

**BIOLOGICAL EVALUATION FOR FOUR WELLS IN THE UPLANDS ALONG  
THE SAN FRANCISCO RIVER GREENLEE COUNTY, ARIZONA**

**Prepared for: U.S. Fish and Wildlife Service**

**Prepared By: Bureau of Land Management**

**January 2010**

## **Background:**

The Permittee for the Bureau of Land Management, San Francisco River Allotment has requested that the Bureau consider authorizing the drilling and water production from four proposed wells on the San Francisco Allotment. The San Francisco Allotment is located in Greenlee County along the San Francisco River approximately five miles north of the town of Clifton, Arizona. The allotment contains 3925 acres of public land 1020 acres of state land and 460 acres of private land. The Bureau currently permits use by 51 head of cattle. Public land grazing on this allotment has been consulted on in the Programmatic Biological Opinion for the Safford /Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona #2-21-96-F-160, as amended. Since the final grazing BO came out, critical habitat for loach minnow has been designated requiring consultation. Pertinent excerpts from the referenced BO follow.

*The proposed action for the reference BO in part is to implement the Bureaus Standards and Guides Regulations (pages 20-22) in part these guidelines state:*

*“New facilities are located away from riparian-wetland areas if they conflict with achieving or maintaining riparian-wetland function. Existing facilities are used in a way that does not conflict with riparian-wetland functions or are relocated or modified when incompatible with riparian-wetland functions”.*

*And*

*“Intensity, season, and frequency of use and distribution of grazing use should provide for growth and reproduction of those plant species needed to reach desired plant community objectives”.*

### **Mitigation Measures stated for Loach Minnow, Pages 55-56, of BO #2-21-96-F-160**

*12. To protect the loach minnow and its habitat:*

*(a) Direct effects from livestock grazing that may jeopardize the continued existence of the loach minnow will be eliminated in the riparian areas of Bureau-administered lands on the San Francisco River and Aravaipa Creek. This may include elimination of grazing, or other range management options.*

*(b) The Bureau will evaluate all stock tanks on Bureau lands in the watersheds of Aravaipa Creek or the San Francisco River above Clifton for their degree of risk to introduce nonnative fish to habitats of the loach minnow. The Bureau will then, in conjunction with the Service and Arizona Game and Fish Department, develop and implement management techniques or practices for tanks in each risk category. Management techniques may include, but are not limited to, replacement of existing tanks with alternate water sources, treatments to eliminate fish, or other appropriate methods.*

*Proposed tanks will undergo the same evaluation for risk, and will include development of a mitigation plan to be approved by the Service.*

*(c) Livestock grazing will be deferred or otherwise managed to assure conditions in the watersheds of Aravaipa Creek and the San Francisco River above Clifton are maintained or improved. Action will be taken to ensure that range condition (see footnote on page 47) does not deteriorate in the South Rim, Painted Cave, and Hell Hole allotments, and in the watershed of the San Francisco River in the San Francisco, and Red Hickey Hills, and Metcalf allotments. Action will be taken within three years on Bureau lands in portions of these allotments in fair condition that will result in a long-term upward trend in range condition (see footnote on page 47).*

*(d) The Bureau will cooperate with the Service and Arizona Game and Fish Department to identify other site-specific measures to protect loach minnow populations from effects of the grazing program as specific effects are identified. These measures could include officially deferring riparian grazing on the Quintana, Brandenburg Mountain, Red Hickey Hills, and San Francisco allotments, surveys of stock waters for nonnative fish, replacement of nonnative fish populations with native fish in perennial stock ponds, and implementation of a prescribed fire plan in the semi-desert grassland areas in the watersheds containing loach minnow to enhance watershed function*

***Reasonable and Prudent Measures and Terms and Conditions, Pages 157-160, of BO #2-21-96-F-160***

***REASONABLE AND PRUDENT MEASURES***

*The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loach minnow:*

- 1. Action shall be taken to eliminate direct effects of grazing on the loach minnow in the San Francisco River and Aravaipa Creek.*
- 2. The Bureau shall coordinate with the Service to ensure that project-level activities are designed to minimize take of loach minnows.*
- 3. Measures shall be included in project-level activities to reduce take of loach minnows to the extent possible.*
- 4. The Bureau shall monitor grazing activities and incidental take resulting from the proposed action and report to the Service the findings of that monitoring.*

***TERMS AND CONDITIONS***

*In order to be exempt from the prohibitions of section 9 of the Act, the Bureau must comply with the following terms and conditions in regard to the proposed action. These terms and conditions implement the reasonable and prudent measures described above.*

*With the exception of measure (a), the Bureau's mitigation measures for loach minnow are included here by reference. Terms and conditions are nondiscretionary.*

*The following term and condition implements reasonable and prudent measure number 1:*

*a. No grazing of cattle shall occur on Bureau-administered lands in the riparian corridors of Aravaipa Creek or on the San Francisco River in the San Francisco and Red Hickey Hills allotments through the life of the project (December 31, 2006). Actions shall be taken, including fencing, monitoring for and removal of trespass cattle, and other measures to ensure grazing does not occur on Bureau lands in Aravaipa Creek or the San Francisco River on the San Francisco (4002) and Red Hickey Hills (4005) allotments.*

*b. Trailing of cattle in loach minnow habitat shall be limited to 10 cattle through Aravaipa Creek on the Hell Hole allotment no more than three times per year, and trailing along the San Francisco River in the San Francisco allotment for no more than 0.25 mi and no more than twice a year. Photos of typical effects of trailing shall be taken in both the Hell Hole allotment and the San Francisco allotment. Trailing shall be conducted so that 1) cattle are present for the shortest period of time possible in riparian/aquatic areas, 2) the shortest route across the stream/river is taken, 3) trailing across streams/ivers is conducted as infrequently as possible, and 4) whenever possible, trailing is conducted when bankline soil moisture is relatively low.*

*The following term and condition implements reasonable and prudent measure number 2:*

*A mitigation plan shall be developed by the Bureau in coordination with the Service for each range improvement project that may adversely affect the loach minnow or its habitat, prescribed fire, and vegetation management project in the allotments in Table 11 and in the San Francisco River watershed in the San Francisco, Red Hickey Hills, and Metcalf allotments. Mitigation plans for prescribed fire shall limit to the extent practicable the possibility that fire would spread to Aravaipa Creek or the San Francisco River. Mitigation plans shall be approved by the Service.*

*2. The following terms and conditions implement reasonable and prudent measure number 3:*

*a. All reasonable efforts shall be made to minimize disturbance within the wetted areas of Aravaipa Creek and its tributary channels, and the San Francisco River.*

*b. The Bureau shall authorize no off-road use of heavy equipment during project activities within the wetted areas of Aravaipa Creek and the San Francisco River.*

*c. All reasonable efforts shall be made to ensure that no pollutants enter surface waters during action implementation.*

*d. Grazing in allotments in Table 11 and the San Francisco, Red Hickey Hills, and Metcalf allotments shall strictly adhere to the Bureau's Arizona Standards and Guidelines, the Upland Livestock Utilization Standard, Safford Drought Policy, Arizona Ephemeral Grazing Policy, and Riparian Area Policy.*

*3. The following terms and conditions implement reasonable and prudent measure number 4:*

*a. Inventory, monitoring, and evaluations as described in the Bureau's proposed action (Bureau 1996a) and applicable sections of the Bureau Manual shall be conducted in the allotments in Table 11 and in the watershed of the San Francisco River in the San Francisco, Red Hickey Hills, and Metcalf allotments.*

*b. The Bureau shall submit annual monitoring reports to the Arizona Ecological Services Field Office by March 15 of each year beginning in 1998. These reports shall summarize for the previous calendar year: 1) the effectiveness of these terms and conditions, and 2) documentation of take, if any. If such activities or monitoring occur, summaries shall also be included of 1) grazing actions initiated or completed including range improvement projects, prescribed fires, and vegetation management in the allotments in Table 11 and in the San Francisco River watershed in the San Francisco, Red Hickey Hills, and Metcalf allotments; 2) allotment monitoring results; 3) fish monitoring data, including numbers and locations of loach minnow observed, presence of nonnative fish, etc.; 4) riparian, stream channel photopoint, channel geomorphology transects, and other monitoring data collected; 5) photo documentation of effects of trailing, and 6) records of downed or damaged exclosure fencing or incidents of cattle within the Bureau-administered riparian corridors of Aravaipa Creek and the San Francisco River, and action taken to remove the cattle. The report shall also make recommendations for modifying or refining these terms and conditions to enhance loach minnow protection or reduce needless hardship on the Bureau and its permittees.*

#### **CONSERVATION RECOMMENDATIONS**

*Sections 2(c) and 7(a) (1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a) (1) responsibilities for loach minnow. In furtherance of the purposes of the Act, we recommend implementing the following actions:*

*1. The Bureau should develop and implement a prescribed fire plan to enhance watershed function in the semi-desert grasslands of the Aravaipa and San Francisco River watersheds.*

2. *The Bureau should conduct surveys for the loach minnow in the San Francisco River through the San Francisco and Red Hickey Hills allotments and report to the Service the findings of such surveys.*

*In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.*

To implement these mitigation measures and term and conditions the Bureau built gap fencing (fencing that connects bluffs and rock outcrops that effectively restrict cattle movement) along both sides and across the San Francisco River. This fencing isolated 1.25 miles of the San Francisco River in the northern end of the allotment from the state and private lands to the south. The permittee was issued grazing decision removing the public land portion of the riparian area of the San Francisco from his allotment. Maintenance of these fences is the responsibility of the permittee, but maintenance has proven to be difficult, particularly the maintenance of the water gap across the river.

The Bureau monitors fish on then public land portion of the San Francisco River on an annual basis.

### **Purpose for the Proposal**

The four wells are intended to replace water currently consumed by livestock from the San Francisco River on state and private land. The wells are part of a larger project altering pastures and moving grazing use along the river on private and state land to the uplands that are predominately public lands. A Cooperative Resource Management Plan is currently being developed to integrate all livestock improvements in the development of a long term grazing plan. The permittee has stated his intent to remove livestock grazing from the riparian areas on private and state land when the projects are completed and the cooperative plan is implemented (see press release). In addition to the wells the Bureau is aware of proposed fence construction, a well on private land and possibly the incorporation of a private land pasture leased form Freeport MacMoRan. These are actions on private lands that are interrelated/interdependent actions to the wells on public lands and are necessary to implement a cooperative management plan.

The expected outcomes from the cooperative management plan are, better water quality, better upland livestock distribution, better control of livestock on the public land portion of the river, and removal of livestock grazing from the riparian area of the San Francisco River on approximately one mile of state lands and approximately one and a half miles of private lands. The Natural Resource Conservation Service (NRCS) in coordination with the livestock operator has developed the private land fencing plan that will provide the upland pastures and effectively exclude livestock from the San Francisco River through the entire length of the allotment. (See attached NRCS map showing fence Plan). These projects are supported and grant money provided by the NRCS, Arizona Department of Agriculture (See attached grant application) and the Arizona Department of

Environmental Quality (attached news release). The Gila Watershed Partnership is assisting in this project.

### **Proposed Action on Bureau Administered Public Land**

Currently no permanent water exits in the upland area of the allotment. Livestock water directly from the San Francisco River or water is pumped from shallow wells next to the river and hauled to troughs in the uplands. Four wells are proposed to be drilled on public lands on the uplands above the San Francisco River (see attached well location map).

All water from the proposed wells will be used solely for livestock and wildlife. When livestock are not using a watering facility, troughs will remain full and control appurtenances such as float valves, wildlife escape ramps (Bureau acceptable design) and general maintenance will continue. Wells will be defined as wells and associated pipeline, storage tanks and troughs. Total surface disturbance would be approximately 3.25 acres or less. All proposed well locations are within 40 feet of an existing road, and are associated with previous ground disturbing activities (see map and photos). No road maintenance is anticipated.

There are four proposed wells, henceforth referred to as Wells #1, #2, #3 and #4. Well #2 would service two pastures (northern portion). Wells #1 and #4 would service the lower (southern) regions of the allotment. Distances (direct, "as the crow flies") are approximately .8 miles between Well #1 and Well #2. Cross-country distance would be slightly greater. Distance between Well #1 and Well #4 would be approximately .5 miles (direct), slightly more cross-country. Concurrent fence projects off public land are needed to implement rotation options and exclude cattle from riparian vegetation along the river. Coordination has occurred between the Permittee, BLM and NRCS (Natural Resource Conservation Service).

All construction will comply with USDA Natural Resources Conservation Service (Conservation Practice Standard, Arizona. Pipeline (Code 516), Water Facility (Code 614) Pumping Plant (Code 533E), Well (Code 642); Engineering Field Code, Arizona Standard Engineering Drawings for Pumps & Pipelines and Livestock Water Facilities, 2002).

The project would use 10,000 gallon round rock storage tanks (NRCS Field Office Technical Guide, Section IV, Code 614, and Watering Facility. NRCS-AZ, 2002), each feeding two steel troughs (NRCS Field Office Technical Guide, Section IV, Code 614, Code 561 (Heavy Use Area Protection) Watering Facility (NRCS-AZ, 2002; BLM internal wildlife specifications). Distance from storage tank to troughs will be less than 200 feet. Pipe (above ground) will be 2 inch Polyethylene 200 psi and will comply with NRCS specifications (NRCS Field Office Technical Guide, Section IV, Code 516, Pipeline. NRCS-AZ, 2002). Well drilling will be done by a vehicle mounted drill (estimated depth: 400 – 450 feet), (NRCS Field Office Technical Guide, Section IV, Code 642, Water Well. NRCS-AZ, 2002), and comply with BLM Environmental Considerations (Ron Peru, Civil Engineer, Safford Field Office).

The proposed wells (4), all located on BLM (see map) will not increase preference (number of permitted livestock), currently set at 51 AU (animal units). However, additional livestock maybe associated with the privately owned pasture that is outside of the Bureau's operation and control. The primary objectives are to better distribute livestock on the uplands, provide year round wildlife water and prevent/limit livestock access to adjacent riparian areas along the San Francisco River.

### **Description of the Affected Environment**

A good description of the San Francisco River and its watershed is found in the Apache-Sitgreaves National Forest, Blue and San Francisco Rivers Consultation #2-21-01-F-307.

#### **Project Area and Action area**

The project area is limited the boundary of the San Francisco Allotment. The action Area includes the allotment plus the San Francisco River to the confluence with the Gila River (see attached map). The confluence of the San Francisco River and the Gila River was chosen as the end point for the action area since influences from the action below that point would not be discernable from those of the Gila River.

#### **Description of Riparian and Aquatic Habitat**

Along the San Francisco River a mesquite forest, or "bosque", grows on high terraces. Vegetation on the river edge develops into a cottonwood/willow community that persists several years between floods a few trees established in flood protected sites can survive for much longer periods of time.

Since the San Francisco River is subject to flash flood and is constrained, functional flood plains cannot develop. The river at low discharge is wide, shallow and sandy. The exception to this occurs where the channel meets canyon walls. In these spots large, deep pools have been scoured in periods of high flow. These deep pools provide a refuge for nonnative fish that feed on or compete with native species. A substantial self-sustaining population of introduced catfish exists within the San Francisco River.

#### **Recreation**

The proposed action is in a recreation area that provides for a variety of dispersed recreational activities. The river is just outside the communities of Clifton and Morenci and is less than an hour drive for the adjacent Gila Valley communities. The River is accessed by a well maintained road that traverses along and through the River. Recreational use occurs year round, The proposed action area supports camping, backpacking, hiking, picnicking, recreational driving, fishing, hunting, horseback riding, water play, tubing, kayaking, bird watching, photography, nature study and mountain biking.



## Livestock Grazing

The BLM has been began taking action to limit cattle use in riparian areas for approximately 25 years, and officially excluded cattle from Public land portion of the San Francisco River as a result of the terms and conditions of the 1996 Grazing BO. A water gap and upland fencing was constructed to separate the public land portion of the river from the downstream portions of the River that are state and private lands. However, the water gap is very difficult to maintain, being damaged with every high flow event. Therefore livestock still make their way upstream on to the Public land portion of the river on a regular basis. Livestock damage seedling trees, which can alter vegetative density, growth and form. Livestock also trample vegetation and may form trails through otherwise dense tree stands, opening up the understory. The Bureau continues to work on ways to reduce incidental trespass. This proposed project as part of the larger effort is inclusive of the river on the allotment and likely would represent the best effort to date to limit livestock use of the San Francisco River.

## Mining Activity

The area around and through the san Francisco Allotment has been and still is used for mineral extraction. The Freeport MacMoRan Morenci operation is approximately one and a half miles west of the allotment. Numerous old abandoned mine shafts, and current mining claims occur throughout the allotment. Metals, primarily copper are mined, but mining operations for limestone and agate also occur in the area.

## Listed and Proposed Species included in this Evaluation

### Greenlee County January 2010

<u>Common Name</u>	<u>Scientific Name</u>	<u>Listing Status</u>	<u>Summary</u>
Apache trout	<i>Oncorhynchus gilae apache</i>	T	No effect. Occurs in rivers and stream generally above 6000 feet in elevation. There is no known occurrence or suitable habitat within five miles of the action area
Chiricahua leopard frog	<i>Lithobates (Rana) chiricahuensis</i>	T	No effect. The species has been known to occur in the upper reaches of the San Francisco River, upstream of the San Francisco Allotment. The average elevation of the San Francisco River through the allotment is 3500 feet which would be lower than the species is thought to occur.
Gila chub	<i>Gila intermedia</i>	E	No effect. Occupied and designated critical habitat for Gila chub exist in tributaries to the San Francisco River (Dix Creek and Harden Cienega Creek) approximately six miles upstream of the allotment. There is currently no evidence of the species spreading downstream of these locations.
Gila trout	<i>Oncorhynchus gilae</i>	T	No effect. Historically Gila trout occurred in the San Francisco River and its tributaries above 5000 feet in elevation. There are currently no known occurrences of the species in the San Francisco River.
lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>	E	No effect. Known roosts and foraging habitat for this species are greater than five miles away from the action area.
loach minnow	<i>Tiaroga cobitis</i>	T	May affect not likely to adversely affect. The San Francisco River is

			occupied habitat for the species, but it has not been documented below the Forest Service boundary in recent years. The San Francisco is still suitable habitat and designated critical habitat, a population in very low number may still exist in the river south of the forest boundary.
Mexican gray wolf	<i>Canis lupusbaileyi</i>	DR, E, EXPN, T	No effect. The allotments northern boundary with the Forest Service is also the southern boundary of the experimental non-essential population area of the wolf. This proposed action is outside of the experimental non-essential reintroduction area.
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	No effect. Known occurrences, designated critical habitat, PACs and suitable habitat is greater than 5 miles away.
razorback sucker	<i>Xyrauchen texanus</i>	E	May affect not Likely to adversely affect. The San Francisco River is suitable habitat. The species has not been documented in the San Francisco River in recent years. Although, a population in very low number may still exist in the river
southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	No effect. Known nesting and suitable habitat occurs greater than five miles away.
spikedace	<i>Meda fulgida</i>	T	May affect not likely to adversely affect. The San Francisco River is historical habitat for the species, but it has not been documented recently. The San Francisco is still suitable habitat and a population in very low number may still exist in the river.
yellow-billed Cuckoo	<i>Coccyzus americanus</i>	C	Yellow-billed Cuckoo likely occur along the San Francisco River, however consultation is not required on candidate species.

E – Endangered

T – Threatened

C – Candidate

EXPN – Experimental Population, Non-Essential

DR – Delisted Taxon, Taxonomic Revision

Reference <http://arizonaes.fws.gov/>

## Description of Species Affected

### Spikedace (*Meda fulgida*)

The spikedace listed threatened (51 FR 23769, July 1, 1986) with critical habitat (72 FR 13356, March 21, 2007). It is a small (3 in (7.6 cm) long), slim fish with silvery sides and a "spine" on the dorsal fin. Breeding males are a brassy golden color. It is found in moderate to large perennial streams, where it inhabits moderate to fast velocity waters over gravel and rubble substrates. Specific habitat consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges. Recurrent flooding helps the spikedace maintain its competitive edge over invading exotic species. Typically occupied streams are found under 6,000 feet (1,829 m) in elevation.

Once common throughout much of the Gila River drainage above Phoenix, Arizona, including the Gila, Verde, Agua Fria, Salt, San Pedro, and San Francisco rivers. Currently in Arizona, populations are found in Aravaipa Creek, and are believed to be present in the Verde River, Eagle Creek, and the middle Gila River within Graham, Pinal,

Greenlee, and Yavapai counties. In New Mexico, the spikedace is found in the mainstem Gila River, as well as in the lower end of West, Middle, and East forks of the Gila River within Hidalgo, Grant, and Catron counties. Populations were reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties, and in Fossil Creek, Gila County, in 2007; Bonita Creek in Graham County, Arizona, and the San Francisco River in Catron County, New Mexico in 2008.

The reasons for the species decline include habitat destruction due to damming, channel alteration, riparian destruction, channel downcutting, water diversion and groundwater pumping; and the introduction and spread of exotic predatory and competitive fish species.

More information can be found in the Programmatic Biological Opinion for the Safford /Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona #2-21-96-F-160, the Apache- Sitgreaves National Forest, Blue and San Francisco Rivers Consultation #2-21-01-F-307 and at <http://www.fws.gov/southwest/es/arizona/Spikedace.htm>.

#### Loach Minnow (*Tiaroga cobitis*)

The loach minnow was listed Threatened (51 FR 39468, October 28, 1986) with critical habitat (72 FR 13356, March 21, 2007). The loach minnow is a small (less than 3 inches (8 cm) long), slender, elongated fish. Olive colored, with darker, irregular spotting along sides and dull white spots at the base of the dorsal and caudal fins. Breeding males develop vivid red-orange markings. They are a bottom dweller of small to large perennial creeks and rivers, typically in shallow turbulent riffles with cobble substrate, swift currents, and filamentous algae. Found below 8,000 feet (2,438 m) elevation. Recurrent flooding is instrumental in maintenance of quality habitat.

The loach minnow was once common throughout much of the Gila River system north of Phoenix, Arizona, including the Gila, Blue, Tularosa, White, Verde, Salt, San Pedro, and San Francisco rivers in Arizona and New Mexico, as well as some of their tributaries. Present populations are geographically isolated and inhabit the upstream ends of their historical range. The species persists in Arizona in limited reaches in the East Fork of the White River (Navajo County), Aravaipa Creek, Deer Creek, and Turkey Creek (Graham and Pinal counties), San Francisco and Blue Rivers and Eagle, Campbell Blue and Little Blue creeks (Greenlee County). In New Mexico, the species is found in the Gila and San Francisco rivers and some of their tributaries, including the West, Middle, and East forks of the Gila River, the Tularosa River, and Dry Blue, Pace, Frieborn, and Negrito creeks in Catron, Grant, and Hidalgo counties. A population was recently found in Bear Creek, a tributary to the Gila River. Populations were reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties, and in Fossil Creek, Gila County in 2007.

Reasons for the decline in population are attributed to habitat destruction due to damming, channel alteration, riparian zone destruction, channel down-cutting, water

diversion and groundwater pumping; and the introduction and spread of exotic predatory and competitive fish species.

More information can be found in the Programmatic Biological Opinion for the Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona #2-21-96-F-160, the Apache- Sitgreaves National Forest, Blue and San Francisco Rivers Consultation #2-21-01-F-307 and at <http://fws.gov/southwest/es/arizona/Loach.htm>.

#### Razorback sucker (*Xyrauchen texanus*)

The razorback sucker was listed endangered (56 FR 54957, October 23, 1991) with critical habitat (59 FR 13379, March 21, 1994). The species head is flattened on top and the body is stout with olive-brown above to yellowish on the belly. A long, high, sharp-edged keel-like hump is found behind the head. The head and tail are quite dark in breeding males. It can grow to 0.9 m (3 ft) in length and over 2.7 kg (6 lbs.) in weight. The razorback sucker is typically found in backwaters, flooded bottomlands, pools, side channels and other slower moving habitats under 1,829 m (6,000 ft) elevation. Historically found in areas near strong currents.

The razorback sucker is endemic to the Colorado River Basin, and formerly occurred in all major rivers and larger streams in the Basin and was once the most widespread and abundant of the Basin's big-river fishes. Currently in the Lower Basin, populations are isolated to Lakes Mohave, Mead, and the lower Colorado River below Havasu. In the Upper Basin, small remnant populations are found in the Green, Yampa, and mainstream Colorado rivers. Also found in the San Juan River near the New Mexico-Utah border. The species is found in parts of Greenlee, Mohave, Pinal, Yavapai, Yuma, La Paz, Maricopa, Gila, Coconino, and Graham counties, Arizona.

The species declined due to alteration of river conditions and loss of habitat caused by dam construction, irrigation dewatering and channelization; and introduction of exotic fish species, such as black bullhead, carp, and channel catfish.

More information can be found in the Programmatic Biological Opinion for the Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona #2-21-96-F-160, and at <http://fws.gov/southwest/es/arizona/htm>.

#### **Analysis of Effects**

The general direct and indirect effects of livestock grazing on riparian areas and aquatic species are well documented in previous biological opinions. Grazing opinions specific to the San Francisco River include the Programmatic Biological Opinion for the Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona #2-21-96-F-160, and the Apache- Sitgreaves National Forest, Blue and San Francisco Rivers Consultation #2-21-01-F-307. Critical habitat for loach minnow was designated after the

grazing BO was finalized, therefore consultation is required for may affect determinations. Since all three species considered in this evaluation are fish and occur or potentially occur in the San Francisco River within the allotment direct and indirect impacts will be consider the same for all species.

#### Direct Effects

Livestock grazing can directly affect water quality by altering stream banks, stream side vegetation and the depositing of waste into the surface water. Other direct effects include, direct consumption of surface water, disruption of egg masses and possibly trampling of individuals. The direct effects of livestock grazing on public lands have been previously addressed in (#2-21-96-F-160). However, there are interrelated and interdependent actions related to the proposed development of the upland wells. If completed foreseeable actions will result in approximately 200 acres of the 100 year floodplain on private and state land being fenced off making it possible to exclude cattle from the lower portion of the San Francisco River. If completed and livestock are excluded direct negative effects from livestock grazing on the private and state lands would be eliminated to the extent possible, while still allowing the allotment to be grazed. This would be a positive benefit to the three species. In addition if livestock are removed from the private and state land portions of the river, there may not be a need for the water gap at the public land boundary, since there would be less likely hood of cattle in the river working their way upstream. Trespass livestock on the Public land portion of the river would be less likely and provide for better compliance with the terms and conditions of the Grazing BO.

#### Indirect Effects

Indirect effects of grazing on the allotment have been previously addressed in (#2-21-96-F-160). However, the Bureau determined that the effects of the proposed wells on surface flow and the effects of shifting grazing use from private and state lands to public land warranted further analysis.

#### Effects on Surface Flow

Currently the 51 head of livestock permitted either consume directly out of the river or water is hauled from shallow wells next to the river to upland troughs. Due to the close connection of the shallow well(s) to the surface water all of the current consumption is considered surface water.

Vallentine (#####) in his text book "Range Development and Improvements" indicated that lactating cows on dry range in Oregon would consume 12-16 gallons per day. Buffering this to provide for a high end estimate on daily consumption we consider 20 gallons a day to be maximum consumption. Therefore, 51 head currently consume a maximum of 1020 gallons per day of the Rivers surface flow.

From 1914 till 2008 the stream flow gauge at Clifton has averaged a monthly flow of 223 cubic feet per second or 1673 gallons per second. The lowest monthly flow ever recorded was 11 cubic feet per second for June of 1956. The lowest monthly flow recorded would be 82.5 gallons per second or 7,128,000 gallons per day. At the maximum current livestock surface water usage (1020 gallons per day) would equate to 0.000143 of the daily water flow at the lowest water flow recorded. The change in flow from this amount of use is not likely measurable and is discountable.

The maximum water withdrawal from the four proposed wells would be the maximum consumed by livestock, that consumed by upland wildlife and water loss associated with leaks and evaporation. An estimate of twice what livestock alone would consume is considered in this analysis. This would be 2040 gallons per day or 510 gallons per day per well. The total increase in water use from the proposed action is 1020 gallon per day.

The influence of subsurface water from wells on surface water flow depends on the depth of the subsurface water, the distance from the surface flow and the geology (permeability, fractures, faults etc.) of the subsurface. Most, but likely not all of the subsurface flow in the San Francisco River Watershed will eventually make its way into the surface flow of either the San Francisco River or the Gila River. At this point before the wells are drilled, there is no way of knowing if subsurface water exists at the proposed sites or what geologic constraints exist in the subsurface that would dictate how the subsurface water makes its way to surface flow. If all of the potential subsurface water tapped by the proposed wells were to contribute to the surface flow of the San Francisco River upstream of the Clifton flow gauge, and the estimate maximum use (current plus increase) were to occur then 0.000286 of the lowest surface flow ever recorded would be used. This amount would still be discountable.

#### Effects on Upland Vegetation

Surface and vegetation disturbance associated with the act of drilling the wells will be minimal the wells are located along existing roads and located in previously disturbed areas (see attached map and photographs).

Effects on upland vegetation in relation to riparian areas and watershed conditions have been addressed in previous biological opinions for the San Francisco river area (Programmatic Biological Opinion for the Safford /Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona #2-21-96-F-160, and the Apache- Sitgreaves National Forest, Blue and San Francisco Rivers Consultation #2-21-01-F-307). Conditions on upland areas in Southeastern Arizona are typically considered degraded primarily due to past livestock use. Alteration of current grazing use can help, but are not likely to result in any substantial change without programs of direct vegetation manipulation such as prescribed fire. This has been recognized by both the Bureau and the Service (see Grazing BO conservation recommendations above).

The San Francisco Allotment is characterized by steep rugged terrain making uniform livestock use impossible to achieve. Areas along roads and naturally flat area become

heavily used while steeper hillsides are lightly used. There are only a few livestock management remedies that can provide for more uniform use. Two management alternatives that can help are better distribution of water and salt and regular rest from grazing during the growing season. Implementation of these management tools are considered generally beneficial to upland vegetation communities that are grazed (proposed action Grazing BO above and Arizona Standards and Guides).

If the foreseen Cooperative Management Plan is implemented and 200 acres of riparian vegetation is removed from livestock use. It is assumed that the use will be absorbed on the uplands away from the river. The current grazing use is set at approximately six head per section or just over 100 acres per head. Even though riparian areas tend to produce more forage, the bureau establishes numbers based on upland forage. The use of two additional head of cattle on the uplands would increase total upland use by approximately four percent. This additional use is not likely to be statistically discernable in any measurements.

It is also assumed that under the cooperative management agreement that water will be better distributed and that a rest rotation grazing system will be implemented. These will be implemented to improve upland conditions; however as vegetation change in this environment is very slow, change would not likely be discernable in human time frames. As mentioned above direct vegetation manipulation through prescribed fire or other techniques, would result in quicker alterations of the vegetative community. It is likely that the benefits of better livestock distribution and rest rotation grazing would counter the negative impacts of the slightly higher grazing use. Again, there would likely be no discernable change from only grazing manipulation within human time frames. One potential positive from a rest rotation grazing system is that it may facilitate the ability to implement vegetation manipulation project such as prescribe fire and herbicide treatments.

#### Effects on Critical Habitat

Each primary constituent element of critical habitat for loach minnow are considered below with analysis:

1. Permanent, flowing water with no or minimal pollutant levels, including:
  - a. Living areas for adult loach minnow with moderate to swift flow velocities between 9.0 to 32.0 in/second (24 to 80 cm/second) in shallow water between approximately 1.0 to 30 inches (3 cm to 75 cm) in depth, with gravel, cobble, and rubble substrates;

*With the removal of cattle on the state and private lands, and better control of trespass livestock use on public land portions of the river, vegetation along the river should increase and associated wood and vegetative debris would be incorporated in the active channel. These results will create more diverse flow patterns and velocities. Also livestock trampling resulting in the physical break down of the river bank and fine*

*sediment release into the flow should be reduced. This will decrease fine sediments and increase available cobble, gravel and rubble.*

*It is unlikely that proposed and assumed changes in upland livestock use will result in any discernable changes in the aquatic habitat.*

b. Living areas for juvenile loach minnow with moderate to swift flow velocities between 1.0 and 34 in/second (3.0 and 85.0 cm/second) in shallow water between approximately 1.0 to 30 inches (3 cm to 75 cm) in depth with sand, gravel, cobble, and rubble substrates;

*See a. above*

c. Living areas for larval loach minnow with slow to moderate velocities between 3.0 and 20.0 in/second (9.0 to 50.0 cm/second) in shallow water with sand, gravel, and cobble substrates;

*See a. above*

d. Spawning areas with slow to swift flow velocities in shallow water where cobble and rubble and the spaces between them are not filled in by fine dirt or sand;

*See a. above*

e. Water with dissolved oxygen levels greater than 3.5 cc/l and no or minimal pollutant levels for pollutants such as copper, arsenic, mercury, and cadmium; human and animal waste products; pesticides; suspended sediments; and gasoline or diesel fuels.

*Reduction in livestock waste as measured by e-coli is one of primary reasons for the actions being proposed (see attached ADEQ press release). Reduction in nitrogen from livestock waste should limit algae production and potentially increase dissolved oxygen. As stated in a. above an increase in the diversity of flows and velocities should increase incorporation of oxygen into the stream. Removal of livestock from the river should reduce suspended sediments, and by the same manner may to some small level also reduce suspended metals.*

2. Sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Suitable levels of embeddedness are generally maintained by a natural, unregulated hydrograph that allows for periodic flooding or, if flows are modified or regulated, a hydrograph that allows for adequate river functions, such as flows capable of transporting sediments.

*Although the action proposed and those assumed will not alter the natural hydrograph of the San Francisco River, removal of livestock from the riparian area will allow for more stream side vegetation growth and increase sediment trapping.*

3. Streams that have:



- a. Low gradients of less than approximately 2.5 percent;

*The actions proposed and assumed will have no effect on stream gradients.*

- b. Water temperatures in the approximate range of 35 to 82 °F (1.7 to 27.8 °C) (with additional natural daily and seasonal variation);

*The proposed and assumed actions will increase vegetation along the banks of the river and reduce to some small extent the temperature of the water. This is likely to be a positive change during the summer months. Recorded summer water temperatures have been between 19 and 22 degrees C.*

- c. Pool, riffle, run, and backwater components;

*Livestock removal from the riparian area will increase vegetation production and the incorporation of this vegetation into the stream. This should increase the diversity of pools, riffles, runs and back waters.*

- d. An abundant aquatic insect food base consisting of mayflies, true flies black flies, caddisflies, stoneflies, and dragonflies.

*As addressed above the proposed and assumed action will decrease sediment and other contaminants, increase stream diversity and organic incorporation, all of which should increase the variety and abundance of aquatic insects.*

4. Habitat devoid of nonnative aquatic species or habitat in which nonnative aquatic species are at levels that allows persistence of loach minnow.

*The proposed action and assumed actions are not likely to have any effect on nonnative aquatic species.*

5. Areas within perennial, interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

*The San Francisco river though the allotment is connected. The proposed and assumed actions will not affect this connectivity.*

#### Cumulative Effects

The most common assessment of the plight of native fish in Arizona is that the pervasive and relentless predation and competition from nonnative fish is greatest suppressor of populations. Nothing, in the proposed or assumed actions in this consultation addresses the nonnative fish impact. Recreational fishing for nonnatives remains a primary

recreational activity in the San Francisco River Watershed supported by the state and the general public.

The San Francisco River will continue to be used heavily by the recreating public. This impact is heaviest at the lower end on private and state land that is closer to the communities of Clifton and Morenci. A well maintained county road provides access to the river. Access to the public land portion of the river further upstream is somewhat more difficult and recreation use drops off. Public recreational activities are generally uncontrolled along the river irrespective of land status.

The human impacts to stream side vegetation and water quality on private and state lands can be similar to livestock use. Differentiating these impacts can be difficult. Current efforts, this proposal among them, may help differentiate these impacts.

In the last 20 years the Arizona Department of Water resources has issued 848 drilling permits for the two townships surrounding the action area. Of these none are indicated to be production wells. All of the approved drilling has been for mineral exploration and monitoring. Future production wells within the San Francisco watershed could be drilled on private or state lands. The Bureau knows of no current proposals, but there is little doubt that production wells will be drilled for commercial, municipal and private use. Given the general rule of thumb that humans consume approximately 100 gallons of water per day. The influx of as few as 10 people into the watershed of the San Francisco River, including communities as far away as Reserve NM, would approximate the increase in water use from this proposed action.

The proposed action in this biological evaluation adds to the cumulative water use in the San Francisco Watershed, but only minutely when compared to past, present and foreseeable actions.

### **Determination of Effects**

From the analysis the Bureau concludes that proposed action could be beneficial to the species considered and that the negative effects considered are discountable. Therefore the Bureau concludes that the proposed action:

**May affect, is not likely to adversely affect,** Loach Minnow (*Tiaroga cobitis*) or its critical habitat.

**May affect, is not likely to adversely affect,** Razorback sucker (*Xyrauchen texanus*) or its critical habitat.

**May affect, is not likely to adversely affect,** Spikedace (*Meda fulgida*) or its critical habitat.

### **Attachments**