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July 24, 2006

Ryan Broderick, Director
California Department of Fish and Game
1416 Ninth Street, 12th Floor
Sacramento, CA 95814

RE: Improving efficiency of California's fish hatchery system

Dear Director Broderick:

On behalf of the Pacific Rivers Council and Center for Biological Diversity, we are writing to express our concerns about the state's fish hatchery and stocking system and to recommend needed changes that will ensure that the system does not negatively impact California's native biological diversity. This letter is an update to our letter of August 31, 2005. With this letter, we are enclosing many of the scientific studies we relied on in developing this letter.

Fish hatcheries and the stocking of fish into lakes and streams cause numerous measurable, significant environmental effects on California ecosystems. Based on these impacts, numerous policy changes are needed to ensure that the Department of Fish and Game's ("DFG") operation of the state's hatchery and stocking program do not adversely affect California's environment. Further, as currently operated, the state's hatchery and stocking program do not comply with the California Environmental Quality Act, Administrative Procedures Act, California Endangered Species Act, and federal Endangered Species Act.

The impacts to California's environment, and needed policy changes to bring the state's hatchery and stocking program into compliance with applicable state and federal laws, are described below.

I. FISH STOCKING NEGATIVELY IMPACTS CALIFORNIA'S NATIVE SALMONIDS, INCLUDING THREATENED AND ENDANGERED SPECIES

Introduced salmonids negatively impact native salmonids in a variety of ways. Moyle, *et. al.* (1996) notes that "Introduction of non-native fish species has also been the single biggest factor associated with fish declines in the Sierra Nevada." Moyle also notes that introduced species are contributing to the decline of 18 species of native Sierra Nevada fish species, and are a major factor in the decline of eight of those species. Moyle adds that with the exception of two species, "the native trout of the Sierra Nevada have declined in the face of competition, predation, and hybridization from non-native trout."

Among the most important impacts of fish introduction on wild California fish species are:

- Hatchery-raised salmonids hybridize with native salmonids, thus weakening the genetic stock of native fish. Hatchery-raised salmonids are inferior to wild salmonids in a variety of ways, including demonstrating lower fitness, reduced ability to respond to environmental changes, and decreased breeding success than their wild counterparts. (*See* Fleming and Gross 1992; Ford 2002; Gale *et. al.* 2004; Green 1964; Horak 1972; Lynch and O' Hely 2001; Miller *et. al.* 1959; Miller *et. al.* 2004; McLean *et. al.* 2005;

  When introduced into water bodies that contain wild fish, hatchery-raised salmonids hybridize with wild salmonids, thus reducing the overall genetic fitness of the wild fish. The resulting hybrid is less adapted to its environment, less able to survive environmental changes, and more susceptible to disease, predation, and other environmental factors that genetically pure wild fish. (*See* Allendorf *et. al.* 2001; Allendorf *et. al.* 2004; Docker *et. al.* 2001; Hayes *et. al.* 1996; Hayes *et. al.* 2004; Hitt *et. al.* 2003; Krueger and May 1991; Levin and Williams 2002; Leary *et. al.* 2003; Lynch and O' Hely 2001; Meffe 2002; Wang and Ryman 2001; Witty and Cramer 2001).

- Introduced fish compete with native fish for food and holding, spawning and rearing habitat. This competition significantly impacts native fish populations (*See* Bohlin *et. al.* 2002; Clark and Rose 1997; Cunjak and Green 1984; Cunjak and Green 1986; De Staso and Rahel 1994; Dewald and Wilzbach 1992; Einum and Fleming 2001; Fausch and White 1981; Fausch and White 1986; Fausch 1988; Flick and Webster 1992; Garcia-Marin *et. al.* 1998; Glova 1986; Griffith 1988; Harvey and Nakamoto 1996; Hearn 1987; Herbold and Moyle 1986; Kruse 1998; Larson and Moore 1985; Lohr and West 1992; Magnan 1988; Magoulick 1994; Magoulick and Wilzbach 1998; Marchand and Boisclair 1998; McMichael *et. al.* 2000; Nagel 1991; Nakano *et. al.* 1998; Rodriguez 1995; Rose 1986; Ross 1991; Schroeter 1998; Strach and Bjornn 1989; Strange and Habera 1998; Taylor *et. al.* 1984; Thomas 1996; Waters 1983; Weiss and Schmutz 2003).

- Introduced fish can introduce diseases to wild salmonids. The spread of whirling disease is only one example of the potentially disastrous impacts of introducing hatchery-raised fish into the wild. Whirling disease was first found in a California hatchery in 1965 and has since spread to two state hatcheries and three private hatcheries. Dispersal of hatchery-raised fish is a major factor in the spread of the whirling disease parasite to at least 15 watersheds across the state. (*See* Modin 1998). While it has not yet severely impacted California wild trout populations, whirling disease has led to devastating results in other regions. Colorado faced a devastating outbreak that severely damaged biological resources. California hatcheries have already been forced to destroy over 165 million tons of hatchery-raised fish to prevent the disease from spreading.

  California hatcheries continue to be plagued with disease and Moyle and Morford (1991) suggest that diseases from hatchery-raised fish are probable causes of endangerment of coho salmon and summer steelhead.

Among the imperiled species in California that have been affected by fish stocking are:

- **Lahontan cutthroat trout**—The Lahontan cutthroat trout is a federally threatened species. The United States Fish and Wildlife Service recognizes the introduction of non-native fish species as a major impact to Lahontan cutthroat trout habitat and abundance. USFWS 1995.
- **Paiute cutthroat trout**—The Paiute cutthroat trout is a federally threatened species. Early introductions of rainbow trout and Lahontan cutthroat trout is a primary factor that led to the endangerment of the Paiute cutthroat trout. USFWS 2004.
- **Little Kern golden trout**—The Little Kern golden trout is a federally threatened species and the California state fish. Past introduction of rainbow trout into the Little Kern River system is a factor leading to the endangerment of the Little Kern golden trout. USFWS 1978.
- **Coho salmon**—Coho salmon are a state and federally threatened species. DFG's recovery plan for the California coho identifies impacts from hatchery-introduced salmonids, including introduction of disease and reduction, reduction of productivity, and lowering of genetic diversity, as factors leading to the endangerment of coho salmon in California. DFG 2004. Disease from hatchery fish may also be a factor in the coho salmon's decline. Moyle and Morford 1991.
- **Summer steelhead**—Moyle and Morford (1991) point to disease from hatchery fish as a probable cause of the catastrophic decline of summer steelhead in California.
- **Chinook salmon**—PWA (1994) describes numerous potential impacts to fall and spring run Chinook salmon in the South Fork Trinity watershed. These impacts include disease, reduced fitness, competition, and weakening of the genetic stock through hybridization. Low returns of wild salmon in the Klamath River have been attributed to increased stocking levels from the Iron Gate Hatchery. PFMC 1994.

II. FISH STOCKING NEGATIVELY IMPACTS CALIFORNIA'S NATIVE FAUNA, INCLUDING THREATENED AND ENDANGERED SPECIES

A. Direct effects of fish introduction on native fauna

Introduced fish impact native amphibians, invertebrates, and overall community dynamics, such as nutrient cycling and algal production (Bradford 1989, Knapp and Matthews 2000, Knapp et al. 2001, Matthews et al. 2001, Pilliod and Peterson 2001, Schindler et al. 2001, Kats et al. 2003, Knapp 2005, Welsh et al. 2006. Most recently, Welsh et al. (2006) found that Pacific treefrog (*Pseudacris regilla*) Cascades frog (*Rana cascadae*, and long-toed salamander (*Ambystoma macrodactylum*) were "strongly negatively correlated with trout presence" in three formerly fishless wilderness areas and concluded: "Our results are consistent with a compelling body of evidence that introduced fishes greatly alter the aquatic community structure of mountain lakes, ponds, and wet meadows."

Non-native trout prey upon amphibian tadpoles, leading to severe declines in populations. Non-native fish also limit amphibian dispersal, thus isolating remaining populations. The introduction of fish into historically fishless waters has led to severe declines in amphibian populations across the state.

Knapp (2005) found strong evidence that introduced trout have "profoundly altered the distribution of two of the four native aquatic-breeding amphibians and both of the widely distributed garter snake species" in Yosemite National Park. Fisher and Shaffer (1996) suggest that introduced predators (which include fish and bullfrogs) are the primary threat to amphibians in the Central Valley. Drost and Fellers (1996) implicate fish

stocking as a primary cause of the collapse of the regional frog fauna in Yosemite National Park. Jennings (1996) points to fish introduction as a primary factor in the decline of Sierra Nevada amphibians, 43% of which are extinct or threatened with extinction. Fish introductions are a significant factor leading to the endangerment of two federally protected species, the mountain yellow-legged frog, and California red-legged frog. Leyse documents the effects of fish introductions on an array of native amphibians.

Fish introduction has been specifically implicated in the decline of the following California species:

- **Mountain yellow-legged frog**. The southern California distinct population of Mountain yellow-legged frog is listed as endangered (Federal Register: July 2, 2002, Vol. 67, No. 127) and the U.S. Fish and Wildlife Service determined that the Sierra Nevada distinct population warranted protection as a threatened or endangered species, but that such protection is precluded by other listing actions (Federal Register: January 16, 2003, Vol. 68, No. 11). Introduction of non-native fish is documented to be a primary factor in the decline of this frog (*See* Bradford 1989; Bradford *et. al.* 1993; Bradford *et. al.* 1998; Drost and Fellers 1996; Jennings 1996; Knapp, *et. al.* 2005; Knapp *et. al.* 2001; Knapp and Matthews 2000; Knapp 1996).
- **California red-legged frog**. California red-legged frogs are listed as threatened under the federal Endangered Species Act. Introduced fish are negatively affecting California re-legged frogs throughout much of its range in California. (*See* Drost and Fellers 1996; Fisher and Shaffer 1996; Graber 1996; Kiesecker and Blaustein 1998).
- **Cascades frog**. Welsh et al. (2006) documented that Cascades Frogs were three times more likely to be found in lakes without fish than lakes with fish and Fellers and Drost (1993) noted a precipitous decline in Cascades frogs throughout the southern portion of its range, and cited the presence of non-native, predatory fish as a factor in this decline.
- **Long-toed salamanders.** Welsh et al. (2006) documented that Long-toed salamanders were 44 times more likely to be found in lakes without fish than lakes with fish and Fellers and Drost (1993) noted a decline in thie salamander.
- **Pacific treefrog**. (*See* Drost and Fellers 1996; Matthews *et. al.* 2001 Knapp 2005; Welsh et al. 2006).
- **Yosemite toad**. (*See* Drost and Fellers 1996).
- **Foothill yellow-legged frog**. (*See* Drost and Fellers 1996).
- **Arroyo Toad.** (See Federal Register, Vol. 59, No. 241, December 16, 1994: Determination of Endangered Status for the Arroyo Southwestern Toad).

B. Indirect effects of fish introduction on native fauna

Introduced trout can spread disease to native fauna, thus causing further impacts. Blaustein, *et. al.* (1994) found that pathogens, such as *Saprolegnia*, which are introduced by hatchery trout into native ecosystems may be an important factor in the demise of native amphibians. These findings were confirmed by Kiesecker, *et. al.* (2001), who notes that western toad populations have suffered mass-mortality due to disease outbreaks, which may be associated with *Saprolegnia* from introduced trout.

Matthews *et. al.* (2002) found that amphibian declines caused by trout introductions have diminished mountain garter snake populations within the Sierra Nevada. These findings were confirmed by Knapp (2005),

who found that by limiting the amphibian prey base of two species of Sierra Nevada garter snakes, trout introductions were negatively impacting these species.

III. CURRENT STOCKING IS IMPACTING NATIVE FISH AND AMPHIBIANS

DFG has never conducted an analysis to determine whether current stocking areas contain sensitive fish and amphibians and thus according to multiple public records act requests (PRA) have no idea to what extent current stocking is harming California's natural heritage. To begin to remedy this situation, we obtained a list of all waters stocked by DFG in 2005 through a PRA.

Current stocking of non-native fish is occurring in areas where sensitive fish and amphibians are occurring. Documents from DFG indicate 805 waters were stocked with fish in 2005. Data provided by DFG was limited, failing to provide any spatial coordinates for stocked waters.[1] To obtain spatial coordinates for the water bodies, we compared DFG's list with a coverage of all California water bodies and based on county and name of the water, we were able to identify 569 (71%) of the stocked waters. To identify waters where stocking was potentially impacting native fish and amphibians, we compared these waters with the distribution of species in the California Natural Diversity Database and identified 91 waters with records of rare and sensitive fish and amphibians either in or near (within 100 m) the water, including 40 species. Several of the species we identified as co-occurring with stocking are federally recognized as threatened or endangered, including Arroyo Toad, California Red-legged Frog, California Tiger Salamander, Chinook Salmon, Delta Smelt, Lahontan Cutthroat Trout, Lost River Sucker, Mountain Yellow-legged Frog, Santa Ana Sucker, Steelhead Trout, Unarmored Threespine Stickleback and Yosemite Toad. Many of the others are known species of concern, such as Foothill Yellow-legged Frog, Klamath Large-scale Sucker, Santa Ana Specled Dace and Sacramento Splittail (See Appendix 1). These data clearly indicate current stocking by DFG is impacting sensitive species over and above the catastrophic impacts of past-introductions of non-native fish from the stocking program.

IV. FISH STOCKING CAUSES SIGNIFICANT EFFECTS ON CALIFORNIA ECOSYSTEMS

Introducing new species into native ecosystems has important effects on aquatic ecosystems. Fish stocking has been shown to reduce or eliminate native zooplankton communities. (*See* Bradford *et. al.* 1994; Bradford *et. al.* 1998; Carpenter, *et. al.* 1985; Carpenter *et. al.* 1987; Goldman, *et. al.* 1979; Knapp 1996; Richards *et. al.* 1975; Stoddard 1987). At least one species, the phantom midge, may have been extirpated from the Sierra Nevada by introduced trout. (*See* Knapp 1996; Stoddard 1987). Introduced fish can also have negative effects on macroinvertebrates including mayflies, beetles, caddisflies, and other insects. (*See* Knapp 1996). These organisms are critical to maintaining healthy, functioning ecosystems and their removal negatively effects ecosystem processes and productivity. (See Brett *et. al.* 1994; Elser *et. al.* 1995; Knapp 1996).

Matthews *et. al.* (2002) found that introduced trout can have "serious effects" on predator populations with whom they compete for prey, and that "fish introductions are further disrupting the high-elevation ecosystems of the Sierra Nevada by also affecting amphibian predators."

[1] DFG also failed to specify what species of fish were stocked.

After surveying Sierra Nevada lakes, Bradford *et. al.* (1994) concluded that "the most profound human impacts on aquatic communities in the High Sierra appear to be related to historical and on-going stocking of exotic fish species into High Sierra waters."

V. FISH STOCKING HAS ADDITIONAL EFFECTS ON CALIFORNIA'S ENVIRONMENT

To reverse the negative impacts of stocking of non-native trout, DFG is increasingly forced to use piscicides, such as rotenone and antimycin. Although we support restoring populations of native trout and other species through trout removal, including use of piscicides where necessary, such action is not without impacts to the environment, resulting in at least short-term impacts to macro-invertebrate, amphibian and native fish populations, and is costly and not always effective to implement. .

VI. DFG'S OPERATION OF THE STATE'S HATCHERY AND FISH STOCKING PROGRAM DOES NOT COMPLY WITH THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) was established to ensure that actions by public agencies do not adversely effect California's environment. The provisions of CEQA apply to any discretionary actions carried out by public agencies unless those actions are specifically exempted from the law's provisions. P.R.C. §21080(a). For any actions that are not exempt, where there is "substantial evidence" that the action "*may* have a significant effect on the environment." P.R.C. §21080(d). Substantial evidence "includes fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact." P.R.C. §21080(e)(1).

Section 21084 of CEQA requires the development of "a list of classes of projects which have been determined not to have a significant effect on the environment." P.R.C. §21084(a). These classes are exempt from the provisions of CEQA. *Id*. The Secretary of Resources must find that the listed classes do not have a significant effect on the environment. *Id*. The Secretary of Resources must certify and adopt the guidelines every two years. P.R.C. §21083(f).

The guidelines for implementing CEQA ("CEQA guidelines") provide an exemption for the operation and repair of existing facilities. C.C.R. §15301. Fish stocking is identified as an example of such an activity. C.C.R. §15301(j).

However, the guidelines also make specific exceptions to the classes of activities that are exempt from CEQA. C.C.R. §15300.2. If an activity meets the criteria of the §15300.2 exceptions, that activity no longer qualifies for a CEQA exemption. Under section 15300.2, "All exemptions for these classes are inapplicable when the cumulative impact of successive projects of the same type in the same place, over time is significant." C.C.R. §15300.2(b). Further, "A categorical exemption shall not be used for an activity where there is *a reasonable possibility that the activity will have a significant effect on the environment* due to unusual circumstances." C.C.R. §15300.2(c) (emphasis added).

"Significant effects" have been defined by statute and case law. The CEQA guidelines defines a significant effect as a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and

objects of historic or aesthetic significance." C.C.R. §15382. *Mountain Lion Foundation v. Fish and Game Commission*, 16 Cal.4th 105 (1997); *Wildlife Alive v. Chickering*, 18 Cal.3d 190 (1976).
Projects that may negatively impact imperiled species are defined as having significant effects under the CEQA guidelines. C.C.R. §15065.

As described above, fish stocking has numerous effects on the California environment. Fish stocking has, and continues to effect, California's imperiled species of fish and wildlife. Fish stocking has cumulative effects on native fish and fauna. There are numerous instances where unusual circumstances, such as the presence of imperiled amphibians, native fish, or sensitive, formerly fishless ecosystems create a reasonable possibility that fish introduction will create significant impacts on the environment. And there are numerous, well-documented cases where fish introduction has already caused significant effects on California's environment.

Despite this overwhelming evidence, DFG has never complied with CEQA's requirements that public agencies analyze the effects of their actions, and mitigate any actions that may adversely effect California's environment. This failure places DFG's fish stocking program squarely in violation of CEQA.

VII. DFG'S OPERATION OF THE STATE'S HATCHERY AND FISH STOCKING PROGRAM VIOLATES OTHER STATE AND FEDERAL LAWS

A. The hatchery and fish stocking program violates the California Administrative Procedures Act

The California Administrative Procedures Act (APA) specifies that "No state agency shall issue utilize, enforce, or attempt to enforce any guideline, criterion, bulletin, manual, instruction, order, standard of general application, or other rule, which is a regulation…" that has not been adopted as a regulation and filed with the Secretary of State. C.G.C. §11340.5. The APA defines regulation as "every rule, regulation, order, or standard of general application or the amendment, supplement or revision of any rule, regulation, order, or standard adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it, or to govern its procedure." C.G.C. §11342.600.

Despite this clear prohibition, and despite the issuance of numerous policy directives and guidelines, DFG has not completed the required rulemaking to guide its fish hatchery and stocking program.

In 2003, DFG developed its Strategic Plan for Trout Management. This plan aims to "identify key issues relative to trout resources and fisheries, and to develop goals and strategies that will address these issues during the next 10 to 15 years." DFG 2003. The plan describes 32 strategies relating to DFG's fish stocking program. *Id*. The plan further recommends that DFG update its existing guidelines for the use of hatchery trout by fisheries managers. *Id*. Neither the strategic plan, nor the existing guidelines referenced by the plan have been legally adopted as a regulation, as required by the CAPA.

B. The hatchery and fish stocking program violates the California Endangered Species Act

Northern and central California coho salmon, and winter and spring run Chinook salmon are protected under the California Endangered Species Act (CESA). DFG 2005. The Joint Hatchery Review Committee

found that DFG anadromous hatcheries directly or incidentally take salmonids that are protected under both the federal and state endangered species acts. DFG/NFMS 2001. In addition, there is evidence that fish introduction is negatively affecting salamanders that are protected under the California Endangered Species Act.

C. The hatchery and fish stocking program violates the federal Endangered Species Act

The federal Endangered Species Act (ESA) prohibits "take" of any endangered species within the United States. 16 U.S.C. §1538(a)(1)(B). Under the ESA, "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. §1532(19). Section 4(d) of the ESA allows the Secretary of Interior to extend similar protections to threatened species. 16 U.S.C. §1533(d).

As described above, fish introduction has numerous, well-documented adverse effects on several of California's threatened and endangered species. Under the ESA, continued stocking in waters where such stocking has been shown to negatively impact protected species is considered a "take" of those species. Despite this, the DFG continues to stock fish into waters that contain, or may contain, protected species of fish and amphibians. Further, the DFG has not received an incidental take permit to carry out such activities. Thus DFG's hatchery and stocking program continues to "take" federally protected species.

The Joint Hatchery Review Committee, which includes DFG and the National Marine Fisheries Service, concluded in 2001 that "Most DFG anadromous hatcheries directly or incidentally "take" salmonids that are listed under the ESA." DFG/NMFS 2001. The review recommends that the DFG implement numerous policy changes and recommends interim guidelines until new hatchery management plans can be developed. It is not clear that DFG has either adopted the interim regulations or implemented the policies recommended by the report.

VIII. POLICY CHANGES ARE NEEDED TO BRING THE STATE HATCHERY AND FISH STOCKING PROGRAM INTO COMPLIANCE WITH STATE AND FEDERAL LAWS

As described above, DFG's operation of the state's hatchery and fish stocking program is causing significant effects to California's environment, and does not comply with state or federal environmental laws. In order to bring the program into compliance with these laws, and to minimize the effects on California's environment, we recommend that DFG immediate undertake the following actions and policy changes:

1. Complete an environmental impact report, as required by the California Environmental Quality Act, on the state's hatchery and fish stocking program. This document should describe the environmental affects of the program, detail possible policy options, and develop mitigation measures, as needed. The document should be completed as soon as possible.

2. Immediately cease all hatchery and stocking operations that negatively affect California's sensitive species, state-listed and federally recognized threatened or endangered species.

3. Place an immediate moratorium, pending the results of the CEQA analysis, on all hatchery and stocking operations that have been shown, or have the potential, to have significant effects on California's environment. These effects include impacts to native fauna, and ecosystems.

4. Immediately cease introducing fish into naturally fishless waters, wilderness areas, and other areas of high biological importance.

5. Immediately cease introducing fish into waters that contain valuable strains of native, wild fish.

IX. CONCLUSION

Historic and present fish introduction has contributed to the decline of many of California's native aquatic species – a downward trend that continues to this day. Despite the growing body of scientific literature on this topic, the Department continues to manage fish and wildlife resources without considering the broader ecosystem context in which that management takes place. Until the Department embraces a more holistic ecosystem management approach, conflict will continue. The Department is in the unique position to spearhead a new, ecosystem-based approach to fish and wildlife management; a good place to start is by reforming its fish hatchery and stocking practices for the benefits of California's native species, streams and rivers, and ecosystems.

Based on these important issues, we believe that the significant effects of California's fish hatchery and stocking program warrants serious consideration and revision.

If you have questions or comments, please do not hesitate to contact Paul Spitler or Debbie Sivas at (650)-725-8571, Noah Greenwald at (503)-484-7495. Thank you for your consideration.

Sincerely,

Deborah Sivas	Paul Spitler	Noah Greenwald
Director	Legal intern	Conservation Biologist

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APPENDIX 1: WATERS IDENTIFIED AS BEING STOCKED BY DFG IN 2005 WHERE THERE ARE RECORDS OF SENSITIVE SPECIES IN THE CALIFORNIA NATURAL DIVERSITY DATABASE

County	Water body	Scientific name	Common name
Alpine	Carson River East Fork	Oncorhynchus clarkii henshawi	Lahontan cutthroat trout
Butte	Butte Creek, Big	Oncorhynchus tshawytscha spring-run	spring-run chinook salmon
Contra Costa	San Joaquin River	Archoplites interruptus	Sacramento perch
Contra Costa	San Pablo Bay	Hypomesus transpacificus	Delta smelt
Contra Costa	San Pablo Bay	Hypomesus transpacificus	Delta smelt
El Dorado	American River Silver Fork	Rana boylii	foothill yellow-legged frog
El Dorado	American River Silver Fork	Rana muscosa	mountain yellow-legged frog
El Dorado	American River Silver Fork	Rana muscosa	mountain yellow-legged frog
El Dorado	American River Silver Fork	Rana muscosa	mountain yellow-legged frog
El Dorado	American River South Fork	Rana boylii	foothill yellow-legged frog
Fresno	Dinkey Creek	Bufo canorus	Yosemite toad
Inyo	Baker Creek	Rana muscosa	mountain yellow-legged frog
Inyo	Big Pine Creek	Bufo canorus	Yosemite toad
Inyo	Sheperds Creek	Hydromantes platycephalus	Mount Lyell salamander
Lake	Cache Creek	Rana boylii	foothill yellow-legged frog
Lake	Cache Creek	Rana boylii	foothill yellow-legged frog
Los Angeles	Big Tujunga Creek, Lower	Gila orcutti	arroyo chub
Los Angeles	Big Tujunga Creek, Lower	Rhinichthys osculus ssp. 3	Santa Ana speckled dace
Los Angeles	Big Tujunga Creek, Lower	Rhinichthys osculus ssp. 3	Santa Ana speckled dace
Los Angeles	Big Tujunga Creek, Lower	Catostomus santaanae	Santa Ana sucker
Los Angeles	Big Tujunga Creek, Upper	Bufo californicus	arroyo toad
Los Angeles	Bouquet Canyon Creek	Gasterosteus aculeatus williamsoni	unarmored threespine stickleback
Los Angeles	Bouquet Canyon Creek	Gasterosteus aculeatus williamsoni	unarmored threespine stickleback
Los Angeles	Bouquet Canyon Creek	Gasterosteus aculeatus williamsoni	unarmored threespine stickleback
Los Angeles	Piru Creek, Frenchmans Flat	Bufo californicus	arroyo toad
Los Angeles	Piru Creek, Frenchmans Flat	Bufo californicus	arroyo toad
Los Angeles	Piru Creek, Frenchmans Flat	Catostomus santaanae	Santa Ana sucker
Los Angeles	San Gabriel River West Fork	Gila orcutti	arroyo chub
Los Angeles	San Gabriel River West Fork	Gila orcutti	arroyo chub
Los Angeles	San Gabriel River West Fork	Rhinichthys osculus ssp. 3	Santa Ana speckled dace
Los Angeles	San Gabriel River West Fork	Catostomus santaanae	Santa Ana sucker
Madera	Willow Creek North Fork	Rana boylii	foothill yellow-legged frog
Marin	Walker Creek	Rana aurora draytonii	California red-legged frog
Marin	Walker Creek	Rana boylii	foothill yellow-legged frog
Marin	Walker Creek	Lavinia symmetricus ssp. 2	Tomales roach
Mariposa	Merced River, Section II	Rana boylii	foothill yellow-legged frog
Mariposa	Merced River, Section II	Hydromantes brunus	limestone salamander
Mariposa	Merced River, Section II	Hydromantes brunus	limestone salamander

Mariposa	Merced River, Section II	Hydromantes brunus	limestone salamander
Mariposa	Merced River, Section II	Hydromantes brunus	limestone salamander
Mariposa	Merced River, Section II	Hydromantes brunus	limestone salamander
Mendocino	Eel River	Oncorhynchus clarkii clarkii	coast cutthroat trout
Mendocino	Eel River	Rana boylii	foothill yellow-legged frog
Mendocino	Eel River	Rana boylii	foothill yellow-legged frog
Modoc	Pit River South Fork	Mylopharodon conocephalus	hardhead
Modoc	Pit River South Fork	Lavinia symmetricus mitrulus	Pit roach
Mono	Lee Vining Creek	Rana muscosa	mountain yellow-legged frog
Orange	Trabuco Creek	Gila orcutti	arroyo chub
Orange	Trabuco Creek	Gila orcutti	arroyo chub
Plumas	Feather River Middle Fork	Rana boylii	foothill yellow-legged frog
Plumas	Feather River Middle Fork	Rana boylii	foothill yellow-legged frog
Plumas	Spanish Creek	Rana boylii	foothill yellow-legged frog
Plumas	Spanish Creek	Rana muscosa	mountain yellow-legged frog
Riverside	Strawberry Creek	Ensatina klauberi	large-blotched salamander
Sacramento	Sacramento River	Pogonichthys macrolepidotus	Sacramento splittail
San Bernardino	Santa Ana River	Gila orcutti	arroyo chub
San Bernardino	Santa Ana River	Gila orcutti	arroyo chub
San Bernardino	Santa Ana River	Gila orcutti	arroyo chub
San Bernardino	Santa Ana River	Gila orcutti	arroyo chub
San Bernardino	Santa Ana River	Rhinichthys osculus ssp. 3	Santa Ana speckled dace
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Bernardino	Santa Ana River	Catostomus santaanae	Santa Ana sucker
San Joaquin	Mokelumne River	Pogonichthys macrolepidotus	Sacramento splittail
San Luis Obispo	Nacimiento River, Lower	Spea (=Scaphiopus) hammondii	western spadefoot
Santa Barbara	Santa Ynez River	Bufo californicus	arroyo toad
Santa Barbara	Santa Ynez River	Bufo californicus	arroyo toad
Santa	Santa Ynez River	Rana aurora draytonii	California red-legged frog

Santa Barbara	Santa Ynez River	Oncorhynchus mykiss irideus	southern steelhead - southern California esu
Santa Barbara	Santa Ynez River	Eucyclogobius newberryi	tidewater goby
Shasta	Burney Creek Lower	Mylopharodon conocephalus	hardhead
Shasta	Burney Creek Lower	Lavinia symmetricus mitrulus	Pit roach
Shasta	Burney Creek Lower	Cottus asperrimus	rough sculpin
Shasta	Clark Creek Lower	Mylopharodon conocephalus	hardhead
Shasta	Clark Creek Lower	Lavinia symmetricus mitrulus	Pit roach
Shasta	Clark Creek Lower	Cottus asperrimus	rough sculpin
Shasta	Clear Creek	Rana boylii	foothill yellow-legged frog
Shasta	Clear Creek	Rana boylii	foothill yellow-legged frog
Shasta	Sacramento River	Oncorhynchus tshawytscha winter run	chinook salmon winter run
Shasta	Sacramento River	Rana boylii	foothill yellow-legged frog
Shasta	Sacramento River	Rana boylii	foothill yellow-legged frog
Shasta	Sacramento River	Rana boylii	foothill yellow-legged frog
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Hydromantes shastae	Shasta salamander
Shasta	Sacramento River	Oncorhynchus tshawytscha spring-run	spring-run chinook salmon
Shasta	Sacramento River	Ascaphus truei	western tailed frog
Shasta	Sacramento River	Ascaphus truei	western tailed frog
Sierra	Yuba River North Fork	Rana boylii	foothill yellow-legged frog
Siskiyou	Butte Creek	Rana cascadae	cascades frog
Siskiyou	Klamath River	Oncorhynchus clarkii clarkii	coast cutthroat trout
Siskiyou	Klamath River	Plethodon elongatus	Del Norte salamander
Siskiyou	Klamath River	Plethodon elongatus	Del Norte salamander
Siskiyou	Klamath River	Plethodon elongatus	Del Norte salamander
Siskiyou	Klamath River	Plethodon elongatus	Del Norte salamander
Siskiyou	Klamath River	Rana boylii	foothill yellow-legged frog
Siskiyou	Klamath River	Catostomus snyderi	Klamath largescale sucker
Siskiyou	Klamath River	Catostomus snyderi	Klamath largescale sucker
Siskiyou	Klamath River	Deltistes luxatus	Lost River sucker
Siskiyou	Klamath River	Rana aurora aurora	northern red-legged frog
Siskiyou	Klamath River	Chasmistes brevirostris	shortnose sucker
Siskiyou	Klamath River	Plethodon stormi	Siskiyou Mountains salamander
Siskiyou	Klamath River	Rhyacotriton variegatus	southern torrent salamander
Siskiyou	Klamath River	Rhyacotriton variegatus	southern torrent salamander
Siskiyou	Klamath River	Rhyacotriton variegatus	southern torrent salamander
Siskiyou	Klamath River	Rhyacotriton variegatus	southern torrent salamander
Siskiyou	Klamath River	Oncorhynchus mykiss irideus	summer-run steelhead trout

Siskiyou	Klamath River	Oncorhynchus mykiss irideus	summer-run steelhead trout
Siskiyou	Klamath River	Ascaphus truei	western tailed frog
Siskiyou	Klamath River	Ascaphus truei	western tailed frog
Siskiyou	Sacramento River South Fork	Rana cascadae	cascades frog
Siskiyou	Sacramento River South Fork	Rana boylii	foothill yellow-legged frog
Siskiyou	Sacramento River South Fork	Rana boylii	foothill yellow-legged frog
Sonoma	Dry Creek	Rana boylii	foothill yellow-legged frog
Sonoma	Dry Creek	Rana boylii	foothill yellow-legged frog
Sonoma	Dry Creek	Rana boylii	foothill yellow-legged frog
Sonoma	Dry Creek	Hysterocarpus traski pomo	Russian River tule perch
Sonoma	Ward Creek	Rana boylii	foothill yellow-legged frog
Sonoma	Ward Creek	Rana boylii	foothill yellow-legged frog
Stanislaus	San Joaquin River	Pogonichthys macrolepidotus	Sacramento splittail
Stanislaus	Tuolumne River	Ambystoma californiense	California tiger salamander
Sutter	Feather River	Pogonichthys macrolepidotus	Sacramento splittail
Tehama	Battle Creek North Fork	Oncorhynchus tshawytscha spring-run	spring-run chinook salmon
Tehama	Battle Creek South Fork	Rana boylii	foothill yellow-legged frog
Tehama	Battle Creek South Fork	Rana boylii	foothill yellow-legged frog
Tehama	Battle Creek South Fork	Rana boylii	foothill yellow-legged frog
Tehama	Deer Creek	Rana boylii	foothill yellow-legged frog
Tehama	Deer Creek	Oncorhynchus tshawytscha spring-run	spring-run chinook salmon
Trinity	Trinity River	Rana boylii	foothill yellow-legged frog
Trinity	Trinity River	Oncorhynchus tshawytscha spring-run	spring-run chinook salmon
Trinity	Trinity River	Oncorhynchus tshawytscha spring-run	spring-run chinook salmon
Trinity	Trinity River	Oncorhynchus mykiss irideus	summer-run steelhead trout
Trinity	Trinity River	Oncorhynchus mykiss irideus	summer-run steelhead trout
Trinity	Trinity River	Ascaphus truei	western tailed frog
Tulare	Kern River South Fork	Rana muscosa	mountain yellow-legged frog
Tulare	Kern River South Fork	Oncorhynchus mykiss aguabonita	Volcano Creek golden trout
Tulare	Kern River South Fork	Oncorhynchus mykiss aguabonita	Volcano Creek golden trout
Tulare	Kern River South Fork	Oncorhynchus mykiss aguabonita	Volcano Creek golden trout
Tuolumne	Deadman Creek	Hydromantes platycephalus	Mount Lyell salamander
Tuolumne	Deadman Creek	Rana muscosa	mountain yellow-legged frog
Tuolumne	Stanislaus River South Fork	Rana boylii	foothill yellow-legged frog
Yolo	Sacramento River	Pogonichthys macrolepidotus	Sacramento splittail