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Memorandum

To: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico
(ARD-ES) (Attn: Marty Tuegel)

From: Field Supervisor

Subject: Intra-Service Section 7 Conference Opinion Regarding the Approval of a Candidate Conservation Agreement with Assurances for the Page Springsnail and the Potential Issuance of a Section 10(a)1(A) Enhancement of Survival Permit (TE-174351-0) to the Arizona Game and Fish Department

This memorandum represents our Conference Opinion, pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531-1544), as amended, on the U.S. Fish and Wildlife Service (FWS) potential issuance of a Section 10(a)1(A) permit (Permit), to the Arizona Game and Fish Department (AGFD), authorizing incidental take of the Page springsnail (*Pyrgulopsis morrisoni*) in Yavapai County, Arizona. AGFD will be responsible for implementing a Candidate Conservation Agreement with Assurances (CCAA), including the authority to issue Certificates of Inclusion (CI). This opinion analyzes the effects of the potential issuance of the Permit and implementation of the CCAA. We have determined that this action "may affect" the Page springsnail.

This opinion is based on information provided in the CCAA for the Page springsnail (March 2009), inter-agency coordination, field investigations, and other sources of information. Literature cited is not a complete bibliography of all literature available on the Page springsnail, activities described in the CCAA and their effects, or on other subjects considered here. A complete administrative record of this consultation is on file at the Arizona Ecological Services Field Office.

CONSULTATION HISTORY

- February 5, 1999: We provided a Draft Conservation Assessment and Strategy for the Page springsnail to interested parties and agencies, including the AGFD.
- December 14, 1999: We attended an interagency coordination meeting where it was decided that AGFD would assume the lead in developing a conservation agreement for the Page springsnail.
- December 26, 2007: We received the Draft CCCA and application for an enhancement of survival permit for the Page springsnail from the AGFD.
- January 28, 2008: We issued the notice of availability, receipt of application, and request for comments on the Draft CCCA and application for an enhancement of survival permit (73 FR 5205).
- March 31, 2009: We received two original copies of the final CCAA signed by the Director of the AGFD.
- April 29, 2009: We informally submitted the draft Conference Opinion to AGFD for review.
- May 4, 2009: AGFD provided informal comments on the draft Opinion.

CONFERENCE OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the issuance of a Section 10(a)(1)(A) enhancement of survival permit associated with the approval and implementation of a CCAA between the FWS, AGFD, and Participating Landowners to address the conservation needs of the Page springsnail in central Arizona. Under the CCAA, AGFD would implement conservation measures for the Page springsnail within the covered area through direct management on the Bubbling Ponds and Page Springs Hatcheries and by providing technical assistance to Participating Landowners. Participating Landowners can implement voluntary conservation measures for the Page springsnail on their properties and would be enrolled by AGFD via Certificates of Inclusion. The life of the CCAA is five years from the date of last signature.

The strategies outlined below are proposed to reduce and/or eliminate threats to the Page springsnail. When the identified strategies are completed and the conservation criteria achieved, as described in the CCAA, the cooperators will evaluate the protection afforded the Page springsnail. As new information or empirical data become available, these actions can be modified through adaptive management to achieve species conservation. Implementation is subject to availability of funds and compliance with all applicable regulations. For the purpose

of this analysis, we have identified each conservation measure as either certain to occur or not certain to occur. A more complete description of conservation measures is presented in the CCAA.

Conservation Measures:

1. Prevent future detrimental habitat modification and affects to individuals at known localities.

Springhead habitat on cooperators' property known to support, or likely to support, Page springsnails will be protected from further degradation, modification, or diversion, unless actions are determined in advance by AGFD and FWS not to negatively impact the species. Future activities that may affect Page springsnails or their known habitats must be coordinated with AGFD and FWS. Types of activities that may affect Page springsnails or their habitat include: the use of herbicides or other chemicals, mechanized or manual aquatic vegetation control, introduction of (unmanaged) non-native organisms, addition of material into the habitat, construction of new impoundments or other water-control devices, modification of existing structures, and diversion of water. We believe this conservation measure is certain to occur on State property.

2. Research.

Additional basic natural history and population trend information is needed to support future management decisions and evaluate conservation strategies. Cooperators agree to pursue potential funding sources to support research, and in some cases, assist in the collection of data. Cooperators have no affirmative obligation to individually provide funding unless they voluntarily choose to do so. Possible funding sources include the AGFD Heritage External Grant Program, the National Fish and Wildlife Foundation, the Partners for Fish and Wildlife Program, the Arizona Water Protection Fund, Section 6 ESA funds, State Wildlife Grants, other agency sources, and private contributions. Funding and investigator(s) are needed to answer the questions outlined below. Accordingly, this conservation measure is not certain to occur.

- A. Population demographics and natural history. Estimate the size of known populations, seasonal density fluctuations, abundance variations among and between springs, sex and age structure, and natality and mortality rates. Further characterize habitat preferences (e.g. CO₂ and dissolved CaCO₃ (calcium carbonate) levels, substrate type, water temperature, flow rate), diet, predators, affect of non-native species, and factors limiting distribution.
- B. Distribution. Document the current distribution (presence/absence) of Page springsnails at historical sites, and survey seeps, springs, and other water bodies on public lands and private property (with consent of landowner) in the Verde Valley.
- C. Taxonomy. Additional analysis comparing shell morphology, anatomy, and genetic relationship of known populations of Page springsnails and congeners is needed. This information could help estimate how much of the Page springsnail's total genetic

diversity is due to genetic variability within populations, versus how much is due to variability among populations.

3. Implement monitoring programs.

Implement a monitoring program for all known populations and habitat types on cooperators' properties. The objective of the Page springsnail monitoring program is to measure the effectiveness of the agreed upon management strategies, and provide baseline information on abundance and population trends. AGFD and FWS have created a survey and monitoring protocol to document snail presence/absence, population size estimates, and habitat conditions. Landowners are strongly encouraged to monitor populations of Page springsnails (annually) on their property (or provide agency access) and submit the results to AGFD. AGFD will house the data on the Heritage Data Management System, which will serve as a permanent central repository. Annual reports summarizing monitoring results should be compiled and distributed to interested parties. This conservation measure is already supported by agency base funding, and is conducted annually on the State fish hatcheries. We believe continuation of monitoring on State property is certain to occur.

A water-flow measuring device has been established at Bubbling Springs Pond and will be used to measure quantity of water emerging from the site. The flow rates will be monitored and reported on in the annual report. Additional water-flow monitoring devices may be considered and established, but are not required. These measuring devices would show seasonal fluctuations in water flow and unsustainable aquifer usage due to groundwater pumping. We believe monitoring with the device that is already operating is certain to occur, but monitoring from additional devices is not certain to occur.

4. Evaluate the aquifer supporting Page springsnail habitat.

Cooperators will gather, compile, review, and prepare a report on hydrological information on the Oak Creek springs complex, Shea Springs, and the regional aquifer, and threats to sustaining historical flow rates from the springs. The report should evaluate current and projected water use, current or projected threats to water flow or quality, including groundwater pumping and water diversion and actions necessary to preserve adequate Page springsnail habitat. Some recommended actions may not be feasible in light of existing permitted usage, such as diversions and pumping, and are subject to valid and existing water rights.

If threats to the aquifer are identified, Cooperators will reevaluate the effectiveness of the conservation strategy and determine if the effects of groundwater pumping can be reduced and/or eliminated through the Conservation Agreement process. Cooperators will initiate and maintain a working relationship with the groundwater management authority for Yavapai County and the Verde Watershed Association to ensure the Page springsnail's needs are considered in regional water planning efforts. Also, the technical expertise of the U.S. Geological Survey may be needed. This conservation measure is not certain to occur.

5. Evaluate, restore, and create habitat.

Cooperators will seek opportunities for restoring and/or creating habitat on private or public lands, however Federal lands are not covered by the assurances provided in this CCAA. Baseline data regarding habitat suitability are needed before any habitat modification efforts can begin. Restoration activities may include removing or modifying springhead impoundments, adding substrate preferred by Page springsnails, and eradication of non-native species. Consideration should be given to water quality (i.e., dissolved CO₂, dissolved O₂, and temperature), predator density, condition of the springhead (i.e., whether it is inundated or free-flowing), property ownership, and economic or cultural impact when evaluating sites. The feasibility and likelihood of success should be assessed before extensive remediation efforts are initiated to avoid unnecessary ecological damage, take, and waste of financial resources. When possible, habitat restoration and renovation activities will be conducted incrementally or experimentally. Efforts will be expanded if activities are determined to be beneficial. Specifically, the following sites will be evaluated as funding allows: Ash Tree Spring, outflow near Bubbling Springs Pond, Page (Cave) Springs, Bass House Springs, Shea Springs (Tavasci Marsh), Lo Lo Mai Springs, Turtle Springs, and other springs and ponds on the property of willing owners that are part of the Oak Creek springs complex. This action is dependent upon funding and is not certain to occur.

6. Identify source population(s) and translocate Page springsnails *OR* discover unknown extant populations.

Portions of this conservation measure are already supported by agency base funding. Accordingly, we believe surveys to attempt to discover unknown populations are certain to occur, but translocations are not certain to occur.

- A) Identify a population or populations of Page springsnails that can be used as a source for re-establishment efforts. AGFD and FWS will establish a protocol determining the number of individuals needed for re-establishment efforts, transportation between sites, benchmarks for measuring translocation success, and post-release monitoring.
- B) Translocate Page springsnails to suitable sites. Before the species can be translocated, release sites will have to be identified and evaluated, project funding secured, donor population(s) located, an AGFD Environmental Assessment Checklist completed, and transportation guidelines established by AGFD and FWS. Other factors to be considered prior to translocation or re-establishment include the following: presence of non-native species and the ability to remove them, risk of introducing exotic pathogens or parasites, displacement of other endemic aquatic species, likelihood of survivorship, impact on donor populations, economic and cultural impact, and wildlife-recreation conflicts. An important 2004 study indicated that significant genetic divergence exists between populations at the Page Springs Hatchery and the population at Bubbling Springs Pond (Hurt 2004). These populations should be managed separately and efforts should be made to preserve their genetic integrity.

- C) With the help of private landowners, discover (through explorative surveys) new populations within the historical range of the species. Working with private landowners will be a critical component of this conservation measure as there are many springs that may harbor populations of Page springsnails.

Additional Measures to Minimize Incidental Take:

We believe all of the following are certain to occur.

- On AGFD properties, within the immediate area of a springhead, no more than 10% of aquatic, springsnail-occupied habitat will be disturbed in the process of monitoring spring flow, maintaining channel integrity, surveying for Page springsnails, or removing submergent or emergent vegetation, or debris (natural or un-natural) in the water. Any rocks, submergent vegetation, or other debris (natural or un-natural) removed from the water will be inspected for Page springsnails, and if present, temporarily held in water at the same site until the Page springsnails disperse. Improvements or modifications within the designated area will be incremental, and will not affect greater than 10% of springsnail habitat within a six month period.
- The results of biological monitoring efforts will be captured in annual reports beginning in 2009 or 2010, and copies will be made available to all Cooperators.
- Notification that incidental take is likely to occur must be provided to the FWS at least 30 days in advance of the action.
- Cooperators will give 45 days written notice to the other Cooperators of any intent to terminate the CCAA or Certificate Inclusion, and must give the FWS an opportunity to relocate affected species within ten days of the notice.

ACTION AREA

The action area is the Oak Creek and Spring Creek watersheds of Central Arizona. The initial enrolled lands include the seeps, springs, canals, and artificial water diversions/ impoundments on AGFD properties (See Figure 1 in CCAA):

Arizona Game and Fish Department
 Bubbling Pond and Page Springs Hatcheries, Yavapai County, Section 23, Township 16N,
 Range 4E. For approximate UTM coordinates see Table 1 in CCAA.

1600 N. Page Springs Road
 Cornville, Arizona
 86325-9738

The AGFD has the authority to enroll Participating Landowners throughout the range of the Page springsnail through CIs. This includes all known, and potentially unknown, spring-fed

ecosystems on private properties within the Oak Creek and Spring Creek watersheds in Yavapai County, particularly near the communities of Page Springs and Cornville.

STATUS OF THE SPECIES

Page springsnail

Hershler and Landye (1988) described the Page springsnail as a medium sized hydrobiid, with a shell height of 0.07 to 0.11 in (1.8 to 2.9 mm). Like many terrestrial and aquatic snails, the Page springsnail's defining characteristic is the male genitalia.

The Page springsnail occurs in springs, seeps, marshes, spring pools, outflows, and diverse lotic (flowing) waters, at approximately 3,510 ft (1070 m) elevation. The most common habitat is a rheocrene, or a spring emerging from the ground as a flowing stream. Habitats of hydrobiid snails are isolated, mid-elevation, permanently saturated, spring-fed aquatic climax communities commonly described as ciénegas (Hendrickson and Minckley 1984). The substrate is typically firm and consists of cobble, gravel, woody debris, and aquatic vegetation. These substrates provide a suitable surface for grazing and egg laying (Taylor 1987, Hershler 1998). Unmodified habitats exhibiting natural integrity are generally free-flowing. In modified habitats, spring vents tend to be inundated with deep water and the substrate around spring vents is typically dominated by sand and silt. *Pyrgulopsis* snails are rarely found on or in soft sediment (Hershler 1998).

The species was historically locally endemic to the Upper Verde River drainage of Arizona (Williams et al. 1985, Hershler and Landye 1988). The historical distribution was within a number of springs located in an approximately 0.93 mi (1.5 km) area adjacent to Oak Creek around the community of Page Springs, plus Shea Springs adjacent to Tavasci Marsh and Pecks Lake near Clarkdale. Springs within the Oak Creek Springs complex from which the species was known include Fry Springs, Lo Lo Mai Springs, Bubbling Springs, Turtle Springs, Bass House Spring, Page Springs, Cave Springs, Shea Springs, and a few unnamed springs and seeps.

The current range is a complex of springs within an area approximately one mile (0.62 km) in length along the west side of Oak Creek and in a small area along Spring Creek, a tributary of Oak Creek. Springs where the species is currently known to occur include the outflow channel of Lo Lo Mai Springs, a small area along Spring Creek, Bubbling Springs Pond, Cave (Page) Springs, Ash Tree Springs, and a few unnamed springs and seeps at Page Springs Hatchery. The species is believed to be extirpated from Shea Springs and Bass House Spring (but occurs in low numbers in a weir outflow near this site). Its status on private lands containing Fry Springs and Turtle Springs is unknown.

Aquatic vegetation typically associated with Page springsnail habitat includes watercress (*Nasturtium officinale*), duckweed (*Lemna minor*), water parsnip (*Berula erecta*), water pennywort (*Hydrocotyl venicillata*), water speedwell (*Veronica anagalli aquatica*), and dock (*Rumex verticillatus*). Prominent aquatic macrophytes found in Bubbling Springs include waterweed (*Elodea occidentalis*), pondweed (*Potamogeton gramineus*), and algae (*Rhizoclonium hieroglyphicum* and *Oscillatoria rubesens*). In limnocrene habitats, *Pyrgulopsis*

snails can be found on or at the base of wetland vegetation (Hershler 1998). Native aquatic invertebrates occurring within these springs include amphipods (*Crangonyx gracilis* and *Hyaella azteca*), caddisflies (*Protophila balmorhea* and *Metrichia volada*), other snails (*Physella virgata* and *Planorbella duiyi*), and an endemic species of leech (*Motobdella suddenness*) (Govedich et al. 1998). Dominant riparian vegetation along Oak Creek includes velvet ash (*Fraxinus velutina*), Fremont cottonwood (*Populus fremontii*), Arizona sycamore (*Plantanus wrightii*), willow (*Salix* spp.), mesquite (*Prosopis* spp.), walnut (*Juglans major*), and berry bush (*Rubus* spp.).

Proximity to spring vents seems to play a key role in the distribution of hydrobiids (Hershler 1984, 1998, O'Brien and Blinn 1999, Mladenka and Minshall 2001, Martinez and Thome 2006). Hydrobiids often exhibit dramatic declines in density downflow from spring sources, presumably due to their need for stable temperature, water chemistry, and flow regime characteristic of springheads (Hershler 1984, 1998). For instance, Hershler (1984) observed decreasing abundance of Hydrobiids in outflow channels at Cuatro Ciénegas, Coahuila, Mexico, and attributed the downstream decrease in springsnail numbers to changes in aquatic vegetation and algal composition and distribution. Martinez and Thome (2006) noted that the species appeared to be more abundant near spring vents, although Page springsnails have been found in spring outflow channels, water delivery ditches, and collection ponds associated with the Oak Creek Springs complex.

The Page springsnail is strictly aquatic and respiration occurs through internal gills. Most freshwater gastropods are herbivores or detritivores that consume algae, bacteria, and decaying organic material, or that passively ingest small invertebrates while feeding. Food is consumed by scraping from hard surfaces with a radula.

Pyrgulopsis snails are oviparous, though no quantitative information has been published on the reproductive biology of the Page springsnail. Anecdotal observation of size-class distribution data by FWS biologists suggests the species experienced a birth pulse during the spring of 2001. Additional research is needed to clarify the reproductive biology of the species. Many prosobranch snails are annual species that reproduce several times during the breeding period (spring-fall) with varying degrees of replacement of generations. Among many prosobranchs the larval stage is completed in the egg capsule and upon hatching tiny snails crawl out into their adult habitat (Brusca and Brusca 1990). The lifespan of the Page springsnail is unknown, but for the majority of aquatic gastropods the usual lifespan is 9 to 15 months (Pennak 1989). Snails of the family Hydrobiidae are sexually dimorphic with females being characteristically larger and longer-lived than males.

Only limited information is available on population numbers of the Page springsnail, though the genus is known to exhibit high fecundity. Martinez and Sorensen (2007) found that Page springsnail populations were as high as 6,242 individuals within a rheocrene (spring emerges from the ground as a flowing stream) environment and as small as 2.055 m² (22.12 ft²) during the summer of 2001. AGFD conducted a survey of Bubbling Springs Pond in November 2001, and calculated a rough population estimate of over 40,900 springsnails for that site. Anecdotal field observations seem to suggest that Page springsnail densities are higher in rheocrene environments versus ponded environments, but this phenomenon needs further investigation.

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 proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the 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.

Status of the species in the action area and factors affecting the species environment within the action area

The species' range is wholly contained within the action area, which is defined as the Oak Creek and Spring Creek watersheds of central Arizona. Several spring sites harboring the species are located on the Page Springs and Bubbling Ponds Hatcheries, which is the minimum land base that would be enrolled under the permit. The Page Springs hatchery is a cold-water facility dedicated to the production of rainbow trout (*Oncorhynchus mykiss*), while Bubbling Ponds hatchery is a warm-water facility now dedicated to the production of native fishes. Additionally, private landowners reside in the area in semi-rural lifestyles, including ranching and agricultural activities

Residential development is currently planned for the area around Spring Creek. This development will result in placement of impermeable surfaces (i.e., asphalt and concrete) near the creek, further groundwater withdrawals, and an increase in human use of the area. Specific effects are difficult to predict, but may include introduction of pollutants from urban runoff (i.e. motor oil, pesticides, etc.), increased stress on the regional water table or aquifer that supports these springs, and habitat modification from human and pet trampling.

At least six springs where the species occurs, or occurred, have been subject to some level of modification to meet domestic, agricultural, ranching, fish hatchery, and recreational needs. Human activity has contributed to widespread modification of the species' habitats resulting in the loss of natural springhead integrity and, in some instances, the entire elimination of the aquatic environment.

Physical and mechanical hand removal of emergent and submerged native or nonnative vegetation (including algae) and organic debris can modify or destroy Page springsnail habitat. Aquatic vegetation and algae have been removed from springs (Raisanen 1991). This activity can result in direct mortality from crushing and desiccation, and indirect mortality through habitat and water quality changes.

Groundwater withdrawal is a potential concern in the foreseeable future and has been implicated in the decline of other freshwater mollusks, including other springsnails (Landye 1973, 1981). Blasch et al. (2006) suggests that groundwater storage in the Verde River Watershed has already declined due to groundwater pumping and reductions in natural channel recharge resulting from streamflow diversions. If pumping of the aquifer were to substantially alter water flow toward

the Oak Creek Springs complex, much of the habitat currently occupied by the Page springsnail could be adversely affected or eliminated.

Water quality degradation through the use of toxic substances is also a current factor threatening the Page springsnail. Several springs have undergone various chemical and physical treatments to reduce the spread of fish diseases and parasites, including dewatering and disinfection (Landye 1981, AGFD 1991, 1998).

We believe the aggregate effects of habitat modification and other stressors within the current range of the Page springsnail are responsible for the present precarious status of the species.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

We anticipate that the potential issuance of the Permit, coupled with the implementation of the CCAA, will provide conservation benefits to the Page springsnail by reducing and/or eliminating threats. The purpose of the CCAA is to join AGFD with the FWS to implement conservation measures by establishing a population survey and monitoring protocol, protecting existing habitat from further degradation, restoring degraded habitat, and reintroducing the species to its historical range. Furthermore, through CIs, the CCAA seeks to include willing landowners to assist with the conservation of the Page springsnail. Benefits to the Page springsnail are expected to occur through the implementation of the conservation measures.

AGFD and Participating Landowners will prevent future detrimental habitat modification at known localities, which is expected to allow populations to persist. Notification requirements will allow AGFD and FWS an opportunity to evaluate management alternatives and rescue and relocate individuals prior to habitat disturbance. We anticipate habitat disturbance may result from springhead modification, aquatic vegetation removal, and introduction of pesticides and/or contaminants, which are activities authorized under the Permit and its attendant CCAA. Additionally, removal of native or non-native aquatic vegetation and organic debris will also result in direct mortality from crushing or desiccation, and indirect mortality through habitat loss and water quality changes.

Habitat modification authorized under the Permit and its CCAA is not expected to result in major adverse effects, such as the permanent loss of suitable habitat within an entire spring system or the loss of an entire population. No more than 10% of aquatic, springsnail-occupied habitat will be disturbed during management activities. Furthermore, Page springsnails removed during management will be salvaged.

Results of research investigations and monitoring programs could guide the development of future management strategies. This would allow landowners and managers to continue to modify actions on their property to reduce and/or eliminate adverse effects to Page springsnail.

The overall quantity of Page springsnail habitat may be increased through creation, restoration, and translocation. If this occurs, it is anticipated to increase populations of Page springsnails and provide protection against catastrophic events that could kill large numbers of the species or result in a site becoming uninhabitable.

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 conference 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 ESA.

Groundwater pumping and mining from the aquifer feeding the springs could be a great threat to the Page springsnail's habitat, especially if climate change affects water resources. Drought conditions and groundwater pumping may play a role in recent declines in spring flow at Page Spring (Mitchell 2001). Since 1997, Arizona Department of Water Resources records show that three wells have been drilled in close proximity and upgradient of Cave (Page) Spring. Two of these wells pump between 4.5 and 5.7 m³ (1200 - 1500 gallons) per minute, and are within 1.2 km (0.75 mi.) of Cave (Page) Spring. Given their proximity, production rate, and hydrological connectivity, groundwater withdrawal by these wells could have a direct impact on spring flow (Mitchell 2001). Additionally, the majority of wells in the Page Spring area tap the aquifer that supports the Oak Creek Springs complex (Mitchell 2001). The number of wells is likely to increase in the future as human populations grow in the Verde Valley.

A 1997 study indicated that the groundwater system of the Verde Valley, particularly the Verde Formation and underlying Supai Formation, had not yet been affected by development (Koniowski and Leake 1997). A 1996 study indicated groundwater pumping in the Verde Valley was probably less than 24,670 m³ (20,000 acre-feet) per year (McGavock 1996). The base flow in the Verde River north of Clarkdale has remained virtually unchanged since 1915 (Owen-Joyce and Bell 1983). However, municipal and industrial reliance on groundwater continues to grow in the Verde Valley, and future water levels and stream base flows will eventually be affected (Owen-Joyce and Bell 1983, McGavock 1996, Koniowski and Leake 1997). Blasch et al. (2006) suggests that groundwater storage in the Verde River Watershed has already declined due to groundwater pumping and reductions in natural channel recharge resulting from streamflow diversions. Accordingly, it is reasonable to expect some level of effect to Page springsnail habitats in the future. However, we cannot reliably predict the magnitude or imminence of this threat at this time.

CONCLUSION

After reviewing the current status of the Page springsnail, the environmental baseline for the action area, the effects of the potential issuance of an enhancement of survival permit, and the

cumulative effects, it is the FWS's conference opinion that the issuance of the permit, as proposed, is not likely to jeopardize the continued existence of the Page springsnail. We base these conclusions on the following:

1. The CCAA contains conservation measures aimed at protecting the Page springsnail and its habitat on the Page Springs and Bubbling Springs Hatcheries. The conservation measures to be undertaken will reduce and/or eliminate threats to the species and improve its conservation status. Conservation measures that are certain to occur on State property include:
 - (1) prevent future detrimental habitat modification and effects to individuals at known localities,
 - (2) implement monitoring programs, and
 - (3) survey to attempt to discover unknown populations.

Other conservation measures may occur but are not certain (not listed here); we do not rely on these additional conservation measures in reaching our non-jeopardy determination.

2. The AGFD will proactively pursue conservation on other private lands through Certificates of Inclusion.
3. Although groundwater pumping is a threat, at this time we cannot predict with certainty that it will negatively affect the Page springsnail and its habitats. As results of monitoring are compiled, this conclusion may need to be reevaluated.

The conclusions of this conference opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including these Conservation Measures that were incorporated into the project design and are certain to occur (i.e. have a firm commitment through dedicated funding or other means).

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA 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 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 ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

Because springsnails exhibit high fecundity we believe that the limiting factor for their continued survival is the provision of suitable habitat. Accordingly, for actions that may affect habitat we are quantifying take in terms of habitat area. Vegetation removal and habitat management on the fish hatcheries will result in incidental take of Page springsnails. The CCAA contains provisions to limit the effects of these activities to only 10% of occupied habitat at any given site within a six month period. Still, considering the local abundance of Page springsnails, this could result in harm or mortality to hundreds of individual snails.

Take may also occur from translocations. We expect take from translocations, in the form of direct handling, to number in the hundreds to thousands of individual springsnails. We do not expect take from handling to result in significant harm or mortality, as we anticipate translocated springsnails will exhibit high survivorship. However, since we have limited experience and cannot reliably predict the number of snails that may die during handling, we are authorizing lethal take for 10% of all springsnails translocated.

EFFECT OF THE TAKE

In this conference opinion, the FWS has determined that this level of anticipated take is not likely to result in jeopardy to the species.

Although thousands of Page springsnails may be taken, we do not expect any detrimental effects to population viability. For species that exhibit high fecundity, such as the Page springsnail, the long-term protection and maintenance of habitat for breeding and foraging outweighs the loss of individuals. Additionally, the AGFD has committed to salvaging Page springsnails during any management operation that may result in take. Accordingly, we anticipate that the expected incidental take will not negatively affect long term survival of the species through population declines because of the species' high fecundity and resilience wherever suitable habitat persists.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the Permittee must comply with the following terms and conditions, which implement the reasonable and prudent measure described below and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The FWS shall require that the Permittee comply with and implement the issued section 10(a)(1)(A) enhancement of survival permit and the CCAA, and require the Permittee to report their findings.

- a. The FWS shall include the CCAA's conservation measures in the issued permit.
- b. Information obtained from pertinent monitoring operations will be reported by the Permittee and made available to the FWS. Reports will include information regarding population monitoring, take, and all other actions undertaken to implement the CCAA. Reports will be completed annually for the term of the permit.

Review requirement: The reasonable and prudent measure, with the implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA 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. Prior to conducting habitat restoration and/or creation for the Page springsnail, AGFD should evaluate any potential effects to Mexican gartersnakes and lowland leopard frogs.

REINITIATION NOTICE

This concludes the conference for the approval and implementation of the CCAA and the potential issuance of a Section 10(a)(1)(A) permit. You may ask this office to confirm the conference opinion as a biological opinion if the Page springsnail is listed. The request must be in writing. After review of the proposed action, if we find there have been no significant changes in the action as planned or in the information used during the conference, we will confirm the conference opinion as the biological opinion for the project and no further section 7 consultation will be necessary.

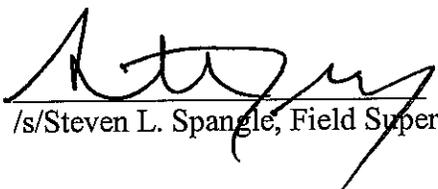
After listing as threatened or endangered and any subsequent adoption of this conference opinion, the Federal agency shall request reinitiation of consultation if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect the species in a manner or to an extent not considered in the conference opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the species that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the proposed species has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. Although not required, we recommend implementation of the reasonable and prudent measure and terms and conditions herein prior to a

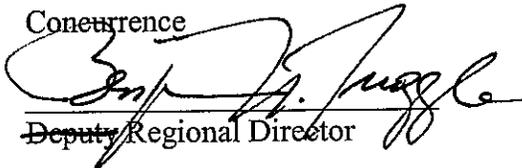
listing decision. If the species is subsequently listed, implementation of reasonable prudent measures and terms and conditions in any conference opinion adopted as a biological opinion, is mandatory.

This concludes formal conferencing on the action outlined in the 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.

If you have questions regarding this Conference Opinion or the CCAA, please contact Mike Martinez (x224) or Debra Bills (x239). Please refer to consultation number 22410-2009-FC-0239 in future correspondence concerning this project.


/s/Steven L. Spangle, Field Supervisor

8/4/2009
Date

Concurrence

Deputy Regional Director

10/7/09
Date

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