

MANAGEMENT ALTERNATIVES CONSIDERED

Appendix A

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POTENTIAL MANAGEMENT ALTERNATIVES CONSIDERED BY THE SYRTAC

The Santa Ynez River Technical Advisory Committee (SYRTAC) identified a wide range of potential management alternatives to improve conditions for fishery resources, especially rainbow trout/steelhead. These were detailed in the report entitled, *Santa Ynez River Fisheries Management Alternatives*, which was prepared by the SYRTAC on March 11, 1998. Most alternatives focused on the mainstem Santa Ynez River and tributaries below Bradbury Dam, while some addressed actions above Bradbury Dam, mainly providing passage for steelhead to spawning and rearing habitat in the upper basin. The types of measures considered included physical enhancement of stream habitat, measures to manage or increase flows, removal of passage impediments, fish supplementation, fishing regulations in the lower river, and predator removal. Each of the 48 alternatives was described conceptually, along with the expected biological benefits and constraints to successful implementation.

Members of the SYRTAC screened and ranked each alternative. Screening criteria were applied to determine if an action was infeasible or faced clear obstacles to implementation, which eliminated two alternatives from further consideration. A three-tiered ranking process was used to evaluate the remaining alternatives. Of greatest importance was the biological benefits provided for fishery resources. The second ranking stage evaluated likelihood of success and cost variables, and the third ranking stage considered constraints such as access to land, requirements for operations and maintenance, institutional coordination and landowner permission for suggested actions on private land.

Twenty-six promising alternatives were identified in the screening and ranking process. Actions that would improve habitat conditions in the lower Santa Ynez basin for over-summering and juvenile rearing received the highest rankings for biological benefits, especially alternatives that increased flows in the mainstem below Bradbury Dam and in Hilton Creek. The most promising can be grouped into several categories:

1. flow-related measures to improve habitat in the mainstem below Bradbury Dam and Hilton Creek;
2. enhancement of physical habitat in the mainstem and tributaries below Bradbury Dam;
3. removal of passage impediments in the mainstem and tributaries below Bradbury Dam;
4. trap-and-truck measures to provide access to habitat above Lake Cachuma;
5. stock supplementation measures; and
6. reduction of direct mortality from anglers or predators in the lower basin.

All the original alternatives are presented in several tables for the mainstem below Bradbury Dam (Table A-1), tributaries below Bradbury Dam (Table A-2), and the upper basin (Table A-3). The tables indicate which alternatives were included in the Management Plan. In addition,

short paragraphs describing those alternatives not covered in more detail in the Plan, are included below. Most of the alternatives recommended in the Management Alternatives Report have been carried forward into the Fish Management Plan. Some actions have been modified. For example, predator removal below Bradbury Dam now will be conducted only in conjunction with fish rescue operations. Other alternatives have been put on hold due to serious institutional obstacles. In particular, transporting adult steelhead around Bradbury Dam to spawning habitat in the upper basin raises problems of moving a listed species to an area outside their defined range. (The National Marine Fisheries Service [NMFS] defined the Southern California Steelhead Evolutionarily Significant Unit [ESU] as the anadromous segments [open to the ocean] of streams from the Santa Maria River south to Malibu Creek. In the Santa Ynez River, rainbow trout/steelhead downstream of Bradbury Dam are protected as an endangered species, but landlocked steelhead above Bradbury Dam are not included in the ESU.)

Finally, a new action has been introduced since the Management Alternatives report was prepared to complement other enhancement measures. This action, public education and outreach, will be especially important, since many actions in the lower basin can only be implemented through voluntary participation by private landowners.

Table 1–1. Management Alternatives Considered for the Mainstem Santa Ynez River below Bradbury Dam

Number	Management Alternative	Priority Action?	Comments
MAINSTEM BELOW BRADBURY DAM			
<i>Flow-related Measures</i>			
1.	Conjunctive use of water rights releases and Fish Reserve Account	Y	Provides year-round rearing habitat
2.	Direct recharge of groundwater using alternate release points along mainstem below Bradbury Dam	N	Institutional concerns, public opposition
3.	Manage flood-control releases	N	Low biological benefits
4.	Additional mainstem flow releases from Fish Reserve Account	Y	Included in conjunctive use of water rights releases and Fish Reserve Account
5.	Surcharge reservoir for Fish Reserve Account	Y	Provides additional water for habitat maintenance
6.	Purchase water and/or water rights for flows in mainstem below Bradbury Dam	N	Water not available for purchase
7.	Recirculate/recycle flows in mainstem below Bradbury Dam	N	Not technically feasible
<i>Habitat Enhancements</i>			
8.	Riparian enhancement along mainstem below Bradbury Dam	N	Lack of landowner interest
9.	Mainstem stream channel modifications below Bradbury Dam	Y	Focus on improving refuge pools for rearing habitat
10.	Instream structures in mainstem below Bradbury Dam (e.g., woody debris, boulders)	Y	Focus on improving refuge pools for rearing and spawning habitat
11.	Place gravel in mainstem below Bradbury Dam	N	Spawning gravels not limiting
12.	Conservation easements along mainstem below Bradbury Dam	N	Lack of landowner interest
<i>Fish Passage</i>			
13.	Passage impediment removal in mainstem below Bradbury Dam	N	Lack of landowner interest
14.	Passage channel at lagoon beach impediment (i.e., breach sandbar)	N	Low biological benefit, adverse effects on other listed species (i.e., tidewater goby)
15.	Fish ladder at Bradbury Dam	N	Not technically feasible, biological concerns
16.	Fish ladder from Hilton Creek to Lake Cachuma	N	Not technically feasible, biological concerns

Table 1–1. Management Alternatives Considered for the Mainstem Santa Ynez River below Bradbury Dam -cont'd-

Number	Management Alternative	Priority Action?	Comments
Fish Passage -cont.d-			
17.	Trap-and-truck adults from mainstem below dam to Lake Cachuma above dam and outmigrants from above to below dam	N	Institutional obstacles in transporting a listed species above Bradbury Dam
18.	Trap-and-truck SYR adults from mainstem below dam to outside SYR drainage	N	Institutional obstacles in transporting a listed species
Predator Removal			
19.	Remove warmwater fish below Bradbury Dam	Y	In conjunction with fish rescue operations in Hilton Creek and select upper mainstem sites
Fishing Regulations			
20.	Fishing moratorium below Bradbury Dam	Y	Already implemented
Fish Supplementation			
21.	Use southern steelhead stocks in hatchery programs to supplement wild population below Bradbury Dam	N	Institutional concerns
22.	Transfer broodstock from the upper basin to the mainstem below Bradbury Dam	N	Institutional obstacles, biological concerns
23.	Streamside incubators along mainstem below Bradbury Dam	N	Low biological benefit, institutional concerns
24.	Spawning channels along mainstem	Y	This concept has been folded into the channel extension for Hilton Creek

Table 1–2. Management Alternatives Considered for Tributaries below Bradbury Dam

Number	Management Alternative	Priority Action?	Comments
TRIBUTARIES BELOW BRADBURY DAM			
<i>Flow-related Measures</i>			
25.	Purchase water/water rights to increase tributary flow below Bradbury Dam	N	Water not available for purchase
26.	Pump/siphon Cachuma water to Hilton Creek	Y	Highly promising
27.	Continuous pump and/or recycle flows in tributaries below Bradbury Dam	N	Not technically feasible
28.	Groundwater wells to augment tributary flow below Bradbury Dam	N	Not technically feasible
<i>Habitat Enhancements</i>			
29.	Instream structures in tributaries below Bradbury Dam	Y	Within conservation easements
30.	Place gravel in tributaries below Bradbury Dam	Y	Within conservation easements
31.	Conservation easements on tributaries below Bradbury Dam	Y	Voluntary participation by the landowner?
32.	Riparian enhancement along tributaries below Bradbury Dam	Y	Within conservation easements
33.	Extend channel of lower Hilton Creek	Y	Creates new spawning and rearing habitat
<i>Fish Passage</i>			
34.	Passage impediment removal in tributaries below Bradbury Dam	Y	Provides access to additional habitat
35.	Trap-and-truck adults from mainstem below dam to tributaries below dam	N	Institutional obstacles, reduced passage problems after implementation of Alt. # 34 (impediment removal)
36.	Trap-and-truck outmigrants at tributaries below Bradbury Dam	N	Downstream passage not limiting, institutional and technical obstacles

Table 1–3. Management Alternatives Considered for the Mainstem Santa Ynez River and Tributaries above Bradbury Dam

Number	Management Alternative	Priority Action?	Comments
MAINSTEM ABOVE BRADBURY DAM			
<i>Flow-related Measures</i>			
37.	Modify flow releases from Gibraltar Dam	N	Limited biological benefit
<i>Physical Habitat Enhancements</i>			
38.	Place gravel in mainstem above Lake Cachuma	N	Limited biological benefit, spawning habitat not limiting
<i>Fish Passage</i>			
39.	Trap-and-truck adults from mainstem below dam to mainstem above Lake Cachuma	N	Access difficulties to the upper basin, biological and institutional concerns in transporting a listed species
40.	Trap-and-truck outmigrants (smolts) from mainstem above Lake Cachuma to estuary	N	Technical and institutional concerns
<i>Predator Control</i>			
41.	Remove warmwater fish from mainstem above Lake Cachuma	N	Limited biological benefit, institutional concerns, infeasible
42.	Remove warmwater fish in Lake Cachuma	N	Limited biological benefit, institutional concerns, infeasible
43.	Remove warmwater fish from Gibraltar Reservoir	N	Limited biological benefit, institutional concerns, infeasible
44.	Remove warmwater fish from Jameson Lake	N	Limited biological benefit, institutional concerns, infeasible
TRIBUTARIES ABOVE BRADBURY DAM			
<i>Fish Passage</i>			
45.	Trap-and-truck adults from mainstem below dam to tributaries above dam	N	Access difficulties to upper basin, biological and institutional concerns in transporting a listed species
46.	Trap-and-truck outmigrants (smolts) from tributaries above Lake Cachuma to estuary	Y	Technical and institutional concerns
<i>Predator Control</i>			
47.	Remove warmwater fish from tributaries above Lake Cachuma	N	Limited biological benefit, institutional concerns, infeasible
<i>Fish Supplementation</i>			
48.	Supplemental rearing facilities on tributaries above Bradbury Dam	N	Institutional concerns, need for supplementation not clear

2. *Alternate release points along mainstem below Bradbury Dam*

This alternative suggests releasing State Water Project (SWP) water into the Santa Ynez River near the Robinson Bridge (Highway 246 Crossing) and near Rucker Road in lieu of the Below Narrows Account. This might elevate the water table below the Narrows and benefit migrating fish later in the year. SWP water could also be released 2.5 miles downstream of Buellton as part of the Above Narrows Account.

The Department of Fish and Game has expressed concerns that anadromous steelhead may obtain false cues for imprinting if they were exposed to SWP water from the Sacramento-San Joaquin Delta. Furthermore, the public voiced opposition to alternate release points and the use of SWP. Due to the uncertain benefits for rainbow trout/steelhead, institutional concerns and public opposition, this alternative will not be considered further at this time.

3. *Manage flood-control releases*

This alternative examines the possibility of conducting “pre-releases” of flood-control releases (in advance of expected storm events) from Lake Cachuma to increase or improve the pattern of streamflows for fisheries downstream of Bradbury Dam. The opportunities for manipulating storm-related releases to benefit rainbow trout/steelhead are limited by the unpredictability of the actual occurrence, duration and magnitude of a potential storm event, the flashy hydrology of the upper Santa Ynez watershed, the difficult control of the spillway gates, and the lack of a flood control pool in the Cachuma Project that can be actively managed.

6. *Purchase water and/or water rights for flows in mainstem below Bradbury Dam*

Purchasing water from existing water rights holders or the outright purchase of their water rights are two means of increasing streamflow. Both methods would be most advantageous in situations where supplemental water would improve instream habitat conditions by either increasing the amount of streamflow at a particular time of year or ensuring that the stream remains a live stream throughout the year (restoring perennial flow).

The complexity of the Santa Ynez River water rights and current land use policies make this alternative likely infeasible. Purchasing additional water rights will not be pursued further at this time.

7. *Recirculate/recycle flows in the mainstem below Bradbury Dam*

Recirculation of base-level streamflows with a pumping system could be used to improve aquatic habitat within a small portion of the river by maintaining higher flow conditions for a longer part of the dry season.

This alternative, however, faces serious technological challenges, would be expensive to operate and maintain, might result in unacceptable environmental impacts, requires landowner cooperation and would improve only limited lengths of stream. Therefore, it will not be pursued further at this time.

8. *Riparian enhancement along mainstem*

Riparian enhancement along the mainstem might improve rainbow trout/steelhead habitat through a number of factors (see C.3.2.3.3). Even though many parts of the mainstem are too wide for riparian planting to directly improve habitat by shading, riparian vegetation could provide sufficient shading during low-flow conditions, when the stream follows the bank, and add to the overall health of the system. However, the opportunity for realizing these biological benefits is limited because along those parts of the mainstem best suited for riparian enhancement, landowner cooperation is lacking. This alternative will be put on hold pending landowner approval.

11. *Place gravel in mainstem*

Addition of gravel may increase the amount of available spawning habitat for rainbow trout/steelhead, and improve rainbow trout/steelhead populations in portions of the mainstem where spawning gravel is the primary limiting factor. However, lack of fry habitat, not spawning habitat, was identified as the overall primary limiting factor in the lower Santa Ynez River, according to the analysis in the Contract Renewal EIR/EIS (ENTRIX 1995). In the areas lacking gravels, hydrological conditions and geomorphic processes indicate that gravels do not tend to accumulate there in the long term. Adding gravel here could impact downstream habitat (*e.g.*, filling of pools).

Due to the uncertain biological benefits, this alternative will not be pursued further at this time.

12. *Conservation easements along river channel of mainstem*

Conservation easements along the mainstem could be used to improve rainbow trout/steelhead habitat in a number of ways (see 3.3.1), provided that landowners are willing to participate.

The failure to locate interested landowners in priority areas eliminates the option of pursuing this alternative at this time.

13. *Passage impediment removal in the mainstem below Bradbury Dam*

The removal of physical passage impediments can improve opportunities for rainbow trout/steelhead to migrate upstream and downstream during periods of moderate and low streamflow. Landowner participation is required in order to access the stream and remove impediments.

This alternative is placed on hold, pending further evaluation of passage problems in the mainstem Santa Ynez River and landowner approval in priority reaches.

14. *Passage channel at the lagoon impediment (breaching of the sandbar)*

Mechanical breaching of the sandbar would allow migrating steelhead to enter or exit the Santa Ynez River when a sandbar closes off the lagoon from the ocean. However, this would only be beneficial during steelhead migration, and when river flows are high enough to provide continuous passage within the stream. Furthermore, breaching the sandbar may have adverse impacts on juvenile steelhead rearing in the lagoon, and on other species, particularly the listed tidewater goby. This fish inhabits the lagoon and the tidally influenced region of the river, and prefers calm conditions which occur when the lagoon is closed (J. Smith, pers. comm.). ESA consultation with the USFWS would be required to implement this action.

At this time, breaching of the sandbar will not be pursued further due to the above mentioned complications.

19. *Remove warmwater fish below Bradbury Dam*

The removal of non-native warmwater fish, such as largemouth bass, bluegill sunfish, and catfish, from below Bradbury Dam could be beneficial to juvenile steelhead by reducing predation and competition. However, the benefits would be temporary because of recolonization from other areas (the mainstem, Lake Cachuma, and/or the tributaries).

In general, fish control projects have had limited success (Meronek *et al.*, 1996), and in particular, the Long Pool and Stilling Basin have been recolonized by non-natives after a thorough removal in 1997 (Engblom, pers. comm.).

Due to the high likelihood of recolonization, a wholesale removal program would be infeasible on a long-term basis. Furthermore, DFG does not support such an effort (C. Raysbrook, CDFG, pers. comm.). Predator removal is being evaluated on a case-by-case basis in conjunction with fish rescue operations in Hilton Creek and selected upper mainstem sites, and after consultation with SYRTAC, NMFS, DFG, Reclamation and FWS.

20. *Fishing moratorium downstream of Bradbury Dam*

A year-round fishing moratorium in waters of the Southern California Steelhead ESU has been implemented for two years. This includes the waters below impassible dams, such as Bradbury Dam. Fishing is prohibited on the Santa Ynez River and its tributaries below Bradbury Dam. This reduces disturbance of rainbow trout/steelhead and will complement habitat enhancement efforts to improve population numbers.

21. *Wild steelhead hatchery*

The rainbow trout/steelhead population of the Santa Ynez River could be directly supplemented by producing fish at a hatchery, using genetically compatible stocks.

In general, CDFG does not support using artificial means to supplement steelhead populations, such as hatchery programs and spawning channels, and rates this as an unacceptable option (C. Raysbrook, CDFG, pers. comm.). According to policies of the CDFG and Fish and Game Commission, artificial supplementation and rearing would only be allowed if current factors that are limiting the population (*e.g.*, passage obstacles, habitat disturbances) are alleviated (D. McEwan, CDFG, pers. comm.).

The current Plan considers the use of a southern steelhead hatchery only for stocking programs in the upper basin, as a means to protect the genetic integrity of native stocks. The need for supplementation in the lower basin is on hold, pending the outcome of habitat improvements.

22. *Transfer broodstock from the upper basin to the mainstem below Bradbury Dam*

Supplementation of the lower river with adults or eggs from the residualized population of rainbow trout/steelhead upstream of Bradbury Dam could boost production in the lower river.

However, CDFG does not support using artificial means to supplement steelhead populations, such as hatchery programs and spawning channels (C. Raysbrook, CDFG, pers. comm.). According to policies of the CDFG and Fish and Game Commission, artificial supplementation and rearing would only be allowed if current factors that are limiting the population (*e.g.*, passage obstacles, habitat disturbances) are alleviated (D. McEwan, CDFG, pers. comm.).

Based on institutional and biological concerns, this alternative will not be pursued further at this time.

23. *Streamside incubators in mainstem below Bradbury Dam*

Egg survival of rainbow trout/steelhead might be improved through the use of streamside incubators to maintain ideal conditions for egg growth and survival.

Instream incubation techniques have had varying degrees of success (*e.g.*, Harshbarger and Porter 1982, Bams 1985). Several of the technical and biological factors contributing to the uncertainty of success and low biological benefit of this alternative include the need of high quality water, monitoring and maintenance of the incubators, the potential risk of predation on young steelhead, the cooperation of private landowners, and the potential risk of vandalism.

CDFG does not support using artificial means to supplement steelhead populations, such as hatchery programs and spawning channels (C. Raysbrook, CDFG, pers. comm.). According to policies of the CDFG and Fish and Game Commission, artificial supplementation and rearing

would only be allowed if current factors that are limiting the population (*e.g.*, passage obstacles, habitat disturbances) are alleviated (D. McEwan, CDFG, pers. comm.).

Due to the above-mentioned obstacles, this alternative will not be considered further at this time.

25. *Purchase water/water rights to increase tributary flows below Bradbury Dam*

Purchasing water from existing water rights holders or the outright purchase of their water rights are two means of increasing streamflow. Both methods would be most advantageous in situations where supplemental water would improve instream habitat conditions by either increasing the amount of streamflow at a particular time of year or ensuring that the stream remains a live stream throughout the year (restoring perennial flow).

The water rights situation in the Santa Ynez River watershed and current land use policies make this alternative unattractive and likely infeasible. Purchasing additional water rights will not be pursued further at this time.

27. *Recirculate/recycle flows in live reaches of tributaries*

Recirculating base-level streamflows with a pumping system could be used to improve aquatic habitat within a small portion of tributaries with perennial flow by maintaining higher flow conditions for a longer part of the dry season.

This alternative, however, faces serious technological challenges, would be expensive to operate and maintain, might result in unacceptable environmental impacts, requires landowner cooperation, the purchase of additional water rights, and would improve only limited lengths of stream. Therefore, it will not be pursued further at this time.

28. *Groundwater wells to augment tributary flow*

A series of groundwater wells could be used to augment instream flows and reduce water temperature during critical periods of low flows in perennial tributaries.

Relatively little information exists, however, on groundwater conditions or the potential production of a proposed well field in likely watersheds. Geologic studies generally characterize the consolidated rock aquifers in the Santa Ynez mountains as non-water-bearing, except for fractured sandstone deposits.

Furthermore, the costs for construction, operation, and maintenance of wells, pumps, and conveyance structures are likely to be high. Additional constraints include the

accessibility of potential well sites, access to private lands, providing electrical service, maintaining adequate water quality, and potential adverse effects on local hydrology due to pumping.

Due to the technical problems, this alternative will not be pursued further at this time.

35. *Trap-and-truck adults from mainstem below Bradbury to tributaries below Bradbury*

Trap-and-truck operations can be used to facilitate upstream passage of adult rainbow trout/steelhead around natural or man-made passage barriers in the mainstem to spawning habitat in the tributaries below Bradbury Dam.

Passage impediment removal below Bradbury Dam (Alternative 34) will reduce the need for trap-and-truck operations on the mainstem below the dam. In addition, due to possible mortalities related to trap-and-truck procedures and institutional obstacles, this alternative will not be pursued further at this time.

36. *Trap-and-truck outmigrants at tributaries below Bradbury Dam*

This alternative can be coupled with another measure to provide upstream passage for adult spawners (Alternative 35), or it can provide downstream passage for residualized steelhead. However, downstream transport of juveniles and adults in other systems has generally been less successful than upstream transport of adults because the typical high streamflows make it more difficult to collect downstream migrants. Furthermore, large numbers of juveniles must be transported in order to produce a discernible effect in the number of returning adults. Finally, downstream passage is not likely to limit fish populations on the tributaries below Bradbury Dam.

Due to the institutional obstacles caused by handling of the listed steelhead involved in this alternative, and the limited biological benefits, this alternative will not be pursued further at this time.

37. *Modify flow releases from Gibraltar Dam*

Habitat in the mainstem Santa Ynez River between Lake Cachuma and Gibraltar Dam could benefit from water released from Gibraltar Reservoir, utilizing existing water rights releases (Gin Chow releases). Water released from Gibraltar Dam would subsequently be recovered and stored in Lake Cachuma, which would provide fisheries and habitat benefits with a minimum of water supply impact.

Since the alternatives suggesting the transport of steelhead above Lake Cachuma have been put on hold, the need for additional water releases from Gibraltar Reservoir to improve habitat above Cachuma has also been reduced. Furthermore, due to the transit losses between Gibraltar and Cachuma, it is uncertain how much additional water would

be contributed to Lake Cachuma to be used for downstream releases. Because of the limited benefits to steelhead, this alternative will not be pursued further at this time.

38. *Place gravel in mainstem above Lake Cachuma*

Periodic addition of spawning gravel could improve spawning habitat in the mainstem above Lake Cachuma. This measure assumes that the rainbow trout/steelhead population is limited principally by the lack of good quality spawning gravel. To benefit the rainbow trout/steelhead population below Bradbury Dam, successful passage of steelhead (outmigrating juveniles and possibly upstream-migrating adults) around or through Lake Cachuma would be required. Adequate streamflows for spawning, incubation and fry rearing must also be present.

In the areas currently lacking gravel, hydrological conditions and geomorphic processes indicate that gravels do not tend to accumulate there in the long term. Adding gravel here could impact downstream habitat (*e.g.*, filling of pools).

Moreover, previous habitat surveys upstream of Bradbury Dam (ENTRIX 1995) showed that spawning habitat was not limiting. Since the alternatives suggesting the transport of steelhead above Lake Cachuma have been put on hold, and due to the low benefits of placing gravel in the mainstem upstream of the dam, this alternative will not be pursued further at this time.

41. *Remove warmwater fish from mainstem above Lake Cachuma*

The removal of non-native warmwater fish, such as largemouth bass, bluegill sunfish, and catfish, from the mainstem above Cachuma could benefit native fish. The benefits would be temporary, however, because of recolonization by survivors or warmwater fish from other areas (the mainstem, Lake Cachuma, spill from Gibraltar Reservoir, and/or the tributaries). In general, fish removal programs in other systems have often failed or had only short-term success (Meronek *et al.*, 1996). Furthermore, DFG does not support such an effort (C. Raysbrook, CDFG, pers. comm.). Thus, this alternative will not be pursued at this time.

42. *Remove warmwater fish in Lake Cachuma*

Non-native warmwater fish, such as largemouth bass, bluegill sunfish, and catfish, can prey on small fish, such as young rainbow trout/steelhead and arroyo chub. The warmwater fish population in Lake Cachuma also acts as a source of predators for the Santa Ynez River upstream and downstream of the lake. Undertaking removal of warmwater fishes from Lake Cachuma would be technically and economically infeasible, due to the large size of the reservoir, the large numbers of fishes, and the importance of the sport fishery for these species. Furthermore, DFG does not support such an effort (C. Raysbrook, CDFG, pers. comm.).

43. *Remove warmwater fish in Gibraltar Reservoir*

Removal of non-native warmwater fish, such as largemouth bass, bluegill sunfish, and catfish, has been suggested to reduce predation on small native fish. Predator removal occurred through natural means several years ago when Gibraltar Reservoir dried up (1989-1991).

However, DFG does not support such an effort (C. Raysbrook, CDFG, pers. comm.). Undertaking removal of warmwater fishes from Gibraltar Reservoir by means other than reservoir drawdown would likely be technically infeasible. This alternative will not be pursued further at this time.

44. *Remove warmwater fish in Jameson Lake*

The removal of non-native warmwater fish, such as largemouth bass, bluegill sunfish, and catfish, may reduce the source of predators for the Santa Ynez River upstream and downstream of the lake. However, fish removal programs have often failed or had only short-term success (Meronek *et al.*, 1996). Furthermore, DFG does not support such an effort (C. Raysbrook, CDFG, pers. comm.). Undertaking removal of warmwater fishes from Jameson Lake would likely be technically infeasible and will not be pursued further at this time.

47. *Remove warmwater fish from tributaries above Lake Cachuma*

The removal of non-native warmwater fish, such as largemouth bass, bluegill sunfish, and catfish, may increase survival of rainbow trout/steelhead and other native species in tributaries above Lake Cachuma. However, fish removal programs have often failed or had only short-term success (Meronek *et al.*, 1996). Recolonization by fish from Cachuma would be expected in accessible areas of these tributaries. Furthermore, DFG does not support such an effort (C. Raysbrook, CDFG, pers. comm.).

The likelihood of recolonization by warmwater fish from Lake Cachuma, low biological benefits, the chance for high incidental environmental impacts and difficult access make this alternative infeasible.

48. *Supplemental rearing facilities on tributaries above Bradbury Dam*

This alternative would enhance production by providing supplemental rearing opportunities on perennial tributaries upstream of Lake Cachuma, where water is more plentiful. Implementation of this alternative would require consultation with the U.S. Forest Service for construction of facilities on Forest Service land. It would be most promising in years where the number of juveniles exceeds the carrying capacity of the rearing sites below Bradbury Dam. Furthermore, juveniles would have to be trapped below Bradbury Dam, trucked to the rearing sites above the dam, and reared fish (smolts) would have to be returned to reaches below the dam. Due to the difficulties involved with the trap-and-truck method (institutional, technical and biological concerns), as well as the low biological benefit provided and the unclear need for supplementation, this alternative will not be pursued further at this time.

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