United States Fish and Wildlife Service
Environmental Action Statement

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA), and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record and determined that the action of converting the existing agricultural fields (85 acres) to native riparian habitat on the Imperial National Wildlife Refuge (NWR):

Check One:

_____ is a categorical exclusion as provided by 516 DM Chapter 8 [*specify CE category and include text of the citation*]. No further NEPA documentation will therefore be made.

__✓__ is found not to have significant environmental effects as determined by the attached environmental assessment and finding of no significant impact.

_____ is found to have significant effects and, therefore, further consideration of this action will require a notice of intent to be published in the Federal Register announcing the decision to prepare an EIS.

_____ is not approved because of unacceptable environmental damage, or violation of Fish and Wildlife Service mandates, policy, regulations, or procedures.

_____ is an emergency action within the context of 40 CFR 1506.11. Only those actions necessary to control the immediate impacts of the emergency will be taken. Other related actions remain subject to NEPA review.

Other supporting documents:

Finding of No Significant Impact and Environmental Assessment for the Agricultural Program at Imperial National Wildlife Refuge

Signature Approval:

[signature]	12-16-2010	[signature]	12-23-10
(1) Originator	Date	(2) Environmental Coordinator, R2 NWRS	Date
[signature] Acting	12/23/10	[signature] Acting	12/23/10
(3) Regional Chief, R2 NWRS	Date	(4) Regional Director	Date

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR AGRICULTURAL MANAGEMENT PROGRAM AT IMPERIAL NATIONAL WILDLIFE REFUGE YUMA COUNTY, ARIZONA, AND IMPERIAL COUNTY, CALIFORNIA

The U.S. Fish and Wildlife Service is proposing to convert the existing 85 acres of agricultural fields to native riparian habitat. An Environmental Assessment (EA) was prepared in compliance with the National Environmental Policy Act (NEPA) to provide decision-making framework that 1) explores a reasonable range of alternatives to meet project objectives, 2) evaluates potential issues and impacts to the refuge, resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts. The EA evaluated the effects associated with three alternatives.

Alternatives Considered and Analyzed

Alternative A – No Action (Current Management)
Under this alternative, the Refuge would continue to grow ryegrass and saltgrass on 85 acres within the 300-acre Farm Unit at the south boundary of the Refuge. These fields have high salinity levels, and the grass aid soil salt remediation while providing browse to migrating waterfowl, songbirds, and other wildlife. Under an agreement with the Bureau of Reclamation established in November 2006, native habitat restoration through the Multi-Species Conservation Program is planned for 33 acres of the existing grass fields. When this restoration begins, the Refuge would continue the current management on the remaining 52 acres of grass fields. The Refuge would also continue to manage the 123 acres of established moist-soil units, including marsh habitats, as part of this alternative.

Alternative B – Replacement of all Existing Grass Fields with Riparian Vegetation (Proposed Action)
This alternative entails converting the existing 85 acres of agricultural fields to native riparian habitat over the long-term. Management of existing moist-soil units and the 33 acres scheduled for restoration through the Bureau of Reclamation will remain the same as Alternative A. After preparing sites for revegetation, the 52-acre area currently planted in grass will be planted mechanically or by hand in cottonwood, willow, and mesquite. This action will improve the mosaic of habitats distributed across the Refuge landscape, providing much-needed habitat for wildlife with benefits that are expected to be far-reaching. Although species that prefer agricultural fields will be negatively impacted, the proposed action will result in benefits to riparian-dependent special status species.

Alternative C – Conversion of a Portion of Existing Agricultural Fields to Riparian Vegetation
Under this alternative, the Refuge would convert 39 acres of existing agricultural fields to riparian vegetation. Restoration methods would be the same as those described under Alternative B. Management of the remaining grass fields and existing moist-soil units would continue as described in Alternative A. This alternative would continue to provide some benefits to migrating waterfowl, songbirds, and other wildlife that use grass fields, while also providing minor benefits to the special status species that depend on native riparian vegetation for survival. Beneficial impacts for both suites of birds are expected to be less than Alternative A or B due to the small amount of acreage in both types.

Proposed Action

Alternative B, replacement of all existing grass fields with riparian vegetation, was selected because it best satisfies the purpose and need for the project and the establishment purpose of the Refuge. Although Alternatives A and C provide food and habitat for wildlife, the proposed action will result in creation of

much-needed riparian habitat along the lower Colorado River where native habitat is limited. This action is expected to improve the mosaic of habitat distributed across the landscape and the lower Colorado River ecosystem while benefiting special status species occurring on the Refuge.

Detailed descriptions and range of effects for all alternatives can be found in Section 2.0 and 4.0 of the EA respectively.

Summary of Effects

Implementation of the Agency's decision would be expected to result in the following environmental, physical, and social and economic effects. Site preparation may include leaching through irrigation regimes, addition of soil amenities, planting of indicator species, and chemical treatments. These actions may result in minor negative effects to air quality, water quality, and soils, in the short-term. As trees become established and riparian forests mature in the long-term, the need for chemical use and maintenance will decrease. Therefore, negative effects to air quality, water quality, and soils will cease. As soil disturbance and salts are reduced, this conversion from farming to native habitat will ultimately improve soils in the long-term thereby creating beneficial moderate impacts.

With native riparian habitat being very limited along the lower Colorado River, the conversion of agricultural acres to riparian will provide much-needed habitat for wildlife. Although this action will reduce habitat and food for species that prefer agricultural fields, the limited size and quality of the existing agricultural program provides minor benefits to species that still have the opportunity to use nearby agricultural lands to meet their needs. Cibola NWR is approximately 30 miles upstream and has a successful agricultural program that provides for wildlife preferring that habitat type. Therefore, planting of cottonwood-willow woodlands will result in moderate long-term beneficial impacts to habitat by improving the mosaic of habitats distributed across the larger landscape of the Lower Colorado River Valley and enhancing riparian habitat used by wildlife and special status species in particular.

Riparian-dependent species such as the Yellow-billed cuckoo, the Southwestern willow flycatcher, and a diversity of migratory and native bird will also benefit from the proposed action. Providing additional habitat for these species will assist in their recovery in the long-term. The alternative, therefore, is expected to result in moderate long-term beneficial impacts to wildlife over a large scale. In addition, newly established native habitat will result in a positive aesthetic value to the visual resources on the Refuge. These benefits may then result in an increase in the number of birdwatchers visiting the Refuge. The economic and social benefits, therefore, will be slightly higher than the existing management.

The proposal is not expected to have any effects on wetlands and floodplains, pursuant to Executive Orders 11990 and 11988, because the project area does not contain jurisdictional wetlands or floodplains. No cultural resource concerns were identified because all farming and restoration activities will occur on lands that were previously disturbed by farming. With the creation of additional riparian habitat, threatened and endangered species that prefer riparian habitats could potentially benefit, but will have no adverse effect. This includes the Yellow-billed cuckoo (candidate species) and Southwestern willow flycatcher (listed as endangered).

The proposal is not expected to have any significant effects on the human environment because: (1) this proposal is compatible with the general Service policy regarding invasive species management on National Wildlife Refuges; (2) this proposal is compatible with the purposes for which Imperial NWR was established; (3) this proposal does not initiate widespread controversy or litigation; and (4) there are no conflicts with local, regional, state, or federal plans or policies.

Public Review

The proposal has been thoroughly coordinated with all interested and/or affected parties, including the

general public, Service staff biologists, and the immediate neighbors adjacent to the site. The FWS has encouraged public participation throughout the NEPA process during which the public had two opportunities to comment on this project: once during initial project scoping and again following the release of the Draft EA. On July 1, 2010, the Service released a News Release to 16 media outlets and posted a public notice soliciting comments on the Refuge's farming program. The Service also sent a letter soliciting feedback on all of the farming programs on refuges in the region to 263 interested parties. A two-month scoping period was established, which ceased on August 31, 2010. Two comments were received as a result of public scoping, and the Service incorporated those comments into the EA.

The Draft EA was released for a 30-day public review period, which ended December 5, 2010. Copies of the Draft EA were provided at Imperial National Wildlife Refuge Headquarters and online at the National Wildlife Refuge System Southwest Region Division of Planning website. The Refuge received one comment from the Arizona Department of Environmental Quality informing the Refuge of their intent to enforce a new permitting program regarding pesticide use. When this regulation is formalized, the Refuge will follow the new permitting process as appropriate. In addition, ADEQ suggested best management practices for mitigating nonpoint source pollution, which the Refuge already implements.

Determination

Based upon a review and evaluation of the information contained in the EA as well as other documents and actions of record affiliated with this proposal, the Service has determined that the proposal to control hogs on the refuge does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of section 102 (2) (c) of the National Environmental Policy Act of 1969 (as amended). As such, an environmental impact statement is not required. An environmental assessment has been prepared in support of this finding and is available upon request to the U.S. Fish and Wildlife Service facility identified above.

Acting Regional Director

12/23/10
Date

Environmental Assessment

Imperial National Wildlife Refuge
Agricultural Program

December 15, 2010

Prepared by

Refuge Staff
Imperial National Wildlife Refuge
Yuma, Arizona

&

National Wildlife Refuge System
Southwest Region
Division of Planning
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Table of Contents

1.0 PURPOSE OF AND NEED FOR PROPOSED ACTION ALTERNATIVE

1.1 Introduction

The United States Fish and Wildlife Service (Service) is proposing to continue agricultural practices conducted by Refuge staff for the benefit of wildlife on the Imperial National Wildlife Refuge (NWR) within the Southwest Arizona National Wildlife Refuge Complex. This Environmental Assessment (EA) is being prepared to evaluate the effects associated with this proposal and complies with the National Environmental Policy Act (NEPA) in accordance with Council on Environmental Quality regulations (40 CFR 1500-1509) and Department of the Interior (516 DM 8) and Service (550 FW 3) policies (see Section 1.7 for a list of additional regulations that this EA complies with). NEPA requires examination of the effects of proposed actions on the natural and human environment. In the following chapters, three alternatives are described and environmental consequences of each alternative are analyzed.

1.2 Location

Imperial NWR consists of approximately 25,125 acres in both Yuma County, Arizona, and Imperial County, California. The Refuge is located approximately 30 miles north of Yuma, Arizona. Refuge lands encompass nearly 30 miles of the main stream of the lower Colorado River, backwaters and sloughs adjacent to the river, uplands, and higher desert terrain. Imperial NWR is one of four refuges that occur within the Lower Colorado River Valley, which is a subdivision of the Sonoran Desert (Figure 1).

1.3 Background

As demonstrated throughout history, the lower Colorado River basin plays a defining and central role for desert and riparian ecosystems in western Arizona and eastern California. Modern technological development beginning in the early 1900s quickly began altering the River basin's natural flows, thereby changing the natural ecosystem and affecting many of the wildlife species that depended on this desert oasis. The construction of dams has produced many significant issues for both wildlife and human ecology. Since the 1930s, natural resource values, especially riparian habitat, have been consistently declining along the lower Colorado River.

The development of refuges on the Lower Colorado River followed hydrological changes resulting from federal water projects, primarily large dams like Hoover (Boulder), Parker, and Imperial. The permanent water harnessed behind Parker and Imperial dams was identified as potential habitat for birds and fish and provided a cornerstone for both Havasu and Imperial NWRs. Therefore, Imperial NWR was created through Executive Order 8685 by President Franklin D. Roosevelt on February 14, 1941. The purpose for establishing Imperial NWR was to provide "a refuge and breeding ground for migratory birds and other wildlife… for purposes of Colorado River Storage Project…"

The Refuge is currently 25,125 acres, however when first created, the Refuge was 46,792 acres. Land withdrawals over the years have reduced the size of the Refuge by nearly half (46%). The largest withdrawal was in 1968, when 17,617 acres of Refuge lands were transferred to the Bureau of Land Management (BLM) per Public Land Order 4367. These lands were withdrawn to provide additional recreational opportunities on public lands.

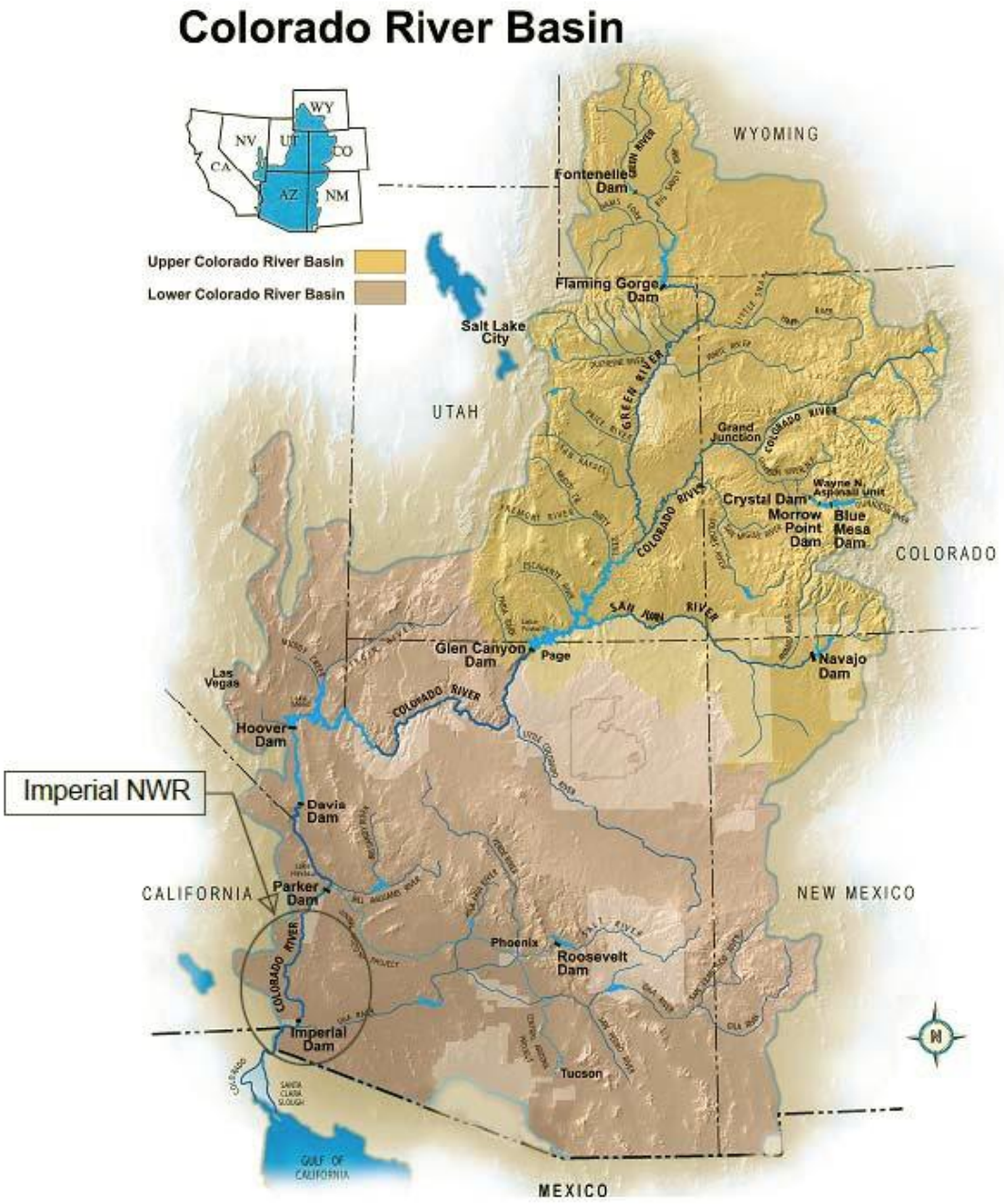

Figure 1. Colorado River Basin. The Imperial Dam is shown near Arizona's U.S.-Mexico border.

When Imperial NWR was first established, providing habitat for migratory birds was the primary management goal. As Service oversight continued for Imperial NWR, changing conditions on and around the lower Colorado River resulted in a reduced wintering and migrating population on and throughout the Refuge.

Water entitlements for Imperial NWR were formally granted in 1964 as part of a larger lawsuit between Arizona and California. Based on the Supreme Court Decree, Section II, Item D7 states: "*The Imperial National Wildlife Refuge in annual quantities reasonably necessary to fulfill the purposes of the Refuge not to exceed (i) 28,000 acre feet of water diverted from the* [LCR] *mainstream or (ii) 23,000 acre feet of consumptive use of mainstream water, whichever of (i) or (ii) is less, with a priority date of February 14, 1941"* (date the Refuge was created). Per the Decree, consumptive use is defined as "… *diversions from the steam less such return flow thereto as is available for consumptive use …*", or simply stated, diversions less returns.

Recognizing the need to determine objectives for the Refuge, determine strategies to best accomplish management objectives, and properly utilize their newly allocated water rights, the Refuge developed the Imperial NWR Master Plan in 1969. At the time of the Master Plan, the Refuge contained a 300-acre "Martinez Farm" unit where winter barley was planted by refuge staff for geese. As these plantings required water, the Refuge started using a portion of their water entitlements beginning in 1966 (350 acre-feet annually). Objectives for priority management at that time consisted of providing goose wintering habitat as well as duck migrating and wintering habitat in combination with supporting rare and endangered species, dove production and feeding, and providing waterfowl hunting opportunities.

In 1983, the Parker Dam exceeded 40,000 cubic feet per second (cfs) outflow, which is nearly four times the average flow. This caused flooding along the river and damaged Refuge infrastructures including water conveyance systems such as irrigation ditches and water control structures. The agricultural fields were flooded during this event and standing water remained for an unknown duration of time. Refuge water records show no water use from 1984 through 1988, supporting the theory that agricultural fields were out of service during this timeframe.

USFWS goals and objectives for Imperial NWR have changed over time as the result of many factors including environmental legislation, progressive science, improved knowledge of habitat success, response to site conditions, and others. As technology facilitated increased irrigation and capabilities, the Refuge was able to progress in their habitat management techniques. They began conducting restoration efforts in 1993 by planting native willows and cottonwood poles in the 3-acre Refuge nursery.

Shortly thereafter, in 1994, the four national wildlife refuges along the lower Colorado River (Havasu, Bill Williams River, Cibola, and Imperial) developed a 20-year Comprehensive Management Plan (CMP) in accordance with Service policy. This document guides overall management of the refuges.

The Lower CMP identified the following goals for these four refuges:

1. In cooperation with other resource management agencies, to restore and maintain the natural diversity of the Colorado River Area of Ecological Concern, especially on refuge lands.
2. To achieve threatened and endangered species recovery and to strengthen the role of the lower Colorado River national wildlife refuges in the recovery of all applicable endangered species, threatened species, all candidate species, and all species of concern to the States of California and Arizona.
3. In cooperation with the Service Fisheries Resource Office, and other state and federal agencies with joint jurisdiction to restore, enhance, and protect fish ecosystems on the lower Colorado River refuges.
4. To improve ongoing refuge management programs that enhance migratory waterfowl populations and health on each of the four River refuges and other jurisdictions within the Area of Ecological Concern.
5. To achieve protection and enhancement of existing wetland areas on the four river refuges and rehabilitation of former wetlands where possible.
6. In cooperation with the Bureau of Reclamation (BR) and the lower basin states, to enhance use of Colorado River water by the refuges, protect existing Refuge water rights holding in the Area of Ecological Concern, and obtain additional rights when possible without adversely affecting other entitlement holders in the lower basin states.
7. In cooperation with the BR and the Army Corps of Engineers, improve the efficiency of water delivery systems and more effectively gauge water use for the ultimate benefit and enhancements to habitat and wildlife.
8. In cooperation with the BR, revegetate substantial amounts of habitat with native mixes of vegetation leading to biological diversity.
9. To improve overall refuge water quality and protect refuge waters from all contamination.
10. To ensure that only compatible and appropriate activities occur on the lower Colorado River national wildlife refuges, and to regulate, as provided by law, all activities, uses, and practices on and off the refuges that are potentially harmful to refuge resources.
11. To clarify each of the Colorado River refuges' jurisdictional authorities as they relate to any concurrent or related authorities vested in other Federal, state, local, and Native American governments with natural resource interests within the Area of Ecological Concern; to ensure refuge boundary integrity relative to adjacent lands; and when the opportunities, funding, and rationale are present, to acquire additional lands to further protect fish and wildlife resources.
12. To reduce levels of non-wildlife-oriented recreation on the River channel that runs through the lower Colorado River refuges, eliminate all non-wildlife-oriented recreation that is not compatible, increase the quality experience related to natural values by all River visitors, and raise public awareness of the lower Colorado River ecosystem values.
13. To establish a formal program for public outreach, identify important public resources, and improve educational and interpretive programs for refuge habitat, wildlife, and cultural resources.

14. To achieve optimum levels of wildlife observation, fishing, and hunting recreation opportunities where such use is legally compatible with the purposes of the refuges and the goals of the National Wildlife Refuge System.
15. To strengthen interagency and jurisdictional coordination of lower Colorado River issues, resulting in decisions benefiting fish and wildlife resources, while avoiding duplication of effort.
16. To strengthen Service working relationships with the various Native American governments situated along the lower Colorado River, resulting in decisions that benefit fish and wildlife resources.
17. To effect improvements to funding and staffing that will result in long lasting enhancements to habitat and wildlife resources in the Area of Ecological Concern and the lower Colorado River national wildlife refuges, leading to the achievement of the goals of this plan and the goals of the National Wildlife Refuge System.

Growing of wheat, ryegrass, millet, milo, and corn continued on the Refuge until 2004. At that time, negotiations for the Lower Colorado River Multi Species Conservation Program (MSCP) began. The MSCP is a multi-stakeholder Federal and non-Federal partnership responding to the need to balance the use of the LCR water resources and the conservation of native species and their habitats in compliance with the Endangered Species Act. The Bureau of Reclamation (BR) is responsible for implementing the MSCP, which extends from Lake Mead to the Southerly International Boundary with Mexico over the 50-year term of the program. In anticipation of habitat restoration efforts as part of this program, some agricultural fields were laid fallow. In 2006, as part of the MSCP, modifications were made to the Imperial Ponds so endangered fish could be stocked. As the ponds were dredged, material was added to agricultural fields to raise their elevation higher than the water table to improve the ability to grow vegetation. For additional information on the MSCP, please visit their website at http://www.lcrmscp.gov. In 2008, the Refuge resumed agricultural practices by planting ryegrass to stabilize soils on 85 acres. This acreage continues to be grown in grass, and 33 acres are scheduled to be restored to native riparian habitat through the MSCP.

To improve efficiencies and pool resources, the Southwest Arizona National Wildlife Refuge Complex was created in 2007. The Complex includes Imperial, Cibola, and Kofa NWRs.

Goals of Imperial NWR include the preservation, restoration, and creation of habitat for fish and wildlife species. The Refuge is legally entitled to divert and consume lower Colorado River water to fulfill the purpose and objectives of the Refuge. Water from the lower Colorado River can be diverted using pumps, wells, and gravity systems. To date, construction of water delivery and conveyance systems has been limited, largely used only in concert with habitat activities in the Martinez Lake and Riverbank Management Unit, hereafter referred to as the Farm Unit, where the agricultural fields are located.

Agricultural practices on the Imperial NWR are designed to fulfill one of the primary purposes for which the Refuge was established, which is to serve as a refuge and breeding ground for migratory birds and other wildlife. Now, Refuge staff continues to grow about 85 acres of salt tolerant grasses as a means of assisting with soil salt remediation as well as providing some browse for various species of wildlife.

1.4 Purpose of Action

The purpose of the proposed action is to produce food and habitat in adequate amounts and concentrations to fulfill the needs of migratory birds and resident wildlife for which the Refuge was established. The purpose of the EA is to determine the adequacy of the current agricultural practices in meeting the purpose of Imperial NWR and fulfilling the needs of migratory birds and resident wildlife. Additionally, the purpose of the EA is to remain consistent with current law, regulation, and policy (National Environmental Policy Act of 1969 and National Wildlife Refuge System Improvement Act of 1997).

1.5 Need for Action

There is a need to thoroughly evaluate the agriculture program, in conjunction with the purpose of the Refuge and current law, regulation, and policy, and to determine if the program is the most biologically efficient means of meeting our wildlife management objectives. In accordance with the Service's Biological Integrity policy, the Refuge and their agricultural activities must maintain and restore, where appropriate, the biological integrity, diversity, and environmental health of the National Wildlife Refuge System.

A goal within the CMP is "to improve ongoing refuge management programs that enhance migratory waterfowl populations and health on each of the four River refuges and other jurisdictions within the Area of Ecological Concern." Strategies to accomplish this on Imperial NWR include holding agricultural management acreage stable at 1993 levels, increasing moist-soil management, and making substantial improvements to the irrigation systems. Agricultural practices are also needed to reduce and maintain low soil salinities on the Refuge.

There is a need "to maintain the Refuge's existing acreage of marsh habitat in a condition suitable for Yuma clapper rails and other marsh and wading birds," "to provide high quality habitat for wintering waterfowl in a setting that will contribute to the overall health of individual waterfowl, thus benefiting the population," and "to provide high quality resting and feeding habitat for shorebirds using the Colorado River corridor during fall and spring migrations." A mosaic of habitats that more similarly resembles historic conditions is important for these species. As riparian habitat is limited, restoration of agricultural fields will improved habitat diversity.

1.6 Decision to be Made

This EA is an evaluation of the environmental impacts of the alternatives and provides information to help the Service fully consider these impacts and any proposed mitigation. Using the analysis in this EA, the Regional Director of the Southwest Region (Region 2 of the U.S. Fish and Wildlife Service) will decide which alternatives to implement and whether there would be any significant effects associated with the selected alternative that would require the preparation of an environmental impact statement. If no significant impacts are identified, a Finding of No Significant Impact (FONSI) will be prepared.

1.7 Regulatory Compliance

National wildlife refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS), the purposes of an individual refuge, Service policy, and laws and international treaties. Relevant guidance includes the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, Refuge Recreation Act of 1962, and selected portions of the Code of Federal Regulations and Fish and Wildlife Service Manual.

The mission of the Refuge System is:

"... to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Improvement Act of 1997, Public Law 105-57).

The goals of the Refuge System are to:

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered;
- develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges;
- conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts;
- provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); and
- foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

This EA was prepared by the Service and represents compliance with applicable Federal statutes, regulations, Executive Orders, and other compliance documents, including the following:

- Administrative Procedures Act (5 U.S.C. 551-559, 701-706, and 801-808) as Amended
- American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996)
- Antiquities Act of 1906 (16 U.S.C. 431-433
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Bald Eagle Protection Act (16 U.S.C. 668-668d) as amended
- Clean Air Act of 1972, as amended (42 U.S.C. 7401 *et seq.*)
- Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*)
- Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*)

- Executive Order 12898, Federal Action Alternatives to Address Environmental Justice in Minority Populations and Low Income Populations, 1994.
- Executive Order 13112, Invasive Species (issued in February 1999)
- Fish and Wildlife Coordination Act of 1958, as amended (16 U.S.C. 661 *et seq.*)
- Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421)
- Floodplain Management (Executive Order 11988)
- National Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee) as amended
- National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321 *et seq.*)
- Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500 *et seq*.)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 *et seq*.)
- National Pollutant Discharge Elimination System, as amended (33 U.S.C. 1251 *et seq.*)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 *et seq.*)
- Protection and Enhancement of the Cultural Environment (Executive Order 11593)
- Protection of Wetlands (Executive Order 11990)
- U.S. Fish and Wildlife Service Manual 601 FW 3, Biological Integrity, Diversity, and Environmental Health
- The Final Comprehensive Management Plan and Environmental Assessment for Lower Colorado River National Wildlife Refuges (1994).

Further, this EA reflects compliance with applicable State of Arizona and local regulations, statutes, policies, and standards for conserving the environment and environmental resources such as water and air quality, endangered plants and animals, and cultural resources.

1.8 Scoping/Public Involvement and Issues Identified

Scoping was initiated on July 1, 2010. The Refuge distributed a news release to 19 local media outlets including Yuma Business Direct, Yuma Sun, Western Agri-Radio Networks Inc., 12 radio stations, and 4 television news networks. The Refuge simultaneously posted a public notice that established a 30-day scoping period with a scheduled culmination date of August 1, 2010. The public notice was posted at Fisher's Landing, Martinez Lake Store, Yuma Public Library, and Foothills Public Library. The Service determined that additional time was necessary to involve the many interested parties in the EA process, and the public scoping period was extended through August 31, 2010. Public notices were reposted to reflect this change.

The Service also developed a scoping letter explaining all of the farming programs on the national wildlife refuges in the Southwest Region. On July 29, 2010, this letter was distributed to 263 potentially interested parties including federal, state, and local agencies; nearby irrigation districts; soil and water conservation districts; cooperative extension offices; volunteer groups; private landowners; local chambers of commerce; county commissioners; members of Congress; and U.S. Representatives. The letter solicited comments and included a brief description of all of the farming programs throughout the region, including the program on the Imperial NWR.

During the two-month scoping period (ending August 31, 2010), the Service received no response letters or emails from the local community that were considered as part of the analysis for Imperial NWR. Two letters were received in response to the regional scoping letter and were considered in development of the Imperial NWR Farming EA. One commenter recommended that all farming on national wildlife refuges should be conducted organically; no genetically modified crops should be used; focus should be on removal of invasive species such as Johnson grass, buffelgrass, salt cedar, etc.; and our first concern should be the health of wildlife. Another commenter, the Center for Food Safety, requested that the Southwest Arizona NWR Complex continue its current ban on genetically engineered crops, issue a moratorium on the planting of such crops on the Refuge, and comply with federal laws by requiring completion of compatibility determinations, NEPA review, and an "essentiality" determination before planting of any said crops. The commenter expressed their view that genetically engineered crops harm wildlife and the ecosystem and expressed concern over the potential for herbicide-resistant crops to foster evolution of resistant weeds and increase use of pesticides.

The Draft EA was released for a 30-day public review period, which ended December 5, 2010. The Refuge distributed a news release to 19 local media outlets including Yuma Business Direct, Yuma Sun, Western Agri-Radio Networks Inc., 12 radio stations, and 4 television news. The Refuge also posted the news release at the Yuma Public Library, Martinez Lake store, and Fishers Landing store. Copies of the Draft EA were available at Imperial National Wildlife Refuge Headquarters, the Southwest Arizona National Wildlife Refuge Complex office, the Yuma Public Library, and online at the National Wildlife Refuge System Southwest Region Division of Planning website. The Refuge received one comment from the Arizona Department of Environmental Quality informing the Refuge of their intent to enforce a new permitting program regarding pesticide use. When this regulation is formalized, the Refuge will follow the new permitting process as appropriate. In addition, ADEQ suggested best management practices for mitigating nonpoint source pollution, which the Refuge already implements.

Internal scoping of refuge and regional office staff was also conducted to identify issues, concerns, and management opportunities. Based on internal and external scoping, the following issues were identified and considered in the development of the alternatives in Chapter 2 of this EA:

Use of Genetically Modified Crops

In accordance with the Service's Biological Integrity, Diversity, and Environmental Health policy (601 FW 3), the use of genetically modified crops (GMCs) is allowed on national wildlife refuges if their use is deemed essential to accomplishing the purpose of the refuge and the Regional Chief approves their use. Imperial NWR has never used GMCs in the past and has no intention to propose their use in the future. One member of the public stated that GMCs should not be used on any refuge, and the Center for Food Safety has requested that the Southwest Arizona NWR Complex issue a moratorium on all genetically engineered crop cultivation on the Refuge. Since the Refuge has made it explicitly clear that no GMCs will be used under any of the alternatives evaluated in this EA, no further discussion of this issue regarding Imperial NWR is necessary.

Use of Chemicals to Control Pests and/or Invasive Species

Chemicals are routinely used on refuges to assist with the management of invasive species as part of Integrated Pest Management (IPM). IPM is an approach to preventing, eliminating, and/or controlling pest species by using a variety and combination of management practices. Scientific information and best professional judgment is used to identify a combination of methods for effective management of pest species. There is concern that chemicals used as part of agricultural programs could adversely affect the physical, biological, or human environment. One commenter recommends that all farming on refuges should be done organically. Refuges only use chemicals that have been approved through the Pesticide Use Proposal (PUP) process. Habitat, Clearcast, Rodeo, and Lineage Clearstand are the pesticides that have been approved for use at Imperial NWR. This EA will include evaluation of the impacts of these chemicals on Imperial NWR.

Management Consideration/Alternatives

It is important to determine the management scheme that will best meet the biological needs of wildlife on a particular refuge. Therefore, the Refuge will evaluate whether the current management is the most biologically efficient way to meet the Refuge's management goals and objectives as well as the Refuge purpose and consider an appropriate range of alternatives including reducing and/or eliminating the farming program if other management tools will more effectively meet the purpose of the Refuge.

Water Rights

Water is often described as the "lifeblood" of the Refuge System, but it is also the lifeblood of agriculture, industry, energy production, and municipalities. This resource is vital to supporting management actions occurring on Refuge lands, especially along the lower Colorado River where water is limited. The Refuge is entitled to divert up to 28,000 acre-feet of water yearly and to consumptively use 23,000 acre-feet of water from the mainstream of the River. The water is used to fulfill purposes of the Refuge. As much of the Refuge is steep, rocky, desert mountains, use of water for management actions is limited. The topography and soils of the area also limit water use. The Refuge is determining the best use of water resources through their Water Management Plan (Draft, 2010) in an effort to achieve their conservation objectives. As part of this EA, the Refuge will consider the impacts that any change in proposed management could have on water rights.

2.0 ALTERNATIVES

Alternatives are different approaches designed to meet the purpose and need for the proposed action. NEPA requires federal agencies to consider a reasonable range of alternatives that meet the purpose and need for the proposed action. Based on the issues, concerns, and opportunities heard during the scoping process, the following alternatives were identified. Three management scenarios that could meet the purpose and need of the proposed action were identified and analyzed in detail in the EA. One other scenario/alternative was also considered but was found to be infeasible (does not meet the stated purpose and need); therefore, it was eliminated from detailed analysis for the reasons listed in Section 2.5.

2.1 Alternative A – No Action (Current Management)

Under the No Action Alternative, current management direction would continue. The 300-acre Farm Unit is located at the south boundary of the Refuge, just north of Martinez Lake. This management unit is closed to public use for the protection of wildlife and consists of 85 acres of grass, 123 acres of moist-soil units, 39 acres of endangered fish ponds, and 53 acres of cottonwood/willow/mesquite riparian fields. On the grass fields (85 acres), the Refuge would continue to grow ryegrass and saltgrass. The fields have high salinity levels and the grasses will help with soil salt remediation and provide browse to migrating waterfowl, songbirds, and other wildlife.

Current management of the 85-acre grass unit involves regular irrigation and periodic mowing to maintain quality food for wildlife and reduce salinities in soils. All growing practices would continue to be conducted by Service personnel. Under an agreement with BR established in November 2006, native riparian habitat restoration through the MSCP is scheduled to occur on 33 acres of the existing grass fields.

The Refuge would continue to manage the 123 acres of established moist-soil units, which include marsh habitats, through daily water manipulation. Maintenance of these units may involve mowing, disking, chemical application to reduce invasive species, and prescribed burning. All prescribed burning would occur according to the Refuge's Fire Management Plan; in addition, the Refuge would prepare a Prescribed Burn Plan for each potential burn project. These actions occur to maintain desirable habitat conditions.

The Refuge would continue to employ Integrated Pest Management practices to control plant pests. Some chemical herbicides would be used to control weeds, but chemical application would be limited to prevent harm to non-target plants, water quality, and wildlife. A variety of cultivation practices such as mowing weeds before flowering occurs and severing weed roots by disking fields with large concentrations of weeds would continue to be used where possible, to control weeds with reduced chemical inputs. All chemical use would continue as a last resort when mechanical and other control methods (such as water level manipulation) are ineffective. Service policy requires that only minimal amounts of chemicals are used on refuge lands, and these chemicals must be approved through the PUP process.

Those chemicals approved through the PUP process for use on the Farm Unit include Habitat, Clearcast, Lineage Clearstand, and Rodeo. Clearcast is used on grasslands to treat invasive *phragmites*, which outcompete planted grasses. Grass fields are also treated with Lineage Clearstand to control invasive species such as Johnson grass and salt cedar. These species outcompete native and desirable species and lower the quality of the available habitat, which can deter native and migratory species from using the habitat. Rodeo is used to treat invasive and nuisance plants such as Bermuda grass, cattail, cocklebur, five hook bassia, giant salvinia, hemp sesbania, Johnson grass, phragmites, and salt cedar, that degrade habitats. Rodeo is applied in close proximity to irrigation ditches to reduce invasive plants whose roots can damage water conveyance structures by cracking and clogging ditches, which weakens structures and greatly reduces efficiency of water delivery.

The agricultural program would continue to support the Refuge purposes by providing forage for wildlife and by contributing to a diversity of habitat types. Refuge grass fields supplement natural foods and provide undisturbed areas where wintering waterfowl and other resident and migratory wildlife can rest and forage. Although the area is closed to the public, it is within view of an observation tower. Wildlife that concentrate in the fields can provide enhanced viewing opportunities for the public.

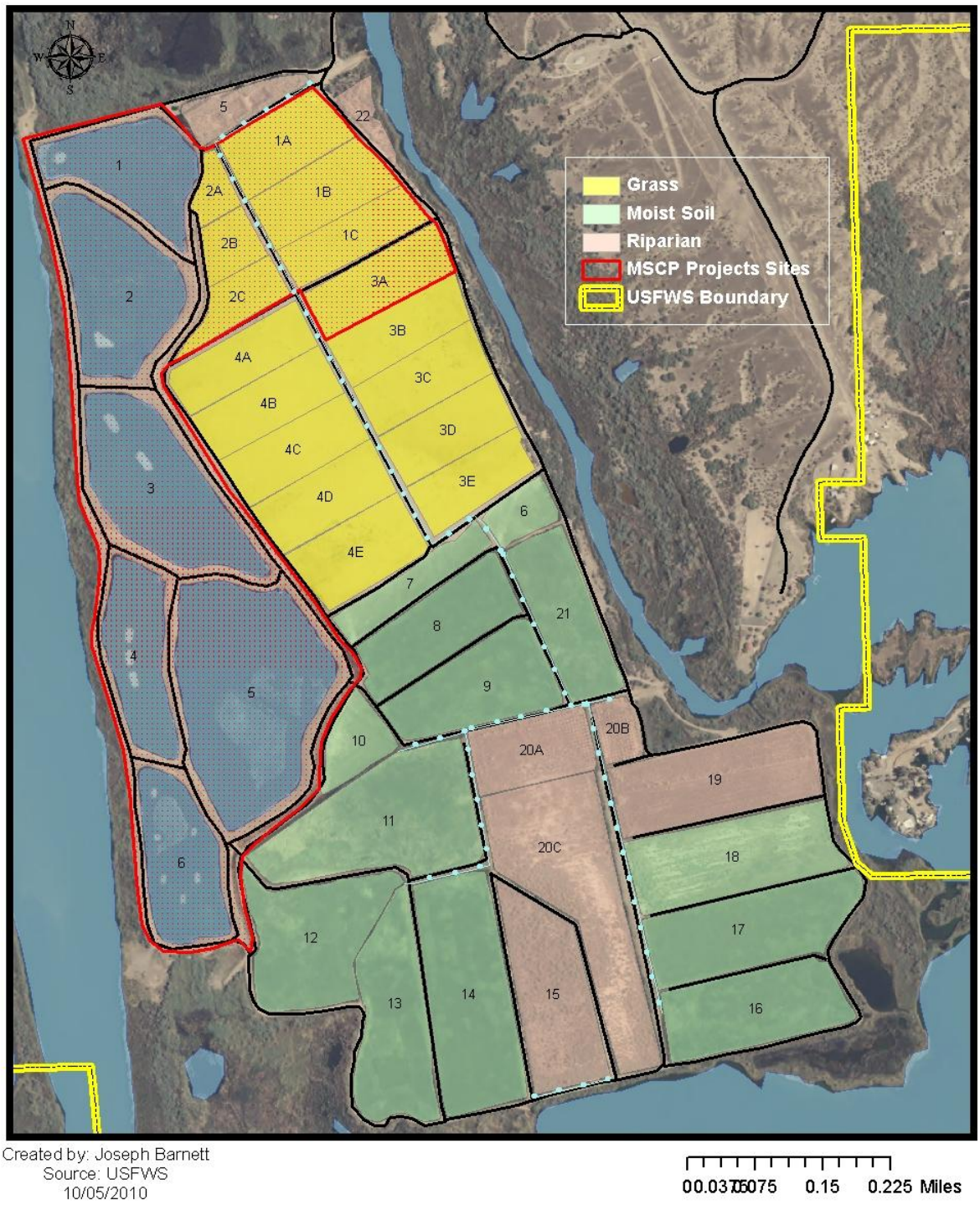

Figure 2. Imperial Management Unit of Imperial NWR, approximately 300 acres total.

2.2 Alternative B — Replacement of all Existing Grass Fields with Riparian Vegetation (Proposed Action)

Under this alternative, which is the proposed action, the Refuge would convert the existing agricultural fields (85 acres) to native riparian habitat over the long-term. Management of existing moist-soil units would remain the same as Alternative A.

Prior to restoration activities, soil salinities and nutrients would be monitored. A variety of practices would be undertaken to prepare sites for revegetation. These include leaching through various irrigation regimes, addition of soil amenities such as organic matter, fertilizers, and planting of indicator species to determine best locations for planting of particular tree species. Site preparation could also include limited use of chemicals to treat invasive and nuisance species.

After soil conditions are optimal for cottonwood and willow plantings, these trees along with mesquite would be planted. Trees would be planted mechanically or by hand over time. Depending on availability, seedlings will most likely be used. Tree stock may be planted from genetics found on the Refuge. Initially, it is anticipated that the Refuge would apply fertilizer to enhance growth and survival. Limited pesticide use would continue around edges of newly restored areas to control invasive species. Only pesticides approved through the PUP process would be used. Pesticide use is expected to be reduced as trees mature. Irrigation would continue in newly planted areas as described under Alternative A. Mature riparian forests would only require seasonal irrigation.

2.3 Alternative C — Conversion of a Portion of Existing Agricultural Fields to Riparian Vegetation

Under this alternative, the Refuge would convert 39 acres of existing agricultural fields to riparian vegetation. Restoration methods would be the same as those described under Alternative B. Management of the remaining grass fields and existing moist-soil units would continue as described in Alternative A.

2.4 Comparison of Alternative

Issue	**Alternative A** **No Action (Current Management)**	**Alternative B** **Replacement of All Existing Grass Fields with Riparian Vegetation (Proposed Action)**	**Alternative C** **Conversion of a Portion of Existing Agricultural Fields to Riparian Vegetation**
Use of Genetically Modified Crops	No GMCs would be used.	Same as Alternative A.	Same as Alternative A.
Use of Chemicals to Control Pests and/or Invasive Species	Only pesticides approved through the Pesticide Use Proposal (PUP) process would be used. This would include the continued use of Habitat, Clearcast, Lineage Clearstand, and Rodeo to control invasive species.	Same as Alternative A.	Same as Alternative A.
Management Considerations	85 acres grown in salt tolerant grass species; 33 acres are scheduled to be restored to native riparian habitat through the MSCP; maintain 123 acres of moist-soil units	Convert all existing grass fields (85 acres) to native riparian vegetation; maintain 123 acres of moist-soil units	Same as Alternative A plus convert 39 acres of grass fields to native riparian habitat; maintain 123 acres of moist-soil units
Water Rights	Use of water rights would not change.	It is anticipated that there may be a net increase in water use of a few hundred acre-feet under this alternative, which will require a minimal overall increase in water use. The Refuge will, however, remain within their existing entitlement.	Same as Alternative B

2.5 Alternatives Considered But Dismissed From Detailed Analysis:

The Refuge considered adding some additional cultivated fields to their current program. However, due to a high water table and high salinities, many fields have low potential for agriculture. Additionally, the lands potentially available for cultivation are currently managed as moist soil units. Some fields currently managed as moist soil units would be only marginally productive, and riparian and marsh habitats would be in short supply under this alternative. Therefore, this alternative was eliminated from further analysis.

Converting to organic farming was an alternative the Refuge considered but determined unfeasible. This action would be labor intensive and expensive as mechanical treatments to control invasive and nuisance species would need to be increased. The quality of the agricultural program would likely decrease as yields decrease; thereby producing less food for wildlife. In addition, the Refuge does not currently have adequate staff and funds to implement organic farming. The invasive species that occur on the Refuge are so persistent and prevalent that chemicals, though only used as a last resort, have been found to be the most effective means of control.

3.0 AFFECTED ENVIRONMENT

This section provides a description of the affected resources determined to be applicable to the range of alternatives. Imperial NWR encompasses 25,125 acres adjacent to and including about 30 river miles on the lower Colorado River. The Refuge is located within the Lower Colorado River Valley, which is a subdivision of the Sonoran Desert. The valley surrounds the lower Colorado River in parts of Arizona, California, Utah, and Colorado, and is the largest, hottest, and driest subdivision. It challenges the Mohave Desert's Death Valley as the hottest and driest place in North America. In this desert environment, the habitat within Imperial NWR plays a vital role in providing wildlife with a green forest oasis for breeding, resting, feeding, and shade.

3.1 Physical Environment

Refuge land is comprised of a large river meandering through an undulating desert terrain. In general, the river and floodplain sit 200-500 feet lower than the surrounding ground. The geography is mostly broad, flat valleys with widely scattered, small mountain ranges of mostly barren rock. The valleys are dominated by drought-tolerant low shrubs that can withstand summer highs in excess of 120 degrees Fahrenheit and surface temperatures approaching 180 degrees Fahrenheit. Precipitation in the area averages about 3 inches annually coming as late summer and winter rains.

Much of Imperial NWR contains steep, desert mountains, which limits the use of Refuge lands for some conservation objectives. Due to topographic features and limited ability to access water, most active management occurs in flat areas near the Colorado River where water can be pumped and irrigation systems used.

3.1.1 Air Quality

The project area has a moderate to good air quality rating, Carbon Monoxide and Nitrogen Oxide rating is unhealthy for sensitive groups.

3.1.2 Soils / Geology

According to data collected by the Refuge and the U.S.D.A. National Resources Conservation Service (NRCS), soils in the lower elevations near the river consist predominately of sands and loamy sands whereas coarse materials dominate in higher elevations. Soils in the floodplain areas, where most habitat improvements are expected to occur, are a combination of coarse to fine alluvium deposited by the river with some influence from adjacent washes. Areas near and downstream of the washes will likely contain some of the coarsest materials and may be best suited for riparian habitat. The soils within the Imperial Management Unit are classified as Lagunita loamy sand by the NRCS; these soils are typical in flood plains, alluvial fans, terraces, and drainageways. The soils on lands nearest to the immediate project area consist of Ligurta-Cristobal complex (2-6 percent slopes) and those typical of marshes or wetlands.

3.1.3 Water Resources and Quality:

Water entitlements for use at Imperial NWR were formally granted in 1964, based on the Supreme Court Decree, Section II, Item D7, stating: "*The Imperial National Wildlife Refuge in annual quantities reasonably necessary to fulfill the purposes of the Refuge not to exceed (i) 28,000 acre feet of water diverted from the* [LCR] *mainstream or (ii) 23,000 acre feet of consumptive use of mainstream water, whichever of (i) or (ii) is less, with a priority date of February 14, 1941"* (date the refuge was created). Per the Decree, consumptive use is defined as "*… diversions from the steam less such return flow thereto as is available for consumptive use …*", or simply stated, diversions less returns. Marginal amounts of water (1-2% of the Refuge's entitlement) were used by the Refuge until 1990 when water consumption increased substantially. Current records of consumptive use show marginal use of approximately 6-8% of Imperial NWR's entitlement.

In the arid southwest, water has always been scarce, and a rapidly increasing human population has heightened the importance of this limited resource. The primary water supply for the local region is the Colorado River and its tributaries, starting hundreds of miles to the north. Precipitation and snowmelt from tributaries accumulate in the river, and this runoff is controlled through a series of dams on the main stem. Flows in the lower Colorado River are normally predictable because water is released in accordance with set operational parameters and downstream demands. Changes in flow are seasonal, ranging from approximately 10,000 cubic feet per second (cfs) during the winter to 14,000 cfs in the spring/summer. Flows are normally dependent on irrigation and energy demands, with the highest flows (and river surface elevations) typical in summer months.

The Sonoran Desert, especially toward the southern portion of the region, experiences two rainy seasons per year, in the winter and late summer, while the more northerly Mojave Desert has only winter rains. Average yearly rainfall in the area is approximately 3 inches, with annual evaporation of approximately 70 inches. According to California Department of Water Resources, data from the closest CIMIS weather station indicates evaporation of approximately 9 inches per month from May through August. 1

Salinity of lower Colorado River water is relatively high. Salinity measured in 2008 ranged from approximately 600 mg/l to 780 mg/l total dissolved solids (TDS). High salinity is due to evaporation and return flows to the river from irrigation.

Groundwater is prevalent in coarse soils found near the river, and is available for use by the Refuge for habitat improvements. Currently, the Refuge has two (2) operational water wells, and relies on groundwater for habitat operations. Groundwater elevations fluctuate near river elevations.

3.2 Biological Environment

3.2.1 Vegetative Communities:

The physical environments near the agricultural lands on Imperial NWR are some of the hottest and driest in North America. The valleys are dominated by low shrubs, primarily creosote bush and white bursage. These are the two most drought-tolerant plants in North America, but, in the driest areas of this subdivision, even they are restricted to drainage courses. Trees such as ironwood, mesquite, paloverde, are found only in larger washes. The mountains support a wider variety of shrubs and cacti, but the density is very sparse. Columnar cacti, one of the indicators of the Sonoran Desert, are rare (virtually absent in California) and restricted to drainages. Annual species comprise well over half the flora (90% at the direst sites); they are mostly winter-growing species and appear in numbers only in wet years. For the majority of species, life in the valley is centered around the lower Colorado River, the lifeblood of the region.

Land cover types include woody riparian, marshland, Sonoran desert scrub, river, and backwater cover types. The habitat types that occur throughout woody riparian land cover types on the Refuge include cottonwood-willow, salt cedar, honey mesquite, salt cedar-honey mesquite, salt cedar – screwbean mesquite, arrowweed, and atriplex. The cottonwood-willow forests are a point of concern for the Refuge, as these habitat types are disappearing from the floodplain and are associated with declines in riparian obligate passerines as well as decreases in species richness and abundance. Other priority natural plant communities include mesquite forests and Sonoran Desert washes and canyons.

3.2.2 Wildlife:

Wildlife present in the project area is typical of the Lower Colorado River ecosystem. Due to the southerly location of the Refuge, it is primarily a wintering area and stopover point for migratory birds. Ducks, geese, shorebirds, and other waterbirds flock to the lower Colorado River each year to spend the winter. Over 275 species of birds have been observed on Imperial NWR. The riparian and upland vegetation along the river provides a migratory corridor for neotropical migrants. Common birds include egrets, herons, flycatchers, and seasonal raptors, waterfowl, and shorebirds. The Refuge also provides important habitat for marsh birds. In the desert, wildlife such as black-tailed jackrabbits and western whiptail lizards are plentiful. Desert bighorn sheep, coyotes, and bobcats can also be found on the Refuge.

3.2.3 Threatened and Endangered Species and Other Special Status Species

Federally listed threatened and endangered species that occur on the Refuge include the Yuma clapper rail, Southwestern willow flycatcher, bonytail chub, razorback sucker, and Mohave Desert tortoise. A number of state-listed, candidate species and species of conservation concern expand the list to include the California black rail, Arizona Bell's vireo, Yellow-billed cuckoo, Gila woodpecker, and elf owl.

3.3 Human Environment

3.3.1 Cultural Resources

Given that the project area is within the flood plain of the Colorado River, much of the ground surface has historically been flooded and reworked, making the location of archeological sites an infrequent occurrence. This is especially true in terms of long-term habitation/village sites, which would normally be expected in an area with a record of continuous occupation of at least a thousand years (as is true of the Colorado River Valley). Indeed, perhaps more than any other region of the Southwest, the native tradition of the lower Colorado River is defined almost entirely through modern ethnography and historic accounts rather than by evidence of prehistoric archeology.

More relevant in defining the value of the cultural resources within the Colorado River Valley is the recognition that a cultural continuum exists between the prehistoric and modern Native American presence on the river. Although the millennia-old systems of subsistence and settlement no longer exist, it is important to note that many traditional practices survived quite late into the historic era, and that Native American communities on the river continue to regard national wildlife refuge lands with a profound reverence for religious and ancestral values.

All of the alternatives involve farming on previously farmed lands or reducing the amount of previously farmed lands. Therefore, it is not expected that cultural resources, including Indian trust assets, will be affected by the actions outlined in this EA.

3.3.2 Socioeconomic Resources

The Refuge is located 30 miles north of Yuma, Arizona, which has a population of about1 95,000. Several other small towns are also within 30 to 90 miles away. The predominate land uses in the Refuge vicinity are irrigated farming, mining, and military operations. The Refuge is tied to the local economy largely through the public's use of the Refuge for recreational opportunities. The Colorado River that runs through the Refuge is popular for a variety of non-wildlife dependent recreational activities such as boating. The Refuge provides opportunities for hunting, fishing, wildlife observation, photography, environmental education, and interpretation. Minimal opportunities for wildlife-dependent recreation exist in the project area because the Farm Unit is closed to the public. The Refuge contributes to the local economy through purchases in addition to employees purchasing homes and living in nearby areas.

3.3.4 Visual Resources:

While the Colorado River and river valley are the most notable natural features and by themselves provide a visual resource, natural views are limited within the project area. The cottonwood-willow forests that once dominated the landscape have been depleted due to woodcutting during the steamboat era, clearing for agriculture, wild fire, exotic plant invasions including that by salt cedar, the use of dams for flood prevention, and habitat alteration from upstream dams. None of the alternatives analyzed in this EA involve new construction activities and is not expected to affect visual resources.

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter analyzes and discusses the potential environmental effects or consequences that can reasonably expected by the implementation of the alternatives described in Chapter 2.0 of this EA. An analysis of the effects of management actions has been conducted on the physical environment (air quality, water quality, and soils); biological environment (vegetation, wildlife, and threatened and endangered species); and socioeconomic environment (socioeconomic features including public use/recreation and visual and aesthetic resource). It has been determined that the current management and its alternatives will not have impacts on climate, hydrology, geology, mineral resources, cultural resources, and visual resources; therefore, there will be no further discussion of these resources in the analysis. Potential impacts to all other resources are addressed below.

The direct, indirect, and cumulative impacts of each alternative are considered in the Environmental Assessment.

- **Direct effects** are the impacts that would be caused by the alternative at the same time and place as the action.
- **Indirect effects** are impacts that occur later in time or distance from the triggering action.
- **Cumulative effects** are incremental impacts resulting from other past, present, and reasonably foreseeable future actions, including those taken by federal and non-federal agencies, as well as undertaken by private individuals. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time.

The Refuge also considered various types of impacts during the Environmental Assessment. These include beneficial and adverse impacts.

- **Beneficial impacts** are those resulting from management actions that maintain or enhance the quality and/or quantity of identified refuge resources or recreational opportunities.
- **Adverse impacts** are those resulting from management actions that degrade the quality and/or quantity of identified refuge resources and recreational opportunities.

The Environmental Assessment also evaluates the reasonably expected duration of each impacts, whether short-term or long-term.

- **Short-term impacts** affect identified refuge resources or recreational opportunities and occur during implementation of the project but last no longer.
- **Long-term impacts** affect identified refuge resources or recreation opportunities and occur during implementation of the management action and are expected to persist in the 1-5 years following implementation.

Lastly, the Refuge considered the intensity of impact when evaluating the alternatives presented in the Environmental Assessment.

- **Negligible impacts** result from management actions that cannot be reasonably expected to affect identified refuge resources or recreational opportunities at the identified scale.

- **Minor impacts** result from a specified management action that can be reasonably expected to have detectable though limited effect on identified refuge resources or recreation opportunities at the identified scale.
- **Moderate impacts** result from a specified management action that can be reasonably expected to have apparent and detectable effects on identified refuge resources or recreation opportunities at the identified scale.
- **Major impacts** result from a specified management action that can be reasonably expected to have readily apparent and substantial effects on identified refuge resources and recreation opportunities at the identified scale.

Scale of impact is an additional consideration evaluated in this EA. Geographic scale can refer to effects at the site-specific level, local level, or Refuge-wide.

- **Site-specific** effects are those impacts that occur solely within the project area agricultural lands.
- **Local** effects are those impacts that can be reasonably expected to have detectable effects within and immediately surrounding the project area agricultural lands.
- **Refuge-wide** effects are those impacts that can be reasonably expected to have noticeable effects across the entire Refuge landscape.

4.1 Physical Environment

4.1.1 Impacts on Air Quality:

Alternative A – No Action (Current Management)
The use of machinery and chemicals to control invasive flora may result in increased emissions, dust, particulates, and spray drift that could have an indirect effect on air quality. To minimize the potential for spray drift, Refuge staff implements best management practices by only treating fields with chemical herbicides when wind speeds are below 10 miles per hour. In addition to these effects, prescribed burning used to maintain the 123 acres of marsh units may result in minor short-term adverse impacts to air quality due to smoke produced by burning vegetation. In the marsh habitat, smoke would dissipate shortly after ignition. All burning would occur under the conditions outlined in the Prescribed Burn Plan, which will more specifically address air quality for any particular burn. Therefore, the current management would continue to result in minor, short-term, localized negative effects.

Alternative B –Riparian Vegetation (Proposed Action)
The impacts will be the same as Alternative A in the short-term. In the long-term, when trees are established, chemical use will decrease thereby reducing any negative effects to air quality.

Alternative C – Grasses and Riparian Vegetation
The effects would be similar to Alternative A. Chemical use would be lower than Alternative A but higher than Alternative B.

4.1.2 Impacts on Water Quality and Quantity

Alternative A—No Action (Current Management)
The use of chemical herbicides in agricultural operations could result in spray drift reaching Refuge waterbodies and threatening water quality. This potential is low because of the scale of the activity and measures implemented by the Refuge to minimize impacts. Based on experience, all potential negative effects to water quality are likely to be minor, short-term, and local in scale.

The Refuges currently uses 6-8 percent of their water entitlement to support agricultural operations. Water for agriculture, moist-soil, and riparian habitats is provided by a well and back channel conveyance through open ditches. As only a small percentage of water is used, current management would continue to result in negligible effects to water quantity.

Alternative B – Riparian Vegetation (Proposed Action)
Short-term impacts would be the same as Alternative A. In the long-term, chemical use would decrease under this alternative thereby resulting in negligible effects to water quality.

The effects on water quantity would be similar to those described under Alternative A. In the short-term, the Refuge may use increased amounts of water to restore native habitats; however, this use will not exceed the Refuge's water entitlement. Increased use of water is likely in the long-term, but the Refuge would be highly likely to remain within their entitlement.

Alternative C – Grasses and Riparian Vegetation
The effects on both water quality and quantity would be similar to Alternative B. Chemical use would be lower than Alternative A but higher than Alternative B.

4.1.2 Impacts on Soils

Alternative A – No Action (Current Management)
Continuing the current management action would entail a marginal level of ground disturbance on grass fields. The activity would include spreading additional grass seed if needed, some disking, and providing water for irrigation. Some disking, seeding, and prescribed burning may also occur in moist-soil units. Due to the use of best management practices, these activities would likely result in short-term site-specific negative effects to soil texture and structure. Prescribed burning may enhance nutrient availability in soils providing beneficial impacts. In addition, the use of chemical herbicides to treat invasive species also has the potential to adversely impact soils. Such chemical use could alter soil chemistry, specifically pH, causing additional short-term site-specific negative impacts. Experience has shown that all of the above effects would remain minor in intensity under current management.

One purpose for cultivating grasses on the Refuge is for soil salt remediation. Soils would be initially disturbed as seeds are planted. As soil salinities decrease over time and the soil becomes amenable to supporting native vegetation such as cottonwood and willow, 33 acres of the grass fields would be planted to native riparian vegetation under the MSCP agreement. Therefore, management activities are expected to indirectly result in long-term, moderate, site-specific

beneficial impacts to soils after these acres are retired from agriculture and replaced with native vegetation.

Alternative B – Riparian Vegetation (Proposed Action)
The short-term impacts to soils would be similar to those described in Alternative A. However, as additional acres would be converted to riparian habitat under this alternative, there would be beneficial long-term, moderate impacts to soils as salts and soil disturbance are reduced.

Preparation of fields for restoring riparian vegetation would entail initial soil disturbance to plant seedling trees (cottonwood, willow, and mesquite). This would include disking and furrows for plant establishment. Once planted, soil disturbance would cease and irrigation would commence. Herbicides may be used if needed to reduce encroachment of invasive species.

Alternative C – Grasses and Riparian Vegetation
The effects to soils under this alternative would be similar to those described under Alternative A and B. As more acres will be converted to riparian habitat than in Alternative A, there would be a beneficial moderate, impact to soils.

4.2 Biological Environment

4.2.1 Impacts on Habitat

Alternative A - No Action (Current Management)
The current agricultural program would continue to provide habitat supporting migratory birds and other wildlife for which the refuge was established. Moist soil unit management would continue as under the current regimen. Some acres would be converted to riparian habitat thereby adding to habitat diversity and a more natural habitat mosaic. Prescribed burning on marsh units would have beneficial impacts to habitat by controlling invasive species that outcompete native vegetation. Due to the small amount of land where this treatment method may occur and the use of best management practices, impacts associated with prescribed burning would be minor, long-term, and site-specific.

Alternative B – Riparian Vegetation (Proposed Action)
With native riparian habitat being very limited along the Lower Colorado River, the conversion of agricultural acres to riparian will provide much-needed habitat for wildlife. As agriculture effectively modifies soil salt conditions over time, agricultural fields will be retired from cultivation and converted to native vegetation. Typically, this will entail planting of cottonwood-willow woodlands that will improve the mosaic of habitats distributed across the landscape. This alternative is expected to result in moderate, long-term, beneficial impacts at the Refuge as well as benefits within the Lower Colorado ecosystem.

Alternative C - Grasses and Riparian Vegetation
A combination of grasses and riparian vegetation would provide habitat similar to Alternatives A and B.

4.2.2 Impacts on Wildlife

Alternative A – No Action (Current Management)
Continuation of agricultural operations is likely to result in short-term disturbance to wildlife typical of any heavy equipment operation. These negative impacts resulting from spraying and maintenance are expected to be short-term, site-specific, and minor. Maintenance activities such as prescribed burning on the 123-acres of marsh units may temporarily disturb wildlife but ultimately provide long-term beneficial impacts to wildlife by providing a mosaic of habitat types and native vegetation. The agricultural fields produce some food for a variety of resident and migratory wildlife. The production of grasses is beneficial for waterfowl, marsh and waterbirds, shorebirds, raptors, and some mammals. Other resident wildlife indirectly benefit from Refuge agricultural practices. The current agricultural program provides short-term minor beneficial impacts to wildlife by providing a food source. The existing moist-soil units that include marsh habitats would continue to provide moderate long-term benefits to marsh and waterbirds including some listed species (See Section 4.2.3).

Alternative B - Riparian Vegetation (Proposed Action)
Under this alternative, those species that prefer riparian habitat including some special status species (See Section 4.2.3) would benefit. This location offers an opportunity to greatly enhance riparian habitat in the area, and the benefits are expected to be far-reaching. Species that prefer agricultural fields would be negatively impacted; however, due to the limited size and quality of the current agricultural program, benefits to waterfowl, marsh and waterbirds, shorebirds, raptors, and some mammals, are limited. Additionally, many agricultural fields are in close proximity. Cibola NWR is about 30 miles upstream and has a successful agricultural program that provides for wildlife that prefer that habitat type. The benefits provided by the existing moist-soil units would be the same as Alternative A as the moist-soil management will not be changed.

Alternative C - Grasses and Riparian Vegetation
Areas that will be maintained as agricultural fields will have similar impacts to Alternative A. Areas that will be converted to riparian habitat will have similar impacts to Alternative B but at a lesser level. Overall, these impacts would have a lower intensity. The benefits provided by the existing moist-soil units would be the same as Alternative A as the moist-soil management will not be changed.

4.2.3 Impacts on Threatened and Endangered Species and Special Status Species

Alternative A – No Action (Current Management)
Under the No Action Alternative, the existing habitat for threatened and endangered species would be maintained. According to the Pesticide Use Proposals, the Refuge expects that each of the chemicals used as part of the agricultural program would have no effect on threatened and endangered species. After fields are converted to cottonwood-willow stands and the trees reach maturity, additional habitat used by the Yellow-billed cuckoo and the Southwest willow flycatcher would be created. Therefore, in the very long-term, the current management would result in moderate long-term beneficial impacts to some threatened and endangered species at the Refuge-wide scale.

Yuma clapper rail and California black rail would continue to benefit from existing moist-soil units. Management of moist soil units would be unchanged. Prescribed burning in the marsh units may result in beneficial impacts to listed species, specifically the Yuma clapper rail and the California black rail. This activity is an efficient and effective way to provide habitat for these species by setting back the successional stage of the habitat to meet the species' needs. This benefit would be short-term, moderate, and site-specific.

Alternative B – Riparian Vegetation (Proposed Action)
Under Alternative B, the increase of riparian habitat is expected to directly benefit riparian-dependant species such as the Yellow-billed cuckoo, the Southwest willow flycatcher, and a diversity of migratory and native birds. Providing additional habitat for threatened and endangered species will assist in their recovery thus providing long-term benefits. The benefits provided by the existing moist-soil units would be the same as Alternative A as the moist-soil management will not be changed. This alternative is expected to result in moderate long-term beneficial impacts over a large scale.

Alternative C – Grasses and Riparian Vegetation
Under this Alternative, additional riparian vegetation would provide benefits as outlined in Alternative B and remaining grass fields would provide similar habitat as described in Alternative A. Grass fields are not regularly used by any listed or candidate species.

4.3 Human Environment

4.3.1 Impacts on Socioeconomics

Alternative A--No Action (Current Management)
Under the No Action Alternative, the economic and social condition of the area would remain the same. An indirect effect on recreational resources is that the current management would maintain wildlife-viewing opportunities for the public, although the Farm Unit is closed to public use. Continuing the current management is not expected to impact priority wildlife-dependent recreational opportunities available on the Refuge. Current agricultural operations require that the Refuge purchase equipment, seeds, and chemicals in nearby communities as well as providing maintenance to machinery, thereby providing short-term minor beneficial impacts to such areas. Overall, the current management would continue to provide short-term minor beneficial impacts to the socioeconomic resources of the nearby communities.

Alternative B – Riparian Vegetation (Proposed Action)
With the increase in riparian habitat and subsequent bird abundance and diversity, it is anticipated that more birdwatchers may visit the area, thereby providing an increase in local revenue through general services such as lodging, purchase of food and supplies, etc. Under Alternative B, the economic and social condition of the area would be similar but slightly more beneficial than Alternative A.

Alternative C – Grasses and Riparian Vegetation
Under Alternative C, the impact to socioeconomics of the area would be similar to Alternatives A.

4.3.2 Impacts on Visual Resources

Alternative A – No Action Alternative
Under the No Action Alternative, visual resources would remain unchanged. While the area is closed to the public, it is within view of an observation tower and provides some level of wildlife viewing opportunities for the public. Prescribed burning on the marsh and moist-soil habitats may result in smoke that could indirectly degrade the Refuge's visual resources in the short-term; however, potential impacts associated with prescribed burning are anticipated to be minor and occur at the local scale.

Alternative B – Riparian Vegetation (Proposed Action)
In the long-term, the current agricultural fields will be replaced with native cottonwood-willow and mesquite forest. It is expected that the elimination of agricultural operations and an increase in native habitat will result in a positive aesthetic value to the visual resources on the Refuge. These beneficial impacts are expected to be minor, long-term, and site-specific.

Alternative C – Grasses and Riparian Vegetation
This alternative would result in a similar benefit as Alternative B.

4.4 Assessment of Cumulative Impacts

A cumulative impact is defined as an impact on the environment that results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future action regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Cumulative impacts are the overall, net effects on a resource that arise from multiple actions. Impacts can "accumulate" spatially, when different actions affect different areas of the same resource. They can also accumulate over the course of time, from actions in the past, the present, and the future. Occasionally, different actions counterbalance one another, partially cancelling out each other's effects on a resource. However, more typically, multiple effects add up, with each additional action contributing an incremental impact on the resource.

This analysis considered an area larger than the Refuge, within the Lower Colorado River Valley, as well as considering cumulative impacts resulting from the variety of projects (past, present, and reasonably foreseeable) occurring on private, state, and other federal lands in the area. Generally, land uses surrounding the four national wildlife refuges in the lower Colorado River Valley are owned by either Indian tribes or other Federal or state agencies.

Imperial NWR is located in close proximity to the BLM Picacho Peak Wilderness Area in California. Additionally, the BLM manages the Little Picacho Wilderness Area, also located near the Refuge. The state of California manages the nearby Picacho State Recreation Area, which lies on the California side of the Colorado River. On all of these nearby public lands, the primary land use is generally recreation. The western most border of the extensive Yuma

Proving Ground, one of the largest military installations in the world, is located only a few miles east of the Refuge.

Cumulative Impacts to the Physical Environment

There is a marginal amount of land in the area surrounding the Refuge currently in agricultural production. Activities occurring on adjacent lands are primarily recreation on public lands and testing of military equipment on the Yuma Proving Ground. The adverse impacts to air quality, water quality, water quantity, and soils associated with each of the alternatives analyzed in this EA are expected to be minor at most. The proposed action, Alternative B, is expected to benefit the physical environment through restoration of native communities that involves reduced ground disturbance and chemical use in the long-term. None of the actions described in Alternatives A, B, or C, would incrementally add to the adverse effects on the physical environment occurring as a result of other projects and land uses in the area. Alternatively, the proposed action will essentially preserve a tract of land in its native form providing a true refuge for wildlife, perhaps counteracting some of the detrimental development activities that could occur nearby or throughout the Lower Colorado River Valley.

Cumulative Impacts to the Biological Environment

As mentioned in the description of Alternative A (Current Management), the Lower Colorado River Multi-Species Conservation Program (MSCP) is restoring 33 acres of lands within the Farm Unit that were previously in agricultural production. The alternatives analyzed in the EA each primarily provide long-term beneficial impacts to the biological environment by providing food and habitat for wildlife. Additionally, the proposed action, involving restoration activities similar to that occurring through the MSCP, will allow for a direct benefit to riparian-dependent threatened and endangered species such as the yellow-billed cuckoo and the southwestern willow flycatcher. This, in combination with the MSCP restoration activities occurring within the same landscape and on nearby lands, is expected to provide beneficial cumulative impacts on the biological environment.

Cumulative Impacts to the Human Environment

Because the Farm Unit is closed to public use and the agriculture program is conducted entirely by Refuge staff, it is not expected that any of the alternatives analyzed in this EA will have a substantial effect on socioeconomics or visual resources. Money currently spent in the local community to support agriculture would continue to be spent to conduct restoration under the Proposed Action. In combination with money spent in the local economy to support MSCP restoration, it is likely that any of the alternatives would result in beneficial cumulative impacts to the socioeconomic resources. The value of the visual resources available within the Farm Unit is at the discretion of the viewer. The proposed action, in combination with the MSCP restoration occurring on 33 acres within the Farm Unit, will provide a larger landscape of native riparian habitat that may provide long-term beneficial cumulative impacts to the visual resources. In addition, none of the alternatives described in the EA will detract from recreational opportunities available on nearby public lands; the proposed action, however, may enhance bird watching opportunities in the area, thereby giving visitors another reason to travel to the area.

4.5 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority and Low-Income Populations; February 11, 1994) was designed to focus the attention of Federal Agencies on the environmental and human health conditions of minority and low-income populations, with the goal of achieving environmental protection for all communities. The order directed federal agencies to develop environmental justice strategies to aid in identifying and addressing disproportionately high and adverse human health and environmental effects of their programs, policies, and activities on minority and low-income populations. The order is intended to promote nondiscrimination in federal programs substantially affecting human health and the environment, and to provide minority and low income communities with access to public information and opportunities for participation in matters related to human health and the environment.

None of the alternatives described in this EA will disproportionately place any adverse environmental, economic, social or health impacts on minority and low income populations. Implementation of the proposed action is anticipated to benefit the environment and people in the surrounding communities.

4.6 Indian Trust Assets

Although Indian Trust Assets have been identified in the Lower Colorado River Valley and the Colorado River Indian Reservation is located in close proximity to the Refuge, it is expected that no Indian Trust Assets will be affected by any of the alternatives outlined in this EA. All proposed agricultural activities or reduction in such would occur on previously disturbed lands, and none of these alternatives involves the breaking of new ground. Therefore, no impacts are anticipated to result from implementation of any of the alternatives described in the EA.

4.7 Unavoidable Adverse Effects

None of the alternatives would result in any unavoidable adverse impacts to Refuge resources. Agricultural operations may result in some short-term disturbance to migratory and resident wildlife, but these impacts are expected to be negligible.

4.8 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that this use could have on future generations. Irreversible effects primarily result from the use or destruction of specific resources that cannot be replaced within a reasonable time frame, such as energy or minerals. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action, such as extinction of a threatened or endangered species or the disturbance of a cultural resource.

None of the alternatives would result in a large commitment of nonrenewable resources. Project implementation would require the irretrievable commitment of fossil fuels (diesel and gasoline), oils, and lubricants used by heavy equipment and vehicles. Since the Proposed Action is a continuation of an ongoing activity, no unavoidable harm or harassment to wildlife is expected. The Service would implement best management practices to minimize potential negative impacts.

4.9 Table 1 - Summary of Environmental Effects by Alternative

Environmental Resource	Alternative A No Action (Current Management)	Alternative B Riparian Vegetation (Proposed Action)	Alternative C Grasses and Riparian Vegetation
Impacts to Air Quality	No effect	Short-term adverse impact; long-term beneficial impact	Long-term beneficial impact
Impacts to Water Quality and Quantity	Short- and long-term effects; increase of water usage	Same as Alternative A with decreased intensity	Same as Alternative A with slight decrease
Impacts to Soils	Short-term minor negative effects at the local scale	Same as Alternative A with decreased intensity	Same as Alternative B with slight intensity
Impacts on Habitat	No adverse impact	Long-term substantial beneficial impact	Long-term beneficial impact; slightly less than Alternative B
Impacts of Wildlife	No effect	Long-term beneficial effects	Similar to B, but greater than A
Impacts on Threatened and Endangered Species	No effect	Long-term substantial beneficial impact	Long-term beneficial impact; slightly less than Alternative B
Impacts on Cultural Resources	No effect	No effect	No effect
Impacts on Socioeconomic Resources	Slightly beneficial effect	Long-term beneficial effect	Long-term beneficial effect

5.0 CONSULTATION, COORDINATION AND DOCUMENT PREPARATION

5.1 Agencies and individuals consulted in the preparation of this document include:

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5.2 References

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