

## **Research Operational Plan**

**Budget Info** – In prep.

### **Narrative**

The Research Branch is responsible for conducting research on terrestrial and aquatic wildlife (both nongame and harvested wildlife), habitat, and recreation using internal and external funding sources; developing new and innovative techniques to assist in managing wildlife populations, serving as the agency's disease surveillance and wildlife health experts; ordering, distributing, and disposing of capture drugs and maintaining the DEA license for the agency; serving on the Fish and Wildlife Cooperative Research Unit (University of Arizona) oversight committee; and providing technical expertise and advice on appropriate subject matters to agency and external partners. The branch serves as a support branch for the Game, Nongame, and Sportfish Management Subprograms as well as other support branches including Law Enforcement and Habitat. The Research Branch is funded by Federal Aid (federal excise tax on shooting and fishing equipment), Wildlife Conservation Fund (from Tribal gaming revenue), Game and Fish Fund (from fees charged for wildlife user licenses), Watercraft Fund (from watercraft license fees), and a variety of external contracts. Additional funding is also occasionally provided through the Arizona Heritage Fund (from Arizona State Lottery) and State Wildlife Grants. Additional research is funded by the Department through Heritage grants and contracts through the subprograms to researchers at universities, nongovernmental organizations, government agencies, and businesses.

### OPERATIONAL APPROACHES:

Below we have listed our planned research projects for FY08 and FY09 by subprogram or support program and species or guilds. A few projects are repeated because they cross between subprograms or support programs. Besides these currently funded activities and projects, we will continue to seek funding and collaborative opportunities that support the Department's Mission and Strategic Plan, Wildlife 2012. In addition to specific research projects, the Research support program will be meeting with personnel from the Game, Nongame, and Sportfish subprograms to develop a process for prioritizing future research projects. Research results are disseminated to managers, scientists, and the general public through multiple avenues including reports, books, peer-reviewed publications, peer-refereed publications, and presentations.

### **Arizona Cooperative Fish and Wildlife Research Unit at the University of Arizona**

We will continue to provide funding and support for the activities of the Arizona Coop Unit including the minority training program and various research projects. We will provide profession representation for the Department on the Board of Cooperators and at the National Cooperator's Coalition. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 1.B.2; 1.B.4; 1.B.5; 2.A.6; 2.C.1; 2.C.2; 2.C.3; 2.C.4; 2.D.1; 2.D.3; 4.A.2)

### **Game**

#### Multi-species

Forest Restoration - This multi-faceted study is attempting to determine how fuel reduction and restoration activities in forest communities impact wildlife populations in Wildland-Urban Interface areas around Flagstaff and on the long-term Mt. Trumbull restoration study area. This is an ongoing study, specifically looking at tassel-eared squirrels, western bluebirds, lizards, and mule deer. (1.A.1; 1.A.2; 1.A.4; 1.A.5; 2.D.1; 2.C.4; 2.D.3)

Wildlife Waters: Phase II – We are investigating how wildlife water developments in southwestern Arizona impact a variety of wildlife species, such as bats, coyotes, desert bighorn sheep, and mule deer. (1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

Highway Impacts: Highway 260 Segment – We are studying elk and white-tailed deer habitat use around Highway 260 in relation to installed crossing structures and fencing to determine if highways can be made more permeable to wildlife while maintaining safer driving conditions for motorists. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

#### Mule deer

Wildlife Diseases and Animal Health: Chronic Wasting Disease (CWD) Monitoring Segment - This surveillance effort uses samples from hunter harvested mule deer, white-tailed deer, and elk across the state, from 5 sampling vegetative types, to determine if CWD is present in Arizona cervid populations. This is part of a national surveillance program. (1.A.1; 1.A.2; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

North Kaibab Mule Deer Browse and Health Assessment - This study is determining the level of browse use on the westside winter range by wintering mule deer and animal health status of animals moving onto winter range in the fall and spring prior to their return to summer range. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

Mule deer movements in the White Tank Mountain Regional Park and Surrounding Areas – The purpose of this study is to describe mule deer movements on and around the White Tank Mountain area with the goal of learning the best placement of corridors for areas west of the White Tank Mountains. (1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

#### Elk

Highway Impacts: I-17 Segment – We are studying elk habitat use in relationship to Interstate 17 to determine if the interstate is a barrier to elk movement and whether there are particular areas where construction changes could facilitate more elk movement without endangering drivers. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

Elk Movement and Use Related to Forest Treatments on Camp Navajo Army Depot – The purpose of this study is to document and evaluate movement patterns of elk on Camp Navajo Army Depot and evaluate the permeability of forest treatment areas by elk. (1.A.1; 1.A.2; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

#### Pronghorn

**Pronghorn Movements: Anderson Mesa segment** – This study is using locations from GPS-equipped pronghorn to determine how existing habitat is being used and to identify migration corridors from the summer range on Anderson Mesa to the nearby winter range. The locations and analyses are helping guide woodland and grassland restoration efforts on the Mesa. In addition, 2 projects are outsourced through Northern Arizona University to provide GIS databases and restoration models to improve efficiency in the restoration and fuel reduction efforts by the Department and Coconino National Forest. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

**Highway Impacts: Hwy 89 Segment** – We are studying pronghorn genetics and habitat use around Highway 89 to determine whether the Highway has prevented movement of pronghorn between areas. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

#### Bighorn sheep

**Highway Impacts: Hwy 68 Bighorn Sheep Crossings Segment** – This study uses GPS-equipped radiomarked bighorn sheep and remote-triggered cameras to assess the effectiveness of wildlife crossing structures on the newly aligned Highway 68. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

#### Predator/furbearer

**Predator Survey Methodology** – We are assessing methodologies used to estimate small predator populations, such as kit fox, across Arizona in different vegetative communities. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5)

**Predator Surveys: Urban lion Segment** – We are investigating how mountain lions use urban interface areas so that we may better understand how to manage large predators in an urban setting. Our study areas include Prescott, Payson, and Tucson. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4)

**Forest Restoration: Black Bear Wildland-Urban Interface Segment** – We are attempting to determine if proposed fuel reduction and restoration treatment activities will impact resident black bear populations in the Greer and Nutrioso Wildland-Urban Interface areas. Specifically, how fuel reduction and restoration treatments affect the understory, which provides both cover (hiding, thermal) and forage for black bears. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

**Black Bear Population Estimation** – We are using hair snares in the Greer and Nutrioso areas and Huachuca Mtns to collect DNA samples from black bears to identify individual bears using specific areas and calculate a minimum density estimate for black bears. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5)

#### Small Game

**Squirrel Surveys in the White Mountains on the Apache-Sitgreaves National Forest** – We will revisit established squirrel plots to perform squirrel surveys to estimate a relative abundance index for Abert's Squirrels. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

Squirrel Surveys on Camp Navajo Army Depot – We will estimate a relative abundance index for Abert’s Squirrels within the forest treatment areas of Camp Navajo Army Depot so that we may eventually compare their abundance between restored and unrestored forest areas. (1.A.1; 1.A.2; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

#### Turkeys

Wild Turkey Movements and Use Relative to Forest Treatments in the Flagstaff Area – We will determine the habitat use patterns of wild turkeys within proposed forest restoration treatments, for subsequent comparison to post-treated areas. (1.A.2; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

#### Waterfowl

Wildlife Diseases and Animal Health: AI Monitoring Segment – This surveillance effort uses samples from hunter-harvested waterfowl to determine if Avian Influenza is present in wintering populations in Arizona. This is part of a national surveillance program. The primary focus is along the Colorado River (Imperial NWR, Cibola NWR) in Region IV Yuma. (1.A.1; 1.A.2; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

### **Nongame**

#### Multi-species

Urban Open Spaces – We are assessing wildlife species diversity and richness related to size and other factors of isolated habitat patches in the Phoenix metroplex. The study concentrates on small mammal trapping, owl call surveys, bird counts, track plates, and incidental observations. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4)

Forest Restoration – This multi-faceted study is attempting to determine how fuel reduction and restoration activities in forest communities impact wildlife populations in Wildland-Urban Interface areas around Flagstaff and on the long-term Mt. Trumbull restoration study area. This is an ongoing study, specifically looking at tassel-eared squirrels, western bluebirds, lizards, and mule deer. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Wildlife Waters: Phase II – This multi-faceted study is investigating how wildlife water developments impact (positively, negatively) a variety of wildlife species, such as bats, coyotes, desert bighorn sheep, and mule deer. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Species at Risk – We will identify high priority habitats and focal species at risk on selected Department of Defense installations in Arizona and create conservation guidelines for those species and their habitats. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Threatened and Endangered Species Survey on Yuma Proving Ground – We will identify potential threatened and endangered species on Yuma Proving Ground and survey for those species. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

### Passerine birds

Southwestern Willow Flycatchers: Gila River, San Pedro Segments – We will conduct a surveillance and monitoring effort documenting the presence of Southwestern Willow Flycatchers along the Gila River. (1.A.1; 1.A.2; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

Southwestern Willow Flycatchers: Roosevelt Lake Segment – We will complete the final report of the long-term surveillance and monitoring effort documenting the presence of Southwestern Willow Flycatchers at Roosevelt Lake and their nesting success as part of the USBR mitigation plan for the Lake. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

Songbird Surveys Related to Forest Treatments on Camp Navajo Army Depot – The purpose of this study is to estimate and compare songbird abundance within the proposed and current forest treatment areas on Camp Navajo Army Depot. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

### Raptors

Artificial Nest Use by Burrowing Owls – The purpose of this study is to develop management recommendations that can be used when selecting artificial burrow colony sites for relocated Western Burrowing Owls in the Sonoran Desert of Arizona. Study areas include Phoenix and Tucson. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Bald Eagle Movements – We are studying local and migration movements of bald eagles that winter in and around the Camp Navajo Army Depot. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 2.C.4; 2.D.1; 2.D.3)

Captive Breeding of Cactus Ferruginous Pygmy-Owls (CFPO) – We are attempting to breed CFPO in captivity to augment existing wild populations and/or establish owls in historical habitat. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.2)

CFPO Habitat Assessment – This study will use attributes of past locations of CFPO to create a model to determine areas of possible habitat for CFPO. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D. 2)

### Desert Tortoise

Micro-habitat Selection by Desert Tortoise of Firing Boxes on Florence Military Reservation and Survey/Movements of Desert Tortoises on the Southern Impact Area – There are concerns regarding the possible impact military training (as well as off-road vehicle use, which is prevalent within FMR) may have on the desert tortoise habitat and their persistence within these areas. This project will provide useful information about the numbers, distribution and habitat selection of desert tortoises on the FMR. Information from this project can be used to track population trends and aid in potential mitigation efforts for the species. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

### Bats

Lesser Long-nosed Bats on Barry M. Goldwater Range (BMGR) – The purpose of this study is to survey historical roost sites for Lesser Long-nosed Bats on BMGR and collect roost site characteristics at known Lesser Long-nosed Bat roost sites. (1.A.1; 1.A.2; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Forest Bats Use of Bat Boxes in Different Forest Treatment Areas on Camp Navajo Base – We will determine relative abundance and species diversity of forest dwelling bats using artificial roosts on the western portion of Camp Navajo (pre- and post- forest restoration treatments) through monitoring and marking of bats. We will determine whether bats forage and roost in same treatment areas and compare temperature profiles of artificial and natural roosts. The study will be restricted to the western portion of Camp Navajo Army National Guard Depot (approximately 26 km<sup>2</sup>) where two different forest restoration treatments have occurred. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Wildlife Waters: Phase II – We are investigating how wildlife water developments impact (positively, negatively) a variety of wildlife species, such as bats, coyotes, desert bighorn sheep, and mule deer. (1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

#### Native Fish

Colorado River (Grand Canyon) Research Projects – We are conducting several long term monitoring and research projects as part of the Glen Canyon Dam Adaptive Management Program, done through cooperative agreement and grants with U.S.G.S. Grand Canyon Monitoring and Research Center. These projects include Lees Ferry long term monitoring, downstream fishery monitoring, effects of mechanical removal of trout on humpback chub recruitment, Little Colorado River long term native fish spring monitoring, investigation of effects of handling on native fish, evaluation of the use of remotely deployed PIT tag antennae, evaluation of mechanical control of warm water non-native fishes, evaluation of the use of sonic tags, and inventory of fish disease and parasites. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Bubbling Ponds Hatchery Projects – We are using U.S. Bureau of Reclamation funds to develop holding and rearing facilities for endangered native fishes, and will provide additional potential to hold salvage fish for short time periods. (1.A.2; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Razorback sucker growth studies – The project will help evaluate methods to improve razorback sucker growth and improve survival of stocked fish. It will work closely with hatchery personnel to develop strategies for future production of native fishes. The project also provides partial funding to support research into effects of handling on native fishes. (1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.D.1; 2.D.3)

Central Arizona Project Funds-Transfer Program (CAP-FTP): Native fish recovery and non-native fish control activities – The project is intended to monitor, assess, and recover federally listed and native species impacted by the Central Arizona Project. Funding is through U.S. Fish and Wildlife Service. Work will include stream repatriations, post-repatriation monitoring, acquisition of rare populations of loach minnow and spikedace and establishment of refuge

populations at Bubbling Ponds Hatchery (see Bubbling Ponds Hatchery Development project). The focus for the first two years will be Turkey Creek, Pont Welch Canyon, and Ash Creek in the Gila River basin. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Salt River Project activities: Fish and Habitat Surveys of Horseshoe Reservoir and the Verde River – The project is designed to evaluate different operations of Horseshoe Reservoir to benefit native fishes in the Verde River. The objective of the project is to estimate species composition, relative abundance, and recruitment to the adult population of nonnative fishes in Horseshoe Reservoir and in the Verde River from Sheep Bridge to Horseshoe Reservoir during a year when Horseshoe Reservoir fills (2005) and a year where Horseshoe remains mostly empty (2006 or later). A minor objective is to gain knowledge of movements and growth, by marking and recapturing marked fish. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

### **Sportfish**

Golden Alga – We will study the effectiveness of stocking sportfish after fish die-offs attributed to golden algae outbreaks and measure lake environmental conditions to determine if particular environmental factors may be indicative of a pending outbreak. We will work closely with SRP and the U.S. Forest Service (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

Colorado River (Grand Canyon) Research Projects – We are conducting several long term monitoring and research projects as part of the Glen Canyon Dam Adaptive Management Program, done through cooperative agreement and grants with U.S.G.S. Grand Canyon Monitoring and Research Center. These projects include Lee's Ferry long term monitoring, downstream fishery monitoring, effects of mechanical removal of trout on humpback chub recruitment, Little Colorado River long term native fish spring monitoring, investigation of effects of handling on native fish, evaluation of the use of remotely deployed PIT tag antennae, evaluation of mechanical control of warm water non-native fishes, evaluation of the use of sonic tags, and inventory of fish disease and parasites. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

### **Habitat**

Saguaro Cactus Inventory and Assessment on Florence Military Reservation – The purpose of this study is to document and evaluate the distribution of Saguaros on the Florence Military Reservation. (1.A.1; 1.A.2; 1.A.4, 1.A.5; 2.C.4; 2.D.1; 2.D.3)

EPA- USGS Projects (EMAP and REMAP): Environmental Monitoring and Assessment Program (EMAP) – The Environmental Monitoring and Assessment Program (EMAP) is a research program to develop the tools necessary to monitor and assess the status and trends of national ecological resources. EMAP's goal is to develop the scientific understanding for translating environmental monitoring data from multiple spatial and temporal scales into assessments of current ecological condition and forecasts of future risks to our natural resources. Research crews have assisted with stream surveys to collect data for development and testing of a western regional EMAP project. (1.A.1; 1.A.2; 1.A.3; 1.A.4; 1.A.5; 1.A.6; 2.C.4; 2.D.1; 2.D.3)

### **Recreation**

Watercraft and Fisheries Compliance – We will assess the affect of varied patrol efforts on compliance of watercraft and fisheries laws, rules, and regulations. We will provide recommendations for patrol efforts needed to maximize compliance and minimize patrol effort as well as to meet a certain minimum level of compliance. (1.A.2; 2.B.2; 2.B.9; 2.C.4;)

#### Linkages

We have identified the major interactions and functions that the Research support program provides to other components of the Department.

Game – Coordinate regarding game-related research and monitoring. Collaborate regarding disease investigations, projects, outbreaks, testing, inoculation, and quarantine for wildlife. Obtain input for research priorities relative to game species and game management issues. Apply for special tag funds for research projects. Coordinate bird banding activities.

Nongame – Coordinate regarding nongame-related research and monitoring. Obtain input for research priorities relative to nongame species and nongame management issues. Provide support and expertise for captive breeding and monitoring of cactus ferruginous pygmy-owls. Collaborate regarding disease testing, inoculation, and quarantine for translocated wildlife.

Sportfish – Coordinate regarding sportfish-related research and monitoring. Assist with population and habitat monitoring and improvements. Provide professional expertise and representation on the Technical Work Group for the Glen Canyon Dam Adaptive Management Program.

Habitat – Coordinate regarding habitat-related research. Provide information to complete NEPA compliance for research projects. Write proposals to enact habitat and improvement projects. Coordinate and plan expenditures of mitigation funds for habitat restoration and improvement projects. Provide input for Department response for external project evaluation. Coordinate geographic information system (GIS) activities.

Information – Write stories for Wildlife Views magazine, user group publications, and scientific outlets. Provide personnel, money, and information for outreach and internal and external media events. Create, get approval for, and distribute communications products.

Education – Provide information and data for the development of instructional materials. Present at schools, youth groups, clubs, user groups, conferences, expos, and other events.

Law Enforcement – Coordinate regarding law enforcement-related research including fisheries and watercraft compliance. Provide information and expertise for animal quarantines and disposal. Serve as a liaison between the Department, Arizona Department of Agriculture, and U.S. Department of Agriculture when needed. Respond to questions regarding monkey bites. Coordinate with personnel to obtain samples of wildlife for disease testing. Work with aviation to conduct radiotelemetry and observational flights on study populations and habitats.

Wildlife Area Management – Use residential facilities at Wildlife Areas for remote field stations, meeting locations, and training grounds. Coordinate and plan expenditures of mitigation funds for habitat restoration and improvement projects.

Business Administration – Provide in-house training in animal capture, handling, and restraint; drug administration; scientific writing; radiotelemetry; and other tools and techniques. Represent the Department on committees and working groups at the Association of Fish and Wildlife Agencies, Western Association of Fish and Wildlife Agencies, and other professional organizations. Provide opportunities for volunteer involvement. Coordinate budget management and oversight, personnel actions, management of fixed assets, and other business-related activities. Provide input to rule making and review processes. Review potential legislation for wildlife impacts. Respond to public records requests.

Watchable Wildlife – Conduct studies on several species considered to be watchable wildlife.

Development – Coordinate research related to development activities such as the construction and renovation of water catchments.

Watercraft – Coordinate and assist in planning and implementing research on watercraft compliance related to patrol effort.