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# LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PROGRAM

# WORK TASKS AND OBLIGATIONS FOR FEDERAL FISCAL YEAR 2005

**MAY 13, 2005**

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The following report documents the on-going Bureau of Reclamation (Reclamation) tasks for Fiscal Year 2005 (FY05) for Lower Colorado River Multi-Species Conservation Program (LCR MSCP) implementation. The implementation phase of the LCR MSCP officially started on April 4, 2005, with the signing of the final documents and agreements for implementing the LCR MSCP. Reclamation, as the implementing entity for the LCR MSCP continued or initiated LCR MSCP tasks beginning October 1, 2004. Therefore, the costs associated with the following tasks are estimates of Reclamation expenditures for the entire fiscal year. Actual obligations that will be requested for financial credit will be presented after the end of FY05. These costs do not include Reclamation's expenditures for MSCP plan development.

Attached is a summary of the total estimated obligations for LCR MSCP activities for FY05. Also included are individual narratives describing each specific work task. Reclamation expects to expend and receive financial credit for these implementation tasks Administrative costs shown are those expected to be expended starting April 4, 2005 through September 30, 2005.

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| **WORK TASKS** | |
| **Program Elements** | **Estimate** |
| Sub-Elements | |
| **A. Program Administration** | **$550,000** |
| 1. Senior and Support Staff | $550,000 |
| **B. Fish Augmentation** | **$1,033,000** |
| 1. Lake Mohave Razorback Sucker Larvae Collections | $175,000 |
| 2. Willow Beach National Fish Hatchery | $170,000 |
| 3. Achii Hanyo National Fish Hatchery | $50,000 |
| 4. Dexter National Fish Hatchery | $142,000 |
| 5. Bubbling Ponds Fish Hatchery | $86,000 |
| 6. Lake Mead Fish Hatchery | $50,000 |
| 7. Lake-side Rearing Ponds | $250,000 |
| 8. PIT Tag Procurement | $75,000 |
| 9. Boulder City Wetland Ponds | $35,000 |
| **C. Species Research** | **$813,000** |
| **General** | |
| 1. Point Count Design and Sample Size Evaluation | $50,000 |
| 2. Brown-Headed Cowbird Trap Assessment | $80,000 |
| 3. Development of Backwater Rating Criteria | $50,000 |
| **Riparian/Neotropic Birds** | |
| 4. Southwestern Willow Flycatcher Feather Colorimetry Study | $21,000 |
| 5. Southwestern Willow Flycatcher Prey Base Study | $65,000 |
| 6. Yellow-Billed Cuckoo Demographics Study | $115,000 |
| 7. Yellow-Billed Cuckoo Surveys, Demographic Study, & Survey Protocol Eval. | $51,000 |
| **Native Fishes** | |
| 8. Razorback Sucker Survival Study | $250,000 |
| 9. Razorback Sucker Pen Rearing Tests | $62,000 |
| 10. Senator Wash Razorback Sucker Stock Assessment | $45,000 |
| 11. Bonytail Feeding Trials | $24,000 |
| **D. System Monitoring** | **$2,133,000** |
| **General** | |
| 1. Vegetation Type Mapping | $327,000 |
| 2. Marsh Bird Surveys | $50,000 |
| **Riparian/Neotropic Birds** | |
| 3. Southwestern Willow Flycatcher Presence/absence Surveys | $785,000 |
| 4. Southwestern Willow Flycatcher Habitat | $160,000 |
| 5. Southwestern Willow Flycatcher Habitat Monitoring in the Grand Canyon | $65,000 |
| 6. Monitoring Avian Production & Survivorship (MAPS) | $300,000 |
| **Native Fishes** | |

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| 7. Lake Mead Razorback Study | $198,000 |
| 8. Lake Mohave Razorback Sucker and Bonytail Stock Assessment | $180,000 |
| 9. Flannelmouth and Razorback Sucker Monitoring Below Davis Dam | $58,000 |
| 10. Humpback Chub Monitoring Program | $10,000 |
| **E. Conservation Area Development & Management** | **$1,991,000** |
| **REACH 3** | |
| 1. Beal Lake, Havasu National Wildlife Refuge | $543,000 |
| 2. Needles-Topock (Az Rm 240) Stabilization, Havasu National Wildlife Refuge | $80,000 |
| 3. Pintail Slough, Havasu National Wildlife Refuge | $10,000 |
| 4. Planet Ranch, Bill Williams River | $100,000 |
| **REACH 4** | |
| 5. Ahakhav Tribal Preserve, Colorado River Indian Tribes | $120,000 |
| 6. Unit #1 (Genetics, Mass Planting, Seed), Cibola National Wildlife Refuge | $492,000 |
| 7. Hart Mine Marsh, Cibola National Wildlife Refuge | $100,000 |
| 8. Cibola Valley Conservation Area | $120,000 |
| **REACH 5** | |
| 9. Imperial Demonstration Ponds, Imperial National Wildlife Refuge | $105,000 |
| 10. Draper Lake, Imperial National Wildlife Refuge | $100,000 |
| 11. Walker Lake, Imperial National Wildlife Refuge | $61,000 |
| 12. Butler Lake, Imperial National Wildlife Refuge | $55,000 |
| 13. McAllister Lake, Imperial National Wildlife Refuge | $40,000 |
| **REACH 6** | |
| 14. Pratt Agricultural Lease | $15,000 |
| 15. Mittry Lake Fire Rehabilitation Project | $50,000 |
| **F. Post Development Monitoring** | **$345,000** |
| 1. Vegetation Survival and Growth – Habitat Monitoring | $250,000 |
| 2. Avian Use of Restoration Sites | $50,000 |
| 3. Small Mammal Colonization of Restoration Sites | $45,000 |
| **G. Adaptive Management Program** | **$195,000** |
| 1. LCR MSCP Data Management | $160,000 |
| 2 Annual Report Writing and Production | $35,000 |
| **TOTAL** | **$7,060,000** |

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| **Work Task A1:** | **Senior and Support Staff** |
| **Point of Contact:** | Ms. Lorri Gray (Reclamation) (702) 293-8411 |
| **Purpose**: | Provide senior staff and administrative support to manage implementation of the LCR MSCP. This will be directed by the LCR MSCP Program Manager. |
| **Location:** | Reclamation's Lower Colorado Regional Office, Boulder City, NV 89005. |
| **FY05 Estimate:** | $550,000. Funding for Program Administration in FY05 provides for the establishment and development of a LCR MSCP Office within the Lower Colorado Region. Funding is provided for staffing that includes for the remaining 5 months of FY05 (April – September). Salary is included for a Program Manager, senior and administrative staff. |
| **Project Description:** | During the remainder of FY05 the Administrative structure for the LCR MSCP will be put into place and become operational. This will involve selecting a Program Manager, in consultation with the Steering Committee, and identifying administrative staff. These staff will include budget management, GIS, database, senior staff including group managers for restoration and research and monitoring, and clerical personnel. |
| **Long-Term Goal:** | To provide program management for the LCR MSCP in an efficient and fiscally responsible manner. To ensure all LCR MSCP goals are accomplished as described in the program documents. |

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| **Work Task B1:** | **Lake Mohave Razorback Sucker Larvae Collections** |
| **Partners:** | Lower Colorado River Native Fish Work Group |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Harvest wild razorback sucker larvae from Lake Mohave and deliver to Willow Beach National Fish Hatchery for inclusion into the LCR MSCP Fish Augmentation Program. |
| **Conservation Measures:** | RASU3, RASU5, and RASU8 |
| **Long-term Goal:** | Razorback sucker are one of two endangered fish species targeted for the Fish Augmentation Project. Wild razorback sucker larvae provide the best quality fish for this program. |
| **Location:** | Lake Mohave |
| **FY05 Estimate:** | $175,000 for in-house staff, equipment, material, and supplies for the collection and transportation of 65,000 larvae from Lake Mohave to Willow Beach Hatchery. This is a labor intensive action. The FY05 budget estimate is $175,000 of which only $25,000 is equipment, material and supplies. |
| **Project Description:** | This project will capture wild-born razorback sucker larvae from Lake Mohave, and deliver them to Willow Beach Hatchery for initial rearing. Since 1992 Reclamation and its partners have been rebuilding the razorback sucker brood stock in Lake Mohave. Each winter/spring these fish spawn along the lake's shoreline. Their larvae represent the remaining genomes for razorback sucker and provide a level of genetic diversity found nowhere else in the world**.**<br><br>The Lower Colorado River Native Fish Work Group met in September 2004 and recommended that all razorback rearing be initiated from wild-caught Lake Mohave larvae. |
| **FY04 Accomplishment:** | During 2004, some 25,000 razorback sucker larvae were captured and transferred to Willow Beach Hatchery. |

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| **Work Task B2:** | **Willow Beach National Fish Hatchery** |
| **Partners:** | U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Develop, maintain, and operate a portion of the fish rearing facility to contribute to the LCR MSCP Fish Augmentation Program. |
| **Conservation Measures:** | RASU3 and RASU4 |
| **Long-term Goal:** | The two principal fishes to be reared are the razorback sucker and the bonytail. Over 1.20 million native fish need to be reared. Willow Beach Hatchery is an integral part of the Fish Augmentation Program. |
| **Location:** | Willow Beach National Fish Hatchery is located on the Colorado River approximately five miles below Hoover Dam within Lake Mead National Recreation Area. |
| **FY05 Estimate:** | $175,000 for in-house staff, equipment, material, and supplies to receive and rear 65,000 razorback sucker larvae, 25,000 juvenile razorback sucker, and 15,000 bonytail. |
| **Project Description:** | This program will facilitate rearing of razorback sucker and bonytail for release into the lower river as part of the LCR MSCP's Fish Augmentation Program. Willow Beach National Fish Hatchery is managed by the FWS, and is staffed by both Service and Reclamation employees. |
| **FY04 Accomplishment:** | In FY04 some 25,000 wild-caught razorback sucker larvae were brought into the hatchery and reared to fingerling size. Over 15,000 razorback suckers from previous stocks were reared, tagged and repatriated to Lake Mohave. Thirty adult razorback suckers were hand spawned and their offspring delivered to Bubbling Ponds Hatchery. 5,000 bonytail were reared, tagged and delivered to Lake Havasu. |

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| **Work Task B3:** | **Achii Hanyo National Fish Hatchery** |
| **Partners:** | Colorado River Indian Tribes (CRIT)<br>U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Continue to develop a native fish rearing facility to contribute to the LCR MSCP Fish Augmentation Program. |
| **Conservation Measures:** | BONY3 and BONY4 |
| **Long-term Goal:** | Increase native fish production capabilities. The two principal fishes to be reared are razorback sucker and bonytail. The goal is to rear and stock over 1.2 million native fish. This facility will have a role in the Fish Augmentation Program. |
| **Location:** | Achii Hanyo, Colorado River Indian Tribes Reservation south of Parker, Arizona. |
| **FY05 Estimate:** | $50,000 will be obligated in FY05 to continue work on water intakes, strengthening earthen berms, developing fish collection kettles and similar facility improvements. |
| **Project Description:** | This project will facilitate rearing of razorback sucker and bonytail for release into the lower river as part of the LCR MSCP's Fish Augmentation Program. Achii Hanyo is a satellite facility of Willow Beach National Fish Hatchery and is managed by the Fish and Wildlife Service. |
| **FY04 Accomplishment:** | In August 2004 an agreement was signed to provide $200,000 for facility improvement at Achii Hanyo over a four-year period. The FY04 obligation was $50,000. |

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| **Work Task B4:** | **Dexter National Fish Hatchery** |
| **Partners:** | U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Rear razorback sucker and bonytail to contribute to the LCR MSCP Fish Augmentation Program. |
| **Conservation Measures:** | RASU3, RASU4, BONY3, and BONY4 |
| **Long-term Goal:** | Increase native fish production capabilities. The two principal fishes to be reared are razorback sucker and bonytail. The goal is to rear and stock over 1.2 million native fish. Dexter Hatchery is an integral part of the Fish Augmentation Program and will be the key production facility for bonytail. |
| **Location:** | Dexter National Fish Hatchery, New Mexico |
| **FY05 Estimate:** | $142,000 has been obligated from FY05 funds under an interagency agreement for work at the hatchery. |
| **Project Description:** | This project will rear razorback sucker and bonytail for release into the lower river as part of the LCR MSCP's Fish Augmentation Program. Dexter National Fish Hatchery is managed and operated by the Fish and Wildlife Service. The facility maintains the only brood stock for bonytail in the world, and also maintains a backup brood stock of razorback sucker. Work scheduled for FY05 includes maintaining extant brood fish and producing young for use in the LCR MSCP program. Target production for FY05 is 75,000 fingerling bonytail for distribution to other hatcheries; rear 500-1000 razorback sucker to 350 mm or greater; and rear 3000-5000 bonytail to 300 mm or greater. |
| **FY04 Accomplishment:** | More than 5,000 razorback sucker and 12,000 bonytail were reared to stocking size, tagged and repatriated to the lower Colorado River. |

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| **Work Task B5:** | **Bubbling Ponds Fish Hatchery** |
| **Partners:** | Arizona Game and Fish Department<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Develop, maintain, and operate a native fish rearing facility to contribute to the LCR MSCP Fish Augmentation Program. |
| **Conservation Measures:** | RASU3 and RASU4 |
| **Long-term Goal:** | Increase native fish production capabilities. The two principal fishes to be reared are razorback sucker and bonytail. The goal is to rear and stock over 1.2 million native fish. Bubbling Ponds Fish Hatchery will be an integral part of the Fish Augmentation Program for the LCR MSCP, providing between 5,000 and 15,000 razorback suckers annually to the program. |
| **Location:** | Bubbling Ponds Fish Hatchery, Sedona, Arizona. |
| **FY05 Estimate:** | $86,000 for in-house staff and agreement costs. |
| **Project Description:** | This project will rear razorback sucker for release into the lower river as part of the LCR MSCP's Fish Augmentation Program. Bubbling Ponds Fish Hatchery is managed by Arizona Game and Fish Department. The facility was first developed in the 1950's. Reclamation and AGFD have been cooperatively upgrading this facility since 1998. |
| **FY04Accomplishment:** | During 2004, some 25,000 razorback sucker fingerlings were transferred to the facility from Willow Beach Hatchery; over 11,000 razorback suckers from previous production years were reared, tagged and repatriated to the lower Colorado River (below Parker Dam). |

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| **Work Task B6:** | **Lake Mead Hatchery** |
| **Partners:** | Nevada Department of Wildlife (NDOW)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Develop warm water rearing capability for offspring of Lake Mead razorback suckers to contribute to the LCR MSCP fish augmentation program. |
| **Conservation Measures:** | RASU3, RASU4, RASU7, and RASU8 |
| **Long-term Goal:** | Razorback sucker are one of two endangered fish species targeted for the Fish Augmentation Program. Production needs will range from 15,000 to 30,000 sub-adult fish per year. Development of warm water capability at Lake Mead Hatchery will provide program assurance for reaching the needed annual production. |
| **Location:** | Lake Mead |
| **FY05 Estimate:** | $50,000 in materials, equipment and supplies to outfit this new native fish portion of the facility in order to rear razorback sucker for the Fish Augmentation Program. |
| **Project Description:** | This project will assist and expedite development of native fish rearing capability at NDOW's Lake Mead Fish Hatchery. The facility is operated and managed by Nevada Department of Wildlife and is currently being renovated. |
| **FY04 Accomplishment:** | Renovation began of this cold-water trout rearing hatchery in 2004. The hatch house design included a section dedicated to native fish. |

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| **Work Task B7:** | **Lake-Side Rearing Ponds** |
| **Partners:** | Lower Colorado River Native Fish Work Group |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Rear razorback suckers in isolated rearing ponds along the Lake Mohave shoreline to contribute to the LCR MSCP fish augmentation program. |
| **Conservation Measures:** | RASU3 and RASU5 |
| **Long-term Goal:** | Increase native fish production capabilities. The two principal fishes to be reared are razorback sucker and bonytail. The goal is to rear and stock over 1.2 million native fish. The Lake Mohave razorback sucker population is the brood stock for the Fish Augmentation Program. Maintenance of this population is dependent upon the success of the lake-side pond operation. |
| **Location:** | Lake Mohave |
| **FY05 Estimate:** | $250,000 for in-house staff, travel, boat maintenance, fuel, and slip rentals to provide bi-weekly care of fish in these ponds from March to November. |
| **Project Description:** | This project is part of the Lake Mohave Razorback Sucker repatriation program and provides for on-site conditioning of juvenile razorback suckers to local water quality and other environmental factors. This work began as the primary tool for accomplishing the repatriation program prior to the involvement of Willow Beach Hatchery (1996). Results to date show significant survival of these fish. |
| **FY04 Accomplishment:** | In 2004, over 2,000 fish were reared in these ponds and repatriated to the lake. |

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| **Work Task B8:** | **PIT Tag Procurement** |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Acquire fish tagging materials for native fishes to be released into the lower Colorado River. |
| **Conservation Measures:** | RASU3, RASU6, BONY 3 and BONY5 |
| **Long-term Goal:** | Increase native fish production capabilities. The two principal fishes to be reared are razorback sucker and bonytail. The goal is to rear and stock over 1.2 million native fish. During the first 10 years of the program, most fish will be tagged with PIT tags to allow for maximum information gathering upon recapture. Such survival and distribution data will be needed for future decision making. |
| **FY05 Estimate:** | $75,000 for the purchase of 20,000 tags, along with repair and replacement of tagging equipment and tag readers. |
| **Project Description:** | Fish Augmentation Program requires all fishes to be marked in some way to facilitate identification upon recapture. To assist with survival studies, PIT tags (passive integrated transponder tags) which provide a unique ten-digit alpha-numeric code for each tag are inserted into the fish's body cavity. Each tag contains a coil of wire and a computer chip. A magnetic field will generate enough electricity to download the tag number. Theoretically the tags should last indefinitely. Reclamation and FWS have been using these tags successfully along the lower Colorado River since 1991. |
| **FY04 Accomplishment:** | In 2004 15,000 tags were purchased to be on hand during FY05 to tag fish currently being reared. |

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| **Work Task B9:** | **Boulder City Wetland Ponds** |
| **Partners:** | Nevada Department of Wildlife (NDOW)<br>City of Boulder City, Nevada<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Develop and maintain off-site rearing capabilities to augment production at state and federal hatcheries. |
| **Conservation Measures:** | RASU3, RASU6, BONY 3 and BONY5 |
| **Long-term Goal:** | The two principal fishes to be reared are razorback sucker and bonytail. Maintaining rearing capability at multiple sites assures program accomplishment by providing contingencies in case of catastrophic events at one or more facilities. |
| **FY05 Estimate:** | $35,000 in FY05 has been estimated to rebuild pond #4 in the Boulder City Wetlands complex and replace the liner damaged by wild fire. Once repaired, the pond will receive juvenile fish from Willow Beach National Fish Hatchery for rearing. |
| **Project Description:** | Reclamation, Nevada Department of Wildlife, and City of Boulder City have been cooperatively operating fish rearing ponds at the Veteran's Memorial Park in Boulder City. |
| **FY04 Accomplishment:** | In FY 2004 the ponds were used for holding and rearing razorback sucker from Lake Mead. A brush fire destroyed the liner of one pond. |

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| **Work Task C1:** | **Point Count Design and Sample Size Evaluation** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | System monitoring is required by the LCR MSCP to evaluate effectiveness of proposed habitat restoration. To initiate a system monitoring program for riparian obligate birds, a monitoring system must be designed and samples taken to determine sample size. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | Starting in FY06, a system monitoring program for riparian avifauna will be initiated, using information obtained in FY05. These surveys will continue on a periodic basis throughout the LCR MSCP period. |
| **FY05 Estimate:** | In 2005, Reclamation biologists will conduct a sample of point count transects along the LCR. Data gathered will be used to design the monitoring system and determine the number of point transects needed to obtain adequate sample size to effectively monitor long-term trends along the LCR. FY05 costs are estimated at $50,000 and include Reclamation staff, travel, and per diem. |
| **Project Description:** | The LCR MSCP lists 26 covered species and 5 evaluation species. Some individual species such as the southwestern willow flycatcher and the yellow billed cuckoo have or will have system monitoring programs established. However, it is inefficient to monitor every covered species individually throughout the entire LCR MSCP project area.<br><br>Monitoring bird populations is an effective way to monitor ecosystem health, especially neo-tropical migratory birds within riparian habitats. Reclamation has worked with Great Basin Bird Observatory, U. S. Geological Survey, and other agencies to develop a system monitoring design for the State of Nevada, through Partners-in-Flight. By utilizing a similar monitoring plan, data from the LCR can be incorporated into a larger, regional database to make these data more powerful during analysis. Population trends can be derived over time, thus enabling Reclamation to monitor riparian habitat health and effectiveness of the LCR MSCP Habitat Conservation Plan. |

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| **Work Task C2:** | **Brown-Headed Cowbird Trap Assessment** |
| **Partners:** | Havasu National Wildlife Refuge<br>Bill Williams National Wildlife Refuge<br>Alamo Lake State Wildlife Area<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Evaluate brown-headed cowbird (BHCO) control program. |
| **Conservation Measures**: | MRM4 |
| **Long-term Goals:** | Post-trap monitoring will continue until BHCO population numbers and/or parasitism rates approach pre-trap numbers. These data will enable Reclamation to determine potential BHCO trapping intervals when such control measures are deemed necessary to protect LCR MSCP covered species, especially southwestern willow flycatcher. |
| **FY05 Estimate:** | Estimated FY05 costs are approximately $80,000, including lower Colorado Regional staff oversight. These costs are for continued monitoring. Reclamation's Denver Technical Service Center (TSC) is conducting this evaluation. |
| **Project Description:** | From 1998-2001, Reclamation implemented a BHCO control program in accordance to the 1997 Biological Opinion on routine operations and maintenance of the lower Colorado River. BHCO traps were placed at Havasu National Wildlife Refuge (1998 only), Alamo Lake State Wildlife Area (Arizona), and the Bill Williams National Wildlife Refuge. Trapping was suspended after the 2001 breeding season and success was monitored from 2002-2004. BHCO populations have not reached pre-trap numbers and parasitism rates for host species have remained low. Monitoring will continue to determine how long trapping can be effective before BHCO population numbers and/or parasitism rates approach pre-trap levels. |
| **Accomplishments to date:** | Trapping was conducted from 1998-2001. The TSC produced a report on post-trap monitoring for 2002-2004. |

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| **Work Task C3:** | **Development of Backwater Rating Criteria** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Develop criteria for classifying backwaters for fish and wildlife habitat values. |
| **Conservation Measures:** | MRM 1, MRM2, CLRA1, CLRA2, BONY2, RASU2, BLRA1, and FLSU1 |
| **Long-term Goal:** | Backwater rating criteria will be used to evaluate existing backwaters for fish and wildlife habitat value and will enable Reclamation to incorporate necessary habitat components into future backwater restoration projects. |
| **FY05 Estimate:** | Creation of covered species profiles and development of rating criteria will be done in FY05 using a contract currently being utilized to update LCR vegetation type maps. Contract costs will be approximately $40,000. Reclamation staff costs for administering this contract will be approximately $10,000. |
| **Project Description:** | In the mid-1980's, BIO-WEST conducted a study for Reclamation on backwaters along the LCR between Davis Dam and the Southerly International Boundary. Existing backwaters were mapped and a model was developed to classify general wildlife and fish habitat values for these backwaters. These maps were updated in 2000. The mapping and classification system developed during these studies have allowed Reclamation to determine the extent of backwaters, to assess existing backwaters for habitat value, and to determine factors necessary for constructing backwaters for fish and wildlife. This project will update the backwater maps and develop rating criteria for fish and wildlife, especially LCR MSCP covered species. These data and models will be used to prioritize backwater restoration projects. |

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| **Work Task C4:** | **Southwestern Willow Flycatcher Feather Colorimetry Study** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | To determine if southwestern willow flycatchers (SWFL) can be identified to subspecies in the field by using colorimetry methodology. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goals:** | Field data will be collected, in conjunction with the SWFL life history studies and the Monitoring Avian Productivity and Surviviorship (MAPS) program, during the 2005 breeding season. A manuscript will be submitted to a peer-reviewed journal by March 2006. If successful, this technique may be used to differentiate between subspecies when monitoring and evaluating restoration projects in the future. |
| **FY05 Estimate:** | A modification of Reclamation's contract with SWCA to conduct presence/absence surveys and life history studies on SWFL along the LCR has been initiated to test the effectiveness of colorimetry in determining subspecies of willow flycatchers. FY05 cost estimates are approximately $21,000 including field support and quality assessment. |
| **Project Description:** | The SWFL is a polytypic species, with four subspecies generally recognized. At least two, and possibly three, subspecies utilize the LCR during migration. One subspecies, the SWFL, is listed on federal and state endangered or sensitive species lists and is a LCR MSCP covered species. Distinguishing subspecies in the field has been problematic. Recently, new technology (colorimetry) has been described as a reliable method for characterizing plumage coloration differences in birds and may be useful in distinguishing willow flycatcher subspecies in the field. |
| **Accomplishments to date:** | In 2004, U. S. Geological Survey analyzed data collected by cooperators to evaluate the potential use of colorimetry and expressed the need for this study. |

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| **Work Task C5:** | **Southwestern Willow Flycatcher Prey Base Study** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Investigate Southwestern Willow Flycatcher (SWFL) diet by acquiring fecal samples and sampling insects within occupied SWFL breeding sites. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | Information obtained from this study will be used to help plan riparian habitat restoration projects and may be used to evaluate habitat quality. |
| **FY05 Estimate:** | SWFL prey availability report will be completed in FY05. Further studies will be implemented to determine potential differences in prey species and abundance between occupied and unoccupied habitat. FY05 costs are estimated at $65,000 including field support and quality assessment. |
| **Project Description:** | Life history studies have shown that abiotic conditions within SWFL habitat may influence habitat selection, especially the presence of standing water or saturated soils. Other biotic components, such as insect distribution and abundance, may also influence habitat quality. In 2004, insect and SWFL fecal samples were collected in occupied SWFL breeding habitat and sent to the University of California – Davis (UCD) for identification. These data will be used to determine prey availability within occupied SWFL breeding habitat. |
| **Accomplishment to date:** | Insect and fecal samples were obtained and delivered to UCD during the 2004 field season. UCD provided Reclamation with insect data. FY04 costs for the cooperative agreement were $41,032. |

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| **Work Task C6:** | **Yellow-Billed Cuckoo Demographic Study** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Conduct demographic studies of yellow-billed cuckoo (YBCU) to better understand life requisites and necessary habitat components for development of system monitoring system and future LCR MSCP riparian habitat restoration projects. |
| **Conservation Measures:** | MRM1 and MRM2. |
| **Long-term Goal:** | This study will conclude after the 2005 field season. A final report is anticipated in the Spring of 2006. Additional studies will be identified, including population genetics. |
| **FY05 Estimate:** | Reclamation has a grant agreement with Southern Sierra Research Station to conduct this study. Estimated FY05 cost associated with this agreement are approximately $115,000 including field support and quality assessment. |
| **Project Description:** | In 2002, Southern Sierra Research Station began a life history study of YBCU along the San Pedro River in southeast Arizona. YBCU life requisites are not fully understood. Populations along the LCR have not been adequately determined, so this study is being conducted where known populations of YBCU occur. Surveys are conducted, cuckoos are captured, and radio telemetry transmitters are attached to individuals to monitor behavior. Nest success is also measured. |
| **Accomplishments to date:** | This study has been ongoing for three years. In 2003, equipment problems made collection of data difficult. These problems were solved during 2004. |

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| **Work Task C7:** | **Yellow-Billed Cuckoo Surveys, Demographic Study, and Survey Protocol Evaluation** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Partners:** | Bureau of Land Management (BLM)<br>Northern Arizona University (NAU)<br>Bureau of Reclamation (Reclamation) |
| **Purpose:** | Conduct surveys to determine existing yellow-billed cuckoo (YBCU) populations on BLM lands near Yuma, Arizona, test the proposed survey protocol, and determine habitat requirements to guide riparian habitat restoration efforts. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | Information obtained from this study will be used to design a system monitoring program for YBCU. In addition, data collected will enable Reclamation to design restoration sites for YBCU and/or recommend future demographic studies necessary to further understand YBCU populations along the LCR. |
| **FY05 Estimate:** | Estimated FY05 cost associated with the Intra-agency Agreement to conduct this study are approximately $51,000 including field support and quality assessment. |
| **Project Description:** | Reclamation and the BLM have entered into an Inter-agency Agreement (IA) to provide funding to Northern Arizona University (NAU) to conduct presence/absence surveys for YBCU in selected areas near Yuma, Arizona, determine breeding habitat selection and preference, identify requirements for breeding and migration stopover habitats, and evaluate the effectiveness of the proposed survey protocol. This study will provide a standardized survey protocol for YBCU for future system monitoring efforts during the LCR MSCP and will determine habitat requirements necessary to restore riparian habitat for YBCU breeding sites. |
| **Accomplishments to date:** | The IA between Reclamation and BLM is being finalized. BLM and NAU will be finalizing their agreement once this IA is signed. |

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| **Work Task C8:** | **Razorback Sucker Survival Study** |
| **Partners:** | Arizona State University (ASU)<br>Arizona Game and Fish (AGF)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Assess survival and distribution of razorback suckers released into the lower Colorado River. |
| **Conservation Measure:** | RASU6 |
| **Long-term Goal:** | The LCR MSCP will rear and release over 1.2 million fish into the lower Colorado River. Assessments of the overall effectiveness this program will be focused on the survival of these fish and an understanding of the factors affected said survival. These data are required for the Adaptive Management Program. |
| **FY05 Estimate:** | Through an agreement with ASU, $170,000 has been obligated so far in FY05. An additional $65,000 will be obligated to cover expenses for radio-telemetry work. In addition, $8,000 will be expended in staff time for field assistance and quality assurance. The total FY05 burden is estimated at $250,000. |
| **Project Description:** | The 1997 and 2002 Biological Opinions on Reclamation's routine operations required rearing and stocking of 50,000 razorback suckers into lower Colorado River below Parker Dam. Additionally, Reclamation offered to assess the survival of these fish as a conservation measure in the 2002 Biological Assessment. A study was designed in 2002 and initiated in 2003 to implement this assessment. The work is being performed by ASU in cooperation with Reclamation and AGF. |
| **FY 04 Accomplishment:** | During 2004 electro-fishing, trammel netting and hoop netting surveys were conducted monthly between Imperial Dam (river mile 50) and Palo Verde Diversion Dam (river mile 137). Over 20,000 fish were sampled, however only 119 razorback suckers were contacted. All razorback suckers had been repatriated fish from rearing programs. |

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| **Work Task C9:** | **Razorback Sucker Pen Rearing Tests** |
| **Partners:** | Willow Beach National Fish Hatchery<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Assess utility of pen-rearing of razorback suckers in the Colorado River at Willow Beach Hatchery to increase rearing capability at the hatchery and to condition fish to Colorado River conditions before release. |
| **Conservation Measure:** | RASU3 and RASU4 |
| **Long-term Goal:** | The LCR MSCP will rear and release over 1.2 million fish into the lower Colorado River. LCR MSCP will continuously seek for measures to improve both quantity and quality of the fish reared and released. This action offers such improvements. |
| **FY05 Estimate:** | Funding estimate for FY05 is $62,000. This includes $22,000 for netting and flotation materials (construction of pens); $14,000 for floating docks and walkways with safety railings; $8500 for underwater anchoring systems and navigational aids (buoys, lights); and $17,500 for construction and installation (includes use of Reclamation's Dive Team). |
| **Project Description:** | Limited field studies to date indicate that conditioning of hatchery reared razorback suckers increases survival in the wild. This program will construct rearing pens in the river at Willow Beach National Fish Hatchery for the purposes of conditioning the fish prior to actual release, and to increase production capacity at the hatchery. |

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| **Work Task C10:** | **Senator Wash Razorback Sucker Stock Assessment** |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Assess status of razorback suckers released into Senator Wash Reservoir. |
| **Conservation Measures:** | RASU1, MRM1 and MRM2 |
| **Long-term Goal:** | There are no long-term plans to continue this investigation. However, the population should be monitored periodically to assess long-term survival. |
| **FY05 Estimate:** | Reclamation is providing $90,000 to continue this investigation for one year. (Only $45,000 is needed from the LCR MSCP; the balance is provided by Reclamation's Yuma Area Office's programs because of commitments made for repair work on Senator Wash Dam.) |
| **Project Description:** | Senator Wash Reservoir was constructed by Reclamation in 1966 as a pump-back storage facility. It is located along the Colorado River just upstream of Imperial Dam and is approximately 460 acres in size. In 1973 California Fish and Game Department captured razorback suckers in the new impoundment, presumably entrained from the main river during initial filling. Between 1987 and 1991 some 4800 juvenile sucker were released into Senator Wash from varying sources. In 2001, larval razorback suckers were captured. A cooperative investigation by California Fish and Game, Reclamation and Arizona Game and Fish Department began in 2003 to assess the razorback population in the reservoir. The Senator Wash population of razorback sucker can contribute to the population of the LCR as evidenced by the capture of larvae at the outlet to Senator Wash to the Colorado River. |
| **FY 04 Accomplishment:** | During 2004 electro-fishing, trammel netting and hoop netting surveys were conducted. Razorback suckers were marked, released and recaptured in sufficient numbers to generate a population estimate of 280 adults. This amounts to six percent of the juvenile fish stocked into the reservoir over 10 years ago. |

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| **Work Task C11:** | **Bonytail Feeding Trials** |
| **Partners:** | U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Evaluate effects of diet on growth of juvenile Bonytail. |
| **Conservation Measures:** | BONY3 and BONY 4 |
| **Long-term Goal:** | LCR MSCP will continue to support research that will benefit the performance of conservation measures. |
| **FY05 Estimate:** | Reclamation will provide $24,000 to support feeding trials at Willow Beach Hatchery during 2005. |
| **Project Description:** | Fish hatchery management attempts to rear fish to target size in the shortest period of time. Bonytail have shown extremely varied growth in captivity, even for fish from the same family lot. However, age, not size, seems to determine sexual maturity, and small bonytail left in ponds after sorting by size, have actually spawned. Their off-spring then overcrowd the pond and add to the stunting problems. This work will investigate improvements to diet to accelerate bonytail growth. |

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| **Work Task D1:** | **Vegetation Type Mapping** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Establish the baseline acreage for riparian and marsh communities at LCR MSCP initiation. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | In FY05, BIO-WEST, a Reclamation contractor, will complete the aerial image processing and type map the vegetation within LCR MSCP project boundaries. Periodic updates of the vegetation type maps will be conducted under the system monitoring requirement of the LCR MSCP Habitat Conservation Plan. |
| **FY05 Estimate:** | FY05 costs total $327,000. Image processing will be concluded in FY05. Vegetation type maps will be created from this imagery. Task order to BIO-WEST will be approximately $302,000. Reclamation staff costs for administering this contract will be approximately $25,000. |
| **Project Description:** | Riparian and marsh vegetation has been characterized using a classification scheme initially designed by Anderson and Ohmart in 1976. Periodic updates have been conducted along the lower Colorado River to help monitor changes in the riparian ecosystem. The most recent type maps were derived by using imagery acquired in 1997. These acre figures were used throughout the LCR MSCP planning process. This project will provide updated conditions at the initiation of LCR MSCP implementation. |
| **Accomplishment to date:** | Entered into a contract with BIO-WEST to acquire digital aerial photography and initiate triangulation/orthorectification, and color balancing/image mosaicing. FY04 costs were $400,000. |

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| **Work Task D2:** | **Marsh Bird Surveys** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | In support of system monitoring, increase marsh bird survey effectiveness. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | If the new protocol proves to be effective, this program will be used to monitor marsh birds covered under the LCR MSCP and become a routine part of the System Monitoring portion of the Adaptive Management Plan. |
| **FY05 Estimate:** | Reclamation will conduct three surveys between U.S. Route 40 and Lake Havasu. Costs estimates are for staff time, travel, and equipment. Total FY05 costs are approximately $50,000. |
| **Project Description:** | Yuma clapper rail (CLRA) surveys have been conducted annually along the LCR since 1995. In anticipation of the implementation of the LCR MSCP, the University of Arizona conducted a study to determine if CLRA surveys could be expanded to include all three marsh birds of interest to the LCR MSCP without compromising CLRA detection rates. This study has shown that one survey can be conducted for all marsh birds, including the LCR MSCP covered species (Yuma clapper rail, California black rail, and western least bittern). Reclamation will conduct marsh bird surveys, in 2005, using the newly established protocol, contingent upon Fish and Wildlife Service approval. |
| **Accomplishments to date:** | Clapper rail surveys have been conducted since the 1980's to monitor CLRA populations along the LCR. These data are available as baseline information to assess and track the general condition of the overall population. |

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| **Work Task D3:** | **Southwestern Willow Flycatcher Presence/absence Surveys** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Monitor southwestern willow flycatcher (SWFL) breeding populations along the Lower Colorado River (LCR) and conduct demography studies in four study areas to understand life requisites, habitat requirements, and population trends. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | Presence/absence surveys will be conducted for SWFL through the life of the LCR MSCP as part of system monitoring. |
| **FY05 Estimate:** | Reclamation has executed option year two of a contract with SWCA for presence absence surveys and life history studies. This will cost approximately $785,000 in FY05 including field support and quality assessment. |
| **Project Description:** | Reclamation entered into a contract with SWCA in 2003 to conduct presence/absence surveys along the LCR from Separation Rapids in the Grand Canyon, including several tributaries of the LCR, to the Southerly International Boundary; and to conduct life histories studies at four areas. |
| **Accomplishments to date:** | Presence/absence surveys and life history studies began in 1996 under a cooperative agreement with the San Bernardino County Museum. These surveys and studies were conducted under the 1997 Biological and Conference Opinion for routine operations and maintenance of the LCR. A one year contract, with the potential for four option years, was entered into with SWCA in 2003. |

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| **Work Task D4:** | **Southwestern Willow Flycatcher Habitat Monitoring** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Monitor the effects of reduced flows and the associated reduction in groundwater table on southwestern willow flycatcher (SWFL) breeding habitat between Parker and Imperial Dams. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | Continue to monitor SWFL habitat condition through the SIA period, that is being implemented as part of the LCR MSCP. |
| **FY05 Estimate:** | Reclamation has modified the existing SWFL contract with SWCA to monitor 372 acres of breeding habitat between Parker and Imperial Dams. FY05 costs will be approximately $160,000 including field support and quality assessment. |
| **Project Description:** | In 2001, Reclamation received a Biological Opinion (BO) on the Secretarial Implementation Agreement (SIA) for the change in point of diversion of up to 400,000 acre-feet between Imperial and Parker Dams. Reduced river flows created by the change in point of diversion may affect SWFL breeding habitat found between these two dams. Reclamation will monitor 372 acres of SWFL breeding habitat to document changes in habitat condition. |
| **Accomplishments to Date:** | In 2004, Reclamation identified 372 acres of SWFL habitat between Parker and Imperial Dams to monitor for the SIA BO requirement. Data loggers were placed in each stand and data collected will be analyzed by SWCA. |

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| **Work Task D5:** | **Southwestern Willow Flycatcher Habitat Monitoring in the Grand Canyon, Hualapai Tribe** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Partners:** | Hualapai Tribe<br>Bureau of Reclamation (Reclamation) |
| **Purpose:** | Conduct presence/absence surveys for southwestern willow flycatcher (SWFL) on Hualapai tribal lands within the Grand Canyon. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | Surveys will continue as part of the system monitoring program. |
| **FY05 Estimate:** | FY05 costs are estimated to be approximately $60,000 to the Hualapai tribe through a grant agreement and $5,000 for field support and quality assessment. |
| **Project Description:** | Reclamation provides the Hualapai tribe with an annual grant to conduct presence/absence surveys for SWFL on tribal lands within the Grand Canyon in conjunction with the system wide monitoring for the SWFL. These surveys enable the tribe to manage recreation within the canyon while limiting disturbance to nesting SWFL, as well as provide additional data for the system monitoring program. |
| **Accomplishments to date:** | The Hualapai tribe has surveyed tribal lands within the Grand Canyon since 1997. Important recreational areas, such as Spencer Creek, have been surveyed and appropriate management actions have been undertaken to minimize impacts to SWFL breeding sites. |

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| **Work Task D6:** | **Monitoring Avian Productivity and Survivorship (MAPS)** |
| **Partners:** | U.S. Fish and Wildlife Service (FWS)<br>Havasu National Wildlife Refuge<br>Cibola National Wildlife Refuge<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Monitor breeding bird long-term population trends and use of different habitat types along the Colorado River using the MAPS protocol. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | The Cibola Nature Trail MAPS station will be run through at least 2006. The Havasu South Dike station will be run through at least 2009. Additional MAPS stations will be established to monitor long-term trends along the LCR, as a whole, and to evaluate riparian restoration sites as they occur throughout the LCR MSCP project period. |
| **FY05 Estimate:** | Each MAPS station is run 10 times between the beginning of May and the beginning of August. Costs estimates are for Reclamation staff time, travel expenses, and equipment. Monitoring both sites is expected to total approximately $300,000 in FY05. |
| **Project Description:** | MAPS monitors avian populations, using a standardized protocol, throughout the U.S., Canada, and Mexico. Long-term population trend data is collected by conducting intensive banding throughout the breeding season. Data collected are analyzed by the Institute for Bird Populations and long-term population trends are determined on a regional and continental level. In addition, site specific use can be derived from MAPS data after five years of continuous data collection.<br><br>In 2002, Reclamation established a MAPS station at Cibola National Wildlife Refuge within the Nature Trail Riparian Restoration Demonstration site. In addition, a MAPS station was run for five years on Colorado River Indian Tribe (CRIT) lands, near Headgate Rock Dam (2000-04), in mixed native and exotic habitat. In 2005, the CRIT station will no longer be operational; however, a new MAPS station will be established on Havasu National Wildlife Refuge, near South Dike. The Havasu site will provide data from a different reach of the LCR, in mixed cottonwood and salt cedar habitats. |

**Accomplishments to date:**

The Cibola Nature Trail MAPS site has been conducted for three years. Data has been collected, entered into a database, and delivered to the Institue for Bird Populations.

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| **Work Task D7:** | **Lake Mead Razorback Study** |
| **Partners:** | Southern Nevada Water Authority (SNWA)<br>Nevada Department of Wildlife (NDOW)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Monitor razorback sucker population in Lake Mead; collect razorback sucker larvae, rear and repatriate to Lake Mead. |
| **Conservation Measures:** | RASU7 |
| **Long-term Goal:** | Razorback suckers are one of the target fish species for the LCR MSCP program. The Lake Mead population is a unique stock within the project area. Monitoring will continue to provide data to assess overall species status and evaluate conservation measures. |
| **FY05 Estimate:** | Total costs for FY05 are estimated at $198,000. This includes $100,000 for SNWA and $98,000 for Reclamation activities. The monitoring will continue at the same level as 2004. In addition, in FY05 Reclamation or its partners will capture larvae for rearing, and add telemetry work on suckers in Las Vegas Bay to evaluate the impacts of dewatering the spawning area due to declining water levels. |
| **Project Description:** | This project will continue a monitoring program for the Lake Mead razorback sucker population. Under the 2001 BO for ISC/SIA, Reclamation is required to capture up to 5000 wild born razorback sucker larvae from Lake Mead, and rear them for return to the lake. Since 1994 Reclamation has partnered with SNWA and NDOW to conduct this work. Bio/West, Inc. has been on contract to SNWA to implement much of this monitoring. Some 30 juvenile fish have been captured, and aging data show that low-level recruitment has occurred in at least 22 of the past 30 years. The study sheds some light as to why this remarkable recruitment has happened in the face of extensive non-native fish populations. |
| **FY04 Accomplishment:** | During 2004, monitoring showed spawning razorback suckers present in both Las Vegas Bay and Echo Bay. Three juvenile suckers were captured along with a few hundred sucker larvae. |

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| **Work Task D8:** | **Lake Mohave Razorback Sucker and Bonytail Stock Assessment** |
| **Partners:** | Lake Mohave Native Fish Work Group<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Monitor razorback sucker and bonytail populations in Lake Mohave. |
| **Conservation Measures:** | RASU3, RASU5, BONY3 and BONY5 |
| **Long-term Goal:** | Razorback sucker are one of the target fish species for the LCR MSCP program. The Lake Mohave population is the target brood stock for the Fish Augmentation Program. Monitoring of this stock will be maintained for the life of the program. |
| **FY05 Estimate:** | The monitoring will continue at the same level as 2004. The cost estimate for 2005 is $180,000 and includes staff, materials, equipment, slip-rental, travel and per diem. |
| **Project Description:** | This project will continue a monitoring program for the Lake Mohave native fish populations. The largest single adult population of razorback sucker occurs in Lake Mohave. Reclamation, along with member agencies of the Lake Mohave Native Fish Work Group, has been actively rearing and repatriating razorback suckers since 1991 in an effort to rebuild a genetically diverse brood stock. These fish will be needed to provide young for future rearing programs. Fish are repatriated as juvenile fish and are distributed along the 61 miles of lake/river between Davis and Hoover Dams. This program consists of trammel netting within different zones of the lake throughout the year to assess population status and distribution. The last known capture of bonytail occurred in Lake Mohave during the 1990's. This netting action provides a systematic search for this species as well. |
| **FY04 Accomplishment:** | During 2004, monitoring contacted some 1000 repatriated razorback suckers. No bonytail were found. |

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| **Work Task D9:** | **Flannelmouth and Razorback Sucker Monitoring Below Davis Dam** |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Monitor razorback sucker and flannelmouth sucker populations in the Colorado River between Davis Dam and Lake Havasu. |
| **Conservation Measures:** | RASU6, FLSU2, and FLSU3 |
| **Long-term Goal:** | Razorback sucker and flannelmouth sucker are target fish species for the LCR MSCP program. Monitoring of flannelmouth sucker will be supported by the LCR MSCP for at least five years. Razorback sucker stock assessments are expected to continue as part of assessment and evaluation of fish augmentation actions. |
| **FY05 Estimate:** | Monitoring will continue at the same level as 2004. The cost estimate for 2005 is $58,000 and includes $25,000 for Denver Technical Service Center (Service Agreement) and $33,000 for staff, materials, equipment, slip-rental, travel and per diem. |
| **Project Description:** | This project will continue a monitoring program for two native suckers in the Colorado River between Lake Havasu and Davis Dam. Flannelmouth suckers were reintroduced to the lower river by Arizona Game and Fish Department in 1976 when a few hundred fish were captured in Grand Canyon at the mouth of the Paria River and transferred to the river below Davis Dam. This stock has persisted through time and is the only known population of flannelmouth sucker in the Colorado River downstream of Grand Canyon. Some 30,000 razorback sucker have been released into Lake Havasu as part of a multi-agency fishery improvement program. This study will monitor and document status and distribution of these fishes. |
| **FY04 Accomplishment:** | During 2004, monitoring contacted only 150 razorback sucker and suggested a population decline of repatriated razorback suckers since initial stocking. Flannelmouth sucker continue to inhabit the upper reaches of the river and appeared to have again successfully recruited as young were found. |

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| **Work Task D10:** | **Humpback Chub Monitoring Program** |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Provide support to existing humpback chub conservation. |
| **Conservation Measure:** | HUC1 |
| **Long-term Goal:** | Humpback chub conservation will be supported at this level for the 50-year life of the LCR MSCP. |
| **FY05 Estimate:** | This action will make available technical staff for field support for the humpback chub monitoring program. The cost estimate for 2005 is $10,000 and includes salary, travel and per diem. |
| **Project Description:** | This project will provide support to the humpback chub conservation activities being conducted by the Glen Canyon Adaptive Management Program. Current research actions in both the Colorado River and Little Colorado River require field trips into isolated reaches for extended time periods (10-20 days each). The trips are labor intensive and often rely on volunteer staff. Reclamation biologists will assist on one or more trips per year, providing trained competent technical support. |
| **FY04 Accomplishment:** | During 2004, Reclamation provided a fishery biologist for a two week monitoring of humpback chub in the Little Colorado River. |

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| **Work Task E1:** | **Beal Lake, Havasu National Wildlife Refuge** |
| **Partners:** | U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Points of Contact:** | *Riparian.* Barbara Raulston, LC-2453 (702) 293-8788<br>*Native Fish.* Gregg Garnett, LC-2455 (702) 293-8644 |
| **Purpose:** | *Riparian.* Establish and demonstrate restoration techniques (using areas covered by material from dredging of Beal Lake) with native riparian vegetation to create habitat for willow flycatchers, yellow-billed cuckoos, black rails and other LCR MSCP species of concern. Restoration techniques being evaluated include; hydroseeding, broadcast seeding, poles, and potted plants.<br><br>*Native Fish.* Restoration research is being conducted, and habitat and management improvements are being made to the existing native fish refugium. |
| **Conservation Measure:** | Develop techniques in support of all covered species habitat creation requirements. |
| **Long-term Goal:** | *Riparian***.** Each field has been laser-leveled and can be flooded independently. This allows a wide range of restoration research tasks to be conducted and monitored. The information obtained from the seeding, planting, and flooding. Experiments at this site will be directly applicable to other restoration projects. The total estimated habitat expected to be established at the site is approximately 100 acres of cottonwood and willow, 100 acres of mesquite, and 5 acres of marsh.<br><br>*Native Fish.* Fish screening research to investigate innovative passive fish barrier technology to protect native fish in a restored backwater refugia. |
| **Location:** | Adjacent to Beal Lake and Topock Marsh on Havasu National Wildlife Refuge (HNWR). |
| **FY05 Estimate:** | $543,000. Funding for in-house staff costs and contract services.<br>The estimated *riparian* costs total $293,000.<br>The estimated *native fish* costs total $250,000. |
| **Project Description:** | Beal Lake is located on Havasu National Wildlife Refuge in Needles, California, within the historic floodplain of the lower Colorado River. When completed, the project will include over 150 acres of cottonwood, willow and mesquite riparian habitat. |

Beal Lake was approximately 225 acres of shallow, low quality aquatic habitat that was dredged to deepen it beginning in 2001. Dredge material was distributed over adjacent areas, to be planted at a later date with native vegetation.

*Riparian.* Establish and restore native riparian species on lands adjacent to the lake. Due to the size of the project the riparian component has been separated into 3 phases. Clearing, root plowing, leveling, and installation of an irrigation system for phase I and phase II has been completed.

Phase 1 (56 acres) of the project resulted in cottonwood and willow along with some naturally established arrowweed and saltcedar.

Phase 2 (50 acres) is partially planted with cottonwood, willow and mesquite; the remaining acres will be planted in 2005.

Phase 3 is approximately 80 acres and designs have been completed for the site to be leveled and fitted with irrigation infrastructure in the future. If completed, the site would be planted mostly with mesquite. Areas within all phases that contain saline soils will be planted with either mesquite or salt-tolerant shrubs and/or wetland plants such as bulrush, depending on salinity levels.

The irrigable fields are being used to evaluate various riparian establishment techniques such as; hydroseeding, hand seeding, poles, and potted plants. Reclamation is monitoring the fields and tracking the watering requirements which should provide guidance on future riparian establishment and management procedures.

*Native Fish.* Evaluate the use of passive fish screens combined with backwater management to cost effectively manage the backwater for native fish. Improvements to the existing backwater included minor dredging and the installation of wedge wire screen to augment flow through the existing semi-permeable rock filter. The cylindrical wedge-wire screen system was installed in Spring 2005. The system consists of two 18-inch diameter PVC pipes installed through the existing rock structure with cylindrical wedge-wire screens installed on each end of the pipes using standard flange connections. This essentially means that each pipe and screen combination will represent an independent system. An in-line valve was installed in each pipe to allow the pipe to be closed when necessary (ie. repair or replacement of screens, etc.).

The screens were custom fabricated and purchased from Johnson Screens using the simplified acquisition process (after a competitive bid). The screens are approximately three feet in diameter and approximately three feet long. They are constructed of Z-Alloy, an anti-biofouling nickel-copper alloy developed by Johnson Screens and are equipped with an internal diffuser and 3-inch air backwash system. The screen slot size is 0.6 mm (0.024 inches) and each screen has a capacity of 1,500 gpm. The procurement cost of each screen was approximately $10,000 and was not purchased by the LCR MSCP. Reclamation will evaluate the system after installation to determine the effectiveness and efficiency of the system with respect to screening capabilities, hydraulic performance, and maintenance requirements.

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| **Work Task E2:** | **Needles-Topock (Az RM 240) Stabilization, Havasu National Wildlife Refuge** |
| **Partners:** | U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Gail Iglitz, LC-2459 (702) 293-8138 |
| **Purpose:** | Incorporate ecological restoration principles into a proposed river stabilization project to achieve river stabilization and habitat creation. |
| **Conservation Measure:** | Develop techniques in support of all covered species habitat creation requirements. |
| **Long-Term Goal:** | Integrate Reclamation's river stabilization responsibilities with LCR MSCP habitat restoration goals to stabilize a section of river and provide quality habitat. |
| **Location** | Havasu National Wildlife Refuge, RM 240, Arizona side. |
| **FY05 Estimate:** | $80,000. Funding is for in-house staff including Yuma Area Office's (YAO) engineering support. |
| **Project Description:** | The site is located on the western edge of the Havasu National Wildlife Refuge (HNWR) in Arizona. Reclamation's front work and levee system, has identified and incorporated the project into the agencies ten year work plan. The Needles-Topock bankline has seen an increasing amount of erosion and shelving due to increased recreational use. The increased use of motor-driven boats and personal watercraft creates a significant amount of wave action against the sandy bankline, which increases the loss of land due to erosion and increase the sediment load in the river.<br><br>The opportunity exists to incorporate the development of various habitats, such as marsh, riparian and backwater environments with stabilization techniques of the bankline now and in the future.<br><br>Along with the stabilization techniques, a passive flood irrigation system will be utilized. The intent of this type of system is to decrease the costs associated with maintenance and personnel to operate irrigation systems. To date, flood irrigation has proven to be the best method of irrigation to create habitat that includes the conditions necessary for federally listed endangered species along the lower Colorado River. |

The passive irrigation system would allow water to flood the site when river flows exceed 12,000 cubic feet per second. These flows are generated during the seasons (spring, summer and fall) of high water demand downstream. They also coincide with both the growing season for trees/vegetation, and the migration and breeding season of Southwestern willow flycatcher. The site will be contoured to create elevation changes which will allow low areas to be saturated or filled pockets of standing water.

Approximately 50 acres will become a narrow long linear mosaic of habitat that will serve as a connection to other restoration sites along the lower Colorado River.

A preliminary design and value engineering study has been completed. Environmental compliance and resource agency input is being solicited.

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| **Work Task E3:** | **Pintail Slough, Havasu National Wildlife Refuge** |
| **Partners:** | Ducks Unlimited, Inc. (DU)<br>U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Kim Kirkland, LC-2451 (702) 293-8151 |
| **Purpose:** | The site will be used to demonstrate restoration techniques with native riparian vegetation to create habitat for willow flycatchers, yellow-billed cuckoos, black rails and other LCR MSCP species of concern. |
| **Conservation Measure:** | Develop techniques in support of all covered species habitat creation requirements. |
| **Long-Term Goal:** | This area will provide a suitable habitat which will benefit the southwestern willow flycatcher and the yellow-billed cuckoo, by restoring up to 88 acres of riparian breeding habitat. Future discussions with the Refuge will determine whether habitat creation is going to be requested and only if there is a long term commitment for operation and maintenance. This large increase in available breeding habitat should enhance the flycatcher population and provide sufficient acreage to support breeding cuckoo at the refuge. The habitat value of the riparian areas located adjacent to seasonal wetlands will be enhanced will provide additional foraging opportunities. |
| **Location:** | Pintail Slough is located in Arizona at the north end of Topock Marsh on Havasu National Wildlife Refuge (NWR) which is just south of Needles, CA. |
| **FY05 Estimate:** | $10,000 for labor in support of a grant to Ducks Unlimited which is expected to be completed in FY05. |
| **Project Description:** | Work will consist of improving a water conveyance and control system and expanding the acreage of riparian and seasonal wetland habitats. Improvements to the water system will focus on maximizing the use of the existing pump system by concrete lining the main canal, establishing an independent fill and drain system for each unit in the slough, and improving water distribution and drainage for each unit. |

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| **Work Task E4:** | **Planet Ranch, Bill Williams River** |
| **Partners:** | Arizona Game & Fish Department (AGFD)<br>City of Scottsdale (Scottsdale)<br>U.S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Nathan Lenon, LC-2457 (702) 293-8015 |
| **Purpose:** | Collect data on the Bill Williams River corridor and to evaluate the potential for restoration on Planet Ranch |
| **Conservation Measures:** | Potential site for creation of habitat for covered species. |
| **Long-Term Goal:** | Habitat creation. |
| **Location:** | Bill Williams River |
| **FY05 Estimate:** | $100,000. Funding is for in-house staff costs and contractor services. |
| **Project Description:** | Planet Ranch is located on the Bill Williams River floodplain, immediately upstream and adjacent to the Bill Williams National Wildlife Refuge. The property is approximately 8,400 acres in total, approximately 2,400 acres of which are agricultural land with a 6 acre-foot/acre water entitlement. The total annual water entitlement for the site is 14,400 acre-feet.<br><br>The property is currently owned by the City of Scottsdale. The ranch had been actively farmed for alfalfa, which has been discontinued for several years now. Conversion of the ranch from alfalfa farming to MSCP-habitat types would result in a decreased amount of consumptive-use of water onsite. This water savings would afford some degree of protection for the groundwater-dependant riparian, marsh, and mesquite habitat occurring at the eastern extent of the refuge. Reclamation, FWS, Scottsdale, and AGFD are working to decide whether a mutually beneficial opportunity exists to obtain an interest in the land and water for LCR MSCP-related program goals.<br><br>Reclamation evaluated Planet Ranch to determine the maximum acreage and habitat types which could be created in support of the LCR MCSP, while minimizing the risks to the habitat at the refuge downstream. A report, entitled “Planet Ranch: Potential Habitat Restoration Site, Preliminary Site Assessment and Conceptual |

Design" was completed in FY05, which details the methodology and assumptions used in the assessment.

Tetra Tech has been retained to establish river cross sections along the Bill Williams River. One of the primary purposes of this data collection effort is to facilitate future hydraulic modeling (FLO-2D) on the river, which would provide a basis for determining the extent of potential habitat protection credit that may be available, should the property be purchased for habitat restoration.

Tetra Tech will accomplish the proposed tasks with their in-house staff. The primary components of the project are river cross section surveys and establishing end point coordinates. Access to some reaches of the river and proposed cross section sites may be an issue, particularly access to some canyon reaches, due to physical access issues, as well as potential weather and flooding issues. In these reaches, cross section coverage will be limited. Cross sections will be surveyed at a variety of flows through the use of all-terrain vehicles and/or small data collection boats.

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| **Work Task E5:** | **Ahakhav Tribal Preserve, Colorado River Indian Tribes** |
| **Partners:** | Colorado River Indian Tribes (CRIT)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Barbara Raulston, LC-2453 (702) 293-8788 |
| **Purpose:** | A research and development agreement will test planting, maintenance and irrigation methods on agricultural fields while producing cottonwood, willow and mesquite habitat for various LCR MSCP species. |
| **Conservation Measures:** | Develop techniques in support of all covered species habitat creation requirements and a potential site for creation of habitat. |
| **Long-term Goal:** | Research and Acreage credit (cottonwood/willow and mesquite) |
| **Location:** | CRIT 9, 10, 11, and 12 at the Ahakhav Tribal Preserve. |
| **FY05 Estimate:** | $120,000 for in-house staff, supplies, and materials in support of the agreement. Funding for the CRIT was obligated in FY04. |
| **Project Description:** | The Ahakhav Tribal Preserve (Preserve) is located on the lower Colorado River south of Parker, Arizona on the Colorado River Indian Reservation. In 1995, the CRIT established the Preserve to protect fish, wildlife and plants in the riparian areas along the river. The Preserve has become an important gathering place for Tribal members and the public for recreational and educational purposes. In partnership with multiple agencies and entities interested in preserving habitat on the river, restoration projects to improve native riparian habitat has been extremely successful here.<br><br>The project will utilize four areas to test different mass planting techniques, irrigation methods, weed control, seed collection, and site maintenance. Three sites are located on the Ahakhav Preserve and are called CRIT 9, CRIT 10, and CRIT 11. All work will be done in an effort to determine the most successful, efficient, and cost-effective methods for various re-vegetation projects. The project will utilize a variety of methodology and procedures from start to finish. Management of the project will include standard restoration efforts and modern farming techniques. Ahakhav staff will closely document all steps so processes will be able to be consistently recreated and expanded upon in the future. The end result of this project will be approximately 120 acres of newly revegetated land, a 135-acre maintenance project, and valuable data on many aspects and methods of the restoration process |

**Accomplishments /Conclusions to date:**

CRIT 9**:** Maintenance-Cover crops planted to protect site from weed infestation and hold soils in place until revegetation. Four acres of cottonwood were grown from seed harvested throughout the Preserve.

CRIT 10: Research for mass planting: testing planting media mixes to produce highest success of seedlings, testing of effects of rooting hormones, application of foliar fertilizer and pruning, dormant vs. non-dormant cutting survival.

CRIT 11: Archeological Surveys completed to satisfy Reclamation compliance requirements. A small portion of CRIT 11 will be left undisturbed based on results of survey. Clearing on remaining area complete and soil sampling has started.

CRIT 12: the area for this portion of the project has not been designated to date.

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| **Work Task E6:** | **Unit #1 (Cottonwood Genetics, Mass Planting Techniques, Seed Feasibility Study), Cibola National Wildlife Refuge** |
| **Partners:** | Northern Arizona University (NAU)<br>Cibola National Wildlife Refuge (CNWR)<br>Bureau of Reclamation (Reclamation) |
| **Points of Contact:** | Genetics — Gregg Garnett, LC-2455, (702) 293-8644<br>Mass Planting — Gail Iglitz, LC-2459, (702) 293-8138<br>Seeding — Barbara Raulston, LC-2543, (702) 293-8788 |
| **Purpose:** | Restoration research projects which have the potential for future habitat development.<br><br>*Cottonwood Genetics*. Research project to investigate the influence of genetic diversity in Fremont cottonwood on community diversity in the context of habitat restoration. One result of this study will be to determine the genetics of the existing stands of cottonwood**s** along the lower Colorado River (LCR). Concerns have been raised over the introduction of genetic strains of cottonwoods<br><br>*Mass Planting Demonstration*. Evaluate mass planting techniques for cottonwood and willow using mechanized planting equipment to increase the cost effectiveness of future habitat creation projects.<br><br>*Seed Feasibility Study*. The purpose of this study is determine the best methods to establish native riparian habitat from seed consisting of cottonwood, willow, and other native groundcovers and shrubs to increase the cost effectiveness of future habitat creation projects. |
| **Conservation Measures:** | Develop techniques in support of all covered species habitat creation requirements and a potential site for creation of habitat. |
| **Long-Term Goal:** | *Cottonwood Genetics.* Use the information gained from this study to select trees with genetically superior traits with respect to growth, reproduction, survival, and habitat quality they influence. The experimental garden will supply stock of known genetic diversity and origin for future restoration efforts. The experimental garden, when mature, will add to the site habitat structural mosaic and may serve as suitable habitat for yellow-billed cuckoo.<br><br>*Mass Planting Demonstration.* Restoration research to reduce the cost of habitat creation and development of southwestern willow flycatcher and yellow billed cuckoo habitat. |

*Seed Feasibility Study.* Restoration research to reduce the cost of habitat creation and development of southwestern willow flycatcher and yellow billed cuckoo habitat.

**Location:** 120 acres of active alfalfa fields within Unit #1 on CNWR.

**FY05 Estimate:** $492,000 will Fund in-house staff and contract services for the following projects.

$50,000 for expansion of experimental plots design to meet Reclamation requests for the cooperative agreement.

**$**350,000 for in-house staff and contractual services in support of the mass planting demonstrations.

$140,000 for in-house staff and contractual services in support of the seeding demonstrations.

**Project Description:** *Cottonwood Genetics.* Information is lacking regarding the relative levels of genetic diversity within the remaining cottonwoods along the LCR and the impact of this genetic diversity as it pertains to community structures and ultimately, wildlife diversity within restoration sites. In an effort to increase knowledge and success in creating functional wildlife habitat, Reclamation's restoration group solicited the scientific community for proposals to investigate these relationships. NAU was awarded a cooperative agreement and contributed matching funds to undertake these investigations. Their project is twofold and includes: (1) the identification of genetic stocks of Fremont cottonwoods that possess traits including superior growth, reproduction, and survival in a typical restoration site, and (2), the identification of stocks of Fremont cottonwood trees that support diverse biological communities, including communities that sustain wildlife species. The first part of the project includes genetic screening of tissues collected from stands of Fremont cottonwood trees across the southwestern U.S. The second involves creating an experimental garden to propagate representatives of the collected genetic stock and monitor the expressions of these different genotypes. Cibola National Wildlife Refuge offered approximately 40 acres (in two roughly 20-acres fields) of agricultural land with water and irrigation infrastructure for NAU to establish their experimental cottonwood garden.

*Mass Planting Demonstration*. Reclamation is demonstrating automated mass-planting techniques using native riparian species. This project represents a combination of research and habitat creation. The intent is to investigate the feasibility and effectiveness of using this technique in restoration of agricultural fields. The cost benefit of this method will be evaluated along with its effectiveness and appropriateness in the creation of native habitat to meet LCR MSCP goals. The technique involves mechanized, rapid, dense planting of 4,500 seedlings per acre to inhibit growth of non-native plant species and to achieve dense growth of native tree species. Eventually up to 36 acres of cottonwood/willow habitat may be created.

A contract for the demonstration of mass planting of cottonwood and willow utilizing commercially available equipment was competed and awarded to two contractors: Greenheart Farms, Arroyo Grande, California and Bluejack Nurseries, Brawley, California. Each contractor detailed a significantly diverse approach for mass planting cottonwood and willow trees. The intent is to demonstrate and compare each of these techniques. Each technique will be evaluated for the effectiveness of creating quality habitat and cost benefit. Currently, these methods are being utilized in the agriculture industry to produce high quality fruits and vegetables at a cost effective approach.

Restoration and research activities will take place on existing alfalfa fields for the mass planting of cottonwood and willow. The FWS currently employs the services Mr. Ron Swan as their co-op farmer to grow crops and deliver water to the fields. The irrigation of the mass planting fields will be incorporated with the current water schedule. A purchase request has been generated for water delivery services and crop loss.

*Seed Feasibility Study*. Reclamation's goal for this study is to determine the best method to produce large acreages composed of a dense mosaic of cottonwood and willow, interspersed with native groundcovers and shrubs, with as little saltcedar as possible. Using seeds collected locally may be less labor intensive and will better preserve the genetic diversity and integrity of the riparian vegetation found on the LCR. Deliverables under this contract will include: 1) Determination and documentation of best protocols for collection, care, storage, and treatment of cottonwood and willow seeds from the LCR, 2) Determination and documentation of a combination of planting techniques using seed that results in cottonwood and willow stands with densities high enough to shade-out saltcedar and other non-native vegetation, and 3) Determination and documentation of best methods to produce a

mosaic of riparian vegetation i.e. native shrub and groundcover components within patches of densely growing cottonwood and willow.

**Accomplishments /Conclusions to date:**

*Cottonwood Genetics.* NAU researchers have collected leaf tissue from 600 Fremont cottonwood trees distributed in five states. They have isolated DNA from approximately 250 trees and performed genetic screening and analysis of DNA. Preliminary results indicate that genetic diversity is high in Fremont cottonwood. Selection and collection of genetic stock for experimental garden is currently ongoing.

*Mass Planting Demonstration.* Contracts were awarded to Greeenheart and Bluejack Nurseries. Planting is scheduled for spring of 2005.

*Seed Feasibility Study.* The Statement of Work and Request for Proposals are in progress, intended for award in 2005

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| **Work Task E7:** | **Hart Mine Marsh, Cibola National Wildlife Refuge** |
| **Partners:** | U.S. Fish & Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Gregg Garnett, LC-2455 (702) 293-8644 |
| **Purpose:** | Create marsh and/or backwater habitats for covered fish and wildlife species. |
| **Conservation Measures:** | Potential site for creation of habitat for the covered species. |
| **Conservation Measures:** | Species-specific conservation measures requiring the creation of marsh, and backwater. |
| **Long-Term Goal:** | To provide protected backwater and marsh habitat for species covered under the LCR MSCP. |
| **Location:** | Arizona side of Cibola National Wildlife Refuge (CNWR) south of refuge headquarters. |
| **FY05 Estimate:** | $100,000 will fund in-house staff including Yuma Area Office's engineering support office. |
| **Project Description:** | Hart Mine Marsh is a degraded marsh located on CNWR that has seasonal open water and relatively poor water quality. Currently, the marsh is not suitable as a protected backwater for native fish species. Portions (approximately 20 acres) of the marsh will be deepened to approximately ten feet by dredging/excavating. The areas adjacent to these deeper areas will be managed as marsh habitat. Passive fish barrier technology will be used to exclude non-native fish and allow a greater volume of water into the marsh and excavated backwaters to improve and maintain water quality for native fish. Adjacent marsh areas will also benefit from the improvement in water quality. Dredging and excavation work is projected to begin in FY07. |
| **Accomplishments /Conclusions to date:** | Conceptual design was initiated, preliminary project scoping and scheduling completed. Currently, information is being gathered to prepare regulatory compliance documents. |

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| **Work Task E8:** | **Cibola Valley Conservation Area** |
| **Partners:** | Arizona Game and Fish Department (AGFD)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Patti Aaron, LC-2456 (702) 293-8466 |
| **Purpose:** | Potential riparian habitat research and habitat creation. |
| **Conservation Measures:** | Potential site for creation of habitat for the covered species. |
| **Long-Term Goal:** | To conduct restoration research and create as much viable habitat as possible on these 1,017 acres. |
| **Location:** | About 15 miles south of Blythe, CA from RM 98.8 to 104.9. The 1,017 acres is comprised of a number of parcels adjacent to the LCR in Township 1 North, Range 23 West within Sections 19, 20, and 21 and Township 1 North, Range 24 West within Sections 24, 25, and 36, La Paz County, Arizona. These lands lie north of Baseline Road. Cibola National Wildlife Refuge lies to the south of Baseline Road. |
| **FY05 Estimate:** | $120,000 for in-house staff costs to evaluate and plan the habitat creation project. |
| **Project Description:** | Portions of the Cibola Valley, owned by Mohave County Water Authority, are being evaluated as a potential habitat creation project. The intent of the assessment is to determine possible restoration research projects and accomplish as much viable habitat creation as possible on these 1,319 acres.<br><br>The initial Assessment has been completed. Phase I, an 80 parcel, which would establish a native plant collection area and initiate the habitat creation process is being evaluated for FY05. Discussions with AGFD on land ownership and management options has begun. |

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| **Work Task E9:** | **Imperial Demonstration Ponds, Imperial National Wildlife Refuge** |
| **Partners:** | U. S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Nathan Lenon, LC-2457 (702) 293-8015 |
| **Purpose:** | Expansion of the existing ponds for marsh and backwater restoration habitat credit. |
| **Conservation Measures:** | Potential site for creation of habitat for the covered species. |
| **Long-Term Goal:** | This project was originally initiated in fulfillment of the 1997 Biological Opinion. Several deficiencies exist with the site, as constructed, which have resulted in impaired water quality. Additionally, Imperial National Wildlife Refuge wishes to dedicate the entire site exclusively to native fish, and expand the existing complex to create additional habitat in support of the LCR MSCP program. Reclamation is working with INWR and other project stakeholders to develop a plan to address water quality concerns and create the additional habitat acreage. |
| **Location:** | Imperial National Wildlife Refuge |
| **FY05 Estimate:** | $105,000 will fund in-house staff including Yuma Area Office's engineering support office. |
| **Project Description:** | The Imperial Demonstration Ponds, also referred to as the DU2 Ponds, were originally constructed to provide a mixture of habitat types, including isolated backwaters, marsh, and riparian. The site consists of 4 ponds which are connected by a single channel that supplies fish-free water from a dedicated well. Some degree of independent water management is possible via water control structures between each pond; however, there is only one inlet and one outlet for the entire site, meaning that fresh water can only be delivered to a single location.<br><br>The ponds were originally renovated in the fall of 2002, and stocked with razorback suckers in the spring of 2003. The survival of razorback suckers in the first year was extremely low, with the two probable causes given for their decline being low dissolved oxygen and the presence of large numbers of non-native warmouth sunfish. |

Due to competing needs of riparian and backwater habitats, water management (as originally designed) was not possible; therefore the decision was made to designate the entire site for native fish. The philosophy was that managing the site primarily for native fish would provide additional flexibility to address water quality concerns. A focus group was held in December 2004 to involve the expertise of the Lower Colorado River Native Fish Workgroup in developing recommendations for how to best manage the site. The group decided to re-design and expand the site to address water quality concerns while providing additional acreage in support of the LCR MSCP program.

An interdisciplinary workshop is scheduled for the week of May 23, 2005. The objective of this meeting is to draft a design for the retrofitting and expansion work. This workgroup will solicit input from subject matter experts in the fields of native fish biology, hydrology, wetland science, and engineering, and will involve participants from the LCR native fish workgroup.

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| **Work Task E10:** | **Draper Lake, Imperial National Wildlife Refuge** |
| **Partners:** | U. S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Gregg Garnett, LC-2455 (702) 293-8644 |
| **Purpose:** | Evaluate Draper Lake as a potential habitat creation project. |
| **Conservation Measures:** | Potential site for creation of habitat for the covered species. |
| **Long-Term Goal:** | Restore decadent backwater to provide protected habitat for native fish. Create marsh and riparian habitats for other species identified under the LCR MSCP. |
| **Location:** | River Mile 82.7, California side, Imperial National Wildlife Refuge (INWR). |
| **FY05 Estimate:** | $100,000 will fund in-house staff including Yuma Area Office's engineering support office. |
| **Project Description:** | Draper Lake is an existing backwater on INWR. Colorado River inflow has been substantially reduced due to siltation and vegetation encroachment of a natural channel that runs between Draper Lake and the Colorado River. The project includes design work, regulatory compliance and associated coordination involved in dredging/excavating 0.3-mile long channel between Draper Lake and the Colorado River at RM 82.7. Passive fish barrier technology will be used to exclude non-native fish life stages from Draper Lake. This project will supply additional water capacity to Draper Lake permitting the survival and maintenance of native fish habitat in the protected backwater.<br><br>Conceptual design and surveying has been initiated, preliminary project scoping and scheduling completed. Currently, information is being gathered to prepare regulatory compliance documents.<br><br>All dredging and excavation work is projected to begin in FY06. |

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| **Work Task E11:** | **Walker Lake, Imperial National Wildlife Refuge** |
| **Partners:** | U. S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Gregg Garnett, LC-2455 (702) 293-8644 |
| **Purpose:** | Evaluate Walker Lake as a possible habitat creation project. |
| **Conservation Measures:** | Potential site for creation of habitat for the covered species. |
| **Long-Term Goal:** | Provide consistent water into the site to maintain adequate breeding habitat requirements for rail (marsh), southwestern willow flycatcher (wetted/moist forest understory and adjacent open water), and/or native fish habitat. |
| **Location:** | River Mile 88.7, California side. The lake is located on lands managed by Imperial National Wildlife and the Bureau of Reclamation. |
| **FY05 Estimate:** | $61,000 will fund in-house staff including Yuma Area Office's engineering support office. |
| **Project Description:** | Walker Lake is a historically occupied southwestern willow flycatcher site on the LCR. Currently, Walker Lake maintains a subsurface connection to the Colorado River. Seasonally, surface water is reduced in area or not present in the lake. In addition, high evaporation rates have concentrated salts into the lake and the surrounding soil. The project includes dredging/excavating a shallow channel to provide continual surface flow into Walker Lake to maintain open water, marsh habitat, and flooded adjacent forested habitats throughout the breeding season's of Yuma clapper rail and southwestern willow flycatcher. This additional water will dilute and flush salts from the lake and surrounding area, providing more suitable substrates for aquatic, emergent, and riparian vegetation which, in turn, will provide increased habitat for terrestrial and aquatic wildlife species.<br><br>Conceptual design and surveying has been initiated, preliminary project scoping and scheduling completed. Currently, information is being gathered to prepare regulatory compliance documents.<br><br>Draft designs to be completed by August 2005. All compliance and permitting documents will be obtained by early spring 2006. All dredging and excavation work is projected to begin in FY06. |

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| **Work Task E12**: | **Butler Lake, Imperial National Wildlife Refuge** |
| **Partners:** | U. S. Fish and Wildlife Service (FWS)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Nathan Lenon, LC-2457 (702) 293-8015 |
| **Purpose:** | Potential habitat restoration project to improve water quality so the lake can support a self-sustaining population of native fish. If successful, this project would provide 43 acres of habitat for razorback sucker and bonytail. |
| **Conservation Measures:** | Potential site for creation of habitat for covered species. |
| **Location:** | River Mile 61.5, Arizona side, Imperial National Wildlife Refuge (INWR). |
| **FY05 Estimate:** | $55,000 for in-house staff for water quality monitoring and assessment of the backwater for native fish. |
| **Project Description:** | Butler Lake, a 43-acre (17.2 hectares) floodplain lake, with an approximate mean depth of 3 feet (0.9 meters) is located at river mile 61.5, approximately 160 meters east of the Colorado River. This backwater is seepage-driven, with no known surface connection to the Colorado, or any other body of water. The lack of freshwater flushing has caused the lake to become hypereutrophic (an advanced state of nutrient enrichment).<br><br>In its current condition, Butler Lake provides little benefit to fish or wildlife. This assessment focused on eutrophication, or the gradual increase of nutrients in a body of water, as the key to understanding the lake's ecology.<br><br>Eutrophication, is an inevitable, naturally-occurring process of ecological succession that lakes and ponds undergo as they age. Prior to the development of the Colorado River for water management purposes, periodic floods would scour away built-up salts, nutrients, and organic sediments, in effect "resetting" the eutrophication process. Because this resetting function no longer occurs, many isolated backwaters on the LCR continue this process uninterrupted, which eventually causes water quality conditions to degrade to levels which no longer support productive fisheries. At this point, waterfowl benefits are also greatly diminished, along with visual aesthetics. |

Working jointly with INWR, Reclamation evaluated Butler Lake as a potential site for establishing a native fish refugium. This analysis consisted of a comprehensive limnological analysis, general surveys for fish and waterfowl, as well as a GIS-based bathymetry map. To date, over one year of baseline monitoring has been completed, which is a minimal requirement in the restoration of an isolated aquatic system. This data will provide: (1) a better understanding of what drives the aquatic system from an aquatic ecology perspective, and (2) a baseline from which to measure the success of any potential restoration activities.

In October of 2004, a report, *Butler Lake Native Fish Refugium, Preliminary Assessment,* was completed and distributed to project stakeholders. This report described the lake's ecology, probable causes of its poor water quality, and several alternative approaches for restoring the lake. Currently, no decision has yet been made whether or how to proceed with this project, however upcoming discussions between several interested parties will focus on reaching a decision.

Reclamation has performed a preliminary habitat assessment, researched possible approaches for habitat restoration, conducted water quality monitoring, and held discussions with project stakeholders to decide on a restoration course of action.

**Work Task E13:** **McAllister Lake, Imperial National Wildlife Refuge**

**Partners:** U. S. Fish and Wildlife Service(FWS)
U. S. Bureau of Reclamation (Reclamation)

**Point of Contact:** Nathan Lenon, LC-2457 (702) 293-8015

**Purpose:** The goals are to determine whether water quality in the lake can be improved by dewatering the lake, and inducing groundwater recharge to dilute the high salt concentrations. This type of procedure is being evaluated as a tool for using isolated bodies of water that have poor water quality initially for protected habitats for native fish.

**Location:** River Mile 61, Arizona Side, Imperial National Wildlife Refuge (INWR).

**FY05 Estimate:** $40,000 for in-house staff for water quality monitoring and assessment of the backwater for native fish.

**Project Description:** McAllister Lake is a shallow 40-acre floodplain lake approximately 1,000 meters east of the Colorado River on INWR. The isolated backwater is seepage-driven, with no known surface connection to the Colorado, or any other body of water. The lack of freshwater flushing had caused the lake to become highly saline, to the extent that it supported very limited numbers of fish and waterfowl.

Working jointly with the INWR, Reclamation initiated a series of experimental pump-tests, which dewatered the lake to about one-fourth of its normal volume. Before, during, and after these tests, a variety of environmental data was collected to measure the lake's response to the pumping. This monitoring includes groundwater and surface water levels, and water quality measurements of the river, lake, and surrounding water table.

These pump tests were conducted from December 2002 through March 2004, during the fall and winter months only, to avoid potential impacts to Yuma clapper rails. March of 2005 represents an important milestone, in that we will have collected one-year of data collected following the completion of the final pump-test.

To date, the 5 pump-tests have been successful in decreasing the lake's salinity by approximately 75%, with relatively minor increases since the completion of pumping. Completion of a report, detailing the methods and results of this project, is planned

for summer of 2005. Discussions between project stakeholders are ongoing as to when the lake will be ready for native fish introduction.

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| **Work Task E14:** | **Pratt Agricultural Lease** |
| **Partners**: | Pratt Farms<br>Bureau of Land Management (BLM)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Barbara Raulston, LC-2453 (702) 293-8788 |
| **Purpose:** | Demonstrate restoration and management techniques with native riparian vegetation to create habitat for southwestern willow flycatchers (SWFL), and provide vegetation cuttings and seed for use at other restoration sites along the lower Colorado River (LCR). This funding was used to pay for irrigation of the site during FY05 and the cutting of poles. |
| **Conservation Measure:** | Develop techniques in support of all covered species habitat creation requirements. |
| **Long-term Goal:** | The research is intended to provide site management criteria which would be applicable on other conservation opportunity areas. For example, tracking water diversions necessary to create suitable conditions in cooperation with bird monitoring will provide an estimate of the water requirements of future restoration projects. |
| **Location:** | 12 acre agricultural site adjacent to Laguna Dam in southern Arizona. |
| **FY05 Estimate:** | $15,000 for in-house staff, services provided by Pratt Farms, and pole harvesting provided by BLM. |
| **Project Description:** | In 1999, BLM removed 12 acres from a contiguous 58 acre agricultural lease, and BLM and Reclamation restored the area with cottonwood and willow. Five years of growth have produced a healthy stand of riparian habitat and migrating SWFL use the site. However, the willow and cottonwood trees are maturing into a gallery forest that is devoid of an understory, making it largely unsuitable habitat for SWFLs. Random patches of vegetation are now being cut in order to produce different size classes and a dense shrub layer to encourage nesting by this species. In the near future, other areas adjacent to the site will also be restored to native riparian habitat in partnership with BLM<br><br>The current Management Plan and commitments in the associated Biological Assessment agreed upon by Reclamation, FWS and BLM ensures that the following activities are implemented in a manner that is compatible with management of the site for wildlife. |

Items addressed in the Management Plan include: (1) monitoring, management, and protection of the site as habitat for the endangered SWFL and other native species; (2) demonstration of irrigation, planting, and vegetation management; (3) research and monitoring of various aspects of riparian vegetation; and (4) harvesting of cuttings, poles and seeds.

Selective harvesting to maintain uneven-aged stands of cottonwood and willow is being implemented by BLM, funded in 2005 by Reclamation. Reclamation and BLM are implementing the Pratt Management Demonstration Plan, Biological Assessment that involves periodic cutting within stands to create a mosaic of uneven aged, structurally diverse habitat. The site is being irrigated frequently throughout the southwestern willow flycatcher breeding season by to simulate nesting conditions. Bird surveys and banding are being conducted in conjunction with management actions to determine when and if SWFLs use the site.

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| **Work Task E15:** | **Mittry Lake Fire Rehabilitation Project** |
| **Partners:** | Bureau of Land Management (BLM)<br>Bureau of Reclamation (Reclamation) |
| **Point of Contact:** | Barbara Raulston, LC-2453 (702) 293-8788 |
| **Purpose:** | To irrigate restoration areas affected by wildfires near Mittry Lake |
| **Conservation Measures:** | Develop techniques in support of all covered species habitat creation requirements. |
| **Long-term Goal:** | Habitat creation and restoration research after a fire. |
| **Location:** | Adjacent to Mittry Lake. |
| **FY05 Estimate**: | $50,000 for in-house labor and contractual services. |
| **Project Description:** | In early 2004, BLM requested assistance from Reclamation in restoring habitat destroyed by fire in March 2003. BLM obtained partial funding through the Wildland Fire Emergency Stabilization and Rehabilitation Program (BAER), but the use of this funding is limited. BLM determined that irrigation was not an allowed use of BAER funds; therefore, Reclamation funded temporary sprinkler-type irrigation installation at the site. |
| **Accomplishments /Results:** | Areas burned previously have been re-vegetated by BLM but show extremely low habitat quality and high mortality of planted trees. Most of the area planted with native plants has been invaded by non-native saltcedar, which was the dominant species present prior to the fire. To avoid this scenario in the future, Reclamation intends to: (1) set up quarterly meetings with BLM to improve communication and coordination; (2) determine a method to fund restoration efforts quickly after fires occur versus reliance on later funding to allow immediate action. Example: fire fighting equipment remains on site until site preparation is completed; (3) stress to partners the importance of using proven techniques that are successful in other restoration projects such as root plowing non-native saltcedar to minimum 18”, leveling the site to allow for even irrigation, installation of irrigation infrastructure for flood-type irrigation; and (5) work with other agencies on the LCR to develop a matrix “if-then” type action plan to follow immediately following fire that addresses funding, equipment needs, soils, and irrigation needs. |

**Work Task F1: Vegetation Survival and Growth – Habitat Monitoring**

**Point of Contact:** John Swett, LC-2320 (702) 293-8574

**Purpose:** Habitat restoration will be monitored for initial survivorship and successional changes over time to determine if habitat acreage goals are met. These data will be used to manage the restoration sites.

**Conservation Measures:** MRM2

**Long-term Goal:** As each demonstration or habitat creation site is established, Reclamation will monitor initial survivorship for two years. Monitoring successional changes will occur on a periodic basis over time, with the interval dependent on age of each stand.

**FY05 Estimate:** All restoration research demonstration sites and habitat creation sites will be monitored using the above protocols. FY05 costs are estimated at $250,000 and include Reclamation staff, travel, per diem, and equipment.

**Project Description:** To implement the adaptive management program, habitat restoration projects must be monitored to determine if necessary habitat components have been provided. Monitoring the biotic components (vegetation) and abiotic components (soil moisture, etc.) will provide data to incorporate into future restoration efforts.

Vegetation will be monitored using two protocols. Initially, each restoration site will be monitored to determine if all necessary habitat components have been provided and to determine survivorship of the newly restored sites. After two years, successional changes within stands will be monitored as each restoration site matures. Changes in habitat quality over time, in conjunction with covered species monitoring, will drive management of each restoration site.

**Accomplishments to date:** Protocols have been established. Habitat restoration sites have been monitored using these protocols in 2004.

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| **Work Task F2:** | **Avian Use of Restoration Sites** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Monitor effectiveness of restoration sites in providing habitat for LCR MSCP covered avifauna. |
| **Conservation Measures:** | MRM2 |
| **Long-term Goal:** | Monitoring restoration sites for avian use will continue throughout the LCR MSCP to provide data for the adaptive management process and to develop management criteria for restored sites. |
| **FY05 Estimate:** | Estimated FY05 costs for Reclamation staff, travel, and per diem are $50,000. |
| **Project Description:** | Riparian habitat restoration will benefit nine LCR MSCP covered avian species, including southwestern willow flycatcher and yellow-billed cuckoo. Restoration demonstration sites will be monitored for bird activity, using a variety of techniques including point counts, area searches, and species specific survey protocols. Protocols will be developed to monitor habitat creation sites as the LCR MSCP evolves. Data gathered will be used to design riparian habitat restoration projects to provide covered species habitat. |
| **Accomplishments to date:** | Reclamation has developed avian monitoring protocols and has used these protocols in riparian restoration sites along the LCR. |

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| **Work Task F3:** | **Small Mammal Colonization of Restoration Sites** |
| **Point of Contact:** | John Swett, LC-2320 (702) 293-8574 |
| **Purpose:** | Monitor small mammal populations within restored habitats. |
| **Conservation Measures:** | MRM2 |
| **Long-term Goals:** | Development of protocols for monitoring small mammal populations within restoration sites. Data will be used in the adaptive management process to design habitat for covered mammal species. |
| **FY05 Estimate:** | Estimated FY05 costs are approximately $45,000 for Reclamation staff, travel, per diem, and equipment. |
| **Project Description:** | The Colorado River cotton rat and Yuma hispid cotton rat are covered species under the LCR MSCP and have habitat acres listed as a restoration goal within the HCP. The desert pocket mouse is listed as an evaluation species. Reclamation will conduct presence/absence surveys in restoration demonstration and habitat creation sites to determine small mammal occurrence. These data will be used to design habitat restoration for these species. |

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| **Work Task G1:** | **LCR MSCP Data Management** |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Centralize data and reports for LCR MSCP, develop and maintain physical and electronic data storage and retrieval system. |
| **Conservation Measures:** | MRM1 and MRM2 |
| **Long-term Goal:** | Data management will be an ongoing task of the LCR MSCP. |
| **FY05 Estimate:** | Funding requirements for FY05 total $160,000. This includes $20,000 for support staff and $5,000 supervision during the summer to collect, copy, and file data and reports. It also includes $70,000 for maintenance of existing environmental databases and development of new databases, and $15,000 for hardware, cabinetry and files. Funding in the amount of $50,000 is included to look at options and begin development of databases for financial accounting and GIS, and develop a system for making the pertinent MSCP information available on the internet. |
| **Project Description:** | This action will develop a physical report library, and will collect, organize and catalog hard copies of studies and reports for ongoing monitoring and research actions of the LCR MSCP. It includes developing/or maintaining electronic storage and retrieval systems for scientific data so these data are available for decision making in the adaptive management process. |
| **FY04 Accomplishment:** | During 2004 scientific data collected by Reclamation were maintained by a variety of inter/intra agency actions. Fish data were maintained by Arizona State University as part of a region wide native fish database; Yuma clapper rail data are maintained by the U. S. Fish and Wildlife Service (FWS); Southwestern willow flycatcher field data are maintained by the recovery team (FWS lead); general riparian and neotropical bird data are filed with the Monitoring Avian Production and Survivorship program and various Bird Atlas programs. Habitat monitoring, restoration monitoring, habitat development work and fish rearing data are all maintained separately by various program managers responsible for the individual tasks. |

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| **Work Task G2:** | **Annual Report Writing and Production** |
| **Point of Contact:** | Tom Burke, LC-2300 (702) 293-8711 |
| **Purpose:** | Write and produce annual report for LCR MSCP program. |
| **Conservation Measures:** | MRM1, MRM2, and a permit requirement. |
| **FY05 Estimate:** | Funding requirements for FY05 are estimated to be $35,000 to write and produce the annual report for the LCR MSCP. |
| **Project Description:** | This activity will develop and produce annual reports. |
| **Long-term Goal:** | This will be an ongoing task of the LCR MSCP. |