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In Reply Refer To
AESO/HC

January 28, 2003

Memorandum

To: Regional Director, Lower Colorado Regional Office, Bureau of Reclamation, Boulder City, Nevada

From: Field Supervisor

Subject: Draft Fish and Wildlife Coordination Act 2(b) Report on Execution of Implementation Agreement, Adoption of Inadvertent Overrun and Payback Policy, and Other Actions on the Lower Colorado River

The enclosed draft Fish and Wildlife Coordination Act (FWCA) 2(b) report was jointly prepared and is submitted by the Arizona Game and Fish Department, California Department of Fish and Game, and U.S. Fish and Wildlife Service (reporting agencies). This report assesses the effects to fish and wildlife resources resulting from the execution of the Implementation Agreement, adoption of an Inadvertent Overrun and Payback Policy, and other actions described in the Bureau of Reclamation's Draft Environmental Impact Statement (DEIS 01-43) filed January 2002, and the Final Environmental Impact Statement (FEIS 02-35) filed November 1, 2002.

The reporting agencies appreciate the opportunity to provide comments on this substantial action. This draft report has been reviewed and approved by the reporting agencies. If you have questions, please contact Bill Knowles (AGFD) at 928-342-0091, Arturo Delgado (CDFG) at 760-921-3265, or Frank Baucom (USFWS) at 602- 242-0210. We look forward to your comments and the opportunity to discuss this draft report with your staff. We propose a 30-day period for review and comment of the draft report. Please send written comments to the Field Supervisor at the above address. After review of submitted comments, the participating agencies anticipate meeting with your staff to discuss the final report.

/s/ Steven L. Spangle

Attachment

CC: (Paper copies)(with attachment)
Environmental Program Manager, Bureau of Reclamation, Phoenix Area Office, Phoenix, AZ
Director, Arizona Game and Fish Department, Phoenix, AZ
Director, California Department of Fish and Game, Sacramento, CA
Administrator, Nevada Division of Wildlife, Reno, NV
Director, Fish and Wildlife Service, Washington, D.C. (AD-BFA)
Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)(RC-NWRS)(ARD-FR)
State Director, Bureau of Land Management, Phoenix, AZ
Area Director, Phoenix Area Office, Bureau of Indian Affairs, Phoenix, AZ
Director, Physical Resources, Fort Mohave Tribe, Needles, CA
Environmental Director, Chemehuevi Tribe, Havasu Lake, CA
Environmental Director, Colorado River Indian Tribes, Parker, AZ
Game and Fish Director, Fort Yuma-Quechan Tribe, Yuma, AZ
Director, Environmental Protection Office, Cocopah Tribe, Somerton, AZ
Mayor, City of Yuma, Yuma AZ
Mayor, Town of Parker, Parker AZ
Mayor, City of Blythe, Blythe CA
Board of Supervisors, Yuma County, AZ
Board of Supervisors, La Paz County, AZ
Board of Supervisors, Imperial County, CA
Board of Supervisors, Riverside County, CA
Board of Supervisors, San Bernardino County, CA

CC: Email Notice (availability of report at http://arizonaes.fws.gov)
Members of Multi Species Conservation Plan
Regional Supervisor, Region 4, Arizona Game and Fish Department, Yuma, AZ
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Sierra Club, Southwest Office (sw.field@sierraclub.org)
Sierra Club, San Diego Chapter (san-diego.chapter@sierraclub.org)
Yuma Rod and Gun Club (part of Arizona Wildlife Conservation Council)
Ducks Unlimited (mpottage@ducks.org)(Sburton@ducks.org)

D R A F T

EXECUTIVE SUMMARY

This Fish and Wildlife Coordination Act (FWCA) 2(b) report is jointly prepared and submitted by the Arizona Game and Fish Department, California Department of Fish and Game, and U.S. Fish and Wildlife Service (reporting agencies). This report assess effects to fish and wildlife resources resulting from execution of the Implementation Agreement (IA), adoption of an Inadvertent Overrun and Payback Policy (IOP), and other actions described in the Bureau of Reclamation's (USBR) Draft Environmental Impact Statement (DEIS-01-43) filed January 2002, and the Final Environmental Impact Statement (FEIS 02-35) filed November 1, 2002, and referred to as the proposed action.

The IA is the Federal action necessary for the State of California to execute the Quantification Settlement Agreement, a significant component of the State of California's draft plan to reduce its annual use of Colorado River water to its normal year apportionment of 4.4 million acre-feet per year (afy). Up to 388,000 afy could be transferred, with a change in the diversion point from the All American Canal at Imperial Dam to Whittsett Intake Structure above Parker Dam in Lake Havasu. This report concentrates on potential impacts to fish and wildlife resources from reduced flows in the above reaches of the lower Colorado River (LCR) and cumulative impacts from other proposed water transfers and diversion point changes.

The reporting agencies have public trust and other legal, regulatory, and policy responsibilities for all fish, wildlife, and related wildlife recreational opportunities within their respective jurisdictions. The mitigation currently proposed by the USBR is limited to the measures agreed to in the proposed action Biological Opinion for impacts to species listed under the Endangered Species Act. This may result in unmitigated impacts to fish and wildlife resources under the jurisdiction of the wildlife agencies.

The purpose of this report is to fulfill the reporting agencies' obligations to conserve and manage fish and wildlife species, their habitats, and dependent recreation for the benefit of current and future generations.

The LCR is a complex and dynamic system that supports hundreds of species of fish and wildlife. The proposed project life is 75 years. The model used to predict impacts requires simplifying assumptions, particularly the use of mean monthly flows and not including minimum flow analysis that creates uncertainty about the accuracy of the predictions. For these reasons it is recommended that an adaptative management approach be used with establishment of baseline conditions in the first 2 years of the project.

An interagency team from the three reporting agencies and USBR (FWCA Team) will be responsible for developing and implementing the adaptative management plan. The FWCA Team will solicit comments and input from other governmental and public stakeholders.

The FWCA Team will have the responsibility for the final FWCA recommendations. The Team will establish baseline conditions, develop a habitat monitoring plan that includes habitat acreages and water parameters, establish thresholds that trigger mitigation, and establish a mechanism that determines appropriate mitigation. The Team will prepare an annual report that covers the year's activities. The first annual report will contain the monitoring plan and preliminary baseline conditions information.

Recommendations

1. The FWCA Team will develop and oversee an adaptive management plan for fish and wildlife resources on the LCR. The Team will establish baseline conditions, develop objectives, develop and implement a monitoring plan, evaluate research, and refine management and mitigation strategies. The overarching objective of the adaptive management plan will be to maintain existing riparian, wetland, and aquatic LCR habitats and, when feasible, to enhance or restore degraded habitats.

2. The monitoring plan, a major component of the adaptive management plan, will include a description of baseline conditions of pertinent habitats over the range of flows to include water quality parameters and fish and wildlife survey data. Identification of information needs will also be included.

3. The primary objective of the monitoring plan will be to document losses or gains of identified habitats by a habitat-based method and an economic valuation of wildlife and wildlife-related recreation. The plan will include a description of baseline conditions of pertinent habitats over the range of flows to include water quality parameters and fish and wildlife survey data. Identification of information needs will also be included.

4. The monitoring plan will have three components: Habitat, baseline and short-term water parameters, and long-term water parameters. Monitoring will begin in 2003.

    Habitat monitoring will be based on the existing series of vegetation maps and identify changes in area and quality at 5-year intervals for the life of the project.

    Baseline and short-term water parameters will use the preliminary species, guilds, activities, and habitats identified in this report and monitor the parameters identified. Data will be correlated with stream gauges and collected on a regular schedule.

    Long-term monitoring of water parameters will continue for the life of the project as part of the adaptive management plan.

5. Management actions will include: (1) determining significance thresholds for water parameters at which corrective action will be taken using existing information and data collected as part of this project; (2) determining corrective actions or establishing a mechanism for developing and implementing corrective actions; (3) reviewing and recommending research project proposals to determine techniques for enhancing, restoring, or creating native habitats that are economically and logistically feasible in the LCR; and (4) identifying water sources for habitat development, enhancement, or restoration. The FWCA Team will produce an annual report on activities undertaken for life of the project. The first report will include a monitoring plan, economic plan, and preliminary results of baseline conditions.

6. The USBR will form a workgroup to make recommendations to the Secretary on how to incorporate sustainable economics into the LCR environmental review process. The planning agencies are willing to discuss this in a preliminary meeting with the USBR and other stakeholders.

7. Because the IOP could impact the LCR from Imperial Dam to the Southern International Boundary, data collection for the monitoring plan will also include those reaches. This will include the wildlife economic data necessary for any sustainable economics review.

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INTRODUCTION

This Fish and Wildlife Coordination Act (FWCA) 2(b) report assess effects to fish and wildlife resources resulting from execution of the Implementation Agreement (IA), adoption of an Inadvertent Overrun and Payback Policy (IOP), and other actions described in the Bureau of Reclamation's (USBR) Draft Environmental Impact Statement (DEIS) filed January 2002, and the Final Environmental Impact Statement (FEIS 02-35) filed November 1, 2002, and referred to as the proposed action (USBR 2002). The primary impact area is in the 100year floodplain of the Lower Colorado River (LCR), downstream of Parker Dam, in Arizona and California.

This report has been prepared under authority of and in accordance with Section 2(b) of the FWCA (48 Stat., 401, as amended; 16 U.S.C. 661 et seq.) and was developed jointly by the Arizona Game and Fish Department (AGFD), California Department of Fish and Game (CDFG), and Fish and Wildlife Service (USFWS). The FWCA requires Federal agencies proposing to alter or modify any body of water for any purpose consult with the USFWS and affected State fish and wildlife agencies to assure that wildlife conservation receives equal consideration and is coordinated with other features of water resource development programs. This report shall include recommendations for wildlife conservation and mitigation for impacts to wildlife and wildlife resources.

The reporting agencies (AGFD, CDFG, and USFWS) jointly submit this report, as evidenced by the transmittal letter, to fulfill the reporting agencies trust, legal, and regulatory obligations under the FWCA for the proposed water transfer and resultant impacts to the habitats, fish, wildlife, and wildlife-related recreational opportunities that are dependent on the waters of the Colorado River. This obligation requires the agencies to conserve and manage fish and wildlife resources; conserve, enhance, or restore the habitats on which fish and wildlife depend; and provide wildlife-dependent recreation opportunities for the benefit of current and future generations.

Previous reviews of the proposed action, provided to the USBR in the USFWS March 26, 2002, memorandum and the AGFD March 26, 2002, letter were in accordance with the FWCA but did not constitute the 2(b) report.

Background

The Secretary of the Department of the Interior (Secretary), under authority as Water Master for Colorado River water, required the State of California to reduce its normal-year use of river water to its apportioned 4.4 million acre-feet per year (afy). To accomplish this the Colorado River Board of California developed the draft California Plan. A significant component to implement the plan is the proposed Quantification Settlement Agreement (QSA).

The QSA is a proposed agreement among Coachella Valley Water District (CVWD), Imperial Irrigation District (IID), and Metropolitan Water District (MWD) to budget their portion of California's 4.4 million afy among themselves and to make water conserved in the IID service area available to CVWD, MWD, San Diego County Water Authority (SDCWA), and others. The QSA calls for specific, changed distribution of that water for the 75-year quantification period. Implementing QSA actions would result in the changing the point of delivery of up to 388,000 afy from Imperial Dam to Whittsett Intake Structure above Parker Dam in Lake Havasu. The Secretary must approve this water transfer. To accomplish this, the USBR developed the IA and, to fulfill compliance requirements of the National Environmental Policy Act, the IA-DEIS and IA-FEIS.

This report is based on the impact analysis in the IA DEIS. The agencies conducted a preliminary review of the IA-FEIS after its distribution in December 2002 and found no significant changes in the impact analysis from that in the IA-DEIS. In addition to the IA-DEIS, the following compliance documents were reviewed and considered in developing this 2(b) report: Imperial Irrigation District Water Conservation and Transfer Project Draft Environmental Impact Review and Statement (Imperial DEIR/DEIS) (CH2MHill 2002); Final Biological Assessment for Interim Surplus Criteria, Secretarial Implementation Agreements for California Water Plan Components and Conservation Measures (Biological Assessment)(USBR 200b); Final Biological Opinion for Interim Surplus Criteria, Secretarial Implementation Agreements, and Conservation Measures on the Lower Colorado River, Lake Mead to the Southerly International Boundary, Arizona, California and Nevada) (Biological Opinion)(USFWS 2001); FEIS Colorado River Interim Surplus Criteria (IS Criteria) (USBR 2000a), Draft Program Environmental Impact Report for Implementation of the Colorado River Quantification Settlement Agreement (SAIC 2002), and draft LCR Multi-Species Conservation Program (MSCP) documents.

California's current effort to reduce its Colorado River water use depends on the Secretary declaring a surplus water year. To increase the likelihood that surplus water would be available to California, the USBR developed IS Criteria with a stipulation that California must reach established benchmarks by specified dates or the IS Criteria will be suspended. One benchmark is that the QSA must be fully executed December 31, 2002. The reporting agencies have worked under the assumption that "fully executed" included all environmental compliance, including this report.

Although the QSA involves distribution of California water, the AGFD and CDFG are the affected State wildlife agencies for this report as they border the Colorado River. In reviewing the IA-DEIS, the AGFD determined that the proposed measures to compensate for impacts to species listed under the Endangered Species Act (ESA) may not mitigate for non-listed species. The FWCA defines wildlife and wildlife resources as birds, fishes, mammals, and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent including their habitat and life support systems. The AGFD determined that a FWCA consultation was necessary to assure that water transfers did not result in significant adverse

impacts to fish and wildlife resources under their jurisdiction and notified the USBR, CDFG, and USFWS of this in a March 26, 2002, letter. The AGFD conferred with the CDFG and USFWS, and the reporting agencies agreed at a June 11, 2002, meeting to prepare a joint FWCA 2(b) report. Because of the magnitude of this project, the 75-year time period that resources will be affected, and the insufficient existing information that would address FWCA concerns; an adaptive management approach was formulated to fulfill requirements of the FWCA. This approach will consider and incorporate baseline studies and detailed delineation of impacts.

The laws, inter-state compacts, court decisions, and other documents that govern operations of the LCR are referred to as "The Law of the River." The IA-DEIS includes a one-page table (Table 1.2-1) listing just some of those documents and a summary of LCR management and water allocation. A summary of other planned programs and projects is also included, and among these is the MSCP.

In 1995, the LCR stakeholders, including the reporting agencies, USBR, and project proponents, formed a partnership to develop the MSCP. The objective of the MSCP is to conserve habitat and work towards the recovery of "covered species" and reduce the likelihood of listing additional species under the ESA while accommodating current operations and optimizing future water and power development. The MSCP would obtain an incidental take permit for a number of actions along the LCR, including changing the point of diversion for up to 1.574 million afy of LCR water below Parker Dam. The proposed water transfer in this 2(b) report is part of the total 1.574 million afy.

The extensive list of species first developed for the MSCP's Conservation Plan (SAIC/Jones and Stokes 2002) was thought by some to provide compliance with the FWCA, but that list of species has greatly diminished. Because the FWCA covers all wildlife resources, not just federally listed or proposed species, this topic was discussed at a July 9, 2002, meeting on the proposed action. The involved agencies agreed that separate FWCA and National Environmental Policy Act reviews would be required for MSCP covered projects as they are implemented. The agencies also agreed that, because the MSCP Conservation Plan is in draft form and will not be finalized prior to the December 31, 2002, deadline for the QSA, MSCP conservation measures could not be applied to this proposed action.

This report analyzes impacts to fish and wildlife resources and wildlife-related recreation from flow reductions up to 388,000 afy for the proposed 75-year project described in the IA-DEIS. The IA-DEIS impact analysis was based on the Biological Assessment that provided an analysis of impacts to federally listed species and a limited number of special status species (Table 17, Summary of Effect Analysis in USBR 2000b) resulting from USBR's discretionary actions implementing the IS Criteria for the LCR and the Secretarial Implementation Agreements with Southern California entities. Because the Conservation Plan will not be completed by the deadline for the QSA (December 31, 2002), a separate, formal ESA consultation was conducted for the proposed action. This consultation did not address potential impacts associated with the IOP. The Biological Assessment included a number of conservation measures as part of the

action to reduce effects on federally listed species. The USFWS issued a Biological Opinion that found no jeopardy to listed species or adverse modification to critical habitat; however, a number of reasonable and prudent measures and several conservation recommendations to reduce adverse impacts to the listed species were included. This report will not specifically analyze impacts to federally listed species as they have been addressed in the Biological Opinion. Similarly, the California project proponents (IID, SDCWA, and MWD) are meeting with the CDFG to discuss compliance with the requirements of the California Endangered Species Act (CESA). Impacts to species listed under the CESA in California will also be addressed in an incidental take permit; however, impacts to those species in the LCR not addressed by the CESA will be included in this report.

This report does not specifically address the IOP and potential impacts to fish and wildlife resources from Lake Mead to Southern International Boundary (SIB). As a result, the Nevada Division of Wildlife did not participate in the preparation of this report. However, potential impacts resulting from LCR flow changes for the IOP will be included in the proposed FWCA monitoring and adaptative management plan. The plan will also address cumulative impacts from additional proposed water transfers addressed in the IA-DEIS, including the Palo Verde Irrigation District water transfer of up to 111,000 afy (Palo Verde Irrigation District 2002).

DESCRIPTION OF STUDY AREA

The project area covers 192 miles of Colorado River, with most of the impacts occurring along the 143-mile reach between Parker and Imperial Dams. The study area has been described on a landscape scale and existing studies reviewed in the Biological Assessment, Biological Opinion, IA-DEIS, IS Criteria FEIS, and draft documents prepared for the MSCP. The Biological Assessment presents the acreage for each major habitat type and defined structural components. Holden (1986) and GeoGraphics (2000) map and describe the backwaters in the study area. The river operations and the model used to estimate impacts are described in Appendix G of the IA-DEIS and Appendix J IA-FEIS. This report relies on this data for analysis and recommendations.

Operation of the reservoirs along the 1400-mile Colorado River is governed by the Long-Range Operating Criteria adopted in 1970 and reviewed every 5 years. Annual Operating Plans are developed in a process lead by the USBR in consultation with the Basin States, Federal agencies, Indian Tribes, and others. A deciding finding in this process is the Secretary's determination of the water supply conditions for the next year, based on current supply and predicted runoff. When the reservoir system is nearing capacity, higher than predicted runoff will trigger release flows to build space in the system. Additional operational decisions occur during the year as orders for water, weather, maintenance, and other parameters affect daily release schedules.

Although the Colorado River is extensively managed by dams and reservoirs, it is still a complex and dynamic system. The existing data indicate that there is significant uncertainty in predicting future conditions of the LCR. The data in Table 8 of the Biological Assessment show that the area of different habitat types and the area of different structure types of the habitat can change significantly over a short period of time. Comparisons of the mapped backwaters indicate that backwaters can undergo significant change is a short amount of time. A major flood or prolonged drought affecting river operations could result in significant and unpredictable changes in habitat types and quality.

FISH AND WILDLIFE PLANNING OBJECTIVES AND CONCERNS

Planning Objectives

Public trust doctrine obligates the State and Federal governments to actively manage and conserve fish and wildlife resources for current and future public benefits. The States have broad responsibilities for all wildlife within their borders, and the USFWS has particular responsibility for certain species and habitats under the Migratory Bird Treaty Act (MBTA) and ESA.

The Colorado River Indian, Quechan, and Cocopah Tribes have wildlife management jurisdiction on their lands. The reporting agencies will coordinate management efforts with the Tribes.

To fulfill public trust responsibilities, the reporting agencies have adopted regulations and policies that recognize the importance of riparian and wetland habitats to fish and wildlife. The reporting agencies' long-term planning objectives are to maintain existing habitats and enhance and restore degraded habitats. This includes mitigation for unavoidable habitat loss. These objectives are consistent with section 2(a) of the Fish and Wildlife Coordination Act "… with a view to the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof in connection with such water-resource development."

In Arizona, the Arizona Game and Fish Commission (Commission) is empowered to "establish broad policies and long range programs for the management, preservation and harvest of wildlife." (Arizona Revised Statues § 17-231). To achieve this mandate, the AGFD has the mission to "conserve, enhance and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation, and use of present and future generations." To support the trust obligations and mission, the Commission has adopted policies seeking 100% compensation, when feasible, for actual and potential habitat losses (AGFD Commission Policy 12.7,1991) and to "actively encourage management practices that will result in the maintenance of current riparian habitat, and restoration of the past or deteriorated riparian habitat …"(AGFD Commission Policy 12.4,1991).

In California, fish and wildlife resources, including all plants and animals, are held in trust for the people of the State by and through the CDFG as characterized by CDFG's mission statement: "…. to manage California's diverse fish and wildlife, and plant resources, and habitats upon which they depend, for their ecological values and for their use and enjoyment by the public." The public trust obligation mandates the CDFG to fulfill the policy of the State to encourage the preservation, conservation, and maintenance of wildlife resources under the jurisdiction and influence of the State; including conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (Fish and Game Code, § 1801-1802). The CDFG has a policy that fish and wildlife resources, and public use thereof, shall be preserved and maintained in connection with impacts caused by land and water development projects (CDFG 2000). The CDFG will strive to prevent further diminishment of these resources from such projects, to restore resources whenever possible, and to assure that fish and wildlife preservation measures are implemented concurrent with other project features. The CDFG will seek implementation of appropriate measures to prevent or fully offset impacts to resources.

The USFWS's Lower Colorado River Ecosystem Team (USFWS 2000) developed the "String of Pearls" conservation strategy that focused on ensuring that native species are present in the LCR ecosystem in sufficient numbers to ensure they are part of the ecosystem and are not maintained strictly as refugia populations. The USFWS (1981) has an established policy for recommending mitigation for adverse impacts of land and water developments on fish, wildlife, their habitats, and uses thereof.

The Colorado River is a highly altered system with natural flows replaced by controlled flows. The altered hydrology has created ecological conditions that frequently favor non-native habitats over native habitats. Ohmart et al. (1988) reported in an ecological review of the LCR that native habitats support a greater number of species and biomass than non-native habitats. Therefore, the replacement of cottonwood - willow forests and mesquite bosques with stands of non-native salt cedar is a significant concern. The result is that the populations of many native wildlife species dependent on the river's habitats have declined. This necessitates long-term planning objectives based on habitat management and managing for species with low or declining populations, including those listed under the ESA and CESA. These objectives operate within constraints of current river operations

The controlled flows that allow use of river water on demand is a dominant factor in the region's economy and is crucial to local economies along the river. The planning objectives must weigh impacts to local and regional economies. A component of increasing importance to local economies is wildlife-related and other recreational activities associated with the river. Birdwatching is growing in popularity and providing increasing economic benefits. The LCR is an important migratory bird travel corridor. In 2000, the City of Yuma recognized this and began a birding festival for residents and visitors to observe migratory birds. The economic value of birdwatching will continue to increase. Wildlife-related and other recreational opportunities on the river are important to the local economies and a quality of life issue for the

region. Potential adverse impacts to the local and regional economy resulting from adverse impacts to wildlife and wildlife related recreation must be considered in long-term planning objectives.

A problematic area for natural resource agencies is planning for both native fish species and non-native sport fish. The altered flow regime, creation of new aquatic habitats, and introduction of predatory sport fish have adversely impacted many native fish species. The reporting agencies have been and will continue to be involved in the recovery and conservation of these native species. However, sport fishing is a popular recreational activity on the river that makes a significant contribution to local and regional economies. Recognition of the permanent alteration of flow regimes and aquatic habitats, coupled with the recreational and economic importance of sport fishing and importance of conserving native fish species, requires management actions to balance these objectives. We believe the recommendations in this report would balance these objectives, managing native fish in suitable areas while continuing to manage sport fish and supporting sport fishing.

In summary, the reporting agencies have public trust and legal mandates to manage fish and wildlife resources associated with the LCR for current and future benefit of the public. The agencies long-term planning is based on managing for habitats, key guilds or species groups, and when required by law or special circumstance, specific species. The planning objectives are to maintain and enhance existing native habitats, mitigate for unavoidable losses of habitat, and enhance or restore degraded habitats when feasible. The objectives also include managing for species and guilds when appropriate and for listed or special status species. The objectives and implementation actions are compatible with and in support of the ESA, CESA, MBTA, and other relevant State and Federal laws and regulations. The planning objectives include providing for wildlife-related recreational opportunities on the river and in associated habitats.

Fish and Wildlife Concerns

The biodiversity and productivity of fish and wildlife habitats in the project area are dependent on the LCR, as annual rainfall in the nearby uplands ranges only from 4.9 inches at Parker, Arizona to 2.9 inches at Yuma. The natural flow regime of the LCR was one of spring floods due to snow pack melt and inflow from tributaries with slowly decreasing flows through the remainder of the year. The amount of the decrease in flows in the study area depended on summer and winter rains in the watershed, especially from tributaries into the LCR. Summer monsoons could result in localized flooding. The spring floods carried a high sediment load, recharged ground water, and flushed soil salts out of the system. The result was a variable and dynamic system. The native fish and wildlife species and habitats are adapted to these conditions.

Present conditions in the LCR are significantly different than historic conditions. The LCR is no longer free flowing but dominated by dams and reservoirs and reaches have been channelized, and banks stabilized. In the regulated river, annual spring floods have been replaced by irregular

flood releases with greatly reduced flows. The flows also have reduced sediment loads. Although river operations significantly reduced the difference between maximum and minimum flow on an annual basis, the difference can be significantly greater for a 24-hour period. The result is a river system with different physio-chemical characteristics and ecological processes from that of the natural system. The result is the degradation or loss of native riparian and wetland habitats that are frequently replaced by habitats dominated by non-native species, especially salt cedar. Generally, monotypic stands of salt cedar support fewer species and a lower biomass than mixed salt cedar/native vegetation stands which support fewer species and biomass than native habitats (Ohmart et al.1988). Efforts to restore the non-native dominated habitats with native habitats have met with little success and generally require large quantities of water. The reporting agencies are concerned that flow and groundwater reductions in the LCR floodplain may further exacerbate the degradation or replacement of native riparian and wetland habitats with non-native dominated habitats. Consequently, implementation of the proposed action could adversely affect the ability to restore native riparian and wetland habitats necessary for the management and sustainability of healthy wildlife populations.

The IA-DEIS impact analysis emphasizes the four species in the LCR floodplain listed under ESA and rely on conservation measures and reasonable and prudent measures described in the Biological Opinion and proposed action. The implied assumption is that these measures for the bonytail, razorback sucker, southwestern willow flycatcher, and Yuma clapper rail will mitigate for impacts to all fish and wildlife resources. However, not all habitats or successional stages of habitats are used by listed species.

Hall et al. (1997) defined "habitat" as the resources and conditions present in an area that produce occupancy, including survival and reproduction by an organism. Habitat is organism-specific and relates the presence of a species, population, or individual (animal or plant) to an area's physical and biological characteristics. Habitat implies more than vegetation or vegetation structure and is the sum of specific resources needed by organisms. For example, mesquite bosques and late successional stage cottonwood-willow are used by a number of species but not by any federally listed species considered in the Biological Opinion. The Biological Opinion only considered impacts to 1,570 acres of occupied habitats or potentially occupied habitats of southwestern willow flycatcher identified in surveys of the LCR. The southwestern willow flycatcher only nests in specific structure types of cottonwood-willow or salt cedar with standing water or saturated soil. This excludes many cottonwood-willow stands that are still important habitat for many species of birds and mammals. Similarly, open shallow water and wetted perimeter areas are used by migratory shorebirds, but not by a listed species. Additionally, the Biological Opinion was prepared prior to the IOP and, therefore, did not consider potential IOP impacts. Therefore, it is possible that there will be adverse impacts to fish and wildlife that will not be compensated for under the actions proposed in the IA-DEIS.

The proposed project has a project life of 75 years. Given that this is a dynamic system dependent on unpredictable precipitation patterns, current and expected future regional population growth, and ever changing technologies, the best possible mitigation package in 2003

may be inadequate or excessive in 2050 or 2075. Under the circumstances, the reporting agencies have decided that an adaptative management approach will best fulfill their respective FWCA responsibilities for fish, wildlife, habitats and related recreation. This decision is also in accordance with the Council for Environmental Quality (1977) recommendation to use an adaptative management approach for large-scale projects impacting complex ecosystems.

The reporting agencies have identified a list of preliminary key habitats, species, and guilds that will form the foundation of this report (Table 1). Monitoring those biological resources will serve as an integral part of the recommended adaptive management plan in which monitoring measures progress toward or success at meeting objectives and provide evidence for management change or continuation (Holling 1978, Ringold et al. 1996).

The IA-DEIS impact analysis relied on a model of the river system which the reporting agencies believe meets the best available tool criteria. Any model, however, including this one, must make simplifying assumptions, has limited data input, and a margin of error. As a result, the accuracy of the prediction is uncertain and there is the potential for unanticipated impacts. There is also the possibility of unanticipated adverse impacts resulting from changes in conditions over the 75-year life of the project. An adaptive management plan that detects and responds to these unanticipated impacts and allows improvements in assessment and mitigation methodologies to be implemented provides the reporting agencies an opportunity to continue to fulfill their public responsibilities.

The IOP also adds uncertainty to the analysis. Overruns will increase flows for a short time and paybacks will decrease flows. Although the volumes would be significant only in a worst-case scenario, the timing of the changes in flow and the full extent of the vertical fluctuations in the river's surface elevation cannot be predicted. Without critical baseline information, analyzing impacts to all species of fish and wildlife and their habitats would be very difficult. Therefore, impacts from the IOP and IA to key habitats, species, and guilds identified in Table 1 will be analyzed

Table 1. Key habitats, species, and guilds identified by the reporting agencies.

Habitat	Species/Guild
Backwaters	Sport fish, Native fish, Waterfowl, Shorebirds
Fish habitat	Sport fish, Native fish
Mesquite	Neo-tropical Migrants, Mammals
Marsh	Black rail, Shorebirds, Waterfowl, Neo-tropical Migrants
Shallow water/wetted perimeter	Shorebirds
Cottonwood/willow w/out wet soils	Migratory birds, Mammals
Riparian scrub	Migratory birds, Mammals

DESCRIPTION OF PREFERRED ALTERNATIVE AND OTHER ALTERNATIVES

The alternatives are described in detail in the IA-DEIS and Imperial DEIR/DEIS. The preferred alternative is to conserve through various methods and transfer up to 388,000 afy of water. The transfer would require a change of diversion point from Imperial Dam to Parker Dam; resulting in a decrease in flows of 388,000 afy between the dams. There would be a ramp up period beginning in 2002, with 20,000 afy transferred. The proposed schedule of increased diversions varies, depending on project completion dates and final transfer totals, but generally increases will transfer 20,000 to 30,000 afy until the total is reached. The only other alternative considered was the no action alternative.

FISH AND WILDLIFE RESOURCES WITHOUT THE PROJECT

The existing fish and wildlife resources are described in the Biological Assessment, Biological Opinion, IA-DEIS, Imperial Irrigation District DEIR/DEIS, and draft documents prepared for the MSCP. Backwater maps (Holden 1986, GeoGraphics 2001) show changes in backwaters between 1986 and 1997. The USBR vegetation maps and Ohmart and Anderson habitat type maps show the change in habitat type and age structure class between 1976 and 1997. With the exception of listed species, there is insufficient population data to determine population trends.

The data shows that the existing river system is dynamic and flood events can cause significant change. Fish and wildlife resources on the river will certainly be affected by social, political, economic and technological changes. Barring significant flooding or drought, the data provides a reasonable prediction of fish and wildlife resources for the next 5 to 10 years, but this becomes more problematic beyond 10 years.

Recent data from natural resource managers along the LCR indicate significant recreational use of the wildlife resources. Bureau of Land Management (BLM) reported 546,620 visitor days in fiscal year 2001 for their recreational sites along the river from Blythe, California, to Yuma, Arizona, not including the Hidden Shores commercial facility (BLM personal communication). A total of 25,571 ‘river stamps’ to fish the Colorado River between Arizona and California were sold in 2001 (AGFD personal communication). The AGFD 2001 waterfowl hunter questionnaire revealed approximately 8,119 waterfowl hunter days along the Colorado River Zone. Imperial National Wildlife Refuge reported a total of 127,045 visitors, including 410 waterfowl hunters, 18,200 anglers and 3,342 wildlife observers in fiscal year 2001 (USFWS 2002). Cibola National Wildlife Refuge reported a total of 115,700 visitors, including 15,000 waterfowl hunters, 15,000 anglers and 7,500 wildlife observers in fiscal year 2001.

PROJECT IMPACTS

The impact analysis in the IA-DEIS is based on the model developed for the Biological Opinion. The IA-DEIS assumes the model also accurately predicts impacts to non-listed species and that the mitigation proposed for listed species is adequate for non-listed species. For the following reasons the reporting agencies do not agree with this assumption.

There are hundreds of fish and wildlife species using the LCR. Many are dependent on habitats or successional stages of habitats not utilized by listed species. Impacts to these habitats may not be mitigated by the mitigation plan proposed for listed species.

Any model of a complex system such as the LCR requires simplifying assumptions and data input to allow the required computations. This creates uncertainty as to the accuracy of the model's predictions. There are two simplifying data inputs that introduce uncertainty to the impact analysis for the fish and wildlife resources under the jurisdiction of the reporting agencies. The first is that the baseline information is at a landscape scale. At this large scale all impacts to fish and wildlife resources may not have been captured. The second is that the model is based on mean monthly flows. However; the minimum flows, length of time at minimum flow, and seasonality of minimum flows will be a crucial factor in determining impacts to water quality, fish, and other aquatic resources. Therefore, the model may not have captured the impacts to these resources.

The uncertainty inherent in the model, especially over the 75-year life of the project, may not adequately predict the impacts to fish and wildlife resources. If the predications are not accurate, the proposed mitigation will not accurately reflect the impacts. This could result in insufficient or excessive mitigation.

There is one project impact that can be predicted accurately. The habitats and fish and wildlife resources under review are dependent on water. Habitat maintenance, enhancement, and restoration require water. Many habitat projects can not be implemented because water is not available or can not be used for this purpose. Reducing water flows in the river would further hamper efforts to enhance or restore habitats.

DISCUSSION AND RECOMMENDATIONS

Fish and wildlife management evolves with results from research and experience. In past projects of this nature, potential impacts were identified and evaluated and management practices, including mitigation, were identified and implemented. Errors in the evaluation or unanticipated environmental changes often resulted in inadequate, inappropriate, failed, or excess mitigation. The results frequently failed to meet requirements of the project proponent, managing agencies, and/or the public. To resolve this problem, an adaptative management approach can be used. The Council for Environmental Quality encourages this approach for projects covering large areas or long periods of time. Examples of recent uses of this approach

on the Colorado River are the Glen Canyon Adaptive Management Program and the MSCP. For these reasons, the reporting agencies are recommending development and implementation of a habitat-based monitoring and adaptive management plan.

Meffe et al. (1994) defined habitat-based management as a management focus that de-emphasizes individual species, focusing instead on maintaining habitat or ecosystem quality including ecological processes important in maintaining the characteristic biodiversity of an area. Adaptive management is a flexible approach that uses ongoing monitoring and research results to refine management strategies and actions through the life of the project. For this project we recommend five parts to the adaptive management plan: (1) An interagency team to develop and oversee the plan; (2) establishment of baseline conditions, including information needs; (3) development of objectives; (4) development and implementation of a monitoring plan; and (5) evaluation of results and refinement of management and mitigation strategies.

1. Fish and Wildlife Coordination Act Team

An interagency team will consist of individuals from the reporting agencies and USBR (FWCA Team). The FWCA Team will hold public information sessions with other government agencies, NGO's, stakeholders, and public with interests in and expertise on the LCR; but the FWCA Team has the decision, reporting, and implementation responsibilities. The FWCA Team will be responsible for developing a monitoring plan, mitigation proposal, and mechanism for mitigating unanticipated impacts. The FWCA Team will determine any information needs for establishing baseline conditions and incorporate them into the monitoring program. The FWCA Team will submit a report for the USBR's consideration by December 31, 2003. The FWCA Team will oversee monitoring and meet annually to evaluate results and propose mitigation. The USBR will be responsible for implementing the monitoring and mitigation measures.

2. Baseline Conditions

In addition to the documents previously noted, there are annual waterfowl surveys, Christmas bird counts, breeding bird surveys, and other information sources available to establish baseline conditions. The FWCA Team will present this information and identify information needs in the first annual report.

3. Objectives

Section 2 (a) of the FWCA directs that consultation be done with a "view to the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for the development and improvement thereof in connection with such water resource development." This is consistent with the reporting agencies' policies of maintaining, enhancing, or restoring riparian habitats. Therefore, the primary objective is to maintain existing riparian habitats by avoiding, restoring, or mitigating for habitats degraded or lost as a result of these water transfers. Another objective is to improve habitats. This last objective could be met by either conducting

or funding riparian habitat restoration or allocating water to the agencies through in-stream flows or diversions for habitat use. Water allocation may require a change in the legal definition of beneficial use.

Section 2(f) of the FWCA establishes a requirement to estimate wildlife benefits or losses resulting from the project. This requirement includes economic benefits. While there are data on LCR wildlife-related recreation, such as user-days, the reporting agencies are not aware of any recent studies documenting the economic value of wildlife or wildlife-related recreation on the LCR. Therefore, the first report will detail a monitoring plan with an objective of estimating wildlife benefits or losses by determining (a) changes in habitat type and quality and (b) impacts to wildlife-related recreation. This will include a habitat-based method, such as the USFWS's Habitat Evaluation Procedures, and a study of baseline economic value of wildlife and wildlife-related recreation and potential economic impacts from lost recreational opportunities.

Water of the LCR is a valuable and sought after resource. As noted in the Background of this report, the proposed action is only about one-fourth of the total amount of flow being considered for transfer or change in point of diversion in the LCR (388,000 afy compared to 1.574 million afy). The MCSP is an effort to meet ESA sections 7 and 10 compliance requirements for such future projects. Future projects will require FWCA consultation. The monitoring plan will be developed so future impact analysis can use this information and the plan expanded to meet future compliance needs or incorporated into future project compliance efforts, including the MSCP. In this regard, an evaluation of impacts from the proposed Palo Verde Irrigation District water transfers of up to 111,000 afy will be included in the monitoring plan.

4. Monitoring Plan

The goal of the monitoring plan is to determine if the flow reduction is having significant adverse impacts to fish and wildlife resources and wildlife-related recreation. Unfortunately, determining a population trend for fish and wildlife species and attributing a cause is very difficult because there may be multiple factors contributing to the trend. Because the primary impact of this project is a reduction in flows and groundwater elevations, the monitoring will focus on water parameters and availability in the identified key habitats. This approach assumes that if the habitats and water parameters are maintained, any impacts to fish and wildlife resources will not be due to this project. The monitoring plan will have three components: Habitat, baseline and short-term water parameters, and long-term water parameters. Monitoring will begin in 2003.

Habitat

In 1976 and 1997, the USBR produced vegetation maps with acres of each habitat type and, when appropriate, subtypes or structure classes. The USBR will produce updated vegetation maps with acreage using protocols such as a geographic information system to be shared with the FWCA Team to allow comparisons with previous maps. The maps will initially be produced at

least every 5 years to correspond to the LROC review schedule. Maps may be produced at shorter intervals if monitoring indicates that significant changes are occurring. Habitats identified and monitored in water parameter studies will be monitored for changes in habitat area and habitat quality. The FWCA Team will identify representative samples of each habitat type to be monitored.

Baseline and Short-term Water Parameters

Table 2 identifies the habitat types; focus fish and wildlife species, guilds, and activities (resources) for that type; and water parameters to be monitored. Data will be collected monthly with a sufficient sample size for a statistically valid study. A representative sample of at least 10 percent total acreage for each type will be sampled. To establish a baseline, the data will be correlated with Parker Dam releases and flows at existing stream gauges. In addition, the USBR will predict river operations and approximate flows for the proposed action so that data can be collected at these flows.

Long-term water parameters

The habitat and water parameters data will be collected periodically with a sufficient sample size for a statistically valid study for the life of the project.

Table 2. Habitats, resources, and water parameters to be measured.

Habitat	Resource	Parameters
Backwater	Native fish	DO, TDS, Temp
Backwater	Sport fish	DO, TDS, Temp
Backwater	Waterfowl	DO, TDS, Temp
Backwater	Sport fishing	Access
Marsh	Migratory birds	Water depth, Flow
Marsh	Black rail	Water depth, Flow
Shallow water	Shorebirds	Depth, Changes in area/location
River channel	Fish	Depth, Temp
River channel	Boating	Access
Mesquite bosque	Migratory birds	Depth to groundwater, TDS, soil TDS
Wetted perimeter	Shorebirds	Extent, Location
Cottonwood-willow	Birds + mammals	Age structure, Health, Depth to groundwater, TDS

5. Evaluation and Management Actions

The goal of this FWCA report is to ensure that existing habitats are maintained at current acreage and quality and to enhance and restore degraded habitats. The FWCA Team, using existing information, will establish baseline habitat acreage and quality and use initial water parameter measures to establish baseline water parameters. The FWCA Team will establish water parameter thresholds that signal possible impacts to habitats or fish and wildlife. The first approach will be to restore water parameters to baseline levels. If this is not feasible, habitat will be replaced or restored to achieve no net loss of habitat. Additional compensation acreage may be necessary to compensate temporal or habitat value losses. If impact thresholds are not reached, there will be no required mitigation. The FWCA Team will more fully develop a mitigation strategy as part of the adaptive management plan to be submitted before December 2003.

Development of a plan to improve wildlife resources and ensure successful mitigation would require conducting research on techniques to restore or enhance native habitats. There have been numerous attempts to enhance or restore native habitats on the LCR, but little long-term success. Building on previous studies, testing of restoration or enhancement techniques needs to continue in order to effectively restore fish and wildlife resources. One criterion of the research would be that the techniques must be applicable to opportunities along the LCR. Data from the monitoring plan should be used in this study.

A significant problem in habitat restoration is obtaining sufficient water. This water transfer exacerbates this problem below Parker Dam. As mitigation and enhancement for fish and wildlife resources, the water agencies may make water available for approved restoration projects. There would be an annual cap of 10 percent of the amount of water transferred with a change in diversion point in that year.

To promote equal consideration of wildlife resources in project planning, review of the economic impacts of all resources related to LCR water should be undertaken to determine the ecological sustainability of their use. With planning horizons as long as 75 years, evaluating resources to determine if they meet "human needs without compromising the health of ecosystems" (Callicott and Mumford 1999) would assist the Secretary, the Basin States, Congress, and others in developing sound natural resource policy in LCR decisions. Information from the wildlife economic studies in the monitoring plan would be useful in this effort. The predictive hydrological models used to determine the AOP would also be a component of this review. We recommend that the USBR take the lead to form a workgroup that would make recommendations to the Secretary on how to incorporate sustainable economics into the LCR environmental review process. The planning agencies are willing to discuss this in a preliminary meeting with the USBR, other Federal and State agencies, and Tribes.

The development of the Colorado River, highlighted by the closure of Hoover Dam, has profoundly affected the long-term livelihood of the LCR ecosystem by reducing and, in many

years, eliminating flows through the Limitrophe Division southerly to the delta and Sea of Cortez. Both the U.S. and Mexico utilize nearly their entire apportionment of Colorado River water for agriculture, municipal, and industrial purposes. The IS Criteria further restrict the possibility that flood flows might reach the delta and Sea of Cortez, and the more exact quantifying of flows for the IA and IOP will further reduce inadvertent overruns that nourished the delta. The reporting agencies, USBR, and their counterparts in Mexico have begun documenting the status of fish and wildlife resources of this area in a first step towards fulfilling Minute 306, a 2000 amendment to the 1944 Water Treaty. The amendment calls for joint studies and for examining ways to ensure water for ecological purposes. Negotiations with Mexico would ensure that water used to sustain the ecological resources of the Limitrophe that flows past the Southern International Boundary would sustain ecological resources in the delta and the Sea of Cortez. To assist in identifying the potential water needs of fish and wildlife resources in the Limitrophe, data collection for the monitoring plan will also include the remainder of the river to the Southern International Boundary. This will include the wildlife economic data necessary for any sustainable economics review and would be an important consideration in the process of reuniting the ecosystem connection between the delta and Sea with the LCR.

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