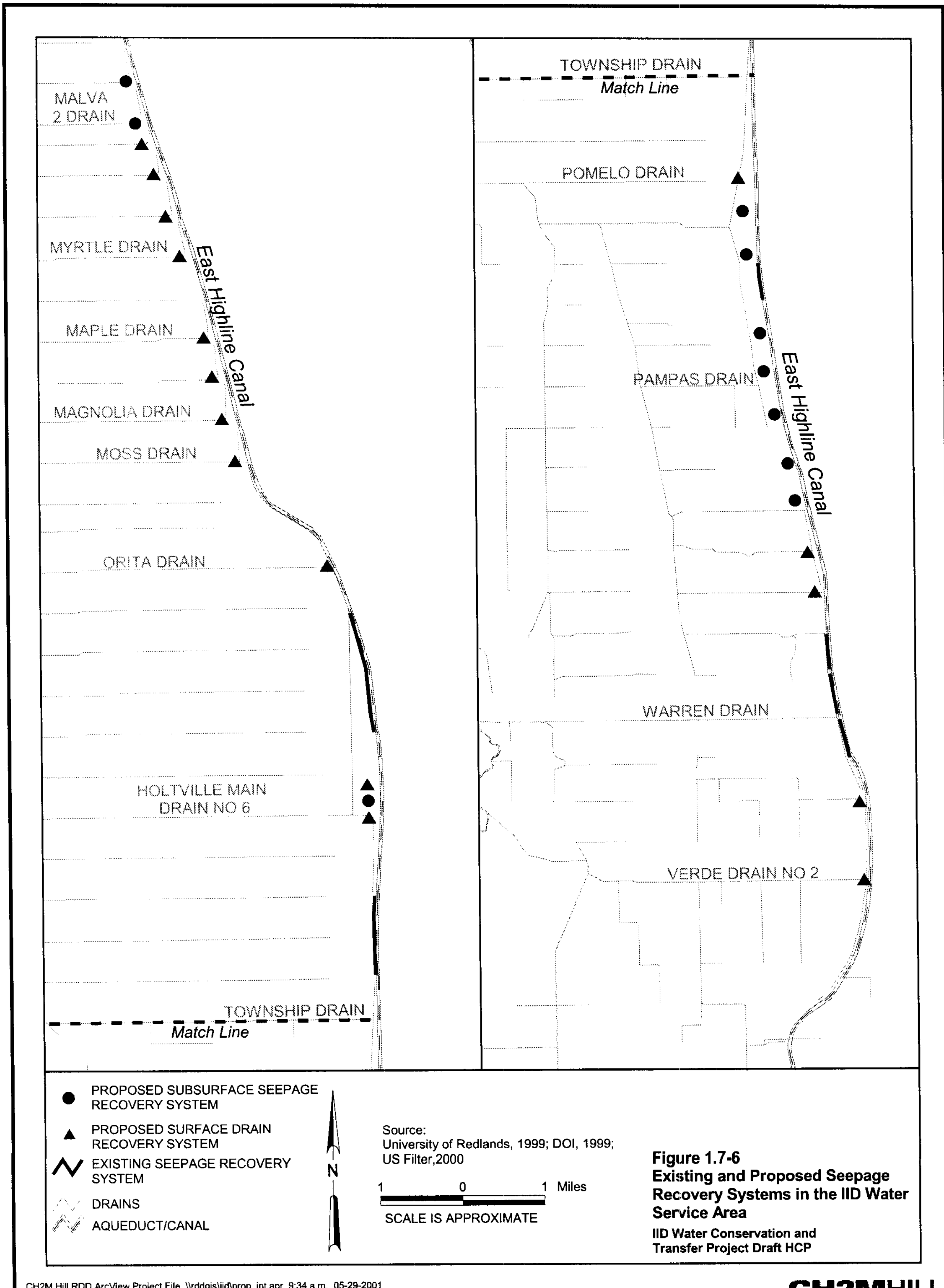

Figure 1.7-6
Existing and Proposed Seepage Recovery Systems in the IID Water Service Area
IID Water Conservation and Transfer Project Draft HCP

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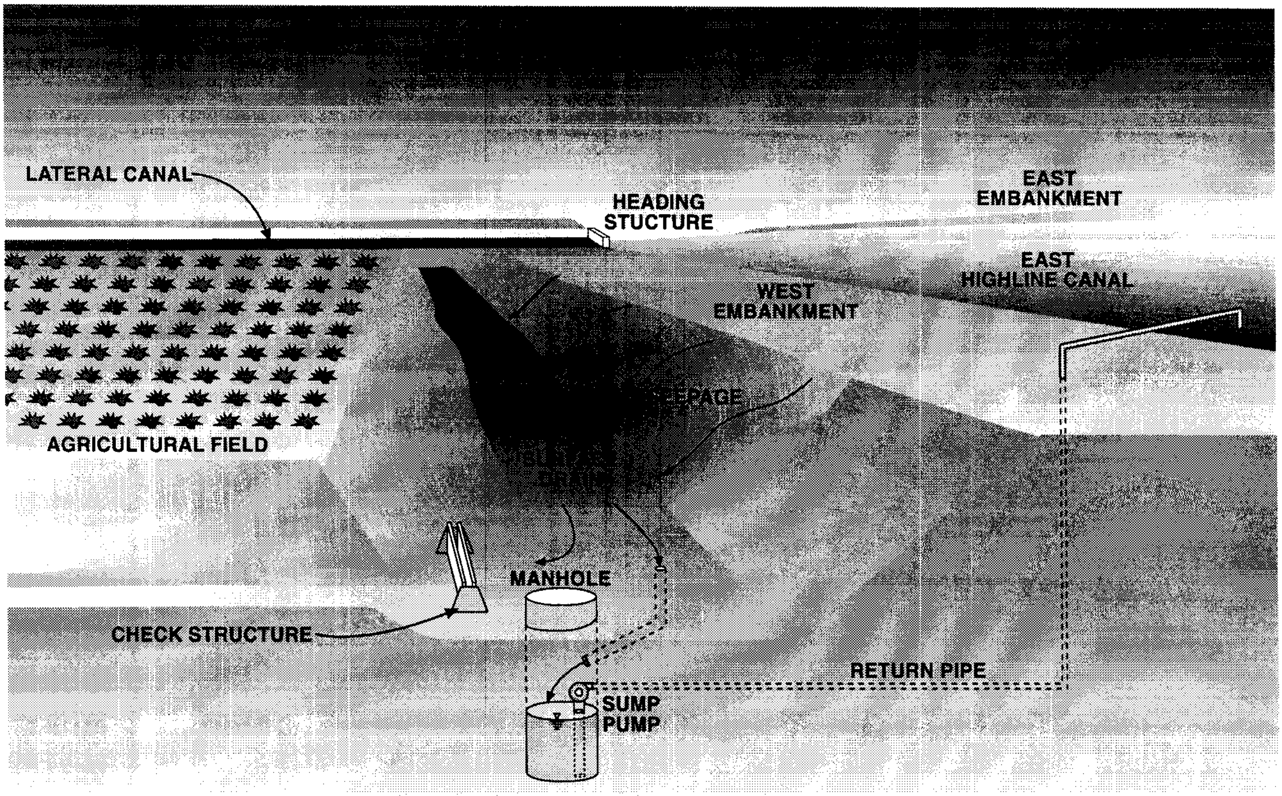
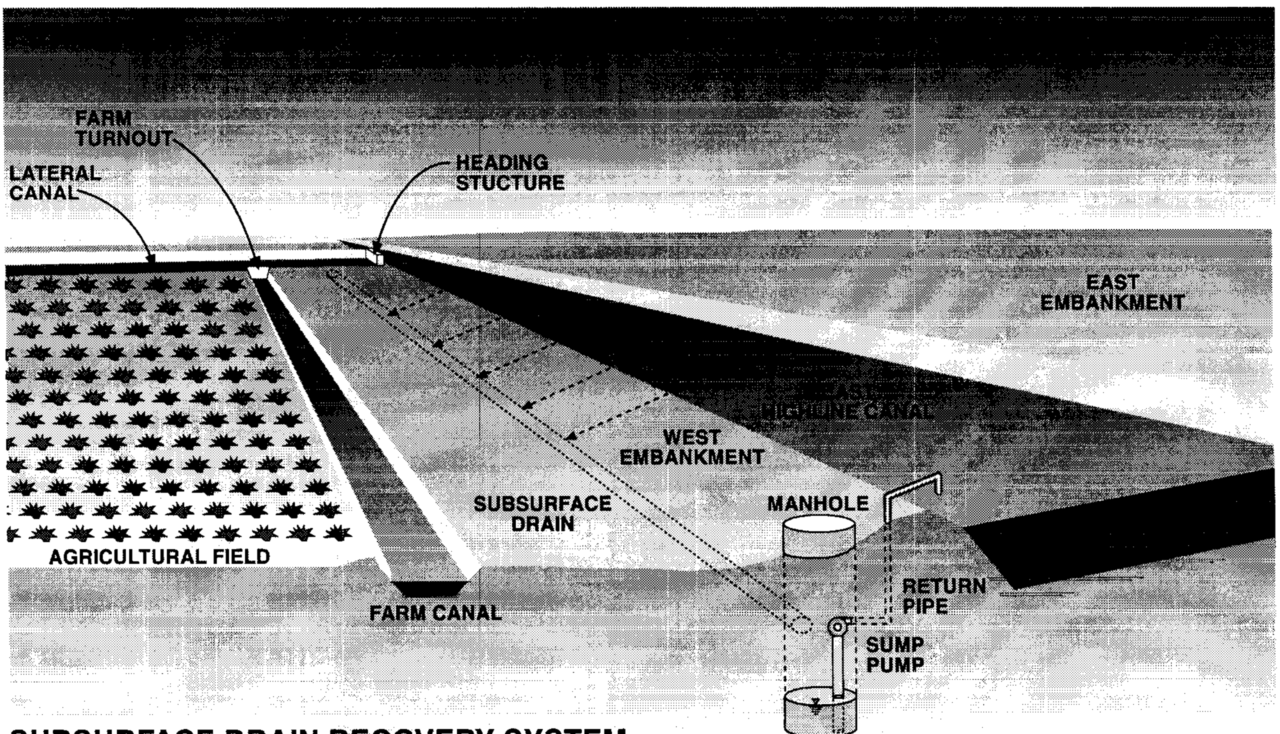


SURFACE DRAIN RECOVERY SYSTEM



SUBSURFACE DRAIN RECOVERY SYSTEM

Figure 1.7-7
Conceptual Seepage Recovery Systems
IID Water Conservation and Transfer Project Draft HCP

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1.7.3 Operation and Maintenance Activities

The primary purpose of this HCP is to provide the ESA and CESA compliance and incidental take authorization required to implement IID's water conservation obligations under the IID/SDCWA Transfer Agreement and the QSA. The water conservation programs will be an integral part of IID's ongoing operation. To implement the conservation program on a long-term basis, IID needs certainty regarding its ability to operate and maintain its irrigation and drainage system. For this reason, the covered activities include the range of IID's normal activities as well as water conservation-related activities. IID's normal activities consist of O&M activities associated with the diversion, measurement, conveyance, and delivery of Colorado River water to customers within the IID service area and the collection, removal, measurement, and transport of drainage waters to the Salton Sea. These activities are described below.

1.7.3.1 Conveyance System Operation

Covered activities associated with the operation of the conveyance system encompass the following:

- Conveyance, measurement, and delivery of water through the entire AAC system beginning where water is diverted at Imperial Dam on the LCR to the Westside Main Canal turnout, located at the southwestern corner of the Imperial Valley
- Conveyance, measurement, and delivery of water to customers through the main and lateral canal system within the IID service area
- Canal operational activities involving the filling, draining, and movement of water through the canal system to accommodate maintenance and customer needs

IID delivers Colorado River water to lands within the Imperial Valley for agricultural, domestic, industrial, and other beneficial uses. Water is diverted from the Colorado River at Imperial Dam and is conveyed by gravity flow to Imperial Valley via the 82-mile-long AAC (Figure 1.7-1). The Coachella Canal branches off from the AAC about 37 miles west of Imperial Dam. The O&M activities associated with the Coachella Canal, which is operated by CVWD, are not covered by this HCP.

Three primary main canals (i.e., East Highline, Central Main, and Westside Main) branch off the AAC as it moves across the southern portion of the Imperial Valley. These main canals are owned and operated by IID and supply water to numerous lateral canals located throughout the irrigated service area of IID. The lateral canals carry water from the main canals to farm fields; turnouts are used on the canals and laterals to deliver water to individual farm fields. Canal segments may be dewatered between irrigation deliveries for maintenance purposes or to reduce moss and algal growth, which interferes with water deliveries.

In total, IID operates and maintains 1,667 miles of canals to deliver water to irrigated farmland in the Imperial Valley. Of the 1,667 miles of canals, 1,114 miles are concrete-lined, about 537 miles are unlined earthen canals, and the remaining 16 miles of the conveyance system are pipelined (cited from IID's Memorandum dated October 4, 2000) (Figure 2.3-5). IID does not anticipate constructing any new canals. However, occasionally a portion of a canal needs to be rerouted. On average, 0.25 miles of canal may be rerouted annually. Construction required to reroute a canal is the same as that required to install a lateral interceptor canal. Thus, about 2 acres could be disturbed each year to reroute canals for a total of 150 acres over the term of the permit.

1.7.3.2 Drainage System Operation

Covered activities associated with the operation of the drainage system include collection, conveyance, measurement, and discharge of drainage water through IID's main and lateral drain system to the rivers and the Salton Sea; and drain operational activities associated with the filling, draining, and movement of drain water through the main and lateral drain system to accommodate maintenance and customer needs.

IID is obliged, as stated in its rules and regulations covering drainage, to provide a drain outlet for every 160 acres of farmland within its service area. To do so, IID operates a complex drainage system within its service area consisting of 1,456 miles (cited from IID's Memorandum dated October 4, 2000) of open and closed (pipeline) drains and associated features, surface and subsurface drainage pumps, subsurface drains and associated collection pipelines, and water recovery systems. The IID drainage system is shown in Figure 2.3-1. Like the canal system, the drain system is composed of main and lateral drains.

Periodically, IID reroutes and constructs new drains. On average, about 2 miles of drains are rerouted or constructed within a 10-year period. Construction of a new drain entails trenching to a depth of about 7 feet and creating the roadways adjacent to the drain. The new drain and associated roadways fill the right-of-way for the drain. The right-of-way on lateral drains is 80 feet and on main drains is 120 feet. Drains to be rerouted or constructed primarily would be lateral drains. Construction of 2 miles of lateral drains would result in ground disturbance encompassing about 10 acres over a 10-year period. If the newly constructed drains were main drains, about 15 acres would be disturbed over a 10-year period. From 75 to 112 acres could be disturbed over the 75 year permit term.

On-farm irrigation water that percolates through the soil is collected by subsurface tile drains and, to a lesser extent, by surface drains. The open drains (mostly the lateral drains) collect tailwater and tilewater from area farms as well as operational discharge water emanating from IID's delivery system. Tailwater is irrigation water that runs off the lower end of the fields and is discharged into the drains. Tilewater is subsurface drainage water generated primarily through leaching operations performed by farmers. Currently, more than 35,000 miles of subsurface drainage tile have been installed by Imperial Valley farmers. Outlets for drainage tile into drains can occur at intervals as close as 660 feet, but are generally at quarter- to half-mile intervals, or tilewater is collected in sumps from which it is pumped to the nearest outlet, which is a drain, a river, or the Salton Sea. IID estimates that there are in excess of 14,000 outlets of tile drains into the IID drainage system from its customers. Most drain water discharges are into IID's surface drain system, although some discharge directly to the New or Alamo Rivers or the Salton Sea.

1.7.3.3 Maintenance Activities

Maintenance activities required for the conveyance and drainage systems include keeping existing irrigation, drainage, and related facilities in good repair and working condition, so that all parts of these facilities can fulfill the intended purpose for which they were originally designed. Minor improvements undertaken during the normal process of performing these activities also are included. Covered maintenance activities include the following activities relating to the irrigation and drainage system and associated facilities:

- Inspection activities
- Canal maintenance
- Right-of-way maintenance
- Seepage maintenance
- Structure maintenance
- Pipeline maintenance
- Reservoir maintenance
- Sediment removal from canals and drains
- Operation and maintenance of the desilting basins
- Mechanical, chemical, and biological weed control maintenance
- New and Alamo River maintenance
- Salton Sea dike maintenance
- Gravel and rock quarrying

Each of these activities is described below.

Inspection Activities

IID continuously inspects its canal and drainage system from access roads adjacent to the facilities to determine where and when maintenance is required.

Canal Maintenance

About 1,114 miles of the IID's conveyance system consist of concrete-lined channels. Concrete-lined canals, including the AAC when lined in the future, require periodic inspection and repair. The concrete-lined canals are segmented with contraction joints to resemble a series of concrete panels. The joints between the panels often are sealed with tar or another waterproof mastic. Repair consists of periodic concrete panel replacement or resealing joints. To replace concrete panels, the existing panels are removed and new concrete poured to create the panels. All activities are restricted to IID's right-of-way on the canal.

Portions of the concrete lining are replaced on an as needed basis. Thus, the frequency, magnitude, and location of this activity are highly variable. To replace or repair canal lining, the canal must be dewatered. IID attempts to dewater each canal every 2 months for about 3 days. However, on average, canals are typically dewatered every 3 to 4 months. Canal lining and repair are conducted during these periods. The amount of canal lining can vary from one or two panels covering several feet to one-half mile. IID anticipates that the concrete lining on currently lined canals will require replacement up to two times over the next 75 years.

Along the AAC, IID maintains and operates three existing seepage recovery systems. Two of these systems are located at Drop 4 and one is at Drop 3. The seepage recovery systems at Drop 4 are pumped, while the system at Drop 3 is a gravity system. About every 10 years, IID needs to clean vegetation out of these systems.

The preferred alternative for the AAC Lining Project is to construct a new canal parallel to the existing AAC from one mile west of Pilot Knob to Drop 3 (Reclamation and IID 1994). When completed, IID will operate and maintain the new canal section in the same manner as the existing canal. In the EIS/EIR for the AAC Lining Project, it was assumed that the old canal section would be retained and maintained for emergency use. The specific operation and maintenance activities required to maintain the canal for emergency use will be developed during project design. The Biological Opinion for the AAC Lining Project describes expected management of the abandoned section as follows.

> *The abandoned sections of the existing canal would be managed by IID as an emergency channel in the event of damage to the parallel canal or other catastrophic event. To accomplish this, a management plan for the old canal would be prepared during the project design phase in coordination with the BLM and other agencies. The plan would include the specific action needed to maintain the abandoned sections for the specified purpose of an emergency use channel. The plan would include actions needed to keep the abandoned canal prism and maintenance roads free of vegetation. Vegetation control may involve regular discing and the use of legally approved chemical herbicides.*

The HCP covers management of the abandoned section in a manner consistent with the management assumed in the EIS/EIR and Biological Opinion for the AAC Lining Project.

Right-of-Way Maintenance

Canals are generally constructed on a 50- to 70-foot-wide rights-of-way, while the right-of-way for drains is generally 80 to 120 feet wide, depending on whether it is a main or lateral facility. The rights-of-way for canals and drains consist of the drain or canal, roadways on both sides of the channel and the associated embankments. The right-of-way on piped sections of the conveyance and drainage systems are typically narrower, about 40 feet. Conveyance pipelines are used through developed areas and are typically covered by roads, parks, and other uses consisting of open space facilities. The rights-of-way of drainage pipelines are typically farmed.

Right-of-way maintenance involves maintaining the canal, drain, and siphons associated with the right-of-way clear of deep-rooted vegetation, debris, and trash, and maintaining the accessibility to facilities and the use of the roadways associated with the channels. This maintenance refers to that portion of the right-of-way outside the canal or drain prism; canal and drain maintenance within the prism is addressed separately. Right-of-way maintenance encompasses maintaining the roads and associated embankments in good repair and controlling vegetation. Vegetation control is described in more detail below. Debris and trash in the canals and drains are removed as needed.

The embankments of drains and canals require periodic maintenance. During sediment removal activities, silt is removed and deposited on the adjacent embankment and roadway. The embankments and associated roadways are later graded and groomed to blend the material into the embankment for the purpose of maintaining a surface that can accommodate vehicle traffic and equipment access. Grading also smoothes the embankment surface and removes rills that develop during rain storms, thus reducing the potential for erosion. IID maintains and operates five graders for maintaining embankments. The graders operate every day except when it rains and each grader can cover 3 miles per day. Thus, about 15 miles can be graded per day. Drain embankments are graded and groomed in association with drain maintenance activities that occur once every 5 years on average. The embankments of the main canals (e.g., East Highline, Westside Main, Central Main, and the AAC) are typically graded and groomed several times a year. The remaining canal embankments are graded and groomed once a year on average.

Other embankment maintenance activities include regular watering of the banks and roadways along the AAC, main and lateral canals, and drains with a water truck to minimize dust generation. Several segments of the main canals, including the AAC, are surrounded by chain link fencing. This fencing requires periodic repair and replacement and is considered part of right-of-way maintenance.

To maintain the canal and drain embankments, both within and outside the canal and drain prism, erosion problems need to be corrected. Erosion maintenance on the outside of the canal or drain occurs infrequently. Damage to the embankments from erosion is generally corrected during the embankment maintenance activities described above. Occasional intense storms can cause localized areas of erosion requiring immediate corrective actions; these are addressed as part of the emergency response activities. Erosion maintenance activities are limited to the rights-of-way of the canals or drains.

Along the portion of the AAC that traverses the Algodones Dunes, IID annually knocks down portions of the sand dunes, creating a flatter slope that allows sand to blow across the canal. In conducting this flattening, a dozer drags an I-beam back and forth across the peaks of the dunes to level them. The area where this activity is conducted begins at the Coachella Turnout (Sta. 1907+20) and extends to about Sidewinder Road at Pilot Knob (Sta. 1243+65), a distance of 12.56 miles. The area actually disturbed is about 50 to 75 feet wide yielding a total acreage disturbed of 76 to 114 acres. This operation begins in July every year and lasts about 6 weeks. In conjunction with flattening the dunes, the roadways along the AAC are cleared of accumulated sand. After the roads are opened up, they are immediately treated with herbicides for vegetation control. IID has been conducting these activities since the construction of the AAC in about 1945.

Erosion also can occur within drains or unlined canals. The erosion results from meandering channels of water from irrigation flow or drain water or stormwater runoff. Vegetation or sandbars can cause a change in water direction within a canal or drain and an associated erosion problem if not corrected by removal. Regular drain and canal maintenance activities (i.e., sediment removal and vegetation control) minimize the occurrence of erosion problems, and most erosion problems are corrected during regular maintenance. However, storm waters can result in embankment damage or loss that may necessitate the hauling and placement of fill material. This condition is addressed as part of the emergency response activities.

Right-of-way maintenance also consists of activities required for the maintenance and operation of power transmission facilities within the HCP area. These activities include regular inspection of facilities, clearing the power line rights-of-way, and repairing and replacing equipment as necessary. The power system within the HCP area is composed of nearly 3,000 miles of distribution and transmission lines and about 50 substations. The transmission and distribution lines exist in canal and drain rights-of-way and right-of-way maintenance for the drains and canals covers right-of-way maintenance for the transmission lines.

Additional transmission lines could be developed as a result of efforts to implement water conservation measures. For example, tailwater pumpback facilities constructed by individual farmers could encourage the extension of power transmission lines to operate the pumps. Currently, tailwater pumps typically are operated by diesel engines. IID anticipates that the relatively high cost associated with extending transmission lines will continue to discourage this practice in the Imperial Valley and that the installation of transmission lines to serve pumpback facilities will be infrequent. Further, any extension of transmission lines likely will occur in farmland along existing canal or drain rights-of-way.

Seepage Maintenance

Gophers or vegetation can cause leaks in the canal banks, although this occurs infrequently. Leaks also can be caused by earthquakes or seal breakage on a canal from cleaning. Activities to correct seepage problems are similar in each case. The embankment is cored, clay is mixed with the existing material, and the mixture is re-compacted. Seepage maintenance activities are focused on unlined canals and limited to the canal's right-of-way. On average, seepage maintenance activities are conducted on 5 to 10 miles of canal a year. Over the term of the permit, seepage maintenance activities could be conducted on all of the unlined canals (537 miles) at least once.

Structure Maintenance

In addition to the canals, about 20,000 structures within the canals and drains are required to convey water throughout the IID service area. These structures include, but are not limited to, delivery gates, checks, headings, turnouts, moss pipes, weep pipes, drainage sumps, irrigation pumps, numerous types of bridges, lifting devices, and flow measurement devices. O&M activities required for these structures include inspection, adjustments, and periodic or emergency repairs and replacement. IID estimates that about 200 structures need to be replaced each year, but historically fewer structures have been replaced. In the future, 300 structures could require replacement each year as the infrastructure ages. Activities associated with the repair and replacement of structures are conducted within the rights-of-way. Ground disturbance to replace structures on laterals is generally limited to a 75 by 75-foot area. On main canals, any ground disturbance generally occurs within a 150 by 150-foot area. If all of the structures are replaced during the term of the permit up to 2,970 acres could be temporarily disturbed.

There are 25 sites in and around cities and towns in the Imperial Valley that currently have trash screens on irrigation and drainage channel facilities. The screens typically exist at road siphons and pipeline entrances. The purpose of the screens is primarily for safety, but they also result in an accumulation of trash. These trash screens require frequent cleaning of debris to prevent water backup and inundation of tile lines in drains and possible minor flooding on adjacent properties where canals are involved.

Pipeline Maintenance

Portions of the conveyance (Figure 2.3-5) and drainage systems are contained in pipelines. Maintenance activities consist of maintaining the pipeline right-of-way and around the manholes that provide access to the pipelines clear of deep-rooted vegetation. Vegetation also is maintained at a height that allows visual access. Drain pipelines primarily occur in farm fields while conveyance system pipelines occur through developed areas. Thus, little vegetation control is necessary. In addition, the pipelines are periodically inspected, repaired, and replaced as necessary. Any activities are generally limited to the 40 feet wide right-of-way of the pipeline. It is anticipated that all pipelines will be replaced once during the 75-year permit term.

Reservoir Maintenance

The IID conveyance system contains 10 regulating reservoirs (Figure 2.3-5). Regulating reservoirs capture spills from a water delivery/conveyance facility and are used to match delivery flows with demand flows. The same types of maintenance activities required for canals are conducted at reservoirs. Vegetation is controlled around the reservoir using chemical methods. Infrequently riprap needs to be replaced or amended to maintain the structural integrity of the embankments. Also, the concrete lining of the reservoirs occasionally but infrequently requires repair or replacement. The reservoir embankments are graded, groomed, and stabilized, as necessary in the same manner as described under Right-of-way Maintenance. Embankment maintenance along reservoirs occurs about once every 5 years. On very rare occasions (e.g., once every 25 years), a reservoir may be drained and the sediment removed. Sediment from the reservoir is deposited and graded along canals. Chain link fencing surrounds the reservoirs and requires periodic repair and replacement. Automated reservoirs with control houses require frequent visitation by maintenance personnel to ensure proper operation.

Sediment Removal from Canals and Drains

The greatest single maintenance expense for IID is the removal of sediment from its canal and drainage systems, with the drainage system receiving the most attention. This is a mechanical process that requires the use of hydraulic excavators or small backhoes to remove the material. Dredged spoil is deposited along the side of the canal or drain, where it is allowed to dry before being groomed into the embankment by a dozer or grader. Drains are cleaned on an as-needed basis, depending on the extent of vegetative growth or sediment accumulation. Drains with the flattest bottom slope accumulate sediment most rapidly, and may require cleaning annually. Other drain segments may not require cleaning for periods of 10 years or more. On average, IID cleans approximately 300 miles of drains annually, but the amount varies from year to year. The drain embankments and road surface along the drain are re-contoured, graded, and groomed in association with drain cleaning or in emergency situations (e.g., bank sloughing during a storm) as described under Right-of-Way Maintenance.

Operation and Maintenance of the Desilting Basins

Colorado River water diverted at Imperial Dam immediately passes into one of three desilting basins used to remove silt and to clarify the water. Each of the desilting basins is 540 feet wide by 770 feet long and is equipped with 72 scrapers designed to remove 70,000 tons of silt per day. Silt removed at the facility is returned to the Colorado River downstream of Imperial Dam. Periodic maintenance of desilting basins requires dewatering of individual basins to performed repairs and routine maintenance.

Weed Control Maintenance

As noted above, maintenance of the canals, drains and various structures typically involves vegetation control. IID uses mechanical, chemical, and biological methods to control vegetation. To a lesser extent, IID occasionally uses controlled burning as a means to improve visibility of the drain channel during drain maintenance, improve the performance of herbicides, and to remove accumulations of dried plant material that impede the flow of water through the drain. These methods and their application to IID's facilities are described below.

Mechanical methods of vegetation control are used in canals. Canals accumulate moss and algae that must be removed periodically because it impedes water flow within the channel and at structures. In concrete-lined canal sections, moss carts and chains are pulled along the canal to remove algae and moss that develop on the bottom and sides of the canal. A backhoe follows and removes the vegetation collected by the moss cart. Moss carts are used for concrete-lined laterals while chaining is used to clear moss and algae from main canals and unlined lateral canals. If very thick moss and algae has developed in unlined canals, discing may be necessary to remove the vegetation. Use of a moss cart requires dewatering the canal. Thus, vegetation removal with a moss cart occurs in conjunction with the regular dewatering for most canals. Chaining does not require dewatering. Vegetation is removed from all canals at least once a year. However, about 10 to 15 percent of the canals accumulate large amounts of moss and algae and require cleaning as frequently as every two weeks.

Mechanical and chemical methods are used to control vegetation in the drain and canal rights-of-way and around IID's other facilities such as hydroelectric facilities, drop structures on the New and Alamo rivers. Chaining, discing, and side scraping (moss cart) are used to control vegetation on embankments and around other facilities. An excavator is used to remove vegetation from the drains. Vegetation removal in the drains occurs in association with sediment removal activities described above. In removing vegetation from the drains, an excavator is operated from the top of the bank where it is used to scrape vegetation from the side and bottom of the channel. Along drains, extensive vegetation can develop on top of the drain banks and access roads, requiring a bulldozer to grade and gain access to the drain prior to maintenance.

Biological control methods are used for aquatic weeds, such as hydrilla, sago pondweed, and Eurasian watermilfoil. Grass carp feed on these plants and triploid sterile grass carp are raised at IID hatchery facilities and stocked in the canals for the purpose of controlling aquatic vegetation. The use of grass carp reduces the frequency of the other control methods. Fish hatchery O&M activities are described in Section 1.7.4.1, Fish Hatchery Operations and Maintenance.

Chemical methods also are used to control vegetation in the drains, canals, and on the drain and canal banks. Take of covered species from changes in the amount or composition of vegetation resulting from herbicide use is covered by this HCP, but any take of covered species resulting from toxicological effects of herbicide use is not covered by this HCP. Chemical control methods are carried out by third parties under contract with the District and by its own staff. On a monthly basis, the District's Pest Control Advisor instructs the contractor on where to conduct control activities and advises on the chemicals to use. Within the general area identified by the District's Pest Control Advisor, the applicator has the discretion to decide where to work, which is generally influenced by the extent of weed growth and local wind conditions.

The chemicals currently used to control vegetation are Roundup®, Direx®, and Rodeo®. Rodeo® is applied where contact with water may occur; Direx® is used for woody plants, particularly salt cedar. Direx® is not used in applications where contact with water could occur. Chemical control of vegetation on the banks of the canal is supplemented with mechanical removal, as necessary. Vegetation is sprayed during March through August, and occasionally into September. All herbicide applications are carried out under a permit from the Imperial County Agricultural Commissioner and are subject to its conditions. The chemicals are applied in accordance with label instructions. About 565 miles of outer drain embankments are sprayed with a mixture of Roundup® and Direx® a year. About 1,430 miles of the outside banks of canals and drains are treated with Roundup® a year and about 980 miles of canals and drains are treated with Rodeo®. Rodeo® is the only chemical control used on drains and canals on the state and federal refuges.

In addition to the weed control measures described, IID occasionally uses controlled burning as a method for controlling unwanted vegetation in the drains. Drain burning, which has been used on a limited basis by IID since the turn of the century, is performed to improve visibility of the drain channel, improve the effectiveness of herbicides, and to remove accumulations of plant material from the drains. IID obtains an annual burn permit from the Agricultural Commissioner and only burns on designated burn days.

During the mechanical removal of sediment, it is necessary for excavator operators to have visual contact with the bottom of the drain. Visual contact allows the operator to avoid excavations that remove too little or too much material from the drain. Under excavations (removal of too little sediment) are corrected by conducting an additional sweep of the excavator arm and removing more material from the site. This results in a duplication of effort and contributes to inefficient use of labor and equipment time. Over excavations (removal of too much sediment) result in a series of deep and shallow areas within the flow path of the drain. These undulations in the channel create disruptions in the flow that create or accelerate erosion processes within the channel. The uneven channel bed and disrupted flow encourages the channel to meander, which contributes to drain bank erosion. In addition, poor visibility increases the potential for the operator to inadvertently pull material directly from the banks. This results in a long-term instability of the channel and can cause erosion and bank failure problems that can take years to correct in some drains.

Controlled burning in the drains also is used to improve the effectiveness of herbicide applications. Tall, old, and established vegetation requires a heavier single application of herbicide or a greater number of lighter applications than young vegetation to achieve the desired level of control. Controlled burning in the drain removes decadent vegetation and encourages sprouting and regrowth. Herbicides applied on the young growth are assimilated into the plant more effectively and provide better control at lower application rates.

In addition to improving visibility and increasing the performance of herbicides, IID uses controlled burning in certain circumstances to remove accumulations of dried plant material that impede the flow of drain water. This practice occurs primarily in dense stands of *Phragmites* where plants on the drain bank collapse and accumulate in the channel.

IID uses controlled burning as a drain vegetation control practice on a limited basis and only under conditions where alternative techniques are not as effective. Currently, IID uses controlled burning on approximately 0.5 to 1.0 miles of drains per year (up to 75 miles over the term of the permit).

New and Alamo River Maintenance

In addition to the constructed drain system, the New and Alamo Rivers carry drain water to the Salton Sea. The District has no legal authority to regulate activities in these rivers. To control erosion of the river, the District constructed and maintains 20 drop structures on the rivers most of which are on the Alamo River. Maintenance activities for the drop structures consist of weed control on the banks around the structures. Mechanical and chemical control methods are used to treat about 0.5 acres every year (0.25 acre on each bank), affecting 10 acres a year. IID also conducts bank protection measures as necessary along the rivers. Bank protection activities focus on specific bank failures or areas of erosion. Typically an area about 100 feet wide and 500 feet long (i.e., about 1 acre) is disturbed in conducting bank protection activities.

IID periodically dredges the New and Alamo River channels from the United States Geological Survey gaging stations on each river to the rivers' outlets at the Salton Sea. Six to eight feet of dredge material typically are removed from the river channel during this operation. The dredge spoils are pushed into deeper water in the Salton Sea creating a submerged river channel. Through this process, the channels of the New and Alamo Rivers have been extended about 1.75 and 2.5 miles into the Salton Sea, respectively. By moving the spoils into increasingly deeper water in the Salton Sea, the rate at which the channel fills with sediment and requires dredging is reduced. IID retains the vegetation on the riverbanks to minimize erosion; however, it is necessary to lay the vegetation (mostly *phragmites*) over on the banks with the dredging equipment in order to gain access. Dredging of the rivers' mouths occurs about once every four years. More frequently, areas around the gaging stations on the rivers are dredged. The area dredged extends from about 200 feet upstream of the gage to about 500 feet downstream of the gage. This dredging occurs about every two years on the New River and annually on the Alamo River. This dredging is currently conducted in the late summer or fall to avoid impacts to Yuma clapper rails.

Salton Sea Dike Maintenance

IID maintains about 20 miles of dikes along portions of the southern end of the Salton Sea to prevent inundation of lands as the Salton Sea rose. Most of the maintenance required for the dikes consists of pulling riprap that has shifted down back into place on the dike bank. This activity is conducted along the dikes at least once a year and sometimes three or four times a year in certain locations. Other maintenance activities include repairing sections damaged in storms, filling in and replacing riprap, and grading and grooming the embankments and road surfaces on the embankments. These activities are either conducted from the road surface along the dike or from the water immediately adjacent to the dike.

Gravel and Rock Quarrying

IID owns and operates two small rock and gravel mining operations to support its maintenance activities. The two quarries, Red Hill and Pumice Island, are located on the south shore of the Salton Sea. The quarries are barren and do not support vegetation. Each quarry occupies approximately 160 acres and was acquired by IID in the late 1930s from the Southern Pacific Railroad Company. They have been operated as quarries since that time. IID quarries rock and gravel from these areas on an as-needed basis for riprap and road construction and surfacing throughout IID's service area as part of maintenance and for emergency repairs.

1.7.4 Miscellaneous IID Activities

IID also conducts activities that do not fall within the categories previously described. These activities include the following:

- Fish hatchery O&M
- Recreational facilities
- Wetland creation projects
- Management of existing habitat for covered species
- Experimental projects
- Use of IID land
- Hydroelectric power generation facilities
- Emergency response activities
- HCP and project EIR/EIS mitigation measures
- Responses to changed and unforeseen circumstances

1.7.4.1 Fish Hatchery Operations and Maintenance

As described earlier, grass carp are stocked in the canal and drain systems to control aquatic weeds. The District operates a hatchery in El Centro and grow-out facilities in Niland to produce grass carp. On average the hatchery produces 20,000 stockable grass carp per year. As of January 1998, more than 200,000 fish had been stocked into the canal system. The District's goal is to stock 20,000 to 25,000 fish a year.

The hatchery operates under a Memorandum of Understanding (MOU) with the California Department of Fish and Game (CDFG). Under this MOU, the hatchery must meet specific requirements, including maintaining a security chain linked fence around the facilities, maintaining high/low water level alarms, and maintaining bird netting over the ponds and filtering of discharge water to minimize the potential for fish to escape. The MOU also prohibits stocking of grass carp in drains that support desert pupfish because of the potential for introducing parasites or diseases, direct competition, and interference behavior.

O&M activities include cleaning and disinfecting the ponds and pipelines, controlling weed growth around the ponds, flushing the ponds and pipelines, spawning the fish, transporting fry to grow-out ponds, and rearing and stocking the fish. Sterile triploid grass carp are produced for release to prevent establishment of a breeding population in the canals. Before release, every fish produced is given a blood test to confirm that it is triploid, and therefore sterile. Diploid grass carp, which are fertile, are destroyed after spawning.

1.7.4.2 Recreational Facilities

Five of the 10 regulating reservoirs and the canal system within IID's service area are open to recreational use. Fishing and bird watching are the primary recreational uses supported by the reservoirs. IID does not conduct any activities specifically to support recreation at the reservoirs and canals.

The District owns and maintains recreational facilities at Fig Lagoon, an approximately 80-acre pond created by IID. Maintenance activities at Fig Lagoon include dredging at the mouth of the drain inlet to the lagoon from Fig Drain. About every 60 days an area 30 feet wide, 4 feet deep and 600 feet long is dredged to maintain water flow from Fig Drain into the lagoon. Developed facilities at Fig Lagoon currently consist of several picnic tables, an information kiosk, and a latrine. The area is used for fishing, bird watching, and picnicking.

In addition to Fig Lagoon, IID owns and operates three recreational vehicle (RV) parks at Salton Sea Beach, Corvina Beach, and Bombay Beach. IID dredges at these RV parks about every 60 days to maintain boat access to the Salton Sea. IID also conducts dredging at the Red Hill Marina on request although the District does not own the marina. IID dredges at Red Hill Marina about every other year.

No additional recreational facilities are planned at this time, but could be pursued by IID during the permit term. Any additional recreational facilities developed by IID and covered by this HCP would be restricted to features developed to support fishing, wildlife viewing, picnicking, walking/jogging, bicycling and related activities at IID facilities. Construction of recreational facilities is a covered activity under this HCP, but take that could result from use of the facilities by third parties is not covered.

1.7.4.3 Use of IID Land by Lessees

The IID currently owns approximately 118,000 acres of land within the HCP/Salton Sea area. Approximately 6,600 acres are located in the irrigated portion of the service area and are not contiguous to the Salton Sea. The Salton Sea currently inundates about 105,000 acres and another 6,100 acres are contiguous to and surround the Salton Sea. IID leases its farmable lands to farmers engaged in the production of agricultural products and to federal and state wildlife agencies for wildlife management. IID seeks coverage under this HCP for whatever incidental take may be attributed to it as the lessor of the land. IID is not seeking coverage for activities conducted by lessees on IID land, except those activities directly related to the water conservation program described elsewhere in this HCP.

The acreages of land leased for these uses are shown in Table 1.7-5.

TABLE 1.7-5
Types of leases and approximate acreages of lands leased by IID to third parties in the HCP area

Type of Lease	Approximate Acreage
Agricultural	1,167
Recreational areas/facilities	7,278
Duck club	371
Wildlife management	4,857
Geothermal[a]	29,325
Archeological excavation	100
Telecommunication facilities	8 facilities
Other (e.g., storage sites, plants, dumps)	1,347

[a] Subsurface lease

1.7.4.4 Use of IID Land by IID

For the term of the permit, IID may convert land that it owns to a new use. As long as the new use is a covered activity, any incidental take of covered species resulting from changed land uses or land management activities will be covered.

1.7.4.5 Hydroelectric Power Generation Facilities

IID operates eight hydroelectric generation facilities on the canal system. Six of these facilities are located on the AAC, one on the Westside Main Canal, and one on the East Highline Canal (Figure 1.7-1). These hydroelectric generation facilities are situated on the canals and occupy a relatively small area. Maintenance activities include vegetation control on the facility grounds, removing debris from the trash racks upstream of the facilities, and occasional stabilization of the canal banks immediately downstream of the facilities.

1.7.4.6 Emergency Response

Emergency activities are actions that IID must take immediately and unpredictably to repair or prevent damage to its facilities in order to prevent property damage or protect human health and safety. Emergencies are situations under which IID cannot follow the normal procedures detailed under each of the conservation strategies (Chapter 3) to correct or prevent damage to property or risk to human health or safety. Emergency activities are most frequently required to respond to storm events or natural disaster (e.g., earthquakes) that result in damage to IID facilities (e.g. canal wash out, plugged siphon) and interrupt the distribution or collection of water. Actions required by IID in emergency situations will vary depending on the specific circumstances but typically include removing debris, hauling fill material, removing sediment, moving large amounts of earth, dewatering a canal section, repairing embankments, replacing/repairing damaged structures, and replacing rip rap.

1.7.4.7 HCP and Environmental Mitigation Measures

Any incidental take of covered species that results from activities associated with the implementation of the mitigation measures and monitoring program associated with the HCP, the Environmental Impact Report and Environmental Impact Statement (EIR/EIS) for the IID Water Conservation and Transfer project, the Program EIR for the QSA, and any other environmental assessment related to the covered activities are covered under this HCP. This includes mitigation and monitoring activities implemented by qualified third parties on behalf of IID.

1.8 Regulatory Context

1.8.1 Federal Endangered Species Act

The ESA, as amended, is administered by the Secretaries of the Interior and Commerce through the USFWS and the National Marine Fisheries Service[1] (NMFS), respectively. Species listed as endangered or threatened under the ESA are provided protection from federal actions that would jeopardize the species' continued existence or destroy or adversely modify critical habitat for the species.

[1] No species under the jurisdiction of NMFS are covered by this HCP.

Under Section 4 of the ESA, the USFWS must designate critical habitat for federally listed species, concurrent with listing that species, to the maximum extent prudent and determinable. The ESA requires designation of critical habitat for listed species to be based on those physical or biological features that are essential for the conservation of the species and according to the best scientific and commercial data available. As defined in the ESA, conservation means the use of all methods and procedures that are necessary to bring any listed species to the point at which the measures provided pursuant to the ESA are no longer needed. Critical habitat is protected under Section 7 of the ESA with regard to actions carried out, authorized, or funded by a federal agency. Federal agencies must ensure that their actions are not likely to result in the destruction or adverse modification of critical habitat.

Section 9 of the ESA and accompanying federal regulations prohibit the taking of fish and wildlife species listed as threatened or endangered by nonfederal agencies and private companies and individuals. As defined in the ESA, taking means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or to attempt to engage in such conduct." By regulation, the USFWS has defined harm as an act, "which actually kills or injures," listed wildlife; harm may include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

Section 9 of the ESA also offers limited protection for federally listed plants. Under Section 9, it is unlawful for any person, "subject to the jurisdiction of the United States," to "remove and reduce to possession, . . .maliciously damage . . . or destroy," any such plant species from areas under federal jurisdiction (such as national forests and park lands). It also is unlawful under Section 9 for any such person to "remove, cut, dig up, or damage or destroy any such species" on any other area "in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law." Under Section 9 of the ESA, therefore, plants are protected from these types of takings on private lands to the extent these species are protected under state law.

In recognition that take cannot always be avoided, Section 10(a) of the ESA includes provisions that allow for takings by nonfederal entities that are incidental to, but not the purpose of, otherwise lawful activities. Similar provisions are found in Section 7 for actions by federal agencies. Under Section 10(a), the USFWS is authorized to issue ITPs. Applicants for such permits must submit habitat conservation plans that specify the following:

- Impact(s) that will likely result from the taking
- Measures the applicant will take to minimize and mitigate the impacts
- Source of funding available to implement the measures
- Alternatives to the taking and the reason the alternatives were not chosen
- Any other measures considered by the Secretary of the Interior (i.e., USFWS) as necessary or appropriate for minimizing or mitigating the impacts of the taking

Upon review of a completed application and HCP, the USFWS must find all of the following before an ITP can be issued:

- Taking will be incidental to an otherwise lawful activity.
- Applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking.
- Applicant will ensure that adequate funding for the conservation plan and procedures to deal with unforeseen circumstances will be provided.
- Taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.
- Applicant will ensure that other measures (if any) required by the approving agency will be met.
- Approving agency is assured that the conservation plan will be implemented.

Because issuance of an ITP is a federal action, the USFWS must comply with the consultation requirements of Section 7 of the ESA, the public review provisions of the ESA, and the environmental analysis and public review requirements of the National Environmental Policy Act of 1969 (NEPA), as amended.

Although phrased in terms of criteria for issuance of an ITP, Section 10(a)(1)(B) also was intended by Congress to authorize the USFWS to approve HCPs for unlisted as well as listed species. Moreover, if an HCP treats an unlisted species as if it were already listed, additional mitigation will not be required within the area covered by the HCP upon the listing of that species. As stated by the Conference Committee when Section 10 was added to the ESA in 1982:

"The committee intends that the Secretary [of the Interior] may utilize this provision to approve conservation plans which provide long-term commitments regarding the conservation of listed as well as unlisted species and long-term assurances to the proponent of the conservation plan that the terms of the plan will be adhered to and that further mitigation requirements will only be imposed in accordance with the terms of the plan. In the event that an unlisted species addressed in an approved conservation plan is subsequently listed pursuant to the Act, no further mitigation requirements should be imposed if the conservation plan addressed the conservation of the species and its habitat as if the species were listed pursuant to the Act (House of Representatives Conference Report No. 97-835, 97th Congress, 2d Session, p. 30)."

The No Surprises policy adopted by the U.S. Department of the Interior provides that landowners who have habitat for listed species on their property and agree to an HCP under the ESA will not be subject to later demands for more land, water or financial commitment if the HCP is adhered to, even if the needs of the species change over time (63 Fed. Reg. 8859).

1.8.2 Bald Eagle and Golden Eagle Protection Act

The Bald Eagle and Golden Eagle Protection Act (BEPA) explicitly protects the bald eagle and golden eagle and imposes its own prohibition on any taking of these species. As defined in the BEPA, take means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb. Current USFWS policy is not to refer the incidental take of bald eagles for prosecution under the Bald Eagle and Golden Eagle Protection Act (USFWS 1996).

For golden eagles, the ITP would serve as a Special Purpose Permit should golden eagles become listed in the future (USFWS 1996).

1.8.3 Migratory Bird Treaty Act

The Migratory Bird Treaty Act makes it unlawful to pursue, hunt, capture, kill, or possess or attempt to do the same to any migratory bird or part, nest, or egg of such bird listed in wildlife protection treaties between the U.S. and Great Britain, United Mexican States, Japan, and the Union of Soviet States. As with the federal ESA, the act also authorizes the Secretary of the Interior to issue permits for take. The procedures for securing such permits are found in Title 50 of the Code of Federal Regulations (CFR), together with a list of the migratory birds covered by the act. The USFWS has determined that an ITP issued under Section 10 of the ESA also constitutes a Special Purpose Permit under 50 CFR 21.27 for migratory birds that are listed under the ESA. For unlisted migratory bird species, the ITP would serve as a Special Purpose Permit should a covered species become listed in the future. The USFWS has determined that take of listed migratory bird species allowed under an ITP will not be in violation of the Migratory Bird Treaty Act of 1918 (USFWS 1996).

1.8.4 National Environmental Policy Act

NEPA, as amended, requires the analysis and full public disclosure of the potential environmental impacts of a proposed federal action. The issuance of an ITP under Section 10(a) by the USFWS constitutes a federal action that requires NEPA compliance. The EIR/EIS for the IID Water Conservation and Transfer Project addresses the effects of issuance of an ITP to IID and fulfills the NEPA requirements associated with this federal action.

1.8.5 Salton Sea Restoration Project

Congress passed Public Law (PL) 102-575 in 1992. The law directs the Secretary of the Interior to "conduct a research project for the development of a method or combination of methods to reduce and control salinity, provide endangered species habitat, enhance fisheries, and protect human recreational values ... in the area of the Salton Sea." The Salton Sea Reclamation Act of 1998 (Public Law [PL] 105-372), developed in response to these conditions, directs the Secretary to do the following:

> *...complete all studies, including, but not limited to environmental and other reviews, of the feasibility and benefit-cost of various options that permit the continued use of the Salton Sea as a reservoir for irrigation drainage and: (i) reduce and stabilize the overall salinity of the Salton Sea; (ii) stabilize the surface elevation of the Salton Sea; (iii) reclaim, in the long term, healthy fish and wildlife resources and their habitats; and (iv) enhance the potential for recreational uses and economic development of the Salton Sea.*

The purpose and need for the Salton Sea Restoration Project is to maintain and restore ecological and socioeconomic values of the Salton Sea to the local and regional human community and to the biological resources dependent upon the Sea. These requirements are reflected in the directives of PL 105-372. The project is intended to have ecological, recreational, and economic benefits.

Prior to implementing the NEPA/CEQA process, the Salton Sea Authority and the Bureau of Reclamation, working jointly with stakeholders and members of the public, developed five goal statements. The goal statements are consistent with the direction contained in PL 105-372, address the underlying purpose and need for the project, and provide guidance for developing project alternatives. The five goals of the Salton Sea Restoration Project are as follows:

1. Maintain the Sea as a repository of agricultural drainage.
2. Provide a safe, productive environment at the Sea for resident and migratory birds and endangered species.
3. Restore recreational uses at the Sea.
4. Maintain a viable sport fishery at the Sea.
5. Enhance the Sea to provide economic development opportunities.

To implement the directive provided in PL 105-372, the Salton Sea Authority, as the lead California agency under CEQA, and Reclamation, as the lead Federal agency under NEPA, released a Draft EIS/EIR in January 2000, that evaluated alternative methods of restoring the Salton Sea. A revised Draft EIS/EIR that includes different alternatives and revised modeling and impact analysis is now being prepared.

1.8.6 California Endangered Species Act

The CESA is part of the California Fish and Game Code (Code). As a guide to state agencies, Section 2053 of the Code states that, " . . . it is the policy of the state that state agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives consistent with conserving the species or its habitat which would prevent jeopardy." The CESA also states, however, that such reasonable and prudent measures must at the same time maintain the project purpose to the greatest extent possible.

Section 2080 of the CESA prohibits import, export, take, possession, purchase, or sale of listed plant and animal species except as otherwise provided in other provisions of the CESA or the Code. The state restrictions under CESA on take differ from those under the ESA in how take is defined. For CESA, take is defined to mean, "hunt, pursue, capture, or kill or attempt the same." Noticeably absent from this definition are certain types of takings prohibited under Section 9 of the ESA (i.e., to harm or harass a listed species). Accordingly, Section 2080 of CESA prohibits the direct take of listed species except as otherwise provided under CESA or the Code, including the Native Plant Protection Act. Take of state-listed species may be authorized under CESA Section 2081. As specifically regards plants, Section 2080 of CESA prohibits the direct take of listed species except as otherwise provided under CESA or the Code, including the Native Plant Protection Act (commencing with Section 1900 of the Code).

1.8.6.1 Section 2081

Under Section 2081(b), the Department may authorize, by permit, the take of state-listed endangered species, threatened species, and candidate species if all of the following conditions are met:

(a) The take is incidental to an otherwise lawful activity.

(b) The impacts of the authorized take are minimized and fully mitigated. The measures required to meet this obligation must be roughly proportional in extent to the impact of the authorized taking on the species. Where various measures are available to meet this obligation, the measures required shall maintain the applicant's objectives to the greatest extent possible. All required measures shall be capable of successful implementation.

(c) The permit is consistent with any Departmental regulations.

(d) The applicant must ensure adequate funding to implement the minimization and mitigation measures, and for monitoring compliance with, and effectiveness of, those measures.

(e) The permit will not jeopardize the continued existence of the species.

The Department will make this determination based on the best scientific and other information that is reasonably available, and shall include consideration of the species' capability to survive and reproduce, and any adverse impacts of the taking on those abilities in light of known population trends; known threats to the species; and reasonably foreseeable impacts on the species from other related projects and activities.

IID is seeking incidental take authorization under Section 2081 for take of state listed and unlisted species (Table 1.5-1) that could occur as a result of O&M activities and activities associated with the water conservation and transfers in the Imperial Valley, Salton Sea and along the AAC. This scope of take authorization is the same as would be authorized by the USFWS under the federal ESA. In addition, IID is seeking authorization under Section 2081 for incidental take of state-listed species that inhabit the LCR and could be affected by the change in the point of diversion of water conserved by IID and transferred to SDCWA or MWD. Appendix F contains the information and analyses necessary for the Department to issue the incidental take permit

1.8.7 California Environmental Quality Act

Similar to NEPA, the CEQA requires state agencies empowered to make discretionary permitting decisions to evaluate the environmental effects of a proposed project. Issuance of a 2081(b) permit constitutes a state action requiring compliance with CEQA. The EIR/EIS for the IID Water Conservation and Transfer project addresses the effects of issuance of a 2081(b) permit to IID and fulfills the CEQA requirements associated with this state action.

1.8.8 California Native Plant Protection Act

The California Native Plant Protection Act (NPPA) includes measures to preserve, protect, and enhance rare and endangered native plants in addition to those provided under CESA. The definitions of rare and endangered in the NPPA differ from those in the CESA, but the list of protected native plants encompasses federal ESA candidate, threatened, and endangered species. The act also includes its own restrictions on take, stating that, "[n]o person shall import into this state, or take, possess, or sell within this state," any rare or endangered native plant, except as provided in the NPPA. The exception is where landowners have been notified of the presence of protected plants by CDFG; they are required to notify CDFG at least 10 days in advance of changing land uses to allow CDFG an opportunity to salvage the plants.

1.8.9 California Fully Protected Species Statutes

Several proposed Covered Species are subject to the provisions of the fully protected species statutes in the California Fish Game Code. The fully protected species statute prohibits the "take" (as defined in the Fish and Game Code) of fully protected species and does not currently include a mechanism for authorizing take of fully protected species. The fully protected species in the HCP area are listed in Table 1.5-1.