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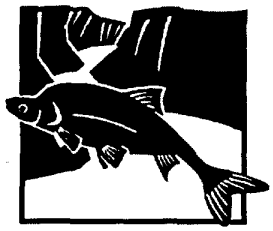
DRAFT RECOVERY GOALS
BRIEFING SCHEDULE

Organization	Date	Location
San Juan River Recovery Program Coordination Committee	1/30	Albuquerque
FWS Region 6 Fisheries & Ecological Services Staff	2/7	Denver
FWS Region 2	2/12	Albuquerque
New Mexico Game & Fish	2/12	Santa Fe
Bureau of Reclamation	2/22	Boulder City
Lower Basin Tribes	2/23	Lake Havasu City
Arizona Game & Fish	2/27	Phoenix
California Fish & Game	3/1	Sacramento
FWS California/Nevada Office	3/2	Reno
State of Colorado	3/7	Denver
Multi-Species Conservation Program & Nevada Division of Wildlife	3/9	Las Vegas
Glen Canyon Adaptive Management Plan Work Group	3/14	Phoenix
San Juan River Tribes	3/22	Ignacio
Upper Basin Tribes	3/27	Ft. Duschesne

Congressionals from Utah, Colorado, Wyoming, Nevada, California, New Mexico and Arizona will be briefed in March.

(States of Utah and Wyoming already briefed.)

For more information, contact Debbie Felker, Information & Education Coordinator, Upper Colorado River Endangered Fish Recovery Program: 303-969-7322, ext. 227.



Upper Colorado River Endangered Fish Recovery Program

U.S. Fish and Wildlife Service • P.O. Box 25486 • Denver Federal Center • Denver, Colorado 80225 • www.r6.fws.gov/coloradoriver

The Colorado pikeminnow, razorback sucker, humpback chub and bonytail are endangered fish species that once thrived in the Colorado River system. Dam installation and the introduction of nonnative fish changed the river environment and put these fish at risk. Established in 1988, the Upper Colorado River Endangered Fish Recovery Program is a partnership of public and private organizations working to recover these endangered species while allowing continued and future water development.

Partners

Colorado River Energy Distributors Assoc.
Colorado Water Congress
Environmental Defense
National Park Service
States of Colorado, Utah and Wyoming
The Nature Conservancy
U.S. Bureau of Reclamation
U.S. Fish and Wildlife Service
Utah Water Users Association
Western Area Power Administration
Wyoming Water Association

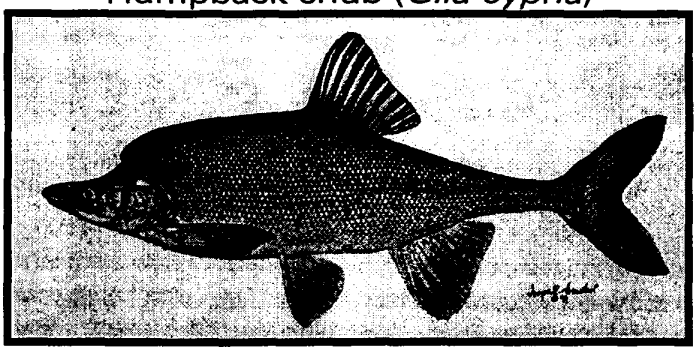
Program Elements

- **Habitat Management** – Identifying and acquiring instream flows, changing Federal dam operations, and operating other reservoirs to benefit the endangered fish
- **Habitat Development** – Restoring floodplain/wetland habitats and constructing fish passageways around dams and other barriers in the river
- **Raising and Stocking Endangered Fish** – Operating hatcheries to raise endangered fish and return them to their native river habitat
- **Nonnative Fish Management** – Managing nonnative fish species to limit encounters with endangered fish
- **Research, Monitoring and Data Management** – Collecting data to measure the effectiveness of recovery efforts

Contact: Debbie Felker, 303-969-7322, ext. 227; debbie_felker@fws.gov

FAST FACTS

Humpback chub (*Gila cypha*)



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Distinguishing Features:

- Gray or olive colored back, silver sides and white belly
- Spawning adults are tinged with rosy-red gill coverings and fins
- Long snout that protrudes over the lower jaw; prominent hump on back behind head; large, streamlined fins
- Generally 14 to 16 inches long but have been known to reach 20 inches

Specifics:

- Thought to have evolved 3 to 5 million years ago
- Have been known to live nearly 30 years
- Capable of spawning at an age of 2 to 3 years; spawns in spring and early summer
- Feeds primarily on insects, plankton, and plant matter
- Natural habitat is in canyon bound reaches of the Colorado River Basin

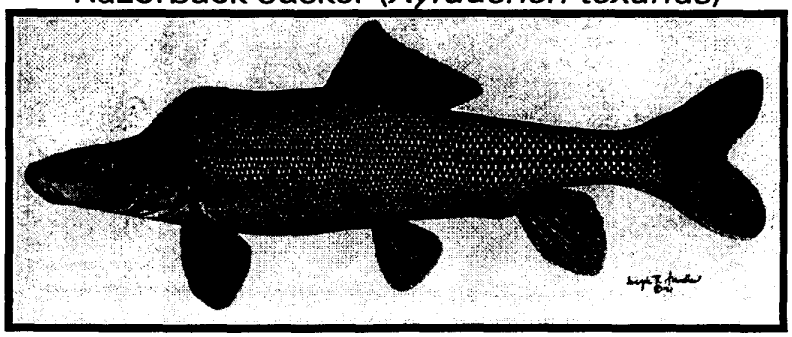
Status:

- Listed as endangered by the U.S. Fish and Wildlife Service as of 1967
- Given full protection under the Endangered Species Act in 1973
- Endangered under Colorado law as of 1976
- Listed as protected under Utah law as of 1973
- 6 known existing populations
- Populations appear stable but small

February 2001

FAST FACTS

Razorback sucker (*Xyrauchen texanus*)



Distinguishing Features:

- Brownish-green upper body with a yellow to white colored belly
- Abrupt, sharp edged hump on back behind head
- Fleshy lips used for sucking up food
- Generally 16 to 28 inches long weighing less than 7 pounds but have been known to reach 36 inches and 13 pounds

Specifics:

- Now limited to 25% of historic range
- Thought to have evolved 3 million years ago
- Have been known to live 40 years or more
- Capable of spawning at an age of 3 to 4 years; spawns in spring
- Feeds primarily on insects, plankton, and plant matter
- Natural habitat is in the Colorado River Basin
- Valued as food by early settlers and miners of the Colorado River Basin
- Hump is believed to provide stability in turbulent flow

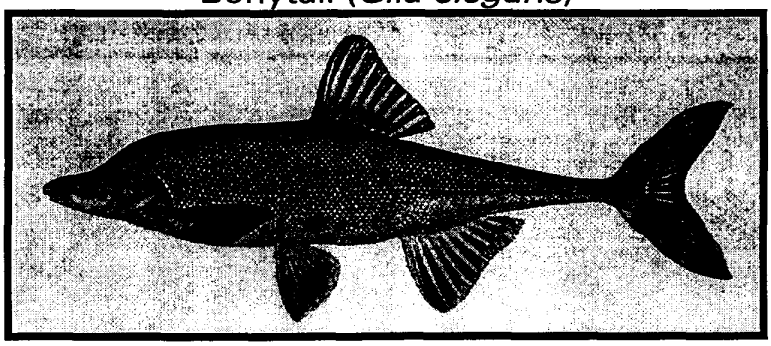
Status:

- Given full protection under the Endangered Species Act in 1991; listed as endangered
- Endangered under Colorado law as of 1979
- Listed as protected under Utah law as of 1973
- Existing population comprised primarily of adult fish because few young survive
- Populations are being reintroduced in the Colorado, Gunnison, Green and San Juan rivers

February 2001

FAST FACTS

Bonytail (*Gila elegans*)



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Distinguishing Features:

- Dark gray or olive colored back, silver sides and white belly
- Small head, large fins, streamlined body that becomes pencil-thin before the tail
- Generally 16 to 18 inches long but have been known to reach 22 inches

Specifics:

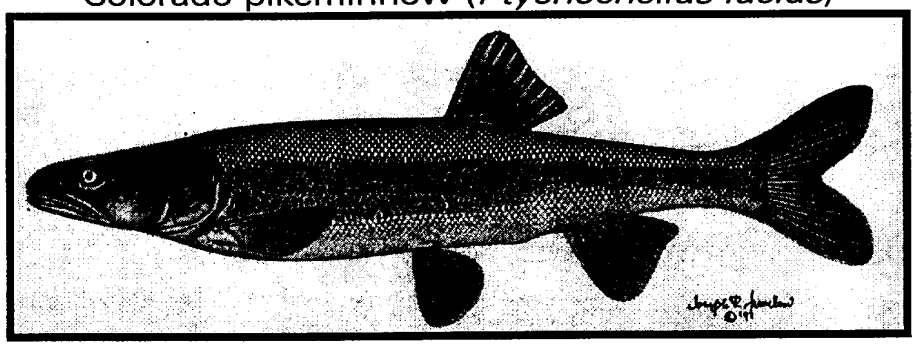
- Thought to have evolved 3 to 5 million years ago
- Have been known to live nearly 50 years
- Capable of spawning at an age of 5 to 7 years; spawns in spring and early summer
- Feeds on insects and plant matter
- Natural habitat is thought to be in large rivers of the Colorado River Basin

Status:

- Given full protection under the Endangered Species Act in 1980; listed as endangered
- Endangered under Colorado law as of 1976
- Listed as protected under Utah law as of 1974
- Rarest of the four endangered fish
- No known reproducing populations in the wild
- Populations are being reintroduced through stocking in the Colorado, Green and Yampa rivers

FAST FACTS

Colorado pikeminnow (*Ptychocheilus lucius*)



Distinguishing Features:

- Olive-green and gold back, silvery-white belly
- Generally grow 18 to 22 inches long weighing 2 to 4 pounds but have been historically known to reach up to 6 feet and 80 pounds or more. Fish larger than three feet are common
- Torpedo shaped body, upper jaw extends to or beyond the middle of the eye

Specifics:

- Range currently limited to the upper Colorado River Basin
- Largest species of minnow native to North America
- Thought to have evolved 3 to 5 million years ago
- Have been known to live 40 years
- Capable of spawning at an age of 5 to 6 years; spawns in late spring and summer
- Known to migrate more than 200 miles to spawn
- Young feed primarily on insects; adults feed mainly on other fish
- Natural habitat is in the Colorado River Basin
- Valued as food by early settlers and miners of the Colorado River Basin
- Known as the "white salmon" or "Colorado salmon" by settlers

Status:

- Listed as endangered by the U.S. Fish and Wildlife Service as of 1967
- Given full protection under the Endangered Species Act in 1973
- Listed as endangered under Colorado law in 1976; downlisted to threatened in 1998
- Listed as protected under Utah law as of 1973
- Populations are reproducing in the wild in the Green and Colorado rivers
- Populations are stable and increasing in the Green and Colorado rivers
- Small population present in the San Juan River Basin

DRAFT FINAL

RECOVERY GOALS FOR THE BONYTAIL (*Gila elegans*) OF THE COLORADO RIVER BASIN

A Supplement And Amendment To The Bonytail Chub Recovery Plan

U.S. Fish and Wildlife Service
Region 6, Denver, Colorado

March 6, 2000

EXECUTIVE SUMMARY

This document supplements and amends the Bonytail Chub Recovery Plan of 1990. The purpose of this supplement and amendment is to describe site-specific management actions/tasks; provide objective, measurable recovery criteria; and provide an estimate of the time required to achieve recovery of the endangered bonytail (*Gila elegans*), according to Section 4(f)(1) of the Endangered Species Act of 1973, as amended.

Current Species Status: The bonytail is listed as endangered under the Endangered Species Act of 1973, as amended. The species is endemic to the Colorado River Basin of the southwestern United States. Adults may attain a maximum size of about 500 mm total length. An unknown number of wild adults exist in Lake Mohave on the mainstem Colorado River of the Lower Colorado River Basin (i.e., below Glen Canyon Dam, Arizona), and there are small numbers of wild, individuals in the Green River and upper Colorado River subbasins of the Upper Colorado River Basin.

Habitat Requirements and Limiting Factors: The bonytail was historically common to abundant in warm-water reaches of larger rivers from Mexico to Wyoming. Little is known about the specific habitat requirements of bonytail because the species was extirpated from most of its historic range prior to extensive fishery surveys. The bonytail is considered adapted to mainstem rivers where it has been observed in pools and eddies. Similar to other closely related *Gila* spp., bonytail in rivers probably spawn in spring over rocky substrates; spawning in reservoirs has been observed to occur over rocky shoals and shorelines. It is hypothesized, based on available distribution data, that flooded bottomland habitats are important growth and conditioning areas for bonytail, particularly as nursery habitats for young. Threats to the species include stream flow regulation, habitat modification, predation by introduced nonnative fish species, hybridization, and pesticides and pollutants.

Recovery Objective: Downlisting and Delisting

Recovery Criteria: This document addresses recovery of the bonytail in the Colorado River Basin. Self-sustaining populations will need to be established through augmentation. With no viable wild populations and very limited information on life history and habitat requirements, there are many uncertainties associated with recovery of bonytail. Recovery criteria are presented for each of two recovery units (i.e., the upper basin and the lower basin) because of different recovery programs and to address unique threats and site-specific management actions/tasks necessary to minimize or remove those threats. The bonytail was listed prior to the 1996 distinct population segment (DPS) policy, but the Service may designate DPSs in a rule-making. These recovery criteria will need to be reevaluated after self-sustaining populations are established and there is improved understanding of bonytail biology.

Downlisting can occur if, over a 5-year monitoring period, (1) self-sustaining populations are established and maintained in the Green River and upper Colorado River subbasins such that: (a) each population point estimate exceeds the estimated minimum viable population (MVP) number

of 4,400 adults (age 4+), and (b) each adult population point estimate is not significantly less than the first estimate acceptable to the Service, and (c) the trend in adult population point estimate does not decline significantly, and (d) mean estimated recruitment of age-3 fish to adult population equals or exceeds adult mortality; and (2) genetic refuge is established and maintained in suitable locations (e.g., Lake Mohave, Lake Havasu) in the lower recovery unit; and (3) two self-sustaining populations of 4,400 adults are established and maintained in the lower recovery unit (e.g., in the Salt River, Verde River, or repatriated riverside habitats), self-sustaining is defined in (a) through (d) above; and (4) when certain site-specific management tasks to minimize or remove threats have been implemented. Delisting can occur if, over a 3-year period beyond downlisting, (1) self-sustaining populations are maintained in the Green River and upper Colorado River subbasins such that: (a) each population point estimate exceeds 4,400 adults (age 4+), and (b) each adult population point estimate is not significantly less than the first estimate acceptable to the Service, and (c) the trend in adult population point estimate does not decline significantly, and (d) mean estimated recruitment of age-3 fish to adult population equals or exceeds adult mortality; and (2) genetic refuge is maintained in suitable locations in the lower recovery unit; and (3) two self-sustaining populations of 4,400 adults are maintained in the lower recovery unit, self-sustaining is defined in (a) through (d) above; and (4) when certain site-specific management tasks to minimize or remove threats have been implemented and/or completed and necessary levels of protection are attained.

Conservation plans will be developed before delisting to provide for long-term management and protection of the species, and to provide reasonable assurances that recovered bonytail populations will be maintained without the need for relisting. Elements of those plans could include, but not limited to, provision and legal protection of flows for maintenance of habitat conditions required for all life stages, regulation and/or control of nonnative fishes, minimization of risk of hazardous-materials spills, and monitoring of populations and habitats.

Management Actions Needed:

1. Reestablish populations with hatchery-produced fish.
2. Identify and maintain genetic variability of bonytail in Lakes Mohave.
3. Provide and legally protect flows and environmental conditions necessary to restore and maintain adequate habitat and sufficient range for all life stages.
4. Provide passage over barriers within occupied habitat to allow unimpeded movement and, potentially, range expansion.
5. Investigate options for providing appropriate water temperatures in the Gunnison River.
6. Minimize entrainment subadults and adults in diversion canals.
7. Investigate the importance of floodplain habitats for all life stages, and provide those habitats if determined necessary.
8. Ensure adequate protection from overutilization.
9. Ensure adequate protection from diseases and parasites.
10. Regulate nonnative fish releases and escapement into the main river, floodplain, and tributaries.
11. Control problematic nonnative fishes as needed.

12. Minimize the risk of increased hybridization among *Gila* spp. in habitats occupied by bonytail.
13. Minimize the risk of hazardous-materials spills in critical habitat.
14. Remediate water-quality problems.
15. Provide for the long-term management and protection of populations and their habitats beyond delisting (i.e., conservation plans).

Estimated Time to Achieve Recovery: Habitat repatriation programs and bonytail augmentation programs are underway. Responses to these programs need to be evaluated and best strategies determined for establishing new populations. Once populations are established, monitoring can begin. Reliable population estimates are needed for wild populations over a 5-year period for downlisting and an 3-year period beyond downlisting for delisting.

DRAFT FINAL

RECOVERY GOALS FOR RAZORBACK SUCKER (*Xyrauchen texanus*) OF THE COLORADO RIVER BASIN

A Supplement And Amendment To The Razorback Sucker Recovery Plan

U.S. Fish and Wildlife Service
Region 6, Denver, Colorado

March 6, 2001

EXECUTIVE SUMMARY

This document supplements and amends the Razorback Sucker Recovery Plan of 1998. The purpose of this supplement and amendment is to describe site-specific management actions/tasks; provide objective, measurable recovery criteria; and provide an estimate of the time required to achieve recovery of the endangered razorback sucker (*Xyrauchen texanus*), according to Section 4(f)(1) of the Endangered Species Act of 1973, as amended.

Current Species Status: The razorback sucker is listed as endangered under the Endangered Species Act of 1973, as amended. The species is endemic to the Colorado River Basin of the southwestern United States. Adults may attain a maximum size of about 1 m total lenght and weigh 5–6 kg. Remaining wild populations are in serious jeopardy. Most individuals occupying exclusively riverine habitats are now limited to the Upper Colorado River Basin (i.e., above Glen Canyon Dam, Arizona) and populations are small. The largest riverine population exists in the middle Green River. The largest extant population is found above Davis Dam in Lake Mohave on the mainstem Colorado River of the Lower Colorado River Basin. Small populations also occur above Hoover Dam in Lake Mead on the lower mainstem Colorado River.

Habitat Requirements and Limiting Factors: Historically, razorback sucker were widely distributed in warm-water reaches of larger rivers of the Colorado River Basin from Mexico to Wyoming. Habitats used by adults in rivers include deeper runs, eddies, backwaters, and flooded off-channel environments in spring; runs and pools often in shallow water associated with submerged sandbars in summer; and low-velocity runs, pools, and eddies in winter. Spring migrations by adult razorback sucker were associated with spawning in historic accounts, and a variety of local and long-distance movements and habitat-use patterns have been documented. Spawning in rivers occurs over bars of cobble, gravel, and sand substrates during spring-runoff flows at widely ranging flows and water temperatures (typically greater than 14°C); spawning also occurs in reservoirs over rocky shoals and shorelines. Young require nursery environments with quiet, warm, shallow water such as tributary mouths, backwaters, or inundated floodplain habitats in rivers and coves or shorelines in reservoirs. Threats to the species include streamflow regulation, habitat modification, predation by nonnative fish species, and pesticides and pollutants.

Recovery Objective: Downlisting and Delisting.

Recovery Criteria: This document addresses recovery of razorback sucker in the Colorado River Basin. Self-sustaining populations will need to be established through augmentation. With no viable wild populations, there are many uncertainties associated with recovery of razorback sucker. Recovery criteria are presented for each of two recovery units (i.e., the upper basin and the lower basin) because of different recovery programs and to address unique threats and site-specific management actions/tasks necessary to minimize or remove those threats. The razorback sucker was listed prior to the 1996 distinct population segment (DPS) policy, but the Service may designate DPSs in a rule-making. These recovery criteria will need to be

reevaluated after self-sustaining populations are established and there is improved understanding of razorback sucker biology.

Downlisting can occur if, over a 5-year monitoring period, (1) self-sustaining populations are established and maintained in the Green River subbasin and **EITHER** in the upper Colorado River subbasin or the San Juan River subbasin such that: (a) each population point estimate exceeds the estimated minimum viable population (MVP) number of 5,800 adults (age 4+), and (b) each adult population point estimate is not significantly less than the first estimate acceptable to the Service, and (c) the trend in adult population point estimates does not decline significantly, and (d) mean estimated recruitment of age-3 fish to adult population equals or exceeds adult mortality; and (2) a genetic refuge of 50,000 adults is established and maintained in Lake Mohave; and (3) two self-sustaining populations that exceed 5,800 adults each are established and maintained in the lower recovery unit (e.g., in the Salt River, Verde River, or repatriated riverside habitats; self-sustaining population is defined in (a) through (d) above); and (4) when certain site-specific management tasks to minimize or remove threats have been implemented. Delisting can occur if, over a 3-year monitoring period beyond downlisting, (1) self-sustaining populations are maintained in the Green River subbasin and **EITHER** in the upper Colorado River subbasin or the San Juan River subbasin such that: (a) each population point estimate exceeds 5,800 adults (age 4+), and (b) each adult population point estimate is not significantly less than the first estimate acceptable to the Service, and (c) the trend in adult population point estimates does not decline significantly, and (d) mean estimated recruitment of age-3 fish to adult population equals or exceeds adult mortality; (a self-sustaining population is defined in (a) through (d) above); and (2) a primary genetic refuge is maintained in Lake Mohave; and (3) two self-sustaining populations that exceed 5,800 adults each are established in the lower recovery unit (e.g., in the Salt River, Verde River, or repatriated riverside habitats; self-sustaining population is defined in (a) through (d) above); and (4) when certain site-specific management tasks to minimize or remove threats have been implemented and/or completed and necessary levels of protection are attained.

Conservation plans will be developed before delisting to provide for long-term management and protection of the species, and to provide reasonable assurances that recovered razorback sucker populations will be maintained without the need for relisting. Elements of those plans could include, but not limited to, provision and legal protection of flows for maintenance of habitat conditions required for all life stages, regulation and/or control of nonnative fishes, minimization of risk of hazardous-materials spills, and monitoring of populations and habitats.

Management Actions Needed:

1. Reestablish populations with hatchery-produced fish.
2. Identify and maintain genetic variability of razorback sucker in Lake Mohave.
3. Provide and legally protect flows and environmental conditions necessary to restore and maintain adequate habitat and sufficient range for all life stages.
4. Provide passage over barriers within occupied habitat to allow unimpeded movement and, potentially, range expansion.

5. Investigate options for providing appropriate water temperatures in the Gunnison River.
6. Minimize entrainment of subadults and adults in diversion canals.
7. Ensure adequate protection from overutilization.
8. Ensure adequate protection from diseases and parasites.
9. Regulate nonnative fish releases and escapement into the main river, floodplain, and tributaries.
10. Control problematic nonnative fishes as needed.
11. Minimize adverse effects of selenium contamination on razorback sucker
12. Minimize the risk of hazardous-materials spills in critical habitat.
13. Remediate water-quality problems.
14. Minimize the threat of hybridization with white sucker.
15. Provide for the long-term management and protection of populations and their habitats beyond delisting (i.e., conservation plans).

Estimated Time to Achieve Recovery: Habitat repatriation programs and razorback sucker augmentation programs are underway. Responses to these programs need to be evaluated and best strategies determined for establishing new populations and augmenting existing ones. Once populations are established, monitoring can begin. Reliable population estimates are needed for wild populations over a 5-year period for downlisting and a 3-year period beyond downlisting for delisting.

DRAFT FINAL

RECOVERY GOALS FOR THE COLORADO PIKEMINNOW (*Ptychocheilus lucius*) OF THE COLORADO RIVER BASIN

A Supplement And Amendment To The Colorado Squawfish Recovery Plan

U.S. Fish and Wildlife Service
Region 6, Denver, Colorado

March 6, 2001

EXECUTIVE SUMMARY

This document supplements and amends the Colorado Squawfish Recovery Plan of 1991. The common name for this species was changed to Colorado pikeminnow by the American Fisheries Society in 1998, and the Service will acknowledge this name change in a *Federal Register* notice. The purpose of this supplement and amendment is to describe site-specific management actions/tasks; provide objective, measurable recovery criteria; and provide an estimate of the time required to achieve recovery of the endangered Colorado pikeminnow (*Ptychocheilus lucius*), according to Section 4(f)(1) of the Endangered Species Act of 1973, as amended.

Current Species Status: The Colorado pikeminnow is listed as endangered under the Endangered Species Act of 1973, as amended. The species is endemic to the Colorado River Basin of the southwestern United States. Adults may attain a maximum size of about 1.8 m total length and weigh 36 kg. Wild, reproducing populations occur in the Green River and upper Colorado River subbasins of the Upper Colorado River Basin (i.e., above Glen Canyon Dam, Arizona), and there are small numbers of wild individuals (with limited reproduction) in the San Juan River subbasin. The species was extirpated from the Lower Colorado River Basin in the 1970's.

Habitat Requirements and Limiting Factors: The Colorado pikeminnow is a long-distance migrator; moving hundreds of miles to and from spawning areas in canyon regions. Adults utilize pools, deep runs, and eddy habitats maintained by high spring flows. These high spring flows maintain channel and habitat diversity, flush sediments from spawning areas, rejuvenate food production, form gravel and cobble deposits used for spawning, and rejuvenate backwater nursery habitats. Spawning occurs after spring runoff at water temperatures typically 18°C or higher. After hatching and emerging from spawning substrate, larvae drift downstream to nursery backwaters that are restructured by high spring flows and maintained by relatively stable base flows. Threats to the species include streamflow regulation, habitat modification, competition with and predation by nonnative fish species, and pesticides and pollutants.

Recovery Objective: Downlisting and Delisting.

Recovery Criteria: This document addresses recovery of the Colorado pikeminnow only in the Upper Colorado River Basin (including the San Juan River subbasin) because existing biological information supports application of the metapopulation concept to extant populations. The need for redundant self-sustaining populations in the lower basin and associated site-specific management actions/tasks necessary to minimize or remove threats will be evaluated at the 5-year review of the species' status. The Colorado pikeminnow was listed prior to the 1996 distinct population segment (DPS) policy. If lower basin populations are determined necessary for recovery, the Service intends to conduct a DPS analysis on the Colorado pikeminnow at the first opportunity (i.e., when recommendations are made to change the listing status of the species, or at the 5-year reviews of the species' status). If DPSs are determined, these recovery criteria will need to be reevaluated. Although the best available scientific information was used in

developing these recovery goals, there are uncertainties and improved understanding of Colorado pikeminnow biology may prompt future revision of these recovery goals.

Downlisting can occur if, over a 5-year monitoring period, (1) a self-sustaining core population is maintained in the Green River subbasin such that: (a) each population point estimate exceeds the estimated minimum viable population (MVP) number of 2,600 adults (age 7+), and (b) each adult population point estimate is not significantly less than the first estimate acceptable to the Service, and (c) the trend in adult population point estimates does not decline significantly, and (d) mean estimated recruitment of ages-5 and 6 fish to adult population equals or exceeds adult mortality; and (2) a self-sustaining population is maintained in the upper Colorado River subbasin such that: (a) each adult population point estimate is not significantly less than 700 individuals, and (b) the trend in adult population point estimates does not decline significantly, and (c) mean estimated recruitment of ages-5 and 6 fish to adult population equals or exceeds adult mortality; and (3) a population with a target of 800 adults is establish and maintain through augmentation and/or natural recruitment in the San Juan River subbasin; and (4) when certain site-specific management tasks to minimize of remove threats have been implemented. Delisting can occur if, over a 7-year monitoring period beyond downlisting, (1) a self-sustaining core population is maintained in the Green River subbasin such that: (a) each population point estimate exceeds 2,600 adults, and (b) each adult population point estimate is not significantly less than the first estimate acceptable to the Service, and (c) the trend in adult population point estimates does not decline significantly, and (d) mean estimated recruitment of ages-5 and 6 fish to adult population equals or exceeds adult mortality; and (2) either the upper Colorado River self-sustaining population exceeds 1,000 adults **OR** upper Colorado River self-sustaining population exceeds 700 adults and San Juan River population is self-sustaining and exceeds 800 adults, such that for each population: (a) each adult population point estimate is not significantly less than the first estimate acceptable to the Service, and (b) the trend in adult population point estimates does not decline significantly, and (c) mean estimated recruitment of ages-5 and 6 fish to adult population equals or exceeds adult mortality; and (3) when certain site-specific management tasks to minimize or remove threats have been implemented and/or completed and necessary levels of protection are attained.

Conservation plans will be developed and implemented before delisting to provide for long-term management and protection of the species, and to provide reasonable assurances that recovered Colorado pikeminnow populations will be maintained without the need for relisting. Elements of those plans could include, but not limited to, provision and legal protection of flows for maintenance of habitat conditions required for all life stages, regulation and/or control of nonnative fishes, minimization of the risk of hazardous-materials spills, and monitoring of populations and habitats.

Management Actions Needed:

1. Provide and legally protect flows necessary to restore and maintain adequate habitat and sufficient range for all life stages.
2. Provide passage over barriers within occupied habitat to allow unimpeded movement and, potentially, range expansion.

3. Investigate options for providing appropriate water temperatures in the Gunnison River.
4. Minimize entrainment of subadults and adults in diversion canals.
5. Ensure adequate protection from overutilization.
6. Ensure adequate protection from diseases and parasites.
7. Regulate nonnative fish releases and escapement into the main river, floodplain, and tributaries.
8. Control problematic nonnative fishes as needed.
9. Minimize the risk of hazardous-materials spills in critical habitat.
10. Remediate water-quality problems.
11. Reestablish populations with hatchery-produced fish.
12. Provide for the long-term management and protection of populations and their habitats beyond delisting (i.e., conservation plans).

Estimated Time to Achieve Recovery: Reliable population estimates are needed for wild populations over a 5-year period for downlisting and a 12-year period for delisting. For example, if first reliable estimates were available in the year 2001, downlisting could be proposed in 2006, and delisting could be proposed in 2013, if all recovery criteria are met.

DRAFT FINAL

RECOVERY GOALS FOR THE HUMPBACK CHUB (*Gila cypha*) OF THE COLORADO RIVER BASIN

A Supplement And Amendment To The Humpback Chub Recovery Plan

U.S. Fish and Wildlife Service
Region 6, Denver, Colorado

March 6, 2001

EXECUTIVE SUMMARY

This document supplements and amends the Humpback Chub Recovery Plan of 1990. The purpose of this supplement and amendment is to describe site-specific management actions/tasks; provide objective, measurable recovery criteria; and provide an estimate of the time required to achieve recovery of the endangered humpback chub (*Gila cypha*), according to Section 4(f)(1) of the Endangered Species Act of 1973, as amended.

Current Species Status: The humpback chub is listed as endangered under the Endangered Species Act of 1973, as amended. The species is endemic to the Colorado River Basin of the southwestern United States. Adults may attain a maximum size of about 480 mm total length and weigh 1,165 g. Six wild populations are known including Black Rocks, Colorado River, Colorado; Westwater Canyon, Colorado River, Utah; Yampa Canyon, Yampa River, Colorado; Desolation/Gray Canyons, Green River, Utah; Cataract Canyon, Colorado River, Utah; and the Colorado and Little Colorado rivers in Grand Canyon, Arizona. The first five populations listed above are in the Upper Colorado River Basin (i.e., above Glen Canyon Dam, Arizona), and the sixth population is in the Lower Colorado River Basin.

Habitat Requirements and Limiting Factors: Populations of humpback chub are restricted to deep, swift, canyon-bound regions of the mainstem and large tributaries of the Colorado River Basin. Adults utilize eddies and sheltered shoreline habitats maintained by high spring flows. These high spring flows maintain channel and habitat diversity, flush sediments from spawning areas, rejuvenate food production, and form gravel and cobble deposits used for spawning. Spawning occurs on the descending limb of the spring hydrograph at water temperatures greater than 16°C. Young typically use low-velocity shoreline habitats, including eddies and backwaters, that are more prevalent under base-flow conditions. Threats to the species include streamflow regulation, habitat modification, predation by nonnative fish species, parasitism, hybridization with other native *Gila*, and pesticides and pollutants.

Recovery Objective: Downlisting and Delisting.

Recovery Criteria: This document addresses recovery of humpback chub in the Colorado River Basin. Recovery criteria are presented for each of two recovery units (i.e., the upper basin and the lower basin) because of different recovery programs and to address unique threats and site-specific management actions/tasks necessary to minimize or remove those threats. The humpback chub was listed prior to the 1996 distinct population segment (DPS) policy, but the Service may designate DPSs in a rule-making. The Service intends to conduct a DPS analysis on the humpback chub at the first opportunity (i.e., when recommendations are made to change the listing status of the species, or at the 5-year reviews of the species' status). If DPSs are determined, these recovery criteria will need to be reevaluated. Although the best available scientific information was used in developing these recovery goals, there are uncertainties and improved understanding of humpback chub biology may prompt future revision of these recovery goals.

Downlisting can occur if, over a 5-year monitoring period: (a) no significant decline occurs in numbers of fish within each wild population, and (b) the trend in adult (age 4+) population point estimates does not decline significantly, and (c) mean estimated recruitment of age-3 fish to adult population equals or exceeds adult mortality, and (d) there are two genetically and demographically viable, self-sustaining core populations with estimates that exceed the estimated minimum viable population (MVP) number of 2,100 adults each, with a specified subadult population structure that reflects viable recruitment, and (e) when certain site-specific management tasks to minimize or remove threats have been implemented. Delisting can occur if, over a 3-year period beyond downlisting: (a) criteria a, b, and c of downlisting continue to be met, and (b) there are three genetically and demographically viable, self-sustaining core populations with estimates that exceed 2,100 adults each, with a specified subadult population structure that reflects viable recruitment, and (c) when certain site-specific management tasks to minimize or remove threats have been implemented and/or completed and necessary levels of protection are attained.

Conservation plans will be developed and implemented before delisting to provide for long-term management and protection of the species, and to provide reasonable assurances that recovered humpback chub populations will be maintained without the need for relisting. Elements of those plans could include, but not limited to, provision and legal protection of flows for maintenance of habitat conditions required for all life stages, regulation and/or control of nonnative fishes, minimization of the risk of hazardous-materials spills, and monitoring of populations and habitats.

Management Actions Needed:

1. Provide and legally protect flows necessary to restore and maintain adequate habitat and sufficient range for all life stages.
2. Investigate options for providing appropriate water temperatures in the Colorado River through Grand Canyon.
3. Ensure adequate protection from overutilization.
4. Ensure adequate protection from diseases and parasites.
5. Regulate nonnative fish releases and escapement into the main river, floodplain, and tributaries.
5. Control problematic nonnative fishes as needed.
6. Minimize the risk of increased hybridization among *Gila* spp. in habitats occupied by humpback chub.
7. Minimize the risk of hazardous-materials spills in critical habitat.
8. Provide for the long-term management and protection of populations and their habitats beyond delisting (i.e., conservation plans).

Estimated Time to Achieve Recovery: Reliable population estimates are needed for all six populations over a 5-year monitoring period for downlisting and over a 3-year monitoring period beyond downlisting in order to achieve delisting. For example, if the first reliable estimates were available for all populations in the year 2001, downlisting could be proposed in 2006, and delisting could be proposed in 2009, if all recovery criteria are met.

2/16/01

Draft Recovery Goals (Endangered Colorado River Fish -- Humpback chub, Colorado pikeminnow, Bonytail and Razorback sucker) Questions and Answers

What are recovery goals?

Recovery goals are supplements and amendments to existing recovery plans for each species. They detail the criteria that must be met before the species may be considered for removal (delisting) from Endangered Species Act (ESA) protection. Recovery is essentially the reverse of listing. Therefore, the goals must address the five listing factors detailed in Section 4(a)(1) of the ESA. The five listing factors are: 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 2) overutilization for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) inadequacy of existing regulatory mechanisms; and 5) other natural manmade factors affecting its continued existence.

Criteria contained in the goals include demographic and genetic needs for self-sustaining, viable populations, and management actions/tasks that address the five listing factors to minimize or remove threats.

What four Colorado River fish species do the draft goals address?

> **Humpback chub (*Gila cypha*)** – listed as endangered in 1967; given full ESA protection in 1973 (Recovery plan developed in 1990; critical habitat designated in 1994)
> **Bonytail (*Gila elegans*)** – listed as endangered and given full ESA protection in 1980 (Recovery plan developed in 1990; critical habitat designated in 1994)
> **Razorback sucker (*Xyrauchen texanus*)** – listed as endangered and given full ESA protection in 1991 (Recovery plan developed in 1998; critical habitat designated in 1994)
> **Colorado pikeminnow (*Ptychocheilus lucius*)** – listed as endangered in 1967; given full ESA protection in 1973 (Recovery plan developed in 1991; critical habitat designated in 1994)

These fish are found in the Colorado River Basin and nowhere else in the world.

Who prepared the draft recovery goals?

The process of writing recovery goals began July 1, 1999. At the request and under the direction of the U.S. Fish and Wildlife Service Director of the Mountain-Prairie Region (who has the lead for recovery of the four endangered fishes), the Upper Colorado River Endangered Fish Recovery Program assumed the responsibility for developing the draft recovery goals.

The Colorado River Fishes Recovery Team was convened to provide input. The team is comprised of representatives of state and federal agencies in seven states. Water and power interests, Indian Tribes, environmental organizations, and other interested agencies or individuals also contributed to the process.

Why weren't recovery goals developed at the time the four species of fish were listed under the Endangered Species Act (ESA)?

When the four fish species were listed under the ESA, very little was known about their behavior, their habitat needs and threats to their survival. Recovery plans were developed for each species using the best information available at that time on life history and population status. The plans included recommendations for numbers of populations but did not address the five listing factors and specific demographic and genetic needs for self-sustaining, viable populations.

Extensive research on the four fish species during the past decade has provided new information about what these fish require to survive and persist in the Colorado River system. The draft recovery goals developed today are comprehensive and contain measurable, objective criteria for downlisting and delisting that address the five listing factors and contain demographic and genetic criteria for self-sustaining, viable populations. It is not unusual for changes and/or additions to be made to original recovery plans as more scientific knowledge is gained during the process of recovering a species.

Are there recovery goals for other fish species?

To our knowledge, these are the most detailed goals in existence for a fish species. These goals may serve as a model for other recovery efforts.

What is the definition of recovery?

As defined in the draft recovery goals, "Recovery is achieved when management actions and associated tasks (to minimize or remove threats associated with the five listing factors) have been implemented and/or completed to allow genetically and demographically viable, self-sustaining populations to thrive under minimal ongoing management and investment of resources."
This definition was developed using criteria dictated by the Endangered Species Act and Fish and Wildlife Service guidelines for recovering an endangered species.

What are the definitions of "endangered" and "threatened" species?

Under the Endangered Species Act (ESA) an **endangered species** is defined as: "any species which is in danger of extinction throughout all or a significant portion of its range." This definition was expanded to include the following conditions:

Genetics: numbers too low to maintain genetic viability
Demographics: populations small; deaths exceed births/recruitment
Population redundancy: populations are too few, scattered, or concentrated
Threats: persistent threats are significant

The ESA defines a **threatened species** as: "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." This definition was expanded to include the following conditions:

Genetics: numbers sufficient to maintain genetic viability
Demographics: self-sustaining populations small; lack sufficient recruitment for long-term persistence
Population redundancy: populations are too few, scattered, or concentrated
Threats: exist over significant portion of the species' range

What is the downlisting and delisting process?

The process of removing an endangered species from Endangered Species Act (ESA) protection occurs in two steps – downlisting and delisting. Downlisting means that a species formerly considered endangered has progressed to a point that it may be reclassified to the threatened status. When downlisting occurs, ESA protections remain in place, the species is carefully monitored for a minimum of five years and the threats continue to be minimized or removed to ensure the population remains stable and does not decline over time and the threats are minimized or removed. If the species declines and the Service believes the protections of the ESA are needed to prevent it from becoming endangered, it can be relisted.

If the species continues to thrive during the downlisting period and its future existence is no longer threatened, it may be considered for delisting – or removal from federal protection under the ESA. At that point, legally mandated management actions at federal, state and/or local levels must be in place to ensure species do not experience the conditions that led to them becoming listed in the first place. Once a species is delisted, state wildlife agencies usually continue to monitor and manage the species.

The downlisting and delisting criteria talk about "control programs" for nonnative fish such as channel and flathead catfish and northern pike. What do you mean by "control program?"

Control of the release and escapement of nonnative fishes into the main river, floodplain and tributaries is a necessary management action to stop the introduction of new fish species into habitats occupied by native endangered fishes. For example, agreements have been signed between the U.S. Fish and Wildlife Service and the states of Colorado, Utah and Wyoming to review and regulate all stockings of fish within the Upper Colorado River Basin.

The agreement prohibits release of nonnative fish within the 50-year floodplain of the river. The agreement also allows the states to regulate and restrict stocking of privately-owned ponds. These procedures will also reduce the likelihood of new parasites and diseases being introduced through nonnative fish stockings. Similar procedures need to be developed and implemented in the lower basin.

Other possible methods of control include complete removal of nonnative fish, screening ponds to prevent nonnative fish from reaching the river and reshaping ponds so that they no longer support year-round habitation by nonnative fish.

Another aspect of nonnative fish control in the upper basin is removal of bag and possession limits on nonnative fish in habit designated as critical for the endangered fish. Colorado has agreed to close river reaches to angling where and when angling mortality is determined to be significant to native fish.

Will nonnative fish control reduce sportfishing recreational opportunities in the Colorado River Basin?

Every effort is being made to implement management actions that will not impact sportfishing opportunities. For example, in the Upper Basin, a fish screen was placed in a reservoir in the Grand Valley that will prevent nonnative fish stocked in the lake from escaping through the spillway into the river where they might interact with endangered fish. These types of innovative actions can ensure that high quality sportfishing opportunities are maintained in communities along the Colorado River.

Why are the required numbers of fish different for each of the four fish species?

The required population numbers for each species are based on demographic and genetic criteria that, when met or exceeded, would ensure populations that are sufficiently abundant and well adapted to environmental conditions for long-term persistence without significant artificial manipulations. Numbers are different among the four species because each species has different requirements for population viability and self-sustainability.

How often are population estimates taken? The process of obtaining data on the numbers of and types of fish in the Colorado River and its tributaries is both time consuming and expensive. Unlike counting species like bears, deer and wolves, biologists cannot simply fly over terrain and do manual counts. In the case of fish, biologists must use sampling techniques such as electrofishing, in which a small electric current is placed in the water that causes fish to rise to the surface where they can be netted, weighed, measured, tagged and then returned to the water.

Because this process is so labor intensive, it can only be done every three to five years in most river reaches. Biologists than use the data collected to establish their best estimate of the numbers and types of fish in the river.

According to the latest population estimates, it appears that the humpback chub currently meets the population numbers required for downlisting. Does this mean the FWS will begin the process of downlisting this species now?

Not immediately. The latest population estimates need to be verified. There is a requirement of a five-year monitoring period once populations reach the minimum number for viability and self-sustainability and the FWS determines that the first estimate for each population is acceptable. This has not yet occurred. In addition, identified management actions and tasks to minimize or remove threats must be implemented.

What are the major threats to the endangered fishes? Six major threats to the endangered fishes have been identified: 1) streamflow regulation; 2) habitat modification; 3) competition with and predation by nonnative fish; 4) increased levels of hybridization; 5) pesticides and pollutants; and 6) parasitism (e.g. Asian tapeworm on humpback chub in Little Colorado River.)

What is being done to remove these threats? The major recovery and conservation programs in the Colorado River Basin are working to eliminate these threats through several means. For example: Dam operations are being managed to provide flow regimes to benefit the endangered fishes. Fish passageways through diversion structures are being constructed to allow fish to reach historic habitats. Nonnative fish management efforts are underway. In some instances, fish screens are being placed in reservoirs to keep nonnative fish from reaching river areas inhabited by endangered fish. In other cases, nonnative fish are being removed. The need for emergency shutoff valves on petroleum product pipelines that parallel or cross rivers is being assessed.

What is a distinct population segment?

Recovery of the four endangered fishes is addressed in the Colorado River Basin as a whole. The fishes were listed prior to the 1996 distinct population segment (DPS) policy, but reevaluation by the Service may determine that DPSs should be designated. A DPS is a portion of populations that includes a part of the range of a species or subspecies. The guiding principles for designation of DPSs are: 1) discreetness of the population segment in relation to the remainder of the species to which it belongs; 2) the importance of the population segment to the persistence of the species; and 3) the population segment's conservation status in relation to the ESA's standards for listing (i.e. is the population segment, when treated as if it were a species, endangered or threatened?)

Why is more than one population per species necessary for recovery?

Population redundancy is extremely important to prevent extinction of a species. The purpose is to ensure that if something occurs to eliminate one population, at least one other population of the species will still exist and the species will not become extinct.

What is a redundant unit?

A redundant unit is one of several demographically viable populations of a species that are independently susceptible to catastrophic events. This provides the security that if one population is severely depleted or eliminated by a catastrophe, other populations will survive as viable and self-sustaining and provide a source of fish and genetic material to restart a nearly extinct population.

Do the draft recovery goals call for recovery actions that are different than those currently being done to recover the fish?

In most cases, no. The recovery goals better focus those actions needed for recovery and provide a means to better track progress toward meeting the measurable, objective endpoints for downlisting and delisting.

Who will determine when downlisting and delisting criteria are met?

The U.S. Fish and Wildlife Service has the responsibility to develop downlisting and delisting criteria and to determine when this criteria is met. Notice of a proposed downlisting or delisting is posted in the *Federal Register* and public comment invited and reviewed.

Can the Service downlist and delist a species even though all recovery goals in the existing recovery plans have not been met or exceeded?

Recovery is the process by which the decline of an endangered or threatened species is arrested or reversed and threats to its survival are neutralized so that long-term survival in nature can be ensured. One of the main purposes of the recovery plan is to enumerate goals (guidelines) that will help the Service to determine when recovery for a particular species has been achieved. The Act does not require that all of the specific recovery goals for a listed species be met or exceeded before it can be downlisted or delisted. The Service determines whether recovery has been achieved based on a species' performance relative to the goals set in its recovery plan, the best scientific information, and interviews with species experts. A species is recovered when it is no longer in danger of extinction, or likely to become endangered within the foreseeable future throughout all or a significant portion of its range, and the threats that led to the species' listing have been reduced or eliminated.

How will we know that the fish populations will not decline without the protections of the Endangered Species Act?

Each species will be monitored for a minimum of five years to evaluate the population after the protections of the Act are lifted. If the population declines and the Service believes the protections of the Act are needed to prevent it from becoming endangered, it can be relisted.

Do state governments have recovery goals for these fish species? If so, are they different?

The state of Colorado is the only state that has attempted to develop recovery goals for all four fish species in 2000. The goals differ from the federal recovery goals because they address only numbers of fish.

Will endangered fish habitat be protected once the protections of the Endangered Species Act have been lifted?

Yes, but not to the same extent that protection was provided under the Endangered Species Act. Other federal laws which protect habitat will still apply. These include the Clean Water Act, The Fish and Wildlife Coordination Act, the National Environmental Policy Act and others.

How will recovery of these fish affect present and future water development?

In the Upper Colorado River Basin, water development has continued without detriment to the endangered fish. This has occurred because water and power users are working cooperatively with the U.S. Fish and Wildlife Service to manage water use in a manner that benefits both the needs of water for irrigation and household and commercial uses without jeopardizing the fish. Any actions taken in the lower basin will likely be modeled after this management plan.

If the fish are ever removed from federal Endangered Species Act protection, will they still be protected by state endangered species laws?

The states of Colorado, Utah, Arizona, New Mexico, Nevada and California list the four species of fish as either endangered or threatened. State endangered species laws vary from state to state on the amount of protection a listed species is afforded. Any federal action taken toward downlisting or delisting the four species of fish will not affect the status the species has in each state. However, should the fish become removed from the federal list, the states may choose to remove the species from their endangered species lists as well.

Before a species is removed from federal protection, management actions and legal mandates must be in place to assure the continued survival of the species. Many times the responsibility for future management of the species falls to the states.

What can a private citizen do to help the four species of endangered fish? Awareness of the importance of restoring river habitat to its more natural state is a big step toward helping recovery endangered fish species, as well as removing threats to other native plants and animals. Individuals can help with recovery efforts by educating their elected officials.

Where can I get more information on the four species of endangered Colorado River fish?

Upper Colorado River Endangered Fish Recovery Program
U.S. Fish and Wildlife Service
P.O. Box 25486, DFC
Lakewood, CO 80225
303-969-7322
www.r6.fws.gov/coloradoriver

San Juan River Basin Recovery Implementation Program
U.S. Fish and Wildlife Service
2105 Osuna NE
Albuquerque, NM 87113
505-346-2525
http://southwest.fws.gov/sjrip

How can I comment on the draft recovery goals?

The U.S. Fish and Wildlife Service will accept comments for 45 days following publication in the Federal Register. Comments should be directed in writing to: Upper Colorado River Endangered Fish Recovery Program, U.S. Fish and Wildlife Service, P.O. Box 25486, DFC, Lakewood, CO 80225

What will happen after the comment period closes?

The U.S. Fish and Wildlife Service will review comments and make any appropriate changes to the draft goals. A decision on the final goals will be developed three to six months after the comment period closes. The final goals will become part of the recovery plan for each species.