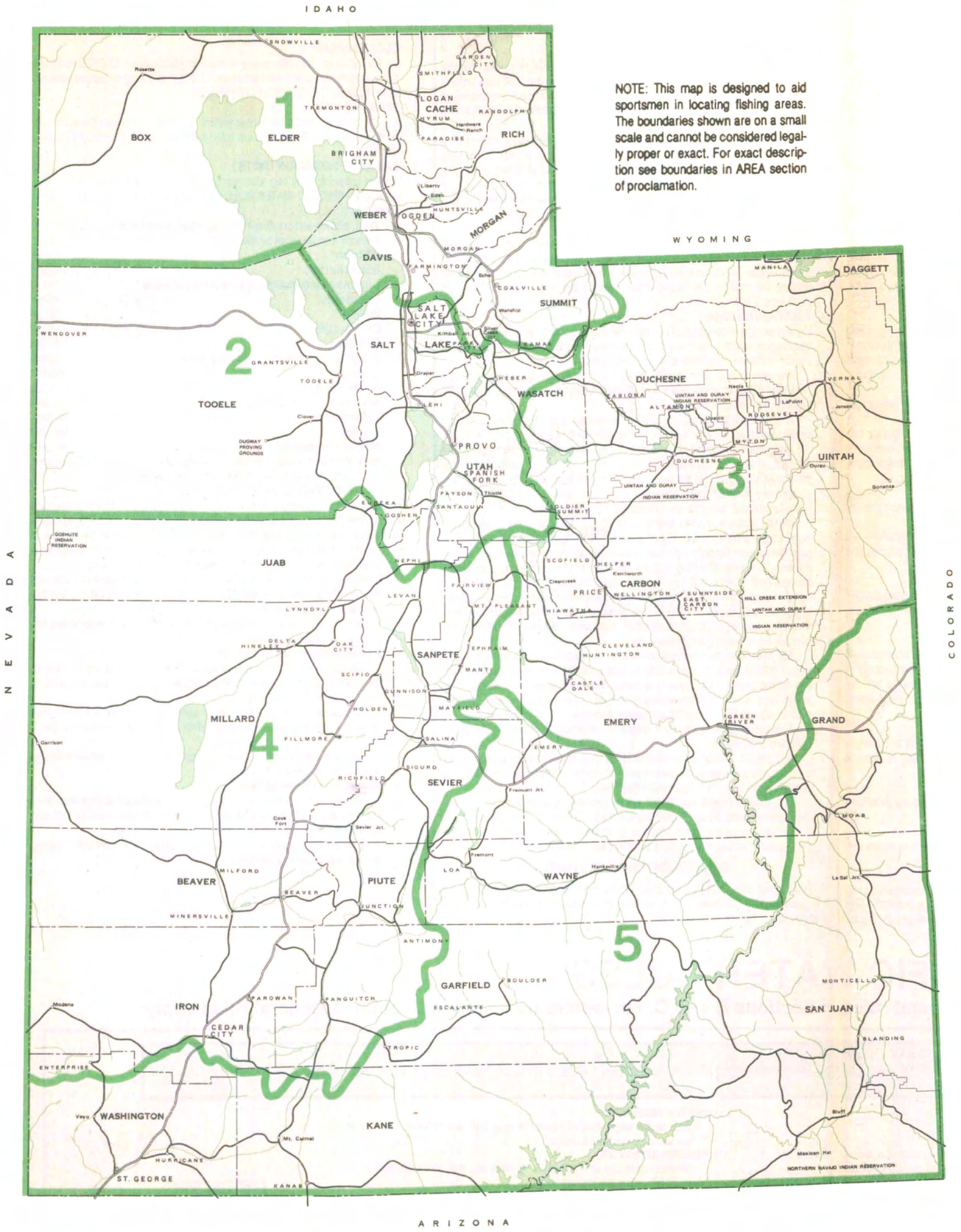


1988 UTAH

FISHING PROCLAMATION and INFORMATION

issued by

UTAH DIVISION OF WILDLIFE RESOURCES
1596 West North Temple Street
Salt Lake City, Utah 84116

William H. Geer, Director

DIVISION OF WILDLIFE RESOURCES OFFICES:

Salt Lake City
1596 West North Temple, Salt Lake City, UT 84116
801/533-9333
Fishing Information (recorded) 530-1298
Fish and Wildlife Update (recorded) 532-2473

Springville
1115 North Main Street
Springville, UT 84663
801/489-5678

Cedar City
622 North Main Street
Box 606
Cedar City, UT 84720
801/586-2455

Ogden
515 East 5300 South
Ogden, UT 84403
801/479-5143

Vernal
152 East 100 North
Vernal, UT 84078
801/789-3103

Price
455 West Railroad Ave.
Price, UT 84501
801/637-3310

HOW TO USE THIS PROCLAMATION

Step 1 — General rules such as seasons, license requirements, bag limits, and methods of angling are printed in the first section of the proclamation. Read and become familiar with these rules first, before going fishing.

Step 2 — When you are ready to go fishing, consult the map to determine in which management area your fishing waters are located.

Step 3 — Turn to that area in Section D., Specific Water Rules. Read the AREA seasons and limits. Also check with the exceptions listed to see if the rules of the specific water you are concerned with differ from the GENERAL and AREA rules.

Step 4 — If the water is not listed in these exceptions, then the area and general rules will apply.

PROCLAMATION

STATE OF UTAH DIVISION OF WILDLIFE RESOURCES

PROCLAMATION OF THE WILDLIFE BOARD FOR FISH, CRAYFISH AND BRINE SHRIMP

1988

After due investigation, we, the Utah Wildlife Board by authority granted us under Title 23, Utah Code, hereby state the following rules governing the taking of all fish, brine shrimp and crayfish from the waters of Utah. These rules will be effective January 1, 1988 and will remain in effect until modified or rescinded by Board action. All dates are inclusive.

Sections B and C set forth general rules. Where more localized and specific rules are given in these and other sections of this proclamation, the more specific rules take precedence.

A. DEFINITIONS

1. **Aggregate.** The combined total of two or more species of fish or two or more size classes of fish which are covered by a limit distinction (i.e., trout and salmon in the aggregate).
2. **Angling.** Fishing with rod, pole, tipup, handline or trollboard, held in the hands of, or within 10 feet of, the person fishing and having a single line with legal hooks, baits or lures attached.
3. **Aquatic wildlife.** Any species of fish, crustaceans, aquatic insects, or amphibians (23-13-2(1)).
4. **Artificial fly.** Any fly made by the method known as fly tying. Weighted jigs, lures, spinners, attractor blades, or bait do not qualify as artificial flies.
5. **Artificial lure.** Any device made of rubber, wood, metal, glass, fiber, feathers, hair or plastic with hook or hooks attached.
6. **Bag limit.** Maximum limit, in number or amount, of aquatic wildlife which may lawfully be taken by any one person during one day (23-13-2(2)).
7. **Bait.** Any digestible substance including, but not limited to, worms, cheese, salmon eggs or marshmallows. Legal baits are described in B.3.a. Baits.
8. **Chumming.** Depositing in the water any substance, not attached to a hook, which may attract fish.
9. **Division.** The Utah Division of Wildlife Resources.
10. **Fishing.** To take fish, crayfish or brine shrimp by any means (23-13-2(10)).
11. **Float tube.** A floating device capable of supporting one person and not considered a boat or a raft.
12. **Game fish.** Trout (rainbow, albino, cutthroat, brown, golden, brook, lake (mackinaw) and splake); kokanee salmon; grayling; whitefish; Bonneville cisco; crappie; yellow perch; largemouth and smallmouth bass; channel catfish; bullhead; bluegill; green sunfish; northern pike; walleye; white bass; and striped bass.
13. **Lake or reservoir.** The standing water level existing at any time within the lake or reservoir basin. Unless posted otherwise, a stream flowing inside or within the high water mark is not considered part of the lake or reservoir.
14. **Length measurement.** The greatest length between the tip of the head or snout and the tip of the caudal (tail) fin when the fin rays are squeezed together. Measurement is taken in a straight line and not over the curve of the body.
15. **Minnow.** All members of the family of fish classified as Cyprinidae (chub, dace, goldfish, minnow, shiner, squawfish and carp); Cyprinodontidae (killifish) and Poeciliidae (mosquitofish). The term minnow does not include the fry or fingerlings of any species not in these three families (i.e., small trout are not minnows).
16. **Motor.** All electric and internal combustion motors.
17. **Nongame fish.** All fish species not listed as game fish. This includes carp, suckers, chubs and minnows.
18. **Nonresident.** Any person who does not qualify as a resident (23-13-2(18)).
19. **Possession.** Includes actual and constructive possession (23-13-2(22)).
20. **Possession limit.** One daily bag limit. This includes fish at home, in a cooler, camper, tent, freezer or any other place of storage.
21. **Protected wildlife.** All wildlife species of fish, birds, amphibians, reptiles, brine shrimp, crayfish, and mammals (23-13-2(27)).
22. **Resident** (23-13-2(29))
    (a) Any person who has been domiciled in the State of Utah for six consecutive months immediately preceding the purchase of a license and who does not claim residency for hunting, fishing or trapping in any other state or country. Utah residents leaving Utah to serve in the armed forces of the United States or for religious or educational purposes and who do not claim residency for hunting, fishing, or trapping in any other state or country shall not lose their residency.
    (b) A member of the armed forces of the United States who is not on temporary duty in this state and does not claim residency for hunting, fishing, or trapping in any other state or country is a resident for purposes of this chapter as of the date the member reports for duty under assigned orders in the state. A copy of the assignment orders must be presented to a wildlife Division office to verify the member's qualification as a resident. Dependents of a member of the armed forces who do not claim residency for hunting, fishing, or trapping in any other state or country may qualify as residents under this chapter after living in the state for 60 consecutive days immediately prior to purchasing a license.
    (c) Nonresidents attending an institution of higher learning in this state as full-time students and who do not claim residency for hunting, fishing, or trapping in any other state or country may qualify as Utah residents for license purposes after having been physically present in this state for 60 consecutive days immediately preceding the purchase of the license. This license becomes invalid upon the purchase of a resident license for hunting, fishing, or trapping in any other state or country.
    (d) Absentee landowners who pay property taxes on land they own in Utah do not qualify as a resident.
23. **Set line.** A line anchored at one end to a nonmoving object and not attached to a fishing pole.
24. **Single hook.** A hook or multiple hooks having a common shank.
25. **Snagging or gaffing.** Attempting to take a fish in such a manner that the fish does not take the hook voluntarily in its mouth. Snag or gaff hooks are hooks with or without handles used to take fish by snagging.
26. **Spoiled.** Impairment of the flesh quality of any form of wildlife beyond which point a reasonable and prudent person would consider it unfit for human consumption (23-13-2(32)).
27. **Take.** To hunt, pursue, harass, catch, capture, possess, angle, seine, trap, or kill any protected wildlife or any attempt to commit any of these acts (23-13-2(34)).
28. **Trout.** All species of the family Salmonidae except whitefish and cisco. (Trout includes rainbow, albino, cutthroat, brown, golden, brook, lake (mackinaw), splake, kokanee salmon and grayling).
29. **Waste.** Protected wildlife that has been abandoned, allowed to deteriorate, or used in a manner not normally associated with beneficial uses of the species involved (23-13-2(37)).
30. **Wildlife.** Any species of vertebrate animal life except feral animals generally living in a state of nature (23-13-2(39)).

B. GENERAL RULES

This section sets forth general rules. Where more localized and specific rules are given in this and other sections of the proclamation, the more specific rules take precedence.

1. **LICENSE AND STAMP REQUIREMENTS**

No person shall engage in fishing for protected wildlife as provided by this proclamation without first having procured the necessary fishing or combination license, permit and tag as herein provided and having at the time such license, permit and tag on his person; nor shall any person lend, transfer, sell, give or assign his license or any permits or tag belonging thereto or the rights granted by such license, permit or tag. It is unlawful for any person to use or have in his possession while fishing, any license or permit not issued to him (23-19-1).

June 11, 1988 has been designated FREE FISHING DAY in Utah. On that day only, no license is required, and all anglers are permitted to have a full limit for the water being fished. All other rules of this proclamation are in effect.

Sales of all licenses, certificates or permits are final, and no refunds may be made by the Division except in those instances where the opportunity to participate in the specific activity for which the license, certificate or permit was obtained is withdrawn by the Division, Wildlife Board, or Board of Big Game Control (23-19-38).

Some interstate waters have separate licensing requirements. See B.1.b. Interstate Waters.

a. **Age Requirements**

(1) **12 Years and Older**

Any person 12 years of age or older must have in possession a current valid fishing or combination license to take any fish, crayfish or brine shrimp.

(2) **Residents Under 12 Years of Age**

(a) Residents less than 6 years of age may fish without a license while in the company of a licensed angler. Fish taken must be included in the limit of the licensed angler.

(b) Residents 6 through 11 years of age may fish without a license. In this case, the daily bag limit is equivalent to one-half of the daily bag and possession limit:

or

Residents 6 through 11 years of age may purchase a resident (age 12 and under 16) fishing license. In this case, full daily bag limits apply.

(3) **Nonresidents Under 12 Years of Age**

(a) Nonresidents under 12 years of age may fish without a license while in the company of a licensed adult angler. Fish taken must be included in the limit of the licensed angler;

or

Nonresidents under 12 years of age may purchase a nonresident fishing license. In this case, full daily bag limits apply.

b. **Interstate Waters**

Reciprocal fishing stamps for Flaming Gorge Reservoir or Lake Powell must be signed across the face by the holder, in the same manner as the holder's name appears on the fishing license, and attached to the fishing license. Reciprocal stamps are valid on a calendar year basis.

Anglers are subject to the rules of the state in which they are fishing.

The holder of a current valid Utah fishing or combination license may fish the Utah portions of all interstate waters.

Only one daily limit of fish may be taken by each licensed angler licensed in either or both states. An angler is entitled to only one limit per day even if licensed in both states.

(1) **Bear Lake**

The holder of a current valid Utah or Idaho fishing or combination license may fish any place on Bear Lake proper.

See other special Bear Lake rules under D. SPECIFIC WATER RULES.

(2) **Lake Powell**

Any person possessing a current valid Arizona license may fish in the waters of Lake Powell within Arizona without a Utah reciprocal fishing stamp, and any person possessing a current valid Utah fishing or combination license may fish in the waters of Lake Powell within Utah without an Arizona reciprocal fishing stamp.

Any person qualifying as an Arizona resident having in his possession a current valid resident Arizona fishing license and a Utah reciprocal fishing stamp is permitted to fish within the Utah boundaries of Lake Powell.

Any person qualifying as a Utah resident having in his possession a current valid Utah fishing or combination license and an Arizona reciprocal fishing stamp is permitted to fish within the Arizona boundaries of Lake Powell.

Persons under the age of 14 may fish without a license. Creel and possession limits are the same as for licensed anglers.

Any person properly licensed pursuant to the rules set forth above may fish in any and all waters of Lake Powell and may enter said waters from any point.

See other special Lake Powell rules under D. SPECIFIC WATER RULES.

(3) **Flaming Gorge Reservoir**

These rules pertain only to Flaming Gorge Reservoir proper at the standing water elevation existing at the time of fishing. Tributaries to Flaming Gorge Reservoir are governed by the fishing rules of the state in which they are located.

Persons under the age of 14 may fish in any portion of Flaming Gorge Reservoir without a fishing license. A current valid fishing license is required for all persons 14 years of age or older to fish on Flaming Gorge Reservoir.

Any person possessing a current valid Wyoming fishing license may fish Flaming Gorge Reservoir within Wyoming without a Utah reciprocal fishing stamp, and any person possessing a current valid Utah fishing or combination license may fish Flaming Gorge Reservoir within Utah without a Wyoming reciprocal fishing stamp.

Any person possessing a current valid Wyoming fishing license and a Utah reciprocal fishing stamp is permitted to fish within Utah in the waters of Flaming Gorge Reservoir.

Any person possessing a current valid Utah fishing or combination license and a Wyoming reciprocal fishing stamp is permitted to fish within Wyoming in the waters of Flaming Gorge Reservoir.

Unlicensed persons under the age of 14 may take only one-half the daily bag limit.

Persons under the age of 14 eligible to buy a license under Utah or Wyoming rules may do so and are allowed a full daily bag limit.

See other special Flaming Gorge rules under D. SPECIFIC WATER RULES.

c. **Fees**

(1) **Resident License Fees**

Combination fishing and hunting (16 years and over)	$35.00
Annual fishing	
Age 6 and under 12 (optional)*	8.00
Age 12 and under 16	8.00
Age 16 and under 65	18.00
65 and over	9.00
Five-day fishing	
Age 12 and under 16	4.00
Age 16 or older	9.00

*License may be purchased by individuals ages 6-11 wanting a full bag limit.

(2) **Nonresident License Fees**

Annual fishing	40.00
Five-day fishing	15.00
One-day fishing	5.00
One-day fishing stamp to extend 1- and 5-day license	5.00

(3) **Reciprocal Fishing Stamps**

Flaming Gorge Reservoir (for use with Wyoming resident license)	5.00
Lake Powell (for use with Arizona resident licenses)	8.00

d. **Division Offices**

Main Office (801/533-9333)
1596 West North Temple, Salt Lake City, Utah 84116
Northern Regional Office (801/479-5143)
515 East 5300 South, Ogden, Utah 84403
Central Regional Office (801/489-5678)
1115 North Main Street, Springville, Utah 84663
Northeastern Regional Office (801/789-3103)
152 East 100 North, Vernal, Utah 84078
Southern Regional Office (801/586-2455)
622 North Main Street, Cedar City, Utah 84720
Southeastern Regional Office (801/637-3310)
455 West Railroad Avenue, Price, Utah 84501

2. **EXHIBIT OF LICENSE, STAMP AND WILDLIFE**

All persons while engaged in hunting, trapping, or fishing, or while transporting wildlife, shall be required upon demand of any conservation officer or any other peace officer to exhibit the required license, permit, tag or certificate of registration; any device or apparatus in his possession used for hunting, trapping, or fishing, or any wildlife in his possession (23-20-25).

3. **FISHING METHODS**

Game fish may be taken only by angling and by use of set lines (B.3.c.), spearfishing (B.3.b.) and cisco dipnetting D.1.b.(1).

Angling is fishing with one rod, pole, tipup, handline or trollboard, held in the hand of, or attended by, the person angling, and having a single line attached with legal hooks, baits, or lures. Attended means the angler must be within ten feet of equipment being used at all times. Fishing with more than one line is illegal, except for crayfishing (B.3.e.) or setlining (B.3.c.).

Angling is permitted with any two lures, except no lure may have more than 3 hooks. No line may have attached to it more than two baited hooks or two artificial flies, except for set lines noted in B.3.c.

Artificial light is permitted, except when spearfishing.

Obstructing waterways and use of chemicals, explosives, electricity, poisons, crossbows, firearms or pellet guns are unlawful to take aquatic wildlife. Persons or companies who want to use any of these means to take fish in any waters of the state must have written approval of the Division.

Snagging and gaffing are illegal, except that a gaff may be used to land fish caught by lawful means.

Chumming is prohibited.

When angling through the ice, no ice hole may exceed 12 inches across at the widest point, except at Bear Lake, Flaming Gorge Reservoir and Fish Lake where no hole may exceed 18 inches. For cisco dip netting at Bear Lake, see D.1.b.(1).

a. **Baits**

Fishing is permitted with any bait, except corn, hominy, any live fish and any game fish or parts thereof; however, the eggs of all fish species are permited for bait.

The possession of corn or hominy when fishing is illegal.

Use or possession of any bait while fishing on waters designated artificial fly and lure only is unlawful.

Using live crayfish for bait is legal only on the water where the crayfish are captured. It is unlawful to transport live crayfish away from the water where captured.

Dead Bonneville cisco may be used as bait only in Bear Lake.

Dead yellow perch may be used as bait only in Deer Creek, Fish Lake, Gunnison, Hyrum, Pineview and Sevier Bridge (Yuba) reservoirs.

Dead white bass may be used as bait only in Utah Lake.

(Proclamation continued on page 2)

PROCLAMATION

Continued from page 1

b. **Spearfishing**

Deer Creek Reservoir, Steinaker Reservoir and Fish Lake are open to taking game fish by means of scuba and snorkel spearfishing between May 31 and September 5.

The daily bag and possession limit is two game fish. No more than one lake trout greater than 20 inches may be taken at Fish Lake.

Spearfishing is permitted from sunrise to sunset. Attracting or immobilizing fish by use of artificial light at any time is prohibited.

A spearfishing permit is required in addition to a current valid fishing or combination license and may be obtained without charge from all Division offices.

c. **Set Line Fishing**

Set lines may be used to take game fish in the Bear River proper downstream from the Idaho state line, including Cutler Reservoir and outlet canals; Little Bear River below Valley View Highway (U-30); Malad River; and Utah Lake.

Conventional fishing with one pole is permitted concurrent with set line fishing.

No more than two set lines per angler may be used and they must not contain more than 30 hooks in the aggregate.

When fishing set lines, the angler must be in attendance within 100 yards on the surface or bank of the water being fished.

Any set line must have attached a legible tag with the name, address and current valid fishing or combination license number of the angler.

d. **Completely Protected Fish**

The following fish species are completely protected and may not be taken without prior written permission from the Division:

Colorado squawfish	*Ptychocheilus lucius*
Bonytail chub	*Gila elegans*
Humpback chub	*Gila cypha*
Roundtail chub	*Gila robusta*
Least chub	*Iotichthys phlegethontis*
Woundfin	*Plagopterus argentissimus*
Razorback sucker	*Xyrauchen texanus*
Virgin River chub	*Gila robusta seminuda*
June sucker	*Chasmistes liorus*
Virgin River spinedace	*Lepidomeda mollispinis*

e. **Taking Nongame Fish and Other Aquatic Wildlife**

Nongame fish, crayfish and brine shrimp may be taken for personal, noncommercial purposes during the open season set for a given body of water. The Green, Colorado, White (Uintah County) and Virgin rivers are closed to the taking of nongame fish; however, carp may be taken from the Green River by angling, archery or spearfishing equipment.

Nongame fish, EXCEPT Completely Protected Fish (B.3.d.), may be taken by angling or with traps, bow and arrow, liftnets, spears or seines; and crayfish may be taken by angling or with traps, liftnets, handlines or seines, provided that:

Crayfish may not be taken with game fish or parts thereof, or any substance illegal for angling.

Seines must not exceed 10 feet in length or width.

No more than five lines may be used to take crayfish. Lines used for crayfishing can be held in the hand or used with a rod and must not have hooks attached. Bait is tied to the line so that the crayfish grasps the bait with its claws.

All legally taken nongame fish must be either released or killed immediately upon removing them from the water.

All crayfish must be killed before transporting from the body of water where taken.

4. **POSSESSION AND TRANSPORTATION**

a. **Dead Aquatic Wildlife**

All fish possessed in the field or in transit must be kept in such a manner that (a) the species of fish can be readily identified, (b) the number of fish can be readily counted, and (c) the size of the fish can be readily measured where size limits apply. Fish fillets must have attached sufficient skin to include the conspicuous markings so species can be identified.

A legal limit of game fish may accompany a bona fide fishing license holder within the state or when leaving the state. A person may lawfully possess or transport a legal limit of fish when accompanied by a donation letter. See B.7.a. Donating.

It is unlawful for any person to have more than one daily bag limit in possession at any time.

A person may lawfully possess or transport dead fish on a seller's receipt from a registered commercial pond owner. This document must specify the number and species of fish purchased; the certificate number of the registered pond owner; the name, address and signature of the seller; and the date and place where the fish were purchased.

b. **Live Aquatic Wildlife**

It is unlawful for any person, except operators of properly registered commercial fish installations, to possess or transport live fish. This section does not preclude the use of live fish stringers, live wells or hold-type cages as part of normal angling procedures while on the same water in which the fish are taken.

It is unlawful to transport live crayfish away from the water where captured.

Brine shrimp may be possessed and transported alive. A separate certificate of registration is required for any commercial operations (see Rules and Regulations Governing Commercial Fishing and Dealing Commercially in Aquatic Wildlife).

5. **RELEASE OF TAGGED OR MARKED FISH**

It is unlawful to tag or mark game fish for the purpose of offering a prize or reward as part of a contest.

It is illegal to introduce any tagged, marked or fin-clipped fish into the water or to tag, mark or fin clip any fish and return it to the water without prior written approval from the Division.

6. **CHECKING STATIONS AND ROADBLOCKS**

It is unlawful for any person to fail to stop at roadblocks or checking stations where a stop sign or red or blue light is displayed (23-20-19).

7. **DISPOSAL OF WILDLIFE**

a. **Donating**

A person may lawfully possess a legal limit of fish when accompanied by a donation letter. This letter must specify the number and species of fish donated; the fishing license number of the person who caught the fish; the name, address and signature of the donor; and the date and place where the fish were taken (23-20-9).

b. **Purchasing or Selling**

It is unlawful for any person to purchase, sell, offer for sale or barter, or to obtain for sale, purchase or barter, any protected wildlife, or parts of them (23-20-6).

c. **Wasting**

It is unlawful to waste or permit to be wasted or spoiled any protected wildlife or any part of them (23-20-8).

8. **AIDING AND ASSISTING**

It is unlawful for any person to aid or assist any other person to violate any rule (23-20-23).

9. **EMERGENCY CLOSING**

The Director of the Division shall have authority to declare emergency closed or open seasons in the interest of the wildlife resource of the state (23-14-8). As a conservation measure, any water or area may be closed to fishing by posting with suitable signs or markers and without further notice.

10. **DAMAGE OF PROPERTY**

It is unlawful for any person to deface, damage, move, remove or destroy any signs, placards or floating markers ordered placed, permitted to be placed, or caused to be placed in any part of this state by the Wildlife Board to enforce provisions of this proclamation or other actions of the Wildlife Board (23-20-13).

It is unlawful for any person, without the consent of the owner or person in charge of any privately owned land, to tear down, mutilate, or destroy any sign, signboard or other notice which regulates trespassing for purposes of hunting, trapping, or fishing on this land; or to, without such consent, tear down, deface, or destroy any fence or other enclosure on this privately owned land, or any gate or bars belonging to any such fence or enclosure (23-20-15).

11. **INDIAN LANDS**

Indian Trust Lands of the Uintah-Ouray reservation are administered separately from state, private and other federal lands. Anglers should observe tribal rules for fishing on Trust Lands of the reservation. Any person wishing additional information on fishing must contact the Ute Indian Tribe, Fort Duchesne, Utah.

12. **TRESPASS (23-20-14)**

Any person entering upon privately owned land of any other person, firm or corporation which is properly posted, without permission from the owner or person in charge, is guilty of a Class B misdemeanor.

Any person who upon request of the owner or person in charge of private land shall refuse to immediately leave such private land, whether posted or not, is guilty of a Class B misdemeanor.

Any person who without the owner's permission shall obstruct any entrance or exit to private property is guilty of a Class B misdemeanor.

Any person convicted of violating any provisions of this section while in the act of hunting or fishing may have his license, certificate or permit relating to the activity engaged in at the time of such violation revoked by the Division, and such person may not obtain another license, certificate or permit for that activity until a period of one year shall elapse from the date of revocation.

Private property shall be deemed posted properly when "No Trespassing" signs and/or a minimum of 100 square inches of fluorescent or bright yellow paint (on exterior fenceposts, trees; or when metal fenceposts are used, the entire exterior side must be painted) are displayed at all corners, and at all fishing streams that cross property lines, and along all roads, and trails, gates and rights-of-way entering such land. Posting must be confined to privately owned land under the control of an individual, group or organization and is not valid in restricting access to public lands other than lands controlled by public agencies posted as conservation measures.

Any landowner desiring enforcement of this provision must notify the Division of Wildlife Resources in writing 14 days prior to the opening of any hunting and fishing season that property is posted in the prescribed manner and that unless anyone has written permission to hunt or fish on the property, the landowner expects the Division to apprehend and prosecute the trespasser.

This section shall not apply to peace or conservation officers in the performance of their duties.

Any person, firm or corporation desiring to permit hunting on privately owned property by the owner or owners and not others, except by permission, may post a special sign "hunting by permission only."

"Hunting by Permission Cards" will be provided to landholders by the Division upon request, for use in granting access to such lands.

Written permission is not required for access to lands posted "Hunting by Permission"; verbal permission is sufficient for access to such lands.

C. SEASON DATES AND BAG LIMITS

This section sets forth general rules. Where more localized and specific rules are given in other sections of this proclamation, the more specific rules take precedence.

1. **CLOSED AREAS**

All waters of state fish-raising or spawning facilities are CLOSED to fishing. State waterfowl management areas are CLOSED to fishing except as posted or as listed under D. SPECIFIC WATER RULES.

2. **SEASON DATES**

The general season for fishing waters is January 1 through December 31, 24 hours each day. Exceptions are listed separately under D. SPECIFIC WATER RULES.

3. **BAG AND POSSESSION LIMITS**

The following daily bag limits apply statewide, except where listed otherwise in D. SPECIFIC WATER RULES. No completely protected fish may be taken (see B.3.d.).

Trout, salmon and grayling in the aggregate, except that no more than two shall be lake trout*	8 fish
Whitefish*	10 fish
Bonneville cisco	30 fish
Largemouth and smallmouth bass in the aggregate*	6 fish
Striped bass	10 fish
Walleye*	6 fish
Channel catfish*	8 fish
Bullhead	24 fish
Bluegill and green sunfish in the aggregate*	50 fish
Crappie*	50 fish
Northern pike	6 fish
White bass	No Limit
Yellow perch	No Limit
Crayfish	No Limit
Nongame fish species	No Limit
Brine shrimp - a weekly bag and possession of -	Ten pounds

*On some waters, bag or size restrictions apply. See D. SPECIFIC WATER RULES for variations.

It is unlawful for any person to have more than one daily bag limit in possession at any time. This means a person may not harvest in one day or have in possession more than one daily bag limit of each species regardless of the number of days spent fishing. Consuming the fish on the same day they were taken does not allow the angler to take more fish and exceed the daily bag limit.

EXAMPLE: If you take 8 rainbow trout in one day and eat 4 of them, you may only take 4 more the next day. You may not take more fish the first day even after eating the 4 fish.

It is unlawful to fish in waters having a special bag or size limit while having fish in possession in violation of that limit.

a. **Residents Under 12 Years of Age**

Residents less than 6 years of age must be in the company of a licensed angler, and the fish taken must be included in the daily bag and possession limit of the licensed angler.

Residents 6 through 11 years of age fishing without a license may possess a limit equivalent to one-half of the daily bag and possession limit.

Residents 6 through 11 years of age fishing with a resident fishing license may possess a full daily bag limit.

b. **Nonresidents Under 12 Years of Age**

Nonresidents under 12 years of age fishing without a license must be in the company of a licensed adult angler, and the fish taken must be included in the daily bag and possession limit of the licensed angler.

Nonresidents under 12 years of age fishing with a nonresident fishing license may possess a full daily bag limit.

D. SPECIFIC WATER RULES

The rules set forth in this Section D take precedence over the general rules in Sections B and C. For waters not listed in Section D, general rules apply.

1. AREA 1: Bear River, Raft River, Weber and Ogden River drainages and all other waters in Box Elder and Davis counties.

a. **General Rule**

Year-round fishing. General bag and possession limits apply; winter bag limit from January 1 through May 27 is 4 trout on all rivers and streams.

b. **Exceptions**

(1) **BEAR LAKE**
- See B.1.b.(1) for license requirements.
- The mouth of Big Spring Creek from State Highway 30 out into the lake as buoyed, CLOSED April 15 through June 30.
- The mouth of Swan Creek into the lake 2,000 feet, or as buoyed, CLOSED April 15 through June 30.
- Trout limit 6, only 2 over 16 inches and no more than 2 lake trout.
- Cisco limit 30. Cisco may be taken with a hand-held dip net January 1 through February 13. Net opening must not exceed 18 inches in any dimension. When netting through ice, the hole size is unrestricted.
- Cisco taken from Bear Lake may be killed and used as dead bait in Bear Lake.
- Whitefish limit 20.

(2) **BIG SPRING CREEK**
- CLOSED April 15 through June 30.
- Same daily bag and possession limit as Bear Lake.

(3) **BIRCH CREEK RESERVOIR**
- CLOSED.

(4) **BLACKSMITH FORK**
- Approximately one-half mile above the second dam as posted, upstream to its source, trout limit is 3 (2 under 12 inches and 1 over 18 inches). For unlicensed anglers under 12, trout limit is 2 (2 under 12 inches or 1 under 12 inches and one over 18 inches). All other trout must be immediately returned to the water. ARTIFICIAL FLIES AND LURES ONLY.

(5) **BLACKSMITH FORK IMPOUNDMENTS**
- January 1 through May 27, trout limit 4.

(6) **EAST CANYON CREEK**
- From East Canyon Reservoir upstream to the confluence of Kimball Creek east of Kimball Junction as posted, CLOSED August 16 through September 30.

(7) **EAST FORK LITTLE BEAR**
- Upstream from Porcupine Reservoir, CLOSED August 16 through September 30.

(8) **FARMINGTON CITY RESERVOIR**
- CLOSED January 1 through May 27.

(9) **HOLMES CREEK RESERVOIR**
- Fishing from boats and float tubes is unlawful.

(10) **HONEYVILLE (COLD SPRINGS) PONDS**
- CLOSED January 1 through May 27.

(11) **HYRUM RESERVOIR**
- Dead yellow perch or parts of them are permitted for bait.

(12) **LOCOMOTIVE SPRINGS**
- CLOSED January 1 through January 16 and November 14 through December 31.

(13) **LOGAN RIVER IMPOUNDMENTS**
- January 1 through May 27, trout limit 4.

(14) **MANTUA RESERVOIR**
- Bass limit 2 larger than 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.
- Trout limit 2.

(15) **NEWTON RESERVOIR**
- Bass limit 2 larger than 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.

(16) **PINEVIEW RESERVOIR**
- Minimum bass size limit 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.

(17) **PORCUPINE RESERVOIR**
- Daily bag and possession limit 24 kokanee salmon and trout in the aggregate, no more than 8 of which may be brown trout, cutthroat trout or splake, in combination.

(18) **ROCKPORT RESERVOIR (Wanship Reservoir)**
- CLOSED to bass harvest (catch and release only). All bass taken must be immediately returned to the reservoir.

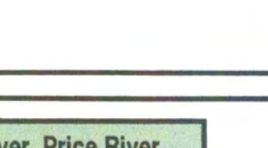
(19) **SPRING CREEK RESERVOIR**
- CLOSED January 1 through May 27.

(20) **STODDARD SLOUGH**
- From Stoddard Lane Bridge upstream to its source, CLOSED January 1 through May 27.
- From Stoddard Lane Bridge downstream to Weber River, trout limit 2, ARTIFICIAL FLIES AND LURES ONLY.

(21) **SWAN CREEK**
- CLOSED April 15 through June 30.

(22) **WELLSVILLE RESERVOIR**
- CLOSED January 1 through May 27.

(23) **WILLARD BAY INLET CHANNEL**
- East of south boat harbor buoys, as posted, CLOSED March 1 through April 30.



2. AREA 2: Provo River, Jordan River and Utah Lake drainages and all waters in Tooele County (includes Burraston Ponds and Salt Creek in Juab County).

a. **General Rule**

Year-round fishing. General bag and possession limits apply; winter bag limit from January 1 through May 27 is 4 trout.

b. **Exceptions**

(1) **AMERICAN FORK CREEK**
- West of I-15 CLOSED between 7:00 p.m. and 5:00 a.m., February 1 through April 30.
- Walleye limit 2.

(2) **BEER CREEK (Benjamin Slough, tributary to Utah Lake)**
- West of I-15 CLOSED between 7:00 p.m. and 5:00 a.m., February 1 through April 30.
- Walleye limit 2.

(3) **BURRASTON PONDS**
- Fishing from boats with motors is unlawful.

(4) **DEER CREEK RESERVOIR**
- Dead yellow perch or parts of them are permitted for bait.

(5) **DRY CREEK (tributary to Utah Lake)**
- West of I-15 CLOSED between 7:00 p.m. and 5:00 a.m., February 1 through April 30.
- Walleye limit 2.

(6) **GRANTSVILLE RESERVOIR**
- Fishing from boats with internal combustion motors is unlawful.

(7) **HOBBLE CREEK (tributary to Utah Lake)**
- West of I-15 CLOSED between 7:00 p.m. and 5:00 a.m., February 1 through April 30.
- Walleye limit 2.

(8) **MAPLE LAKE**
- Fishing from boats with motors is unlawful.

(9) **McCLELLAN RESERVOIR**
- Fishing from boats with motors is unlawful.

(10) **PAYSON RESERVOIR**
- Fishing from boats with motors is unlawful.

(11) **PROVO RIVER**
- CLOSED from the Highway U.S. 40 bridge at Hailstone Junction upstream as posted.
- From Olmstead Diversion Dam upstream (not including Deer Creek Reservoir) to the county road 241 bridge directly south of Woodland, the limit is 2 trout. All trout over 15 inches must be immediately returned to the river. ARTIFICIAL FLIES AND LURES ONLY.
- West of I-15 CLOSED between 7:00 p.m. and 5:00 a.m., February 1 through April 30.
- Walleye limit 2.

(12) **RED BUTTE CREEK**
- CLOSED.

(13) **RED BUTTE RESERVOIR**
- CLOSED to general public. OPEN to disabled veterans of the United States armed forces who are domiciled in veterans' hospitals.

(14) **RED CREEK RESERVOIR (near Payson)**
- Fishing from boats with motors is unlawful.

(15) **SETTLEMENT CANYON RESERVOIR**
- Fishing from boats is unlawful.

(16) **SILVER LAKE FLAT RESERVOIR**
- Fishing from boats with internal combustion motors is unlawful.

(17) **SPANISH FORK RIVER**
- West of I-15 CLOSED between 7:00 p.m. and 5:00 a.m., February 1 through April 30.
- Walleye limit 2.

(18) **SPRING CREEK (tributary to Utah Lake)**
- West of I-15 CLOSED between 7:00 p.m. and 5:00 a.m., February 1 through April 30.
- Walleye limit 2.

(19) **TIBBLE FORK RESERVOIR**
- Fishing from boats with internal combustion motors is unlawful.

(20) **UTAH LAKE**
- Dead white bass or parts of them are permitted for bait.

(21) **VERNON RESERVOIR**
- Fishing from boats with internal combustion motors is unlawful.

3. AREA 3: All waters in the Green River Drainage. Major tributaries are Blacks Fork, Henrys Fork, Ashley Creek, Duchesne River, Strawberry River, Price River, Huntington Creek, Cottonwood Creek and Ferron Creek.

a. **General Rule**

Year-round fishing. General bag and possession limits apply.

b. **Exceptions**

(1) **ASHLEY CREEK**
- From Steinaker (Thornburg) diversion to the water treatment plant near the mouth of Ashley Gorge, trout limit 6, no more than 2 brown trout. ARTIFICIAL FLIES AND LURES ONLY.

(2) **BIG SANDWASH RESERVOIR (Duchesne County)**
- Trout limit 6.

(3) **BROWN DUCK BASIN (Uinta Mountains)**
- All streams in the Brown Duck Basin and the outlet of Clemments Reservoir to its confluence with Lake Fork Creek, CLOSED January 1 through July 14.

(4) **ECCLES CREEK (Carbon County)**
- CLOSED January 1 through July 14.

(5) **ELECTRIC LAKE TRIBUTARIES**
- All tributaries to Electric Lake CLOSED January 1 through July 14. Boulger Creek is only CLOSED from Electric Lake upstream to Boulger Reservoir.

(6) **FAIRVIEW LAKES**
- January 1 through May 27, trout limit 4.
- Fishing from boats with internal combustion motors is unlawful.

(7) **FISH CREEK (and all its tributaries from Scofield Reservoir upstream to Gooseberry Reservoir)**
- Trout limit 8, only 2 may be larger than 13 inches.

(8) **FLAMING GORGE RESERVOIR**
- See B.1.b.(3) for license requirements.
- Licensed anglers, limit 8 trout or salmon in the aggregate, no more than 2 may be lake trout. Only 1 trout of any species larger than 20 inches may be taken.
- Unlicensed anglers under age 14, limit 4 trout or salmon in the aggregate, no more than 1 may be lake trout. Only 1 trout of any species larger than 20 inches may be taken.
- Bass and catfish limit 10 in the aggregate.
- No line may have more than 3 baited hooks or artificial flies in series or more than 3 lures.

(9) **GRANDADDY LAKE TRIBUTARIES (Uinta Mountains)**
- All tributaries to Grandaddy Lake CLOSED January 1 through July 14.

(10) **GREEN RIVER**
- CLOSED to the taking of nongame fish, EXCEPT that carp may be taken by angling, archery or spearfishing equipment.
- Channel catfish limit 24.
- From Flaming Gorge Dam downstream to the Colorado state line, trout limit is 3 (2 under 13 inches and 1 over 20 inches). For unlicensed anglers under age 12, trout limit is 2 (2 under 13 inches or 1 under 13 inches and 1 over 20 inches). All other trout must be immediately returned to the river. ARTIFICIAL FLIES AND LURES ONLY.
- From Flaming Gorge Dam downstream to Indian Crossing Raft Ramp, fishing from boats with motors is unlawful.

(11) **HUNTINGTON CREEK**
- Above Electric Lake, see D.3.b.(5).
- From Flood and Engineer canyons upstream to Electric Lake Dam, ARTIFICIAL FLIES ONLY.

(12) **HUNTINGTON NORTH RESERVOIR**
- CLOSED to largemouth bass harvest (catch and release only). All bass taken must be immediately returned to the reservoir.

(13) **JONES HOLE CREEK**
- Trout limit 6, no more than 2 may be brown trout.
- ARTIFICIAL FLIES AND LURES ONLY.

(14) **PELICAN LAKE**
- Bluegill and green sunfish limit 20 in the aggregate.

(15) **PONTOWN CREEK (tributary to Scofield Reservoir)**
- Trout limit 8, only 2 may be larger than 13 inches.

(16) **RED CREEK (including RED CREEK RESERVOIR in Duchesne County)**
- CLOSED January 1 through April 30 and December 1 through December 31.

(17) **ROCK CREEK**
- Upper Stillwater Dam construction zone CLOSED as posted.

(18) **SANDWASH RESERVOIR (Duchesne County)**
- See D.3.b.(2) BIG SANDWASH RESERVOIR.

(19) **SHEEP CREEK**
- From Flaming Gorge Reservoir upstream to Ashley National Forest boundary, CLOSED August 16 through September 30.

(20) **STRAWBERRY RESERVOIR TRIBUTARIES**
- CLOSED January 1 through June 30.
- Trout limit 4.

(21) **STRAWBERRY RIVER**
- Above Strawberry Reservoir Tributaries (see D.3.b.(21)).
- From Soldier Creek Dam downstream to the mouth of Red Creek, CLOSED January 1 through June 30 and October 16 through December 31. ARTIFICIAL FLIES ONLY.

(22) **UPPER STILLWATER DAM**
- CLOSED.

(23) **WEST FORK DUCHESNE RIVER**
- CLOSED January 1 through June 30.
- ARTIFICIAL FLIES AND LURES ONLY.

(24) **WHITE RIVER (Uintah County)**
- CLOSED to the taking of nongame fish.
- Channel catfish limit 24.

4. AREA 4: All waters in Sevier River Drainage, Millard, Beaver and Iron counties, and a small portion of Kane County including Navajo Lake and Duck Creek. Major tributaries are San Pitch River, Salina Creek, Lost Creek, Asay Creek, Panguitch Creek and Beaver River.

a. **General Rule**
Year-round fishing. General bag and possession limits apply.

b. **Exceptions**

(1) **ASPEN-MIRROR LAKE**
- CLOSED January 1 through May 27.
- Fishing from boats or float tubes is unlawful.

(2) **BIRCH CREEK (Deep Creek Mountains, Juab County)**
- CLOSED.

(3) **DUCK CREEK**
- CLOSED January 1 through May 27.

(4) **DUCK CREEK SPRINGS LAKE**
- CLOSED January 1 through May 27.
- Fishing from boats or float tubes is unlawful.

(5) **EAST FORK SEVIER RIVER**
- Feeder canal from Antimony to Otter Creek Reservoir, CLOSED January 1 through May 27.
- Kingston Canyon, including all portions of the river and spillway ponds between Otter Creek and Piute reservoirs, January 1 through May 27, trout limit 4; May 28 through December 31, trout limit 6.

(6) **ENTERPRISE RESERVOIRS TRIBUTARIES (tributaries to Upper and Lower Reservoirs)**
- CLOSED January 1 through May 27.

(7) **ENTERPRISE RESERVOIR (Upper)**
- CLOSED.

(8) **MANNING MEADOW RESERVOIR AND TRIBUTARIES**
- CLOSED January 1 through June 30.

(9) **MINERSVILLE RESERVOIR**
- January 1 through May 27, trout limit 4.
- May 28 through December 31, trout limit 6.

(10) **NEWCASTLE RESERVOIR**
- CLOSED to smallmouth bass harvest (catch and release only). All bass taken must be immediately returned to the reservoir.

(11) **NINE MILE RESERVOIR**
- January 1 through May 27, trout limit 4.

(12) **OTTER CREEK**
- Otter Creek Reservoir upstream to Angle Diversion, CLOSED January 1 through May 27.

(13) **OTTER CREEK RESERVOIR (and spillway ponds immediately downstream from dam)**
- January 1 through May 27, trout limit 4.
- May 28 through December 31, trout limit 6.

(14) **PALISADE LAKE**
- January 1 through May 27, trout limit 4.
- Fishing from boats with motors is unlawful.

(15) **PANGUITCH LAKE**
- January 1 through May 27, trout limit 4.

(16) **PANGUITCH LAKE TRIBUTARIES**
- CLOSED upstream from lake to USFS Boundary January 1 through June 30.

(17) **PARAGONAH (RED CREEK) RESERVOIR TRIBUTARIES**
- CLOSED January 1 through May 27.

(18) **PIUTE RESERVOIR**
- January 1 through May 27, trout limit 4.
- May 28 through December 31, trout limit 6.
- CLOSED to smallmouth bass harvest (catch and release only). All bass taken must be immediately returned to the reservoir.

(19) **SCIPIO LAKE**
- Minimum bass size limit 15 inches. All bass less than 15 inches must be immediately returned to the lake.

(20) **SEVIER BRIDGE (YUBA) RESERVOIR**
- Dead yellow perch or parts of them are permitted for bait.

(21) **TROUT CREEK (Deep Creek Mountains, Juab County)**
- CLOSED.

5. AREA 5: All waters in the Colorado River Drainage (except Green River Drainage). Major tributaries are Virgin River, San Juan River, Escalante River, Muddy River, Indian Creek, Mill Creek and Dolores River.

a. **General Rule**
Year-round fishing. General bag and possession limits apply.

b. **Exceptions**

(1) **BLANDING RESERVOIR #3 and #4**
- Fishing from boats is unlawful.

(2) **COLORADO RIVER**
- CLOSED to the taking of nongame fish.
- Channel catfish limit 24.

(3) **FISH LAKE**
- January 1 through May 27, trout limit 4, no more than 2 may be lake trout (mackinaw) and only 1 may be a lake trout larger than 20 inches.
- May 28 through December 31, trout limit 8, no more than 2 may be lake trout (mackinaw) and only 1 may be a lake trout larger than 20 inches.
- Dead yellow perch or parts of them are permitted for bait.

(4) **FORSYTH RESERVOIR**
- January 1 through May 27, trout limit 4.

(5) **FOY LAKE**
- Fishing from boats with motors is unlawful.

(6) **GUNLOCK RESERVOIR**
- Minimum bass size limit 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.

(7) **IVINS RESERVOIR**
- Minimum bass size limit 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.

(8) **KOLOB CREEK**
- Upstream from Kolob Reservoir, CLOSED January 1 through June 30.

(9) **LAKE POWELL**
- See B.1 b.(2) for license requirements.
- Crappie limit 20.
- Channel catfish limit 25.
- Striped bass limit 10.
- Walleye limit 10.
- Unlicensed anglers under 14 years of age may take a full daily bag limit.

(10) **LOWER SAND COVE RESERVOIR**
- Minimum bass size limit 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.

(11) **LOYDS LAKE (South Creek Reservoir)**
- Fishing from boats with internal combustion motors is unlawful.

(12) **MONTICELLO LAKE**
- Fishing from boats with motors is unlawful.

(13) **OAK CREEK RESERVOIR (UPPER BOWNS RESERVOIR) AND TRIBUTARIES**
- CLOSED January 1 through June 30.

(14) **PINE VALLEY RESERVOIR**
- Fishing from boats or float tubes is unlawful.

(15) **QUAIL CREEK RESERVOIR**
- Minimum bass size limit 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.

(16) **SAN JUAN RIVER**
- Channel catfish limit 24.

(17) **TWIN CREEK (tributary to Fish Lake)**
- CLOSED.

(18) **UPPER SAND COVE RESERVOIRS**
- Minimum bass size limit 15 inches. All bass less than 15 inches must be immediately returned to the reservoir.

(19) **VIRGIN RIVER**
- CLOSED to the taking of nongame fish.

(20) **WIDE HOLLOW RESERVOIR**
- January 1 through May 27, trout limit 4.

It is provided by law that the above rules shall have the full force and effect of law. Any violation shall be considered a misdemeanor and shall be prosecuted as such. Each villation shall constitute a separate offense.
Adopted by the Utah Wildlife board on the 6th day of November, 1987.

UTAH WILDLIFE BOARD

By Hugh H. Hogle
Chairman of the Board

By William H. Geer
Board Secretary

STATE OF UTAH)
:ss
COUNTY OF SALT LAKE)

On this 6th day of November, 1987, personally appeared before me William H. Geer, Director of the Division of Wildlife Resources, acting on behalf of the Division of Wildlife Resources and as Secretary of the Wildlife Board, and Hugh H. Hogle, Chairman of the Wildlife Board, who duly acknowledged to me that they signed the foregoing proclamation of the Wildlife baord and that the same has been duly adopted, filed and published in accordance with Title 23, Utah Code, and the Utah Administrative Rulemaking Act, Chapter 46a, Title 63.

Clea D. Chidester
Notary Public Residing in Salt Lake County. My Commission Expires: September 11, 1989.

GENERAL INFORMATION

Catch and Release
Suggestions That Help Put Them Back Alive

Utah anglers are sometimes required, by law, to return fish to the waters alive. Many fishermen also return fish voluntarily. By following a few simple rules you can be more certain that released fish will live to be caught again.

TIME is of the essence. Play and release fish as rapidly as possible. A fish played gently for too long may be too exhausted to recover.

KEEP FISH IN THE WATER as much as possible when handling them. This prevents suffocation and injury. If pictures are to be taken, the fish should be kept in the water until the pictures are taken, and then returned quickly to avoid undue harm.

GENTLENESS in handling is essential. A dip net is very useful and highly recommended as a means to handle and control fish without removing them from the water. Above all, do not drag fish out of the water onto the shore when planning to release them. If the fish needs measuring to determine whether or not it can be kept - place some colored tape at various lengths on your rod. That way the fish can be measured right in the water.

UNHOOK the fish as rapidly as possible by backing the hook out - don't jerk it out. Longnosed pliers work well for this. If a fish is deeply hooked, it is best to cut the line or leader and leave the hook in. If one plans to do a lot of catch and release fishing, the barb should be pinched down on the hook or use barbless hooks.

REVIVE the fish in the water by holding it gently and facing it upstream in the current until it becomes reacclimated. In lakes, moving the fish slowly back and forth in the water will help it regain and maintain its equilibrium.

FISHING TACKLE should be artificial flies and/or lures for anglers who want to return fish to the water alive. These fishing methods normally do not hook fish as deeply as bait fishing and survival is much higher. If you are catching numerous small fish, switch to artificial lures to increase survival of the released fish. Care also needs to be used when selecting hooks, as noncorrosive (plated) and treble hooks are almost certain death if left in the fish.

COMMON SENSE is important. Not all released fish live to fight another day. Some sustain fatal injuries, either from the fight they put up or from the handling when released, that are not evident to us as they swim away. Memories of the fishing experience, in its total, should mean more than to seek to catch large numbers of fish.

Leave no trace

The true mark of a skilled outdoors-person is no mark at all. On your next fishing/hunting trip, plan and prepare to "Leave No Trace". You'll enjoy your time in the great outdoors more and so will those who follow you. The Utah Division of Wildlife Resources, USDA Forest Service, and other agencies ask your help cleaning up and keeping clean Utah's magnificent wild lands.

Following are a few simple tasks all of us can do to keep our outdoors looking good.

- Pack your trash home and pick up a sack or two left by less thoughtful visitors.
- If outdoor toilets are not available, bury human waste 6" to 8" deep and 200' from streams or lakes.
- Avoid building new fire rings. Use old ones if fires are permitted. Gather small wood from the ground. Burn it completely and leave the ring clean for the next visitor.
- Where wood is scarce and fires are not permitted, use a gas stove. They "Leave No Trace".
- Make sure fires are dead out—cold to the touch—before leaving.
- Camp away from meadows, streams, and lakes—fragile, easily scarred areas.
- Avoid ditching around your tent. Camp on high ground where natural drainage will carry rain water away.
- Stay on the trails. Avoid cutting across switchbacks or starting new paths that scar the landscape.
- Give others who will follow your written instruction rather than hanging paper signs and other markers along your route.

For more information on "Leave No Trace" camping, visit your nearest Forest Service Office.

Endangered Colorado River fishes

Anglers fishing the Green, Colorado, and White Rivers should be especially alert to the presence of endangered fish species. *They are illegal to possess.* The Colorado squawfish and humpback chub readily take lures and bait. Each year anglers fishing these waters encounter a few of these rare fish. If you should catch one of these fish, or any fish you are unable to identify, carefully release it, unharmed, as quickly as possible. Report any catches of rare fish to the nearest Utah Division of Wildlife Resources (UDWR) office or by calling 533-9333. Some of these fish have been marked with a tag attached at the base of the dorsal fin. If you find a tag, do not remove it, but record the number and tag color and report it to the UDWR. Your assistance is needed to help conserve these fish species in their native habitat.

STATE OF UTAH
RECORD FISH RULES, PROCEDURES, AND CURRENT RECORDS

The Utah Division of Wildlife Resources maintains current state record fish by species. The Division will recognize anglers who catch fish breaking a current record, and an attractive certificate will be awarded.

Certain procedures must be followed to qua ify for certification of record fish. This article enumerates those procedures.

RULES

1. **CATCHING THE FISH**
To qualify for the state record, the fish must be caught legally by angling. However, a separate record fish category has been established for fish caught by other legal methods. These include set line, archery, and spear fishing.

2. **IDENTIFYING THE FISH**
The fish must be positively and properly identified. The Utah Division of Wildlife Resources is the sole judge. The fish is to be documented by Division personnel whenever possible.
If a Division employee is not available to verify identification, the angler must present a close-up, side view, color photo with the fish laying near a suitable, legible measuring stick. This should be done as soon as possible and before freezing. In the event the fish cannot be identified by the Division from the color photo, a certificate will **not** be issued.

3. **WEIGHING THE FISH**
Only one weighing is required. The fish must be weighed on an inspected, certified scale (most grocery store scales are certified and inspected). This weighing must be witnessed and certified in writing.

a. **WITNESS AND CERTIFICATION**
A Utah Division of Wildlife Resources employee should witness and certify the fish's weight and species in writing. If a Division employee is not available, the weigh-in must be witnessed by at least TWO UTAH RESIDENTS who are not members of the successful angler's family or fishing party. The witnesses must be 18 years of age or older, and must provide their address, phone numbers, and make written statement that the weigh-in was on inspected scales, and attest to the accurate true weight of the fish.

4. Fish taken from Flaming Gorge Reservoir, Lake Powell, and Bear Lake, will be recognized if taken legally from any portion of these waters, provided that the fish must be weighed in Utah in accordance with Sections 2 and 3, of these rules. Page, Arizona will also be accepted as an official weigh-in location.

5. **TIME LIMIT FOR ENTREES**
All entrees must be made within 30 days of the date of catch. Pictures and other documentation must be received within 60 days.

6. **REQUIRED DOCUMENTATION AND INFORMATION**
Applicants must provide the following information to the Utah Division of Wildlife Resources, Fisheries Section, 1596 West North Temple, Salt Lake City, Utah 84116.

a. Name, address, telephone number, and Utah fishing or combination license number and fishing stamp (on applicable waters) of the person taking the fish.
b. Common name of the fish.
c. Weight—in pounds and nearest whole ounce or nearest tenth of pound.
d. The total length in inches from tip of snout to tip of tail, and girth in inches (in front of the forward edge of the dorsal fin).
e. Name of lake or stream and exact location in that water where the fish was caught.
f. Date and time of day taken.
g. Type of gear used—trolling, angling, set line, archery, or spear gun.
h. Kind of bait or name of lure.
i. Name of Division personnel who witness the species identification and weight OR all necessary documents required in Sections 2 and 3 concerning names and signatures of witnesses and pictures of fish.

CURRENT RECORD FISH

SPECIES	YEAR	WEIGHT	LOCATION
BASS, Largemouth	1974	10 lb 2 oz	Lake Powell
BASS, Smallmouth	1983	6 lb 12 oz	Midview Reservoir
BASS, Striped	1987	39 lb 12 oz	Lake Powell
BASS, White	1970	4 lb 1 oz	Utah Lake
BLUEGILL	1983	2 lb 3 oz	Pelican Lake
BULLHEAD, Black	1984	2 lb 7 oz	Utah Lake
CARP	1960	30 lb 0 oz	Great Salt Lake Marshes
CATFISH, Channel	1978	32 lb 5 oz	Utah Lake
CHUB, Utah	1987	1 lb 11 oz	Starvation Reservoir
CRAPPIE, Black	1982	2 lb 11 oz	Lake Powell
GRAYLING, Artic	1976	1 lb ½ oz	Uinta Primitive Area
PERCH, Sacramento	1987	2 lb 13 oz	Garrison Reservoir
PERCH, Yellow	1984	2 lb 11 oz	Sevier Bridge Reservoir
PIKE, Northern	1986	22 lb 0 oz	Sevier Bridge Reservoir
SALMON, Kokanee	1984	5 lb 5 oz	Flaming Gorge Reservoir
SUCKER, Flannelmouth	1985	2 lb 7 oz	Flaming Gorge Reservoir
SUCKER, Utah	1987	6 lb 0 oz	Willard Bay Reservoir
SUCKER, White	1985	1 lb 13 oz	Flaming Gorge Reservoir
SUNFISH, Green	1983	0 lb 9 oz	Steinaker Reservoir
TROUT, Albino	1987	1 lb 2 oz	Joes Valley Reservoir
TROUT, Brook	1971	7 lb 8 oz	Boulder Mountain
TROUT, Brown	1977	33 lb 10 oz	Flaming Gorge Reservoir
TROUT, Cutthroat	1930	26 lb 12 oz	Strawberry Reservoir
TROUT, Golden	1977	0 lb 13½ oz	Atwood Creek
TROUT, Lake	1985	41 lb 4 oz	Flaming Gorge Reservoir
TROUT, Rainbow	1979	26 lb 2 oz	Flaming Gorge Reservoir
WALLEYE	1984	12 lb 11 oz	Utah Lake
WHITEFISH, Bonneville	1982	4 lb 4 oz	Bear Lake
WHITEFISH, Mountain	1984	4 lb 6 oz	Upper Provo River

Help keep your fishing waters clean!

Scofield, Strawberry, Pineview, Deer Creek, and Panguitch Lake have serious water quality problems. At these lakes, DO NOT dispose of fish entrails in the water or on the lakeshore. Carbon County Ordinance No. 184 specifically prohibits disposal of fish entrails into and along the shoreline of Scofield Reservoir.

On all fishing waters, either clean you catch away from the lake, or place entrails in a plastic bag for later disposal. By doing this, you are doing your part to help keep excessive nutrients from re-entering the water.

Please do your part to keep your fishing water clean.

Fisherman's guide to the High Uintas

A set of ten booklets have been published to describe the lakes of the High Uintas. Over 650 lakes and 19 drainages are managed to provide fishing in this unique area.

The new booklets sell for $1.00 each and provide improved maps, updated trail descriptions, and pertinent information about each lake. They are available at each of the regional offices and the Salt Lake office.

GET HOOKED ON FISHING! FREE FISHING DAY JUNE 11, 1988

Fishing is a popular form of recreation for many Utahn's. They've discovered the fun, relaxation and the excitement of the outdoors while pursuing this sport.

In order to stimulate the enthusiasm of those persons who have not participated in Utah's excellent fishing or who may have discontinued the sport for whatever reason, the Division of Wildlife Resources is extending a Free Fishing Day on June 11, 1988. For that day only, anyone may fish in Utah waters whether they have a Utah fishing license or not. All other regulations dealing with limits, methods, closed areas, etc. will still be in effect and enforced.

If you are an ardent angler, make an effort to introduce or reaquaint someone to the enjoyment of fishing, take someone along who wouldn't normally get out - a friend, neighbor, a young child, someone from work, that oldtimer from down the street who doesn't get out much anymore or make it a family outing. Make your arrangements now for June 11, 1988. Watch too for announcements of Special Fishing Activities for that day. But most of all remember that to just get out in the outdoors is a great experience for the family, friends or just by oneself. We should also show our appreciation for the lakes, streams, parks, and general outdoors by cleaning up our litter and any other we come across.

Utah State Fish Hatchery system

Most coldwater fish caught in Utah's waters originated in a State Fish Hatchery, the exceptions being lake trout, kokanee, some populations of cutthroat, and brown trout that reproduced naturally and are protected by special regulations. Warmwater species of fish such as largemouth bass, channel catfish, smallmouth bass, bluegill, etc. usually are naturally reproducing populations that have had their start several generations back from the stocking of hatchery produced fish.

Alterations of waterways and increased demand for sport fish have made it impossible for the historic fisheries of the State to sustain a reasonable yield naturally. It has long been necessary to rely on the stocking of hatchery fish to provide the fishing opportunities Utah's fisherman desire and to keep it a family sport.

The first State Fish Hatchery was authorized by the State Legislature in 1899. Today there are ten hatchery that produce about 10 million trout per year. Fry to catchable-sized fish are stocked in more than 2,000 waters around the state. As many as 80 percent of these are stocked in reservoirs and the remainder are stocked in streams and high lakes.

All these hatcheries are located on springs that yield only a certain volume of water. That volume limits the amount of fish that can be produced. In some cases, production is limited further by stocking schedules and the specific rearing facilities available. The design and condition of rearing ponds and other physical facilities currently restrict production at several older hatcheries, some built in 1930s by the WPA.

Most State Hatcheries are operating at their full capacity. As Utah's population grows the public desire for fishing opportunities is likely to increase. The time has come to increase the capacity of our State Hatchery system to supply the fish the public want and to keep fishing a family sport.

The fish culture branch is developing plans for reconstruction and modernization of several hatcheries in the next five years using some of the new revenue generated by the recent increase in the fishing license fee. Some of these hatcheries may be equipped with a new oxygen injection system which is presently being field tested. Use of supplemental oxygen could double the fish production of some of these stations using the same amount of water. This could greatly help meet the State's future fish needs.

Complete hatchery restoration is very expensive. Today, a new hatchery capable of producing 500,000 eight-inch trout annually would cost about $5,000,000 to construct and may be expected to last 50 years with good maintenance. Six out of the ten State Fish Hatcheries have had no major reconstruction over the last 20 to 30 years and some of the buildings and raceways are in poor condition and badly in need of restoration.

Although the Mammoth Creek Hatchery (formerly the Panguitch Hatchery) was completely restored in 1984, with trout stamp and fishing license revenue this was the first major hatchery reconstruction in ten years. Clearly, to keep ten hatcheries in operation requires that worn-out facilities be replaced periodically. To restore one hatchery per decade is inadequate. The restoration of one hatchery or the equivalent every 4-5 years is the minimum rate at which this work has to be accomplished to keep all ten State Hatcheries in operation. This would require an investment of approximately $1,000,000 per year over and above the cost of operation and maintenance. However, the restoration of old hatcheries will reduce O & M costs.

Modernization and incorporation of new technology in State Hatcheries promises to allow for greater fish production without increasing the number of State Hatcheries beyond the ten that are now in operation. Hopefully, the hatchery system will be upgraded in the years to come enabling our hatcheries to keep pace with future fish needs and to keep fishing a family sport.

Importation, exportation, collection of and possession of live wildlife

Separate regulations govern the importation, exportation, collection and possession of live wildlife. Many nonnative species and forms of animals are prohibited in Utah because of potential adverse effects on native wildlife. It is unlawful to collect, possess, import, or export any species of live wildlife without first obtaining a certificate of registration. Persons contemplating importing or possessing any species are strongly urged to obtain a copy of the Proclamation of Importation, Exportation, Collection of, and Possession of Live Wildlife. A copy of this proclamation and applications for these certificates may be obtained at any Division office. A letter of application must be submitted to the Director, Utah Division of Wildlife Resources in advance of the date the certificate needed.

Private ponds

There are separate regulations which govern keeping aquatic wildlife in private ponds. It is illegal to have fish in a private pond or to purchase, transport, or import fish for a private pond without first having a certificate of registration for each pond. All certificates of registration are valid for a calender year and must be renewed annually. Applications for a certificate and a copy of the regulations for private fish ponds and private fish installations are available at all Division regional offices.

FREE Guide to Fishing Areas

A popular and useful pamphlet available at no cost from Division of Wildlife Resources offices is the UTAH HUNTING & FISHING GUIDE.

FISH IDENTIFICATION

Anglers in Utah must be able to identify various sport fish. This is particularly true now that some possession and size limits are listed by species. The drawings below illustrate the most prominent distinguishing characteristics for each species. A description of the colors and spotting patterns is included.

FISHERMAN'S GUIDE TO THE HIGH UINTAS

A set of ten booklets have been published to describe the lakes of the High Uintas. Over 650 lakes in 19 drainages are managed to provide fishing in this unique area.

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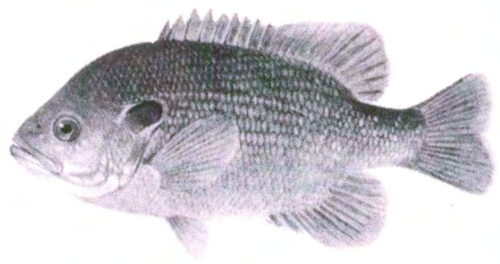
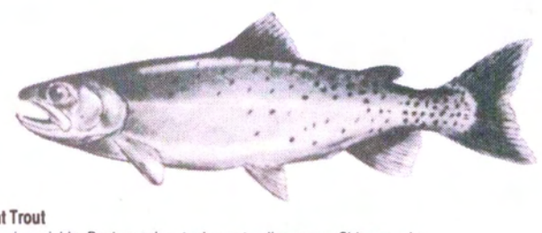
Rainbow Trout
Body color usually olive to greenish-blue on the back; belly white to silvery; sides usually show a prominent red or pink streak. This marking is indistinct or absent in young. Fish from lakes sometime lose essentially all color and appear silvery-pink. Irregular spots on back, sides, head, dorsal fin and tail. No teeth on back of tongue.

Mountain Whitefish
Back and fins are light brown, and the sides and belly are silver and white. There are no spots. Tail deeply forked and body is deep and round. Mouth small with no teeth. Large fleshy adipose fin. Scales large and rough. There are two other whitefish species, Bonneville whitefish and Bear Lake whitefish, which inhabit only Bear Lake. These are difficult to distinguish and are not segregated in the bag limit.

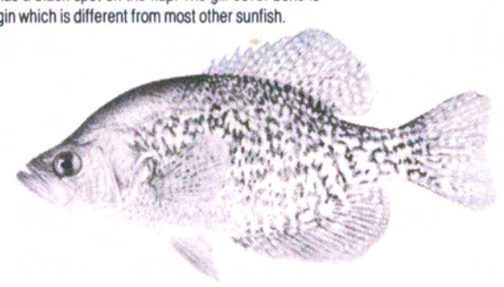


Green Sunfish
Each scale is flecked with yellow or emerald green. Back and sides olive-green, and lower belly yellowish-copper or brassy. Body is short, stocky and deeply compressed from side to side. The gill cover has a broad, light margin, and it often has a black spot on the flap. The gill cover bone is stiff all the way to the margin which is different from most other sunfish.



Cutthroat Trout
Body color is variable. Back may be steel-gray to olive-green. Sides may be yellow-brown with red or pink along the belly. Slash marks on either side of the throat beneath the lower jaws may be crimson-red or orange. Fins uniform color with no white tips. Scattered spots are usually round and black, more closely grouped toward the tail (the Snake River strain has profuse spottings, with many small irregular spots). Teeth on back of tongue. May hybridize in wild with rainbow.

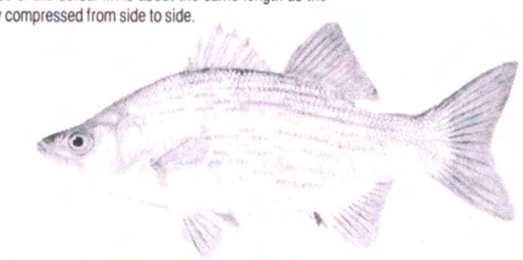
Bonneville Cisco
This member of the whitefish family has been segregated out for the purpose of these regulations. Light in color, except during the breeding season, when they become brassy colored. Cisco have a long sharply pointed snout with a projecting lower jaw. Body is thin and appears streamlined. Rarely attains a length of over 7.5 inches.



Black Crappie
Silver-olive with numerous black or dark green splotches on the sides. Forehead is dished and the snout is turned up. Five or more anal spines and 7 or 8 dorsal spines. Base of the dorsal fin is about the same length as the base of the anal fin. Body compressed from side to side.

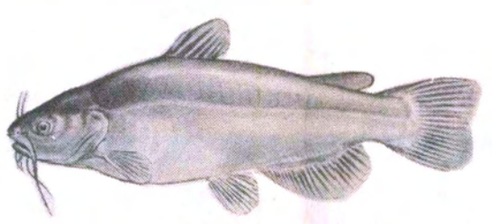
Brown Trout
Back brown or olive with large black spots. Sides light brown to yellowish, with numerous black and also red-orange spots surrounded by light blue ring. Adipose fin in young fish may be orange. Few, if any, spots on tail. Tail square, not forked.

Channel Catfish
No scales. Tail deeply forked with pointed lobes. Body pale bluish-olive above and bluish-white below. Spots vary from a few to many over much of its body. Older fish may not have spots. Barbels extend from the chin and upper jaw. Both dorsal and pectoral fins have strong, sharp spines.



White Bass
Dark gray to black on the back, with bright silvery sides and white belly. The sides have dark stripes or lines (about 5 are above the lateral line). There are 13 or 14 rays in the dorsal fin, and 11 to 13 in the anal fin. Body strongly compressed from side to side.

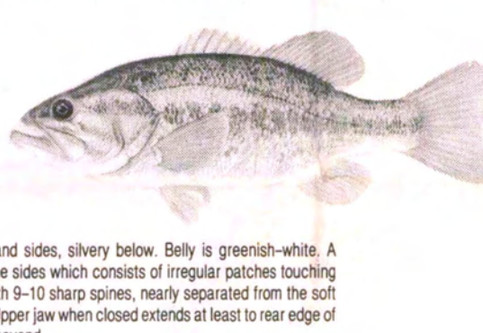
Brook Trout
Color ranges from olive, blue-gray or black on the back to white on the belly. Belly and lower fins may turn brilliant red in spawning males. Upper body and dorsal fin have mottled or worm-like markings. Red spots, with or without bluish rings around them, are evident on the side though they are not numerous. The most distinguishing marks are the white and then black stripe along the foreedge of the lower fins. Tail square or slightly forked.



Black Bullhead Catfish
No scales. Tail only slightly forked, with rounded lobes. Adults are blackish, dark olive or dark brown. The belly is yellow, greenish-white, or white. Chin barbels are entirely black. The pectoral fin spine is smooth.

Striped Bass
Body olive-green above, shading through silvery on sides to white on belly, with brassy reflections. There are 7 or 8 longitudinal dark stripes following the scale rows. A spiny dorsal fin is barely separated from a soft dorsal fin. The tail is forked. Body cylindrical in shape.

Lake Trout (Mackinaw)
Not as highly colored as other trout. Dark gray or gray-green above, belly light gray or white. Light gray irregular shaped spots or lines on the back, sides, dorsal fin and tail. No white edging appears on lower fins, as in brook trout. Tail deeply forked.



Largemouth Bass
Dark green on back and sides, silvery below. Belly is greenish-white. A broad, dark band on the sides which consists of irregular patches touching together. Dorsal fin with 9-10 sharp spines, nearly separated from the soft rays by a deep notch. Upper jaw when closed extends at least to rear edge of eye in adults – usually beyond.

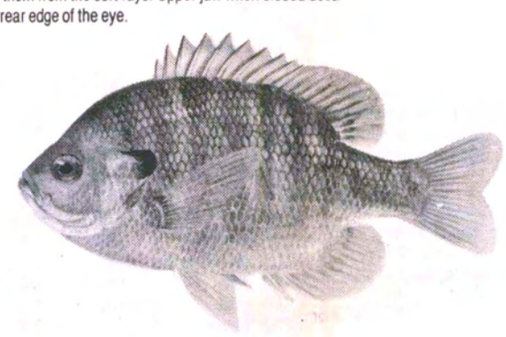
Walleye
Prominent "canine" teeth distinguish this big perch from its smaller family member, the yellow perch. Color is a brassy-olive buff sometimes shading to yellowish sides and white beneath. No distinct bars on the sides, but rather an overall mottling of black or brown. Large dark blotch at rear base of dorsal fin, and the lower lobe of tail fin is white-tipped. The tail fork is moderate.

Arctic Grayling
Gray to olive-green on the back, sides silvery to light purple and bluish-white on the belly. The most distinguishing characteristic is the long, high, brilliant purple and blue dorsal fin. There are teeth on the tongue.

Smallmouth Bass
Dark olive to brown on back, sides bronze, belly white. Five dark vertical bands on sides. Eyes reddish. Dorsal fin with 9-10 sharp spines without a deep notch separating them from the soft rays. Upper jaw when closed does *not* extend beyond the rear edge of the eye.

Yellow Perch
Rich yellow to brassy-green with 6 to 8 dark vertical bars on the sides, dark green back. No "canine" teeth. The belly is whitish. The dorsal fin has two sections, the front one containing 12 to 14 sharp spines and the rear 12 to 13 soft rays.

Kokanee Salmon
Back greenish-blue with faint speckling. The sides and belly are silvery. No distinct spotting on dorsal fin or tail as in the rainbow. Anal fin rays generally number 14 to 16 and are not less than 13 (trout have less than 13 rays). During spawning in the fall, skin becomes "leathery" and turns dark red to bright scarlet and the head turns dusky green.



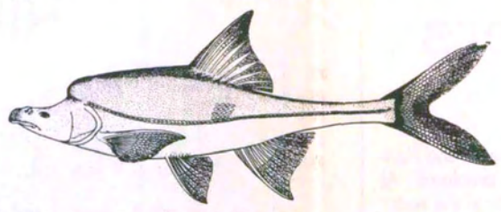
Bluegill
Very colorful. Light to dark blue to bright purple. In breeding season, the breast of the male is red. Gill covers often blue with a black spot on the rear of the "ear flap." Faint vertical bars on the side. Dorsal fin has 10 spines followed without interruption by 10 or 12 rays. The mouth is small and when closed, barely reaches the *front of the eye*. Body deep for its length and compressed from side to side.

Northern Pike
Color extremely variable depending upon the water from which it is taken. Usually bluish-green to gray on back with irregular rows of light yellow or gold spots. Snout broad and shaped like a duck bill. Body long and slender with the dorsal and anal fins well back toward the tail.

COMPLETELY PROTECTED SPECIES – ILLEGAL TO POSSESS

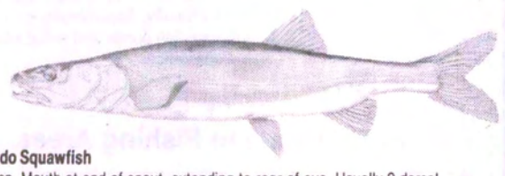
The fish described in this section are native to the Colorado River Drainage. Five of the six fish described are threatened with extinction. The remaining species, the roundtail chub, is still common but the threatened fish are frequently mistaken for it. If you catch any of these fishes, immediately return them unharmed to the water. Your knowledge and willingness to protect these species may significantly affect the outcome of their preservation.

Roundtail Chub
No hump. Mouth at end of snout, EXTENDS ONLY TO FRONT OF EYE. Usually 9 dorsal and 9 anal fin rays. Sides silvery-gray, dark on dorsal surfaces. Seldom grows longer than 13 inches. No spot at base of tail. This species is OFTEN MISTAKEN for the Colorado squawfish. It has been given protection even though it is still common throughout the Green and Colorado river drainages.



Humpback Chub
Rounded, nearly scaleless hump. Snout overhangs mouth. Usually 9 dorsal fin rays and 10 anal fin rays. Sides silvery-gray, darker on dorsal surfaces. Found in the canyon reaches of the Colorado River Basin's large rivers.

Razorback Sucker
A narrow keel-like bone forms a hump along the back, which is knife-like when viewed from top. Snout overhangs mouth. Usually 14-15 dorsal fin rays. Olive-brown to black on back; yellowish-white belly. Once abundant in the mainstream rivers of the Colorado River Drainage from Wyoming to New Mexico, this species is found in small numbers through most of the free-flowing stretches of these rivers.



Colorado Squawfish
No hump. Mouth at end of snout, extending to rear of eye. Usually 9 dorsal and 9 anal fin rays. Olive-green back with silvery-white belly. A wedge-shaped dark spot at base of tail distinguishes young squawfish. Today it has disappeared from the Lower Colorado Basin, and is rare in the Upper Basin. May be caught in the Yampa, Green, White or Colorado rivers.

Bonytail Chub
No hump. Mouth at end of snout, extends to front of eye. Rear part of body with a thin, pencil-like portion in front of tail. Usually 10 or more dorsal and 10 anal fin rays. Sides silvery-gray, dark on dorsal surfaces. Formerly common in the Green River and may still be present anywhere along the Green and Colorado rivers.

Virgin River Chub
No hump. Olive to brownish-black, and silvery sides and belly. Common to the Virgin River, below LaVerkin Springs.

STATE OF UTAH
NATURAL RESOURCES
Wildlife Resources

SPECIAL REPORT
Strawberry Valley Project

Treating Strawberry Reservoir

by Glenn Davis
Fisheries Program Coordinator

The Division of Wildlife Resources (DWR) is planning to treat Strawberry Reservoir to remove competing rough fish and maintain its place as the #1 trout fishery in Utah. The project will be accomplished by chemically removing the rough fish, rehabilitating the streams to increase natural spawning, and reintroducing trout and salmon species which are capable of holding off the rapid return of rough fish.

In Utah, chemical treatments of lakes and reservoirs have been very successful. Since 1954, the Division of Wildlife Resources has conducted over 170 treatment projects. The benefits from the restored fisheries usually offset the cost of treatment within the first year.

Certain waters have been difficult to treat, however, because of their extensive drainage systems. The success of treatment projects is limited when target species cannot be eliminated from all of the tributaries or spring seep areas.

Based on our successful experience in treating the tributaries of Strawberry Reservoir in 1961 and other similar drainages, the Division of Wildlife Resources is confident that chemical treatment of Strawberry Reservoir will be effective. Wildlife biologists will conduct a double treatment on the streams. The first is scheduled for mid-July 1988, just prior to the reservoir treatment. The second is planned for September 1988. The purpose of the September treatment is to remove any eggs or young fry which may have been in the gravel during the first treatment.

Wildlife officials do have some concerns that water temperature and other factors may reduce the project's effectiveness and longevity. Reservoir treatment projects have usually been conducted in the fall when the water column is homogeneous and there are no temperature or chemical barriers to restrict the dispersal of the rotenone toxicant through the water. In the fall, the water temperature is about 50F and the lake will stay toxic for about three weeks. The cooler temperature allows the extra time to mix the rotenone evenly through the water column.

The Strawberry treatment planned for mid-August will be done under a totally different set of circumstances. First, the reservoir will be stratified with warm water on top and cold water below. In addition, there will be no dissolved oxygen below 30 feet throughout most of the reservoir. This means that fish will not be able to inhabit the bottom portion of the water column, and the reservoir may be treated with less chemical. Secondly, the temperatures above the anoxic (no dissolved oxygen) layer of the reservoir will average approximately 65F which should enhance the treatment in some ways. However, one concern over water temperature is that the toxicant will lose its strength quickly, since the lethal concentration will last only two to five days. On the positive side, the high temperatures will stress the fish physiologically, and the contact time necessary to deliver a lethal dosage will be significantly reduced.

The project objective is to remove 99 percent of the fish life from Strawberry Reservoir. Division personnel have studied the results from similar projects in the state of Wisconsin, where it was determined the rate at which toxicant will kill fish is much shorter at high temperatures. In addition, two Utah pilot projects completed during the summer of 1987 confirmed that the rotenone is very effective in eliminating fish species. The rotenone penetrated the water column quickly, and the toxicity above the anoxic layer was of sufficient duration to assure a complete kill.

Success stories indicate potential

The recovery of nongame populations in a treated reservoir usually relates directly to elevation and associated water temperatures. At the higher elevation lakes, such as Scofield, Panguitch, and Strawberry, conditions for competitive species of fish to grow and reproduce are less than optimum. It takes longer for these species to take over, and they are more vulnerable to biological controls which are used to enhance game fish populations.

A similar situation existed at Panguitch Lake before it was treated with rotenone in 1973. Now the lake is providing good fishing and the growth of stocked five-inch rainbow trout is quite satisfactory.

Scofield Reservoir was treated in 1977. Very few chubs have been found in the reservoir and, most important of all, the fishing has been excellent. A comprehensive creel census completed in 1986 showed that 252,166 trout were harvested in 346,939 hours of angling. The average catch rate was 0.72 fish per hour.

Utah has an excellent reference point for determining longevity from the first chemical reclamation project conducted at Strawberry Valley in 1961. For more than 21 years, a viable fishery was maintained. While it is highly unlikely that nongame fish can be be totally eliminated, it does provide an indication of what is possible and that an exceptional fishery can make it when one of the problem species is eradicated.

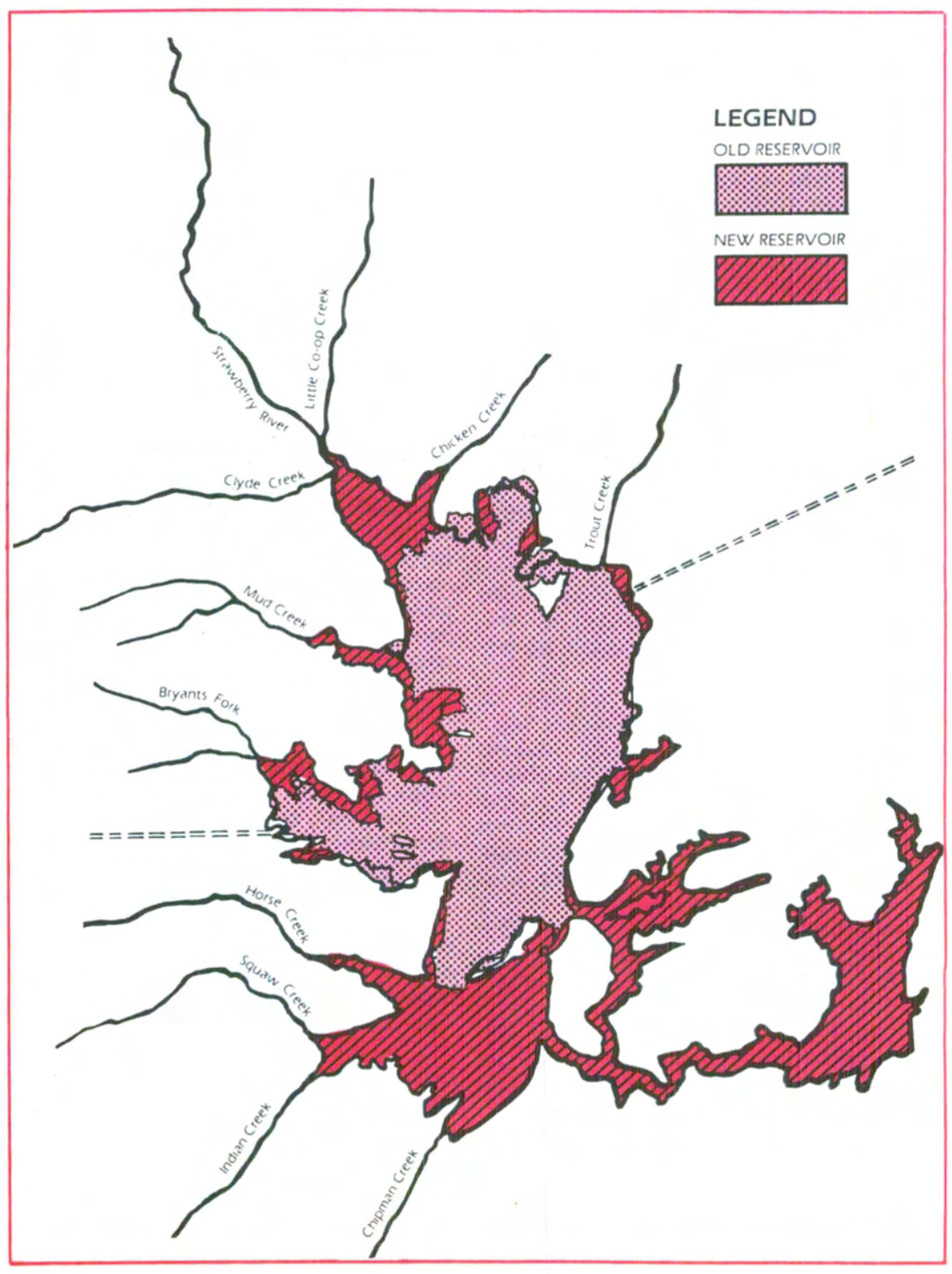
A realistic estimate of longevity can be made assuming 99 percent of the species (chubs and suckers) are eliminated. It was not until 1973 that the first Utah chubs were found in Strawberry Reservoir after the 1961 treatment. Even after that discovery, the reservoir provided a very suitable fishery for the next 11 years. We feel this is a fairly accurate estimate of what can be expected if a 99 percent kill is attained and no special biological measures are taken to enhance the fishery. The difference in 1988 is that we are combining the chemical treatment with a new approach toward biological management specifically designed to resist redevelopment of a massive rough fish population.

Longevity of benefits expected from the chemical treatment will be enhanced by the biological control features. Success of the biological control proposal does require that the chemical proposal be totally successful. For more information concerning the biological control aspect, please see article titled: The New Strawberry — A Different Kettle of Fish by James Johnson.

Aerial view of Strawberry Reservoir, Utah's number one fishery.

History of Strawberry Valley

by Charles W. Thompson
Regional Fisheries Manager, Springville, Utah



Fisheries management of Strawberry Reservoir has been influenced by nongame fish species for more than 30 years. During the late 1950s, nongame species (chub, sucker, carp, and yellow perch) had almost completely displaced trout in the reservoir. Strawberry Reservoir was chemically treated in 1961 to remove undesirable fish. Reservoir volume at the time was 22,661 acre feet covering 3,300 surface acres. The treatment consisted of applying 330 gallons of liquid rotenone to 55 miles of tributary streams, 3,500 gallons of liquid rotenone along the shoreline, and 60,000 pounds of rotenone mixed with water to the reservoir surface. The treatment concentration of rotenone was estimated at 1.77 parts per million. Total cost of the treatment was $43,000.

This treatment was highly successful and resulted in the elimination of chub, sucker, carp, and yellow perch and allowed the reestablishment of an excellent trout fishery. The fishery was well maintained for over 20 years. Anglers spent 929,000 hours fishing the reservoir in 1975, harvesting 253,000 trout for an average catch rate of 0.27 fish per hour.

In 1973, completion of Soldier Creek Dam resulted in the Soldier Creek arm of Strawberry Reservoir. The two reservoirs were joined with the breaching of the old Strawberry Dam in 1985. Tributaries to the Soldier Creek portion of the reservoir were chemically treated in 1973 to eliminate nongame fish, and an excellent trout fishery was in place. In 1981 angler use of the enlarged reservoir was an estimated 835,000 angler hours and a harvest of 457,000 trout for a catch rate of 0.55 fish per hour.

In 1973 chubs began to reappear in Strawberry Reservoir and, by 1978 suckers were being caught. Chub and sucker populations were seriously impacting the fishery of the old Strawberry portion of the reservoir by 1985 when breaching of the old Strawberry Dam occurred.

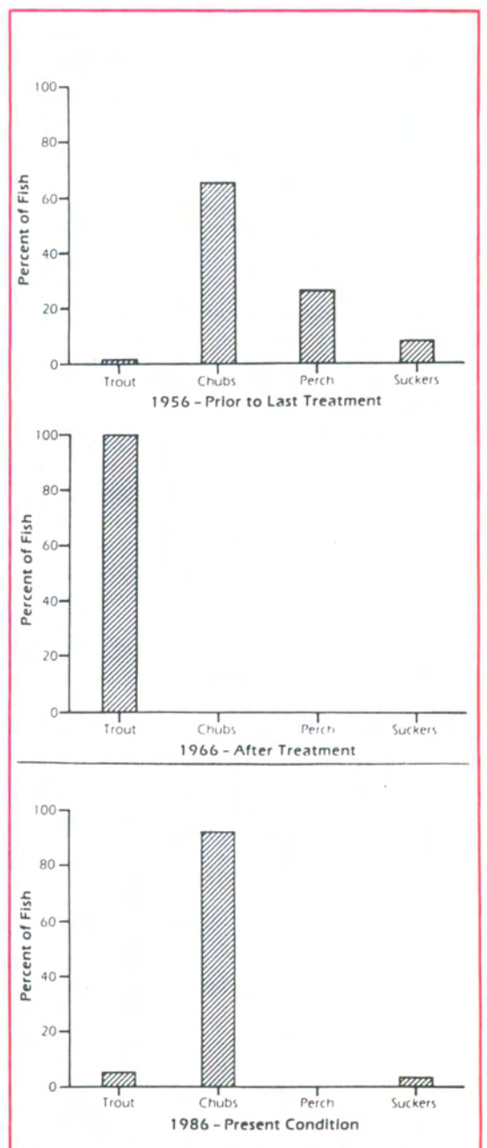
Importance of Strawberry Reservoir

Strawberry Reservoir is one of the most important trout fisheries in the state of Utah. This is primarily because of its close proximity to the heavily populated Wasatch Front. The reservoir is within an hour's drive of Salt Lake and Utah counties with a total population of 951,000 people (1986 Utah census data). The reservoir has traditionally produced large numbers of quality trout satisfying a large recreational demand. The Bureau of Reclamation's Recreation Master Plan for Strawberry Reservoir Enlargement proclaimed that the reservoir is primarily used by families. Ninety-nine percent of the user groups listed fishing as the primary reason for going to the reservoir, and more than 50 percent of visitors to Strawberry have been fishing there for more than 14 years and strongly believe the fishing to be superior.

Strawberry Reservoir has in the past provided between 200,000 and 225,000 angler days of recreation annually. Following chemical treatment, an enlarged reservoir will provide at least 300,000 angler days of recreation generating over $5 million in annual economic activity.

Other trout fisheries close to Utah's most populated counties (Utah and Salt Lake) include East Canyon, Deer Creek and Scofield reservoir. These waters are presently being used to their maximum capacity for fishing and other water related activities. The Jordanelle Dam on the Provo River is currently under construction but will not provide trout fishing for at least 10 years.

If the Strawberry Reservoir fishery is not restored, at least 200,000 angler days of recreation could be lost or displaced. This does not account for any recreation increase that would result from the restoration of Strawberry. Utah does not have another water that can provide the recreational demand placed on Strawberry.



Figures 1, 2, and 3 show graphically the fish population structure prior to the 1961 treatment, following the 1961 treatment, and in 1986.

Strawberry Treatment Delayed

by Bruce Schmidt
Chief of Fisheries Management, Division of Wildlife Resources

What can possibly go wrong with a project that has had hours of planning, thought and research to be sure nothing can go wrong? The things you have the least control over, if you ask the fisheries section of the Utah Division of Wildlife Resources.

For more than a year, the Division of Wildlife Resources has been making plans to remove rough fish from Strawberry Reservoir in August 1988. This project is the largest chemical treatment of its kind ever planned. August 1988 is the earliest date all the parts of this complex program can be organized. Timing is critical: the newly enlarged Strawberry Reservoir is filling with water well in advance of initial projections; and the Upper Stillwater Dam on Rock Creek will begin delivering massive amounts of water to Strawberry Reservoir through the Strawberry Collector System, part of the Central Utah Project, beginning in 1989. It is essential to complete the renovation project before the reservoir gets much larger.

Because of the potential increase in the size of the reservoir, 1988 continues to be the favored treatment date. In the last few months, however, several stumbling blocks have appeared which likely will delay the treatment until August 1989. Can the treatment be a success if it is postponed until 1989?

Two factors that have the biggest potential for delaying the treatment project are: failure to get the environmental papers completed and failure to get adequate supplies of rotenone, the chemical used to treat the reservoir.

Factor: Environmental papers

We do not expect that this is a likely problem, since rotenone has been used for well over 30 years and is widely documented as safe and effective. There is always concern by some people whenever any wild animals are killed. Even though some sport fish will be killed, we know that about 95 percent of all of the fish in Strawberry are rough fish, none of which are native to that particular basin. The trout that are killed will be replaced immediately following treatment. Since these projects have been successfully conducted for many years, the normal course of events is that the environmental assessments have been approved, and the projects have been successfully completed. We do not expect it to be any different with Strawberry.

Factor: Will rotenone be available?

The second problem confronting us is the availability of over a million pounds of rotenone. We need to acquire the full amount of rotenone in one harvest year, and the amount we will be using represents a significant one-time increase in the world market. The major supplier now indicates there probably is not enough to supply this demand.

Several factors have resulted in the uncertain rotenone supply. Rotenone is made from the roots of several species of plants which grow in tropical rain forests. The major supply comes from Peru, where leftist rebels are presently destabilizing the government. This has disrupted much business activity, including the annual rotenone harvest. Added to that, the Peruvian workers are also tempted to spend their time harvesting other wild botanical products which bring more money, like the coca leaves used to produce cocaine.

If the rotenone is not available for the treatment in 1988, we will still proceed with acquiring as much rotenone as is available so that we could take delivery of our needs out of two different harvest seasons. This would minimize the impacts on the Peruvian rotenone crop and any shortage problems that might develop from our one-time need. This more desirable way of acquiring the rotenone without disrupting world markets would have been chosen initially if not for the urgency of treating the reservoir before it fills much higher.

1988 or 1989: What's the difference?

The major difference between the treatment in 1988 and 1989 is the water level. Water from the Upper Stillwater Dam will begin flowing into Strawberry Reservoir by the latter half of 1988. That means the amount of water to be treated will be greater in 1989. The Bureau of Reclamation's projection, however, indicates that 1989 levels will still be within the size we can treat. This will not be true in the years beyond.

Because the rotenone supply is unlikely for 1988, no changes have been made in catch limit at Strawberry for the 1988 fishing season. If luck is on our side and the needed supply of rotenone becomes available by January 1, 1988, we will liberalize regulations by an emergency change notice. Otherwise, normal regulations will remain in effect for 1988 and more liberal regulations may be adopted for 1989.

What about the fishing? What can you expect for fishing in Strawberry if the treatment project is not conducted in 1988? When the small-scale pilot treatment was conducted at Strawberry in early September of 1987, a large number of small- to moderate-sized chubs and many suckers showed up. Conditions have been good for chubs. The rising water levels have provided new areas for them to spawn and protect them from predators. Their numbers added to the abundant sucker population, gives them the edge when competing with trout. However, it appears that the trout stocked in 1987 survived and, as a result, fishing should remain fairly good in 1988.

This does not mean that everything will be rosy. Because of the severe competion for food, there may be a noticeable decrease in growth rates and fish condition during 1988. Anglers may start noticing skinny and smaller than usual fish in the creel. Thus, fishing quality may not hold up in 1988, but the fishery will not collapse completely.

The treatment is just one part of this Strawberry Valley rehabilitation project. A delay in treatment date would not necessarily delay other parts of the project. Cooperative efforts between Division of Wildlife Resources, U.S. Forest Service, Bureau of Reclamations and the Strawberry Water Users to identify means of stablizing streambanks and improving habitat conditions will continue. The stream rehabiliation portion is designed to improve habitat conditions so trout and kokanee salmon can become self-sustaining through natural reproduction.

Anglers should not despair if the division postpones the Strawberry treatment until 1989. By all indications, the project will still be completely feasible. Fishing is likely to hold up well for another year. Fish quality could decline in 1988, but the good populations of trout in the reservoir are enough to carry us over an additional year. All of this will help achieve the results we all desire: To Keep Strawberry Reservoir Utah's Number One Trout Fishery!

Wildlife biologists preparing rotenone with aid of cement mixer.

Rotenone Treatment — How It Is Done

by Glenn Davis
Fisheries Program Coordinator

The rotenone treatment of Strawberry Reservoir will be the largest such project ever attempted. The volume of water in Strawberry Reservoir in August 1988, the proposed time of treatment, will be 10 times greater and the surface area 3 1/2 times greater than any Utah water previously treated. Many fisheries biologists across the country would advise against such a large project. Why then are we so confident that we can treat Strawberry Reservoir successfully?

To address such concerns it must be noted that most states use a liquid form of rotenone to eradicate undesirable fish populations because it is easier to apply. It also costs a lot more money. Only Utah and Washington use large amounts of powdered rotenone, which costs about one-third as much as liquid.

Another factor in selecting powdered rotenone is Utah's long experience with it. Utah's wildlife biologists first used powder to treat Scofield Reservoir in 1958. That project was very successful. The chemical was mixed with lake water on floating barges.

Beginning in 1961, powdered rotenone was mixed with water in circulating mixers to form a water slurry. We discovered that this form was easier to disperse over the lake's surface.

During the early years of rotenone treatments (1961-1980), the slurry was applied from the air. These projects went very well, but factors such as cost, plane availability, and weather became concerns. Aircraft were also used to fight forest fires and sometimes were difficult to obtain. The costs for aerial application ranged between $0.44 and $2.16 per acre foot, depending on the travel distance from the airport. On some projects the application costs were one-third or more of the total project cost.

Since 1981, the division has used 30-foot-long pontoon barges to disperse the rotenone slurry. These craft are very stable and carry about 60 percent the amount of slurry that the plane holds. Operating costs are low because barges are owned by the division. The time to distribute a load of slurry with a barge is comparable to distribution by air. Eight barges will be used simultaneously in the 1988 treatment of Strawberry.

Ready-mix trucks speed operation

Probably the most important change in our powdered rotenone operation is the use of ready-mix cement trucks to mix the slurry. Prior to 1981 we used circulating mixers, which required the powder to be metered in carefully to avoid foaming. With ready-mix trucks, rotenone powder can quickly be dumped in at once.

The latest innovation in mixing rotenone slurry is still in the development stage, but preliminary results are favorable. Beginning in 1987, the Division of Wildlife Resources received the rotenone powder packaged in large bulk bags weighing approximately 1,000 pounds. Since the ready-mix trucks are able to mix the slurry quickly without foaming, it is possible to lift these bags by forklift or front-end loader and pour them directly into the mixer through a spout in the bottom of the bag. This greatly enhances mixing and speeds up the whole operation.

Now that you know how the the ready-mix trucks, bulk bags, and barges have revolutionized the use of powdered rotenone, you may ask: How is the chemical dispersed quantitatively across the reservoir surface? First, the reservoir is divided into separate treatment zones. There will be 12 or 13 zones on Strawberry Reservoir. These are bouyed off and the water volume is measured for each zone. Next, the amount of rotenone slurry needed to provide 1.5 parts per million rotenone in each zone is calculated, and the number of barge trips needed to attain that concentration is determined. It is important to streamline the mixing and loading operation to keep the barges running efficiently.

A good way to think of such an operation is to visualize 10 Panguitch Lakes being treated side by side. This approximates the size of the enlarged Strawberry Reservoir. Then visualize six or eight barges distributing slurry systematically into two or three of the treatment zones simultaneously. Each barge operator uses navigation instruments to determine the exact spot where the last load ran out and where the next load begins. The treatment process is expected to take approximately 11 days. Wildlife officials are confident that the equipment is reliable, the methods are tested, and the personnel are experienced.

Another important consideration is that the procedure is straight forward and there are no serious unknowns. Even the weather, which cannot be controlled, is not expected to be a major consideration. Division biologists have used these procedures in an eight-inch snowstorm (Minersville 1984) and a one-inch rainstorm (Mantua 1981).

Threat To Trout Is Real

by Leo Lentsch
Strawberry Project Manager

The future of Utah's fishery resources in Strawberry Valley is at a critical crossroads. Degradation of tributary habitat has altered most of the valley's streams. Trout populations in most of Strawberry Valley's waters are being overrun with nongame fish. Trout habitat in the streams has been degraded to the point that only chubs, suckers, and shiners can successfully reproduce. Loss of trout spawning habitat is probably the most significant impact of poor land management practices. In order to restore this habitat, an interagency team from the *Division of Wildlife Resources, Bureau of Reclamation,* and *U.S. Forest Service* has identified three major categories of rehabilitation techniques which need to be employed within the next 10-year period. The techniques include: (1) reestablishment of historic water flows, (2) bank stabilization, and (3) placement of instream fish habitat structures.

Specific actions that need to be taken within each of the rehabilitation technique categories are:

Reestablish historic flows

Land management agencies need to support reestablishment of historic flows in Strawberry River. A significant portion of the Strawberry River dries up each summer from diversion of flows into Heber Valley for irrigation. Reestablishment of these flows could be accomplished through aquatic mitigation from the Central Utah Project. Returning water to the Strawberry River is critical to restoring trout spawning habitat in the valley. This river and its tributaries are expected to contribute more wild young-of-the-year trout to Strawberry Reservoir than all the other tributarties to the reservoir combined.

Stabilize banks

As a result of overgrazing and aerial herbicide application, stream banks in the valley are unstable and sloughing. This condition has increased the amount of silt in stream channels, washed away valuable pasture land, and increased nutrient loading to the reservoir. The increase in silt load in the streams has changed prime areas for trout spawning into prime areas for chub and sucker spawning.

To combat the negative conditions the following actions are recommended:

1. ***Eliminate aerial application of herbicides.*** *Once a major cause of stream degradation, this destructive practice has been discontinued.*
2. ***Control grazing along stream corridors.*** It is imperative that rehabilitation of Strawberry Valley's streams occur soon. For those streams that have a high potential for trout spawning and have the least stable banks, temporary exclusion of livestock has been recommended. Approximately 30 miles of streams need total exclusion of livestock and an additional 30 miles need to be evaluated for potential exclusion. Management of grazing practices along stream corridors should be directed towards maximizing streambank and riparian vegetation protection throughout the valley.
3. ***Replant willows.*** Past practices of grazing and herbicide spraying have completely stripped most stream banks of vegetation in Strawberry Valley. In order to reestablish rooted vegetation in stream banks, willows need to be planted. These plantings should occur only after grazing controls have been implemented.
4. ***Reinforce banks with streamside structures.*** Over 40 miles of stream banks in the valley need to be strengthened with logs and juniper trees or riprap. These devices will prevent further sloughing of the banks and provide a place to reestablish vegetation.

Placement of instream fish habitat

In many of the streams of Strawberry Valley, gravels that were once used by trout for spawning have been washed out. In other streams, the stream channel has cut deep and reduced subirrigation to pasture lands and riparian vegetation. With the removal of streamside vegetation, the streams in the valley are unstable, and peak flows during high water years have scoured these unstable stream channels. Instream structures must be designed to replace the spawning gravels and raise the water tables. These devices (drop structures) need to be placed in the stream channels so that spawning gravels and substrate are deposited upstream of the structure. Eventually, the depth of the stream channel should decrease and the water table will be raised.

Strawberry Valley is unique fishery

The most significant benefits from implementing proper land use management practices and restoring trout habitat in Strawberry Valley will be derived in association with Strawberry Valley's Fisheries Restoration Project. This project represents the largest attempt to reestablish a wild cutthroat trout fishery in North America. It is based on the unique characteristics of Strawberry Valley waters which allow the production of a large number of large cutthroat trout through natural reproduction. These characteristics have given Strawberry Valley a reputation for fishing that is unique to Utah and the western United States.

Economic benefits could reach $50 million

Land management agencies, *U.S Forest Service* and *Bureau of Reclamation,* are primarily responsible for rehabilitation of the streams. The *Utah Department of Health,* however, through administration of U.S. Environmental Protection Agency funds, may also play a significant role. It will cost approximately $2.4 million over a 10-year period to rehabilitate Strawberry Valley streams.

The total economic benefits derived from Strawberry Valley's Fisheries Restoration Project will be approximately $50 million over a 20-year period. These benefits could be significantly reduced if the stream rehabilitation component of the project is not completed. These reductions in economic benefits may be grouped into two categories: (1) direct benefits (increases in yearly expenditures) and (2) derived benefits (reductions in benefits from lower recreational use).

The most significant direct cost associated with failure to rehabilitate the tributaries would be accrued from the lack of young-of-the-year production. Each year, approximately 10 million young trout could be produced from the rehabilitated tributaries. These naturally produced fish would reduce the state's cost of stocking Strawberry Reservoir by approximately $100,000 each year. Furthermore, failure to rehabilitate streams would result in a more rapid return of chubs and suckers to the reservoir and shorten the life of the chemical treatment by as much as 25-50 percent. Expenditures associated with implementation of alternate management techniques *(i.e., species introductions, spot poisoning, etc.)* to control chubs and suckers could amount to as much as $30,000 per year in addition to stocking costs.

Although not directly associated with Strawberry Valley, the 60,000 pounds of fish that would not have to be stocked in Strawberry Reservoir would be available for stocking in other Utah waters. This poundage of fish could provide as much as 37,500 recreational-user days or approximately $1 million in yearly benefits to Utah's economy.

The benefits of rehabilitating Strawberry Valley streams for fisheries management will greatly enhance and secure the success of Strawberry Valley's Fishery Restoration project. In fact, rehabilitation of these streams will not only benefit the state's fisheries but will also benefit other wildlife species and associated recreational activities.

Strawberry Reservoir's Fishery Management Objectives

1. Maintain cutthroat trout as an integral component of the fishery and more specifically, establish the Bear Lake cutthroat strain as the only cutthroat in the reservoir. This will be accomplished through stocking fingerling size Bear Lake cutthroat into Strawberry Reservoir annually until natural reproduction in the tributaries can support the cutthroat population.
2. Provide 1.2 million angler hours of recreational angling yearly from natural reproduction, and when needed, stock with salmonids.
3. Achieve an average catch rate of .4 (12-inch) fish per angler hour.
4. Produce 10 million cutthroat trout young-of-the-year from tributaries each year.
5. Collect 6 million cutthroat trout eggs yearly from spawn-taking operations for statewide use.

Is Strawberry Treatment Cost Effective?

by James Johnson
Fisheries Research Coordinator

The Division of Wildlife Resources recognizes that the chemical treatment of Strawberry will be expensive. It will cost about $1.85 million. These funds will not come from the general tax coffers but from the support of anglers through license fees and the federal excise tax levied on fishing equipment. Thus, as the sole financial supporters of the Strawberry Valley project, anglers should ask the questions: 1)Is it worth the cost? and 2) Would our money be better spent elsewhere?

Lets look at the second question first. What if we spent the same amount of money on other options? Several options, besides the treatment plan were investigated for Strawberry. The Division of Wildlife Resources has looked at the prospects of managing Strawberry Reservoir with partial treatments and species changes. These options are also very costly and are likely to result in major declines in angler use at Strawberry Reservoir. The money could be spent at other waters, but there are no other waters big and productive enough to replace even half the recreation Strawberry Valley now provides, regardless of the amount of money spent on them.

At an average size of 16,000 acres, Strawberry will be about as large as all the other cold water reservoirs of northern Utah combined (excluding Bear Lake). And all of Utah's smaller waters are now fished to their capacity. Strawberry Valley is tied with Lake Powell as the most heavily fished water in the state. As it fills and reaches its enlarged average size, Strawberry Reservoir's role is expected to increase. If nongame chubs and suckers are allowed to take their toll on this reservoir, where will Strawberry's anglers go? Strawberry now hosts about 200,000 angler trips a year. If even half of these anglers were to transfer to the other smaller waters of the Wasatch Front, the additional pressure would be the last straw for such heavily fished waters as Scofield and East Canyon reservoirs.

Utah is an arid state, and there are not enough alternative waters to absorb the fishing pressure and harvest now provided by Strawberry. Strawberry does, indeed, seem to be a good investment.

But can we really afford it? Can we come up with the money to treat Strawberry? Yes, with some sacrifice to other programs, we can and we have.

Will we be getting our money's worth? There are a number of ways of looking at the economic value of the investment in Strawberry: 1) economic value to concessionaires and parks and other developments at Strawberry, 2) economic value to the local and state economies, 3) savings in fishery management costs over the long term.

When Strawberry's campgrounds and other recreational facilities were developed by the Bureau of Reclamation, a private concession invested heavily in such services as restaurant, gas and grocery services, boat rental, slip and anchorage rentals, and bait sales. More than 90 percent of visitors to Strawberry go there to fish. Should Strawberry Reservoir's fishery decline, so will public use of its facilities and services.

Recreation opportunities, including fishing, play an important role in Utah's economy. Strawberry Reservoir, as one of the state's most heavily fished waters, is economically important to the state and extremely important to the economies of the immediately surrounding areas.

U.S. Forest Service and Bureau of Reclamation economists estimate that a four-hour fishing day generates $17.60 to the economy. Strawberry Valley now hosts about 200,000 such fishing days per year, which according to the U.S. Forest Service, is approximately $3.52 million annually. When the reservoir is treated and game fish habitat is improved, it will support at least 300,000 four-hour fishing days which translates into an economic value of $5.28 million annually. On the other hand, if Utah allows Strawberry's fishery to deteriorate and use falls to less than 125,000 fishing days, the economic value generated by the Strawberry Valley will declined by $2.2 million. Economics alone suggest renovation of Strawberry Valley's fisheries could stimulate over $3 million in economic activity for Utah's economy.

Of prime concern to the Division of Wildlife Resources is the value of the Strawberry Reservoir to its fishery budget and to anglers. **Table I** shows the current costs to stock Strawberry Reservoir, the stocking costs after chemical treatment, and the costs of stocking with restoration of the tributaries. Tributary restoration will allow reproduction of cutthroat trout and kokanee salmon to almost completely support the fishery.

Tributaries contribute to nongame problem

The Division of Wildlife Resources's lengthy studies in 1986 demonstrated that, although the Strawberry River contributed large numbers of young fish to the reservoir, virtually all were nongame fish. Habitat conditions in the Strawberry River are no longer suitable for the reproduction of trout.

Dewatering for irrigation purposes and spraying with herbicides to eliminate willows, combined with grazing on the stream banks, have resulted in increased temperature and sediment loads and caused the channel to become wide and unstable. An interagency team of representatives from of the *U. S. Forest Service, Bureau of Reclamation, Strawberry Water Users Association, Utah Department of Health,* and the *Division of Wildlife Resources* has proposed a program to restore the tributary trout spawning habitat of Strawberry Reservoir. This project will result in an annual migration of an estimated 10 million cutthroat trout fry (1-2-inch young-of-year) and similar numbers of kokanee fry to the reservoir, probably eliminating the need to stock these species.

To prevent hybridization of rainbow and cutthroat trout, the Division of Wildlife Resources plan to stock only sterile rainbow. The combined chemical reclamation and stream reclamation plans should save the state approximately $220,000 in annual fish rearing costs. Elimination of chubs and suckers, without the restoration of the tributaries, would reduce stocking costs by approximately $126,000. The hatchery production space made available will be reallocated to the new Jordanelle and Stillwater reservoirs now under construction as parts of the Central Utah Project.

Economic benefits add up

Economic justifications of the proposed treatment of Strawberry Valley are all very positive. The money is well spent at Strawberry. Utah can afford to do it. In fact we can't afford not to do it. The project will benefit consessionaires and local and state economies. And the treatment will greatly benefit Utah's anglers by improving the future of fishing at Strawberry Reservoir and by making funds and hatchery fish available for better management of other Utah waters.

Table 1. Stocking plans and their costs for Strawberry Reservoir[1] with and without chemical treatment to remove nongame fish.

Species	Size	Number	Pounds	Cost[2]
Future without treatment				
Rainbow	5″	1,100,000	55,000	$143,000
Cutthroat	5-6″	500,000	38,000	$98,800
Total		1,600,000	93,000	$241,800
Future with treatment				
Rainbow	3″	1,000,000	11,000	$40,000
Kokanee	3″	400,000	4,500	$16,000
Cutthroat	3″	1,500,000	17,000	$60,000
Total		2,900,000	32,500	$116,000
Future with treatment and tributary restoration				
Sterile Rainbow	3″	500,000	5,555	$19,998
Kokanee		self-sustaining		
Cutthroat		self-sustaining		
Total		500,000	5,555	$19,998

[1]All figures based on 16,000-acre surface area
[2]5″ fingerling cost = $2.60/lb
3″ fingerling cost = $3.60/lb

The New Strawberry: A Different Kettle of Fish

by James Johnson
Fisheries Research Coordinator

Whether or not it is chemically treated, Strawberry Reservoir will soon feature species new to many Utah anglers. The Division of Wildlife Resources has spent many years researching ways of slowing the growth of nongame populations. These methods include introduction of certain species.

As a rule, treated waters are restocked with rainbow trout. Sometimes cutthroat and brook trout are added for diversity. After most treatment and restocking, biologists set out nets each year and hold their breaths. Should nongame fish appear in the catch, it is only a matter of a few years before another chemical treatment is needed. Until recently, there was really nothing the wildlife biologists could do to slow the invasion of nongame fish. Biologists could stock warm water predators like walleye and bass, but these species tend to eat trout before they start on nongame chubs. Once the chubs are gone, the result is often stunted warm water fish. Lake trout and brown trout also prefer to eat rainbow trout and their own young over chubs. To make matters worse, all of these predators are harder to catch than rainbow trout, and their introductions have always resulted in major declines in catch rate, harvest, and angler use.

As a result of recent research at Bear Lake, Flaming Gorge, and Division of Wildlife Resources hatcheries, two options that could prove to be potent weapons against nongame fish are available to the fishery manager. Studies have shown the Bear Lake cutthroat to be a fish eater and easier to catch than the Strawberry cutthroat. In fact, the Bear Lake cutthroat is probably easier to catch than any other predator fish. Moreover, it is now possible to sterilize rainbow trout so they will live longer, grow faster, and not hybridize with cutthroat trout.

The second option is the kokanee salmon which does not eat fish. Kokanee eat nearly the same things as chubs do but do not seem to be bothered by competition from chubs. Studies at Flaming Gorge Reservoir have shown that kokanee can find food where rainbow trout cannot. In fact, Flaming Gorge, which is loaded with chubs, recently produced the state record kokanee (5 lb. 5 oz. and 23 1/4 inches long).

Rainbow trout are doing poorly at Flaming Gorge because of nongame chubs and suckers. Kokanee salmon and lake trout do not appear to be eliminating chubs at Flaming Gorge, but they are providing a fishery in spite of them. If kokanee salmon or easy-to-catch predators like Bear Lake cutthroat had been planted after the 1961 treatment, they may have prevented or at least slowed the explosion of nongame fish in the 1970s. This is why the Division of Wildlife Resources has proposed stocking Strawberry with these species after the 1988 treatment.

Fish to be stocked after treatment

Bear Lake Cutthroat - This Utah native has literally been brought back from the verge of extinction by the Division of Wildlife Resources Bear Lake Cutthroat Trout Restoration Project. Beginning with only a few hundred fish in the 1970s, there are now several million eggs taken annually from Bear Lake and the division's Egan Hatchery. For the first time, these fish became available for use in waters other than Bear Lake. They are a recent addition to Strawberry Reservoir, where they immediately proved to be chub eaters. In fact, Bear Lake cutthroat have survived better than Strawberry cutthroat and are much easier to catch.

In Bear Lake, cutthroat feed heavily on sculpins and cisco after reaching 12 to 16 inches in length. They mature much later than other cutthroat. Strawberry cutthroat mature at three to five years of age as compared with the five-to-seven-year maturity for Bear Lake cutthroat.

Spawning causes heavy mortality among fishes. About half to three-fourths of wild trout die shortly after spawning. This heavy loss seriously affects the life span and maximum size of the fish. By living five to seven years before their first spawn, Bear Lake cutthroat grow much larger than other cutthroat and, since a trout has to be about 16 inches long to become a really effective fish eater, the Bear Lake cutthroat have two to three years during which they feed almost exclusively on fish before reaching maturity. Many Strawberry cutthroat, upon reaching 16 inches, become mature, spawn, and die.

Fishing for Bear Lake Cutthroat - Because smaller (less than 16 inches) Bear Lake cutthroat eat the same things and are similar to other cutthroat, they can be caught with traditional trolling gear. Like other cutthroat, they are a little harder than rainbow to catch on most types of bait; however, they are at least as easy to catch on flies and lures as rainbow trout.

For larger Bear Lake cutthroat (10-pound fish are not uncommon), troll or cast with big lures such as rapalas, lead headed jigs, flatfish, and brass or red-and-white spoons. Fly fishing near shore with big streamers can be very effective in the spring and fall. In mid-summer, when water temperatures near shore are a little too warm for most trout, fishing for Bear Lake cutthroat will be best using deep trolling techniques to get the lure down 25 to 30 feet.

Sterile Rainbow Trout - Sterilization of trout is a new way to prevent rainbow trout from spawning, thus avoiding associated high mortality rates. More important, sterilization will prevent rainbow trout from crossing with the Bear Lake cutthroat.

Rainbow trout hybridization with Strawberry cutthroat has become a serious problem. Strawberry has been Utah's most important source of cutthroat trout eggs for such waters as Scofield, the lakes of the Uintas, and Strawberry Reservoir itself. But the Strawberry "cutthroat" has become a cutthroat-rainbow hybrid. Beginning in 1988, all rainbow trout stocked in Strawberry and its watershed will be sterilized to prevent the hybridization problem.

Sterile rainbow are the aquatic equivalent of a steer. Hatchery biologists treat the eggs and young fry with hot (84 degrees) water or with a trace amount of a growth hormone. The result is a sterile fish that grows better and lives longer because it does not spend energy producing eggs and spawning. Otherwise the sterile rainbow will look like any other rainbow trout and can be caught using the same techniques.

Kokanee Salmon - Kokanee are the fresh water version of sockeye (red) salmon and are regarded by many as the finest table fare of any trout or salmon found in fresh water. Kokanee eat small, almost microscopic, shrimp-like animals known as plankton. Plankton are found by the millions suspended in the waters of lakes and reservoirs and are the preferred food of many other species including rainbow trout and chubs. When there are too many chubs, only the plankton that is too small to eat remains, and rainbow trout growth slows or stops.

Kokanee are especially adapted for feeding on smaller plankton and continue to thrive after plankton becomes too small for rainbow. Kokanee are also prolific spawners. They have established reproducing populations in Porcupine and Flaming Gorge reservoirs where rainbow trout have failed to become self-sustaining.

However, in the absence of predators, kokanee can over produce and become stunted. Because the strain of kokanee to be stocked in Strawberry must spawn in streams, fisheries biologists can control the numbers entering the streams and, thus, reproductive success. In addition, the Bear Lake cutthroat will feed heavily on kokanee if they become abundant. This fact alone will probably keep them from overpopulating. Like other salmon, kokanee spawn in the late summer and fall and then die.

Natural fish reproduction dramatically reduces stocking costs. If Strawberry Reservoir can be partially sustained by natural reproduction, an estimated $100,000 in annual hatchery production costs can be used for other waters.

Kokanee in lakes look similar to rainbow trout. It takes some practice to tell them apart. The easiest way to identify a kokanee is to look for the forked tail. Rainbow tails do not fork. Also, the anal fin of kokanee (the bottom fin in front of the tail) is wider along its base than it is long. The rainbow is just the opposite. The flesh of the kokanee (like the sockeye salmon) is bright red—more so than any rainbow. The average size of Strawberry kokanee will probably be the same as rainbow—about 11 to 15 inches.

Fishing For Kokanee - There are two things to remember about kokanee: 1) they feed on smaller foods than rainbow and therefore require smaller lures, and 2) they prefer cooler (55 degrees) water and range deeper in summer than rainbow. Anglers fish for kokanee like they would for rainbow but with smaller lures. When the surface of the reservoir warms up in late June, anglers should fish down about 30 feet.

(Do not fish much deeper in August at Strawberry because there is no oxygen deeper than about 30 feet at that time of year.)

Forest Service Supporting Strawberry Project

by Loyal Clark, *Uinta National Forest*

In cooperation with the *Utah Division of Wildlife Resources, Bureau of Reclamation, Central Utah Water Conservancy District,* the *Uinta National Forest* is now working on projects to mitigate losses of aquatic habitat from the Central Utah Project.

One of these projects involves fish habitat improvement in the upper Strawberry River. During the summer, efforts were being made to restore natural streamflows to the upper Strawberry River.

The U.S. Forest Service was also represented on the interagency committee evaluating alternative treatment plans for eradicating nongame fish in Strawberry Reservoir. Due to the treatment of the reservoir, camping and other recreation use will be temporarily reduced. The Forest Service will provide alternate recreation opportunities for the public during this period. Public education and suport for the project will be a major role of the Forest Service.

The Heber district will continue its work to rehabilitate Strawberry Reservoir tributary streams. The purpose of this project is to stabilize stream banks and restore riparian vegetation. This will reduce soil erosion and sediment being carried into the lake and will enhance fish habitat in the streams. If properly protected and managed, the streams will promote successful spawning and reduce the dependency on hatchery fish. Natural fish reproduction in these streams is expected to keep the lake and streams stocked with fish.

The overall role of the U.S. Forest Service is to manage and improve fish and wildlife habitat in the national forest. The expected benefits to national forest users and resource management agencies as a result of the restoration project are quality fishing for future generations, reduced costs to the Division of Wildlife Resources due to natural fish reproduction, and reduced demand for fish from hatcheries.

Strawberry Reservoir -- the family fishery where there's always something to smile about.

Stream restoration is an important part of the Strawberry project.

Frequent Questions Asked About The Strawberry Rehabilitation Project

The Strawberry Valley Fisheries Restoration Project has raised concern in the minds of many people. Here are answers to your most often asked questions about the project:

Q. What are you trying to do at Strawberry?

A. For many years, Strawberry has enjoyed the reputation as an excellent place to catch lots of pan-sized trout, as well as large ones. We are trying to perpetuate this reputation. By removing the abundant chubs and suckers, survival of stocked and naturally produced trout will increase, and the growth and condition of the trout will improve. Strawberry will then be able to accommodate the large numbers of anglers who have made Strawberry a fishing tradition in Utah.

The project also involves rehabilitation of the reservoir's tributaries to improve trout spawning. Once the banks are stabilized and spawning gravels cleaned, the tributaries can produce most of the fish needed to support the fishery. Re-stocked Bear Lake cutthroat and kokanee salmon will be able to spawn naturally.

Q. When will the lake be treated?

A. Treatment to remove the chubs and suckers was scheduled for August of 1988. A shortage of rotenone in 1987 may now postpone treatment until August of 1989. Fishing should remain fairly good up to the treatment date.

Q. When can we fish Strawberry again after the treatment?

A. The three-inch fish scheduled for stocking in the Spring will not be stocked. Instead, they will be held in the hatcheries and stocked in October and November, after the treatment. By that time, they will be eight inches long. Fishing will reopen in the following spring. Check the Fishing Proclamation for details. Fishing will be a little slow the first year, because it will take two years to build the fish population. Fishing should be good the second year after treatment and excellent afterward.

Q. Why treat the lake when fishing is so good?

A. Fishing has been good this year. Unfortunately, it is a temporary situation. Fishing in 1985 was poor because the large number of chubs and suckers reduced survival of the fish stocked in 1984. In 1985, however, water levels increased substantially. The enlarged volume of water diluted the effects of the rough fish population, and newly flooded ground added extra nutrients to the water. Trout stocked in 1985 and 1986 survived and grew well. Fishing improved and should remain good right up to the treatment.

But the effects of the increased water volume are temporary. Chub and sucker populations spawn and increase rapidly. As soon as the water level slows its rise or stabilizes, the rough fish will again control the food in the reservoir, and fishing will decline. Since we know this will happen, we need to act now, while the project is still feasible, to solve the problem before the fishery collapses.

Q. How can you actually treat such a large water?

A. This will be the largest treatment ever attempted. The lake is projected to be about 16,000 surface acres at the time of the project. At that level, total volume will be 740,000 acre feet. At one time, we thought the project at this level was impossible.

In 1986, however, we found that in August the water below 30 feet in depth has no oxygen and cannot sustain fish. By treating only the upper layer, we only have to treat half of the total volume. This is much more feasible and less costly.

Q. How will the treatment actually be done?

A. Powdered rotenone will be mixed with water into a slurry in a ready-mix cement truck. The slurry will be transported in six 30-foot barges equipped with 1,200-gallon tanks. The lake has been divided into grids, and the barges will distribute the rotenone slurry along established lines. A total of 866 barge trips will be needed to cover the entire lake with rotenone. Barring delays for bad weather, it will take about 11 days to apply the rotenone.

Q. How safe is rotenone?

A. Rotenone comes from a plant that grows in South America. It is an organic chemical found in the roots. It is highly toxic to insects and fish, but has a very low toxicity for birds and mammals. Livestock can safely drink water treated with rotenone. Rotenone also breaks down quickly and has no lasting harmful effects on the environment.

Q. Can we collect and eat the trout killed by the rotenone?

A. Rotenone taken into the fish's system blocks utilization of oxygen. Since it is absorbed into the fish, the fish should not be eaten. Even though it has low toxicity for mammals, rotenone has not been registered by the Food and Drug Administration for use on fish destined for human consumption.

Q. How will you clean up all of the dead fish?

A. Strawberry Reservoir contains at least 5,000 tons of fish. After the treatmemt, many of the dead fish will sink and decay, but many will wash ashore. Time and personnel requirements make cleanup impossible. Luckily, Strawberry is somewhat remote. Because most of its use centers around fishing, we expect very few people to be around immediately after the treatment. In August, decomposition will take place rapidly, and the nutrients will be quickly recycled into plankton. Plankton, tiny plants and animals in the water, will feed the trout that will be stocked a month or so after the treatment.

Q. With the weather cycle looking drier, why don't you wait to treat the lake at a lower level?

A. The watershed for Strawberry Reservoir has been greatly enlarged with construction of the Strawberry Collection System, part of the Central Utah Project which brings additional water over from the Uinta Basin. The collector system is being completed before water deliveries downstream begin, so even in a drought, Strawberry is predicted to fill in only a few more years. A lengthy drought in the future, when full delivery is underway, may lower the lake. But, since we cannot predict when, we cannot afford to wait. Also, the water coming in from the Uinta Basin is high-quality and low in nutrients. This should increase water quality at Strawberry and increase the amount of oxygen in the deeper waters. It is the present lack of oxygen in the deep water that makes this treatment plan feasible, so we must act now while this condition exists.

Q. Since you knew the lake would be filling, why didn't you treat it when it was lower?

A. We wanted to. By 1981, net catches indicated a dramatic increase in chub and sucker numbers, even though fishing was still good. We formed an interagency team to decide on a course of action and asked for public input. The interagency team was unable to reach any agreement, and the public response was mostly negative. We had begun stocking larger fingerlings, and 1981 was an excellent year for fishing. It was easy to underestimate the potential problem. We had to see the poor results in 1984 and 1985 before enough people could agree on the need for treatment.

Q. Won't the chubs and suckers come right back after the treatment?

A. On a treatment of this size, it is unlikely we will eliminate all the rough fish, but several parts of the project are designed to prevent their rapid return. First, rehabilitation of the tributaries will make them excellent trout spawning habitat. Presently, they are only good chub and sucker habitat. Second, the fish to be stocked after treatment will limit growth of chub and sucker populations. Bear Lake cutthroat trout are very predacious, and we expect chubs to make up a significant portion of their diet. Kokanee salmon should out-compete the chubs and suckers for food. In combination, they present a 1-2 punch for the rough fish.

Q. Why not just stock predator fish and let them control the rough fish?

A. This approach was considered, but there are several problems. First, the stocking of predators in numbers sufficient to control rough fish would lead to a trophy-only fishery. Large predacious trout are always present in the smallest numbers in a lake, or they eliminate their food source and stunt. While this plan would be well received by a small number of skilled anglers, it would eliminate the fishery reputation for which Strawberry is so popular. It might be necessary to regulate fishing to protect these large fish, since they would be needed to control rough fish.

Second, we have never been able to develop a trout fishery which has controlled chubs once they are well established, not even the brown trout and lake trout at Flaming Gorge. Third, cool water predators, like the walleye or northern pike, suggested by a few people, have clearly demonstrated their ability to wipe out trout populations.

Finally, even if successful, the approach is very slow and would take a long time to show results. As an example, Walleye were stocked in Starvation Reservoir in 1977, and smallmouth bass were added several years later. Chub numbers are only now showing some signs of decline.

Q. Won't a lot of trout be wasted?

A. Some trout will be lost. Our sampling, however, shows that about 95 percent of the fish in the reservoir are rough fish. It is interesting that very few of the fish to be killed are native to the Strawberry drainage. The chubs and Utah suckers came from the Bonneville Basin. The rainbow trout are native to the Pacific Northwest. The brook trout came from the eastern United States, and the cutthroat came from Yellowstone Park.

Plans are being made to move all of the trout captured in the 1988 spawning run in the Strawberry River and Indian Creek to other waters. Limits will be adjusted to allow greater angler harvest prior to treatment. See the Fishing Proclamation for details.

Q. Isn't it too expensive to stock so many fish in Strawberry every year?

A. Stocking is expensive, but it has been necessary to maintain adequate trout populations due to the poor condition of the tributary streams. The Strawberry project, however, is much more than just a rough fish eradication. It is a multi-agency attempt to rehabilitate the entire Strawberry Valley fishery. Once the tributaries are stabilized and trout spawning habitat improved, we expect that approximately 10 million cutthroat trout fry will be produced naturally each year. Kokanee salmon should enjoy equal success. We should be able to gradually reduce stocking. This is a major objective of the treatment project. Our hatcheries are at capacity, and extra fish will be needed to stock Jordanelle, Upper Stillwater, and other new lakes as they are constructed.

Q. Isn't the treatment too expensive?

A. The treatment is expensive. Original estimates for the rotenone treatment were about $1.3 million. This estimate will change, depending on the price of rotenone. There will also be additional costs for the tributary rehabilitation work.

The cost, however, has to be weighed against the benefits. Without treatment, the fishery will decline severely. With treatment, we expect to obtain or exceed our management targets of 1.2 million angler hours annually and a harvest of 480,000 trout. The economic value to the entire state of that level of fishery is over $4.5 million annually. In addition, with tributary rehabilitation, we will be able to save over $100,000 annually on stocking costs alone. We think these benefits clearly justify the cost.

Q. With the state in a tight budget crunch, isn't this too much tax money to spend?

A. No state tax money is being used in this project. Funding for the project is 25 percent from fishing license sales and 75 percent from federal excise taxes on fishing tackle, boats, and boat fuel through the Sport Fish Restoration Program (Wallop-Breaux fund). The revenue comes from anglers, and anglers will receive the benefits. We think that perpetuation and improvement of the state's number one trout fishery for the long term will benefit not only anglers but the state economy as a whole.

For more information about the Strawberry project, contact any Division of Wildlife Resources office.