City of Benson
City Council Communication

Regular Meeting **April 11, 2016**

To: Mayor and Council Agenda Item # 3

From: Joe DelVecchio PGA, Director of Golf Operations
San Pedro Golf Course

Subject:

Discussion and possible action regarding Resolution 7-2016 of the Mayor and Council of the City of Benson, Arizona, approving the Safe Harbor Agreement for Topminnows and Pupfish in Arizona between the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service and the City of Benson

Discussion:

At the Council meeting on February 8, 2016, Council considered Resolution 7-2016 approving the Safe Harbor Agreement between the Arizona Game and Fish Department and the U.S. Fish and Wildlife Service and the City. This agreement would allow the introduction of an endangered fish species in the pond on Hole 9 at the San Pedro Golf Course.

During the process of preparing the lake for the introduction of these fish, there will be a chance to improve the lake surrounds, bringing the water feature up-to-date with current golf course designs. The lake will be cleaned out and railroad tie edging will be installed on the fairway side, improving the looks and maintenance requirements of the area. The green side area that has been sinking will also be corrected, greatly improving the maintenance and playability of the hole.

Council discussion included the term of the agreement and if it would be an issue should the City ever sell the golf course, the 30-day notification to the Game and Fish before any activity that would result in loss of the fish and reporting requirements. Council then agreed it would be beneficial to have a more detailed presentation from the Game and Fish Department to make sure Council had all the information and knew what the responsibilities and ramifications of the agreement are; tabling the item until a presentation could be scheduled.

A representative from the Game and Fish Department then gave Council a formal presentation at the Council meeting on March 28, 2016 answering and addressing Council questions and concerns. The resolution was not approved, with the vote being tied 3-3. Mayor King has now asked for this item to be brought back to Council for reconsideration.

Staff Recommendation:

Approval of Resolution 7-2016

RESOLUTION 7-2016

A RESOLUTION OF THE MAYOR AND COUNCIL OF THE CITY OF BENSON, ARIZONA, APPROVING THE SAFE HARBOR AGREEMENT FOR TOPMINNOWS AND PUPFISH IN ARIZONA BETWEEN THE ARIZONA GAME AND FISH DEPARTMENT AND THE U.S. WILDLIFE SERVICE AND THE CITY OF BENSON

WHEREAS, the Gila Topminnow and Desert Pupfish are two of 36 species that historically inhabited Arizona's waters prior to European-American settlement; and

WHEREAS, historically, topminnow were the most abundant fish species in the entire Gila River basin, occupying river systems from western New Mexico to southern and western Arizona, while Desert pupfish, not as common and widespread, occurred in portions of the lower Gila River basin, including the Salt, San Pedro, and Santa Cruz rivers as well as occurring along much of the lower Colorado River, from the Colorado River delta in the Gulf of California to current day Needles, California; and

WHEREAS, habitat loss and degradation resulted in the topminnow and pupfish populations rapidly decreasing despite their once broad distribution; with these fish currently inhabiting a fraction of their historic range. By the early 1900s, pupfish no longer existed in the wild in Arizona (with the exception of Quitoboquito), and Gila topminnow were reduced to only 14 locations; and

WHEREAS, the rapidly declining topminnow populations, and the likelihood of complete extinction, the Gila topminnow was federally listed as endangered in 1967 and two decades later, the desert pupfish was federally listed as endangered in 1986. Designating these species as endangered provided funding and defined actions or tools to be used for both topminnow and pupfish recovery. A recovery plan was drafted and accepted for each species; and

WHEREAS, using recommendations from the species' recovery plans, the Arizona Game and Fish Department and its partners are taking steps to increase populations of these species in hopes of removing them from the Endangered Species list in the future. Partner organizations include the U.S. Fish and Wildlife Service; U.S. Forest Service; Bureau of Land Management; U.S. Bureau of Reclamation; The Nature Conservancy; Native American tribes; state, county, and city agencies; private landowners, leasees and permittees; universities; non-governmental organizations; and, volunteers.

NOW, THEREFORE, BE IT RESOLVED by the Mayor and Council of the City of Benson as follows:

1. The "Safe Harbor Agreement for Topminnows and Pupfish in Arizona" attached hereto as Exhibit "A" is hereby approved and adopted.

2. The City Manager is hereby authorized to execute the above-titled Agreement on behalf of the City of Benson.

3. City Staff are directed to take such necessary and reasonable actions to put into effect the terms and conditions of the above-titled Agreement.

PASSED AND ADOPTED BY THE MAYOR AND COUNCIL OF THE CITY OF BENSON, ARIZONA, this 11th day of April, 2016.

_____
TONEY D. KING SR., Mayor

ATTEST:

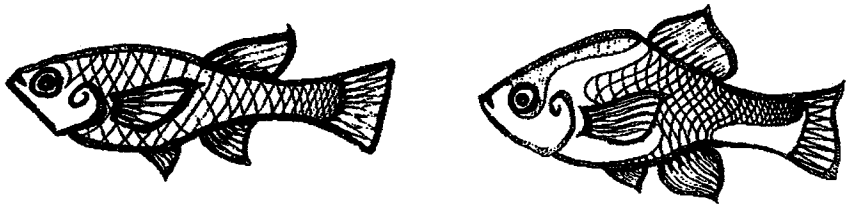
_____
VICKI L. VIVIAN, CMC, City Clerk

APPROVED AS TO FORM:

_____
MESCH, CLARK & ROTHSCHILD
By GARY J. COHEN
City's Attorney

SAFE HARBOR AGREEMENT
FOR TOPMINNOWS AND PUPFISH IN ARIZONA

Between Arizona Game and Fish Department
and the U.S. Fish and Wildlife Service



Prepared By:
Arizona Game and Fish Department
2221 West Greenway Road
Phoenix, Arizona 85023-4399

December 3, 2007

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Arizona Game and Fish Department
Office of the Deputy Director, DOHQ
2221 West Greenway Road
Phoenix, Arizona 85023-4399
(602) 789-3290

or

The Office for Diversity and Civil Rights
U.S. Fish and Wildlife Service
4040 North Fairfax Drive, Suite 130
Arlington, Virginia 22203

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RECOMMENDED CITATION

Arizona Game and Fish Department. 2007. Safe Harbor Agreement for topminnows and pupfish in Arizona. Arizona Game and Fish Department, Phoenix, Arizona.

COVER ILLUSTRATIONS

Marco Mazzoni

PROJECT FUNDING

Funding for this project was provided by: the Arizona Game and Fish Department's Heritage Fund; voluntary contributions to Arizona's Nongame Wildlife Checkoff; hunting and fishing license revenues; State Wildlife Grants, and Section 6 of the Endangered Species Act.

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1.0 INTRODUCTION

This Safe Harbor Agreement (Agreement) between the U.S. Department of the Interior Fish and Wildlife Service (Service or USFWS) and the Arizona Game and Fish Department (Department) has been developed under the Service's Safe Harbor Agreement final regulations (USFWS/NMFS 1999a) and final policy (USFWS/NMFS 1999b). This Agreement implements the intent of the Service and the Department to follow the procedural and substantive requirements of Section 10(a)(1)(A) of the Endangered Species Act (ESA) of 1973, as amended.

This Agreement covers the historical ranges of Gila topminnow (*Poeciliopsis occidentalis*), Yaqui topminnow (*Poeciliopsis sonoriensis*), desert pupfish (*Cyprinodon macularius*), and Quitobaquito pupfish (*Cyprinodon eremus*) on non-federal lands in Arizona (Appendix 1). In Arizona, Gila topminnow's historical range is the Gila River basin, below about 5200 feet in elevation (Minckley 1999). Yaqui topminnow is restricted to the Yaqui River drainage in southeastern Arizona (USFWS 1994). The historical range in Arizona for desert pupfish is the Gila River basin, below 5000 feet in elevation, including the "Gila, Santa Cruz, San Pedro, and Salt Rivers; and the lower Colorado River...downstream from the vicinity of Needles" (USFWS 1993:2). The other extant species of pupfish native to Arizona, Quitobaquito pupfish, occurs in Quitobaquito Spring in the Rio Sonoyta drainage.

Under this Agreement, the Department will issue Certificates of Inclusion to non-Federal property owners (Cooperators) who voluntarily agree to carry out conservation efforts for the benefit of topminnow and pupfish. In return for voluntary conservation commitments, the Agreement will extend assurances to the Cooperator allowing future alteration or modification of the enrolled property back to its original baseline condition. Without this cooperative Federal and non-Federal effort, the enrolled lands would not likely be used by these species in the foreseeable future.

When signed, this Agreement will serve as a basis for the Service to issue a permit under ESA Section 10(a)(1)(A) for the take of covered, listed species associated with the potential future return of the enrolled lands to baseline condition. The permit will authorize take of individuals of the species that are reestablished to the enrolled lands or have increased in numbers or distribution on those lands as a result of voluntary conservation activities. The Service and the Department anticipate that the maximum level of take authorized under this Agreement and permit will never be realized. Permit issuance will not preclude the need to abide by all other Federal, State, and local laws and regulations that may apply.

2.0 BACKGROUND

Although once common throughout most of the Gila River basin (below 5200 feet in elevation), the Gila topminnow and desert pupfish now naturally occur in only a fraction of their historical range (USFWS 1993, USFWS *in prep.*). Both topminnows and pupfish are Federally listed under the ESA as endangered throughout their ranges in the United

States (USFWS 1967 and USFWS 1986, respectively). The topminnow listing included both the Gila and Yaqui topminnows, and the desert pupfish listing included both the desert and Quitobaquito pupfish. Habitat loss and alteration and the introduction of nonnative fishes have contributed to declines in natural populations of these four species (Weedman and Young 1997). The location of natural and reestablished populations of topminnow and pupfish, along with life history information, can be found in their respective recovery plans (USFWS 1993, USFWS 1994; Weedman 1999).

2.1 Purpose and need for action

This Agreement is a mechanism to promote the establishment or maintenance of suitable habitat in to which topminnow and pupfish populations may be established. Past efforts by the Department, Service, Bureau of Land Management, and U.S. Forest Service to reestablish Gila topminnow and desert pupfish populations met with varying degrees of success, possibly due to poor site selection (Weedman and Young 1997).

One factor limiting topminnow and pupfish recovery is availability of suitable habitat. Permanent water sources, free of nonnative predators and within the species' historical ranges, are necessary for successful establishment of topminnow and pupfish populations. Task 2 in the Desert Pupfish Recovery Plan states that "efforts should be made to reestablish pupfish into a diversity of habitat types reflective of those occupied historically" (USFWS 1993).Criteria necessary for recovery of Gila topminnow, as listed in the draft revised Gila Topminnow Recovery Plan (Weedman 1999), include reestablishment in suitable habitats following geographic and other guidelines.

A need also exists to provide public health and safety via mosquito control. Every summer, natural and artificial water sources in southern and central Arizona act as breeding grounds for mosquitos, which are vectors for transmission of encephalitis and other diseases. Although nonnative mosquitofish (*Gambusia affinis*) have traditionally been stocked into these habitats for mosquito control, the Gila topminnow is as effective for mosquito control as mosquitofish (Childs 2001; 2006). Desert pupfish have also demonstrated effectiveness in mosquito control (Walters and Legner 1980). Establishing topminnow and pupfish populations in these types of habitats would serve to protect public health while assisting in the recovery programs for these endangered fishes.

2.2 Importance of non-Federal lands

Recovery plans for topminnows and pupfish list their reestablishment into suitable habitats within their historical ranges as recovery objectives or tasks (USFWS 1993, USFWS 1994; USFWS *in prep.*). Maintenance of refuge populations in natural, semi-natural, or artificial habitats would aid in recovery efforts. The use of non-Federal lands for reestablishment efforts will provide:

1. Additional suitable aquatic habitats that have previously been largely unavailable for reestablishment of topminnow and pupfish populations;

2. Opportunities to increase public awareness of conservation needs for native fishes;

3. Opportunities to use native fish for mosquito control while reducing or eliminating use of the nonnative mosquitofish; and

4. Opportunities to develop new partnerships among Federal, State, and non-Federal property owners and improve conservation efforts for threatened and endangered species.

Under the Permit, participating Cooperators enrolled with the Department under this Agreement will receive a Certificate of Inclusion (Appendix 2). The Certificate of Inclusion will include:

1. A map of the property and the portion of the property to be enrolled;

2. Baseline condition of the property as agreed upon by all parties, including a thorough habitat analysis of the enrolled property conducted by the Department, or other qualified parties approved by the Department; and

3. The specific responsibilities of the Cooperator, the Department, and the Service.

This Agreement is a voluntary partnership among the Service, the Department, and non-Federal property owners receiving Certificates of Inclusion under the Permit. It is expected that each party is committed to this Agreement and intends to implement it.

3.0 Species and Habitats to be Covered in this Agreement

The scope of this Agreement covers all non-Federal lands in the State of Arizona within the historical ranges of the topminnows and pupfish, excluding Native American lands (Appendix 1). Properties enrolled in this Agreement will be examined by the Department or other qualified individuals to determine habitat suitability. The Department will verify habitat suitability, approve sites, document baseline conditions, and determine

populations to be used as a source for stocking at approved sites in consultation with the Service, as identified in each species' recovery plan (USFWS 1993, 1994; Weedman 1999).

3.1 Species covered by the Agreement

This Agreement covers Gila topminnow, Yaqui topminnow, desert pupfish, and Quitobaquito pupfish.

3.2 Habitats covered by the Agreement

Topminnows and pupfish have historically occupied a variety of habitat types (Weedman and Young 1997). In general, suitable habitat consists of relatively shallow (40 inches in depth), slow-moving water along stream or river margins, ponds, cienegas, and springs (USFWS 1993, 1994; Weedman 1999). The species are associated with aquatic or streamside vegetation, algal mats, and organic debris; they are also adapted to environmental extremes (water salinity and temperature, flooding, etc.) (USFWS 1993, 1994; Weedman 1999).

This Agreement covers all habitats occurring on non-Federal land within the historical ranges of topminnow and pupfish in Arizona including, but not limited to:

- Natural habitats such as springs, marshes, and streams;
- Artificial habitats such as water treatment facilities, artificial wetlands, golf course ponds, and residential water features.

Although the upper elevational range of topminnows and pupfish is considered to be generally below 5200 feet (USFWS 1993, Minckley 1999), the Service will evaluate and (if appropriate) use potential sites that exist above that elevation on a case-by-case basis.

If fish have the potential to naturally spread to adjacent landowners' properties, the sites will not be used, unless potentially affected adjacent landowners have been given the opportunity to voluntarily participate by signing a Certificate of Inclusion. The potential for fish to spread will be determined using the following criteria:

- The water to be stocked is not hydrologically connected to other waters; or
- If the water to be stocked were to be breached by flooding, any fish being moved or moving from the site would not reach suitable habitat.

How the site to be enrolled meets these criteria will be documented in Section 5.B of each Certificate of Inclusion. Ensuring that sites meet these criteria will eliminate potential conflicts with adjacent landowners that do not wish to participate in this voluntary Agreement. In certain cases, coordination and compliance with Federal land management agencies may also be necessary if fish

have the potential to naturally disperse from habitats covered under this Agreement onto Federal lands.

The property owners who participate in this Agreement may include, but are not limited to:

- Private citizens
- Non-governmental organizations;
- State, county, and local vector control agencies;
- State, city, or county land and water management divisions;
- State, county, and municipal parks;
- Private corporations; and
- The Arizona Game and Fish Commission (as signatory to this Agreement, the Department will enroll aquatic sites on Wildlife Areas or other Arizona Game and Fish Commission properties on a case-by-case basis under separate Certificates of Inclusion).

4.0 OBLIGATIONS OF THE PARTIES

In addition to the following stipulations, all parties will work cooperatively on other issues as necessary to further the purposes of this Agreement. Moreover, nothing in this Agreement shall limit the ability of Federal and State conservation authorities to perform their lawful duties and conduct investigations as authorized by statute and by court guidance and direction. The following are the obligations of the Service, the Department, and Cooperators.

4.1 U.S. Fish and Wildlife Service – Arizona Ecological Services Office shall:

1. Provide technical assistance and provide information on Federal funding programs.

2. Assume no jurisdiction over the premises by the Agreement. The Service assumes no liability for damage except that resulting from its own negligence on the properties covered under this Agreement as authorized by the Federal Tort Claims Act (28 USC 2671-80).

3. Assume no liability to restore the property to its prior condition upon termination or expiration of this Agreement.

4. Issue an Enhancement of Survival Permit to the Department under ESA Section 10(a)(1)(A), authorizing incidental take of the covered species as a result of lawful activities within the enrolled property upon execution of the Agreement and satisfaction of all other applicable legal requirements. The term of the permit will be 50 years, after which time the permit may be renewed if agreed upon by all parties.

5. Provide topminnows and pupfish (or coordinate for appropriate genetic stock to be provided via another agent, such as the Department).

6. Ensure the Department is implementing the terms of the Agreement.

7. Assist the Department with compliance monitoring and biological monitoring, as necessary, contingent on availability of funds.

4.2 Arizona Game and Fish Department shall:

1. Coordinate with non-Federal property owners to determine site suitability.

2. Provide technical advice and assistance with obtaining necessary State permits that may be required to fulfill the terms of this Agreement.

3. Coordinate with the Service to determine the appropriate source of fish to be stocked at each property, and conduct stocking or augmentation.

4. Coordinate with Cooperators and the Service to determine a schedule for monitoring and reporting on compliance, as identified in Section 9 of this Agreement.

5. Conduct compliance monitoring on Cooperators' properties as identified in Section 9 of this Agreement, contingent on availability of funds.

6. Conduct biological monitoring as deemed necessary by each party, or as funds remain available to the Department to conduct monitoring.

7. Notify the Service before any planned action that will result in complete loss of a population. The Department agrees to notify the Service within five days of receipt of notice from the Cooperator of any such planned action.

4.3 The Service and Department mutually agree that Cooperators shall:

1. Retain all rights to control trespass and access, and retain all responsibility for taxes, assessments, and damage claims pertaining to ownership or management of the property.

2. Guarantee ownership of the land and warrant that there are no outstanding rights that interfere with this Agreement.

3. Agree to notify the Department of planned or pending ownership changes at least 60 days in advance. A change of ownership shall not change the terms of this Agreement, which shall remain in effect on the described

property for the duration of the period specified if the new landowner agrees.

4. Notify the Department 30 days in advance of any planned activity that may result in complete loss of the population as defined in Section 8.1 on the enrolled lands, and provide the Department the opportunity to capture and relocate individuals, if warranted.

5. Notify the Department 15 days in advance of any planned activity that may result in take of the species (but would not result in complete loss of the population) as defined in Section 8.1 on the enrolled lands, and provide the Department or its authorized representative the opportunity to capture and relocate individuals, if warranted.

6. Allow the Department or its authorized representative, access to the project site, upon reasonable notification by the Department, for agreed upon wildlife habitat development and management purposes, to inspect work completed, to perform biological monitoring, and to augment the population if necessary, pursuant to Section 3 of the Certificate of Inclusion. All Department employees will be in uniform and all Department representatives will have proper identification as government employees, agents, or assignees.

7. Allow the Service (its members, agents, or assignees) access to the project site, upon reasonable notification by the Service, to perform compliance monitoring, as necessary. At least one Service representative will be in uniform, and all will have proper identification as government employees, agents, or assignees.

8. Prevent or otherwise minimize and control the introduction of nonnative competitors or predators or potential disease vectors into enrolled properties via the following measures: (i) commitment by Cooperators to not knowingly engage in releases of nonnative species into habitats on participating properties; (ii) commitment by Cooperators to report any observed occurrences of such species in native fish habitat on participating properties to the Department; (iii) commitment by Cooperators to permit access to their land by appropriate personnel necessary to implement control programs (subject to reasonable advance notice and approval); and (iv) where appropriate, and subject to their concurrence, agreement by Cooperators to conduct control measures when requested by the Department (e.g. temporarily drying out stock tanks that support such species). Any such control measures, however, must be compatible with assurances provided to the Cooperator in the Agreement.

9. Agree to not transport any topminnows or pupfish from the stocked location to any other location.

10. Assume responsibility for securing any other permits or authorizations as needed to carry out this Agreement.

11. Coordinate with the Department to conduct annual population monitoring and reporting as identified in Section 9 of this Agreement.

12. Consider notifying adjacent landowners of the Certificate of Inclusion holder's participation in this Agreement for conservation of endangered fishes.

5.0 BASELINE CONDITION DETERMINATION

For a Cooperator to participate in this Agreement, the baseline condition of the property to be enrolled must be determined. Under the Service's Safe Harbor Agreement policy (USFWS/NMFS 1999b), baseline conditions are defined as "population estimates and distribution and/or habitat characteristics and determined area of the enrolled property that sustain seasonal or permanent use by the covered species at the time the Safe Harbor Agreement is executed between the Services and the property owner Before enrolling a potential participant, AGFD shall determine what species analyzed in the Biological Opinion are potentially present on a participant's property and may be impacted by Agreement activities. If suitable habitats for these species are not present, surveys (as described in 2.I.i.-v. below) are not required. Determinations on which species to survey for will be established for each site. These determinations and surveys results will be documented in each Certificate of Inclusion.

Properties requiring surveys will be surveyed by the Department or other qualified individuals to determine baseline conditions before issuance of a Certificate of Inclusion (Appendix 2). Baseline conditions will be determined and agreed to in writing by the Department and Cooperator, with concurrence from the Service. Baseline conditions may include habitat characteristics or species presence. Since topminnow and pupfish most likely do not currently occur on the lands to be covered in this Agreement, it is likely that baseline conditions on most properties covered under this Agreement will be zero.

Cooperator(s) may agree to an elevated baseline condition when appropriate and agreed upon if topminnows or pupfish do not already occur on that property. The Department, with Service concurrence, must determine if an elevated baseline condition at any particular site supports the goals of the Agreement and furthers the recovery of either or both species. Properties where an elevated baseline condition might be most appropriate are those that have natural or semi-natural aquatic habitats and where development of the property is not expected to occur in the foreseeable future. An elevated baseline condition indicates that the population will still exist when taken back to baseline conditions (with a baseline of zero, the population is eliminated when taken back to baseline conditions).

6.0 Net Conservation Benefit and Contribution to Recovery

The items listed below are specific tasks in the recovery plans intended to lead to recovery of these four species (USFWS 1993, USFWS 1994; Weedman 1999). The way in which populations established under the Agreement count toward recovery will be determined by the respective recovery plan.

Implementation of this Agreement will provide a net conservation benefit for topminnows and pupfish in the following ways:

1. Provide refuge populations as insurance against catastrophic loss of natural populations and as sources for future reestablishment efforts;
2. Safe Harbor populations may count towards downlisting and delisting criteria as specified in the recovery plans;
3. Reduce the need to stock mosquitofish, which have contributed to the decline of topminnows and are a continuing threat; and
4. Provide convenient sites for public education and information related to endangered species recovery, conservation of limited resources, and native aquatic ecology.

Net conservation benefit will be obtained through the increase in total numbers of existing populations of topminnows and pupfish. Additionally, use of topminnows in lieu of mosquitofish will decrease the spread of nonnative mosquitofish. Through the Agreement and implementation of elevated baseline conditions (likely to be considered for already existing suitable and secure habitats), it is anticipated that these populations will exist for longer periods of time, and may count toward downlisting and delisting criteria. A net conservation benefit is expected, whether or not landowners agree on an elevated baseline condition.

7.0 Duration

7.1 Agreement Duration

This Agreement and its associated Section 10(a)(1)(A) permit are in effect for a duration of 50 years following permit signature.[1] At the end of the permit term, properties covered under this Agreement may be taken back to baseline conditions (see Section 6.0) before the permit expires to avoid accruing additional take liability under the ESA. However, the permit and Agreement may be extended beyond the specified terms through amendment, upon agreement by all parties.

[1] If the species covered by this Agreement and its associated Section 10(a)(1)(A) permit are delisted federally, this Agreement and the Permit shall be terminated within 90 days by written notice from the Service to the Department, and within 90 days of receiving such notice the Department shall terminate by written notice to each Cooperator all Certificates of Inclusion pertaining to this Agreement.

If the Agreement (and the Department's Section 10(a)(1)(A) permit) expires without renewal:

1. A new agency or organization could apply for the Section 10(a)(1)(A) permit and issue Certificates of Inclusion to Cooperators; or

2. Cooperators could apply to receive their own Section 10(a)(1)(A) permit; or

3. Existing populations could be removed and relocated by the Department and the Service; or

4. Populations could be taken back to baseline conditions if the Department and the Service decide not to remove individuals.

7.2 Required Conservation Period

Each Certificate of Inclusion issued by the Department to a Cooperator must specify the time period during which the conservation measures identified in the Agreement will be maintained or implemented. This is termed the "required conservation period" and shall be agreed to by the Department and Cooperator.

The conservation period agreed to within individual Certificates of Inclusion will depend on several circumstances including whether or not the landowner has any future land use plans, whether or not conservation measures under the Agreement have included a material benefit to the landowner, and the landowner's comfort level. A minimum 10-year commitment is preferred under this Agreement, but longer periods are allowable and are encouraged. Any conservation period in excess of 10 years must have the consent of the Cooperator, and must be specified within the Cooperator's Certificate of Inclusion (Appendix 2).

In certain situations, a 10-year or longer commitment may not be practicable, and shorter commitments will be granted on a case-by-case basis. Such instances would include artificial habitats that are anticipated to be relatively temporary and require ongoing management to maintain.

The conservation commitments required under this Agreement include:

1. The Cooperator will grant permission to the Department to establish new populations of topminnows and/or pupfish on their lands at suitable sites;

2. The Cooperator will grant permission to the Department and Service to conduct biological and compliance monitoring as identified in Section 9 of this Agreement;

3. The Cooperator will complete any habitat improvement projects or actions agreed upon in the Agreement;

4. The Cooperator will implement the Take Minimization Measures described in Section 8.4; and

5. The Cooperator will provide appropriate notification as described in Section 9.2 through 9.4.

The required conservation period is considered the minimum to which a landowner must agree to obtain the program's regulatory assurances. However, the Department anticipates that some Cooperators will continue to implement most or all the Agreement's conservation commitments even after the required conservation period has been satisfied. This is because the Agreement's conservation program is specifically designed to be compatible with current or future land uses. Thus, in most cases Cooperators are expected to have little incentive or need to discontinue their commitments.

The Cooperator may request termination of their Certificate of Inclusion at any time for circumstances beyond their control, upon written notification to the Department. The Department then has up to 60 days to salvage topminnows and pupfish, if deemed necessary, in consultation with the Service. The Cooperator remains authorized for incidental take during the 60-day time period. At the end of the 60 days, the Certificate of Inclusion is terminated via written notification to the Cooperator and the Service.

Additionally, the Cooperator may terminate their Certificate of Inclusion for any other reason, upon written notification to the Department. However, such termination shall extinguish the Cooperator's authority to incidentally take topminnows or pupfish under the Enhancement of Survival Permit.

8.0 TAKE

Safe Harbor Agreements are written in anticipation of future incidental take of listed species. As defined in the ESA, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Section 9 of the ESA and Federal regulations prohibit take of Federally-listed fish and wildlife species without special exemption. Any incidental take of topminnows or pupfish that occurs as a result of a landowner's identified activities on properties covered under this Agreement would be authorized by the "Enhancement of Survival Permit" issued by the Service to the Department following Section 10(a)(1)(A) of the ESA. Incidental take is defined in 50 CFR 402.02 as "take of listed fish and wildlife species that results from, but is not the purpose of, carrying out any otherwise lawful activity conducted by a Federal agency or applicant." However, measures will be implemented to reduce levels of take. In addition, Cooperators must notify the Department 30 days before any action that

may result in incidental take of the entire population (see Section 8.4). Examples of management actions that may result in take are listed in Section 8.1 below.

8.1 Methods of Take

The following activities are among those that may result in take:

- Aquatic site maintenance;
- Actions to remove nonnative aquatic species;
- Monitoring of topminnow and pupfish populations as agreed upon in Section 9 of this Agreement; and
- Any normal day-to-day land use and management activity as agreed to by the Department and the Cooperator.

In addition to the activities listed above, extenuating factors beyond the landowner's control could result in loss of topminnows and pupfish. Examples of extenuating factors include, but are not limited to:

- Invasion and predation by native or nonnative species;
- Desiccation as a result of drought or flooding;
- Water quality fluctuations resulting from natural causes or outside sources; and
- Immediate responses to emergencies.

8.2 Extent of Take

The first two bulleted activities in Section 8.1 above could result in complete take of topminnows and pupfish from lands covered in this Agreement. The six remaining bulleted activities above are not expected to result in complete take of a population. Isolated individuals could be subject to take during these routine activities; however, it should be noted that none of the activities are expected to result in complete take due to measures to minimize and mitigate any negative impacts as identified in Section 8.4.

The possibility of invasion by nonnative aquatic species does exist and could result in partial or complete loss of a population. Loss to birds or other wildlife is more difficult to ascertain; however, predation and loss as observed in nature, can be expected to occur and is not the responsibility of the Cooperator.

8.3 Impacts Likely to Occur as a Result of Take

Topminnows or pupfish stocked onto properties under this Agreement will originate from captive refuge populations or from wild sites where the populations are large enough to maintain viable populations after removal of reestablishment cohorts. Therefore, while the loss of individuals, or even entire populations of topminnows and pupfish is possible under this Agreement, no

negative impacts to natural or other existing reestablished populations in the wild are expected.

If elevated baseline conditions are agreed upon for particular properties, it is expected that these may count toward downlisting and delisting criteria, and should exist for an extended time. However, if a population fails, reestablishment may be necessary, depending on the cause(s) of the loss (see Section 10.2).

8.4 Measures to Monitor, Minimize, and Mitigate Negative Impacts

Management actions such as major earthwork, removal of nonnative aquatic species, pesticide application, and other management activities expected to result in take, will be scheduled in advance, and notification, at least 30 days before the activities, will be provided to the Department. Responses to emergencies (Section 8.1.16 above) are not subject to the 30-day advance notice. This will allow the Department the opportunity to relocate fish temporarily if deemed necessary by the Department in consultation with the Service. If activities require long-term removal of fish, arrangements can be made to house them at alternative locations.

If nonnative aquatic species that would negate the desired conservation benefits occur in any habitat covered under this Agreement, they should be removed before topminnows or pupfish are released. However, on a case-by-case basis, topminnows and pupfish may be compatible with certain nonnative species. Therefore, if the habitat is deemed appropriate for the overall benefit of topminnows and pupfish, it may be used for purposes of this Agreement despite the presence of nonnative species.

Any loss of the reestablished populations may require supplemental stockings of topminnows and/or pupfish. The Department will consult with the Service and criteria in the species' recovery plans to determine the appropriate source population for initial and supplemental stockings.

9.0 Reporting and Monitoring

This Agreement provides for two types of monitoring as required by Federal regulation (USFWS/NMFS 1999a) and Service policy (USFWS/NMFS 1999b): (1) compliance monitoring to ensure that all commitments in the Agreement are being met, and (2) biological monitoring to ensure that the biological goals of the Agreement are being met and to determine the effectiveness of its conservation program.

9.1 Compliance Monitoring

The Department or its authorized representatives (e.g. qualified biologists designated by the Department that have experience with the species, including biologists with other agencies, Non-governmental Organizations (NGOs), universities or civilian) will ascertain compliance as necessary. Specific

requirements of compliance monitoring are a maximum of four visits per year (and a minimum of one visit per two years) to each site subject to this Agreement to verify that all required conservation commitments are being properly implemented. Before any visit, Department monitoring personnel shall give notice to the Cooperator of not less than 14 days before the visit and shall arrange the visit so it is compatible with the landowner's schedule and needs. This monitoring requirement shall commence from the effective date of the Certificate of Inclusion for each affected Cooperator.

In addition, the Service is responsible for monitoring the Department's compliance with the ESA Section 10(a)(1)(A) Permit. This may include audits of relevant Department files at least once each two years.

9.2 Biological Monitoring

The Department and the Cooperator are jointly responsible for coordinating efforts to ensure that monitoring and reporting related to implementation of the Agreement and fulfillment of its provisions are arranged. Biological monitoring by the Department of populations established under this Agreement will be covered by the Department's ESA Section 10(a)(1)(A) Permit and ESA Section 6 work plans. The biological monitoring will address the status and distribution of topminnow and pupfish populations established under this Agreement. The biological monitoring may also address issues that require adjustment to the Agreement's conservation program through the Adaptive Management provisions described in Section 10 of this Agreement. Specific biological monitoring requirements of the Department or its authorized representatives (e.g. qualified biologists designated by the Department that have experience with the species, including biologists with other agencies, NGOs, universities or civilian) are as follows:

1. For any aquatic site on participating urban, suburban, and rural lands to which topminnows or pupfish have been stocked: one monitoring visit one year after stocking and at least once every two years thereafter. For aquatic sites on seminatural, natural and wild sites,to which topminnows or pupfish have been stocked: one monitoring visit conducted six months after the stocking, one visit one year after stocking, and monitoring must be done at least once every two years thereafter. The monitoring schedule shall remain in effect unless the Department and the Cooperator determine that another schedule is appropriate, such as for smaller sites (<1600 ft^2).

2. Information to be collected during site visits described in paragraph (1) above shall consist of the following:

    a. Type of site (stream, pond, wetland, etc.);

b. General description of the site and its condition, including water quality (water temperature, pH, conductivity, and dissolved oxygen);

c. Presence or absence, and distribution of topminnows and pupfish and at least approximate numbers of adults and juveniles;

d. Presence or absence, and distribution of nonnative aquatic species;

e. Color photos (35mm slides or digital photos) of the habitat taken at fixed points;

f. Land management activities that may result in take, if any;

g. A general threat assessment and recommendations for how to alleviate the threats; and,

h. Any other pertinent information.

9.3 Responsibility for Monitoring

Compliance monitoring for this Agreement and its associated permit will be funded and carried out by the Service or its authorized representative. Compliance monitoring of Cooperators will be funded and carried out by the Department or its authorized representative, contingent on availability of funds.

Biological monitoring under this Agreement will be funded and carried out by the Department or its authorized representative, in a manner unique for each covered property as agreed upon by the Department and each Cooperator, with concurrence from the Service, and contingent on availability of funds. The primary obligations of Cooperators with respect to biological monitoring will be to grant access to their properties by authorized personnel conducting the monitoring, subject to reasonable advance notification. In addition, Department personnel or authorized representatives of the Department that conduct biological monitoring must be able to distinguish between topminnow and mosquitofish. The Department is ultimately responsible for ensuring that biological monitoring is done for each enrolled property.

9.4 Annual Reporting

1. Cooperator Reporting Responsibility

Each Cooperator will submit an annual report to the Department by January 30 that provides the information required in subsection (2 a, c, d and f) of Section 9.2 of this Agreement. If the first year of the Agreement is a partial year of six months or less, activities implemented in that year may be reported in the following year's report.

2. Department Reporting Responsibility

The Department, as the permittee under this Agreement, shall submit one copy of a cumulative report describing biological monitoring activities under the Agreement for the preceding year to each of the Service's Arizona Ecological Services Office and Albuquerque Regional Office. The Department's annual report will be due by March 15 of each year throughout the term of the permit. The first report is due March 15, 2008. Information required in the Department's annual report is as follows:

a. A summary of the cumulative total of Cooperators enrolled in the Agreement at the time of preparation of the report;

b. The cumulative total of topminnow and pupfish populations being managed under this Agreement, including a description of the status of the populations and their associated habitats;

c. The status of each population within the covered area at the time of the report with respect to the Agreement's biological and recovery goals;

d. Any Cooperators that enrolled under the Agreement in the preceding year, including copies of any related Certificates of Inclusion;

e. Any topminnow and pupfish management activities that were implemented in the preceding year, including population establishments or habitat improvement projects, and original source of topminnow and pupfish stocked under this Agreement;

f. Funding sources that were used in the preceding year for activities associated with this Agreement;

g. Any incidental take of topminnows or pupfish known or suspected to have occurred within the covered area in the preceding year and an explanation of the reasons for the take;

h. Results of biological and compliance monitoring activities conducted in the preceding year, with supplemental information on biological or habitat-related problems that need to be addressed; and

i. Any other pertinent information regarding the status of the Agreement's conservation program or implementation of the program.

10.0 MODIFICATIONS AND ADAPTIVE MANAGEMENT

The Department agrees to meet annually, or more frequently if necessary and agreed upon, with the Service to review progress in implementing this Agreement and to review needs for adaptive management due to changing circumstances. Any major change in land use or natural changes in the watershed that affect the covered species or their habitats should be reported by the Department in writing to the designated Service representative, or by that representative or other Cooperators in writing to the Department as soon as possible.

Amendments to the Section 10(a)(1)(A) permit must be evaluated by all parties based on the effects that proposed amendments would have on the habitat, individual species, and permitted actions. The Service must be consulted on all proposed amendments. Concurrence through consensus will be sought among parties before implementation of any amended action. It is understood that unforeseen circumstances will not require the Department or Cooperators to provide additional habitats and mitigation above that designated in this Agreement, nor provide additional compensations above that provided for in this Agreement, without consent of the Department.

10.1 Adaptive Management

Adaptive management allows a conservation program to be adjusted from time to time to take into account new information and to ensure that the program is as effective as possible. The Agreement must adapt to specific management opportunities and needs as they arise. The Agreement therefore includes an Adaptive Management program to ensure flexibility and that the most up-to-date information is used.

The need to adopt Adaptive Management modifications to the Agreement may result from various sources, including but not limited to:

1. New scientific information concerning the biology, population dynamics, or status of topminnows or pupfish;

2. New scientific information concerning the effects of biotic or abiotic factors on topminnows or pupfish;

3. Information derived from the Agreement's monitoring program;

4. Management needs or recommendations described under any updated Recovery Plans for topminnows and pupfish; and

5. New information pertaining to management or status of lands covered by this Agreement including Certificates of Inclusion thereto.

Two types of Adaptive Management modifications within the covered area can be implemented under this Agreement, depending on their scope and the process for

incorporating them. These are termed: (1) major revisions to the Agreement, and (2) ongoing management adjustments.

A major revision is defined as one triggered by the availability of substantial new scientific information, typically from a source not related to the Agreement, concerning any biological assumption or criterion upon which the conservation program is based, and which would require modification of any of the Agreement's specific biological criteria or conservation measures. Major revisions would likely require that the Section 10(a)(1)(A) permit be amended to reflect any required new standards or management activities. This, in turn, would require mutual agreement between the Department and Service (the Agreement's signatories) and written formalization of the amendment following the Service's amendment procedures.

Ongoing management adjustments are defined based on the Agreement's monitoring program, and concern any situation within the covered area that requires a management response, and which is within the scope of the existing Agreement. Examples of circumstances requiring ongoing management adjustments would be the identification of specific problems at specific topminnow or pupfish sites within the covered area (e.g. colonization by nonnatives, drought, or extirpation of a population); or the identification of specific management opportunities or needs that would benefit the conservation program. The Department and Cooperators will typically address ongoing management adjustments collaboratively. Under the Agreement, Sections 8 (Take) and 10.2 (Changed Circumstances) describe conditions that could require ongoing management adjustments, as well as the standards that will be considered in determining the appropriate adjustment or response.

10.2 Changed Circumstances

Changed circumstances are defined by Federal regulation (50 CFR 173) as "changes in circumstances affecting a species or geographic area covered by a conservation plan or agreement that can reasonably be anticipated by plan or agreement developers and the Service and that can be planned for". Changed circumstances identify events that can reasonably be anticipated to occur and are planned for.

In the event of a changed circumstance, the Department and Cooperator(s) will respond cooperatively as follows:

1. The cause of the circumstance will be determined, if possible;

2. An appropriate response will be determined. If a problem can be identified, the decision whether or not to correct the problem will be made based on the following factors:

    a. The technical and logistical feasibility of correcting the problem, and the likelihood of long term success;

b. The biological importance of the population to the net conservation benefit of the species; and

c. Funding availability to undertake corrective action.

The Department and Service anticipate that three types of Changed Circumstances could occur within the covered area over the life of the Agreement:

1. Drought: Droughts are a periodic phenomenon in the arid environments of Arizona and almost certain to occur over the life of the Agreement. During drought, the Department and Cooperators will monitor topminnow and pupfish population sites and habitat conditions in the covered area according to the needs of the situation and will implement corrective measures on a case-by-case basis. Responses to actual or potential drought conditions may include, as necessary and appropriate:

    a. Improvements in water reliability at selected sites through water-hauling, well-drilling, deepening, or other means;

    b. Salvage and relocation of topminnows and pupfish from desiccated sites to other sites or temporary holding facilities;

    c. Reestablishment of extirpated populations when conditions allow; and

    d. Other measures as appropriate and agreed upon.

2. Invasion by nonnative organisms that may pose a threat to the population: Colonization or inadvertent introduction of nonnative fish, bullfrogs, crayfish, or other predators into topminnow and pupfish habitat is also a possibility over the life of the Agreement. Bullfrogs and crayfish are of special concern, because they can migrate substantial distances over land under the right conditions and are present throughout the State. Responses to colonization of habitats by nonnative species within the covered area will be addressed by the Department and Cooperators on a case-by-case basis and may include:

    a. Removal of existing nonnatives from new sites (and areas adjacent to new sites, when possible) before stocking of topminnows and pupfish;

    b. Periodic control and removal of nonnatives using available and appropriate means;

    c. Redefinition of an elevated baseline condition, if necessary and agreed upon by the Department, Service, and Cooperator(s);

d. Adjustment of the Agreement's conservation program to incorporate new scientific information concerning nonnative migration, population dynamics; and

e. Other measures as appropriate and agreed upon.

3. Failure of topminnow and pupfish populations: It is expected that topminnow and pupfish populations within the covered area will, from time to time, fail as a result of one or more of the above factors or other factors. If and when previously extant topminnow or pupfish populations disappear or are in immediate peril (as determined by the Agreement's monitoring program), the Department and Cooperators will respond cooperatively as follows:

   a. The cause of failure will be determined, if possible. The cause will likely be an adverse condition such as drought or invasion by nonnative predators and will usually have been identified in advance, with an attempt made to correct it.

   b. An appropriate response will be determined. If a problem can be identified, a decision whether or not to reestablish the topminnow and pupfish population will be made based on the following factors:

      i. The technical and logistical feasibility of correcting the problem, and the likelihood of long term success;

      ii. The biological importance of the population to the net conservation benefit of the species (Section 6 of this Agreement);

      iii. The willingness of the Cooperator to reestablish the population; and

      iv. Funding availability to undertake corrective action and reestablish a new population.

Generally, the responsibility for monitoring, evaluating, and correcting changed circumstances will not lie with the Cooperator. Exceptions to this would include changed circumstances that are specific to a landowner's property (e.g. the berm of a tank fails causing the water level to drop) and associated corrective measures that are clearly identifiable and within the normal scope of management activities (e.g. repairing the berm to maintain the ideal water level). A Cooperator may undertake such measures with appropriate notification to the Department. Otherwise, the responsibility for implementing responses to changed circumstances deemed necessary by the Department will lie with the Department.

10.3 Amendments to the Permit

The Department's Section 10(a)(1)(A) permit may be amended following all applicable legal requirements in force at the time of the amendment, including, but not limited to, the ESA, National Environmental Policy Act, and Service permit regulations (currently these are codified in 50 CFR, Parts 13 and 17). Amendment of the permit would require, at a minimum: (1) a written explanation of why the amendment is needed; (2) an explanation of what, if any, effects the amendment would have on topminnows and pupfish; and (3) a *Federal Register* notice of the proposed amendment and a public comment period.

10.4 Permit/Certificate Revocation

The Service may suspend or revoke the Department's Section 10(a)(1)(A) permit for cause following currently applicable Federal regulation (50 CFR Parts 13 and 17), or any laws and regulations in force at the time of such suspension or revocation.

A Cooperator's Certificate of Inclusion may be suspended or revoked by the Department, but only if: (1) the landowner has failed to satisfy a specific conservation commitment or commitments for which they are responsible; (2) the Department has made reasonable, good-faith efforts to cooperatively work with the landowner to correct the deficiency; (3) the deficiency remains uncorrected, even after the Department's good-faith efforts; and (4) written notice has been provided to the affected landowner alerting the landowner of the pending suspension or revocation a minimum of 30 days before the effective date of the suspension or termination.

11.0 Additional Measures

1. For matters applicable to this Agreement, the Service Point of Contact (POC) is the person whose name appears on the signature block below. No change to this Agreement shall be binding upon the Service or the Department unless and until in writing and signed by all parties.

2. Following Section 22, Title 41, United States Code, it is further mutually agreed that no member of or delegate to Congress or resident [Federal] commissioner, after their election or appointment, and either before or after they have qualified and during their continuance in office, shall be admitted to any share or part of this Agreement, or to any benefit to arise thereupon; but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.[2]

3. This Agreement may be modified at any time by mutual written consent of all the parties as identified in Section 10.3 of this Agreement.

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[2] In Additional Measure 2, "resident commissioner" refers to Federal appointees and shall not be construed to include members of the Arizona Game and Fish Commission.

4. The Service or the Department may cancel this Agreement without penalty or further obligation pursuant to A.R.S. § 38-511.

5. The Service and the Department agree to engage in any alternative dispute resolution procedures authorized by their respective statutes, regulations, and court rules, including but not limited to 5 U.S.C. § 575 and A.R.S. § 12-1518.

6. The Arizona Game and Fish Commission (Commission) has authority to execute this Agreement pursuant to A.R.S. § 17-231(B)(7). The Commission has statewide responsibility for wildlife and habitat management in Arizona, and the Arizona Game and Fish Department acts under the authority of the Commission.

7. All documents pertinent to this Agreement shall be retained by the Department and made available to the Service, if requested, for review and/or audit purposes for a period of five (5) years after completion of this Agreement. Pursuant to A.R.S. § 35-214, all books, accounts, reports, files, electronic data, and other records relating to this Agreement shall be subject at all reasonable times to inspection and audit by the State of Arizona for five (5) years after completion of this Agreement.

12.0 SIGNATORIES

IN WITNESS WHEREOF, THE PARTIES HERETO have executed this Safe Harbor Agreement to be in effect as of the date last signed below.

APPLICANT, Arizona Game and Fish Department

BY _____ Date 12/17/07

Duane L. Shroufe, Director
Arizona Game and Fish Department
Phoenix, Arizona

BY _____ Date 3/12/08

Acting Christopher T. Jones, Deputy Regional Director
Region 2, United States Fish and Wildlife Service
Albuquerque, New Mexico

LITERATURE CITED

Childs, M.R. 2001. Comparison of Gila topminnow and mosquitofish as biological control agents of mosquitoes. Report to U.S. Bureau of Reclamation, Phoenix Area Office, Federal Grant 99-FG-32-0080. Arizona Game and Fish Department, Phoenix, Arizona.

Childs, M.R. 2006. Comparison of Gila topminnow and western mosquitofish as biological control agents of mosquitoes. Western North American Naturalist 66(2), pp. 181-190.

Minckley, W.L. 1999. Ecological review and management recommendations for recovery of the endangered Gila topminnow. Great Basin Naturalist 59(3): 230-244.

Minckley, W.L., R.R. Miller, and S.M. Norris. 2002. Three New Pupfish Species, *Cyprinodon* (Teleostei, Cyprinodontidae), from Chihuahua, Mexico, and Arizona, USA. Copeia 2002(3): 687-705.

U.S. Fish and Wildlife Service (USFWS). 1967. Native fish and wildlife. Endangered Species. *Federal Register* 32(48): 4001.

USFWS. 1986. Endangered and threatened wildlife and plants; determination of endangered status and critical habitat for the desert pupfish. *Federal Register* 51: 10842-10851.

USFWS. 1993. Desert Pupfish Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

USFWS. 1994. Yaqui Fishes Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

USFWS. In Prep. Gila Topminnow Revised Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

USFWS and National Marine Fisheries Service (NMFS). 1999a. Safe harbor agreements and candidate conservation agreements, final rule. *Federal Register* 64:32706-32716, June 17, 1999.

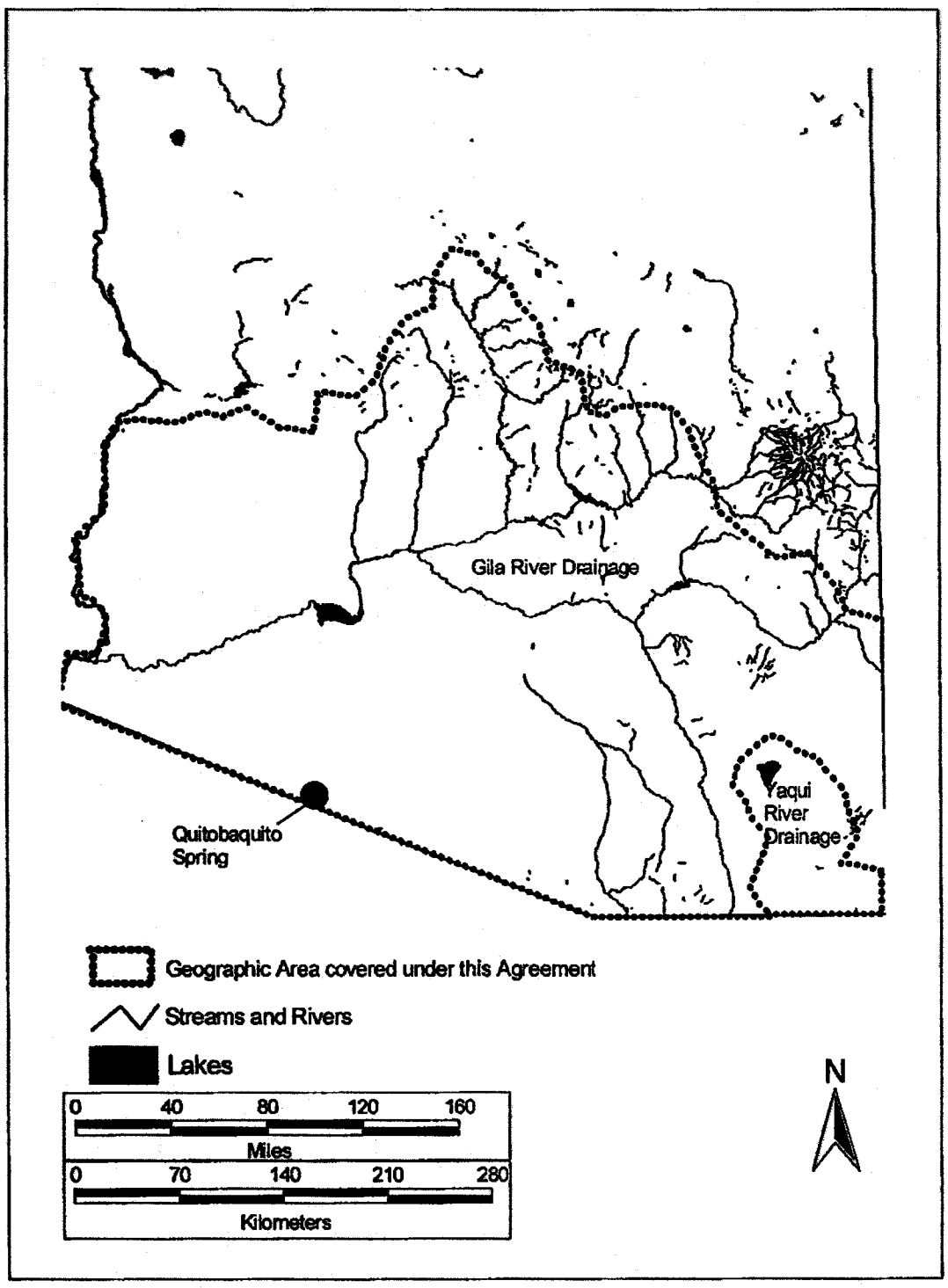
USFWS and NMFS. 1999b. Announcement of final safe harbor policy. *Federal Register* 64: 32717-32726, June 17, 1999.

Walters, L.L and E.F. Legner. 1980. Impact of the desert pupfish, *Cyprinodon macularius*, and *Gambusia affinis affinis* on fauna in pond ecosystems. Hilgardia 48:1-18.

Weedman, D.A. 1999. Draft Gila topminnow, *Poeciliopsis occidentalis occidentalis*, revised recovery plan. Prepared by Arizona Game and Fish Department for U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 83 pp.

Weedman, D.A. and K.L. Young. 1997. Status of the Gila topminnow and desert pupfish in Arizona. Nongame and Endangered Wildlife Program Technical Report 118. Arizona Game and Fish Department, Phoenix, Arizona.

Appendix 1. Figure of the geographic coverage of this Agreement. All non-Federal lands (with the exception of Native American reservations) within this area are eligible under this Agreement.



Appendix 2. Safe Harbor Agreement Landowner Certificate of Inclusion Template

Certificate of Inclusion
In The Safe Harbor Agreement
For Gila topminnow (*Poeciliopsis occidentalis*), Yaqui topminnow (*Poeciliopsis sonoriensis*), desert pupfish (*Cyprinodon macularius*), and Quitobaquito pupfish (*Cyprinodon eremus*) between the Arizona Game and Fish Department and U.S. Fish and Wildlife Service

This certifies that the participating landowner (Cooperator), who owns or administers property described in the attached Cooperative Agreement, is included within the scope of Permit No. **[insert no.]**, issued by the U.S. Fish and Wildlife Service (Service) on **[insert date]** to the Arizona Game and Fish Department (Department) under the authority of Section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, 16 U.S.C. 15389(a)(1)(A). Such Permit authorizes certain activities by Cooperators as part of a Safe Harbor Agreement to establish populations of endangered topminnow and pupfish. Following that Permit and this Certificate, the holder of this Certificate is authorized to engage in any otherwise lawful activity on the above described property that may result in the incidental taking of the topminnow and pupfish, as appropriate, subject to the terms and conditions of such Permit and the Cooperative Agreement entered into pursuant thereto by the Arizona Game and Fish Department and **[insert Cooperator's name]** on **[insert date]**. By signing this Certificate of Inclusion, the Cooperator agrees to carry out all assigned conservation measures as described in the Agreement and in the attached Cooperative Agreement for a period of **[insert number of years Certificate is in effect]** years.

_____ _____
Director Date
Arizona Game and Fish Department

_____ _____
Cooperator **[insert name]** Date

_____ _____
Concurrence, U.S. Fish & Wildlife Service Date
Field Supervisor, Arizona Field Office, Phoenix

WITNESSETH

WHEREAS, the Gila topminnow, Yaqui topminnow, desert pupfish, and Quitobaquito pupfish are listed as endangered species under the Federal Endangered Species Act of 1973, as amended (Act); and,

WHEREAS, the Service and Department have entered into the Safe Harbor Agreement following the authorities of Section 10(a)(1)(A) of the Act and associated Service policy and Federal regulation to establish a conservation program for topminnows and pupfish in Arizona and to provide for regulatory assurances to non-Federal landowners who own lands in Arizona and who enter into the Safe Harbor Agreement with the Service and Department; and,

WHEREAS, the Service and Department are signatories to the Safe Harbor Agreement, while individual non-Federal landowners within Arizona may participate in the Safe Harbor Agreement's conservation program and receive its regulatory assurances through this Certificate of Inclusion issued by the Department to the participating landowner; and,

WHEREAS, the Safe Harbor Agreement contemplates that cooperation by agencies and organizations in addition to the signatories and participating landowners will be necessary and desirable in ensuring comprehensive implementation of the Safe Harbor Agreement and long-term conservation of topminnows and pupfish in Arizona; and,

WHEREAS, other organizations or Federal or State agencies who are not signatories to the Safe Harbor Agreement may, nevertheless, have certain regulatory or land management authorities or responsibilities in Arizona, or may themselves be engaged in topminnow and pupfish conservation efforts within the State; and,

WHEREAS, such other agencies and organizations (including, but not limited, to the Arizona State Land Department; Arizona County and Municipal governments, and The Nature Conservancy) may elect or desire to become Cooperators in the Safe Harbor Agreement's conservation program;

NOW, THEREFORE, the parties to this Agreement mutually agree and understand as follows:

1. **Involved Parties.** This Certificate of Inclusion, between the Arizona Game and Fish Department (Department) and **[insert name of Cooperator]**, is intended to promote good land stewardship by assisting the Cooperator in carrying out actions to establish topminnow and/or pupfish populations on land owned by the Cooperator.

2. **Enrolled Property.** Cooperator owns property at **[insert street and city address and/or legal description]** in **[insert county name]** County, Arizona, that contains habitat suitable for topminnows and/or pupfish as defined in the Safe Harbor Agreement (SHA) between the Department and the Service. The

Department will enroll this property under the SHA, as shown on the attached property map. Other species (listed and non-listed) of wildlife may also occur on the property, but will not be covered for incidental take under the terms of the Department's Enhancement of Survival Permit.

3. **Access to Enrolled Property.** The Cooperator agrees to allow the Department or its representatives, reasonable access to their property for the purposes of (a) assessing the habitat value of their property, (b) stocking topminnows, pupfish, or both, (c) ascertaining that the habitats are suitable and are being maintained in the manner required by the SHA, and (d) monitoring the topminnow or pupfish populations as required by the SHA.

   Additionally, the Cooperator agrees to allow the Service reasonable access for the purposes of (a) conducting compliance monitoring and (b) conducting biological monitoring in cooperation with the Department.

   The Department, Service, and the Cooperator will coordinate a schedule to conduct visits to the property at times that avoid inconvenience to the Cooperator or disruption of the Cooperator's use of the property. The Department or Service shall give the Cooperator at least 14 days advance notice of its desire to enter the property for any of the above purposes, and the Cooperator shall not unreasonably withhold permission for such entry.

4. **Liability.** The Cooperator assumes no liability for injury to any employee or representative of the Department or Service in the course of any visit to the property under this paragraph, except insofar as such injury is the result of the Cooperator's negligence. The Department or Service or their representatives shall not be liable for any damage to the property of the Cooperator arising from any visit to the property pursuant to this paragraph, except insofar as such damage is the result of the Department's or Service's negligence.

5. **Baseline Condition Determination.** Based upon the site survey conducted on the Cooperator's property on **(insert month/day/year)**, the following has been determined:

   A. **Physical description of property.** [Description should include - (a) the mailing address or legal description of the property to be enrolled; (b) a thorough habitat analysis - including photos; and, (d) any other relevant information].

   B. **Map of Property.** (Attach on separate sheet a map of the entire property with the enrolled portions clearly outlined and marked as habitat to be stocked with topminnows and/or pupfish).

C. **Baseline Condition Determination** (Description will include the results of the baseline condition surveys, as well as the final baseline condition determination as agreed upon in writing by all parties).

6. **Terms and Conditions.** This Cooperative Agreement is subject to the following additional terms and conditions:

A. **Cooperator Responsibility.** The Cooperator agrees to all Terms and Conditions as identified in Section 4.3 of the Safe Harbor Agreement. The Cooperator agrees to notify the Department before taking the property back to baseline conditions or other land management actions that could result in take of the species.

B. **Length of the Cooperative Agreement.** This Cooperative Agreement will be valid from the date of the last signature on this Certificate of Inclusion until at least **[insert date as agreed upon by all parties]**, but may not exceed **[insert the Department's Permit expiration date]**, unless the Permit is extended.

C. **Restrictions on Taking Property Back to Baseline Condition:**

i. **Type of Take**. Topminnow and pupfish may not be "taken" except as defined in Section 8 of the Safe Harbor Agreement.

ii. **Permit Duration.** This Certificate of Inclusion may be extended if the Department's Permit is renewed and that renewal allows for such extension.

D. **Notification.** The Cooperator agrees to notify the Arizona Game and Fish Department not less than 30 days before any activity that will take the property back to baseline conditions, except as noted under Section 8 for emergency responses. The Cooperator also agrees to allow the Department or Service to access the property to rescue any topminnow or pupfish individuals, if possible and appropriate, before taking the property back to baseline conditions.

E. **Reporting Requirements.** The Cooperator understands that to fulfill the responsibilities of the SHA, the Department must report all monitoring activities conducted under the SHA to the Service.

F. **Early Termination.** The Cooperator may request termination of their Certificate of Inclusion at any time for circumstances beyond their control, upon written notification to the Department. The Department then has up to 60 days to salvage topminnow and pupfish, if deemed necessary, in consultation with the Service. At the end of the 60-day time period, the

Certificate of Inclusion is terminated via written notification to the Cooperator and the Service.

Additionally, the Cooperator may terminate their Certificate of Inclusion for any other reason, upon written notification to the Department. However, such termination shall extinguish the Cooperator's authority to incidentally take topminnows or pupfish under the Enhancement of Survival Section 10(a)(1)(A) Permit.

G. **Transfer of Property.** The Cooperator will notify the Department not less than 60 days before selling or transferring the enrolled property to another entity, to provide the Department the opportunity to secure the successor's agreement to continue the identified Safe Harbor activities.

H. **Unforeseen Circumstances.** If, before the expiration of the Permit to be issued to the Department, the Department should cease to exist or cease to be able to continue to administer the Safe Harbor program, and no other entity satisfactory to the Service is willing to assume the Department's responsibilities as administrator of the program, the Department will relinquish its Permit to the Service. In that event, the Service shall convert the Certificates of Inclusion that have been previously issued by the Department to participating landowners into freestanding permits that authorize the same actions by the participating landowners as had been authorized by the Certificates of Inclusion, provided the participating landowners agree to fulfill the management activities for their property, as well as the administrative, monitoring, and reporting requirements, for the enrolled property, as outlined in this Certificate of Inclusion and the Safe Harbor Agreement.

Safe Harbor Agreement Landowner Certificate of Inclusion

Certificate of Inclusion
In The Safe Harbor Agreement
For Gila topminnow (*Poeciliopsis occidentalis*), Yaqui topminnow (*Poeciliopsis sonoriensis*), desert pupfish (*Cyprinodon macularius*), and Quitobaquito pupfish (*Cyprinodon eremus*) between the Arizona Game and Fish Department and U.S. Fish and Wildlife Service

This certifies that the participating landowner (Cooperator), who owns or administers property described in the attached Cooperative Agreement, is included within the scope of Permit No. TE-083636-0, issued by the U.S. Fish and Wildlife Service (Service) on March 12, 2008, to the Arizona Game and Fish Department (Department) under the authority of Section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, 16 U.S.C. 15389(a)(1)(A). Such Permit authorizes certain activities by Cooperators as part of a Safe Harbor Agreement to establish populations of endangered topminnow and pupfish. Following that Permit and this Certificate, the holder of this Certificate is authorized to engage in any otherwise lawful activity on the above described property that may result in the incidental taking of the topminnow and pupfish, as appropriate, subject to the terms and conditions of such Permit and the Cooperative Agreement entered into pursuant thereto by the Arizona Game and Fish Department and [insert Cooperator's name] on date of last signature. By signing this Certificate of Inclusion, the Cooperator agrees to carry out all assigned conservation measures as described in the Agreement and in the attached Cooperative Agreement for a period of **[insert number of years Certificate is in effect]** years.

WITNESSETH

WHEREAS, the Gila topminnow, Yaqui topminnow, desert pupfish, and Quitobaquito pupfish are listed as endangered species under the Federal Endangered Species Act of 1973, as amended (Act); and,

WHEREAS, the Service and Department have entered into the Safe Harbor Agreement following the authorities of Section 10(a)(1)(A) of the Act and associated Service policy and Federal regulation to establish a conservation program for topminnows and pupfish in Arizona and to provide for regulatory assurances to non-Federal landowners who own lands in Arizona and who enter into the Safe Harbor Agreement with the Service and Department; and,

WHEREAS, the Service and Department are signatories to the Safe Harbor Agreement, while individual non-Federal landowners within Arizona may participate in the Safe Harbor Agreement's conservation program and receive its regulatory assurances through this Certificate of Inclusion issued by the Department to the participating landowner; and,

WHEREAS, the Safe Harbor Agreement contemplates that cooperation by agencies and organizations in addition to the signatories and participating landowners will be necessary and desirable in ensuring comprehensive implementation of the Safe Harbor Agreement and long-term conservation of topminnows and pupfish in Arizona; and,

WHEREAS, other organizations or Federal or State agencies who are not signatories to the Safe Harbor Agreement may, nevertheless, have certain regulatory or land management authorities or responsibilities in Arizona, or may themselves be engaged in topminnow and pupfish conservation efforts within the State; and,

WHEREAS, such other agencies and organizations (including, but not limited, to the Arizona State Land Department; Arizona County and Municipal governments, and The Nature Conservancy) may elect or desire to become Cooperators in the Safe Harbor Agreement's conservation program;

NOW, THEREFORE, the parties to this Agreement mutually agree and understand as follows:

1. **Involved Parties.** This Certificate of Inclusion, between the Arizona Game and Fish Department (Department) and **[insert name of Cooperator]**, is intended to promote good land stewardship by assisting the Cooperator in carrying out actions to establish topminnow and/or pupfish populations on land owned by the Cooperator.

2. **Enrolled Property.** Cooperator owns property at **[insert street and city address and/or legal description]** in **[insert county name]** County, Arizona, that contains habitat suitable for topminnows and/or pupfish as defined in the Safe Harbor Agreement (SHA) between the Department and the Service. The Department will enroll this property under the SHA, as shown on the attached property map. Other species (listed and non-listed) of wildlife may also occur on the property, but will not be covered for incidental take under the terms of the Department's Enhancement of Survival Permit.

3. **Access to Enrolled Property.** The Cooperator agrees to allow the Department or its representatives, reasonable access to their property for the purposes of (a) assessing the habitat value of their property, (b) stocking topminnows, pupfish, or both, (c) ascertaining that the habitats are suitable and are being maintained in the manner required by the SHA, and (d) monitoring the topminnow or pupfish populations as required by the SHA.

   Additionally, the Cooperator agrees to allow the Service reasonable access for the purposes of (a) conducting compliance monitoring and (b) conducting biological monitoring in cooperation with the Department.

   The Department, Service, and the Cooperator will coordinate a schedule to conduct visits to the property at times that avoid inconvenience to the Cooperator

or disruption of the Cooperator's use of the property. The Department or Service shall give the Cooperator at least 14 days advance notice of its desire to enter the property for any of the above purposes, and the Cooperator shall not unreasonably withhold permission for such entry.

4. **Liability.** The Cooperator assumes no liability for injury to any employee or representative of the Department or Service in the course of any visit to the property under this paragraph, except insofar as such injury is the result of the Cooperator's negligence. The Department or Service or their representatives shall not be liable for any damage to the property of the Cooperator arising from any visit to the property pursuant to this paragraph, except insofar as such damage is the result of the Department's or Service's negligence.

5. **Baseline Condition Determination.** Based upon the site survey conducted on the Cooperator's property on **(insert month/day/year)**, the following has been determined:

   A. **Physical description of property.** [Description should include - (a) the mailing address or legal description of the property to be enrolled; (b) a thorough habitat analysis - including photos; and, (d) any other relevant information].

   B. **Map of Property.** (Attach on separate sheet a map of the entire property with the enrolled portions clearly outlined and marked as habitat to be stocked with topminnows and/or pupfish, and a copy of Topminnow and Pupfish SHA Site Evaluation form).

   C. **Baseline Condition Determination** (Description will include the results of the baseline condition surveys, as well as the final baseline condition determination as agreed upon in writing by all parties).

6. **Terms and Conditions.** This Cooperative Agreement is subject to the following additional terms and conditions:

   A. **Cooperator Responsibility.** The Cooperator agrees to all Terms and Conditions as identified in Section 4.3 of the Safe Harbor Agreement. The Cooperator agrees to notify the Department before taking the property back to baseline conditions or other land management actions that could result in take of the species.

   B. **Length of the Cooperative Agreement.** This Cooperative Agreement will be valid from the date of the last signature on this Certificate of Inclusion until at least [**insert date as agreed upon by all parties**], but may not exceed March 31, 2058, unless the Permit is extended.

C. **Restrictions on Taking Property Back to Baseline Condition:**

i. **Type of Take**. Topminnow and pupfish may not be "taken" except as defined in Section 8 of the Safe Harbor Agreement.

ii. **Permit Duration.** This Certificate of Inclusion may be extended if the Department's Permit is renewed and that renewal allows for such extension.

D. **Notification.** The Cooperator agrees to notify the Arizona Game and Fish Department not less than 30 days before any activity that will take the property back to baseline conditions, except as noted under Section 8 for emergency responses. The Cooperator also agrees to allow the Department or Service to access the property to rescue any topminnow or pupfish individuals, if possible and appropriate, before taking the property back to baseline conditions.

E. **Reporting Requirements.** The Cooperator understands that to fulfill the responsibilities of the SHA, the Department must report all monitoring activities conducted under the SHA to the Service.

F. **Early Termination.** The Cooperator may request termination of their Certificate of Inclusion at any time for circumstances beyond their control, upon written notification to the Department. The Department then has up to 60 days to salvage topminnow and pupfish, if deemed necessary, in consultation with the Service. At the end of the 60-day time period, the Certificate of Inclusion is terminated via written notification to the Cooperator and the Service.

Additionally, the Cooperator may terminate their Certificate of Inclusion for any other reason, upon written notification to the Department. However, such termination shall extinguish the Cooperator's authority to incidentally take topminnows or pupfish under the Enhancement of Survival Section 10(a)(1)(A) Permit.

G. **Transfer of Property.** The Cooperator will notify the Department not less than 60 days before selling or transferring the enrolled property to another entity, to provide the Department the opportunity to secure the successor's agreement to continue the identified Safe Harbor activities.

H. **Unforeseen Circumstances.** If, before the expiration of the Permit to be issued to the Department, the Department should cease to exist or cease to be able to continue to administer the Safe Harbor program, and no other entity satisfactory to the Service is willing to assume the Department's responsibilities as administrator of the program, the Department will relinquish its Permit to the Service. In that event, the Service shall convert the

Certificates of Inclusion that have been previously issued by the Department to participating landowners into freestanding permits that authorize the same actions by the participating landowners as had been authorized by the Certificates of Inclusion, provided the participating landowners agree to fulfill the management activities for their property, as well as the administrative, monitoring, and reporting requirements, for the enrolled property, as outlined in this Certificate of Inclusion and the Safe Harbor Agreement.

I. **Additional Conservation Commitments.**

By participating under this Agreement, the Cooperator understands and acknowledges that information contained within the Certificate of Inclusion, Site Evaluation form(s), and monitoring reports is subject to the Arizona State Public Records Law (A.R.S. Title 39-121) and Freedom of Information Act (FOIA).

Larry Voyles, Director, Arizona Game and Fish Department	Date
Cooperator **[insert name]**	Date
Concurrence, Steve Spangle, U.S. Fish & Wildlife Service Field Supervisor, Arizona Field Office, Phoenix	Date

Endangered Species Program

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Information, Planning and Consultation System (IPaC)

Recovery Online Activity Reporting System (ROAR)

SHA Enrollment Process

1. To participate in the SHA program, landowners having a listed species or its habitat on their property are invited to contact the appropriate regional office of the U.S. Fish and Wildlife Service. See the inside back cover of the Bulletin for contact information.

For breeding, including egg and tadpole development, Houston toads require still or slow-flowing bodies of water, such as this shallow pond.

Photo Credit: Paige Najvar/USFWS

2. If an SHA is feasible, the landowner and the Service work together to compile information about the land, including a map, the current management, and the management needs of the species and/or habitat.

3. The landowner and the Service determine the baseline condition of the property for the species -- the number and location of individuals, a habitat assessment, or a combination of the two.

4. The landowner and the Service identify voluntary actions that would provide a net conservation benefit for the species. They also determine the duration of the SHA, allowing enough time to achieve the desired benefit.

5. The landowner and Service develop a draft SHA that specifies management actions that will provide a net conservation benefit to the species. The draft plan should describe the current and anticipated management of the property (farming, ranching, timber management, etc.) It should also address the

monitoring needed to determine if the prescribed management actually benefits the species and/or its habitat.

6. The Service identifies any anticipated incidental take of listed species that might result from the management planned under the SHA, including any "incidental take" of a listed species that could be expected if the landowner chooses to return the property to its baseline condition when the agreement ends.

7. The landowner submits the completed SHA and an application for an "enhancement of survival permit" to the Service.

8. The Service then publishes an announcement in the Federal Register that it has received an application for an "enhancement of survival permit." A 30-day public comment period follows.

9. During the public comment period, the Service conducts internal reviews related to issuance of the requested permit.

10. Following a response to any public comments, and after incorporating any appropriate changes, the Service and the landowner approve and sign the final SHA. Assuming all criteria have been met, the Service then issues the enhancement of survival permit.

11. The landowner begins any new conservation actions and/or continues with existing practices identified in the SHA, and reports annually to the Service on the plan's progress.

Last updated: August 29, 2012

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Safe Harbor: A Tool to Help Recover Topminnow and Pupfish in Arizona

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Abstract—*The Arizona Game and Fish Department (Department) has developed a Safe Harbor Agreement (SHA) for four native fishes in Arizona. The SHA will allow Gila and Yaqui topminnow (*Poeciliopsis occidentalis *and* P. sonoriensis*) and desert and Quitobaquito pupfish (*Cyprinodon macularius *and* C. eremus*) to be released onto non-Federal lands while safeguarding landowner options for future property use. The SHA will assist recovery of these species by: creating replicate populations; creating partnerships between State, Federal, and other groups; minimizing stocking of mosquitofish and other nonindigenous species; providing for mosquito control; and educating those outside the native fish community about the plight of Arizona's native fishes.*

Introduction

Safe Harbor Agreements are a relatively new Endangered Species Act tool for non-Federal landowners. Only three have been completed in Arizona, and two of those were in the last year. The Arizona Game and Fish Department's Safe Harbor Agreement for topminnow and pupfish will be a proactive tool that will promote the conservation and recovery of these endangered species. The conservation status of Gila and Yaqui topminnow (*Poeciliopsis occidentalis* and *P. sonoriensis*) and desert and Quitobaquito pupfish (*Cyprinodon macularius* and *C. eremus*) is poor, recovery actions have been spotty, and a great deal of work is needed.

Safe Harbor

Much of the Nation's endangered species habitat is on non-Federal property. Conservation efforts on non-Federal lands are essential to the survival and recovery of many endangered and threatened species. Safe Harbor Agreements can provide the means to garner non-Federal property owners' support for species conservation on their lands. The assurances an SHA provides to non-Federal landowners ensure that voluntary conservation actions taken for listed species covered by an SHA on their property will not restrict uses of their property, except as provided in the SHA. SHAs can encourage landowners to manage their properties for the benefit of listed species, and they must be designed to achieve a net conservation benefit to these species. Many property owners are willing to voluntarily manage their properties to benefit listed fish, wildlife, and plants.

The Species

The Gila and Yaqui topminnow were listed as endangered in 1967, and the desert and Quitobaquito pupfish were listed as endangered in 1986 (USFWS 1967, 1986c). Since then, many conservation efforts have been attempted, but the status of all four species is only marginally better than when the species were listed (USFWS 1993; Minckley 1999; Weedman 1999). Basic life history information and recovery actions can be found in the species' recovery plans (USFWS 1993, 1994; Weedman 1999).

The Agreement

The SHA will assist recovery of topminnow and pupfish through five goals: creating replicate populations; creating partnerships between State, Federal, and other groups; minimizing stocking of mosquitofish and other nonindigenous species; providing for mosquito control; and educating those outside the native fish community about the plight of Arizona's native fishes.

Aldo Leopold (1953) once said: "To keep every cog and wheel is the first precaution of intelligent tinkering." The creation of refuge habitats for topminnow and pupfish has allowed us to intelligently tinker with recovery of these species. Refuge populations of topminnow and pupfish are currently held at museums, laboratories, universities, parks, and schools under various permits. The SHA will allow for the Arizona Game and Fish Department to hold a single Endangered Species Act permit at a range-wide level, thus allowing interested parties to "sign-on" to the permit through a Certificate of Inclusion.

Recovery of topminnow and pupfish will not occur solely due to the SHA, as most available natural habitat is on Federal lands. What will occur, however, is an increase in the number of fish refuges that will be available for wild site reestablishment. Use of the native topminnow and pupfish will also lead to a decrease in the perceived need for stocking of nonnative species to control mosquitoes and other insects, and education and outreach to educate the public about the value of our native natural resources. The SHA will facilitate the use of managed waters like effluent, stock ponds, and small public or private ponds that are increasingly major features of the Southwestern aquatic environment.

In recent years there have been an increased emphasis and interest in collaborative conservation. The SHA for topminnow

and pupfish will bring non-Federal land owners to the same table as the State and Federal agencies and will increase collaborative conservation for these four fishes in Arizona.

Nonnative aquatic species have had major detrimental impacts on native aquatic fauna and have been a major factor in the listing of topminnow and pupfish, as well as many other fishes native to the Gila basin (USFWS 1984, 1986a,b,c, 1991). Introduction of nonnative pathogens, parasites, plants, invertebrates, amphibians, and fish negatively affects the native fishes of the Southwest (Miller 1961; Robinson et al. 1996). The primary biological threat to the Gila topminnow is the nonnative western mosquitofish (*Gambusia affinis*), introduced to streams in the Southwest in the 1920s (Minckley 1999). Large scale reductions of Gila topminnow correspond strongly with the spread of mosquitofish.

Aquatic nonnative species are introduced and spread into new areas through a variety of mechanisms, intentional and accidental, and authorized and unauthorized (Fuller et al. 1999). These nonnative aquatic species include fishes, aquatic and semi-aquatic mammals, reptiles, amphibians, crustaceans, mollusks (snails and clams), insects, zoo- and phyto-plankton, parasites, disease organisms, algae, and aquatic and riparian vascular plants (Fuller et al. 1999). They affect native fish, including Gila topminnow, through predation (Courtenay and Meffe 1989; Marsh and Brooks 1989; Meffe 1985), competition (Baltz and Moyle 1993; Douglas et al. 1994; Schoenherr 1981), aggression (Meffe 1984), habitat alteration (Allen 1980), aquatic community disruption (Hurlbert et al. 1972; Ross 1991), introduction of diseases and parasites (Clarkson et al. 1997; Robinson et al. 1998), and hybridization (Dowling and Childs 1992; Echelle and Echelle 1997). Nonnative plants can reduce available habitat with abundant growth (e.g., water cress, giant salvinia), potentially cause loss of surface water (e.g., salt cedar), or alter ecosystem dynamics (Lovich and DeGouvenain 1998).

Allowing topminnow and pupfish to be used on non-Federal properties will reduce the public's use of nonnative fish. This will increase the number of topminnow and pupfish populations and minimize nonnative fish populations. Most movement of fish is not done legally by the Department, but illegally. Minimizing the number of populations of nonnative fish will help to reduce the spread of these problematic species.

The arrival of West Nile Virus in Arizona has created an additional, urgent need for this SHA. Since both topminnow and pupfish are known to prey on mosquito larvae as effectively as mosquitofish (Childs 2001; Walters and Legner 1980), having the SHA ready in 2004 will allow the use of topminnow and pupfish near the beginning of the mosquito season. This is a tremendous opportunity that will allow the Department and Service to market and publicize the SHA and native fishes. Making these fish available for release in suitable habitats to control mosquitoes will allow us to meet our goals for the SHA. This may create a substantial number of new populations, as well as encourage public institutions and private entities to think critically about ecosystem structure and management in terms of both mosquito control and native species recovery.

Education is always listed in species recovery plans as a task necessary to recover the species. However, since recovery plans are written and implemented by biologists with precious little time for anything but their core mission, effective and far-reaching education is rarely, if ever achieved. Because most threats impacting native fishes today are human caused or mitigated, education can go a long way to remove or reduce those threats. The two major causes of species endangerment in Arizona today are loss and modification of water from human causes and nonindigenous species such as mosquitofish and sunfishes. The propitious timing of the SHA and the arrival of West Nile Virus in Arizona is providing us with an incredible education opportunity that must be taken advantage of. Since both topminnow and pupfish are known to prey on mosquito larvae as effectively as mosquitofish (Childs 2001; Walters and Legner 1980), a tremendous marketing opportunity has presented itself that will provide us with a large audience and prodigious education opportunities. Making these fish available for release in suitable habitats to control mosquitoes will allow us to meet our five goals for the SHA, create partnerships essential to species conservation, and provide a positive public image of these fish as an environmentally beneficial biological control.

Plans and Implementation

Because of the amount of interest expressed previously by non-Federal landowners for having native fishes, and the increasing interest in mosquito control, we expect demand to initially outpace the supply of topminnow and pupfish. Therefore, the initial sites will be large sites and sites with the greatest education potential. Larger sites that receive fish early in the season can supply fish for stocking later efforts, increasing the supply of fish quickly. Utilizing other sites with high education potential will allow us to take advantage of the initial opportunity provided by the concern over mosquito control and mosquito borne diseases.

The SHA provides for two types of monitoring as required by Service policy and Federal regulation: (1) compliance monitoring to ensure that all commitments in the SHA are being met, and (2) biological monitoring to ensure that the biological goals of the SHA are being met and to help determine the effectiveness of its conservation program.

The SHA requires each landowner to comply with certain requirements. The Department will ascertain compliance to determine if each landowner is properly implementing those conservation commitments. The U.S. Fish and Wildlife Service is responsible for monitoring the Department's compliance with the ESA section 10(a)(1)(A) Permit.

The Department and the land owner will coordinate annual monitoring and reporting. Biological monitoring will address the status and distribution of fish populations established under the SHA. The biological monitoring may also address issues that require adjustment to the SHA's conservation program through adaptive management.

Biological monitoring will be funded and done primarily through the efforts of State and Federal agencies, academic institutions, conservation organizations, or other entities. Biological monitoring will be conducted uniquely by the Cooperator and agency, academic, and conservation personnel for each property as agreed upon by the Department and the Cooperator. Ultimately, the Department must ensure that required monitoring is completed for each property. The Department, as the

permittee under the Agreement, will submit an annual report to the Service describing biological monitoring activities.

There is no additional funding for the Service to assist with implementation of the Agreement. All Service work time is in addition to other duties. The Department may be eligible for ESA Section 6 funding to assist with implementation costs. Other external funding sources that the Department may use to implement the SHA are the continuing Section 6 topminnow/pupfish project and Heritage funds.

The draft agreement and Environmental assessment were released for a 30-day public comment period that was announced in the Federal Register. We addressed public comments and made changes as necessary to the SHA. When the SHA is signed and the permit issued, we will advertise it as widely as possible. In late 2003 and April 2004, a Tucson newspaper ran articles on the potential SHA. The first article was picked up nationally in newspapers and on CNN, with a West Nile Virus and human health focus.

Conclusion

The Department's topminnow and pupfish SHA will contribute significantly to the conservation and recovery of the species. Of the five benefits we hope to achieve with the SHA: replicate populations, partnerships, nonindigenous species reduction, mosquito control, and education; education may be the greatest benefit. However, the potentially extensive use of these native fishes in the ever increasing well of human-created and managed waters should not be underestimated. Effective education has been the weakest link in the conservation efforts for these species. The media coverage and other opportunities for outreach are likely to be the most significant education to occur regarding native fishes and their plight in Arizona.

References

Allen, A. W. 1980. *Cyprinus carpio*. In: Lee, E. S.; Gilbert C. R.; Hocutt, C. H.; Jenkins, R. E.; McAllister, D. E.; Stauffer, J. R.; Jr., eds. Atlas of North American freshwater fishes. Raleigh, NC: North Carolina State Museum of Natural History: 152.

Baltz, D. M.; Moyle, P. B. 1993. Invasion resistance to introduced species by a native assemblage of California stream fishes. Ecological Applications 3(2): 246-255.

Childs, M. R. 2001. Comparison of Gila topminnow and mosquitofish as biological control agents of mosquitoes. Report to U.S. Bureau of Reclamation, Phoenix Area Office, Federal Grant 99-FG-32-0080. Phoenix, AZ: Arizona Game and Fish Department.

Clarkson, R.W.; Robinson, A. T.; Hoffnagle, T. L. 1997. Asian tapeworm (*Bothriocephalus acheilognathi*) in native fishes from the Little Colorado River, Grand Canyon, Arizona. Great Basin Naturalist 57(1): 66-69.

Courtenay, W. R., Jr.; Meffe, G. K. 1989. Small fishes in strange places: A review of introduced poeciliids. In: Meffe, G. K.; Snelson, F. F., Jr., eds. Ecology and evolution of livebearing fishes (Poeciliidae). Englewood Cliffs, NJ: Prentice Hall: 319-331.

Douglas, M. E.; Marsh, P. C.; Minckley, W. L. 1994. Indigenous fishes of Western North America and the hypothesis of competitive displacement: *Meda fulgida* (Cyprinidae) as a case study. Copeia 1994(1): 9-19.

Dowling, T. E.; Childs, M. R. 1992. Impact of hybridization on a threatened trout of the Southwestern United States. Conservation Biology 6(3): 355-364.

Echelle, A. A.; Echelle, A. F. 1997. Genetic introgression of endemic taxa by non-natives: A case study with the Leon Springs pupfish and sheepshead minnow. Conservation Biology 11(1): 153-161.

Fuller, P.; Nico, L.; Williams, J. D. 1999. Nonindigenous fishes introduced into inland waters of the United States. Special Publ. 27. Bethesda, MD: American Fisheries Society: 613 p.

Hurlbert, S. H.; Zedler, J.; Fairbanks, D. 1972. Ecosystem alteration by mosquitofish (*Gambusia affinis*) predation. Science 175: 639-641.

Leopold, Luna B., ed. 1953. Round River: From the journals of Aldo Leopold. New York: Oxford University Press.

Lovich, J .E.; DeGouvenain, R. C. 1998. Saltcedar invasion in the desert wetlands of the Southwestern United States: ecological and political implications. In: Majumdar, S. K.; Miller, E. W.; Brenner, F. J. Ecology of wetlands. Philadelphia, PA: The Pennsylvania Academy of Science: 447-467 .

Marsh, P. C.; Brooks, J. E. 1989. Predation by Ictalurid catfishes as a deterrent to reestablishment of hatchery-reared razorback suckers. Southwestern Naturalist 34(2): 188-195.

Meffe, G. K. 1984. Effects of abiotic disturbance on coexistence of predator-prey fish species. Ecology 65(5): 1525-1534.

Meffe, G. K. 1985. Predation and species replacement in American Southwestern fishes: A case study. Southwestern Naturalist 30: 173-187.

Miller, R. R. 1961. Man and the changing fish fauna of the American Southwest. Papers of the Michigan Academy of Science, Arts, and Letters. XLVI: 365-404.

Minckley, W. L. 1999. Ecological review and management recommendations for recovery of the endangered Gila topminnow. Great Basin Naturalist 59(3): 230-244.

Robinson, A. T.; Hines, P.; Sorensen, J. A.; Bryan, S. D. 1996. Parasites, pathogens, and health of fishes in the Verde River, Arizona, and implications for management of razorback suckers (*Xyrauchen texanus*) and Colorado squawfish (*Ptychocheilus lucius*). Proceedings of the Desert Fishes Council 28: 73-74.

Robinson, A. T.; Hines, P. P.; Sorenson, J. A.; Bryan, S. D. 1998. Parasites and fish health in a desert stream, and management implications for two endangered fishes. North American Journal of Fisheries Management 18: 599-608.

Ross, S. T. 1991. Mechanisms structuring stream fish assemblages: Are there lessons from introduced species. Environmental Biology of Fishes 30: 359-368.

Schoenherr, A. A. 1981. The role of competition in the replacement of native fishes by introduced species. In: Naiman, R. J.; Soltz, D. L., eds. Fishes in North American deserts. New York: John Wiley & Sons: 173-204.

U.S. Fish and Wildlife Service (USFWS). 1967. Native fish and wildlife. Endangered Species. Federal Register 32(48): 4001.

USFWS. 1984. Sonoran topminnow recovery plan. Albuquerque, NM: U.S. Fish and Wildlife Service. 56 p.

USFWS. 1986a. Endangered and threatened wildlife and plants; determination of threatened status for the spikedace. Federal Register 51(126): 23769-23781.

USFWS. 1986b. Endangered and threatened wildlife and plants; determination of threatened status for the loach minnow. Federal Register 51(208): 39468-39478.

USFWS. 1986c. Endangered and threatened wildlife and plants; determination of endangered status and critical habitat for the desert pupfish. Federal Register 51(61): 10842-10851.

USFWS. 1991. Endangered and threatened wildlife and plants; determination of critical habitat for four Colorado River endangered fishes. Federal Register 59(54): 13374-13400.

USFWS. 1993. Desert pupfish recovery plan. Albuquerque, NM: U.S. Fish and Wildlife Service.

USFWS. 1994. Yaqui fishes recovery plan. Albuquerque, NM: U.S. Fish and Wildlife Service.

Walters, L. L.; Legner, E. F. 1980. Impact of the desert pupfish, *Cyprinodon macularius*, and *Gambusia affinis affinis* on fauna in pond ecosystems. Hilgardia 48: 1-18.

Weedman, D. A. 1999. Draft Gila topminnow, *Poeciliopsis occidentalis occidentalis*, revised recovery plan. Prepared by Arizona Game and Fish Department for U.S. Fish and Wildlife Service, Albuquerque, NM.