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In Reply Refer To:
AESO/SE
02-21-05-F-0243

May 20, 2005

Memorandum

To: Refuge Manager, Buenos Aires National Wildlife Refuge, Sasabe, Arizona

From: Field Supervisor

Subject: Biological Opinion on the Buenos Aires National Wildlife Refuge Fire Management Plan for the 2005-2008 Burn Seasons

Thank you for your request for reinitiation of formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). In our April 30, 2002, Biological Opinion (BO) (file no. 2-21-02-F-0068), we evaluated the effects of the proposed action on Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*, pineapple cactus), cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*, pygmy-owl), masked bobwhite quail (*Colinus virginianus ridgewayi*, masked bobwhite), lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), and mountain plover (*Charadrius montanus*). In our May 18, 2004, BO (file no. 2-21-02-F-0068 R1), we evaluated the effects of proposed changes to the action for the 2004 prescribed fire season, in addition to a change in the effects determination for masked bobwhite. We removed the mountain plover from the consultation, as we withdrew the proposal to list the plover as a threatened species under the Act (68 FR 53083). Your current request for reinitiation was dated January 26, 2005, and received by us on February 1, 2005. Reinitiation is requested to extend the proposed action through the 2008 prescribed fire season, to address changes in the proposed action, confer on the effects to proposed pygmy-owl critical habitat, and consult on effects to Chiricahua leopard frog (*Rana chiricahuensis*, leopard frog) and Gila topminnow (*Poeciliopsis occidentalis occidentalis*, topminnow) within the action area. You have not requested reinitiation on the lesser long-nosed bat, as you believe the effects have not changed.

This biological opinion is based on information provided in the January 26, 2005, Intra-Service Biological Evaluation, the 2002 and 2004 BOs on the Fire Management Plan (FMP), the 2001 Buenos Aires National Wildlife Refuge (Refuge) FMP, telephone conversations with Refuge staff, field investigations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, effects of prescribed and wildland fire, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at Arizona Ecological Services Office in Phoenix, Arizona.

Consultation history

- February 5, 2002, Biological Assessment for the Refuge FMP.
- April 30, 2002, Biological Opinion and concurrence for masked bobwhite quail, for the Refuge FMP.
- April 25, 2003, Memorandum from Refuge requesting reinitiation of consultation.
- May 18, 2004, Biological Opinion for the reinitiation request on the Refuge FMP.
- December 2, 2004, Meeting between Refuge and AESO staff to discuss the next 4 years of implementation and a second reinitiation of the Refuge RMP.
- January 26, 2005, Memorandum for the reinitiation request on the Refuge FMP for 2005-2008.
- February 14, 2005, Telephone conversation to discuss the Brown North, Brown South, and Lopez Burn Unit proposed burns and proposed pygmy-owl management areas.
- February 24, 2005, Memorandum sent to the Refuge to request clarification on proposed burn management unit rotation, conservation measures, and proposed critical habitat.
- March 4, 2005, Telephone conversation to discuss issues in the February 24, 2005, memorandum.
- March 10, 2005, Memorandum received from the Refuge clarifying the proposed burn rotation, conservation measures and proposed critical habitat.
- March 24, 2005, Memorandum sent to the Refuge formally initiating Section 7 consultation.
- May 13, 2005, Draft Biological Opinion sent to the Refuge for review.
- May 18, 2005, Email was received with the Refuge's comments on the Draft Biological Opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the implementation of prescribed burns from 2005 through 2008. Details on the implementation of the proposed prescribed burns are described in the original FMP (USFWS 2001) and Biological Evaluation (USFWS 2002), 2002 BO, 2003 reinitiation

Biological Evaluation and 2004 amendment to the Biological Evaluation (USFWS 2003b, 2004), 2004 BO, and 2005-2008 Biological Evaluation (USFWS 2005). The identified Burn Management Units (BMU) and the proposed rotation for fiscal years 2005-2008 are listed in Table 1 and illustrated in Figures 2 and 3. The changes to the action include the use of cool season burning, a 14,000-acre cap on the acres burned, changes in the BMUs, and an experimental pineapple cactus burn. While the BE identifies a proposed rotation, it may become necessary to not burn a BMU in any one year, due to soil moisture conditions, presence of large numbers of masked bobwhite, detection of masked bobwhite nests, lack of fine fuels, or other circumstances that would compromise the success of the burn or are needed for resource protection. Therefore, the Refuge may substitute and swap BMUs from year to year with a maximum of 14,000 acres being burned in any given year.

Burn Season

All burns in 2005 will be done starting in late May. In 2006-2008, some units may be burned during the cool season (October-April) in order to conserve specific habitat types or to protect facilities or wildlife, and meet specific habitat management objectives.

In particular, it is anticipated that Punta North and Punta South may be burned in spring in order to protect and stimulate growth of sacaton (*Sporobolus* spp.), unless soil moisture conditions are appropriate in May. Brown Wash, located between Brown North and Brown South Units (and technically part of Brown North) is a large mesquite bosque which contains numerous trees with cavities. This area may be burned with a cooler fire in order to protect the potential pygmy-owl habitat from wildfire. In addition, the area around the Quail Facility may be burned as a wildland/urban interface (WUI) fire in the cool season to reduce fire threats to structures in the vicinity.

Punta South, Punta North and the Quail Facility will be ring fires, with the downwind corner being ignited first and ignition crews following the burn perimeter lighting flanking fires until the upwind end of the unit is lit creating a head-fire. The head-fire will be allowed to burn out the unit. This decreases residence time of the flaming front, in turn, decreasing the time plant crowns are exposed to heat, which should limit mortality of the sacaton occurring within the units. Ring fires will be ignited by hand, utilizing drip torches or other ignition sources.

The ignition pattern for the Brown Canyon Wash area will be a strip-head fire pattern with strips limited to 50-100 feet depending upon fine fuel loadings. This pattern will allow you to control fire intensity and reduce the amount of heat to which trees are exposed. This pattern is a safer approach and gives the fire crews more control than using backing or flanking fires, as these have a tendency to become head fires at some point. Strip-head fires will be ignited by hand using drip torches or other ignition sources.

The sacaton in Punta South and North burns will produce 10-15 foot flames in the areas with heavier fuel loadings and 2-5 feet in the lighter fuels and uplands. In Brown Wash, the flame lengths will be 2-6 feet with the average being 2-4 feet. The flame lengths in the Quail Facility burn are anticipated to average 2-4 feet with pockets (20%) reaching 10 feet.

Acreage

The refuge will burn no more than 14,000 acres per year. In order to provide some flexibility in the planned burns, more acres will be planned and surveyed than would be burned, allowing for the flexibility to move to other areas depending on fuel conditions or other environmental constraints. It allows the fire staff to seize the opportunity to burn units when conditions are right.

Major Changes in Burn Units

Several new burn units have been added to those set forth in the original Fire Management Plan. Las Delicias Unit is comprised of land held by BANWR and state trust land with the grazing permit held by the Las Delicias Ranch. Located on the west side of Highway 286, it comprises 1185 acres. Preliminary inspection of the area revealed potential Pima pineapple cactus habitat and masked bobwhite habitat, but probably no cactus ferruginous pygmy-owl nesting habitat in the unit, although pygmy-owls may use it as dispersal habitat.

Mormon West Unit (337 acres) was formerly used as a control area for the burn program. Despite intentions of never burning the site, it burned in a wildfire in 2000. This area is appropriate for masked bobwhite, and Pima pineapple cactus, and it may be suitable for pygmy-owl; evaluations are pending for these species.

The Quail Facility burn is planned as a WUI burn. Consisting of only 70 acres, it will be in the bottomlands below (west) of the Arivaca Quail Facility and associated houses. Bottomland habitat prevails and consists mostly of Johnson grass (*Sorghum* spp) and pigweed (*Amaranthus*). There are isolated hackberry (*Celtis*) trees and a ring of large diameter hackberries surrounding the bottoms which could be pygmy-owl habitat. A portion may be appropriate pineapple cactus habitat. Masked bobwhite are possible in the area, as well.

King Unit (1986 acres) is also on the west side of Highway 286. It has masked bobwhite, pygmy-owl and pineapple cactus habitat. During pygmy-owl surveys last year, a saguaro was found on the edge of a drainage. The unit will be searched during pineapple cactus surveys for additional saguaro cacti.

Brown North (1482 acres) and Brown South (977 acres) were added three years ago. Brown South was burned in 2003. The drainage between the 2 units (Brown Wash) is good pygmy-owl habitat (one was detected in 2002), and the uplands may harbor masked bobwhite and pineapple cactus.

A 111-acre portion of City Hall Unit, called the City Hall Experiment, will be burned in 2005. This burn will be done to determine the effects of 3 iterations of prescribed burns 2 years apart. No pygmy-owl habitat exists in the area, but masked bobwhite and pineapple cacti are possible.

Experimental Pima Pineapple Cactus Burn

During the 2005 prescribed fire season, the Refuge, in coordination with our office, will be conducting an experiment to determine the fire effects on unprotected pineapple cactus in various vegetation types. The experiment will be conducted in the boundaries of the Las Delicias prescribed burn. Known pineapple cactus will be visited before the fire as part of pre-fire surveys, and data will be collected on the type and density of vegetation surrounding the cactus. The cacti included in the sample will have none of the additional conservation or protective measures, as described below. This will allow the Refuge and our office to observe and possibly quantify the effects of fire on these cacti. Furthermore, it will let us compare the effects of prescribe burns in natural vegetation types to those that occur in exotic species dominated vegetation types. These data should provide us with information on the amount of physical protection needed and what fire prescriptions and fuel loads will need to be considered in future prescribed burn and wildland fire use consultations.

All pineapple cacti in the burn unit will be visited within two weeks of the prescribed burn. Standard post burn data will be collected for each pineapple cactus including mortality, distance to nearest fire, percent vegetation burned, plant damage, etc. A second post burn visit will take place 4 or 5 weeks after the prescribed burns to locate pineapple cacti exhibiting any damage. The Refuge will summarize the data forms for all protected and non-protected cacti from our pre-burn and post-burn field data forms to describe vegetation conditions associated with each pineapple cactus and to evaluate the fire effects on these cacti. These results will be submitted to our office by December 31, 2005, or as part of the Refuge's annual work plan.

Conservation Measures

The following measures are actions that the Refuge will take as part of the action to reduce adverse impacts to and to conserve listed species:

Pima Pineapple Cactus

Surveys for pineapple cacti will be conducted in high and medium probability areas, as predicted by the Pima pineapple cactus predictive model, in each burn unit scheduled for burning if the habitat in the unit has not been completely surveyed within the past 5 years. The goal is to survey 100% of the habitat designated as having high or medium potential for pineapple cactus based on the GIS habitat model. Post burn surveys of up to 100% of the low potential habitat within each burn unit will be conducted, and the data will be used to further validate the GIS habitat model.

Data collected as part of each pineapple cactus survey will include cactus measurements, number of pups present, percent vegetative cover, map of the area surveyed, hours surveyed, number of people surveying, number of pineapple cacti located, and UTMs for each individual cactus. Pima pineapple cactus datasheets will be completed for each individual.

All known pineapple cacti will be marked and the cactus will be protected from fire through the removal of fuels around each cactus, except those cacti in the experimental burn sample. As

discussed at the December 2, 2004, meeting with us, measures will be taken to insure that mortality of pineapple cactus from fire will not exceed 5 percent. Vegetative cover surrounding each cactus will determine the level of clearing. You plan on saving a circle of vegetation within a 1-foot radius from each cactus. A 10-foot radius will be cleared around the 1-foot radius circle. The clearing could be done by black-lining, mowing (weedwhacking) and raking, foaming or whatever measure is appropriate to make the doughnut shaped area unlikely to burn.

You agreed to experiment with fireproof structures over cacti. You have not yet devised a design for such structures, but are looking into possibilities. We hope a model can be devised which is lightweight and easy to carry to the field, as well as effective against fire and solar-heating damage to the cacti.

All known pineapple cacti in each BMU will be monitored after a prescribed burn. This will assist in the determination of the effectiveness of the protective measures. It will also assist in evaluating the effectiveness of the pre-burn surveys based upon the habitat model.

An experiment will be conducted to determine the effects of surrounding vegetation and fire on pineapple cacti without any protective measures. This will require a pre-burn assessment of the level and type of surrounding vegetation and a post-burn assessment.

Surveys will be conducted in all the high and medium probability areas predicted by the Pima pineapple cactus predictive model. Since the predictive model did not accurately predict presence of the cacti on narrow, gravelly ridges due to the coarseness of the digital elevation model (DEM) data in 2004, finer DEM data has been incorporated into the model. Currently, accuracy of the model is at 89%. The model will continue to be refined using newly acquired data. The model is considered dynamic and may be refined whenever potential contributing information is identified. In addition to surveying the high and medium probability areas, areas deemed to be appropriate, but not predicted by the model, will also be surveyed.

Cactus Ferruginous Pygmy-owl

Surveys for cactus ferruginous pygmy-owls (AGFD and USFWS 2000) will be conducted in drainages with saguaros or trees 8 inch diameter at breast height (dbh) or greater. If only a few trees exist, but no saguaro cacti are present, these trees will be surveyed for cavities, and pygmy-owl surveys will only be conducted if potential nest cavities are present.

Surveys for pygmy-owl will be conducted in a 400-meter radius around a saguaro cacti or trees with potential nest cavities. If the potential nest structure is near a drainage where suitable habitat is limited to the drainage, survey points can be placed 400 meters on either side of the nest structure within the suitable nesting habitat.

Protection of saguaros will be accomplished by clearing the immediate area surrounding the cactus, leaving at least two trees 0-20meters away to serve as guard trees. The presence of appropriate guard trees will dictate how far out you clear around each saguaro.

If a pygmy-owl nest or occupied territory is located within or adjacent to a BMU to be burned, a minimum 600-meter, radius buffer will be established to protect the nest or territory from the effects of the prescribed burn or fire crew activities. In the event that fire officials determine that they cannot adequately protect the pygmy-owl and its nest or territory site, the BMU will not be treated that season.

Human activity in the vicinity of an area used by an owl will be kept to a minimum. Only work deemed necessary for the preservation of the owl's habitat will be allowed within 100 meters of a nest site or territory center.

If an owl is known to exist in an area adjacent to a BMU slated for burning in a particular year, precautions will be taken to avoid smoke effects to the owl . BMUs will be burned when the prevailing wind will blow smoke away from the direction of the owl, if possible.

During a prescribed burn, ignition patterns will be adjusted to the maximum extent practicable to divert fires away from washes containing large trees, in order to avoid burning trees. Generally, these are the washes shown on the Proposed Cactus Ferruginous Pygmy-Owl Management Plan Map (Figure 1).

Proposed pygmy-owl management zones (Figure 1) will provide maximum protection of suitable nesting habitat and medium protection for a system of drainages that will provide connectivity through the refuge. Minimum protection zones will be primarily managed for restoration of native grasslands and reduction of upland mesquite. A wildland/urban interface zone around the towns of Sasabe and Arivaca and all refuge buildings will be managed for protection of people and property.

The draft proposed pygmy-owl management plan will be finalized within the Refuge Habitat Management Plan.

Masked Bobwhite

In order to help improve the survivorship of masked bobwhite during prescribed burns, when aerial ignition is used, there will be 1/4-1/2 mile-distance between parallel ignition lines. If nesting birds or a high density of masked bobwhite are located within a BMU, that portion of the unit containing the nest or the numerous birds will not be burned that year.

In general, adjacent units will not be burned during the same year in order to preserve habitat for birds to move into if the area they are using becomes undesirable due to lack of regeneration of habitat. The exceptions to this are the very small units which, for practical reasons, will be burned together. These include Headquarters/Mormon (710 acres combined) and Horse North/Horse South (1246 acres combined). In the event that a cool season burn is done in a unit and the habitat regenerates adequately, a burn in an adjacent unit might be considered for the normal May-June time frame if it is needed for a valid wildlife habitat restoration goal.

Gila Topminnow and Chiricahua Leopard Frog

The dirt tanks containing Gila topminnow and Chiricahua leopard frogs these are typically surrounded by elevated berms which effectively protect the tanks from ash and sediment flow. However, the inlets are somewhat vulnerable. In the situation of Rock and State tanks, both are double tanks where a smaller dugout area effectively functions as a silt trap. In order to protect tanks from any infiltration of harmful ash, either the trap will be cleaned at some interval following the burn or a straw bale-type sediment trap will be used at the inlet in order to prevent harmful ash from settling into the tanks. Choffo, Carpenter, and Garcia tanks are not in burn units, so no protection will be needed.

The headquarters holding pond is a cement structure and is adjacent to the headquarters building. No protective measures are needed at this pond, other than protecting the entire headquarters area from fire.

STATUS OF THE SPECIES

Pima Pineapple Cactus

The pineapple cactus was listed as endangered on September 23, 1993 (58 FR 49875). The rule became effective on October 25, 1993, and critical habitat was not designated at that time. Factors that contributed to the listing include habitat loss and degradation, habitat modification and fragmentation, limited geographic distribution and species rareness, illegal collection, and difficulties in protecting areas large enough to maintain functioning populations. The biological information was summarized in the 2002 BO BANWR FMP, the proposed and final rules, and other sources.

The cactus has continued to experience declines throughout most of its range because of the loss of habitat and individuals due to residential and commercial development in the Santa Cruz River Valley, the lands south of Tucson and along the corridor north and south of State Route 86. The Altar Valley has not seen the development pressures that have been seen in the rest of this species' range, and the majority of the habitat in this valley remains intact. Surveys related to prescribed fire projects and research activities have continued to provide information on the status of this species in this part of its range.

The area of habitat reviewed under section 7 of the ESA between 1987 and 2000 (i.e., habitat developed or significantly modified beyond the point where restoration would be a likely alternative) is approximately 24,429 acres, which represents 43 percent of the total area surveyed to date. In 1998, more than 1,100 acres of pineapple cactus habitat were lost, including 752 acres from the ASARCO, Inc. Mission complex project. In 2000, 586 acres of habitat were lost with the expansion of a state prison in Tucson. In 2001, 177 acres of habitat were lost through development, but 888 acres of occupied and suitable habitat were conserved through conservation easements. In 2002-2003, 76.5 acres of occupied habitat were destroyed, but 36 acre-credits were purchased in the pineapple cactus conservation bank, thus protecting 36 acres of pineapple cactus habitat, and an additional 58.5 acres of pineapple cactus habitat were conserved in a conservation easement. We are aware of housing developments along Valencia Road, Pima County, Arizona, in the vicinity of T15S, R12E, Section 15 and surrounding areas,

which support pineapple cacti. These developments affect several hundred acres of habitat and have not been evaluated through the section 7 process. The number of acres lost through private actions, not subject to Federal jurisdiction, is not known but, given the rate of urban development in Pima County, we believe it is significant.

Most of the documented habitat loss has occurred south of Tucson through the Santa Cruz Valley to the town of Amado. This area is critical for the future recovery of the species. The expansion of urban centers, human population, and mining activities will continue to eliminate habitat and individuals, and result in habitat fragmentation.

The protection of habitat and individuals is complicated by the varying land ownership within the range of this species. An estimated 10 percent of the potential habitat for pineapple cacti is held in Federal ownership. The remaining 90 percent is on Tribal, State, and private lands. Most of the federally owned land is either at the edge of the plant's range or in scattered parcels. The largest contiguous piece of federally owned land is the Buenos Aires National Wildlife Refuge, located at the southwestern edge of the plant's range at higher elevations and lower plant densities.

Based on surveys and habitat analysis, areas south of Tucson through the Santa Cruz Valley to the town of Amado and surrounding developed parts of Green Valley and Sahuarita, and parts of the San Xavier District of the Tohono O'odham Nation, appear to support abundant populations and some recruitment, and units of extensive habitat still remain. However, the primary threat to the status of this species throughout its range is the accelerated rate (i.e., since 1993) at which much of the prime habitat is being developed, fragmented, or modified.

The Arizona Native Plant Law may delay vegetation clearing on private property for the salvage of specific plant species within a 30-day period. Although the Arizona State Native Plant Law prohibits the illegal taking of this species on State and private lands without a permit for educational or research purposes, it does not provide for protection of plants in situ through restrictions on development activities.

Based on current knowledge, urbanization, farm and crop development, and exotic species invasion alter the landscape in a manner that would be nearly irreversible in terms of supporting pineapple cactus populations. Prescribed fire can have a negative effect on pineapple cactus if not planned properly.

Other specific threats that have been previously documented (58 FR 49875), such as overgrazing and mining, have not yet been analyzed to determine the extent of effects to this species. However, partial information exists. Mining has resulted in the loss of hundreds, if not thousands, of acres of potential habitat throughout the range of the plant. Much of the mining activity has been occurring in the Green Valley area, which is the center of the plant's distribution and the area known to support the highest densities of pineapple cactus. Overgrazing by livestock, illegal plant collection, and fire-related interactions involving exotic Lehmann lovegrass (*Eragrostis lehmanniana*) may also negatively affect pineapple cactus populations (58 FR 49875).

Even with complete data on historical change related to pineapple cactus distribution and abundance, we cannot reliably predict population status due to compounding factors such as climate change, urbanization, and legal and political complexities (McPherson 1995). We do not know if the majority of populations of pineapple cacti can be sustainable under current reduced and fragmented conditions. Thus, there is a need to gather information on limits to the plant's distribution under current habitat conditions.

In summary, monitoring has shown that the range-wide status of the pineapple cactus appears to have been recently affected by threats that have completely altered or considerably modified more than a third of the species' surveyed habitat, and have caused the elimination of nearly 60 percent of documented locations. Dispersed, patchy clusters of individuals are becoming increasingly isolated as urban development, mining, and other commercial activities continue to detrimentally impact the habitat. The remaining habitat also is subject to degradation or modification from current land-management practices, increased recreational use on lands when adjacent to urban expansion (i.e., off-road vehicle use and illegal collection), and the continuing aggressive spread of nonnative grasses into pineapple cactus habitat. Habitat fragmentation and degradation will likely continue into the foreseeable future based on historical data and growth projections produced by the Pima County Association of Governments (1996). There is very little Federal oversight on conservation measures that would protect or recover the majority of the potential habitat. Even some areas where section 7 consultations have been completed have been modified and may not be able to support viable populations of the pineapple cactus over the long-term.

Our information indicates that, rangewide, more than 26 consultations have been completed or are underway for actions affecting the pineapple cactus. The majority of these opinions concerned the effects of development (approximately 38 percent), utility infrastructure (approximately 15 percent), prescribed fire plans (approximately 12 percent), and roads and bridges (approximately 8 percent). The remaining 42 percent of consultations dealt with grazing, mining, and agency planning issues.

Cactus Ferruginous Pygmy-Owl

The Arizona population of the pygmy-owl was listed as an endangered distinct population segment on March 10, 1997, (62 FR 10730) without critical habitat. In response to a court order, approximately 731,712 acres of critical habitat were designated on July 12, 1999, (64 FR 37419) in areas within Pima, Cochise, Pinal, and Maricopa counties in Arizona. On January 9, 2001, a coalition of plaintiffs filed a lawsuit with the District Court of Arizona challenging the validity of the listing of the Arizona population of the pygmy-owl as an endangered species and the designation of its critical habitat. On September 21, 2001, the Court upheld the listing of the pygmy-owl in Arizona but at our request, and without otherwise ruling on the critical habitat issues, remanded the designation of critical habitat for preparation of a new analysis of the economic and other effects of the designation (National Association of Home Builders *et al.* v. Norton, Civ.-00-0903-PHX-SRB). The Court also vacated the critical habitat designation during the remand. We published a proposed rule to redesignate critical habitat in the Federal Register on November 27, 2002 (67 FR 71032). The proposal includes approximately 1,208,000 acres in portions of Pima and Pinal counties, Arizona.

The plaintiffs appealed the District Court's ruling on the listing of the pygmy-owl as a distinct population segment. On August 19, 2003, the Ninth Circuit Court of Appeals rendered an opinion regarding this appeal, which held that, although we did not arbitrarily find the Arizona pygmy-owl population to be discrete, we arbitrarily found the discrete population to be significant. The judgment of the District Court was reversed and the case was remanded to the district court for further proceedings consistent with the Ninth Circuit's opinion (No. 02-15212, CV 00-0903-SRB). Prior to being remanded to the district court, Defenders of Wildlife, intervenors on the original 2001 lawsuit, filed a petition with the Ninth Circuit for rehearing, or, in the alternative, rehearing *en banc*. This petition was denied, and the matter returned to the District Court. The District Court ruled on June 28, 2004, remanding the Listing Rule to us for further proceedings consistent with that order and the opinion of the Court of Appeals for the Ninth Circuit. The Listing Rule was left in place pending the outcome of our reconsideration. We were required to provide a status report to the Court in January 2005. On January 31, 2005, we reported to the court that a decision on the listing of the pygmy-owl would be forthcoming in the next three months.

Because conservation and recovery of the pygmy-owl may rely upon a landscape mosaic of appropriate habitat, we have proposed critical habitat areas that will link a network of State, private and Federal lands. The proposed system of critical habitat is designed to provide an interconnected system of suitable habitat essential to Arizona pygmy-owl survival and maintain the viability of groups of pygmy-owls that are dependant upon continued genetic interchange and population immigration. Two premises were considered in establishing this system: 1) protecting verified pygmy-owl sites and areas with the presence of one or more of the constituent elements within the mean straight-line dispersal distance (8 km (5 mi)) from nest sites and three of the four recovery team-recommended Special Management Areas (SMAs); and 2) providing for the linkage of these verified sites with areas of suitable habitat for which we have adequate scientific information indicating that they are essential to the conservation of the listed population and in need of special management. A complete description of the primary constituent elements of proposed critical habitat and the proposed critical habitat units can be found in the Federal Register announcement of the proposed rule to designate critical habitat for the pygmy-owls (67 FR 71032). When consulting with Federal agencies on projects that may destroy or adversely modify critical habitat, we will evaluate the effects of their project on both the Unit and the-whole-of critical habitat. Then we can best evaluate the scope of effects and recommend project modifications that conserve or augment the values that would otherwise potentially be lost to that particular unit.

In September 1998, we appointed the Cactus Ferruginous Pygmy-Owl Recovery Team. The Team is comprised of a Technical Group of biologists (pygmy-owl experts and raptor ecologists) and an Implementation Group, which includes representatives from affected and interested parties (i.e., Federal and State agencies, local governments, the Tohono O'odham Nation, and private groups). A draft recovery plan was released for public comment in January 2003 (USFWS 2003a). Following consideration of the public comments and resolution of listing litigation, we will work to finalize the recovery plan.

Documentation of the total number of pygmy-owls and their current distribution in Arizona is incomplete. Survey and monitoring work in Arizona resulted in documenting 41 adult pygmy-owls in 1999, 34 in 2000, 36 in 2001, 24 in 2002, and, most recently, 21 in 2003 (AGFD 2002). The surveys and monitoring of pygmy-owls for 2004 are not complete at this time. The preliminary data at this time include 17 total individuals (Dennis Abbate pers. com.). Most of these pygmy-owls were distributed in four general areas: northwest Tucson, southern Pinal County, Organ Pipe Cactus National Monument, and the Altar Valley. We believe that more pygmy-owls exist in Arizona, but systematic surveys have not been conducted in all areas of potential habitat. Current summary of rangewide information of known pygmy-owls is in Table 2.

Our information indicates that, rangewide, more than 105 consultations have been completed or are underway for actions affecting pygmy-owls. The majority of these opinions concerned the effects of development (approximately 24 percent), grazing (approximately 22 percent), agency planning (approximately 13 percent), or roads and bridges (approximately 12 percent). The remaining 29 percent of consultations dealt with, fire, flooding, recreation, utility infrastructure, animal stocking, water development, border security, and water quality issues.

Masked Bobwhite Quail

We listed the masked bobwhite as endangered with the original passage of the Endangered Species Conservation Act of 1969 (Public Law 91-135; 83 Stat.275); the Act. Shortly after specimens were first collected in 1884, masked bobwhites were essentially extirpated from Arizona (and the United States) by 1900. In the U.S., the species was generally associated with the Santa Cruz and Altar valleys of southeastern Arizona (USFWS 1995). Critical habitat is not designated for this species. A recovery plan for the masked bobwhite exists and has been revised several times (USFWS 1995).

Biological information on masked bobwhite is summarized in the 2004 BO BANWR FMP (U.S. Fish and Wildlife Service 2004) and in the recovery plan for this species (U.S. Fish and Wildlife Service 1995). Quantitative data on masked bobwhite in Mexico is lacking. The population of masked bobwhite in the United States is found primarily on the Refuge and ranchlands immediately adjacent to the Refuge. Several observations in the north end of the Altar Valley have been made along SR 286. Summer call-count survey data from the Refuge is summarized in Table 3.

The only formal Section 7 consultation on masked bobwhite quail is the Refuge Fire Management Plan. It has been included in several informal consultations related to the Refuge's Comprehensive Conservation Plan and various quail related management actions.

Chiricahua Leopard Frog

The Chiricahua leopard frog (*Rana chiricahuensis*) was listed as a threatened species without critical habitat in a Federal Register notice dated June 13, 2002 (67 FR 40790). Included was a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. The frog is distinguished from other members of the

Rana pipiens complex by a combination of characters, including a distinctive pattern on the rear of the thigh consisting of small, raised, cream-colored spots or tubercles on a dark background; dorsolateral folds that are interrupted and deflected medially; stocky body proportions; relatively rough skin on the back and sides; and often green coloration on the head and back (Platz and Mecham 1979). The species also has a distinctive call consisting of a relatively long snore of 1 to 2 seconds in duration (Davidson 1996, Platz and Mecham 1979). Snout-vent lengths of adults range from approximately 2.1 to 5.4 inches (Stebbins 2003, Platz and Mecham 1979). The Ramsey Canyon leopard frog (*Rana subaquavocalis*) is similar in appearance to the Chiricahua leopard frog, but it reportedly grows to a larger size and has a distinct call that is typically given under water (Platz 1993). Recent genetic work suggests *R. subaquavocalis* and *R. chiricahuensis* may be conspecific (Goldberg *et al.* 2004).

The Chiricahua leopard frog is an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora, and the Sierra Madre Occidental of northern and central Chihuahua (Platz and Mecham 1984, Degenhardt *et al.* 1996, Sredl *et al.* 1997, Sredl and Jennings *in press*). Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable. The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Rana montezumae*) in the southern part of the range of the Chiricahua leopard frog. In New Mexico, of sites occupied by Chiricahua leopard frogs from 1994-1999, 67 percent were creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of all known historical localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl *et al.* 1997). Sixty-three percent of populations extant in Arizona from 1993-1996 were found in stock tanks (Sredl and Saylor 1998).

Northern populations of the Chiricahua leopard frog along the Mogollon Rim and in the mountains of west-central New Mexico are disjunct from those in southeastern Arizona, southwestern New Mexico, and Mexico. Genetic analyses, including a 50-loci starch gel survey, morphometrics, and analyses of nuclear DNA supports describing the northern populations as a distinct species (Platz and Grudzien 1999). In another study, frogs from these two regions showed a 2.4 percent average divergence in mitochondrial DNA sequences (Goldberg *et al.* 2004). Multiple haplotypes within *chiricahuensis* were also identified using mitochondrial DNA analysis (Benedict and Quinn 1999), providing further evidence of genetically distinct demes or groups of related populations. Based on morphological similarities, Hillis and Wilcox (2005) suggest the northern populations may be referable to *Rana fisheri* (Vegas Valley leopard frog), a taxon from the Las Vegas Valley, Nevada, considered by most to be extinct (Bradford 2002). However, *R. fisheri* in the Vegas Valley was disjunct from Mogollon Rim *chiricahuensis* populations by about 230 miles, thus if the two are closely-related or conspecific, it begs some interesting biogeographical questions. The Ramsey Canyon leopard frog (*Rana subaquavocalis*, Platz 1993) is similar in appearance to the Chiricahua leopard frog, and genetic work supports subsuming *R. subaquavocalis* into *chiricahuensis* (Goldberg *et al.* 2004, Hillis and Wilcox 2005).

Die-offs of Chiricahua leopard frogs were first noted in former habitats of the Tarahumara frog (*Rana tarahumarae*) in Arizona at Sycamore Canyon in the Pajarito Mountains (1974) and Gardner Canyon in the Santa Rita Mountains (1977-78) (Hale and May 1983). From 1983-1987, Clarkson and Rorabaugh (1989) found Chiricahua leopard frogs at only two of 36 Arizona localities that had supported the species in the 1960s and 1970s. Two new populations were reported. During subsequent extensive surveys from 1994-2001, the Chiricahua leopard frog was found at 87 sites in Arizona, including 21 northern localities and 66 southern localities. (Sredl *et al.* 1997, Rosen *et al.* 1996, Service files). In New Mexico, the species was found at 41 sites from 1994 -1999; 31 of those were verified extant during 1998-1999 (Painter 2000). During May-August 2000, the Chiricahua leopard frog was found extant at only eight of 34 sites where the species occurred in New Mexico during 1994-1999 (C. Painter, pers. comm. 2000). The species has been extirpated from about 75 percent of its historical localities in Arizona and New Mexico. The status of the species in Mexico is unknown.

Based on Painter (2000) and the latest information for Arizona, the species is still extant in most major drainages in Arizona and New Mexico where it occurred historically; with the exception of the Little Colorado River drainage in Arizona and possibly the Yaqui drainage in New Mexico. It has also not been found recently in many rivers, valleys, and mountain ranges, including the following in Arizona: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek mainstem. In southeastern Arizona, no recent records (1995 to the present) exist for the following mountain ranges or valleys: Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. Moreover, the species is now absent from all but one of the southeastern Arizona valley bottom cienega complexes. In many of these regions Chiricahua leopard frogs were not found for a decade or more despite repeated surveys. Recent surveys suggest the species may have recently disappeared from some major drainages in New Mexico (C. Painter and R. Jennings, pers. comm. 2004).

Threats to this species include predation by nonnative organisms, especially bullfrogs, fish, and crayfish; disease; drought; floods; degradation and loss of habitat as a result of water diversions and groundwater pumping, poor livestock management, altered fire regimes due to fire suppression and livestock grazing, mining, development, and other human activities; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. Loss of Chiricahua leopard frog populations is part of a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well (Carey *et al*. 2001). Numerous studies indicate that declines and extirpations of Chiricahua leopard frogs are at least in part caused by predation and possibly competition by nonnative organisms, including fish in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs (*Rana catesbeiana*), tiger salamanders (*Ambystoma tigrinum mavortium*), crayfish (*Orconectes virilis* and possibly others), and several other species of fish (Fernandez and Rosen 1998, 1996; Rosen *et al.* 1996; 1994; Snyder *et al.* 1996; Fernandez and Bagnara 1995; Sredl and Howland 1994; Clarkson and Rorabaugh 1989). For instance, in the Chiricahua region of southeastern Arizona, Rosen *et al.* (1996) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported Chiricahua leopard frogs. All waters except three that supported

introduced vertebrate predators lacked Chiricahua leopard frogs. Sredl and Howland (1994) noted that Chiricahua leopard frogs were nearly always absent from sites supporting bullfrogs and nonnative predatory fish. Rosen *et al.* (1996) suggested further study was needed to evaluate the effects of mosquitofish, trout, and catfish on frog presence.

Disruption of metapopulation dynamics is likely an important factor in regional loss of populations (Sredl *et al.* 1997, Sredl and Howland 1994). Chiricahua leopard frog populations are often small and habitats are dynamic, resulting in a relatively low probability of long-term population persistence. Historically, populations were more numerous and closer together. If populations winked out due to drought, disease, or other causes, extirpated sites could be recolonized via immigration from nearby populations. However, as numbers of populations declined, populations became more isolated and were less likely to be recolonized if extirpation occurred. Also, most of the larger source populations along major rivers and in cienega complexes have disappeared.

Fire frequency and intensity in Southwestern forests are much altered from historical conditions (Dahms and Geils 1997). Before 1900, surface fires generally occurred at least once per decade in montane forests with a pine component. Beginning about 1870-1900, these frequent ground fires ceased to occur due to intensive livestock grazing that removed fine fuels, followed by effective fire suppression in the mid to late 20th century (Swetnam and Baisan 1996). Absence of ground fires allowed a buildup of woody fuels that precipitated infrequent but intense crown fires (Danzer *et al.* 1997, Swetnam and Baisan 1996). Absence of vegetation and forest litter following intense crown fires exposes soils to surface and rill erosion during storms, often causing high peak flows, sedimentation, and erosion in downstream drainages (DeBano and Neary 1996). Following the 1994 Rattlesnake fire in the Chiricahua Mountains, Arizona, a debris flow filled in Rucker Lake, a historical Chiricahua leopard frog locality. Leopard frogs (either Chiricahua or Ramsey Canyon leopard frogs) apparently disappeared from Miller Canyon in the Huachuca Mountains, Arizona, after a 1977 crown fire in the upper canyon and subsequent erosion and scouring of the canyon during storm events (Tom Beatty, Miller Canyon, pers. comm. 2000). Leopard frogs were historically known from many localities in the Huachuca Mountains; however, natural pool and pond habitat is largely absent now and the only breeding leopard frog populations occur in artificial tanks and ponds. Crown fires followed by scouring floods are a likely cause of this absence of natural leopard frog habitats. Bowers and McLaughlin (1994) list six riparian plant species they believed might have been eliminated from the Huachuca Mountains as a result of floods and debris flow following destructive fires.

An understanding of the dispersal abilities of Chiricahua leopard frogs is key to determining the likelihood that suitable habitats will be colonized from a nearby extant population of frogs. As a group, leopard frogs are surprisingly good at dispersal. In Michigan, young northern leopard frogs (*Rana pipiens*) commonly move up to 0.5 mile from their place of metamorphosis, and 3 young males established residency up to 8.4 miles from their place of metamorphosis (Dole 1971). Both adults and juveniles wander widely during wet weather (Dole 1971). In the Cypress Hills, southern Alberta, young-of-the year northern leopard frogs successfully dispersed to downstream ponds 3.4 miles from the source pond, upstream 0.6 mile, and overland 0.6 mile. At Cypress Hills, a young-of-the-year northern leopard frog moved 13 miles in one year (Seburn *et al.* 1997). The Rio Grande leopard frog (*Rana berlandieri*) in southwestern Arizona has been

observed to disperse at least one mile from any known water source during the summer rainy season (Rorabaugh, *in press*). After the first rains in the Yucatan Peninsula, leopard frogs have been collected a few miles from water (Campbell 1998). In New Mexico, Jennings (1987) noted collections of Rio Grande leopard frogs from intermittent water sources and suggested these were frogs that had dispersed from permanent water during wet periods.

Dispersal of leopard frogs away from water in the arid Southwest may occur less commonly than in mesic environments in Alberta, Michigan, or the Yucatan Peninsula during the wet season. However, there is evidence of substantial movements even in Arizona. Movement may occur via movement of frogs or passive movement of tadpoles along streamcourses. The maximum distance moved by a radio-telemetered Chiricahua leopard frog in New Mexico was 2.2 miles in one direction (R. Jennings, C. Painter, pers. comm. 2004). In 1974, Frost and Bagnara (1977) noted passive or active movement of Chiricahua and Plains (*Rana blairi*) leopard frogs for 5 miles or more along East Turkey Creek in the Chiricahua Mountains. In August, 1996, Rosen and Schwalbe (1998) found up to 25 young adult and subadult Chiricahua leopard frogs at a roadside puddle in the San Bernardino Valley, Arizona. They believed that the only possible origin of these frogs was a stock tank located 3.4 miles away. Rosen *et al.* (1996) found small numbers of Chiricahua leopard frogs at two locations in Arizona that supported large populations of nonnative predators. The authors suggested these frogs could not have originated at these locations because successful reproduction would have been precluded by predation. They found that the likely source of these animals were populations 1.2-4.3 miles distant. In the Dragoon Mountains, Arizona, Chiricahua leopard frogs breed at Halfmoon Tank, but frogs occasionally turn up at Cochise Spring (0.8 mile down canyon in an ephemeral drainage from Halfmoon Tank) and in Stronghold Canyon (1.1 mile down canyon from Halfmoon Tank). There is no breeding habitat for Chiricahua leopard frogs at Cochise Spring or Stronghold Canyon, thus it appears observations of frogs at these sites represent immigrants from Halfmoon Tank. In the Chiricahua Mountains, a population of Chiricahua leopard frogs disappeared from Silver Creek stock tank after the tank dried up; but frogs then began to appear in Cave Creek, which is about 0.6 mile away, again, suggesting immigration. Movements away from water do not appear to be random. Streams are important dispersal corridors for young northern leopard frogs (Seburn *et al.* 1997). Displaced northern leopard frogs will home, and apparently use olfactory and auditory cues, and possibly celestial orientation, as guides (Dole 1968, 1972). Rainfall or humidity may be an important factor in dispersal because odors carry well in moist air, making it easier for frogs to find other wetland sites (Sinsch 1991).

Recent evidence suggests a chytridiomycete skin fungi, *Batrachochytrium dendrobatidis*, is responsible for global declines of frogs, toads, and salamanders (Speare and Berger 2000, Longcore *et al.* 1999, Berger *et al.* 1998, Hale 2001). Although the cause of death is uncertain, a thickening of the skin on the feet, hind legs and ventral pelvic region is thought to interfere with water and gas exchange, leading to death of the host (Nichols *et al.* 2001). The proximal cause of extinctions of two species of Australian gastric brooding frogs and the golden toad (*Bufo periglenes*) in Costa Rica was likely chytridiomycosis. Another species in Australia for which individuals were diagnosed with the disease may be extinct (Daszak 2000). In Arizona, chytrid infections have been reported from four populations of Chiricahua leopard frogs (M. Sredl, pers. comm. 2000), as well as populations of other several other frogs and toads (Bradley *et al.* 2002, Hale 2001, Davidson *et al.* 2000, Sredl and Caldwell 2000, Morell 1999). In New Mexico,

chytridiomycosis was identified in a declining population near Hurley, and patterns of decline at 3 other populations are consistent with chytridiomycosis (R. Jennings, pers. comm. 2000). Die-offs occur during the cooler months from October-February. High temperatures during the summer may slow reproduction of chytrids to a point at which the organism cannot cause disease (Bradley *et al.* 2002). Rollins-Smith *et al.* (2002) also showed that chytrid spores are sensitive to antimicrobial peptides produced in ranid frog skin. The effectiveness of these peptides is temperature dependent and other environmental factors probably affect their production and release (Matutte *et al.* 2000).

The role of the fungi in the population dynamics of the Chiricahua leopard frog is as yet undefined; however, there is increasing evidence for amphibian population declines correlated with chytrid infections (Carey *et al.* 2003). It is clear that Chiricahua leopard frog populations can exist with the disease for extended periods. The frog has coexisted with chytridiomycosis in Sycamore Canyon, Arizona since at least 1972. However, at a minimum, it is an additional stressor, resulting in periodic die-offs that increase the likelihood of extirpation and extinction. It may well prove to be an important contributing factor in observed population decline, and because of the interchange of individuals among subpopulations, metapopulations of frogs may be particularly susceptible. Rapid death of all or most frogs in stock tank populations in a metapopulation of Chiricahua leopard frogs in Grant County, New Mexico was attributed to post-metamorphic death syndrome (Declining Amphibian Populations Task Force 1993). Hale and May (1983) and Hale and Jarchow (1988) believed toxic airborne emissions from copper smelters killed Tarahumara frogs and Chiricahua leopard frogs in Arizona and Sonora. However in both cases, symptoms of moribund frogs matched those of chytridiomycosis. The disease has now been documented to have been associated with Tarahumara frog die-offs since 1974 (Hale 2001). The earliest record for chytridiomycosis in Arizona (1972) roughly corresponds to the first observed mass die-offs of ranid frogs in Arizona.

Free-ranging healthy bullfrogs with low-level chytriodiomycosis infections have been found in southern Arizona (Bradley *et al.* 2002). Tiger salamanders and bullfrogs can carry the disease without exhibiting clinically significant or lethal infections. When these animals move, or are moved by people, among aquatic sites, chytridiomycosis may be carried with them (Collins *et al.* 2003). Other native or nonnative frogs may serve as disease vectors or reservoirs of infection, as well (Bradley *et al.* 2002). Chytrids could also be spread by tourists or fieldworkers sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and thus could be spread by wet or muddy boots, vehicles, cattle, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms. The Service and Arizona Game and Fish Department are employing preventative measures to ensure the disease is not spread by aquatic sampling.

Additional information about the Chiricahua leopard frog can be found in Painter (2000), Sredl *et al.* (1997), Jennings (1995), Degenhardt *et al.* (1996), Rosen *et al.* (1996, 1994), Sredl and Howland (1994), Platz and Mecham (1984, 1979), and Sredl and Jennings (*in press*).

Our information indicates that, rangewide; more than 71 consultations have been completed or are underway for actions affecting Chiricahua leopard frogs. The majority of these opinions concerned the effects of grazing (approximately 62 percent), utility and water projects

(approximately 8 percent), agency planning (approximately 8 percent), or recovery actions (approximately 8 percent). The remaining 14 percent of consultations dealt with, fire, flooding, recreation, residential development, water development, border security, and water quality issues.

Gila Topminnow

We listed the Gila topminnow as endangered on March 11, 1967, without critical habitat (32 FR 4001). The reasons for decline of this fish include past dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonindigenous fishes (Miller 1961, Minckley 1985). Life history information can be found in the 1984 recovery plan (USFWS 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in the plans and in this biological opinion.

Gila topminnow was listed in 1967 as *Poeciliopsis occidentalis*. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969b, 1973). *P. o. occidentalis* is known as the Gila topminnow, and *P. o. sonoriensis* is known as the Yaqui topminnow. *Poeciliopsis occidentalis,* including both subspecies, are collectively known as the Sonoran topminnow. Both subspecies are protected under the Act. Recent information presented by Minckley (1999) and others (Minckley 1973, Quattro *et al.* 1996), considers the two subspecies to be separate species. Regardless of their taxonomy, both species, or subspecies, are protected under the Act.

Male Gila topminnows are smaller than females, rarely greater than one inch [25 millimeters (mm)] in total length, while females are larger, reaching two inches (50mm total length). Body coloration is tan to olivaceous, darker above, lighter below, and often white on the belly. Breeding males are usually darkly blackened, with some golden coloration of the midline, and with orange or yellow at base of the dorsal fins. Fertilization is internal and sperm packets are stored which may fertilize subsequent broods. The brood development time is 24 to 28 days. Two to three broods in different stages develop simultaneously in a process known as superfetation. Gila topminnows give birth to one to 31 young per brood (Schoenherr 1974). Larger females exhibit greater fecundity and produce more offspring (Minckley 1973).

Gila topminnows mature a few weeks to many months after birth depending on when they are born and water temperature. They breed primarily from March to August, but some pregnant females occur throughout the year (Schoenherr 1974). Some young are produced in the winter months. Minckley (1973) and Constantz (1980) reported that Gila topminnow eat bottom debris, vegetation, amphipods, and insect larvae when available.

Gila topminnow and many other poeciliids can tolerate a wide variety of physical and chemical conditions. They are successful colonizers in part because of this tolerance and in part because one gravid female can start a population (Meffe and Snelson 1989). Minckley (1969a, 1973) described their habitat as edges of shallow aquatic habitats, especially where abundant aquatic vegetation exists. Gila topminnows rarely co-occur with mosquitofish (*Gambusia affinis*), as the

latter is aggressive and preys upon young topminnow and harasses adults (Schoenherr 1974, Minckley *et al.* 1977).

Gila topminnows are known to occur in streams fluctuating from 43 to 97^{o} Fahrenheit, pH from 6.6 to 8.9, dissolved oxygen levels of 2.2 to 11 milligrams/liter, and can tolerate salinities approaching those of sea-water (Meffe *et al.* 1983). Topminnow can burrow under mud or aquatic vegetation when water levels decline (Deacon and Minckley 1974, Meffe *et al*. 1983). Sonoran topminnows, *Poeciliopsis occidentalis*, regularly inhabit springheads with high loads of dissolved carbonates and low pH (Minckley *et al.* 1977, Meffe 1983, Meffe and Snelson 1989). This trait has helped protect small populations of topminnows from mosquitofish which are usually rare or absent under these conditions.

To summarize Gila topminnow habitat requirements, this fish needs: 1) unpolluted water that can have wide variation in temperature, pH, and salinity; 2) shallow water with abundant aquatic plants including algae that provide cover and habitat for invertebrate prey; 3) channel morphology that prevents habitats from scouring severely, which otherwise may remove this weak swimmer from its habitat; 4) habitat areas free of nonnative competitors and predators; and 5) areas with slow currents and soft bottoms.

Gila topminnows are highly vulnerable to adverse effects from nonindigenous aquatic species (Johnson and Hubbs 1989). Predation and competition from nonindigenous fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe *et al.* 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997). The native fish fauna of the Gila basin and of the Colorado basin overall, was naturally depauperate and contained few fish that prey on or compete with Gila topminnow (Carlson and Muth 1989). With the introduction of many predatory and competitive nonindigenous fish, frogs, crayfish, and other species, Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1989) and small (Meffe *et al.* 1983) nonindigenous fish cause problems for Gila topminnow, as can nonindigenous crayfish (Fernandez and Rosen 1996) and bullfrogs.

The *Sonoran Topminnow Recovery Plan* (USFWS 1984) established criteria for down- and de-listing. Criteria for downlisting were met for a short period; however, due to concerns regarding the status of several populations, downlisting was delayed. Subsequently, the number of reestablished populations dropped below that required for downlisting, where it has remained. A draft revised recovery plan for the Gila topminnow is available (Weedman 1999). The plan's short-term goal is to prevent extirpation of the species from its natural range in the United States and reestablish it into suitable habitat within historical range. Downlisting criteria require a minimum of 82 reestablished populations, some of which must persist at least 10 years.

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at no more than 32 localities (12 natural and 20 stocked). Many of these localities are small and highly threatened, and topminnow have not been found in some recent surveys at these sites.

Gila topminnows historically occupied larger streams and rivers including the Gila, Salt, Santa Cruz, San Pedro, San Carlos, and many of their tributaries. Although not documented from the Verde, Hassayampa, or Agua Fria rivers, they likely occurred in the lower elevation (<1500 m) reaches of those rivers. BLM lands support a large proportion of the Gila topminnow's former range, several of the currently occupied sites, and much of the remaining suitable, but unoccupied habitat.

Currently, there are 14 remaining natural topminnow sites (Weedman 1999). In addition, twenty-one stocked populations persist and cooperative efforts by the BLM, FWS, and AGFD to reestablish topminnow into historical habitats are on-going.

Our information indicates that, rangewide, more than 35 consultations have been completed or are underway for actions affecting both Gila topminnow. The majority of these opinions concerned the effects of recovery activities (approximately 34 percent), grazing (approximately 29 percent), water development and flood related projects (approximately 11 percent), or agency planning (approximately 9 percent). The remaining 17 percent of consultations dealt with, fire, land trades, utility infrastructure, roads, and water quality issues.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all Federal actions in the action area that have undergone formal or early section 7 consultation, and impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

The general environmental baseline for the action area is described in the 2002 BO BANWR FMP (USFWS 2002) and the 2004 BO BANWR FMP (U.S. Fish and Wildlife Service 2004). The Refuge habitat and activities on the Refuge have not changed substantially. The fire program has been more focused on objectives, with a subsequent reduction in the acres burned. In response to the an increase in illegal immigration and smuggling across the Refuge and in the Altar Valley at large, Border Patrol activities have increased. This increased illegal activity has increased the number of agents, frequency of patrols, surveillance activity, and interdictions.

Pima Pineapple Cactus

A. Status of the Species within the Action Area

The status of pineapple cactus through 2003 was described in the 2004 BO BANWR FMP and in the 2002 BO BANWR FMP. The Refuge implemented the prescribed burns that were proposed in the 2004 BO (USFWS 2004). In 2004, complete surveys of high and medium quality habitat in burn units were completed for the first time since cactus surveys began. A total of 85 cacti were found during 542 person hours of pre-burn surveys and 226 person-hours of post-burn surveys. Several of these new locations were used to refine the GIS-based habitat model which is being used to identify habitat on or adjacent to the Refuge. Post-burn monitoring of 38

individuals in the BMUs, documented six pineapple cactus killed due to fire and four killed through non-fire related effects. A total of 236 pineapple cactus locations are known on the Refuge.

B. Factors Affecting Species Environment within the Action Area

Factors affecting pineapple cactus in the action area are documented in the 2002 BO BANWR FMP and in the 2004 BO BANWR FMP . The only change has been a substantial increase in illegal immigration and drug smuggling activities moving north from the border through the Refuge. The actions of the U.S. Border Patrol have also increased in response to this increase in activity.

Cactus Ferruginous Pygmy-Owl

A. Status of the Species within the Action Area

The status of pygmy-owls through 2003 was described in the 2004 BO BANWR FMP and in the 2002 BO BANWR FMP. The Refuge implemented the proposed burns in the 2004 BO BANWR FMP. Additional surveys on the Refuge have periodically located dispersing individuals, but no new nesting locations have been documented. An inventory of saguaros and potential breeding habitat is on-going. The Refuge has used this information to propose management zones for the pygmy-owl (see conservation measures). These management zones will be the basis for the development of the Refuge pygmy-owl management plan.

Proposed Critical Habitat
The project area falls within the 435,464-acre Unit 1 of the proposed critical habitat for the pygmy-owl (67 FR 71032). All of the primary constituent elements defined in the proposed rule designating critical habitat are found within the project boundaries. The Refuge proposed a strategy to manage pygmy-owl and pygmy-owl habitat within the action area, which was incorporated into the 2004 BO BANWR FMP . This has been used as interim management guidance for the FMP until a pygmy-owl management plan is finalized. The zones are illustrated in Figure 1 and are described below.

Pygmy-owl habitat elements needed for nesting, saguaros and large trees, are primarily located in the foot hills region west of SR 286, Brown Canyon, the northeast end of the Refuge and along Arivaca Creek. These areas have been placed in the “Maximum CFPO Protection Zone” (Table 1), approximately 19,192 acres. This zone has been removed from the normal prescribed burn rotation since the 2004 burn season. This maximum protection zone may be burned during the cool season to reduce fuels and protect them from catastrophic wildland fire. A cool season burn is proposed during this 4-year plan for the bottom of Brown Canyon, which is in this maximum protection zone.

Habitats that are primarily dispersal habitat, xeroriparian habitat, and have had documented use by pygmy-owl are included in the “Moderate CFPO Protection Zone” (Figure 1), approximately 13,834 acres. This protects a network of xeroriparian washes that connect the potential nesting habitats on the east and west sides of the valley, and also connects the south end of the Refuge

and Mexico to habitats north of the Refuge. These areas run through and along the edges of BMUs that are to be ignited to control mesquite invasion in the upland habitats. Protection of this group of dispersal habitats is done through planning the ignition patterns to avoid allowing a head fire that will remove canopy cover from these washes. The Refuge has been burning in this manner since 2002. The higher humidity and cooler temperatures in the xeroriparian habitats also assist in protecting these habitats from fire effects.

Upland habitats are managed for masked bobwhite and are being burned to reduce invasive shrub cover. These habitats are included in the "Minimum CFPO Protection Zone" (Figure 1), approximately 82,875 acres. Smaller xeroriparian habitats that have not had been documented use by pygmy-owls for dispersal are also included in this zone. These smaller xeroriparian habitats are not actively ignited, and due to the higher humidity and higher fuel moistures they have been fairly resistant to burning.

The final management zone is the "Hazard Fuel CFPO Zone", which consists of approximately 1,438 acres around the towns of Sasabe and Arivaca. These are areas used to protect these developed areas from wildland fire. Vegetation management is aimed at reducing fuels to provide a fire break.

The boundaries of these protection zones are modified as new information becomes available. The management of these zones will be finalized as part of the Refuge's Habitat Management Plan.

B. Factors Affecting Species Environment within the Action Area

Factors affecting pygmy-owls in the action area are documented in the 2002 BO BANWR FMP and in the 2004 BO BANWR FMP . The only change has been a substantial increase in illegal immigration and drug smuggling activities moving north from the border through the Refuge. The actions of the U.S. Border Patrol have also increased in response to this increase in activity.

Masked Bobwhite Quail

A. Status of the Species within the Action Area

The reintroduced individuals on the Refuge make up the only known population in the United States. The Refuge continues to breed and release more individuals. The population has been monitored continually using summer call counts. The population on the Refuge has remained relatively stable at approximately 150-300 individuals. Five nests have been observed on the Refuge (Simms 1989, Sally Gall pers. com.). One of these observations was in late April of 2004, several months prior to the typical nesting period of July.

Masked bobwhite quail may occur refuge-wide in appropriate grassland habitat (approximately 80 percent of the refuge is suitable for bobwhite). They are most likely in the valley bottom, and least likely to be found in the foothills, Brown Canyon, and in the riparian areas. The species has spread to areas off-refuge, as well, with reports as far north as the Diamond Bell area near Three Points and on Rancho de la Osa west of Sasabe.

Surveys for masked bobwhite are done annually, during the summer breeding season. Since 2001, twenty-one standardized routes have been used. Call counts begin when the monsoon rains begin, and may continue until early September. Summer call counts do not detect all of the birds, and may only detect the unpaired males still seeking females. In addition, recent observations of two males calling side by side from a small tree indicate that even unpaired males may be under-counted due to our inability to differentiate the call of one male from that of another when the two exist in close proximity. The sporadic calling patterns of the males in summer also make it difficult to count birds. At best, the summer call counts are an index of abundance. Bobwhites detected on summer call count surveys during the past 6 years are summarized in Table 3.

In October and November 2004, assembly call counts were done in order to locate coveys in the central portion of the refuge. This is the currently recommended technique for counting bobwhite. Taking into account certain weather variables, 75-79 percent of coveys typically are detected, based upon responses from northern bobwhite quail (Wellendorf el al. 2004, Seiler et al. 2002). However, in situations of low density birds, such as with the masked bobwhite, the techniques turned out to be labor intensive and a somewhat unreliable indicator of presence/absence of birds. Three coveys were detected in Middle Unit, one in Secundino Unit, two in Triangle Unit and one just below the Headquarters buildings.

B. Factors Affecting Species Environment within the Action Area

The factors affecting masked bobwhite on the Refuge were documented in the 2004 BO BANWR FMP. The only change in factors affecting this species has been an increase in illegal immigration and drug smuggling activities moving north from the border through the Refuge. The actions of the U.S. Border Patrol have also increased in response to this increase in activity.

Chiricahua Leopard Frog

A. Status of the Species within the Action Area

Chiricahua leopard frogs were discovered in Garcia Tank in 1994. Since that time they have been found in Choffo, Carpenter, State and Rock Tanks and were found in the headquarters holding pond, which was originally constructed for Chiricahua leopard frog propagation. The species has also been found on adjacent Forest Service land in 2004 where over 300 individuals were noted. The locations on the Forest Service land are part of the metapopulation of Chiricahua leopard frogs on the southern portion of the Refuge.

B. Factors Affecting Species Environment within the Action Area

Threats to this species are from invasion of exotic predators, primarily bullfrogs, into these tanks and loss of aquatic habitats to drought. In order to conserve the metapopulation of leopard frogs, the Refuge has dug a well and installed a solar pump at Garcia Tank in order to provide reliable permanent water for the frog. Carpenter, State, Rock Tanks, and the headquarters holding pond (artificially filled) are permanent water sources. Status of the Choffo Tank population is

unknown. The refuge is currently working with the University of Arizona to remove bullfrogs from several tanks in order to prepare them for leopard frog releases in the future. In addition, the restoration of earthen water tanks, once used for livestock, is being planned for wildlife use, including Chiricahua leopard frogs. Additionally, the placement of these tanks is being discussed to avoid providing a potential pathway for bullfrog dispersal.

The effects of increased immigration and Border Patrol activities have little impact on Chiricahua leopard frogs. The occupied tanks are relatively large and the potential for impacts from immigrants (undocumented aliens) drinking or walking in the water are insignificant. The use of these tanks for bathing and personal hygiene may result in some decrease in water quality, but effects of this type have not been studied or documented.

Gila Topminnow

A. Status of the Species within the Action Area

This species was originally introduced into the Refuge's headquarters holding pond in late 2002 for display purposes. None currently exist in the holding pond, having disappeared in 2004. The species was found by a group of University of Arizona researchers during summer 2004 in Rock and State tanks. Subsequent surveys of these two tanks in July 2004, revealed the presence of only a few topminnow in Rock Tank and none in State Tank.

B. Factors Affecting Species Environment within the Action Area

These populations are very small and isolated, making them vulnerable to stochastic environmental events. Threats to the populations include illegal introduction of nonnative predators and competitors to these tanks. The effects of increased illegal immigration and Border Patrol activities have little impact on the Gila topminnow population as the tanks in which they occur are relatively large and the potential for impacts from immigrants drinking or walking in the water are insignificant. The use of these tanks for bathing and personal hygiene may result in some decrease in water quality, but effects of this type have not been studied or documented.

EFFECTS OF THE ACTION

Pima Pineapple Cactus

The effects of the proposed action are similar to those described in the 2004 BO BANWR FMP. Due to the increased accuracy of the predictive habitat model for pineapple cactus and the experience with protective measures of the past fire season, we would expect that the effects of the fire management plan should be slightly less that those described in the 2002 and 2004 BO BANWR FMP.

The one exception is the fire effects from experimental burns planned for the 2005 fire season. The purpose of these experimental burns is to help us determine the range of the effects to the pineapple cactus in various vegetation types, specifically native versus exotic grass species. The

results may assist us in understanding the need for protective measures on a landscape level throughout the Refuge and the Altar Valley. However, many more cacti may be adversely affected during this experiment than have been in the previous prescribed burns of 2002 and 2004.

Cactus ferruginous pygmy-owl

The effects of the proposed prescribed burns in May and June will be similar to those described in the 2004 BO BANWR FMP. The changes in the habitat evaluation criteria for surveys are not expected to change the effects of the FMP on pygmy-owl.

The cool season burns may have much higher potential effects on pygmy-owls, if dispersal habitat is in or adjacent to the proposed burn area. During May and June, territories have been established and birds are tending their nests. There is a certainty as to where they are and that they can be located during the survey period. Outside of the breeding season, August through January, birds without established territories are dispersing across the landscape looking for suitable sites to establish territories, and unpaired females are searching for suitable mates. Therefore, there is the potential to have an adverse effect on pygmy-owls in or near a cool season burn if there is suitable dispersal habitat adjacent to a proposed cool season burn. The activities of the crews preparing the unit for the burn, implementing the burn, and mopping up after the burn may result in disturbing pygmy-owls, forcing additional movements out of preferred habitats, exposing them to increased risk of predation and increased energy use. In addition to disturbance, depending on the ignition pattern, multiple flame fronts could move into pygmy-owl dispersal habitat from multiple sides if an entire BMU is to be ignited during the cool season. This could result in the death or severe injury of a pygmy-owl that is trapped between flame fronts. The mitigating factors in this scenario are the high humidity and low temperatures under which these burns would be implemented. Therefore, while pygmy-owl mortality could occur in these areas, the low fire intensity, high humidity, and low temperatures, would reduce the probability of a pygmy-owl perishing in the flames.

<u>Proposed Critical Habitat</u>
This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to critical habitat.

The project area falls within the 435,464-acre Unit 1 of the proposed critical habitat for the pygmy-owl (67 FR 71032). All of the primary constituent elements defined in the proposed rule designating critical habitat are found within the project boundaries. A zone management plan of the action area was drafted and incorporated into the 2004 BO BANWR FMP. This plan has been used as interim management guidance for the FMP until a pygmy-owl management plan is finalized. The zones are illustrated in Figure 1 and are described above under the Baseline within the Action Area section for the pygmy-owl.

Effects to Features That Were the Basis for Determining the Habitat to be Critical - The primary constituent elements of proposed pygmy-owl critical habitat (67 FR 71032) will be affected by the BANWR FMP. The following is a discussion of the specific effects:

- Primary Constituent Element 1 (elevation below 4,000 feet in appropriate biotic communities) - The elevation and biotic communities within the action area are dependent on geomorphology and biogeography. The fire management plan will not alter the geomorphology or biogeography of the action area. Potential effects to the vegetation component of the biotic communities will be discussed below, under the appropriate Primary Constituent Element.

- Primary Constituent Element 2 (existence of or potential for nesting cavities) - Potential pygmy-owl nest substrates, including large trees greater than six inches trunk diameter and saguaros, are primarily found in the Maximum CFPO protection zone and will not be subjected to hot season burns that could result in the loss of these substrates. There may be cool season burns used in this zone to reduce fuels that in the event of a wildland fire could result in a stand replacing event. Potential nest substrates are also dispersed within the Moderate and Minimum Protection Zones. The saguaros are being protected by the removal of fuels from around bases, while conserving guard trees in an appropriate configuration for use by pygmy-owls. Potential nesting substrates are also scattered within these protection zones in xeroriparian wash habitats or adjacent to them. The existing or potential nesting cavities or substrates in the Moderate and Minimum Protections Zones are at reduced risk of loss due to the conservation measures related to ignition patterns, protection of saguaros, and the physical parameters of xeroriparian habitat; i.e. fuel types, fuel humidity, and high relative humidity. Some losses of large diameter trees or saguaros are possible in these habitats, but these losses have been shown to be a rare event, limited in size, and are distributed in isolated patches. Therefore, while some loss of nesting substrate may occur, it will be relatively rare, and the effects will be scattered in small areas across the action area and not concentrated in one area.

- Primary Constituent Element 3 (vegetation structural diversity) - The vegetation within the project boundaries is characterized by relatively high structural diversity. The proposed action will result in a mosaic of impacts to vegetation across “CFPO Protection Zones”. In the Maximum CFPO Protection Zone,” cool season burns may be allowed only to reduce fuel loads and are proposed in Brown Canyon wash. Burns in this zone are to be implemented to protect the structural diversity in potential nesting habitat from catastrophic wildland fire. Burns that will impact the “Moderate CFPO Protection Zone” are not to reduce the vegetation structural diversity to the point of hindering the dispersal habitat of xeroriparian wash. While some vegetation may be lost in this zone, it is anticipated to be in small dispersed patches that will not reduce the dispersal function of these washes. The removal of shrubby vegetation and the structural diversity in the “Minimum CFPO Protection Zone” is the object of the BANWR FMP (USFWS 2001, 2005). This represents a maximum of approximately 14,000 acres of shrub invaded grassland habitat being burned annually. The implementation of these burns is likely to result in 60 percent coverage of the upland portion of a BMU, resulting in approximately 40 percent of the vegetation structure being unaffected during a burn. The effects of the proposed action are not anticipated to impact breeding habitat due to the implementation of conservation measures resulting in surveys and protection of potential nest structures. The potential impacts to dispersal habitat discussed above within the “Moderate CFPO Protection Zone” will be

incidental to the objectives of the FMP in the "Minimum CFPO Protection Zone". In the "Hazard Fuel CFPO Zone," the goal is to reduce fuels and provide a fire break for the towns of Sasabe and Arivaca. This will result in a reduction of vegetation structural diversity on approximately 1,438 acres within the action area. However, this acreage is divided between two isolated parcels that are located next to urban development. Therefore, while there may be a reduction in the vegetation structural diversity within the action area, it will not significantly impact the function of the breeding habitat or dispersal habitat within Critical Habitat Unit 1.

• Primary Constituent Element 4 (presence of canopy cover) – This primary constituent element relates to a site providing adequate cover for pygmy-owl movements, primarily dispersal, but also movement within an established home range for foraging and predator avoidance. The goal of the proposed action is to reduce the upland canopy cover, but as part of the proposed action the drainages and potential nesting habitat will be protected, as discussed above. While there may be some loss of canopy cover in small isolated patches, the function of the canopy cover in the nesting habitat and the dispersal habitat will be maintained.

• Primary Constituent Element 5 (configuration and human activity) - Retaining the function of proposed pygmy-owl critical habitat is not attributed solely to the quantity of habitat remaining on a site. The configuration of that habitat must also be considered. Connectivity must be maintained in order to preserve function, and human activity changes cannot disrupt the configuration. Some primary constituent elements discussed above may be affected through the loss of a few trees in xeroriparian washes, or nesting substrate may be lost within the medium protection, minimum protection, and hazardous fuel zones, as discussed above. The effects to constituent elements are expected to occur rarely, in small patches, and to be dispersed across the action area rather than grouped in one location. Human activity on the Refuge is relatively low. The BANWR FMP (USFWS 2001, 2005), as proposed, will not result in an increase in human activity over the current baseline and is not anticipated to disrupt the use of the habitat by pygmy-owls. Therefore, the configuration of the habitat is not anticipated to be adversely impacted as a result of this action, as proposed.

In summary, while some impacts to primary constituent elements are expected to occur as part of the proposed action, these impacts will be rare events, affect small portions of the habitat, and be distributed across a broad landscape. The proposed action will also result in increased protection of the highest quality nesting and dispersal habitats from a catastrophic wildland fire. The action should maintain breeding habitats and the connecting network of xeroriparian wash habitats providing dispersal routes across the action area. Therefore, we anticipate the proposed action will not appreciably diminish the value of proposed critical habitat to the conservation of the pygmy-owl.

Masked bobwhite quail

The effects of the proposed action are similar to those described in the 2004 BO BANWR FMP. The reduction in the number of acres burned per year, a maximum of 14,000 acres, will result in reducing the potential direct and indirect adverse effects on masked bobwhite from those described in the 2004 BO BANWR FMP. However, the cool season burns in the sacaton bottoms and other grass dominated bottomlands and terraces could result in moving the coveys

from the protection of these bottomland grass habitats, removing foraging resources (seeds), and increasing the potential for masked bobwhite to be trapped within the fire and killed.

Chiricahua leopard frog

The proposed action is not anticipated to have direct effects on Chiricahua leopard frogs. The season when BMUs would be ignited is prior to the typical dispersal period during the monsoon season, July-September. In addition, the frogs are inactive during the period of the cool season burns and are not anticipated to be directly impacted by the burns.

Indirect effects of the prescribed fire are anticipated through increased sediment and ash flow into occupied waters from project related activities that occur upstream from occupied sites. Fire removes vegetation and consumes organic components of ground cover, thus changing the physical and chemical properties of watersheds and the streams, wetlands, and aquatic habitats to which they contribute. The removal of vegetation can trigger an increase in water yield and storm-flow discharge (Swanston 1991). Elevated peak flow volumes and velocities are associated with increased transport of ash and nutrients (Ffolliott et al. 2004). Heavy ash and soot content in water clogs tadpole and fish gills and leads to acute and chronic chemical effects. The runoff of ash contributes phosphoric nutrients to aquatic ecosystems, and the presence of charcoal in water is associated with reduced dissolved oxygen concentrations. Both ammonia and phosphorus levels have been documented to be above lethal limits to fish during fires (Spencer and Hauer 1991). Similar effects are anticipated for leopard frog tadpoles and eggs. In addition, inflow of ash and sediment into a water body is capable of smothering eggs and tadpoles, resulting in the loss of individuals and reproductive potential. Sediment and ash flow can also inhibit respiration in macroinvertebrates, resulting in reduced density and composition of macroinvertebrates (a primary food resource for the frogs). A reduction in the amount of prey can ultimately affect leopard frog numbers and reproduction. This could have an effect on population persistence and alter the metapopulation dynamics in this portion of the Altar Valley. The conservation measures that are included in this action will minimize these potential indirect effects. In addition, State and Rock tanks are the only two occupied sites within or downstream of BMUs proposed to be burned as part of this action. The effects of ash and sediment flows are temporary. The aquatic habitats should be habitable after the ash and sediment settles, and the aquatic community of invertebrates and plants become reestablish. This leaves Choffo and Carpenter tanks outside of the impact area of this proposed action, and they can act as sources of recolonization. The Chiricahua leopard frog has a very high reproductive potential and can repopulate a tank fairly quickly once the aquatic habitat becomes hospitable.

Gila Topminnow

Effects to Gila topminnow would be similar to those described above for Chiricahua leopard frog aquatic habitats. The primary difference is that Gila topminnows on the Refuge are not part of a functioning metapopulation, with a series of dispersal and colonization events that provide for local extirpation and recolonization of sites. Therefore, if a population is lost due to fire, reestablishment will have to occur through a direct management decision to place topminnow back into the tank. In addition, the adult Gila topminnows have no means of avoiding impacts of sediment and ash flows like adult and metamorph Chiricahua leopard frogs. Therefore, the

conservation measures included in this action are important to reduce these effects, namely cleaning of silt-traps of the double tank systems in Rock and State Tank and the use of straw bales to stabilize and trap sediment.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. These non-Federal actions have not substantially changed as described in the 2002 and 2004 BO BANWR FMP.

CONCLUSION

Pima pineapple cactus

After reviewing the current status of the Pima pineapple cactus, the environmental baseline for the action area, the effects of the proposed BANWR FMP 2005-2008 (USFWS 2005) and the cumulative effects, it is the our biological opinion that the BANWR FMP 2005-2008, as proposed, is not likely to jeopardize the continued existence of the pineapple cactus. No critical habitat has been designated for this species; therefore, none will be affected. We present this conclusion for the following reasons:

- The reduction in the number of acres burned annually reduces overall effects of the action.

- The results of the experimental burn will have broader applications in prescribed burns throughout the pineapple cactus range.

- The habitat model developed for the Refuge focuses survey efforts and minimization efforts.

Cactus ferruginous pygmy-owl

After reviewing the current status of the cactus ferruginous pygmy-owl, the environmental baseline for the action area, the effects of the proposed BANWR FMP 2005-2008 (USFWS 2005) and the cumulative effects, it is the our biological opinion that the BANWR FMP 2005-2008, as proposed, is not likely to jeopardize the continued existence of the cactus ferruginous pygmy-owl or result in destruction or adverse modification of proposed critical habitat. We present this conclusion for the following reasons:

- The change in the habitat evaluation for identifying habitat for surveys has not changed significantly.

- The effect on this species of the warm season burns has not changed since the 2002 and 2004 BO.

- The proposed changes to the BMU boundaries have not resulted in a significant change in effects.

- The reduction of proposed acreage to be burned has reduced the potential effects to the species.

- Cool season burns will be limited to four units during the four years covered by this action.

- Cool season burns will have limited impact to the breeding population of pygmy-owls, based upon fire intensity and the location of burns.

- The cool season burns in the Brown Canyon wash area will reduce the potential for a catastrophic wildland fire and, therefore, help retain dispersal and breeding habitat.

- The zone management of pygmy-owl habitat will minimize affects to primary constituent elements of proposed critical habitat and should result in increased protection form wildland fire.

- Impacts to the primary constituent elements of proposed critical habitat are expected to rare, affect only small portions of the habitat, and be distributed across a broad landscape.

- Impacts to proposed critical habitat should maintain breeding habitats and the connecting network of xeroriparian wash habitats providing dispersal routes across the action area.

Masked bobwhite quail

After reviewing the current status of masked bobwhite, the environmental baseline for the action area, the effects of the proposed BANWR FMP 2005-2008 (USFWS 2005) and the cumulative effects, it is the our biological opinion that the BANWR FMP 2005-2008, as proposed, is not likely to jeopardize the continued existence of the masked bobwhite. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of masked bobwhite has remained relatively constant on the Refuge for the past five years with approximately 300 individuals making up the reestablished population.

- Captive breeding of masked bobwhite has continued to provide individuals to augment the reestablished population.

- The reduction of proposed acreage to be burned has reduced the potential effects to the species.

- The current distribution of the burns within the action area provide adequate habitat for the existing population of masked bobwhite on the Refuge and for those likely to be released this year.

- BMUs with high concentrations of masked bobwhite will not be burned.

- The prescribed burns will be implemented to improve quail habitat, so the short-term negative effects will be offset by long-term positive effects.

- The minimum spacing of parallel ignition lines will provide a reasonable chance of escape from the fire to patches of unburned areas within the BMU.

- The cool season burns in Punta North and Punta South BMUs will not be burned in the same year, so some of the native bottomland habitat will be available for coveys that may use them.

Chiricahua leopard frog

After reviewing the current status of Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed BANWR FMP 2005-2008 (USFWS 2005) and the cumulative effects, it is the our biological opinion that the BANWR FMP 2005-2008, as proposed, is not likely to jeopardize the continued existence of the Chiricahua leopard frog. No critical habitat has been designated for this species; therefore, none will be affected. In making this determination, we considered the following:

- Only half of the known population sites on the Refuge would be potentially impacted by the proposed action.

- These tanks are part of a functioning metapopulation that includes several water tanks on the Refuge and on the adjacent Coronado National Forest lands.

- The design of these tanks and the conservation measures included as part of the action reduce the potential for anticipated impacts.

- Any impact from sediment and ash flow will be short-term.

- Chiricahua leopard frog reproductive potential will make up for any reduction in existing population size due to the action.

Gila Topminnow

After reviewing the current status of Gila topminnow, the environmental baseline for the action area, the effects of the proposed BANWR FMP 2005-2008 and the cumulative effects, it is our biological opinion that the BANWR FMP 2005-2008, as proposed, is not likely to jeopardize the continued existence of the Gila topminnow. No critical habitat has been designated for this

species; therefore, none will be affected. In making this determination, we considered the following:

- The design of these tanks and the conservation measures included as part of the action reduce the potential for anticipated impacts.

- A sediment and ash flow is unlikely to affect the entire water tank based upon the design and size of the water tanks.

- Any impact from sediment and ash flow will be short-term.

- Gila topminnow reproductive potential will make up for any reduction in existing population size.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Refuge so that they become binding conditions of any grant or permit issued to the Refuge, as appropriate, for the exemption in section 7(o)(2) to apply. The Refuge has a continuing duty to regulate the activity covered by this incidental take statement. If the Refuge (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Refuge must report the progress of the action and its impact on the species to the us as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such

species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

AMOUNT OR EXTENT OF TAKE

Cactus Ferruginous Pygmy-Owl

We have developed the following incidental take statement based on the premise that the action will be implemented in its entirety. We anticipate the proposed action may result in incidental take of up to one dispersing cactus ferruginous pygmy-owl through direct mortality during the cool season burns and up to four dispersing cactus ferruginous pygmy-owls through harm and harassment during the preparation and implementation of cool season burns and preparation of warm season burns. We base the anticipated level of take upon the following:

- During the breeding season, January through July, pygmy-owls are within established territories and are detectable through the survey protocol.

- If a BMU contains a pygmy-owl territory/nest or has a territory/nest adjacent to the BMU, a minimum 600-meter diameter buffer around the territory/nest will be used to protect the nest; if this buffer is not adequate, then the BMU will not be burned that year.

- Washes used by pygmy-owls for dispersal will be protected from the effect of prescribed burns.

- Ignition patterns will be adjusted to avoid burning trees in and along washes.

- All known saguaro cacti will be buffered by a protection area. Fuel reduction activities may occur within these buffers around saguaro cacti to avoid uncontrolled spot fires.

- Outside the breeding season, dispersing pygmy-owls, young of the year and females looking for mates will travel throughout the action area in xeroriparian areas, wooded washes, and shrub invaded uplands.

- Outside of the breeding season, locating these birds prior to cool season prescribed burns will be difficult as these birds are primarily dispersers looking to establish new territories or mates.

- In Punta North and Punta South BMUs, no active ignition will be applied to pygmy-owl dispersal habitats. Shrubby upland and woody xeroriparian habitats will only ignite from the flame advancing from the sacaton bottoms into the uplands.

- The ignition pattern in Brown Canyon Wash mesquite bosque is likely to flush any dispersing pygmy-owls from the unit before the flames.

- The intensity of cool season burns will have less impact on pygmy-owl breeding and dispersal habitat than the warm season burns.

This is the total level of incidental take anticipated for the proposed actions as described in the Description of Proposed Actions section of this opinion.

Effects of the Take:

In the accompanying biological opinion, we determined that this level of anticipated incidental take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

Masked Bobwhite Quail

We anticipate the proposed action may result in the incidental take of up to 30% of adult masked bobwhite within the BMUs proposed to be burned within masked bobwhite habitat. We estimate take to be up to 102 adult individuals over the four years of the action in the form of direct mortality, harm and harass. The anticipated level of take is based upon the following assumptions:

- The maximum known occupancy of a BMU since 1999, based upon call count data in Table 2.
- We assume a 50% response rate of male birds to call count surveys.
- We assume a 1:1.5 sex ratio and that only males respond to call count surveys.
- We assume the prescription used will result in flame lengths greater than 24 inches.
- We assume that 60% of the area of a BMU will be affected by fire.
- We assume 30% of the adults within a BMU will be taken by active flame fronts and the intense heat based upon the mobility of the adults.

We further anticipate the proposed action may result in the incidental take of up to 60% of the early season nests within the BMUs proposed to be burned within masked bobwhite habitat through direct mortality, harm and harass. We estimate take of up to 15 nests, including all eggs and/or hatchling masked bobwhite in these nests over the four years of the action. The anticipated level of take is based upon the following assumptions:

- We assume the number of females estimated to be in the BMUs, based upon the previous assumptions, to be 204.
- We assume that only 25% of the females will nest early.
- We assume that 60% of the area of a BMU will be affected by fire.
- We assume 60% of the early season eggs or chicks in the BMUs will be taken by fire.

These assumptions are based upon the known biology of the species and personal observations of Refuge staff.

We have developed this incidental take statement based on the premise that the action will be implemented in its entirety. The amount of take is based upon the worst-case scenario for the proposed action. This is the total level of take anticipated for the proposed actions as described in the Description of Proposed Actions section of this opinion.

Effect of the Take:

In the accompanying biological opinion, we have determined that this level of anticipated take is not likely to result in jeopardy to the species.

Chiricahua Leopard Frog

We anticipate take of Chiricahua leopard frogs to occur in the form of harm, harass, or indirect mortality resulting from the increased flow of sediment and ash into Rock and State tanks. Individuals will be harmed through changes in the water chemistry; heavy sediment and ash deposits covering eggs, tadpoles, and clogging gills; and the temporary habitat loss through increased run off after the prescribed burn. Harm would also occur through the loss of habitat resulting in the movement within the stock tanks from altered habitats and increased intra-species competition for food and territory. Incidental take of Chiricahua leopard frogs will be difficult to detect for the following reasons: early life stages of this species have a small body size, losses may be masked by seasonal fluctuations in numbers or other causes (e.g., oxygen depletions for aquatic species, disease), dead tadpoles and frogs are easily scavenged, and the species occurs in habitat that makes detection difficult; therefore finding a dead or impaired specimen is unlikely. However, take of this species can be anticipated if more than 50 percent of the bottom of Rock or State tank is covered by fresh silt or ash deposits following a precipitation event. Such deposits are directly related to habitat modifications and, if exceeded, will constitute an unacceptable impact to occupied habitat and individual Chiricahua leopard frogs. Take will also be exceeded if more than 10 dead or dying Chiricahua leopard frogs or 20 fish, tadpoles, or other aquatic vertebrates of any species are observed near or within Rock or State Tank during or within three days of a runoff event. This represents a much larger potential die off of Chiricahua leopard frogs due to a significant change in water and habitat quality.

Effects of the Take

In the accompanying biological opinion, we have determined that this level of anticipated take is not likely to result in jeopardy to the species.

Gila Topminnow

We anticipate take of Gila topminnows to occur in the form of harm, harass, or indirect mortality resulting from the increased flow of sediment and ash into Rock and State tanks. Individuals will be harmed through changes in the water chemistry; heavy sediment and ash deposits

covering eggs, fry, and clogging gills; and the temporary habitat loss through increased run off after the prescribed burn. Harm would also occur through the loss of habitat resulting in the movement within the stock tanks from altered habitats and increased intra-species competition for food and territory. Incidental take of Gila topminnow will be difficult to detect for the following reasons: these species have a small body size, losses may be masked by seasonal fluctuations in numbers or other causes (e.g., oxygen depletions for aquatic species), dead topminnows are easily scavenged, and the species occurs in habitat that makes detection difficult; therefore finding a dead or impaired specimen is unlikely. However, the following level of take of this species can be anticipated if more than 25 percent of the bottom of Rock or State tank is covered by fresh silt or ash deposits following a precipitation event. Such deposits are directly related to habitat modifications and, if exceeded, will constitute an unacceptable impact to occupied habitat and individual Gila topminnow. Take will also be exceeded if more than 20 dead or dying fish or other aquatic vertebrates of any species are observed near or within Rock or State Tank during or within three days of a runoff event. This represents a much larger potential die off of Gila topminnow due to a significant change in water and habitat quality.

Effects of the Take

In the accompanying biological opinion, we have determined that this level of anticipated take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

We believe the following reasonable and prudent measures are necessary and appropriate to minimize take of cactus ferruginous pygmy-owl, masked bobwhite quail, Chiricahua leopard frog, and Gila topminnow. In order to be exempt from the prohibitions of section 9 of the Act, you must comply with their accompanying terms and conditions with regard to the proposed action. The terms and conditions are nondiscretionary and implement the reasonable and prudent measure as described.

Cactus Ferruginous Pygmy-Owl

The following reasonable and prudent measure(s) and terms and conditions are necessary and appropriate to minimize take of pygmy-owls:

1. You shall conduct all proposed actions in a way that will minimize direct mortality of, or harm to, cactus ferruginous pygmy-owls.

    A. If cool season burns will be conducted in, adjacent to, or will be allowed to burn into, potential pygmy-owl dispersal or breeding habitats, the Refuge shall monitor the pygmy-owl habitat for individuals that may be present.

    You shall implement the following as they apply to the action:
    1) Surveys shall be conducted during the dispersal season, September 15 through October 31, per approved cactus ferruginous pygmy-owl survey protocol (AGFD and USFWS 2000); for cool season burns during the fall season.

2) Cool season burns conducted in the fall shall be implemented within 7 days of completion of fall clearance survey protocol.
3) Surveys shall be conducted during the breeding season, January 1 through June 30, per approved cactus ferruginous pygmy-owl survey protocol (AGFD and USFWS 2000); for cool season burns during the spring season.
4) Cool season burns shall not be conducted from November 7 through February 1, as this is outside the seasons when you are reasonably likely to detect pygmy-owls that may be in the action area through surveys.

2. The Refuge shall monitor incidental take resulting from the proposed action, analyze how it occurred, develop means to avoid future incidental take, and report to us the results of that monitoring.

A. The Refuge shall monitor the project area and other areas that could be affected by the proposed action to ascertain take of individuals of the species and/or loss of its habitat that causes harm or harassment to the species.

You shall implement the following as they apply to the action:
1) Document any loss of trees and saguaro cacti in any of the Maximum pygmy-owl and Moderate pygmy-owl protection zones from fire, or other activities, as indicated on the Proposed Cactus Ferruginous Pygmy-Owl Management Plan in Figure 1.
2) Report all activities by January 15th of each year or incorporate this information into the Annual Refuge Work Plan and provide to our office.

Masked Bobwhite Quail

The following reasonable and prudent measure(s) and terms and conditions are necessary and appropriate to minimize take of masked bobwhite quail:

3. You shall monitor incidental take resulting from the proposed action and report to us the findings of that monitoring. Include observations on fire behavior, document fire prescription parameters, and document behavior of all quail species in response to the prescribed fire. This information will assist you in reducing take in future years and in determining if reinitiation is required.

A. Report to us by January 15 of each year or incorporate this information into the Annual Refuge Work Plan, the extent of the burns, results of all surveys for masked bobwhite, and the effectiveness of conservation measures; include all observations of any species of quail escaping from prescribed burns and those that are unsuccessful.

4. Minimize effects of fire on early-season masked bobwhite nests.

A. If the locations of nests are known, exclude these areas of the BMU from the prescribed burn to the best of your abilities, considering the importance of fire containment and burn crew safety.

You shall implement one of the following:

1) Postpone the burns in a BMU with a known nest until there is a reasonable likelihood the eggs have hatched and the chicks are mobile, or
2) Exclude the portion of the BMU that contains the nest from the proposed burn by use of fire lines or other natural fire breaks, or
3) Cancel burning the BMU for the year, or
4) Establish a protective area around the nest with a broad connection to an adjoining unburned BMU.

Chiricahua Leopard Frog and Gila Topminnow

The following reasonable and prudent measure(s) and terms and conditions are necessary and appropriate to minimize take of Chiricahua leopard frogs and Gila topminnow:

5. You shall attempt to reduce the extent of take in State and Rock tanks when Rock and State BMUs are burned by monitoring fire effects and run-off, and monitor these tanks to determine if take has occurred.

   A. Report to us by January 15 of each year or incorporate this information into the Annual Refuge Work Plan, the extent of the burns, results of all surveys for Chiricahua leopard frog and Gila topminnow, and the effectiveness of conservation measures.

   B. When prescribed burns occur in Rock or State BMUs, evaluate the impact of the burn on vegetation and soils to determine if excessive sediment is likely to flow into the drainages of Rock and State tanks.

      1) On-the-ground evaluation shall be made post burn to determine if the fire severity was enough to remove vegetation and ground cover in or immediately adjacent to drainages or if it led to the formation of hydrophobic soils which would reduce water infiltration and increase run off.
      2) The upper tank of the double tank system, or sediment traps, shall be inspected prior to the summer rains and after any large precipitation event to determine if silt removal is needed to allow for the capture of the increased influx of sediment and ash from post-burn run-off.
      3) Rock and State tanks shall be inspected after precipitation events to determine the amount of sediment and ash that may have entered the tank. If Chiricahua leopard frogs, Gila topminnow, or any other aquatic vertebrate species are observed to be stressed or dying, collection and relocation of Chiricahua leopard frogs and Gila topminnows shall be performed, in coordination with Arizona Game and Fish Department.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such

incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Refuge must immediately provide an explanation of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the Refuge document all survey efforts and data on Pima pineapple cactus in the Annual Work Plan or as part of the report under the Terms and Conditions for the pygmy-owl, masked bobwhite, Chiricahua leopard frog, and Gila topminnow take statements.

2. We recommend that the Refuge evaluate the existing Refuge prescribed fire program and its long-term effects on recovery of masked bobwhite. Specifically, evaluate whether the benefits of prescribed fire outweigh the short-term impact to the population of masked bobwhite.

3. We recommend that the Refuge review all available data on masked bobwhite to refine the assumptions used in this BO’s take statement for masked bobwhite. We recommend further research into the validity of any assumptions that cannot be refined by existing data.

4. We recommend that the Refuge support or encourage research into fire effects on masked bobwhite habitat regeneration and invertebrate food availability.

5. We recommend that the Refuge experiment with the use of mechanical and chemical mesquite control in BMUs where high numbers of masked bobwhite are known to occur and where high or moderate habitat for pineapple cactus is not present.

6. We recommend that the Refuge develop a management plan for Gila topminnow in cooperation with Arizona Game and Fish Department and our office.

In order for the us to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the reinitiation request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Our office appreciates the Refuge's efforts to identify and minimize effects to listed species from this project. For further information please contact Marty Tuegel (520) 670-6150 (x232) or Sherry Barrett (520) 670-6150 (x223). Please refer to the consultation number 02-21-05-F-0243 in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
(Attn: Sarah Rinkevich)
Regional Director, National Wildlife Refuge System, Fish and Wildlife Service, Albuquerque, NM
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ (Attn: Joan Scott)

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TABLES AND FIGURES

Table 1. Burn management units to be treated with prescribed fire by year.

2005		
Unit Name	**Unit #**	**Acres**
Las Delicias	Pvt	1185
Hippy	10	1734
Round Hill 3	18	1176
Round Hill 1	24	2321
Bertha South	32	1169
Headquarters	34	504
Mormon West	53	337
Borrego North	35	461
Compartidero 3	44	708
Garcia	50	2440
Linberg Ridge	15	886
Punta South	20	1361
Quail Facility	none	70
City Hall Expt	none	111
Mormon	37	206
Total		14669

2006		
Unit Name	**Unit #**	**Acres**
Pozo	2	1744
Brown South	52	977
Linberg Tank	19	1402
Road Camp	9	1024
King	none	1986
McKay	25	459
State	39	1624
N. Border	46	1700
Compartidero 1	42	935
Punta North	16	740
		12591

2007		
Unit Name	**Unit #**	**Acres**
Brown North	51	1482
City Hall	3	5312
Guijas Tank	12	467
Secundino	13	1624
Round Hill 2	22	1747
Rock	29	1956
Bertha North	30	1053
Horse North	33	344
Horse South	36	902
Borrego South	38	1187
Lopez	45	2164
Total		18238

2008		
Unit Name	**Unit #**	**Acres**
Espinosa	1	1507
Blanco	6	3968
Pajonal	5	2854
Indios	11	682
Middle	14	1871
High (SW portion)	23	1292
Bertha South	32	1169
Airport	27	764
Snake	43	1664
Yellowjacket	47	584
Compartidero 2	41	808
Total		17163

Table 2. Summary of known pygmy-owl by general region from 1999-2005.

	NW Tucson	Pinal County	Altar Valley	Organ Pipe	West Tucson
1999	10 adults 4 nests	5 adults 2 nests	18 adults 4 nests	4 adults 1 nest	
2000	11 adults 3 nests	3 adults 1 nests	8 adults 1 nest	8 adults 1 nest	
2001	8 adults 3 nests	0 adults 0 nests	18 adults 7 nests	8 adults 3 nests	
2002	7 adults 1 nests	0 adults 0 nests	6 adults 2 nests	2 adults 0 nests	
2003	3 adults 0 nests	1 adult 0 nests	8 adults 4 nests	6 adults 0 nests	2 adults 1 nest
2004	3 adults 0 nests	0 adults 0 nests	8 adults 3 nests	7 adults 0 nests	2 adults 1 nest
2005[1]	2 adults 0 nests	0 adults 0 nests	9 adults 4 pairs(?)	2 adults 0 nests	0 adults 0 nests

[1]Records for 2005 were based upon information as of March 15, 2005.

TABLE 3. Number of Male Masked Bobwhite Detected on Summer Call Count Surveys 1999-2004.

UNIT #	UNIT NAME	ACRES	1999	2000[1]	2001	2002	2003	2004	Maximum Occupancy
1	Espinosa	1507							
2	Pozo	1744	0.5[2]						1
3	City Hall	5312	0.5[2]						1
4	Dry	821	1						1
5	Pajonal	2854							
6	Blanco	3968							
7	Mosca	3478				4			4
8	Buena	1120							
9	Road Camp	1024	6		4				6
10	Hippy	1734	1		2				2
11	Indios	682							
12	Guijas Tank	467							
13	Secundino	1624	14.5[2]	0.5[2]	3	2		1	15
14	Middle	1871	7.5[2]	0.5[2]	3	5	9	7	9
15	Linberg Ridge	886		1			1	2	2
16	Punta North	740						1	1
18	Round Hill 3	1176	5			1			5
19	Linberg Tank	1402	1						1
20	Punta South	1361							
21	Mesquite	928							
22	Round Hill 2	1747	1					1	1
23	High Gates	4905							
24	Round Hill 1	2321							
25	Mckay	459							
26	Bailey	520			1				1
27	Airport	764			1		1		1
28	Aguirre	287							
29	Rock	1956	2						2
30	Bertha North	1053						1	1
31	Triangle	593			1		1	2	2
32	Bertha South	1169						1	1
33	Horse North	344							
34	Headquarters	504			1			1	1
35	Borrego North	461			2			1	2
36	Horse South	902						2	2
37	Mormon	206							
38	Borrego South	1187						1	1
39	State	1624						3	3
40	Carrizo	1179							
41	Compartidero 2	1194	1		2	2			2
42	Compartidero 1	935				1		1	1
43	Snake	1664			1			1	1

UNIT #	UNIT NAME	ACRES	1999	2000[1]	2001	2002	2003	2004	Maximum Occupancy
44	Compartidero 3	708	1						1
45	LOPEZ/Control	2164	1						1
46	North Border	1700			1	1			1
47	Yellowjacket	584				1			1
48	East Gate	808							
49	South Border	915	2						2
50	Garcia	2440			1				1
51	Brown North	1482							
52	Brown South	977							
53	Mormon West	337							
54	West Bailey	1038							
55	West Bertha	1923							
56	Canoa	1706							
57	Ted	2627							
	Non Burn Unit		3		7	2			7
	Total Calling Males		48	2	30	19	12	28	

[1]Minimal effort was expended on call counts in 2000.
[2]Fractions of birds are due to birds being sighted in the middle of the road between units or uncertainty in the recording of burn management unit birds occurred in. Prior to 2001, birds were not recorded by burn management unit.

Figure 1. Proposed Cactus Ferruginous Pygmy-owl Management Zone Map.

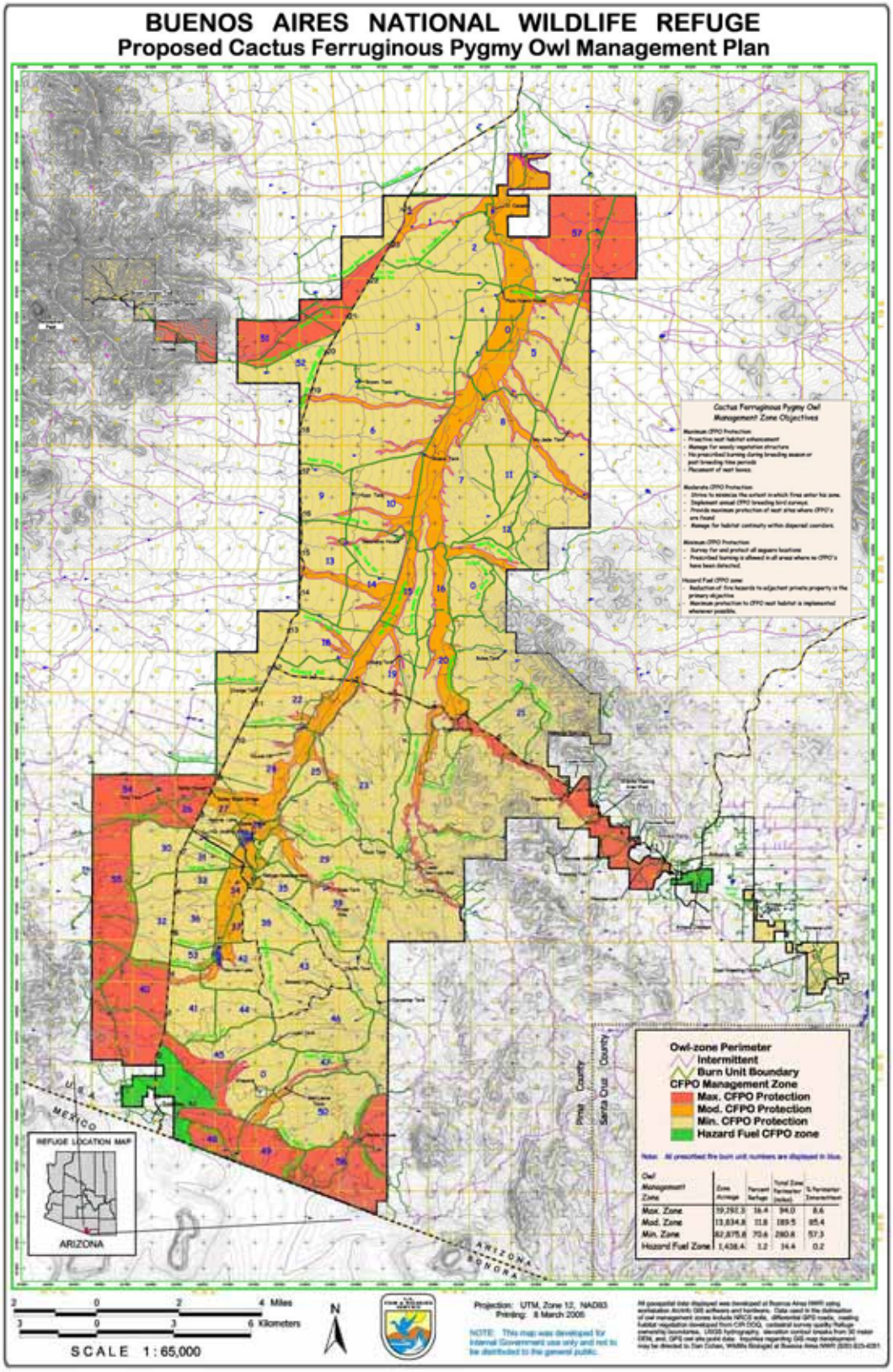

Figure 2. Burn Management Units proposed to be burned in 2005-2006.

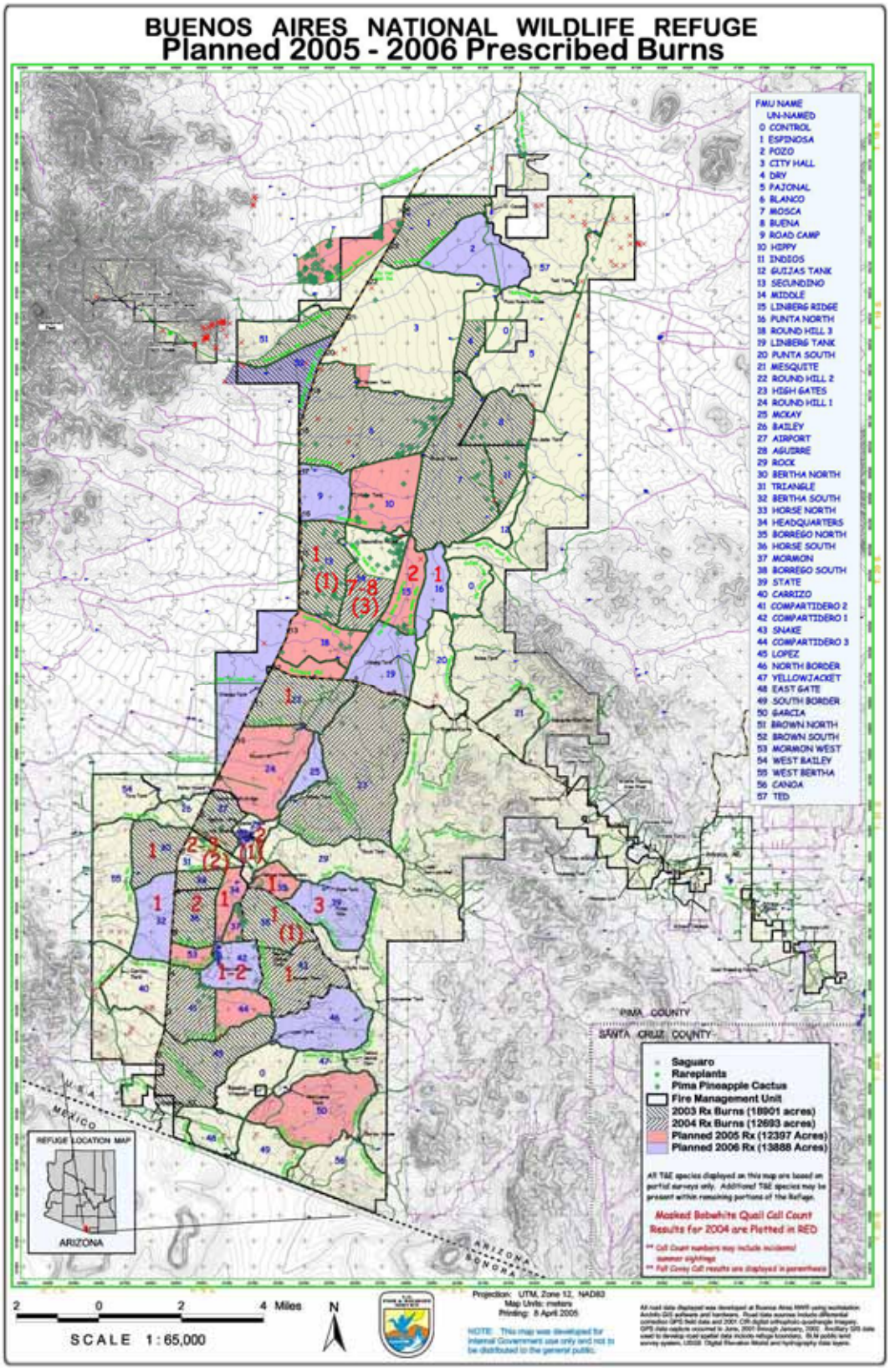

Figure 3. Burn Management Units proposed to be burned in 2007-2008.