



FISH OF THE COLORADO RIVER

Colorado River and tributaries between
Glen Canyon Dam and Lake Mead

ON-LINE TRAINING: DRAFT



Outline:

- Colorado River
- Glen Canyon Dam Adaptive Management Program (GCDAMP)
- Native Fishes
- Common Non-Native Fishes
- Rare Non-Native Fishes
- Standardized Sampling Protocol



Colorado River:

- The Colorado River through Grand Canyon historically hosted one of the most distinct fish assemblages in North America (lowest diversity, highest endemism)
- Aquatic habitat was variable
 - Large spring floods
 - Cold winter temperatures
 - Warm summer temperatures
 - Heavy silt load
- Today
 - Stable flow releases
 - Cooler temperatures
 - Predation

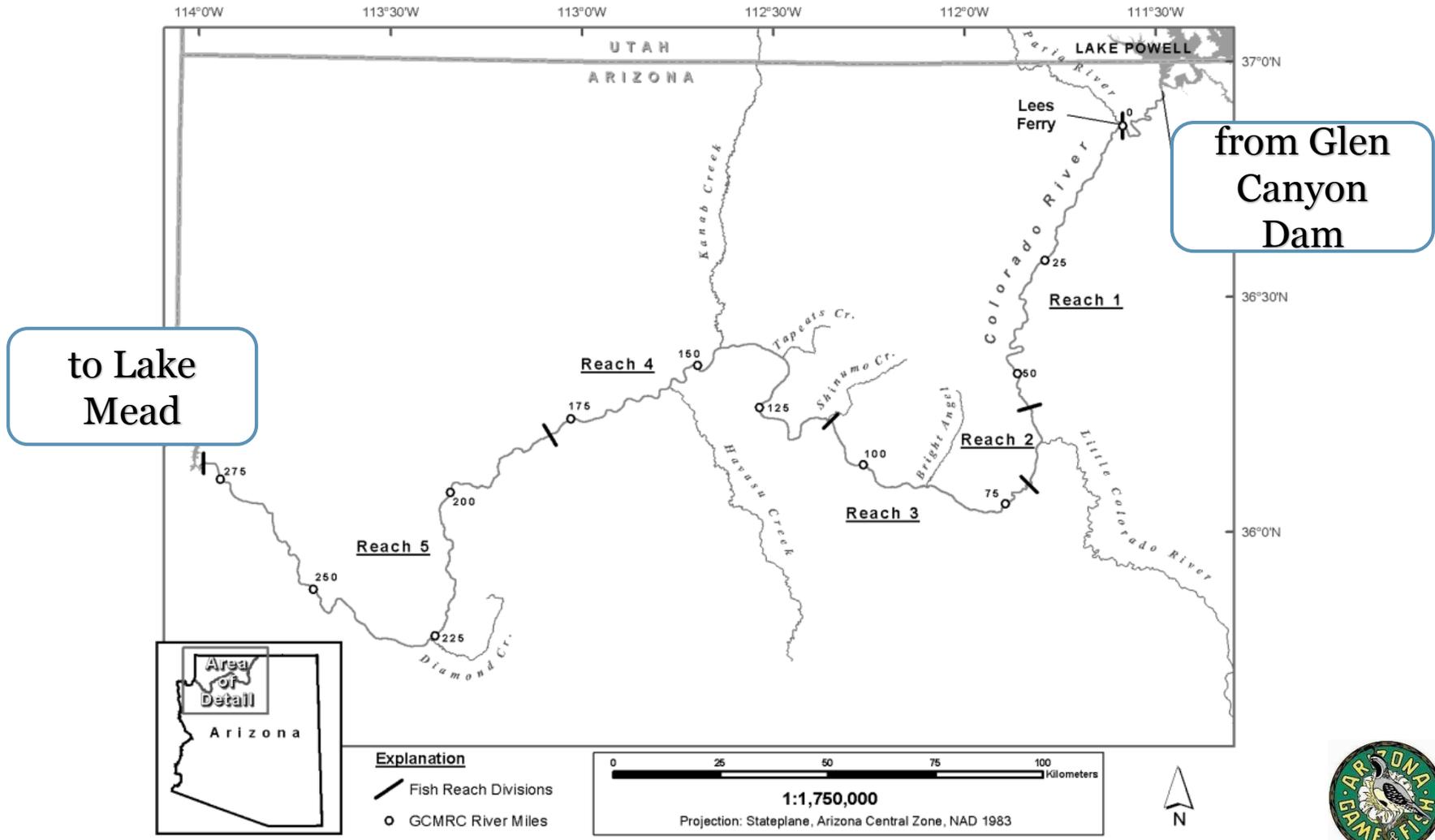


Overview:

- The Glen Canyon Dam Adaptive Management Program was established in 1997 to address downstream ecosystem impacts from operation of Glen Canyon Dam and to provide research and monitoring of downstream resources.



Area of Interest:



Glen Canyon Dam Adaptive Management Program (Fish) Goals:

- Maintain or attain viable populations of existing native fish, eliminate risk of extinction from humpback chub and razorback sucker, and prevent adverse modification to their critical habitat.
- Maintain a naturally reproducing population of rainbow trout above the Paria River, to the extent practicable and consistent with the maintenance of viable populations of native fish.



Course Purpose:

- The purpose of this training course “Fish of the Colorado River” is to provide a general overview of fish located within the Colorado River below Glen Canyon Dam downstream to Lake Mead and linked directly to the GCDAMP.
- Also included are brief explanations of management concerns related to the native fish species, as well as species locations.

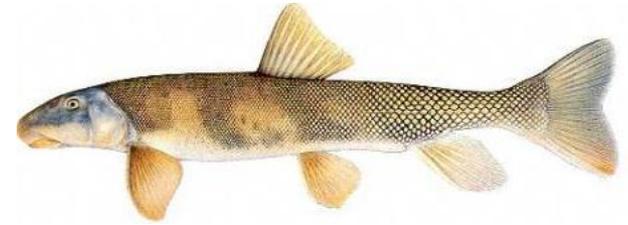


Native Fishes:

Colorado River and tributaries between
Glen Canyon Dam and Lake Mead



Bluehead Sucker



- **Scientific name:** *Catostomus discobolus*
- **Status:** Species of Special Concern (conservation status may be at risk)
- **Description:** Streamlined with small scales. Body color ranges from dark gray-black to light brown, with lighter underbelly and fins. Smooth cartilaginous lip in half moon shape. Average size 10 – 16 inches.
- **Distribution:** Found throughout portions of AZ, ID, NM, UT, and WY in small tributary streams to large rivers. In Arizona, found in the Colorado River, as well as the San Juan drainage and on the Navajo Reservation.
- **Habitat:** Adults occupy deep pools and eddies during periods of clear water during the day, moving to areas of flowing water with gravel, cobble, or rock substrate at night or when water is turbid. Are bottom feeders that scrape algae.
- **Biology:** Fish spawn from April – June. Breeding males have a bluish head, orange lower fins, and tubercles present. May live over 20 years.
- **Management Concerns:** Habitat degradation and introduction of non-native fish.
- **Location in Colorado River:** Widespread throughout mainstem; Little Colorado River; Kanab Creek; Havasu Creek; Shinumo Creek; Tapeats Creek.



Flannelmouth Sucker



- **Scientific name:** *Catostomus latipinnis*
- **Status:** Species of Special Concern
- **Description:** Streamlined fish with small eyes and scales, and a down-turned mouth with large, fleshy protrusible lips. Coloring is grayish-green on back and sides, with a yellow or cream-colored abdomen. Fish can grow more than 27 inches and weigh 7 lbs.
- **Distribution:** Occurs only in the Colorado River and its tributaries. Widespread in the upper Colorado River basin above Lake Powell.
- **Habitat:** Typically inhabits pools, runs, riffles, and backwaters. Prefers water temperatures 60 – 80°F. Are omnivorous, benthic feeders.
- **Biology:** Fish spawn from March – May, with males developing tubercles on fins and red coloration. The flannelmouth sucker can live more than 20 years.
- **Management Concerns:** Protection of natural flow regimes in tributaries is vital to persistence of species.
- **Location in Colorado River:** Widespread throughout mainstem; Little Colorado River; Kanab Creek; Havasu Creek; Shinumo Creek; Paria River; Surprise Creek; Spencer Creek.



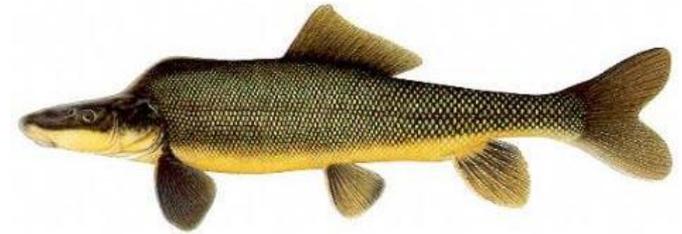
Humpback Chub



- **Scientific name:** *Gila cypha*
- **Status:** Endangered (since 1967)
- **Description:** Named for prominent hump rising behind head to dorsal fin, with a streamlined body and narrow base with deeply forked tail. Long snout overhangs jaw. Chub are gray or olive colored on back with silver sides and white belly. Average size of 8-12 inches and up to 2.5 lbs.
- **Distribution:** Endemic to the Colorado River basin. Currently found in the Green, Yampa, and White Rivers in UT, as well as the Little Colorado River and Colorado River in AZ.
- **Habitat:** Reside in a variety of habitats from slow to fast current, substrate of sand to boulders, and depths 1 – 15 m. Opportunistic and piscivorous (eat fish) feeders.
- **Biology:** Spawning occurs from April – June when water temperatures are 60 – 75°F. Adults develop red coloration on fins and gills during spawning season. Humpback chub can live more than 30 years in the wild.
- **Management Concerns:** Declines likely due to reduced water temperatures, regulated water flows, reduced turbidity, and increased competition and predation by non-native fishes.
- **Location in Colorado River:** Mainstem near confluence with Little Colorado River and elsewhere; Little Colorado River; Havasu Creek; Shinumo Creek.



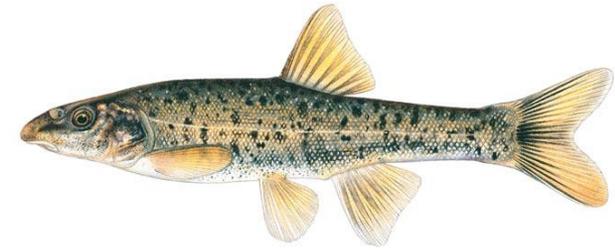
Razorback Sucker



- **Scientific name:** *Xyrauchen texanus*
- **Status:** Critically Endangered (since 1991)
- **Description:** Possess a bony keel located on dark olive-colored back, with yellow colored abdomen. Fish can grow up to 36 in long and weigh 13 lbs.
- **Distribution:** Historically common in the lower Colorado River, reservoirs, and canals. Previously extirpated, today the largest, and possibly only population of wild, reproducing razorbacks is in Lake Mead. Fish are stocked in Lake Havasu, Lake Mead, Lake Mohave, as well as Green and Yampa Rivers in the Upper Colorado River Basin.
- **Habitat:** A large river species, razorbacks are not found in smaller tributaries and headwaters. Fish are found in water 4 - 10 ft deep and associated with varied habitats, including strong currents or flat water stretches. May feed on both plant and animal matter.
- **Biology:** Spawning occurs in late winter to early spring. Fish may live over 40 years.
- **Management Concerns:** Population fragmentation from dams, altered hydrograph (flow), thermal regime shift, and predation by non-native fishes.
- **Location in Colorado River:** Mainstem near Lake Mead inflow.



Speckled Dace



- **Scientific name:** *Rhinichthys osculus*
- **Status:** Common
- **Description:** Also known as a spotted dace for their spotted sides, this member of the minnow family reaches 5 inches in length.
- **Distribution:** Native to western USA, as well as southwestern Canada and northern Mexico.
- **Habitat:** Adapted to varied habitats, from cold swift-flowing headwaters to warm desert streams and springs. Benthic feeders.
- **Biology:** Fish spawn during spring and summer over gravel areas. Adults develop red coloration on base of fins and snout during spawning. May live up to 4 years.
- **Management Concerns:** None.
- **Location in Colorado River:** Widespread throughout mainstem and tributaries, including Bright Angel Creek, Clear Creek, Diamond Creek, Havasu Creek, Hermit Creek, Kanab Creek, Little Colorado River, Nankoweap Creek, Paria River, Salt Creek, Shinumo Creek, Surprise Creek, and Tapeats Creek.



Extirpated Native Fishes

Colorado Pikeminnow

Ptycocheilus lucius

- Known to be the largest cyprinid in North America, they grew up to 6 ft long and weighed over 100 lbs, while living for 40 years. They have a torpedo-shaped body, large, toothless mouth, and an olive-green back with a silvery-white belly.
- Endangered since 1967, and once abundant in the mainstem of the Colorado River and most major tributaries, today only two wild populations are found in the Upper Colorado River Basin (upper Colorado River and Green River).



Bonytail Chub

Gila elegans

- Bonytail grow over 2 ft in length with a lifespan of 30 years. They have a streamlined body, thin base to tail fin, and terminal mouth. Coloring is dark dorsally and lighter ventrally.
- Once found in states throughout the west, the fish has experienced abrupt declines, and is considered functionally extinct with no known reproducing populations. With an endangered status since 1980, today, stocked fish are found in the Green and upper Colorado rivers, as well as Lake Mead.



Common Non-Native Fishes

Colorado River and tributaries between
Glen Canyon Dam and Lake Mead



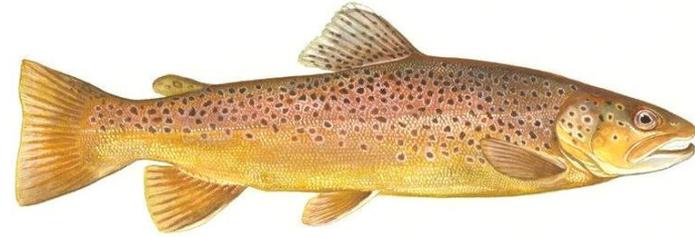
Black Bullhead



- **Scientific name:** *Ameiurus melas*
- **Description:** Black barbels located near mouth, broad head, spiny fins, and no scales. Distinctly squared off tail. Coloring is dark on back, with a greenish-white belly. Fish don't grow large, only weighing 1 – 2 lbs and growing 5 – 15 inches.
- **Distribution:** Native to areas east of the Rocky Mountains in the United States, they have become established in warm waters across the country.
- **Habitat:** Thrive in low oxygen, turbid, or warm slow-moving water with soft bottoms. Omnivorous bottom feeders.
- **Biology:** Spawn April – June. May live up to 10 years.
- **Location in Colorado River:** Little Colorado River and mainstem in vicinity of confluence; mainstem near Diamond Creek.



Brown Trout



- **Scientific name:** *Salmo trutta*
- **Description:** Olive brown with yellowish brown sides containing red spots and black spots encircled with white. Can grow 6 – 36 inches and weigh over 22 lbs.
- **Distribution:** An exotic species native to Europe, brown trout are today found world wide.
- **Habitat:** Found in both streams and lakes, can thrive at warmer temperatures than other salmonids.
- **Biology:** Late fall spawners. May live up to 40 years. Feeding habits are aggressive and very piscivorous.
- **Management Concerns:** Predation and competition with native fishes.
- **Location in Colorado River:** Found throughout mainstem; common near Lee Ferry and Bright Angel Creek confluence.



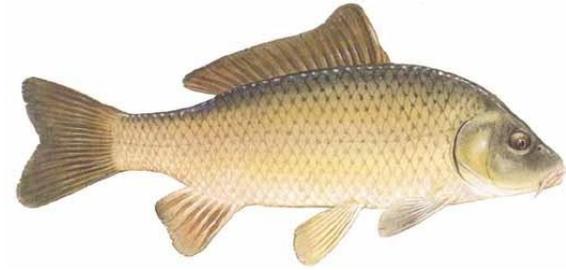
Channel Catfish



- **Scientific name:** *Ictalurus punctatus*
- **Description:** Brown to blue on back and sides, with a silvery-white belly. Distinguished by a deeply forked tail, black spots on sides, scale-less skin, and barbels. Size averages 10 – 30 inches and can reach 50 lbs.
- **Distribution:** Native to the eastern and northern United States as well as parts of southern Canada and northern Mexico.
- **Habitat:** Prefers large, turbid streams or warm lakes, with moderate current. Often found in deeper pools, but move near shore at night to feed omnivorously. Rely on whiskers to detect prey.
- **Biology:** Spawn in late spring to early summer when water temperatures warm to 75°F. Can live to 20 years.
- **Location in Colorado River:** Most often found in the Little Colorado River and downstream of Diamond Creek (Lake Mead inflow); throughout mainstem.



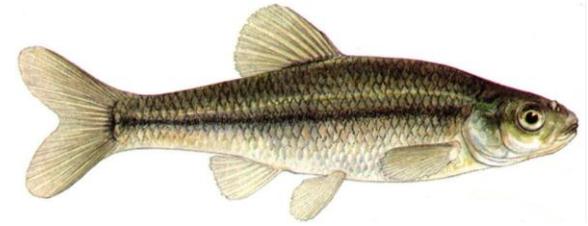
Common Carp



- **Scientific name:** *Cyprinus carpio*
- **Description:** A large, golden colored fish with big scales, a long dorsal fin, and barbels. Average size is approx. 16 – 32 inches and 5 – 30 lbs.
- **Distribution:** Native to Eurasia but introduced widely throughout the United States beginning around 1880.
- **Habitat:** Common in turbid, sluggish streams or large bodies of standing water. Feed off soft vegetated sediment on bottom.
- **Biology:** Spawn when temperatures reach 62 – 64°F in spring.
- **Management Concerns:** Large carp populations can cause a decline in water quality, leading to reduced plant health, increased algae growth, and decline in other fish populations.
- **Location in Colorado River:** Glen Canyon Dam outflow area; Little Colorado River; throughout mainstem.



Fathead Minnow



- **Scientific name:** *Pimephales promelas*
- **Description:** Olive-gray in appearance with a dark stripe along side and a lighter color belly. Possess a distinct rounded snout. Adults average 2 – 3 inches in length.
- **Distribution:** A popular bait minnow, fatheads have been extensively introduced across North America.
- **Habitat:** Tolerates a range of conditions from high temperatures, low oxygen, and high turbidity. Found anywhere from small ponds to large lakes and streams. Feed primarily on plant material.
- **Biology:** Spawn from May – August, beginning when temperatures approach 64°F and ending when temperatures drop below 64°F. Lifespan of 3 years.
- **Location in Colorado River:** Havasu Creek; Kanab Creek; Little Colorado River; Shinumo Creek; Spencer Creek; Surprise Creek; Tapeats Creek; throughout mainstem.



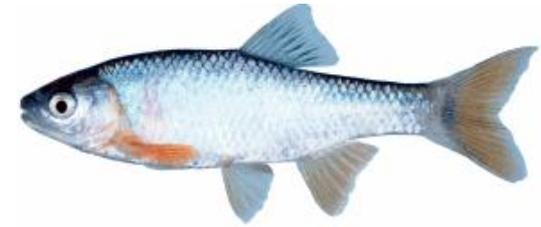
Rainbow Trout



- **Scientific name:** *Oncorhynchus mykiss*
- **Description:** Generally blue-green with heavy black spotting over length of body, reddish stripe along lateral line, with a silvery belly and mildly forked tail. Average length 8 – 32 inches. Size 1 – 5 lbs.
- **Distribution:** Native to cold water tributaries of the Pacific Ocean in North America and Asia, the species has been introduced on every continent except Antarctica.
- **Habitat:** Both lake-dwelling and riverine forms exist. Prefer small to large, well-oxygenated, rivers with gravel bottoms. Omnivorous feeders, known to be less piscivorous than brown trout.
- **Biology:** Spawn in early to late spring, and live an average of 3 – 5 years in the Colorado River.
- **Management Concerns:** Predation and competition by rainbow trout is thought to negatively affect native fishes.
- **Location in River:** Heavily concentrated near Lee Ferry (River Mile 0), numbers decline downstream towards the Little Colorado River confluence.



Red Shiner



- **Scientific name:** *Cyprinella lutrensis*
- **Description:** Silver sides and whitish belly, with a pointed snout and terminal mouth. Grow to 3 inches.
- **Distribution:** Native to the Mississippi River basin. Widely utilized as a baitfish, the species is present within the Colorado River basin and in the eastern USA.
- **Habitat:** Found in a variety of habitats from still backwaters to large flowing streams. Tolerant of high turbidity and siltation. Feeds primarily on small aquatic insects.
- **Biology:** Spawn from late spring through summer. During breeding season, males have red fins. Can live up to 3 years.
- **Location in Colorado River:** Little Colorado River; Mainstem near confluence with Little Colorado River; Lake Mead inflow; Spencer Creek; Surprise Creek.

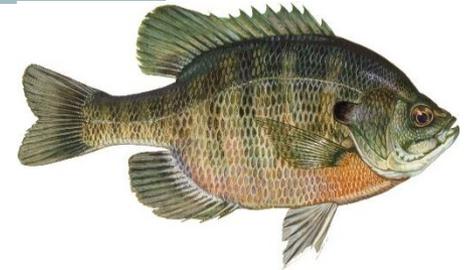


Rare Non-Native Fishes

Colorado River and tributaries between
Glen Canyon Dam and Lake Mead



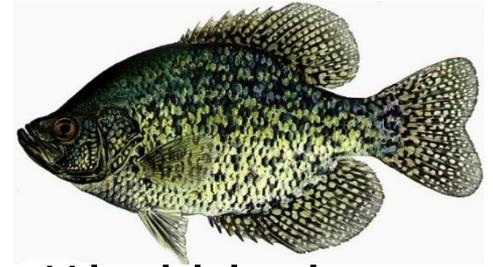
Bluegill



- **Scientific name:** *Lepomis macrochirus*
- **Description:** Dark olive back, to copper sides, to orange-yellow on belly, with vertical bars on sides and a black ear flap. Size ranges from 6 – 10 inches.
- **Distribution:** Native to Great Lakes and Mississippi River basin, but introduced throughout the United States.
- **Habitat:** Shallow waters of lakes and ponds, as well as slow-moving streams. Prefer areas of vegetated or woody cover. Diet shifts from plant matter to aquatic insects as they grow.
- **Biology:** Spawn from April – June. May live up to 10 years.
- **Location in Colorado River:** Inflow to Lake Mead; Glen Canyon Dam outflow area.



Black Crappie



- **Scientific name:** *Pomoxis nigromaculatus*
- **Description:** Silvery-green in color with mottled black splotches over entire body. Average length is 4 – 8 inches long.
- **Distribution:** Native to the eastern United States and Canada, but introduced populations exist throughout the country.
- **Habitat:** Found in lakes and backwaters of large rivers, they prefer little to no current, clear water, and abundant cover. Feed on fish and insects.
- **Biology:** Spawn in spring – early summer. Lifespan typically 7 years.
- **Location in Colorado River:** Lake Mead inflow; mainstem near Little Colorado River.



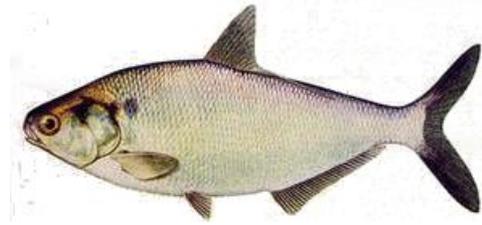
Green Sunfish



- **Scientific name:** *Lepomis cyanellus*
- **Description:** Blue-green in color with yellow coloration towards belly. Has black spot located behind operculum and dark spot on back of dorsal fin. Typically grow 4 – 8 inches and weigh less than a pound.
- **Distribution:** Native to North America east of the Rocky Mountains and west of Appalachian Mountains, but introduced and common throughout the United States.
- **Habitat:** Sunfish can be found in streams, lakes and ponds, preferring vegetated areas and structures for cover. Are able to tolerate poor water conditions, and can be aggressive predators, feeding on fishes and aquatic insects.
- **Biology:** Spawn in May – July. Individuals may live for 9 years.
- **Location in Colorado River:** Little Colorado River; Kanab Creek; scattered throughout mainstem including Lee Ferry reach, near confluence of Little Colorado River, and Lake Mead inflow.



Gizzard Shad



- **Scientific name:** *Dorosoma cepedianum*
- **Description:** Named for its muscular gizzard-like stomach. Characterized by silvery color, deep body, and a blunt snout. May reach lengths of 20 inches and weigh up to 7 pounds.
- **Distribution:** Native to the eastern United States, but introduced as a forage fish in many western impoundments.
- **Habitat:** Prefer warm water of rivers, reservoirs, and lakes. Travel in large schools near surface. Feed on microscopic plants and animals, filtering food through gills.
- **Biology:** Spawning occurs late spring – early summer. May live up to 6 years.
- **Location in Colorado River:** Lake Mead inflow (below Diamond Creek).



Largemouth Bass



- **Scientific name:** *Micropterus salmoides*
- **Description:** Different than smallmouth in that mouth extends back beyond eye. Back is olive-green to brown in color, with greenish sides, a white belly, and a broad black band running horizontally. Average size 12 – 30 inches, and up to 16 pounds.
- **Distribution:** Native to the eastern United States but range has expanded to the Pacific coast through introductions.
- **Habitat:** Thrive in lakes and ponds, tolerant of turbidity and current. Aggressive predators, they feed exclusively on other fish and large invertebrates.
- **Biology:** Spawn in April – May, with an average lifespan of 10 – 12 years.
- **Location in Colorado River:** Inflow to Lake Mead; Lost Creek; Quartermaster Creek.



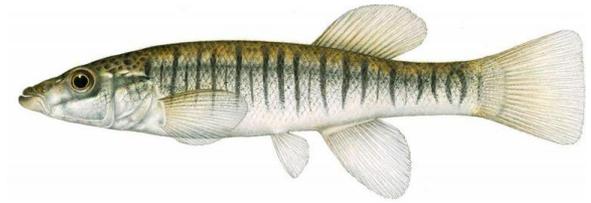
Western Mosquito Fish



- **Scientific name:** *Gambusia affinis*
- **Description:** Small and dull gray in color, with rounded fins and an upturned mouth. May reach 3 inches in length.
- **Distribution:** Introduced worldwide as a biological control of mosquito populations.
- **Habitat:** Abundant in shallow water, can survive in hot temperatures and low oxygen concentrations.
- **Biology:** A livebearer that can spawn throughout summer. Lifespan averages less than a year. An aggressive omnivore whose introductions have resulted in the decline and loss of many native fish species.
- **Location in Colorado River:** Inflow to Lake Mead; Lost Creek; Emery Falls Creek.



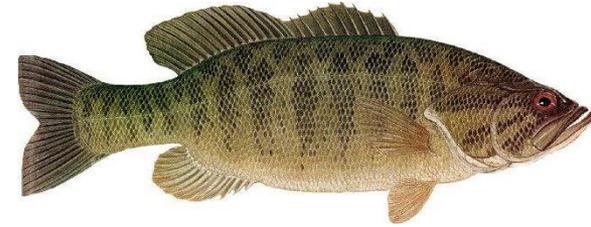
Plains Killifish



- **Scientific name:** *Fundulus zebrinus*
- **Description:** Tan or yellow in color fading to white on stomach, with thin, dark bars on sides. Have rounded tail fins and an upturned mouth. Killifish seldom exceed 4 inches in length.
- **Distribution:** Native to streams of the Great Plains in central North America. Introduced into western CO, UT, AZ, NM, MO, and WY.
- **Habitat:** Typically found in shallow, sandy bottom streams. Tolerant of current, warm water, and low-oxygen. Consume a variety of aquatic invertebrates.
- **Biology:** Spawn in late spring – early summer when water temperature exceeds 80°F. They rarely live longer than 2 years.
- **Location in Colorado River:** Lake Mead inflow; Crystal Creek; Havasu Creek; Kanab Creek; Little Colorado River; Quartermaster Creek; Shinumo Creek; Spencer Creek; Surprise Creek.



Smallmouth Bass



- **Scientific name:** *Micropterus dolomieu*
- **Description:** Green or bronze in color with dark vertical bands on sides. Length 12 – 22 inches and 6 pounds.
- **Distribution:** Originally ranged throughout the Midwest, today introduced populations are established throughout the country.
- **Habitat:** Prefer large, clear water lakes and cool streams with gravel substrate. Feed on small fishes, crayfish, and insects.
- **Biology:** Spawn in spring when water temperatures reach 60°F. May live 10 – 12 years.
- **Location in Colorado River:** Just below Glen Canyon Dam; Lake Mead inflow; Mainstem around confluence with Little Colorado River.



Striped Bass



- **Scientific name:** *Morone saxatilis*
- **Description:** 6 – 9 horizontal stripes on silvery sides, lower jaw protrudes past upper jaw, and has two separate dorsal fins. May grow from 10 – 56 inches and weigh 1 – 65 pounds.
- **Distribution:** Originally native to the eastern USA from the St. Lawrence River to Louisiana. They naturally live in salt water and migrate into freshwater streams to spawn, but have been introduced successfully into some western impoundments.
- **Habitat:** School in open, deep, clear water. Known to be highly piscivorous (eat fish).
- **Biology:** Spring spawners. Live up to 30 years.
- **Location in Colorado River:** Lake Mead inflow; few in mainstem near confluence with Little Colorado River.



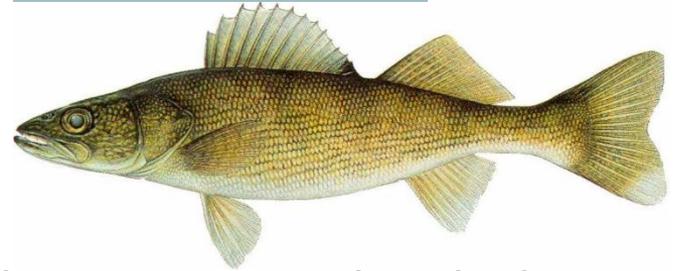
Threadfin Shad



- **Scientific name:** *Dorosoma petenense*
- **Description:** Named for its elongated dorsal fin, it has a gray-blue back with silvery sides, and a black spot behind head. May reach 8 inches in length.
- **Distribution:** Native to the southeastern United States, but widely introduced as forage for game fish throughout the country.
- **Habitat:** Found in large schools near the surface of large lakes and rivers. Feed on plankton.
- **Biology:** Spawning occurs in the spring when temperatures reach 65°F. Life expectancy is only 2 – 3 years.
- **Location in Colorado River:** Lake Mead inflow.



Walleye



- **Scientific name:** *Sander vitreus*
- **Description:** Named for a reflective layer on eye that helps it see at night or in murky water. Walleye are olive-gold in color with white belly, a large mouth, and sharp teeth. May grow to 30 inches in length and weigh up to 20 pounds.
- **Distribution:** Native range is the midwest United States and Canada, however, introductions extend into New England and west to the Columbia River.
- **Habitat:** Prefer deep, cooler water or vegetated cover. Feed heavily on fish at dawn and dusk.
- **Biology:** Spawn in early spring when water temperatures just above freezing. May live to be 15 years old.
- **Location in Colorado River:** Just below Glen Canyon Dam; below Diamond Creek.



Yellow Bullhead



- **Scientific name:** *Ameiurus natalis*
- **Description:** Yellow-brown in color, with a dark back and light underside. They lack scales, have a rounded tail, and chin barbels are white. Average length 6 – 14 inches.
- **Distribution:** Range throughout Atlantic and Gulf drainages to the Mississippi River basin. Introduced in the west.
- **Habitat:** Shallow, vegetated areas of lakes and slow-moving streams with clear water. Omnivorous feeders, consuming variety of plant and animal material.
- **Biology:** Spawns May – July. Lifespan of 4 years.
- **Location in Colorado River:** Little Colorado River and mainstem near its confluence; Kanab Creek; Havasu Creek.



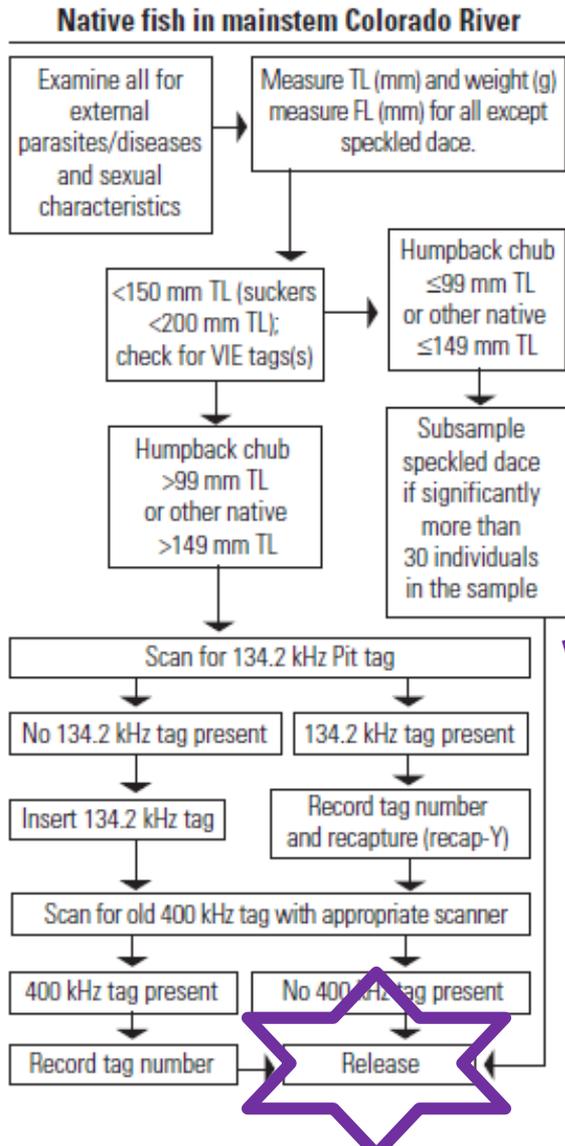
Historically Rare Non-Natives

- **Brook Trout:** Found from Lee Ferry down to confluence with Bright Angel Creek in the 70's and 80's.
- **Cutthroat Trout:** Found in the early 80's around Little Colorado River.
- **Redside shiner:** Found in Paria River (tributary of Colorado River at Lee Ferry) in early 90's.
- **Roundtail Chub:** Few found in lower reaches of Grand Canyon in early 90's.



Standardized Sampling Protocol:

Mainstem Colorado



MEASURE LENGTH AND WEIGHT

SCAN FOR PIT TAG

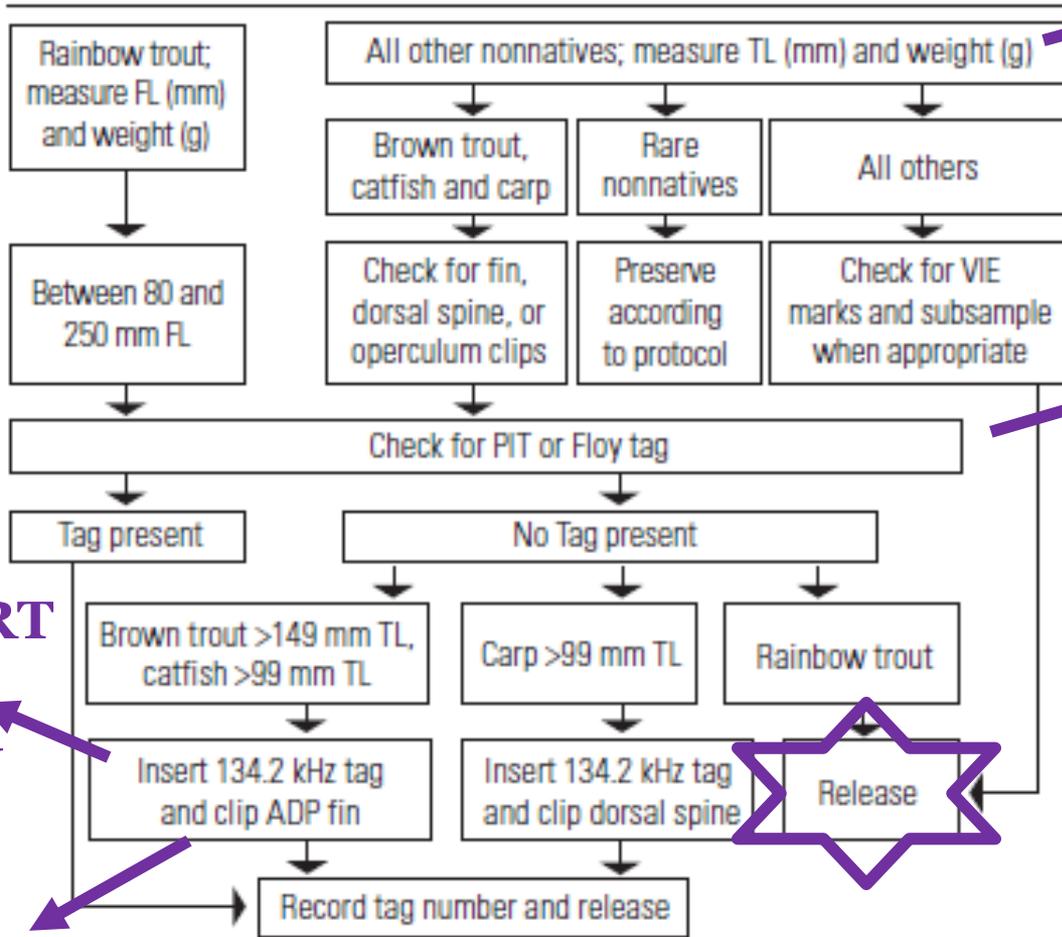
INSERT PIT TAG



Standardized Sampling Protocol:

Mainstem Colorado

Nonnative fish in mainstem Colorado River



MEASURE LENGTH AND WEIGHT

SCAN FOR PIT TAG

INSERT PIT TAG

FIN CLIP



Definitions:

- **Species of Special Concern** = A species whose occurrence in a state is or may be in jeopardy, or with known or perceived threats to population decline.
- **Endangered** = A species in imminent jeopardy of extinction.
- **Extirpated** = Local extinction of a species in a geographic area.
- **Turbidity** = Amount of cloudiness to water because of suspended sediment.
- **Tubercles** = small, raised nodules appearing on the surface of fish, mostly cyprinids, during breeding season.
- **Piscivorous** = feeding mainly on fish.
- **Benthic** = relating to the bottom of a lake or river, and the organisms which reside there.

