

STATE OF CALIFORNIA
FISH AND GAME COMMISSION
INITIAL STATEMENT OF REASONS FOR REGULATORY ACTION
(Pre-publication of Notice Statement)

Add Section 8.01,
Title 14, California Code of Regulations
Re: Special Measures for Fisheries at Risk

- I. Date of Initial Statement of Reasons: August 21, 2015
- II. Dates and Locations of Scheduled Hearings:
 - (a) Notice Hearing: Date: December 10, 2015
Location: San Diego
 - (b) Discussion Hearing: Date: February 11, 2016
Location: Sacramento
 - (c) Adoption Hearing: Date: April 14, 2016
Location: Santa Rosa

III. Description of Regulatory Action:

- (a) Statement of Specific Purpose of Regulation Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary:

California has recently experienced severe drought conditions with record low snow pack in 2015. In early 2014, Governor Edmund G. Brown Jr. proclaimed a State of Emergency to exist in California and ordered the Department to work with the Commission, using the best available science, to determine whether restricting fishing in certain areas will become necessary and prudent as drought conditions persist. On April 1, 2015, the Governor ordered state agencies to impose statewide mandatory water restrictions that will save water, increase enforcement against water waste, streamline the state's drought response, and invest in new drought resilient technologies for California.

The Department of Fish and Wildlife (Department) continues to evaluate and manage the changing impacts of drought on threatened and endangered species and species of special concern, and develop contingency plans for state Wildlife Areas and Ecological Reserves to manage reduced water resources in the public interest.

Statewide water quality and quantity in many systems will likely be inadequate to support fisheries if existing environmental conditions persist, resulting in impeded passage of spawning fish, increased vulnerability to mortality from predation and physiological stress, and increased angling harvest and/or hooking mortality. Furthermore, survival of eggs and juvenile fish in these systems experiencing degraded habitats could be extremely low. The historically low water conditions may concentrate cold water fish populations into shrinking pools of cold water habitat making them easy prey for illegal angling methods such as snagging, increased hooking mortality due to legal catch and release, over-harvest, as well as other human-related disturbances within their freshwater habitat. When coupled with environmental stressors, such as high water temperature, low dissolved oxygen, and severely reduced suitable habitat, these stressors can seriously affect reproductive success and survival rates. Although habitat conditions can recover with the onset of good water quality, reduced population levels caused by drought conditions could still threaten the persistence and resilience of the fishery.

Since 2014, the Department has worked with the Fish and Game Commission (Commission), using the best available science, to determine whether restricting fishing in certain areas will become necessary and prudent as habitat conditions degrade and or fish populations drop below a sustainable level. On June 11, 2015, the Commission adopted emergency regulations which establish a quick response process to temporarily close fisheries experiencing degraded environmental conditions that may affect fish populations or their habitat within waters of the state. These emergency regulations went into effect on July 2, 2015 and will expire on December 28, 2015.

To ensure that fisheries are protected now and in the future, the Department is proposing that the Commission make permanent the emergency regulations set forth in Section 8.01, Title 14, CCR, as amended herein.

Regulatory Proposal

Environmental conditions resulting in degraded habitat quality and or extremely low population size may require temporary restrictions on fishing to protect fish populations and sustain future opportunity. These conditional changes may affect each waterbody and fish population differently based on various abiotic and biotic factors. Increased angling mortality, harvest, angling pressure, and fish population size are the key components used to evaluate potential effects associated with degraded environmental conditions and will need to be evaluated on a water by water basis and over time as conditions change.

To ensure that fisheries are protected under critical conditions, the Department is proposing a set of triggers to guide fishing closure and reopening decisions. The Department's decision to close or open individual waters will be based on the most current information available, collected by professional staff trained in the associated fields. Criteria for evaluating aquatic conditions are based on site-specific monitoring efforts with an emphasis on listed fish species, species of special concern, and gamefish.

The following proposed criteria will be used to determine if a fishing closure or associated reopening is warranted:

Any water of the state not currently listed in Section 8.00 of these regulations may be closed to fishing by the Department when the Director, or his or her designee, determines one or more the following conditions have been met:

- Water temperatures in occupied habitat exceed 70° Fahrenheit for over eight hours a day for three consecutive days.
- Dissolved oxygen levels in occupied habitat drop below 5 mg/L for any period of time over **two** consecutive days.
- Fish passage is impeded or blocked for fish species that rely on migration as part of a life history trait.
- Water levels for ponds, lakes and reservoirs drop below 10% of their capacity.
- Adult breeding population levels are estimated to be below **50 individuals for a sub-population or 500 individuals for a standard population.**

All waters closed pursuant to this section will be reopened by the Department when the Director, or his or her designee, determines the initial closure-based criteria are no longer met and **water temperatures do not exceed 70° Fahrenheit for over eight hours a day for 14 consecutive days and dissolved oxygen remains above 5 mg/L for 14 consecutive days.**

Proposed Regulatory Changes from Emergency Regulations:

The Department proposes additional modifications to the originally approved "emergency" text as shown in bold above due to further review of scientific literature as follows:

1. A consecutive 48 hour (two days) exposure rate for dissolved oxygen provides a better basis to address natural variability and risk for juvenile and early life stages of fish.
2. The Department is proposing to use the 50/500 rule in evaluating angling closures to address the effects on both the localized level for smaller sub-populations and larger meta-population complexes.
3. The Department is proposing an extended period of recovery for water temperature and dissolved oxygen closures to account for natural variability and fluctuations once the upper limits for water temperature and dissolved oxygen have been exceeded.

Justification and associated data for closure and reopening decisions will be provided to the Commission for any water that is subject to a fishing closure.

Rationale for Proposed Criteria

Water Temperature

Results from various studies assessing the effects of catch and release angling on salmonids have shown high rates (30-40%) of salmonid mortality at water temperatures >70°F (Boyd 2008). For example, catch-and-release mortality of Atlantic salmon caught on lures and flies was below 10% at water temperatures up to 64°F (Thorstad et al. 2003), but was 40% at 72°F and 30% at 73°F (Wilkie et al. 1996; Wilkie et al. 1997). According to Titus and Vanicek (1998), mortality of Lahontan cutthroat trout caught with lures was less than 10% when water temperatures were below 64°F and increased to 50% when water temperatures were 70°F. Results from these studies suggest that catch and release mortality rates for salmonids caught with lures and flies remain below 10% at cooler water temperatures but increase rapidly at water temperatures above 68°F (Boyd 2008).

The eight-hour threshold was chosen based on the length of time fish would be exposed to cooler water temperature in a 24-hour period. Fish that spend longer durations in cooler water temperatures are able to “repair” physiological damage (Meyer et al. 1995), thus potentially reducing catch and release mortality. Setting an eight-hour threshold also provides a temporal basis to account for variability and avoid unnecessary closures in the face of changing temperatures that could occur.

The criterion that water temperature must remain above 70°F for three consecutive days was chosen to account for natural variability and fluctuations in daily water temperature as well as prohibit angling once

daily water temperatures reach the upper lethal limit for an extended period of time. A review of water temperature data for various rivers and streams within the state have shown when mean daily water temperatures reach 70°F for three consecutive days during summer, they are likely to remain constant and above the water temperature threshold due to reduced instream flow and higher ambient air temperature. Therefore, the three-day threshold was chosen due to low probability that the water temperature in a particular river or stream will drop below the threshold once it has reached 70°F for three consecutive days.

Dissolved Oxygen

Although there are ample studies that evaluate the lethal limits for salmonids in relation to dissolved oxygen (Gutsell, 1929; Doudoroff & Shumway, 1970; Raleigh et al., 1984) less is known about how angling may affect fish physiology and related mortality in degraded water quality. Guidelines for ambient water quality standards do exist for dissolved oxygen in streams (USEPA, 1986), however when trying to establish closure criteria DFW must set thresholds above survivorship curves. Additionally, as with temperature, extended periods of exposure of degraded dissolved oxygen (DO) can create an adverse environment as opposed to brief exposure rates. Some studies have indicated that fish will avoid dissolved oxygen levels below 5 mg/l and will move to find higher oxygen concentrations if available (Reynolds & Thompson, 1974; Kramer, 1987; Spoor, 1990). However, Mathews and Berg (1997) found when faced with the choice between high temperatures and low DO, trout were distributed closest to the water with the lowest temperature despite its associated low oxygen.

Dean and Richardson (1999) found that juvenile salmonid mortality began (14%) after 36 hours of exposure to DO of 5 mg/l. Although juvenile and early life stages of fish may be more susceptible to low DO (USEPA, 1986), utilizing a consecutive 48 hour (two days) exposure rate provides a basis to warrant and address natural variability and risk for fish that may be encountered by anglers. If and when the DO has recovered to a level that exceeds 5 mg/l for 14 consecutive days, the Department believes a re-evaluation and potential re-opening of the fishery may be warranted.

Fish Passage

Flow reduction from natural or anthropogenic causes can affect stream connectivity by rendering riffles too shallow for passage of migratory fish into historical spawning and rearing habitats. Changes in stream flow causing diminished water depth can impede the hydrologic connectivity of natural river habitats and can disrupt critical life history tactics of anadromous salmonids. Limited flow may delay the timing of migratory

species, adversely affecting survival and reproduction rates, as well as increase the vulnerability of salmonids to natural predation and/or fishing pressures through increased exposure. Loss of connectivity also affects the flow of nutrients and energy, potentially affecting water quality conditions such as temperature and dissolved oxygen. The Department utilizes established standards and criterion for various fish life stages to assess passage thresholds. Velocity, water depth, and barrier height are just a few of the metrics that the Department utilizes through the assessment process. Instream metrics are critical to the assessment process and will be used in concert with fish information to inform closure recommendations.

Water Levels

Impacts from the drought have affected reservoirs, lakes, and ponds in different ways. Although some of these effects have resulted in significantly reduced capacity, the available habitat for fish varies considerably based on configuration of the waterbody, water source, and overall size. The Department has evaluated many of these waters over the last three years and has observed that when water holding capacity drops below 10%, most of the fisheries run a significant risk to overexploitation. Although major reservoirs even at 10% will likely have some available habitat to maintain the population, increased angling pressure and potential over-harvest could result in substantial loss beyond sustainable yield. It is likely that some of the other closure criteria may be triggered prior to a waterbody getting below 10%.

Fish Population Levels

Utilizing fish population size to help guide management decisions is a long standing approach in fisheries science. Evaluating the efficacy of an emergency action to close angling for a “at risk” fishery based on population level effects is a challenge and should be founded in the most current information available. Although fisheries may experience natural population fluctuations over time, demographic stochasticity and genetic drift can negatively affect small populations. Demographic stochasticity leads to the random extinction of small populations, while genetic drift can cause a reduction of genetic diversity within a population. When fisheries experience these types of stochastic events it is imperative that managers assess the affect angling may have on the population.

Angling mortality

Angling associated mortality can vary based on multiple factors including species, harvest limits, gear type, water temperature, and handling time. These variables can all have significant effects on mortality rates but are not mutually exclusive. The effect of angling mortality on a population can be either additive or compensatory (Nichols et al. 1984). In short, if angling

associated mortality does not exceed natural mortality then it is likely compensatory. If, however, angling mortality exceeds natural mortality then it is additive. The relationship of both additive and compensatory mortality is directly related to population size (density dependent) but is not linear (Miranda and Bettoli, 2007).

Effective population size and MVP

Although the effects of angling mortality are density dependent, the relative genetic importance of each individual fish in the population is not part of that equation. The loss of genes from an individual fish from a small population can be substantially more important than loss from a larger population. To help assess how population genetics may be affected by angling mortality, fisheries managers must estimate the existing effective population size (N_e). Establishing N_e is often problematic given limited resources and managers often rely on genetics and sub-sampling to get at N_e . Once N_e is estimated managers can then assess the risk of having directed harvest or associated angling mortality on the population. Additionally, the approach of establishing a minimum viable population (MVP) has also been used in efforts to help guide conservation programs (Foose et al. 1995). Generating a MVP for a specific area or localized population can often take a lot of time and resources thus making an emergency response based on a MVP problematic.

The 50/500 approach

Given the limitations faced by generating a MVP, others have used a concept proposed by Franklin (1980) termed the 50/500 rule. The “50” part of the 50/500 rule states that populations with an inbreeding effective population size (N_{ef}) under 50 are at immediate risk of extinction. This is because, in such small populations, inbreeding and demographic stochasticity can quickly push the population into an extinction vortex. The “500” part of the rule means that populations with a variance effective size (N_{ev}) of less than 500 are at long-term risk of extinction. In these populations, genetic drift may be a strong force, leading to eventual loss of genetic variation (Harmon and Braude, 2010). After variation is lost, the population will no longer be able to respond to environmental changes, and may be reduced in size or go extinct if any such changes occur.

A key component to assess “at risk” fisheries is to understand the population structure, boundaries, and connectivity. Often populations are made-up of smaller discrete sub-populations making-up a larger meta-population. The relative importance of each sub-population may or may not be known, which also provides complexity in establishing population structure and boundaries. This is true of many of our coastal and anadromous populations. The USFWS/NOAA often use genetics to qualify and group these populations into distinct population segments (DPS). This

approach is based primarily on relatedness and helps guide conservation and recovery actions but does not always account for localized or sub-populations effects or importance.

The Department is proposing to use the 50/500 rule in evaluating angling closures and would look at both the localized level for smaller sub-populations and larger meta-population complexes in its process. If the Dept. has information supporting that angling mortality is additive for a sub-population at or below 50_{ef} then an angling closure will likely be recommended. If the Department has information supporting that angling mortality is additive for a standard or meta-population at or below 500_{ev} then an angling closure will likely be recommended. If angling mortality or harvest is thought to be compensatory at either population level, then closure to the fishing would likely not be recommended. One advantage of using this evaluation is that it takes into account population trend/dynamics to estimate N_{ev} . This is important given the natural fluctuations in populations and in some instances even small populations may have larger N_{ev} given their history.

- (b) Authority and Reference Sections from Fish and Game Code for Regulation:

Authority: Sections 200, 202, 205, 240 and 315, Fish and Game Code.

Reference: Sections 200, 205, 240, and 315, Fish and Game Code.

- (c) Specific Technology or Equipment Required by Regulatory Change:

None.

- (d) Identification of Reports or Documents Supporting Regulation Change:

Boyd, J.W. 2008. Effects of water temperature and angling on mortality of salmonids in Montana streams. Master's thesis. Montana State University, Bozeman.

Dean, T. L., and J. Richardson. 1999. Responses of seven species of native freshwater fish and a shrimp to low levels of dissolved oxygen. *New Zealand Journal of Marine and Freshwater Research*. 33:99–106.

DF0. 2012. Temperature threshold to define management strategies for Atlantic salmon (*Salmo salar*) fisheries under environmentally stressful conditions. DFO Can. Sci. Advis. Sec. Scit. Advis. Rep. 2012/019.

Doudoroff, P. & Shumway, D. L. 1970. Dissolved oxygen requirements of freshwater fishes. United Nations FAO Fisheries Technical Paper FIRI/T86. Rome: FAO.

Gutsell, J. S. (1929). Influence of certain water conditions, especially dissolved gasses, on trout. *Ecology* 10, 77–96. Kramer, D. L. 1987. Dissolved oxygen and fish behavior. *Environmental Biology of Fishes* 18, 81–92.

Harmon, J. L. and S. Braude. 2010. An Introduction to Methods and Models in Ecology, Evolution, and Conservation Biology. Chapter 12. Conservation of Small Populations: Effective Population Sizes, Inbreeding, and the 50/500 Rule. Pages 125–138.

Matthews, K.R. and N.H. Berg. 1997. Rainbow trout responses to water temperature and dissolved oxygen stress in two southern California stream pools. *Journal of Fish Biology* 50:50-67.

Miranda, L. E and Bettoli, P. W. 2007. Chapter 6, Mortality. Analysis and Interpretation of Freshwater Fisheries Data. American Fisheries Society, Bethesda, Maryland. Pages 1-49.

Raleigh, R. F., Hickman, T., Soloman, R. C. & Nelson, P. C. 1984. Habitat suitability information: Rainbow trout (*Oncorhynchus mykiss*). U.S. Fish and Wildlife Service FWS/OBS-82/10.60. 64 pp.

Thorstad, E. B., T. F. Naesje, P. Fiske, and B. Finstad. 2003. Effects of hook and release on Atlantic salmon in the River Alta, northern Norway. *Fisheries Research* 60:293-307.

Titus, R. G., and C. D. Vanicek. 1988. Comparative hooking mortality of lure-caught 55 Lahontan cutthroat trout at Heenan Lake, California. *California Fish and Game and Game*. 74:218–225.

USEPA. 1986: Ambient water quality criteria for dissolved oxygen. United States Environmental Protection Agency Publication EPA 440/5-86-003. 46 p.

Wilkie, M. P., K. Davidson, M. A. Brobbel, J. D. Kieffer, R. K. Booth, A. T. Bielak, and B. L. Tufts. 1996. Physiology and survival of wild Atlantic salmon following angling in warm summer waters. *Transactions of the American Fisheries Society* 125:572-580.

Wilkie, M. P., M. A. Brobbel, K. Davidson, L.Forsyth, and B.L. Tufts. 1997. Influences of temperature upon the postexercise physiology of Atlantic salmon (*Salmo salar*). *Canadian Journal of Fisheries and Aquatic Sciences* 54:503-511.

(e) Public Discussions of Proposed Regulations Prior to Notice Publication:

No public meetings are scheduled prior to the notice publication. The 45-day public notice comment period provides adequate time for review of the proposed changes.

IV. Description of Reasonable Alternatives to Regulatory Action:

(a) Alternatives to Regulation Change:

No alternatives were identified.

(b) No Change Alternative:

The no change alternative would leave existing regulations in place.

(c) Consideration of Alternatives:

In view of information currently possessed, no reasonable alternative considered would be more effective in carrying out the purpose for which the regulation is proposed, would be as effective and less burdensome to affected private persons than the proposed regulation, or would be more cost effective to affected private persons and equally effective in implementing the statutory policy or other provision of law.

V. Mitigation Measures Required by Regulatory Action:

The proposed regulatory action will have no negative impact on the environment; therefore, no mitigation measures are needed.

VI. Impact of Regulatory Action:

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following initial determinations relative to the required statutory categories have been made:

(a) Significant Statewide Adverse Economic Impact Directly Affecting Businesses, Including the Ability of California Businesses to Compete with Businesses in Other States:

The proposed action is not anticipated to have a significant statewide adverse economic impact directly affecting business, including the ability of California businesses to compete with businesses in other states because the expected impact of the proposed regulations on the amount of fishing activity is anticipated to be minimal relative to recreational angling effort statewide.

- (b) Impact on the Creation or Elimination of Jobs Within the State, the Creation of New Businesses or the Elimination of Existing Businesses, or the Expansion of Businesses in California; Benefits of the Regulation to the Health and Welfare of California Residents, Worker Safety, and the State's Environment:

The expected impact of the proposed regulations on the amount of fishing activity is anticipated to be minimal relative to recreational angling effort statewide. Therefore the Commission does not anticipate any impacts on the creation or elimination of jobs, the creation of new business, the elimination of existing business or the expansion of businesses in California.

The Commission anticipates benefits to the health and welfare of California residents. Protecting fish populations during poor habitat conditions ensures the maintenance of the fishery and is needed to ensure future opportunity for California anglers. Recreational angling is a healthy outdoor activity that encourages consumption of a nutritious food. The Commission does not anticipate any non-monetary benefits to worker safety because the proposed regulations do not affect working conditions.

The Commission anticipates benefits to the environment by the sustainable management of California's sport fishing resources.

- (c) Cost Impacts on a Representative Private Person or Business:

The agency is not aware of any cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action.

- (d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State:

None.

- (e) Nondiscretionary Costs/Savings to Local Agencies:

None.

(f) Programs Mandated on Local Agencies or School Districts:

None.

(g) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4, Government Code:

None.

(h) Effect on Housing Costs:

None.

VII. Economic Impact Assessment:

If any waters are proposed for closure under the proposed regulatory criteria, the Department's approach will be to achieve adequate resource protection with minimized disruptions to recreational activities and the economy of the immediate surrounding locales. Closures are expected to be implemented over limited areas for short time periods. In many instances, anglers can shift to other areas of the river that remain open. Additionally, other recreational activities such as rafting, hiking, and swimming will most often still be allowed, which can mitigate potential losses in visitor spending to the local economies. However, to derive the most conservative estimates of future economic impacts, the Department's economic analysis did not consider any potential mitigation of total economic impact from shifts in recreational effort. Estimates of future economic impacts are done with the assumption that anglers would not substitute fishing for other activities in the area or shift trips to other higher effort months of the year.

Impacts of Potential Closures:

Economic impact assessments of past emergency closures provide reasonable estimates of the potential impact of future closures under the proposed regulations. In 2013, a combined emergency closure of the lower American River, Russian River, and a combined coastal area consisting of portions of North Coast, Central Coast and South Central District Low Flow Restricted Areas were in effect for up to three months. In 2014 and 2015, emergency closures along a portion of the Merced River were put into effect for up to five months. Additionally a hypothetical 2016 seasonal closure of the Klamath River Basin (~50% of the available area) was used to model potential impacts of large watershed closure. Table 1 presents a comparison of the above economic impact assessments to illustrate the potential low-, mid- and high-economic

impact of potential closures under Section 8.01.

Table 1. Economic Impact of Potential Closures (2015\$)

Year	Affected Area	Angler Spending	Total Output Loss	Job Loss
2013	American River	-\$77,000	-\$93,000	-1.9
2013	Russian River	-\$24,000	-\$29,000	-0.6
2013	Coastal Low-Flow Areas	-\$34,000	-\$41,000	-0.8
2014	Merced River	-\$1,300	-\$1,500	-0.03
2015	Merced River	-\$1,000	-\$1,200	-0.02
2016	Klamath River (hypothetical)	-\$1,000,000	-\$1,040,000	-21.3

- The Merced River 2014 and 2015 closures resulted in a relatively low total economic output loss estimate of \$1,200 to \$1,500 with less than one job lost for each closure.
- The 2013 Russian River closure occurred during peak fishing months, resulting in an estimated loss of 280 angler trips with an associated \$24,000 drop in angler spending. This three month closure resulted in a mid-range total output loss of \$29,000 and less than one job lost.
- The concurrent 2013 coastal low-flow closures resulted in a slightly higher total economic output loss estimate of \$34,500 with less than one job lost.
- The American River closure during the same time period resulted in a higher estimated loss of 900 angler trips with an associated \$77,000 drop in angler spending. This closure resulted in a higher total output loss of \$93,000 and about two jobs lost.
- A hypothetical 2016 Klamath River Basin closure could potentially result in the loss of 4,000 angler trips with an associated \$1,000,000 drop in angler spending resulting in the highest expected total output loss of \$1,040,000 and about 21 jobs lost.

A. Effects of the Regulation on the Creation or Elimination of Jobs

The Commission does not anticipate significant adverse impacts on the creation or elimination of jobs to be precipitated by temporary closures of isolated inland fisheries.

The potential impacts of a short-term closure were estimated to result in the loss of less than one job loss at the low end to a high impact of up to 21 jobs lost depending upon the extent, duration and location of the potential closure. However, even though the number of visitors and thus probable visitor expenditures in the fisheries areas is expected to decline for the closure period ,

significant impacts on job creation or elimination are generally unlikely given the short closure period and lags in employment level adjustment.

B. Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses

The projected loss in angler spending for a freshwater closure is estimated to range from \$1,000 to \$1,000,000. This spending loss is associated with a drop in total economic output as each dollar spent is passed through the economy in the range of \$1,200 to \$1,040,000. This estimated output loss would be shared by a number of businesses over several months, such that it is not anticipated to constitute sufficient impact to trigger the creation of new businesses or elimination of existing businesses.

C. Effects of the Regulation on the Expansion of Businesses in California

The projected loss in angler spending for a freshwater closure is estimated to range from \$1,000 to \$1,000,000. This spending loss is associated with a drop in total economic output as each dollar spent is passed through the economy in the range of \$1,200 to \$1,040,000. This estimated output loss would be shared by a number of businesses over more several months, such that it is not anticipated to constitute sufficient impact to trigger expansion of new businesses.

D. Benefits of the Regulation

Benefits of the Regulation to the Health and Welfare of California

Residents:

The Commission anticipates benefits to the health and welfare of California residents through the protection of aquatic and riparian habitats and the fish and wildlife resources that depend upon them. Trout and salmon are a nutritious food source and maintaining inland sport fishery opportunities encourages consumption of this nutritious food. Sport fishing also contributes to increased mental health of its practitioners as fishing is a hobby and form of relaxation for many. Sport fishing also provides opportunities for multi-generational family activities and promotes respect for California's environment by younger generations, the future stewards of California's natural resources.

Benefits to the Environment:

The Commission anticipates benefits to the environment through the protection of aquatic and riparian habitats and the fish and wildlife resources that depend upon them. Stream flows in many systems are inadequate to allow passage of spawning anadromous fish, increasing their vulnerability to mortality from predation, physiological stress, and fishing. Furthermore, survival of eggs and juvenile fish in these systems is likely to be extremely low in higher temperature waters. Under these extreme conditions, conservation and protection of the

juvenile fish populations will protect as many adult fish as possible. It is the policy of the state to encourage the conservation, maintenance, and utilization of the living resources of the inland waters under the jurisdiction and influence of the state for the benefit of all its citizens and to promote the development of local California fisheries. The objectives of this policy include, but are not limited to, the maintenance of sufficient populations of all species of aquatic organisms to ensure their continued existence and the maintenance of a sufficient resource to support a reasonable sport use, taking into consideration the necessity of regulating individual sport fishery bag limits in the quantity that is sufficient to provide a satisfying sport.

Benefits to Worker Safety: The Commission does not anticipate benefits to worker safety because the proposed regulations will not impact working conditions.

Informative Digest/Policy Statement Overview

California has recently experienced severe drought conditions with record low snow pack in 2015. In early 2014, Governor Edmund G. Brown Jr. proclaimed a State of Emergency to exist in California and ordered the Department to work with the Commission, using the best available science, to determine whether restricting fishing in certain areas will become necessary and prudent as drought conditions persist. On April 1, 2015, the Governor ordered state agencies to impose statewide mandatory water restrictions that will save water, increase enforcement against water waste, streamline the state's drought response, and invest in new drought resilient technologies for California.

The Department of Fish and Wildlife (Department) continues to evaluate and manage the changing impacts of drought on threatened and endangered species and species of special concern, and develop contingency plans for state Wildlife Areas and Ecological Reserves to manage reduced water resources in the public interest.

Statewide water quality and quantity in many systems will likely be inadequate to support fisheries if existing environmental conditions persist, resulting in impeded passage of spawning fish, increased vulnerability to mortality from predation and physiological stress, and increased angling harvest and/or hooking mortality. Furthermore, survival of eggs and juvenile fish in these systems experiencing degraded habitats could be extremely low. The historically low water conditions may concentrate cold water fish populations into shrinking pools of cold water habitat making them easy prey for illegal angling methods such as snagging, increased hooking mortality due to legal catch and release, over-harvest, as well as other human-related disturbances within their freshwater habitat. When coupled with environmental stressors, such as high water temperature, low dissolved oxygen, and severely reduced suitable habitat, these stressors can seriously affect reproductive success and survival rates. Although habitat conditions can recover with the onset of good water quality, reduced population levels caused by drought conditions could still threaten the persistence and resilience of the fishery.

Since 2014, the Department has worked with the Fish and Game Commission (Commission), using the best available science, to determine whether restricting fishing in certain areas will become necessary and prudent as habitat conditions degrade and or fish populations drop below a sustainable level. On June 11, 2015, the Commission adopted emergency regulations which establish a quick response process to temporarily close fisheries experiencing degraded environmental conditions that may affect fish populations or their habitat within waters of the state. These emergency regulations went into effect on July 2, 2015 and will expire on December 31, 2015.

To ensure that fisheries are protected now and in the future, the Department is proposing that the Commission make permanent the emergency regulations set forth in Section 8.01, Title 14, CCR, as amended herein.

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To ensure that fisheries are protected under critical conditions, the Department is proposing a set of triggers to guide fishing closure and reopening decisions. The Department's decision to close or open individual waters will be based on the most current information available, collected by professional staff trained in the associated fields. Criteria for evaluating aquatic conditions are based on site-specific monitoring efforts with an emphasis on listed fish species, species of special concern, and gamefish.

The following proposed criteria will be used to determine if a fishing closure or associated reopening is warranted:

Any water of the state not currently listed in Section 8.00 of these regulations may be closed to fishing by the Department when the Director, or his or her designee, determines one or more the following conditions have been met:

- Water temperatures in occupied habitat exceed 70° Fahrenheit for over eight hours a day for three consecutive days.
- Dissolved oxygen levels in occupied habitat drop below 5 mg/L for any period of time over **two** consecutive days.
- Fish passage is impeded or blocked for fish species that rely on migration as part of a life history trait.
- Water levels for ponds, lakes and reservoirs drop below 10% of their capacity.
- Adult breeding population levels are estimated to be below **50 individuals for a sub-population or 500 individuals for a standard population.**

All waters closed pursuant to this section will be reopened by the Department when the Director, or his or her designee, determines the initial closure-based criteria are no longer met and **water temperatures do not exceed 70°**

Fahrenheit for over eight hours a day for 14 consecutive days and dissolved oxygen remains above 5 mg/L for 14 consecutive days.

Proposed Regulatory Changes from Emergency Regulations:

The Department proposes additional modifications to the originally approved “emergency” text as shown in bold above due to further review of scientific literature as follows:

1. A consecutive 48 hour (two days) exposure rate for dissolved oxygen provides a better basis to address natural variability and risk for juvenile and early life stages of fish.
2. The Department is proposing to use the 50/500 rule in evaluating angling closures to address the effects on both the localized level for smaller sub-populations and larger meta-population complexes.
3. The Department is proposing an extended period of recovery for water temperature and dissolved oxygen closures to account for natural variability and fluctuations once the upper limits for water temperature and dissolved oxygen have been exceeded.

Justification and associated data for closure and reopening decisions will be provided to the Commission for any water that is subject to a fishing closure.

Benefits of the regulations

As set forth in Fish and Game Code section 1700 it is “the policy of the state to encourage the conservation, maintenance, and utilization of the living resources of the ocean and other waters under the jurisdiction and influence of the state for the benefit of all the citizens of the state and to promote the development of local fisheries and distant-water fisheries based in California in harmony with international law respecting fishing and the conservation of the living resources of the oceans and other waters under the jurisdiction and influence of the state.

Adoption of scientifically-based criteria for angling closures due to adverse habitat conditions provides for the protection and maintenance of sport fish populations to ensure their continued existence. The benefits of the proposed regulations are in sustainable management of the State’s sport fish resources, and the businesses that rely on sport fishing in California.

Consistency with State and Federal Regulations

Section 20, Article IV, of the State Constitution specifies that the Legislature may delegate to the Fish and Game Commission such powers relating to the protection and propagation of fish and game as the Legislature sees fit. The Legislature has delegated to the Commission the power to regulate recreational fishing in waters of the state (Fish & Game Code, §§ 200, 202, 205). The Commission has reviewed its own regulations and finds that the proposed regulations are neither inconsistent nor incompatible with

existing state regulations. The Commission has searched the California Code of Regulations and finds no other state agency regulations pertaining to angling closures to protect sport fish populations. Further, the Commission has determined that there are no existing comparable federal regulations.