United States Department of the Interior

FISH AND WILDLIFE SERVICE
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SUMMARY
BIOLOGICAL OPINION ON THE EFFECTS TO THE SONORAN TIGER SALAMANDER FROM THE PROPOSAL TO IMPLEMENT THE SMALL SCALE EXOTIC SPECIES REMOVAL PROJECT, SANTA CRUZ COUNTY, ARIZONA

Cons. # 22420-2006-F-0118

Date of the biological opinion: June 15, 2006

Action agency: U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office

Project: The request concerns the proposal to implement the Small-Scale Exotic Species Removal Project, Santa Cruz County, Arizona. The proposed action will remove exotic species (i.e., bullfrogs [larvae and adults] and exotic fishes) from four earthen stock tanks within a discrete geographical area in the San Rafael Valley, Arizona. Removal of exotic species would reduce threats to native species and create opportunities to conserve their populations in the selected stock tanks. In particular, the endangered Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*), which is known from the area, would benefit from this action.

Species affected: Sonora tiger salamander

Biological Opinion: The proposed action is not likely to jeopardize the Sonora tiger salamander.

Incidental take statement: We anticipate no more than 20 salamanders (eggs, larvae, branchiate, and terrestrial adults) could be taken in the form of harm, harass, and kill as a result of this proposed action.

Conservation Recommendations: Implementation of the conservation recommendation is discretionary. One conservation recommendation is provided.

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Memorandum

To: Field Supervisor, Arizona Ecological Services Field Office, U.S. Fish and Wildlife Service, Phoenix, Arizona

From: Acting Field Supervisor, New Mexico Ecological Services Field Office, U.S. Fish and Wildlife Service, Albuquerque, New Mexico

Subject: Intra-Service Biological Opinion on the Proposed Small Scale Exotic Species Removal Project, San Rafael Valley, Arizona

This document transmits our biological opinion on the proposed Small-Scale Exotic Species Removal Project, Santa Cruz County, Arizona, and its effects on the endangered Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*) (salamander) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your May, 16, 2006 request for formal consultation was received on May 19, 2006.

This biological opinion is based on the project proposal, the April 12, 2006, draft environmental assessment, field investigations, and other sources of information. References cited in this opinion are not a complete bibliography of all literature available on the salamander or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at the Phoenix Ecological Services Office.

CONSULTATION HISTORY

- April 4, 2006. Jim Rorabaugh, Arizona Ecological Services Field Office, called Eric Hein, New Mexico Ecological Services Field Office to discuss the intra-service consultation process.

• May 19, 2006. The request for consultation and biological evaluation were delivered to New Mexico Ecological Services Office.

DESCRIPTION OF PROPOSED ACTION

Action Area

The action area includes those areas to be affected directly and indirectly by the proposed action, as well as areas affected by interrelated or interdependent activities associated with the proposed action. The action area for this project is the high water line of Dan, Bwoods, Rosemary, and Upper 21 stock tanks in the San Rafael Valley (SRV), and a radius of 100 feet beyond that water line (Figure 1).

Proposed Action

The purpose of the proposed action is to remove exotic species (i.e., bullfrogs [larvae and adults] and exotic fishes) from four earthen stock tanks within a discrete geographical area in the SRV (Figure 1). Removal of exotic species would reduce threats to native species and create opportunities to conserve their populations in the selected stock tanks. In particular, the salamander, which is known from the area, would benefit from this action.

Arizona Ecological Services Field Office, working with Arizona Game and Fish Department (AGFD) and other cooperators, would remove exotic species from four stock tanks in the SRV. Three of the tanks (Rosemary, Bwoods, and Dan tanks) are located on Coronado National Forest lands. Upper 21 Tank is located on the privately-owned San Rafael Ranch (Figure 1). The proposal includes: 1) remove exotic species from selected stock tanks, 2) monitor and adaptively manage as needed to ensure native species survival, and 3) continue coordination among participants to ensure issues and concerns are addressed appropriately. These three primary elements of the plan and related conservation measures are described briefly below.

Remove Exotic Species

Exotic species would be removed using both mechanical and chemical treatments. Mechanical treatments include: seining, gill netting, gigging, electrofishing, and draining of stock tanks. Rotenone, used in accordance with the label, would be used as well to kill exotic fishes (we expect it would also kill bullfrog tadpoles incidentally). Our best estimate of which techniques would be used at each tank is found in Table 1. However, any of these techniques could be used at any of the four tanks, and decisions about which techniques to use will be made on-site.

Table 1. Description of mechanical and chemical treatments expected to be used for removal of exotic species from stock tanks.

Tank Name	Renovation Treatments
Rosemary	Drain part way, mechanical and chemical
Bwoods	Mechanical treatments
Dan	Drain part way or completely, depending on presence of salamanders, mechanical and chemical treatments
Upper 21	Drain part way, mechanical and chemical

We propose to conduct this work in June or July 2006 before the onset of the monsoon season, when water levels in tanks are low and control techniques are most efficient. However, if National Environmental Policy Act (NEPA) or other compliance is not completed in time, or other circumstances require delay, we may conduct exotic species removal later in 2006 or in May or June 2007.

Monitor and Adaptively Manage

The tanks would be visited periodically for two years following treatments. Tanks would be surveyed with seines and visual encounter surveys to search for salamanders and exotic species. If exotics are detected, we would control them through chemical or mechanical means, if possible.

Continue Coordination Among Participants

To ensure any issues and concerns with the proposed action are addressed appropriately, we would meet periodically with the Salamander Recovery Team and adjacent and interested landowners and other affected parties and stakeholders. During these meetings, we would describe and discuss progress to date and any needed follow up actions.

Conservation Measures

The following conservation measures are part of the proposed action. These conservation measures were evaluated below as part of our jeopardy analysis. They are intended to minimize or avoid adverse impacts to the salamander. These conservation measures include:

- All monitoring work that may result in forms of take of regulated native and exotic species will be conducted under Service and AGFD permits, and will conform to all conditions of those permits;

- All field work shall conform to amphibian disease prevention protocols in the Salamander Recovery Plan (U.S. Fish and Wildlife Service 2002). For example, equipment will either be disinfected between uses at different sites, or air dried;

- Prior to use of rotenone, gill nets, or electroshockers, and prior to draining a tank, we will seine the tanks several times and salvage any salamanders found in the tanks. Salamander will be held on-site in aquaria or other suitable aquatic habitats until potentially hazardous treatments are completed and until toxic conditions due to rotenone treatments are abated. In tanks with salamanders, we will use potassium permanganate ($KMnO_4$) or sodium permanganate (NAMnO4) to neutralize the rotenone and reduce the amount of time until we can return salamanders to the tank. These compounds are strong oxidizing agents and quickly break down to naturally occurring compounds that are non-toxic (Archer 2001). The time from the application of rotenone to the time when the tank is completely detoxified (using potassium or sodium permanganate) is expected to be less than 24 hours;

- To minimize fire risk, no camp fires will occur during any backcountry camping associated with project activities. Field workers will not smoke while conducting field work;

- Rotenone will only be applied in accordance with a Pesticide Use Plan and by a certified pesticide use applicator. Pesticide Use Plans are required by National Forest regulations and identify methods, sensitive areas, and precautions that will be taken to minimize or eliminate adverse effects to non-target species, resources, and people;

- Personnel will remain on-site at tanks treated with rotenone to prevent recreational use of the tanks until toxic conditions are neutralized;

- When salamanders are encountered, the tank would not be drained completely to ensure habitat is available for the species after the treatments; and

- Where needed for cattle, water removed from tanks will be replaced or alternative water sources will be provided until rains refill the stock tanks. The need to provide alternative water for cattle will be coordinated with the Coronado National Forest, Sierra Vista Ranger District, and the permittees, or in the case of Upper 21 Tank, with Ross Humphreys, the ranch owner.

STATUS OF THE SPECIES AND CRITICAL HABITAT

Sonora tiger salamander

STATUS OF THE SPECIES

The salamander is large with a dark venter and light-colored blotches, bars, or reticulation on a dark background. Snout-vent lengths of metamorphosed individuals vary from approximately 2.6 to 4.9 inches (Jones *et al.* 1988, Lowe 1954). Larval salamanders are aquatic with plume-like gills and well-developed tail fins (Behler and King 1980). Larvae hatched in the spring are large enough to metamorphose into terrestrial salamanders from late July to early September, but only an estimated 17 to 40 percent metamorphose annually. Remaining larvae mature into branchiates (aquatic and larval-like. but sexually mature salamanders that remain in the breeding pond) or over-winter as

larvae (Collins and Jones 1987; James Collins, Arizona State University, pers. comm. 1993). The salamander was listed as endangered on January 6, 1997. No critical habitat has been proposed or designated. A final recovery plan was finalized in September 2002.

The salamander is known from approximately 60 breeding localities, although not all are currently occupied (U.S. Fish and Wildlife Service 2002 and files, Abbate 1998, Collins and Jones 1987, Collins 1996). During intensive surveys in 1997, from one to 150 salamanders were found at 25 stock tanks (Abbate 1998). Populations and habitats are dynamic, thus the number and location of extant aquatic populations change over time, as exhibited by the differences between survey results in 1985 and 1993 to 1996 (Collins and Jones 1987; Collins 1996; James Collins, pers. comm. 1996). IN 1999, salamanders were found at 17 localities (Collins 1999). All sites where salamanders have been found are located in Arizona in the Santa Cruz and San Pedro river drainages, including sites in the San Rafael Valley and adjacent portions of the Patagonia and Huachuca mountains in Santa Cruz and Cochise counties. All confirmed historical and extant aquatic populations are found in cattle tanks or impounded cienegas within 19 miles of Lochiel, Arizona. A population of salamanders at Rancho Los Fresnos, a natural cienega in the San Rafael Valley, Sonora, Mexico also may be *A. t. stebbinsi* (Varela-Romero *et al.* 1992).

Historically, the salamander probably inhabited springs, cienegas, and possibly backwater pools of the Santa Cruz River and streams in the San Rafael Valley where permanent or nearly permanent water allowed survival of mature branchiates. The grassland community of the San Rafael Valley and adjacent montane slopes, where all extant populations of salamanders occur, may represent a relictual grassland and a refugium for grassland species. Tiger salamanders in this area became isolated and, over time, genetically distinct from ancestral *A. t. mavortium* and *A. t. nebulosum* (Jones *et al.* 1995, Storfer *et al.* 2004). The salamander apparently has opportunistically taken advantage of available stock tank habitats as natural habitats disappeared (Hendrickson and Minckley 1984) or were invaded by nonnative predators with which the salamander cannot coexist (U.S. Fish and Wildlife Service 2002).

Although most records for salamanders occur at stock tanks where breeding occurs, terrestrial metamorphs potentially may wander considerable distances from these aquatic habitats, and are occasionally encountered in upland habitats. For example, a salamander was captured in a pit fall trap at Oak Spring in Copper Canyon, Huachuca Mountains, by AGFD personnel. The nearest known breeding site is approximately 0.6 mile to the south, suggesting the salamander may have moved at least that far. Capture in a pit fall trap also confirms that the individual was surface active. In other subspecies of *Ambystoma tigrinum*, metamorphs may disperse hundreds of meters from the breeding pond, or may remain nearby (Petranka 1998, Gehlbach *et al.* 1969). Of hundreds of marked *Ambystoma tigrinum nebulosum* in northern Arizona, two were found to move from 0.9 to 1.2 miles to new ponds (J. Collins, pers. comm. 1998). On Fort Huachuca, Sheridan Stone (pers. comm. 1998) reported finding terrestrial tiger salamanders (probably *A. t. mavortium*) 1.9 to 2.5 miles from the nearest known breeding pond. Referring to conservation of the California tiger salamander, *A. californiense*, Petranka (1998) reported that conservation of a 650 to 1,650 foot radius of natural vegetation around a breeding pond would protect the habitat of most of the adult terrestrial population. Adults of western subspecies of *A. tigrinum* typically live in or about mammal

burrows (Petranka 1998), although metamorphs may construct their own burrows, as well (Gruberg and Stirling 1972, Semlitsch 1983). Some species of salamanders exhibit seasonal migrations of up to several miles each way from breeding sites to upland habitats (Stebbins and Cohen 1995). If such migrations occur in the salamander, we have no information about migration corridors or non-breeding habitat. Because of the arid nature of the environments in the region where the subspecies occurs, if salamanders move very far from breeding ponds, they may use wet canyon bottoms as movement corridors.

Primary threats to the salamander include predation by nonnative fish and bullfrogs, diseases, catastrophic floods and drought, illegal collecting, introduction of other subspecies of salamanders that could genetically swamp *A. t. stebbinsi* populations, and stochastic extirpations or extinction characteristic of small populations. Predation by catfish, bass, mosquito fish, and sunfish can eliminate stock tank populations of the salamander (J. Snyder, Arizona State University, pers. comm. 1996; Collins *et al.* 1988). The salamander can apparently coexist with bullfrogs, but bullfrogs prey on salamanders (J. Snyder, pers. comm. 1996) and perhaps if they are present in sufficient densities could reduce or eliminate salamander populations. Tadpoles of wood frogs (*Rana sylvatica*) are known to feed on spotted salamander (*Ambystoma maculatum*) eggs (Petranka *et al.* 1998), but under experimental conditions bullfrog tadpoles do not feed on viable salamander eggs or hatchlings (Collins 1996, J. Collins, pers. comm. 1996). Recent genetic analysis confirmed that barred salamanders (*A. t. mavortium*) or hybrids between barred salamanders and salamanders are present at 7 stock tanks along Highway 83 and near Parker Canyon Lake in the San Rafael Valley (Ziemba *et al.* 1998, Storfer 2004). Barred salamanders are likely present in this area due to their use as fish bait in and around Parker Canyon Lake. A salamander population in Garden Canyon, Fort Huachuca, near the crest of the Huachuca Mountains, may contain hybrids (Storfer *et al.* 1999).

Tiger salamander populations in the western United States and Canada, including populations of the salamander, exhibit frequent epizootics (Collins *et al.* 2001). Salamander populations experience frequent disease-related die-offs (approximately eight percent of populations are affected each year) in which almost all salamanders and larvae in the pond die. *Ambystoma tigrinum* virus (ATV) is the pathogen believed to be primarily responsible for these die-offs (Jancovich *et al.* 1997). This, and possibly other iridoviruses, are also apparently the proximate cause of die-offs observed in other *Ambystoma* salamander populations in the United States and Canada (Collins *et al.* 2000, Docherty *et al.* 2003). ATV may be spread by bullfrogs, birds, cattle, or other animals that move among tanks (Jancovich *et al.* 1997); however, the viral life cycle appears to be restricted to tiger salamanders - no other syntopic hosts have been identified (Jancovich *et al.* 2001). In the laboratory, salamanders exhibited lower survival and growth rates when exposed to the disease as compared to *Ambystoma tigrinum nebulosum* from the White Mountains of Arizona (Collins *et al.* 2003). Animals that survive ATV exposure may harbor transmissable infection for more than six months. Dispersing metamorphosed salamanders have been found carrying ATV, and when they return to a pond to breed, may reinfect the aquatic population (Collins *et al.* 2003). The disease could be spread by researchers or anglers if equipment such as waders, nets, or fishing tackle used at a salamander tank are not allowed to dry or are not disinfected before use at another tank. ATV is an emerging pathogen (Storfer 2003), and genetic analysis suggests a single introduction and recent spread over a large geographic area from Arizona to Saskatchewan (Jancovich *et al.* 2005). ATV may have

switched from sport fishes to salamanders or was introduced with water dogs (*A. t. mavortium*), imported for use as fish bait in Arizona and elsewhere (Jancovich *et al.* 2005). Collins *et al.* (2003) identified ATV in waterdogs obtained from a Phoenix bait shop.

Some die-offs might also occur as a result of low pH (M. Pruss, AGFD, pers. comm.). A copper smelter at Cananea, Sonora, less than 25 miles south of the border, may have released sulfur plumes resulting in acid precipitation (Platz 1993, Blanchard and Stromberg 1987), but currently there is no evidence to connect salamander die-offs with the copper smelter, and the smelter has not been operated since 1999.

Salamanders also contract chytridiomycosis, a fungal disease associated with global declines of frogs and toads (Davidson *et al.* 2003, Speare and Berger 2000, Longcore *et al.* 1999, Berger *et al.* 1998). However, compared to anurans, infected salamanders exhibit only minimal symptoms (Davidson *et al.* 2000). In the laboratory, infected salamanders did not die from the disease and are capable of ridding themselves or much reducing chytrid infections by frequent sloughing of the skin (Davidson *et al.* 2003). The effect of the disease on salamander populations needs further study.

With the exception of Bog Hole in the San Rafael Valley and a site on Fort Huachuca, cattle grazing occurs throughout the range of the salamander. Cattle can degrade habitat at stock tank breeding sites and overgrazing can cause loss of cover and erosion that can threaten the integrity of stock tanks used by the salamander. However, the salamander has coexisted for about 250 years with grazing and because of its current use of livestock tanks for breeding, is now dependent upon maintenance of cattle waters by ranchers (U.S. Fish and Wildlife Service 2002).

For further information on the ecology, taxonomy, range, and threats to this subspecies, refer to U.S. Fish and Wildlife Service (2002), Collins (1996, 1981), Collins and Jones (1987), Collins *et al.* (1988, 2003), Gehlbach (1967), Jancovich *et al.* (1997, 1998, 2005), Jones *et al.* (1995, 1988), Lowe (1954), Snyder *et al.* (1998, 1996), and Storfer (2003, 2004).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are anticipated impacts of all proposed Federal projects that have undergone section 7 consultation, and impacts of State and private actions that are contemporaneous with the consultation in progress. 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.

Status of the Species within the Action Area

The four stock tanks lie in the southeastern portion of the SRV in the upper Santa Cruz River watershed. The vegetation community is a plains grassland-oak woodland transition between the valley bottom and the foothills of the Huachuca Mountains. Elevations range from about 5,000 to

5,300 feet. The tanks lie along interconnected drainages between Jones Mesa and Dove Canyon. They are geographically and hydrologically separated to some degree from other tanks in the region by mesas and ridgelines. The tanks have a history of supporting exotic species, but are also habitat for the salamander. If exotics can be eliminated from these tanks, natural recolonization by exotics would likely be slow due to the geographical and hydrological barriers.

All tanks are impounded with dirt dams on the downstream side and fill when surface runoff occurs into the tanks. In March 2006, stock tanks had ≤ 5 percent vegetation cover in each of three categories (see Table 2), and some tanks either had a partly open fence around the perimeter or a fence through the middle of the tank. Water depths varied from 2.0 to 5.6 feet, but the volume of water is highly variable and corresponds to recent runoff events.

Table 2. Descriptions and historical and recent survey records at the four stock tank renovation sites.

Tank Name	March 2006 Survey			Location of Stock Tank		
	Shoreline vegetation (%)	Submerged vegetation (%)	Emergent vegetation (%)	UTM-E	UTM-N	Elevation (feet)
Rosemary	0	1	5	545063	3472777	5,069
Bwoods	0	1	1	547716	3475495	5,145
Dan	0	1	1	544841	3474583	5,240
Upper 21	na	na	na	541146	3475565	4,821

Rosemary, Bwoods, and Dan tanks all have records (1980 to 2005) of salamanders. All four have a history of bullfrog presence, and green sunfish have been found at Rosemary Tank. No salamanders have been found at Upper 21 Tank. During a March 2006 survey of all four tanks, salamanders were only found at Dan Tank, but bullfrogs were present at all of the tanks. Techniques for detecting species included visual encounter surveys and seining (at least 3 seine pulls, or until salamanders are found). These techniques can miss detecting fishes, salamanders, or bullfrogs.

Factors Affecting Species Environment within the Action Area

Factors affecting the salamander in the action area are generally the same as those affecting the species throughout its range in the SRV (described in the Status of the Species). Drought is of particular concern this year, and Bwoods Tank could dry out before the monsoons begin in July. If salamanders are present, aquatic forms could be eliminated. No sign of disease was observed at any of the tanks during the March surveys. None of these tanks are known to support barred tiger salamanders, but they occur nearby, and it is possible that salamanders at Dan or other tanks may carry some barred tiger salamander genes.

EFFECTS OF THE ACTION

Salamanders will be affected by the project at Dan Tank and potentially the other three tanks if they occur in those tanks. Salamanders will be affected as follows:

1) Salamanders may be captured, injured, or killed by mechanical means including seines, dipnets, gill nets, electroshocking, or draining of tanks;

2) Salamanders not salvaged prior to chemical treatments may be killed or injured by rotenone;

3) By moving seines, muddy boots, or other equipment among tanks, we may unintentionally move iridovirus among tanks, as well, resulting in death of salamanders; and

4) Salamander populations in the action area should benefit by removal of exotic predators.

The Service and AGFD have conducted many surveys for the salamander in the SRV. During surveys, salamanders are often seined or occasionally dip-netted. These animals are returned to the water after identification, and although we have no evidence that these techniques injure or kill salamanders, we cannot rule out the possibility that a salamander could be accidentally stepped on in a net (particularly a very small larval salamander), eggs could be damaged or killed, or other forms of injury or death may result during mechanical removal. In accordance with the conservation measures, we would not drain a tank completely if salamanders are present; but rather would leave enough water so that salamanders will have sufficient habitat and water will remain until the monsoon rains begin. Also consistent with the conservation measures, salamanders will be salvaged via seining and/or dip-netting prior to rotenone treatments, electroshocking, and draining of tanks, but we are unlikely to capture all salamanders in a tank with seines and nets. Hence, some salamanders will be subjected to electroshocking and rotenone treatments, and some salamanders could be drawn through a pump. Very small larvae are particularly susceptible and are difficult to salvage. However, at the time we conduct the project, most larvae should be large enough to detect (they breed from January to early May).

Rotenone is a naturally occurring substance derived from roots of tropical plants in the bean family. It has been used for modern fishery management since the 1930's and is also used as an insecticide on crops and livestock (Finlayson *et al.* 2000). It is effective on gill-breathing organisms, such as fish, tadpoles, and gilled tiger salamanders. Houf and Campbell (1977) studied rotenone effects on aquatic macro-invertebrates in ponds and concluded that rotenone is not detrimental to benthic communities in ponds when applied at the dosages used for fish removal. Rotenone can be detected by fish and evaded in areas of incomplete mixing. Its effects are reversible if fish can be moved to untreated waters, and rotenone does not kill fish eggs. We believe the same is true for the salamander. Because of some poorly-administered projects in streaming water that resulted in undesired downstream fish kills, rotenone use has become publicly controversial in some cases (i.e., Lake Davis, Ca) (Finlayson *et al.* 2000). However, for this proposal, rotenone would be applied in relatively small treatment areas of standing water, and controversial use of rotenone does not appear to apply to the focus area in the SRV. Potassium permanganate would be used to neutralize the rotenone and reduce the length of time treated ponds remain toxic. Breakdown components of $KMnO_4$ and $NaMnO_4$ (potassium, sodium, manganese, and water) are common in nature and have no deleterious environmental effects at concentrations used for neutralization of rotenone (Finlayson

et al. 2000). Kemp *et al.* (1966) found $KMnO_4$ formed a biologically inert residue when it reacted with organic material.

In accordance with the conservation measures, we would immediately salvage and remove to fresh aerated water, any salamanders that are found during rotenone treatments in the hopes of reviving the animal. Although some injury and death of salamanders is expected, we anticipate relatively few animals will be affected by mechanical or chemical treatments. The mechanical treatments include techniques we use to sample the salamander; and we have no evidence that salamanders are injured or killed during such sampling. We will salvage as many salamanders prior to chemical treatments, and then will salvage and attempt to revive any remaining salamanders that are affected.

Iridovirus can kill all or most salamanders in a stock tank (see Status of the Species). This disease can be moved from place to place in water or mud. Although no sign of disease (sick or dying salamanders) were noted during the March surveys, disease prevention protocols in the Salamander Recovery Plan will be followed, which should prevent any movement of the disease (if present) due to the proposed action.

Although there will be short-term direct adverse effects to individual salamanders, in the longer term, the removal of exotic predators should result in beneficial indirect effects that allow salamander populations to become more robust in the absence of predators, and tanks not currently occupied are likely to be colonized by the salamander. Mortality of salamanders is expected to be minor, and will not result in extirpation of any extant populations. This project could also serve as a pilot project for future renovations that could benefit this species outside of the action area.

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. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Activities at and near Dan, Rosemary, and Bwoods tanks will often be Federal actions due to the preponderance of Federal lands managed by the Coronado National Forest. The effects of these Federal activities are not considered cumulative effects. However, illegal immigration and smuggling in the SRV commonly occurs and is increasing. Illegal activities cause trailing and accumulation of refuse, and illegal immigrants and smugglers have started fires. Upper 21 Tank is on the privately-owned San Rafael Ranch, which is used primarily for conservative livestock grazing. Uses of the 17,000-acre ranch are limited by the terms of a conservation easement, which prohibits subdivision and all but minor changes to the landscape and habitats of the salamander and other sensitive species.

CONCLUSION

After reviewing the current status of the salamander, the environmental baseline for the action area,

the effects of the proposed action, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the salamander. No critical habitat has been designated for this species; therefore, none will be affected. Our conclusion is based on the following:

1. Although short-term adverse effects to the salamander are anticipated, removal of exotic species should benefit the species in the four tanks in the long term.

2. Although some individual salamanders are likely to be killed or injured, the project will not result in extirpation of any extant populations, and in the absence of exotic species, the salamander could colonize additional tanks.

3. This project, if successful, could serve as a pilot project or model for future renovations in the SRV.

4. Conservation measures are included in the proposed action that substantially reduce adverse effects and reduce the likelihood of injury and mortality to the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation 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 by the Service 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 by the Service 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 Arizona Ecological Services Field Office so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this incidental take statement. If Arizona Ecological Services Field Office (1) fails to assume and implement the terms and conditions or (2) fails to require any 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, Arizona Ecological Services Field Office must report the progress of the action and its impact on the species to the Service as

specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE ANTICIPATED

We anticipate no more than 20 salamanders (eggs, larvae, branchiate, and terrestrial adults) could be taken in the form of harm, harass, and kill as a result of this proposed action. We do not anticipate extirpation of any salamander populations from any stock tanks due to the conservation measures to salvage and repatriate salamanders after exotic species removal.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service has determined that this level of anticipated take is not likely to jeopardize the continued existence of the salamander.

REASONABLE AND PRUDENT MEASURES/TERMS AND CONDITIONS

No reasonable and prudent measures or terms and conditions are identified. Those potential reasonable and prudent measures and terms and conditions have been incorporated into the proposed action and are not repeated here.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use 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. The recommendations provided here relate only to the proposed action and do not represent complete fulfillment of the agency's section 7(a)(1) responsibility for this species. We recommend the following conservation recommendation be implemented:

1. Arizona Ecological Services Field Office should continue to pursue opportunities to implement the Salamander Recovery Plan, as well as exploring options for multi-species recovery projects that might include the Chiricahua leopard frog, Huachuca water umbel, Gila topminnow and other listed or sensitive species native to the SRV.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of the conservation recommendation.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the Service'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 the New Mexico Ecological Services Field 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.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the Small Scale Exotic Species Removal Project outlined in the request for consultation. 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.

We appreciate your efforts to identify and minimize effects to the salamander from this project. For further information please contact Eric Hein at 505-761-4735 or myself. Please refer to consultation #22420-2006-F-0118 in future correspondence concerning this project.

Wally Murphy

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Figure 1: Location of the four tanks where renovations are proposed.