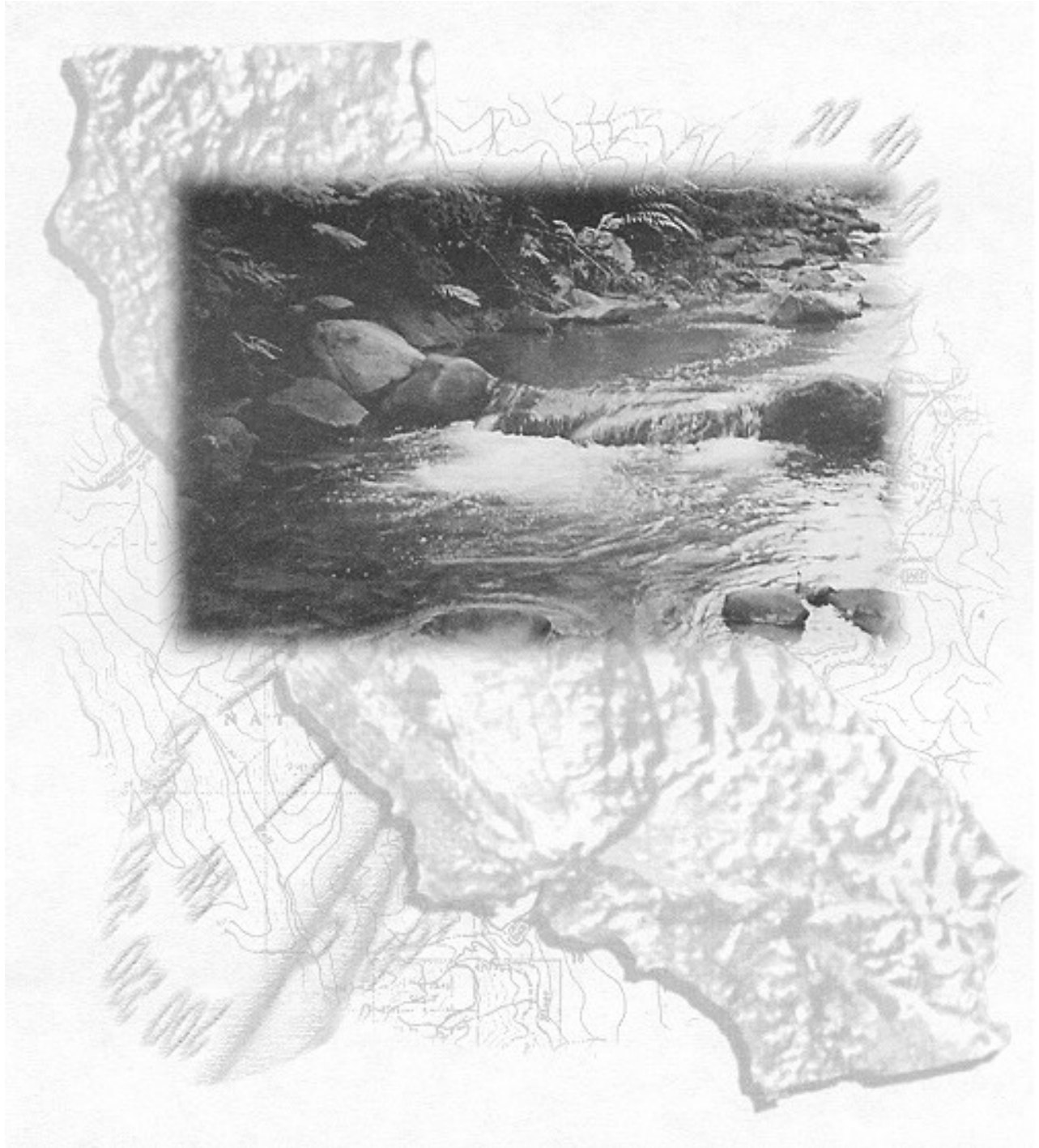


---

**CALIFORNIA SALMONID STREAM  
HABITAT RESTORATION MANUAL**

---

**APPENDICES**



---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## APPENDIX A.

### POLICY AND REGULATIONS FOR SALMON AND STEELHEAD RESTORATION IN CALIFORNIA

#### FISH AND GAME COMMISSION POLICY

##### Steelhead Rainbow Trout

It is the policy of the Fish and Game Commission that:

- I. Steelhead rainbow trout shall be managed to protect and maintain the populations and genetic integrity of all identifiable stocks. Naturally spawned steelhead shall provide the foundation of the Department's management program.
- II. Steelhead shall be rescued only when they will be returned to the stream system of origin. Rescue of juvenile steelhead shall be limited to circumstances where fish can be held until habitat conditions improve, or where immediate release can be made in understocked areas of their natal stream system.
- III. Restoration and acquisition plans shall be developed and implemented to safeguard such critical habitats as estuaries, coastal lagoons, and spawning and rearing areas, and to protect or guarantee future instream flows. All steelhead streams shall be inventoried for quantity and quality of habitat, including stream flow conditions. Steelhead Restoration Card and other funding shall be directed to implement the plans.
- IV. Existing steelhead trout habitat shall not be diminished further without offsetting mitigation of equal or greater long-term habitat benefits. All available steps shall be taken to prevent loss of habitat, and the Department shall oppose any development or project which will result in irreplaceable losses. Artificial production shall not be considered appropriate mitigation for loss of wild fish or their habitat.
- V. Sport fishing for sea-run steelhead shall be encouraged where the Department has determined that harvest will not harm existing wild populations. Harvest of juveniles shall only be permitted where such harvest does not impair adequate returns of adults for sport fishing and spawning. Special restrictions on the harvest of wild juvenile steelhead may be necessary when a fishery includes both wild and hatchery stocks.
- VI. Resident fish will not be planted or resident fisheries developed in drainages of steelhead waters, where, in the opinion of the Department, such planting or development will interfere with steelhead populations.
- VII. Exceptions to this policy may be made by the Commission (a) where the stream is no longer adaptable to anadromous runs, or (b) during the mid-summer period in those individual streams considered on a water-by-water basis where there is a high demand for angling recreation, and such planting or development has been determined by the Department not to be detrimental to steelhead.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

The following waters are excepted.

Nacimiento River	San Luis Obispo County
North Fork Battle Creek	Shasta County, upstream from Manton
Cow Creek	Shasta County upstream from Fern Road and Ingot
Antelope Creek	Tehama County, upstream from Ponderosa Way
Deer Creek	Tehama County, upstream from upper Deer Creek Falls
American River	Sacramento County, only in Arden Pond

### Salmon

It is the policy of the Fish and Game Commission that:

- I. Salmon shall be managed to protect, restore and maintain the populations and genetic integrity of all identifiable stocks. Naturally spawned salmon shall provide the foundation for the Department's management program.
- II. Salmon streams shall be inventoried for quantity and quality of habitat, including instream flow requirements. Restoration plans shall identify habitats for restoration and acquisition and opportunities to protect or guarantee future instream flows. Commercial Salmon Trollers Stamp and other funding shall be directed to implement the plans.
- III. Existing salmon habitat shall not be diminished further without offsetting the impacts of the lost habitat. All available steps shall be taken to prevent loss of habitat, and the Department shall oppose any development or project which will result in irreplaceable loss of fish. Artificial production shall not be considered as appropriate mitigation for loss of wild fish or their habitat.
- IV. Salmon shall be rescued only when they will be returned to the stream system of origin. Rescue of juvenile salmon shall be limited to circumstances where fish can be held until habitat conditions improve, or where immediate release can be made in understocked areas of their natal stream system.
- V. In coastal streams without Department hatcheries, artificial rearing shall be limited to areas where the Department determines it would be beneficial to supplement natural production to re-establish or enhance the depleted wild population. In the Sacramento, American, Feather, San Joaquin, Klamath, and Trinity river systems, hatchery production shall be used to meet established mitigation goals. At the discretion of the Department excess eggs and fish from State, Federal, or cooperative hatcheries may be used to provide additional fish for the commercial and sport fisheries.
- VI. Resident fish will not be planted or resident fisheries developed in drainages of salmon waters, where, in the opinion of the Department, such planting or development will interfere with salmon populations. Exceptions to this policy may be authorized by the Commission (a) where the stream is no longer adaptable to anadromous runs, or (b) during the mid-summer period in those individual streams considered on a water-by-water basis where there is a high demand for angling recreation and such planting or development has been determined by the Department not to be detrimental to salmon.

---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## Classification and Management System

The classification system shall be employed to define the appropriate stocks and the role of artificial production for management of each salmon and steelhead stream in California. This classification may be applied to drainages, individual streams, or segments of streams as necessary to protect discrete stocks of salmon or steelhead. Only designated appropriate stocks may be placed or artificially produced in any stream within the guidelines specified under this classification system. Exceptions to these management constraints may be allowed only under emergency conditions that substantially threaten the long-term welfare of the fishery. Exceptions may only be granted upon submission of a written request, which details the emergency conditions, by a DFG region or an Inland Fisheries Division (IFD) Assistant Chief to the Chief of IFD. The IFD Chief will review the request and make recommendations for approval or denial to the Deputy Director of Fisheries who will then approve or deny the request.

### Salmon and Steelhead Stream Classification System Terms

The salmon or steelhead stocks stream management goal shall manage streams for the following appropriate stock and only those stocks may be placed in the stream (each term is progressively inclusive of the preceding terms):

- a. Endemic - Only historic naturally reproducing fish originating from the same stream or tributary.
- b. Naturally reproducing stocks within drainage - Naturally reproducing stocks from the drainage of which the stream is part.
- c. Hatchery stocks within basin - Stocks which may include hatchery produced fish from streams within the drainage.
- d. Naturally reproducing stocks from out of basin - Naturally reproducing stocks from streams outside the basin.
- e. Hatchery stocks out of basin - Stocks which may include hatchery produced fish from streams outside the basin.
- f. Any stock - Any stock which appears to exhibit characteristics suitable for the stream system.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

Artificial production limitations shall be defined according to the following terms. The Department of Fish and Game (DFG) guidelines for cooperative fish production in California are included as Appendix B.

- a. None - No artificial production or fish planting permitted. Manage for natural reproduction. Rearing habitat fully occupied by natural production in most years.
- b. Supplementary - Artificial production is less desirable than natural production and is allowed only to the extent that it provides for full stocking of the stream. Artificial production shall be construed to be a temporary measure until such time as the DFG determines the stream to be fully stocked, but shall not continue beyond 5 years without formal review by the appropriate Regional Fisheries Management Supervisor and Inland Fisheries Division representative. Releases of artificially reared fish shall be distributed to minimize disruption of naturally produced salmon or steelhead.
- c. Complementary - Artificial production is as important for fishery management purposes as natural production and hatchery production may be used on a permanent basis to complement natural production. The level of hatchery production shall not significantly interfere with natural reproduction and survival.
- d. Hatchery - Managed principally for hatchery production with natural production protected but considered secondary.

---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## DEPARTMENT OF FISH AND GAME FISH SCREEN POLICY

*This fish screening policy is structured to comply with existing fish screening statutes, the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), the Federal Endangered Species Act of 1973 (ESA), the California Endangered Species Act (CESA), and court decisions in place at the time of its adoption. All diversions shall be dealt with uniformly on a statewide basis, as outlined in this policy memorandum.*

### **Diversions Covered By Section 6100**

The Department of Fish and Game shall require the installation of fish screens under Section 6100 et seq. of the Fish and Game Code on any new diversion, or on the intake of any existing diversion that is either enlarged, relocated, or at which the season of use is changed, in salmon and steelhead (anadromous) waters of the State.

In addition, all diversions covered by this section which are located within the essential habitat of a State-CESA listed species or the critical habitat of a Federal-ESA listed species shall be screened.

Variances from these requirements shall be supported by a report, prepared by the diverter, which includes data from onsite monitoring and a review of historical entrainment and diversion data. The scope of the report and the sampling effort shall be approved by the Department of Fish and Game prior to the initiation of work.

Both approval of the scope of the report and approval of an exception to this policy shall require the concurrence of the appropriate Regional Manager, the Chief of the Inland Fisheries Division, and the Chief of the Environmental Services Division. The final exception notice shall be issued by the Deputy Director - Fisheries.

### **Diversions Covered By Section 5980**

The Department of Fish and Game shall investigate, and where necessary, order fish screens installed on all diversions which affect fishery resources with a capacity greater than 250 cubic feet per second (cfs). Diversions in anadromous waters of the State shall be screened unless onsite sampling demonstrates otherwise.

In addition, all diversions covered by this section which are located within the essential habitat of a State CESA-listed species or the critical habitat of a Federal-ESA listed species shall be screened.

Variances from these requirements shall be supported by a report prepared by the diverter, which includes data from onsite monitoring, and a review of historical entrainment and diversion data. The scope of the report and the sampling effort shall be approved by the Department of Fish and Game prior to the initiation of work.

---

---

## **CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL**

---

---

Both approval of the scope of the report, and approval of an exception to this policy shall require the concurrence of the appropriate Regional Manager, the Chief of the Inland Fisheries Division, and the Chief of the Environmental Services Division. The final exception notice shall be issued by the Deputy Director - Fisheries.

### **Diversions Covered By Section 6020**

The Department of Fish and Game may consider for screening any diversion with a capacity of 250 cfs or less. Activities in this category should be assigned a lower priority than those covered by provisions of Section 5980, until all of the Department of Fish and Game obligations for both its own diversions, and for those diversions with a capacity greater than 250 cfs, have been fulfilled.

In addition, all diversions covered by this section which are located within the essential habitat of a State CESA-listed species or the critical habitat of a Federal-ESA listed species shall be screened.

Variances from these requirements shall be supported by a report, prepared by the diverter, which includes data from onsite monitoring, and a review of historical entrainment and diversion data. The scope of the report and the sampling effort shall be approved by the Department of Fish and Game, prior to the initiation of work.

Both approval of the scope of the report, and approval of an exception to this policy shall require the concurrence of the appropriate Regional Manager, the Chief of the Inland Fisheries Division, and the Chief of the Environmental Services Division. The final exception notice shall be issued by the Deputy Director - Fisheries.

### **NEPA And CEQA Processes**

When reviewing projects, the Department of Fish and Game shall make every effort to require the installation of fish screens on all unscreened diversions where other measures cannot reasonably prevent entrainment of fish. Further, the Department of Fish and Game shall make every effort to require modernization of fish screens which do not meet our present fish screening criteria. This effort shall include the Streambed Alteration Agreement process (Section 1600 et seq. of the Fish and Game Code). Variances from the fish screening policy shall be treated as discussed above.

### **Fish and Wildlife Coordination Act**

Under the provisions of this Federal legislation enacted in 1934, the Department of Fish and Game shall require installation of fish screens on all unscreened diversions where fish are present. Further, the Department of Fish and Game shall make every effort to require improvement of fish screens not meeting our present screening criteria. For example, opportunities are provided by the U.S. Army Corps of Engineers permit process under the Federal Rivers and Harbors and Clean Water acts.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

*The “General Fish Screening Criteria” shall be used as the basis for design of fish screens required under this policy. The need-to-screen criteria may be modified by the Department of Fish and Game, and it is the responsibility of the project proponent to have the most recent copy of these agreement criteria. Copies are available from either the Environmental Services Division or the In land Fisheries Division of the Department of Fish and Game.*

### **SENATE BILL 2261** (CHAPTER 1545, Statutes of 1988)

*SENATE BILL 2261, introduced by Senator Barry Keene. Salmon, Steelhead Trout, and Anadromous Fisheries Program Act) added Chapter 8 (commencing with section 6900) to Part 1 of Division 6 of the Fish and Game Code, relating to fish, making an appropriation therefore, and declaring the urgency thereof, to take effect immediately.*

The people of the State of California do enact as follows:

SEC. 1. The Legislature finds that the Advisory Committee on Salmon and Steelhead Trout, reestablished by Resolution Chapter 141 of the Statutes of 1983, has conducted a thorough inquiry into the decline of the naturally spawning salmon and steelhead trout resources of the state and has presented to the public its findings and recommendations for legislative and administrative actions to protect and increase those resources. As a result of the advisory committee’s inquiry, findings, and recommendations, the Legislature has recommended the establishment of a salmon, steelhead trout, and anadromous fisheries program set forth in Chapter 8 (commencing with Section 6900) of Part 1 of Division 6 of the Fish and Game Code.

SEC. 2. Chapter 8 (commencing with Section 6900) is added to Part 1 of Division 6 of the Fish and Game Code, to read:



---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## CHAPTER 8. SALMON, STEELHEAD TROUT, AND ANADROMOUS FISHERIES PROGRAM ACT

### Article 1. Citation and Legislative Findings

6900. This chapter shall be known and may be cited as the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act.

6901. The Legislature, for purposes of this chapter, finds as follows:

(a) According to the department, the natural production of salmon and steelhead trout in California has declined to approximately 1,000,000 adult chinook or king salmon, 100,000 coho or silver salmon, and 150,000 steelhead trout.

(b) The naturally spawning salmon and steelhead trout resources of the state have declined dramatically within the past four decades, primarily as a result of lost stream habitat on many streams in the state.

(c) Much of the loss of salmon and steelhead trout and anadromous fish in the state has occurred in the central valley.

(d) Protection of, and in increase in, the naturally spawning salmon and steelhead trout resources of the state would provide a valuable public resource to the residents, a large statewide economic benefit, and would, in addition, provide employment opportunities not otherwise available to the citizens of this state, particularly in rural areas of present underemployment.

(e) Proper salmon and steelhead trout resource management requires maintaining adequate levels of natural, as compared to hatchery, spawning and rearing.

(f) Reliance upon hatchery production of salmon and steelhead trout in California is at or near the maximum percentage that it should occupy in the mix of natural and artificial hatchery production in the state. Hatchery production may be an appropriate means of protecting and increasing salmon and steelhead in specific situations; however, when both are feasible alternatives, preference shall be given to natural production.

(g) The protection of, and increase in, the naturally spawning salmon and steelhead trout of the state must be accomplished primarily through the improvement of stream habitat.

(h) Funds provided by the Legislature since 1978 to further the protection and increase of the fisheries of the state have been administered by the Department of Fish and Game in a successful program of contracts with local government and nonprofit agencies and private groups in ways that have attracted substantial citizen effort.

(i) The Department's contract program has demonstrated that California has a large and enthusiastic corps of citizens that are eager to further the restoration of the stream and fishery resources of this state and that are willing to provide significant amounts of time and labor to that purpose.

(j) There is need for a comprehensive salmon, steelhead trout, and anadromous fisheries plan, program, and state government organization to guide the state's efforts to protect and increase the naturally spawning salmon, steelhead trout, and anadromous fishery resources of the state.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

6902. The Legislature, for purposes of this chapter, declares as follows:

(a) It is the policy of the state to significantly increase the natural production of salmon and steelhead trout by the end of this century. The Department shall develop a plan and a program that strives to double the current natural production of salmon and steelhead trout resources.

(b) It is the policy of the state to recognize and encourage the participation of the public in privately and publicly funded mitigation, restoration, and enhancement programs in order to protect and increase naturally spawning salmon and steelhead trout resources.

(c) It is the policy of the state that existing natural salmon and steelhead trout habitat shall not be diminished further without offsetting the impacts of the lost habitat.

### Article 2. Definitions

6910. Unless the context clearly requires a different meaning, the definitions in this article govern the construction of this chapter.

6911. "Production" means the survival of fish to adulthood as measured by the abundance of the recreational and commercial catch together with the return of fish to the state's spawning streams.

6912. "Program" means the program for protection and increasing the naturally spawning salmon and steelhead trout of the state provided for in Article 3 (commencing with Section 6920).

### Article 3. Salmon, Steelhead Trout, and Anadromous Fisheries Program

6920. (a) The Department shall, with the advice of the Advisory Committee on Salmon and Steelhead Trout and the Commercial Salmon Trollers Advisory Committee, prepare and maintain a detailed and comprehensive program for the protection and increase of salmon, steelhead trout, and anadromous fisheries.

(b) The Department shall consult with every public agency whose policies or decisions may affect the goals of this program to determine if there are feasible means for those public agencies to help the Department achieve the goals of this program.

6921. The program shall identify the measures the Department will carry out to achieve the policies set fourth in Section 6902.

6922. The program shall include, but is not limited to, all of the following elements:

(a) Identification of streams where the natural production of salmon and steelhead trout can be increased primarily through the improvement of stream and stream bank conditions without effect on land ownership, land use practices, or changes in stream flow operations.

(b) Identification of streams where the natural production of salmon and steelhead trout can be increased only through the improvement of land use practices or changes in stream flow operations.

(c) Identification of streams where the protection of, and increase in, salmon and steelhead trout resources require, as a result of significant prior loss of stream habitat, the construction of artificial propagation facilities.

(d) A program element for evaluating the effectiveness of the program.

(e) Recommendations for an organizational structure, staffing, budgeting, long-term sources of funding, changes in state statutes and regulations and federal and local government policy and such other administrative and legislative actions as the Department finds to be necessary to accomplish the purposes of this chapter.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

(f) Identification of measures to protect and increase the production of other anadromous fisheries consistent with policies set forth in Section 6902.

(g) Identification of alternatives to, or mitigation of, manmade factors which cause the loss of juvenile and adult fish in California's stream systems.

6923. Measures which are the responsibility of other agencies or persons, such as the repair or replacement of dysfunctional fish screens, are not eligible for funding under the program.

6924. The Department shall determine the initial elements of the program and transmit a report describing those elements to the Legislature and the Advisory Committee on Salmon and Steelhead Trout within six months of the effective date of this chapter.

SEC. 3. The Department of Fish and Game shall determine the initial elements of the salmon, steelhead trout, and anadromous fisheries program initiated pursuant to Chapter 8 (commencing with Section 6900) of Part 1 of Division 6 of the Fish and Game Code, shall coordinate existing programs, and shall implement the elements of the program. In addition to the personnel positions authorized in the Budget Act of 1988, the Department shall use moneys allocated to the salmon, steelhead trout, and anadromous fisheries program, upon appropriation by the legislature, to provide three additional personnel years for the purposes of maintaining a salmon, steelhead trout, and anadromous fisheries program. The Department shall annually submit a budget for the purpose of continuing this program.

SEC. 4. The sum of one hundred twenty-five thousand dollars (\$125,000) is hereby appropriated from the Environmental License Plate Fund, and the sum of one hundred sixty-six thousand dollars (\$166,000) is hereby appropriated from the Fish and Game Preservation Fund to the Department of Fish and Game to establish the salmon, steelhead trout, and anadromous fisheries program pursuant to Chapter 8 (commencing with Section 6900) of Part 1 of Division 6 of the Fish and Game Code. The Department may also utilize its allocation of funds received pursuant to Chapter 10B (commencing with Section 777) of Title 16 of the United States Code for this program.

SEC. 5. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

The decline of naturally spawning salmon, steelhead trout, and other anadromous fish resources is occurring at such a rate that some segment of these native California fish may be threatened with extinction. In order to stop the decline and restore the fishery resource at the earliest possible time, it is necessary that this act take effect immediately.

---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## APPENDIX B.

### COOPERATIVE FISH PRODUCTION IN CALIFORNIA

Artificial fish production is accomplished through three separate administrative processes:

- State or Federal hatcheries operated for mitigation of water project damages or for fisheries enhancement.
- Aquaculture contracts for production of mitigation or fisheries enhancement fish for public harvest. Some fish such as striped bass are reared for mitigation purposes by registered aquaculturists; refer to IFD Informational Leaflet No. 34 for the laws and regulation on aquaculture.
- Cooperative fish rearing operations for production of fish to accelerate fisheries restoration or to enhance fisheries.

Each of these options for fish production can play an important role in the management and restoration of California's fisheries resources. In addition to maintaining State hatcheries, the Department of Fish and Game (DFG) strongly advocates involvement by the public sector where it is economically and operationally advantageous to the fisheries. The policies and State laws pertaining to cooperative fish rearing which permit, contract, or grant rearing of public domain fish for return to the public domain are aimed at maintenance of a strong and beneficial public involvement in fish rearing. Aquaculture is regulated under a special set of laws and regulations which permit the sale of the fish produced.

### SPECIAL PURPOSE FACILITIES

A wide variety of facilities and strategies are used by DFG and its cooperators to fulfill the needs for artificial production of fish for restoration and enhancement.

#### Rescue Rearing

Annually, Department personnel rescue fish stranded in inhospitable conditions due to poor water quality or lack of flow. The fish are collected and then relocated to suitable waters. Occasionally, it is preferable to place rescued fish in rearing facilities where the fish are grown to a larger size and released to the wild at the time of year most likely to result in their survival. Rearing facilities for rescued fish may be used to insure the survival of a run of fish, to reintroduce fish to suitable streams, or where natural rearing conditions have temporarily been too severely degraded to maintain wild populations.

#### Trapping Weirs

Trapping weirs are sometimes used to trap fish for tagging, marking, measuring, transporting, or obtaining eggs for fish rearing programs. These weirs are usually fish-proof fences installed across streams to direct fish into a containment device. All fish moving upstream or downstream can be stopped at the weir and can only pass when the weir and trap are deactivated

---

---

## **CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL**

---

---

or removed. Care must be taken to avoid harming fish during handling, and juvenile fish must be provided a hiding place in the trap to reduce predation by larger fish or by other species that have been captured.

Weirs used for counting or marking fish are sometimes kept in operation for days or even weeks to obtain the necessary number of fish to meet the purpose of the project. Fish not retained for project purposes are observed or marked and then released to continue on their way.

Weirs used for obtaining fish for relocation to another area or for obtaining eggs are normally installed for a short period of time or are periodically deactivated to allow the majority of the fish to pass unhindered. This allows the stream to retain its basic population of fish, and reduces the potential for adversely impacting production of the stream. A weir is not allowed in areas where it could cause harm to the fishery.

### **Ocean Net Pen Rearing**

Ocean net pen rearing operations are used to rear and acclimate chinook salmon fingerlings from freshwater to salt water conditions in a protected environment where the salmon can be imprinted to the nearby bay. Ocean net pen rearing is used mainly for ocean fishery enhancement.

Ocean net pen rearing operations require suitable water quality and temperature, water depth, and minimal tidal action in the harbor or bay. Usually a plastic liner is inserted into the net pen which is filled with filtered fresh water and oxygenated. Over a period of three to six days, sea water is gradually added until the liner contains full strength sea water. The liners are then removed, as the salmon are then acclimated to the sea water. The chinook salmon are usually reared from two weeks to four months for imprinting purposes. The longer term provides protection for the chinook salmon during poor summer ocean conditions, El Nino events, and predators. The fish are released at the rearing location when they have reached a targeted size.

### **Rearing Ponds or Other Facilities**

DFG cooperators typically produce salmon and steelhead juveniles by rearing fish in small artificial ponds. The rearing ponds require fry from an acceptable sources. Most frequently, to meet genetic stock selection requirements, the fry are from eggs taken from natal fish captured in local streams and the eggs are incubated in a hatch box, egg baskets, or in stacks of egg trays.

Rearing facilities require a reliable source of high quality water ranging in temperature from 45E to 59E Fahrenheit. All water intake structures must meet Department of Fish and Game fish proof screening and flow bypass criteria. These specifications are found within the Fish and Game Code Sections 5900 - 6100 et. seq. Required screen size is listed in a 1984 memo by Department of Fish and Game Engineers. This memo is available from the Department of Fish and Game, Environmental Services Division at DFG Regional offices.

Chinook salmon are typically reared until mid-May and are released as juveniles weighing no less than 90 fish to the pound. Coho salmon and steelhead trout require similar water conditions but should be reared for one full year. Coho salmon must be released in March, April, or May. Generally, survival for steelhead is greatest for large fish that count 2 or 3 to the pound

---

---

## **CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL**

---

---

when they are released as one-year-old fish during the winter months. Coho that are too large at time of release will frequently return to the spawning grounds the following fall as "grilse" which are only two years old. Grilse do not contribute to the commercial fishery and seldom contribute to the sport fishery. For that reason, it is better to release coho in March, April, or May at 6 to 12 fish to the pound so they will be more likely to spend two summers growing in the ocean. Some cooperators, with expressed permission from the Department, may release fish at smaller sizes into newly restored or underseeded areas. This allows the fish to "imprint" on the area for future returns. The fish generally will stay within the area until stream flows and temperatures trigger natural migration downstream to the ocean. Usually, only one species of fish is allowed to be released in one location to prevent inordinate levels of competition for food and habitat.

### **GENETIC CONSIDERATIONS**

Genetic considerations must be made in the selection of fish stocks for rearing or relocation programs. Live salmon and steelhead may not be taken from one stream or lake and put in a different stream without a specific permit from DFG. Generally, movement of fish will be allowed within all or part of a river system or drainage basin. This means that transportation of live fish is limited to areas that the genetic strain of fish could normally be expected to frequent on their own.

These limitations on the transportation and stocking of live fish into different rivers is to protect the general fish population. Fish from different waters could carry disease unique to their source stream. This could cause mortality among fish endemic to the receiving stream. Conversely, the transplanted stocks could lack immunity to diseases present in their new home. Introduced fish that are not genetically suited to their new home can also have long term effects on their new neighbors. If the fish interbreed, which would typically happen, then their offspring may inherit genetic traits that are not suited for survival in some part of their ocean or stream habitats. For example, stocks genetically suited to a short migration would be ill suited for locations far from the ocean. Some stocks are suited for late winter spawning; these would not do well in a location that only provided favorable spawning conditions in autumn. If some limited reproduction did occur, even with endemic stocks, their offspring would likely be poorly suited for survival.

Habitat conditions and genetic adaptations determine the long-term productivity and survival of salmon or steelhead stocks. Subtle differences in habitat, genetics, and endemic stocks must be carefully evaluated before stock transfer is carried out. Generally, relocation is restricted to intra-basin transfer, or to similar, nearby watersheds. Relocation of fish from the South Fork Eel River fall-run chinook population is confined to the South Fork Eel River and its tributaries, and to Warm Springs Hatchery on the Russian River where there are no native fall-run chinook to be impacted. Larger streams like the Sacramento River are restricted even further; fish from the lower Sacramento are used to stock the upper half of the river only in emergencies.

---

---

## **CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL**

---

---

### **GENERAL INFORMATION ABOUT PUBLICLY OPERATED FISH REARING PROGRAMS**

Contracts and permits that may be required:

- Before trapping or spawning any fish, all fish rearing projects must have a permit from the appropriate DFG Regional Manager.
- A National Marine Fisheries Service (NMFS) permit is required before handling any fish listed by the Federal Threatened and Endangered Species Act.
- Any lake or streambed alteration requires a written 1601-1603 agreement from the local Fish and Game Biologist or Warden.
- Certified Spawn Taker: A DFG training session must be attended by any individual actively participating in an artificial spawning (egg taking) project.
- A State Water Resources Control Board permit is required for appropriative water use.
- Water pumped from a stream requires a 1601-1603 agreement from the area Fish and Game Biologist or Warden.
- A Regional Water Quality Control Board waste discharge permit is required for any discharge.
- No payments will be made to a contractor without a fully executed contract, memorandum of understanding, or joint powers agreement. Payments will not be made for work completed before the approval date or after the closing date of the contract.
- No work will be started until all permits have been obtained, and copies mailed to the Contract Administrator. All cooperative rearing projects must conform to the California Environmental Quality Act.
- All publicly operated fish rearing facilities will be linked to restoration goals and objectives with an approved written project and management plan providing for evaluation and covering a period of five years, linked to an overall long-term watershed fishery restoration plan.

---

---

## **CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL**

---

---

### **Fish Culture Practices and Site Requirements**

- An adequate water supply, with a suitable emergency backup system, through the proposed period of operation must be demonstrated.
- Water temperatures between 42E and 56E Fahrenheit are required for egg incubation.
- Year round water temperatures between 45E and 59E Fahrenheit are required for rearing yearling or post-smolt salmonids.
- Water supplies must have a minimum of seven parts per million dissolved oxygen, and be free of harmful gasses and pollutants. A pH between 6.7 and 8.2 is desirable.
- Zinc, copper, lead, and cadmium are lethal to fish and eggs. Galvanized pipe may not be used for hatchery or incubator water supplies.
- Ultraviolet lighting, such as fluorescent lights, may not be used in spawning and incubation areas. UV light, especially sunlight, is detrimental to fish eggs. Incandescent lighting is recommended. Windows should be covered with black plastic to prevent sunlight from entering the room.
- Feeding must be started when swim-ups appear. The appropriate size starter mash for the species will be fed at least 10 times daily during this early feeding stage. Larger fish must also be fed daily though less often. DFG Fish Bulletin 164 should be consulted for feeding criteria in conjunction with the food chart provided by the feed supplier.
- Rearing ponds must be cleaned on a regular basis to prevent build-up of biomass and algae as a control for diseases. Biomass and algae contribute to the production of toxic gasses which is lethal to fish.
- The rearing and incubation facility must be secure from vandals and predators. The facility must be kept in a clean condition at all times.
- Frozen fish food must be kept at -10E Fahrenheit. No more than two daily feedings may be thawed at one time. No feed will be used after the lot expiration date.
- Fish screen sizes should be changed as fish grow. See DFG Fish Bulletin 164 for details.
- No treatment other than salt can be used without prior written permission from the DFG Pathology Section.



---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

- It is DFG policy that steelhead trout and coho salmon will be raised to yearlings before release. Chinook salmon will be raised to a minimum size of 90 fish to the pound.
- If a project does not receive the eggs or fish agreed upon in the regional permit, the contract funds will be reduced using criteria established by DFG.
- Cost effectiveness will be calculated for each project based upon fish and egg inventories and total dollars spent.

### SPECIFIC GUIDELINES FOR CREATION OF FIVE-YEAR FISH REARING PLAN

The following outline is a guide for the production of a five-year fish rearing plan, as required by State Fish and Game Commission Policy, for the operation of a cooperative fish rearing facility.

The purpose of the five-year fish rearing plan is to develop background information, goals, operational procedures, and monitoring plans for all existing and proposed cooperative fish rearing programs, regardless of funding sources. This plan will assist Department personnel to assess the environmental issues and suitability of existing and proposed programs. An update of the five-year management plan will be required when any major change occurs in hatchery operation, watershed condition, or new environmental issues are raised concerning the rearing facility and/or watershed. The plan is the responsibility of the project sponsors but should be developed with input from the DFG regional fishery biologist. The supervisor of the regional fisheries program will make the final decision concerning the acceptance of the management plan.

The acceptance of the five-year management plan does not guarantee five years of project operation, but it does indicate the Department's intention to provide the necessary trapping and rearing permits as long as the project adheres to the approved plan. The project sponsor is responsible for providing adequate project funding and obtaining all necessary permits.

#### **Program Summary**

**Project Name:**

**Organization:** (give name and address)

**Contact Person:** (give name, address and telephone)

**Program Goal:** (give purpose and objective(s) of program, including number of years of operation)

**General Rearing Plan:** (separate information for each species)

**Species of fish to be reared:**

**Number to be reared:**

**Size(s) at release:**

**Date(s) of release:**

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

**Release site(s):**

**Source of eggs or fry:**

**Project Funding:** (state how project will be funded)

**Supporting and Cooperating Organizations:** (give names and addresses and a contact person)

(start new page for remainder of information)

### Detailed Project Description

**Project Location:** (mark locations on map or indicate latitude and longitude of rearing, release and trapping sites, and describe physical and legal access; describe land ownership and land use agreement)

#### **Rearing Water Source:**

**Flow:** (for the rearing period give range of flows expected at water source, for both primary and emergency backup)

**Water rights:** (describe the status of the water right)

**Temperature:** (give range in temperature of water source during rearing period)

**Turbidity:** (describe seasonal levels of turbidity and settleable solids to be expected in water source)

**Dissolved oxygen:** (provide any available information on dissolved oxygen levels of water source(s))

**Other water quality factors:** (provide any available information on chemical makeup of water at source(s))

**Physical Facilities:** (fully describe rearing facilities including water delivery system, water treatment system, capacity of water delivery system, type and size of rearing tanks or ponds, pond effluent treatment facilities (must meet Regional Water Quality Control Board requirements), and water discharge system - include a full set of diagrams)

**Egg incubation facilities (if any):** (provide same information as required for "Rearing Facilities," including diagrams)

**Adult trapping and egg taking facilities (if any):** (fully describe adult trapping and egg taking facilities including type of trap, holding tanks and spawning area and equipment - including full set of diagrams)

#### **Plan of Operation:**

**Water system:** (fully describe capacity and operation of system including water collection and delivery (for both primary and backup), water treatment (including aeration and removal of sediment and any toxicants, and treatment of effluent))

**Rearing facilities:** (fully describe operation of facilities including number of eggs or fry needed, pond loading rates (number of fish per gallon), feeding methods and rates, type of food, removal of wastes, treatment of disease (note: DFG approval required for use of chemicals) and recovery of fish)

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

**Egg incubation facilities (if any):** (fully describe operation of facilities including incubator loading rates, treatment of disease and recovery of fry)

**Adult trapping and egg taking facilities (if any):** (fully describe operation of facilities including proposed trapping schedule, selection of broodstock, method of spawning and disposition of spawned and unspawned fish)

**Personnel:** (list persons expected to work on project and describe qualifications of each)

### **Project Justification**

**Species Status:** (Describe adult and juvenile fish population trends and status in affected stream and drainage; provide information on the affected stream's capacity for both juveniles and adults)

### **Project Effects:**

**Wild populations:** (fully describe expected positive and negative effects from project on established wild populations in the affected stream and drainage, including expected genetic effects)

**Other environmental effects:** (describe potential effects, positive and negative, on other hatchery operations, other resources and human uses in the affected area; attach a completed environmental checklist)

**Alternatives to Proposed Project:** (describe alternatives to the project and their positive and negative aspects - include a "No Project" alternative)

### **Project Evaluation**

**Project History:** (for established projects, provide annual records by species of adults spawned, eggs taken, number and size planted, affects on wild populations and contribution of the project's production to spawning runs and sport and commercial fisheries)

**Concurrent Evaluation:** (describe your plan for keeping project records on water temperature, fish mortality, growth, feed rates, fish tagging, fish trapping records, etc.)

**Long Term Evaluation:** (provide a plan for evaluating the long term effects of the cooperative rearing project by using techniques such as spawning surveys, migrant traps, tagging, etc.)

---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## FISH AND GAME CODE SECTIONS

### Article 1. General Provisions

**6400 - Fish placing without permission is unlawful.** It is unlawful to place, plant, or cause to be placed or planted, in any of the waters of this State, any live fish, any fresh or salt water animal, or any aquatic plant, whether taken without or within the State, without first submitting it for inspection to, and securing the written permission of the Department.

### Article 5. Private Nonprofit Hatcheries

**1170 - Permit.** The Commission may issue a permit, subject to such restrictions and regulations as the Commission deems desirable, to a nonprofit organization to construct and operate an anadromous fish hatchery.

**1171 - Financial capacity as prerequisite.** The Commission shall not issue a permit unless it determines the nonprofit organization has the financial capability to successfully construct and operate the hatchery and will diligently and properly conduct operation authorized under the permit.

**1172 - Grounds for denial of permit.** No permit will be issued which may tend to deplete the natural runs of anadromous fish, result in waste or deterioration of fish, or when proposed operation is located on a stream or river below a State or Federal fish hatchery or egg taking station.

**1173 - Hatchery or wild fish; status.** All fish handled under authority of this article during the time they are in the hatchery or in the wild are the property of the State and when in the wild may be taken under the authority of a sport or commercial fishing license as otherwise authorized for wild fish.

**1174 - Conditions.** Any permit granted by the Commission pursuant to this article shall contain all of the following conditions:

- (a) If after a hearing the Commission finds that the operation described in the permit and conducted pursuant to this article is not in the best public interest, the commission may alter the conditions of the permit to mitigate the adverse effects, or may cause an orderly termination of the operation under the permit. An orderly termination shall not exceed a three-year period and shall culminate in the revocation of the permit in its entirety.
- (b) If the Commission finds that the operation has caused deterioration of the natural run of anadromous fish in the waters covered by the permit, it may require the permittee to return the fishery to the same conditions as was prior to issuance of the permit. If the permittee fails to take appropriate action, the Commission may direct the Department to take the action, and the permittee shall bear any cost incurred by the Department.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

- (c) Prior to release into State waters and at any other time deemed necessary by the Department, the fish may be examined by the Department to determine that they are not diseased or infected with any disease which, in the opinion of the Department, may be detrimental to the State fishery resources. (amended by Stats 1986 ch. 1244)

**1175 - Operation responsibility.** The State shall assume no responsibility for the operation of a hatchery pursuant to this article and shall not be in any manner liable for its operation. (added by Stats 1970 ch. 862)

**Note:** Section 2 of Chapter 862 provides: Any permit issued under this act shall be on an experimental basis until its impact on the fishery resource can be ascertained and, therefore, this act shall be applicable only to the waters of Rowdy Creek, contained within Del Norte County.

**2081 - Endangered species; exceptions.** Through permits or memorandums of understanding, DFG may authorize individuals, public agencies, universities, zoologic gardens, and scientific or educational institutions, to import, export, take, or possess any endangered species, threatened species, or candidate species for scientific, educational, or management purposes.

**6901 - Legislative findings.** The Legislature, for purposes of this chapter (Chapter 8. Salmon, Steelhead Trout, and Anadromous Fisheries Program Act), finds as follows:

- (e) Proper salmon and steelhead trout resource management requires maintaining adequate levels of natural, as compared to hatchery, spawning and rearing.
- (f) Reliance upon hatchery production of salmon and steelhead trout in California is at or near the maximum percentage that it should occupy in the mix of natural and artificial production in the state. Hatchery production may be an appropriate means of protecting and increasing salmon and steelhead in specific situations; however, when both are feasible alternatives, preference shall be given to natural production.
- (g) The protection of, and increase in, the naturally spawning salmon and steelhead trout of the State must be accomplished primarily through the improvement of stream habitat.

### **ARTICLE 6. Cooperative Salmon and Steelhead Rearing Facilities**

**1200 - Rearing facilities; agreements.** The Department is authorized to enter into agreements with counties, nonprofit groups, private persons, individually or in combination, for the management and operation of rearing facilities for salmon and steelhead. All such agreements shall be in accordance with the policies of the Commission and the criteria of the Department which govern the operation under such agreements.

The purpose for operating such facilities shall be to provide additional fishing resources and to augment the natural runs.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

**1201 - Financial ability; demonstration.** An applicant who wishes to enter into an agreement to operate a rearing facility shall demonstrate, to the satisfaction of the Department prior to executing such agreement, such applicant's financial ability to properly operate the rearing facility. The Department shall develop and specify the means for an applicant to make such a demonstration.

**1203 - Fish release in accordance with policy.** The release of fish reared in facilities pursuant to this article shall be made in accordance with the policy of the Commission.

**1204 - Funding.** The Department shall fund the agreements provided for in Section 1200 only on a matching basis with the person or entities who enter into such agreements. Funds appropriated for the purposes of this article shall not be used to purchase equipment or for construction.

The Department shall be reimbursed from funds appropriate for the purposes of this article for administrative costs, legal costs, and supervisorial costs relating to the execution and supervision of such agreements by the Department.

**1205 - Department responsibilities as to fish size, etc. according to agreement.** The Department shall, subject to the limitations of appropriate egg sources and funding, make available fish of appropriate size and species to persons or entities who enter into agreements pursuant to this article.

**1206 - Salmon, etc. release at point of conception.** Salmon and steelhead raised pursuant to this article shall be released in streams, rivers, or waters north of Point Conception and upon release shall have unimpeded access to the sea.

**15900 - Private stocking of anadromous fish (ocean ranching).** A registered aquaculturist may be granted a permit by the commission, under any terms and conditions that the commission may prescribe, to release and capture anadromous fish in state waters which have been reared in an aquaculture facility. (*Effective only until 1/1/2001.*) Regulations covering this activity are contained in Section 15901 - 15908 of the Code, and Section 238.5 of Title 14.

### TITLE 14 OF THE CALIFORNIA ADMINISTRATIVE CODE

#### **238.5 - Stocking of Aquaculture Products**

No person shall stock aquaculture products in this state except in accordance with the following general terms and conditions:

- (h) Except for those specific areas and waters covered in Section 238.5 (c)(1) and all authorized species not listed in Section 238.5(c), no person shall stock aquatic plants and animals except as follows:
  - 1) Each stocking of fish shall require a separate Private Stocking Permit (FG 749) issued by the department. A copy of this permit shall accompany all shipments. However, with the exception of Inyo and Mono counties, a copy of the same permit

---

---

## **CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL**

---

---

(FG 749) may be used for additional consignments of the same species when stocked in the same water, until canceled by the Department.

- 2) Application for the private stocking permit shall be made to the regional manager of the DFG Region in which the fish are to be stocked. An application will be supplied to each applicant upon request.
- 3) No person shall stock any species of fish in any water in which the stocking of such fish is contrary to the fisheries management programs of the Department for that water or drainage, or in any water from which such fish might escape to other waters where such fish are not already present. All applicants will be advised upon request of the said departmental fisheries management programs.
- 4) Permittee shall notify the regional office of the department not less than 10 days in advance of stocking in order to make arrangements for inspection. Such inspection may be waived at the discretion of the Department. If, upon inspection, diseased or parasitized fish or fish of unauthorized species are found by the Department to be present, they shall be disposed of by the permittee as directed by the Department. The Department may require that the expense of any inspection made necessary by the provisions of these regulations be borne by the permittee.

### **FISH AND GAME COMMISSION POLICY**

#### **COOPERATIVELY OPERATED REARING PROGRAMS FOR SALMON AND STEELHEAD**

- I. The State's salmon and steelhead resources may be used to support cooperative rearing programs. Rearing programs may be of two types: (1) those that grow fish for use in accelerating the restoration/rehabilitation of depleted wild populations in underseeded habitat and (2) those that are dedicated solely to growing fish for harvest. The following constraints apply to both types:
  - A. Only those fish surplus to the needs of the Department's programs shall be utilized for such programs and allocation shall be based on past performance and the Department's evaluation of the potential of proposed new programs.
  - B. The suitability and acceptance or rejection of proposed programs shall be determined by the Department after reviewing a written proposal. A written project and management plan providing for evaluation and covering a period of five years must be evaluated and approved by the Department. Prior to reauthorization the Department must determine that the project is in compliance with the approved plan and continuance of the program is in the best interest of the State's fishery resources.
  - C. Routine care and food costs shall be the financial responsibility of the sponsoring entity. The Department shall provide technical advice and special assistance as appropriate.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

- D. Fish raised in these programs shall not be stocked in, or broodstock captured from, waters where the Department has determined that adverse effects to native fish populations or other aquatic species may result.
- II. The bulk of the state's salmon and steelhead resources shall be produced naturally. The State's goals of maintaining and increasing natural production take precedence over the goals of cooperatively operated rearing programs.

### SALMON

It is the policy of the Fish and Game Commission that:

- I. Salmon shall be managed to protect, restore and maintain the populations and genetic integrity of all identifiable stocks. Naturally spawned salmon shall provide the foundation for the Department's management program.
- II. Salmon streams shall be inventoried for quantity and quality of habitat, including instream flow requirements. Restoration plans shall identify habitats for restoration and acquisition and opportunities to protect or guarantee future instream flows. Commercial Salmon Trollers Stamp and other funding shall be directed to implement the plans.
- III. Existing salmon habitat shall not be diminished further without offsetting the impacts of the lost habitat. All available steps shall be taken to prevent loss of habitat, and the Department shall oppose any development or project which will result in irreplaceable loss of fish. Artificial production shall not be considered as appropriate mitigation for loss of wild fish or their habitat.
- IV. Salmon shall be rescued only when they will be returned to the stream system of origin. Rescue of juvenile salmon shall be limited to circumstances where fish can be held until habitat conditions improve, or where immediate release can be made in understocked areas of their natal stream system.
- V. In coastal streams without Department hatcheries, artificial rearing shall be limited to areas where the Department determines it would be beneficial to supplement natural production to re-establish or enhance the depleted wild population. In the Sacramento, American, Feather, San Joaquin, Klamath, and Trinity river systems, hatchery production shall be used to meet established mitigation goals. At the discretion of the Department excess eggs and fish from State, Federal, or cooperative hatcheries may be used to provide additional fish for the commercial and sport fisheries.
- VI. Resident fish will not be planted or resident fisheries developed in drainages of salmon waters, where, in the opinion of the Department, such planting or development will interfere with salmon populations. Exceptions to this policy may be authorized by the Commission (a) where the stream is no longer adaptable to anadromous runs, or (b) during the mid-summer period in those individual streams considered on a water-by-



---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

water basis where there is a high demand for angling recreation and such planting or development has been determined by the Department not to be detrimental to salmon.

### STEELHEAD RAINBOW TROUT

It is the policy of the Fish and Game Commission that:

- I. Steelhead rainbow trout shall be managed to protect and maintain the populations and genetic integrity of all identifiable stocks. Naturally spawned steelhead shall provide the foundation of the Department's management program.
- II. Steelhead shall be rescued only when they will be returned to the stream system of origin. Rescue of juvenile steelhead shall be limited to circumstances where fish can be held until habitat conditions improve, or where immediate release can be made in understocked areas of their natal stream system.
- III. Restoration and acquisition plans shall be developed and implemented to safeguard such critical habitats such as estuaries, coastal lagoons, spawning and rearing areas, and to protect or guarantee future instream flows. All steelhead streams shall be inventoried for quantity and quality of habitat, including stream flow conditions. Steelhead Restoration Card and other funding shall be directed to implement the plans.
- IV. Existing steelhead trout habitat shall not be diminished further without offsetting mitigation of equal or greater long-term habitat benefits. All available steps shall be taken to prevent loss of habitat, and the Department shall oppose any development or project which will result in irreplaceable losses. Artificial production shall not be considered appropriate mitigation for loss of wild fish or their habitat.
- V. Sport fishing for sea-run steelhead shall be encouraged where the Department has determined that harvest will not harm existing wild populations. Harvest of juveniles shall only be permitted where such harvest does not impair adequate returns of adults for sport fishing and spawning. Special restrictions on the harvest of wild juvenile steelhead may be necessary when a fishery includes both wild and hatchery stocks.
- VI. Resident fish will not be planted or resident fisheries developed in drainages of steelhead waters, where, in the opinion of the Department, such planting or development will interfere with steelhead populations.
- VII. Exceptions to this policy may be made by the Commission (a) where the stream is no longer adaptable to anadromous runs, or (b) during the mid-summer period in those individual streams considered on a water-by-water basis where there is a high demand for angling recreation and such planting or development has been determined by the Department not to be detrimental to steelhead.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

The following waters are excepted.

Nacimiento River	San Luis Obispo County
North Fork Battle Creek	Shasta County, upstream from Manton
Cow Creek	Shasta County upstream from Fern Road and Ingot
Antelope Creek	Tehama County, upstream from Ponderosa Way
Deer Creek	Tehama County, upstream from upper Deer Creek Falls
American River	Sacramento County, only in Arden Pond

### TROUT

It is the policy of the Fish and Game Commission that:

- I. Natural reproduction and rearing of trout will be encouraged to the greatest extent possible by protecting and improving habitat and by affording protection from disease, predators and competing fish species.
- II. Populations of wild trout shall be sustained in suitable waters to provide a diversity of angling opportunities. In some waters it may be necessary to restrict angler harvest to the extent that such harvest has virtually no long-term effect on numbers and sizes of fish in the populations.
- III. Artificial propagation and rearing of trout is a major Department program, but will be utilized only when necessary to augment natural production. Stocking fingerling and sub-catchable-sized trout shall take priority over planting catchable-sized trout in the hatchery stocking program when the smaller fish will maintain satisfactory fishing.

Hatchery trout shall not be stocked in waters where they may compete or hybridize with trout which are threatened, endangered or species of special concern. Exceptions may be made for stocking waters which are not part of a species recovery program.

- IV. Catchable-sized trout shall be stocked only:
  - A. In lakes, reservoirs and streams where natural reproduction and growth are inadequate to maintain populations capable of supporting fishing; and
  - B. When it is reasonable to expect at least 50 percent by number or weight will be taken by anglers.

In stocking catchable-sized trout, lakes and larger streams shall have priority over smaller streams. Suitable waters with heavy fishing pressure compared to the size of planting allotments shall have priority. Trophy fish, weighing one pound or more may constitute up to 10 percent by weight of each load of catchables stocked, if they replace an equivalent poundage of catchables in the allotment for the water stocked.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

- V. Sub-catchable-sized trout may be stocked in lakes, reservoirs and streams where appropriate to augment trout populations in such waters, and to increase fishing opportunities and success. Fingerlings shall be stocked primarily in waters where reproduction is limiting and satisfactory angling can be supported with fingerling stocking, where the population has been destroyed, and in lakes where they will establish a new fishery or augment the existing fishery.
- VI. Water companies, utility districts and other public or private agencies in control of urban lakes shall be encouraged to finance put-and-take trout fishing in such waters when suitable for such purposes. The Department shall provide technical advice and otherwise assist in the development and maintenance of such programs.

### DEPARTMENT OF FISH AND GAME OPERATIONS MANUAL (POLICY)

#### **Section 5220 - Importation of trout and salmon eggs.**

Several serious fish diseases are known to be transmitted by eggs. The only treatment for some of these diseases is destruction of all infected fish. Because of the potential threat to broodstock, hatchery production, and wild fish, all trout and salmon or their eggs imported by the DFG from out-of-state will be sent to and retained at the Yountville Fish Facility until they have been certified disease-free by the Fish Disease Section. All importations of eggs must have prior written approval from the Division Chief.

Trout eggs exchanges or purchases for DFG hatcheries will be arranged by Inland Fisheries Division (IFD) subject to the following restrictions:

- a. Eggs may be imported only if the egg source has been tested by competent pathologists or hatchery biologists and are free of certain diseases. (See Section 5435, DFG Operations Manual);
- b. Eggs may not be purchased from so-called "egg brokers." These dealers obtain eggs from worldwide sources and it is impossible to maintain adequate checks on the condition of their eggs;
- c. Live salmon and trout and their eggs may not be imported into California from Idaho.

**Section 5225 - Transfer of fish or eggs.** Live fish and egg transfers between DFG facilities are considered during the January meeting of the Hatchery Operations Committee (HOC) (see Section 5210). All egg transfers within, or into, DFG hatchery system must be documented using form FG 701, "Records of Eggs Shipped and Received", transfers of eggs or fish into the system shall be coordinated by IFD with the approval of Pathology and the Division Chief.

Pathology approval (use Form FG 701A "Pathology Approval to Ship Eggs or Fish") shall be obtained at least 30 days prior to any proposed transfer of eggs or fish into the DFG hatchery system (see Fish Hatchery Operations Manual for more detail).

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

Trout and salmon eggs to be transferred within the DFG hatchery system which were not considered in the January fish production and allocation meeting of the HOC shall be coordinated by IFD and require Directorate approval.

Egg transfers may require special treatment by pathology to prevent disease transmittal. Special labeling/marketing of containers used for shipping may also be required.

**Section 5240 - Cooperative rearing programs.** The DFG may enter into agreements with counties, non-profit groups or private persons for management and operation of rearing facilities for salmon and steelhead (Fish and Game Code Sections 1200-1206). The Fish and Game Commission (FGC) policy supports the program, with restraints on its size and goals.

**Section 5330 - Fingerling trout.** Fingerling trout shall be utilized primarily to stock naturally barren waters, waters where the population has been destroyed, waters that have inadequate recruitment and lakes where fingerlings will provide an adequate fishery.

Fingerling trout shall be stocked pursuant to the approved annual regional trout allotments. Addition of any new water to the fingerling trout stocking program requires prior approval from the Division Chief.

Trout fingerlings surplus to existing allotments may be stocked in waters within reasonable distances from hatcheries where transportation costs are minimal, provided the waters have been previously planted. This is preferable to destroying such surplus fish.

**Section 5335 - Sub-catchable trout.** Sub-catchable trout shall be planted in waters with a potential for their growth. Sub-catchable trout shall be given priority over catchable trout when they can support all or a part of the fishery, and when expected costs of putting fish in the creek are less than that expected from catchable fish.

Sub-catchable trout shall be stocked pursuant to the approved annual regional trout allotments. Addition of any new water to the sub-catchable trout stocking program requires prior approval from the Division Chief.

**Section 5340 - Catchable trout.** Catchable trout shall be stocked only in heavily fished roadside lakes and streams where natural reproduction is inadequate to provide satisfactory fisheries. Exception may be made for special waters with approval of the Division Chief.

Waters shall not be stocked with catchable trout unless it is reasonable to expect that 50 percent or more of the stocked fish, by number or weight, will be taken by anglers.

Catchable trout shall be stocked pursuant to the approved annual regional trout allotments.

Addition of any new water to the catchable trout stocking program requires approval from the Division Chief.

**Section 5355 - Temperature and flow criteria for catchable trout.** Catchable trout shall not be stocked in streams when water temperatures reach 75<sup>E</sup> Fahrenheit and it appears that such

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

temperatures will continue to occur regularly or when stream flows drop below 10 cubic feet per second (cfs). The exception is that suitable streams with flows between 2 and 10 cfs may be planted if water temperatures do not exceed 70<sup>E</sup> Fahrenheit and other conditions are satisfactory. Stocking shall be discontinued if conditions are unsuitable because of shallow water, lack of pools, growth of algae, poor water quality, or other reasons.

Catchable trout shall not be stocked in lakes or reservoirs after surface water temperatures reach 78<sup>E</sup> Fahrenheit and it appears that such temperatures will continue to occur regularly, nor after a trout die-off is attributed in whole or in part to an oxygen deficiency. Stocking shall be discontinued if algae blooms, aquatic weed growth, high turbidity, high alkalinity, or other conditions render the lake unsuitable for catchable trout or for fishing.

Catchable trout shall not be stocked in lakes or reservoirs until water temperatures reach 42<sup>E</sup> Fahrenheit or higher most afternoons, or in streams until water temperatures reach 45<sup>E</sup> Fahrenheit or higher most afternoons.

Catchable trout stocking may be suspended in reservoirs during periods of spill in order to avoid losses of planted fish to downstream areas where trout may not be readily available to anglers.

**Section 5360 - Native anadromous salmon and trout in inland waters.** Anadromous salmon or trout from sources within the state may not be stocked in inland waters without prior approval of the Deputy Director for Fisheries. This stocking may be done only if the fish are surplus to the needs of the regular stocking program.

**Section 5365 - Native anadromous salmon and trout in anadromous waters.** Serious problems occur in several drainages in California. To prevent the spread of these diseases, restrictions on movement of fish between drainages are necessary. It is also important to protect the genetic integrity of fish in several drainages that have been relatively unaffected by past stockings.

A policy is now being developed to address these problems. In the meantime, all movement of fish between drainages must have prior written approval of the Division Chief.

**Section 5370 - Time and size of planting anadromous salmon and trout.** Causal relationships have been established between survival and size of fish at release and the timing of release. Following are guidelines to be used in size of release and timing of release for chinook salmon, coho salmon, and steelhead trout from DFG hatcheries and cooperative rearing facilities.

- a. **Chinook salmon.** Chinook salmon will normally be held until they reach at least 90/lb. Central Valley fall-run chinook stocks usually attain this size about May 1. Exceptions must be approved by the Division Chief.

Chinook salmon reared to yearlings normally reach a size of 8 to 12/lb. in October and should be released before November 1st.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

- b. **Coho salmon and steelhead trout.** Coho salmon should range from 10 to 20/lb. and steelhead trout should be at least 10/lb. at the time of release. The time period for release of coho salmon and steelhead trout is only between March 15 and May 1 except with approval of the Division Chief.

**Section 5430 - Private stocking of anadromous fish.** Under authority of Section 15900 of the Fish and Game Code, the Fish and Game Commission may grant a permit to a registered aquaculturist to rear and stock anadromous fish in State waters (ocean ranching). Regulations covering this activity are contained in Section 15901-15908 of the code, and Section 235.2 of Title 14.

Permits are issued by Wildlife Protection Division after approval is given by the FGC. All stocking of fish under this permit must have advance approval of the DFG.

---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## APPENDIX C.

### HYDROLOGIC BASIN PLANNING MAPS

Hydrologic unit boundaries are displayed on a series of 12 hydrologic basin maps for California at a scale of 1 to 500,000. Each map is based upon a Hydrologic Basin Planning Area. These maps may be used for: geocoding water-related data for computer storage and retrieval, such as sampling stations, sewage treatment facilities, industrial dischargers, stream flows, and water quality and aquatic tissue monitoring data; water quantity/quality problem (pollution) identification and control; and coordinating water resource planning. The 12 hydrologic basins are:

North Coast (NC)	Tulare Lake (TL)
San Francisco Bay (SF)	North Lahontan (NL)
Central Coast (CC)	South Lahontan (SL)
Los Angeles (LA)	Colorado River (CR)
Sacramento (SB)	Santa Ana (SA)
San Joaquin (SJ)	San Diego (SD)

These basins are surface water drainage areas, with some minor adjustments and follow Regional Board boundaries and the previously defined DWR hydrologic study areas.

State Board and DWR hydrologic boundaries are now congruent at all four levels (basin, unit, area, and subarea) of the hierarchy. The numbering systems for the areas are different, but the names and areas are identical. The state hydrologic boundaries are correlated with, and allow use of, a number of State Board, Regional Board, and other State agencies' mapping systems and/or associated databases. The State Board and DWR have agreed to use different numbering (coding) systems for the hydrologic hierarchy, but the two coding systems are related and have been documented in a reference computer file.

The numbering system used in the USGS hydrologic hierarchy is different than the State systems, but has been referenced to the State numbering systems in the same computer file noted above. This correlation between coding systems allows an interchange among mapping databases at the State and Federal level.

To obtain copies of the hydrologic basin planning area maps:

Chief, Surveillance and Monitoring Unit  
Division of Water Quality  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, California 95801

---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## APPENDIX D.

### AERIAL PHOTO SOURCES

One of the best initial contacts for researching aerial photography and related information is the Earth Science Information Center (ESIC), operated by the U.S. Geologic Survey (USGS). For example, ESIC's Aerial Photography Summary Record System identifies over 130 California sources of aerial photography, public and private. In addition to the California office in Menlo Park, ESIC also maintains liaisons with the State Agencies listed below.

Another good source is the aerial photo "clearing house" for the U.S. Department of Agriculture (USDA) and the Agriculture Stabilization and Conservation Service (ASCS). The ASCS can provide photo indexes and hard copies of current and historical aerial photography, as well as information on in-progress and planned aerial photo missions by the federal agencies. Allow four to six weeks for delivery. Private sources have quicker turn-around times (some offer overnight service), but prices for typical products (9 x 9 contact prints or simple enlargements) are substantially higher than federal and state sources.

#### FEDERAL ESIC

USGS  
Earth Science Information Center  
345 Middlefield Rd.  
MS 532  
Menlo Park, CA 94025  
(415) 329-4309

NASA Ames Research Center  
Aircraft Data Facility  
MS 240-12; Bldg 240, Room 219  
Moffet Field, CA 94035-1000  
(415) 604-6252

#### OTHER FEDERAL AGENCIES

U.S. Department of Agriculture  
Agricultural Stabilization &  
Conservation Service  
Aerial Photography Field Office  
P.O. Box 30010  
Salt Lake City, UT 84130  
(801) 975-3503

U.S. Forest Service  
Region 5 Office  
630 Sansome Street  
San Francisco, CA 94111  
(415) 705-2836

U.S. Department of Interior  
Bureau of Reclamation  
Mid-Pacific Region  
2800 Cottage Way, Room W1324  
Sacramento, CA 95825  
(916) 978-5010

U.S. Environmental Protection Agency  
Environmental Sciences Division  
Landscape Ecology Branch  
P.O. Box 93478  
Las Vegas, NV 89193-3478  
(702) 798-2100



---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

U.S. Army Corps of Engineers  
Regulatory Functions Branch  
333 Market St. 8th Floor  
San Francisco, CA 94105  
(415) 977-8462

U.S. Army Corps of Engineers  
Survey Branch, Sacramento District  
1325 J St  
Sacramento, CA 95814-2922  
(916) 557-7158

U.S. Department of Interior  
Bureau of Indian Affairs  
Sacramento Office, Br. Of Land Operations  
2800 Cottage Way, Room W2550  
Sacramento, CA 95825  
(916) 979-2600

U.S. Geological Survey  
EROS Data Center  
Sioux Falls, SD 57148  
(605) 594-6151

U.S. Army Corps of Engineers  
Survey Branch, Los Angeles District  
645 Durfee Ave  
El Monte, CA 91733  
(818) 401-4009

U.S. Geological Survey  
Western Mapping Center  
345 Middlefield Rd  
Menlo Park, CA 94025  
(650) 853-8300

### STATE ESIC AGENCIES

### OTHER STATE AGENCIES

California Department of Conservation  
Division of Mines and Geology  
Information Office  
801 K Street, MS 12-30  
Sacramento, CA 95814-3532  
(916) 445-1825

CALTRANS  
Division of Highways, Photogrammetry Br.  
1120 N St., MS 35  
Sacramento, CA 95814  
(916) 227-7680

Library, Map Collection  
San Diego State University  
San Diego, CA 92182-0511  
(619) 594-5832  
(916) 653-4881  
Map and Imagery Laboratory  
Davidson Library University of California Santa Barbara  
Santa Barbara, CA 93106  
(805) 893-2779

CA Department of Water Resources  
1416 9th St.  
P.O. Box 942836  
Sacramento, CA 94236-9257

### COUNTY AGENCIES

County assessors, planners, and public works departments often have historical aerial and other photography used for timber tax assessment or early land surveys.

---

---

## CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

### PRIVATE FIRMS

A selection of firms serving California and other western states is provided below. Additionally, ESIC=s Aerial Photography Summary Record System for address and phone numbers of all organizations which contribute photo archive information.

Richard B. Davis Company  
140 Rowdy Creek Rd  
Smith River, CA 95567  
(707) 487-6277

PDS  
1090 Bailey Hill Rd. Suite E  
Eugene, OR 97402  
(541) 343-8877

Pacific Aerial Surveys  
8407 Edgewater Dr  
Oakland, CA 94621-1403  
(510) 632-2020

Aerial Data Systems  
990 Klamath Lane, Suite 18  
Yuba City, CA 95993-8962  
(530) 673-1430

WAC Corporation  
520 Conger Street  
Eugene, OR 97402  
(800) 845-8088  
(541) 342-5169

Aerial Photomapping Services  
2929 Larkin Ave.  
Clovis, CA 93612  
(209) 291-0147

Chase Jones  
1500 S. W. 12th Avenue  
Portland, OR 97201  
(503) 228-9844

I. K. Curtis Services, Inc.  
2901 Empire Avenue  
Burbank, CA 91504  
(818) 842-5127

---

---

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

---

---

## APPENDIX E.

### LIST OF CALIFORNIA FISH SPECIES

The California Department of Fish and Game uses the following standardized abbreviations for aquatic species found in California.

<u>Variety</u>	<u>Abbreviation</u>
Lamprey	LP
White sturgeon	WST
Green sturgeon	GST
American shad	AS
Threadfin shad	TFS
Freshwater smelt	FS
Delta smelt	DS
Mountain whitefish	WF
Salmon	
Pink salmon	PINK
Chum salmon	CHUM
Coho salmon	COHO
Chinook salmon	CHIN
Sockeye salmon	SOCK
Kokanee salmon	KOK
Trout	
Brown trout	BN
Cutthroat trout	CT
Coast cutthroat trout	CT-C
Lahontan cutthroat trout	CT-L
Paiute cutthroat trout	CT-P
Rainbow trout	RT
Steelhead rainbow trout	SH
Coleman stock	RT-C
Kamloops rainbow trout	RT-K
Junction Kamloops stock	RT-KJ
Hot Creek stock	RT-H
Mt. Shasta stock	RT-S
Mt. Whitney stock	RT-W
Pit River stock	RT-P
Eagle Lake trout	ELT

---

---

**CALIFORNIA SALMONID STREAM  
HABITAT RESTORATION MANUAL**

---

---

<u>Variety</u>	<u>Abbreviation</u>
Golden trout	GT
Little Kern golden stock	GT-LK
South Fork Kern golden trout	GT-SF
Chars	
Brook trout	EB
San Joaquin stock	EB-SJ
Lake trout	LT
Arctic grayling	AG
Suckers	SKR
Owens sucker	SKR-O
Lost River sucker	SKR-LR
Modoc sucker	SKR-MO
Western sucker	SKR-W
Mountain sucker	SKR-MT
Klamath smallscale sucker	SKR-KS
Klamath largescale sucker	SKR-KL
Santa Ana sucker	SKR-SA
Tahoe sucker	SKR-T
Shortnose sucker	SKR-SN
Humpback sucker	SKR-H
Minnows	
Common carp	CP
Grass carp	GC
Goldfish	GF
Golden shiner	GSH
Sacramento blackfish	BLK
Hardhead	HH
Hitch	HCH
Squawfish	SQ
Colorado squawfish	SQ-C
Sacramento squawfish	SQ-S
Lahotan redbreast	LRS
Roach	RCH
Tui chub	TC
Dace	DC
Red shiner	PRS
Fathead minnow	FHM

---

---

**CALIFORNIA SALMONID STREAM  
HABITAT RESTORATION MANUAL**

---

---

<u>Variety</u>	<u>Abbreviation</u>
Catfish	
Channel catfish	CCF
White catfish	WCF
Blue catfish	BCF
Flathead catfish	FCF
Brown bullhead	BB
Black bullhead	BLB
Yellow bullhead	YB
Mosquitofish	GAM
Molly	MOL
Inland silverside	IS
Striped bass	SB
White bass	WHB
Yellow perch	YP
Bigscale logperch	BLP
Sunfish	
Redeye bass	REB
Smallmouth bass	SMB
Spotted bass	SPB
Alabama spotted bass	SPB-A
Northern spotted bass	SPB-N
Largemouth bass	LMB
Northern largemouth bass	LMB-N
Florida largemouth bass	LMB-F
Warmouth	WB
Green sunfish	GSF
Pumpkinseed	PSD
Redear sunfish	RSF
Bluegill	BG
Northern bluegill	BG-N
Southeastern bluegill	BG-F
Sacramento perch	SP
White crappie	WCR
Black crappie	BCR
Northern Black crappie	BCR-N
Blacknose crappie	BCR-A
Florida black crappie	BCR-F

---

---

**CALIFORNIA SALMONID STREAM  
HABITAT RESTORATION MANUAL**

---

---

<u>Variety</u>	<u>Abbreviation</u>
Tule perch	TP
Sculpin	SCP
Stickleback	STB
Striped mullet	MUL
Yellowfin goby	YFG
Longjaw mudsucker	LJM
Tilapia	TIL
Redbelly tilapia	TIL-Z
Mozambique tilapia	TIL-M
<u>Tilapia hornorum</u>	TIL-H
Pupfish	PUP
Bairdiella	BAR
Sargo	SAR
Orangemouth corvina	ORC
Crayfish	CF
Signal crayfish	PL
Shasta crayfish	PF
Red swamp crayfish	PC
<u>Orconectes virilis</u>	OV
Freshwater prawn ( <u>Macrobrachium</u> )	MR
Asian clam ( <u>Corbicula</u> )	COR