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

Add Section 180.6
Title 14, California Code of Regulations
Re: Minimum trap hole diameter to take hagfish

I. Date of Initial Statement of Reasons: April 7, 2014

II. Dates and Locations of Scheduled Hearings:

(a) Notice Hearing: Date: June 4, 2014
Location: Eureka, California

(b) Discussion/Adoption Hearing: Date: August 6, 2014
Location: San Diego, California

III. Description of Regulatory Action:

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

Pacific hagfish, *Eptatretus stoutii*, (hagfish) may be taken by Korean style traps or 5-gallon bucket traps (sections 9000.5 and 9001.6, Fish and Game Code (FGC)). Both trap types consist of an entry funnel and have many holes which allow water to pass, dispersal of scent from bait, and escapement of small hagfish. Korean traps are smaller and come with pre-made holes; they are not currently in use in California. Bucket traps are fabricated by the fisherman using common 5-gallon buckets with lids, and selecting the desired hole diameter and drilling many holes. Each bucket is equipped with a destruction device according to the requirement in Section 9003, Fish and Game Code, and Section 180.2, Title 14, California Code of Regulations (CCR). Bucket traps are laid on the ocean floor in strings of 200. Typically all hagfish retained by the traps, unless culled by the fisherman at sea, are landed. Smaller hagfish are undesirable by market standards; however, all hagfish regardless of size or maturity are exported and utilized by the end consumers.

Present Regulations

Statutes specify the maximum number of traps allowed by type (whether bucket or Korean), require a general trap permit, and prohibit possession of other species or gear while targeting or having in possession hagfish

(Sections 9000.5, 9001, 9001.6, FGC). Presently there are no statutes or regulations requiring a minimum escapement hole diameter for immature hagfish in either type of trap.

Proposed Regulation

The Department of Fish and Wildlife (Department) is proposing a regulation requiring that any trap used to take hagfish shall have all holes with a minimum diameter of 9/16 inch (refer to Figure 1). This proposal is intended to maintain the sustainability of California's hagfish fishery by reducing retention of smaller, immature fish by providing a means of escapement. The smallest size of retained hagfish is influenced by the size of the many holes in the trap and length of soak time (hours in the water typically vary from several to a full day). It is impractical to attempt to regulate soak time; whereas, setting a minimum size for the escapement holes is both easy for the fishery to meet and for law enforcement to apply.

Preferred Option: 9/16 inch minimum hole diameter

The Department completed a trap study (Tanaka and Crane 2013) testing the influence of hole diameter on average size of hagfish retained by the trap. Hole diameters tested included 3/8 inch, 1/2 inch, 9/16 inch, and 5/8 inch. Based on the results of this study, and other research, a 9/16 inch hole diameter is recommended by the Department:

Pros

- Significantly decreases retention of immature hagfish.
- The larger hagfish retained by the trap are more likely to be desirable by consumers and thereby reduce waste.
- A 9/16 inch hole diameter is already employed by some fishery participants as required by their fish receiver.

Cons

- Existing traps with smaller holes (generally 1/2 inch) will be required to be modified.
- Such modifications will require time and effort and may result in some lost fishing time; however, the hole diameter is easily increased by using a 9/16 inch drill bit.
- Less retention of smaller hagfish could result in smaller landings by weight; however, the landed larger fish are more desirable to the end consumer.

Rationale

Since 2007, hagfish have been shipped in live condition as human food with commercial interest by California fishermen remaining steady. The primary market is export only, mainly to South Korea. Participation peaked in 2008 with 83 vessels landing 901.4 tons. Since 2010, six port complexes have been landing hagfish with an average of 28 participating vessels annually. The hagfish fishery along the west coast of North America now occurs coast-wide from Washington State to Mexico.

This fishery appears to be self-regulating due to the demands and expectations that hagfish exporters have regarding hagfish size and quality. However, the fishery is volume-based and generally the catch from several vessels may be mixed after landing, making catch ownership difficult. All hagfish, regardless of size, are shipped. There is no regulatory mechanism to ensure that immature fish are not a significant proportion of the catch. In order to promote the sustainability of this fishery, a regulation is desirable that would reduce the potential for harvesting a significant percentage of immature hagfish. The following points provide a rationale for establishing a minimum hole diameter for all hagfish traps.

1. Relationship between average weight/ length and hole diameter. Melvin and Osborn (1992) conducted a study testing various parameters (including hole diameters) employed by the 1988-92 fisheries. They concluded that escapement occurs and hole diameter is a potential tool to select for larger hagfish.

   The Department's study (Tanaka and Crane 2013) utilizing hole diameters (3/8 inch, 1/2 inch, 9/16 inch, and 5/8 inch) confirmed that hole diameter significantly influences weight and length of retained hagfish.

2. Relationship between hole diameter and female first maturity. The Department's data (Tanaka and Crane 2013) show female first maturity at 338 mm in length. A 9/16 inch escapement hole diameter (refer to Figure 1) reduced take of immature fish (less than 338 mm) by 10 percent compared to other diameters.

Figure 1.

A 5-gallon bucket trap (left) with 9/16 inch diameter minimum dimension for all holes throughout the top, sides and bottom with a single entry funnel. This configuration will meet the proposed escapement hole dimension of 9/16 inch.

The Korean trap (right) with 5/16 and 3/8 inch diameter holes will not meet the proposed escapement hole dimension of 9/16 inch.

3. Fishery average count per pound indicates take of immature hagfish. Department sampling of major ports of landing for all years combined, show an average count per pound range of 4.30 (+/- 0.60) to 4.62 (+/- 0.75). Sampling occurred at Terminal Island (2008-11), Morro Bay (2009-12), Moss Landing (2008), and Eureka (2011-14). Department dissection data taken from dockside sampled hagfish show that the 4.62 average count per pound resulted in an estimated take of 50 percent immature females. This is based on a sample of 5676 female hagfish, of which, 2425 were immature. By contrast, the 4.30 average count per pound resulted in a 10 percent reduction of immature females. This reduced average was the result of all fishery participants in that port using 9/16-inch holes.

4. Low fecundity, age, and average length of hagfish when first caught in the fishery. Mature female hagfish typically produce 30 or fewer eggs per spawning event (Gorbman 1997). Age estimates for hagfish are few; one estimate predicts that it may take 7-12 years to reach maturity (Nakamura 1994). Department fishery-dependent sample data show that the smallest sampled female was 215 mm.

It is the policy of the State to encourage the conservation, maintenance, and utilization of the living resources of the ocean and inland 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 California fisheries. The objectives of this policy include, but are not limited to, rebuilding depressed stocks and achieving the sustainable use of the State's fishery resources. Where a species is the object of commercial fishing, a sufficient resource shall be maintained to support reasonable take, taking into consideration the necessity of regulating fishing practice such that a sustainable population exists to withstand fishing pressure. Adoption of measures to ensure escapement of immature hagfish will help maintain sufficient populations of hagfish to ensure the continued sustainability of this resource and therefore, the benefits to the environment.

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

Authority cited: Sections 8403 and 9022, Fish and Game Code.
Reference: Sections 8403 and 9022, Fish and Game Code.

(c) Specific Technology or Equipment Required by Regulatory Change: None.

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

Economic Impact Assessment

Barss, W. H. 1993. Pacific Hagfish, *Eptatretus stouti*, and Black Hagfish, *E. deani*: The Oregon Fishery and Port Sampling Observations, 1988-92. Marine Fisheries Review 55(4):19-30.

Gorbman, A. 1997. Hagfish development. Zoological Science 14:375-390.

Melvin, E.F. and S.A. Osborn. 1992. Development of the west coast fishery for Pacific hagfish. National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Final Report. NA90AA-H-SK142.

Nakamura, R. 1994. Growth and age study of Pacific hagfish *Eptatretus stoutii* off the central California coast. National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Final Report NA27FD0169-01.

Tanaka, T.H. and K. Crane. 2013. Investigation into the optimal bucket trap hole diameter to reduce capture of immature hagfish. California Fish and Game (in review) 100:1-11.

(e) Public Discussion of Proposed Regulation Prior to Notice Publication:

Presentation of Department study results to hagfish industry participants 21 November 2013. Eureka, California. Meeting to inform fishery participants about the study, results, and the Department's plan to pursue a requirement for a minimum hole diameter. One fish receiver attended and provided oral comments. The one attendee was asked to submit comments in writing or by email. None were received.

Presentation of Department survey results to hagfish industry participants, 21 November 2013. Morro Bay, California. Meeting to inform fishery participants about the study, results, and the Department's plan to pursue a requirement for a minimum hole diameter. Three fishermen attended and provided oral comments. Attendees were asked to submit comments in writing or by email. None were received.

IV. Description of Reasonable Alternatives to Regulatory Action:

(a) Alternatives to Regulation Change:

The smallest size of retained hagfish is influenced by the size of the many holes in the trap and length of soak time (hours in the water). The Department identified regulation of the soak time as an alternative; however it is impractical to regulate soak time

because enforcement cannot be present at sea for the many hours necessary. No other alternative was identified.

(b) No Change Alternative

The no change alternative would allow the fishery to take any size hagfish as at present. However, this is not preferable because data indicate the catch trend is toward smaller, immature fish. Since hagfish are a low fecundity species, excessive take of immature hagfish may be detrimental to the long term sustainability of the fishery.

(c) Consideration of Alternatives:

In view of the 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 is difficult to assess since socio-economic data for this fishery are limited. Due to data limitations, assumptions are made. Notwithstanding this limitation, 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 will not have a significant statewide adverse economic impact directly affecting businesses, including the ability of California businesses to compete with businesses in other states. This is an export-only fishery, with very few participating fishery receivers. The demand from the primary importing country has been stable for several years and is increasing.

(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 Resident, Worker Safety, and the State's Environment.

No impacts are anticipated on the creation or elimination of jobs within the state, the creation of new businesses or elimination of existing businesses, or the expansion of businesses in California. The commercial fishery is influenced primarily by the foreign market demand for hagfish.

There is no anticipated change in benefit to the health and welfare of California residents. The fishery is entirely for foreign export, so the regulation is unlikely to affect the health and welfare of California residents.

The proposed regulation does not affect worker safety.

There are anticipated benefits to the environment by the sustainable management of California's hagfish resource.

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

The Commission anticipates minor costs to some hagfish fishermen to drill larger holes in their current traps. Some fishermen already comply but the number is not known. The cost for the work to comply is estimated to be $500.00 per fisherman.

(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.

Informative Digest/ Policy Statement Overview

Current statutes, California Fish and Game Code §9000.5(a)(d), §9001, and §9001.6, define the types of traps used in the hagfish fishery, require a general trap permit, specify maximum number of traps allowed by type, and prohibit possession of other species or gear while targeting or having in possession hagfish. No statute or regulation exists requiring a minimum hole diameter for hagfish traps.

The proposed regulation would require all traps used within the hagfish fishery to have a minimum hole diameter of 9/16 inch. Its purpose is to sustain the hagfish resource by promoting escapement of smaller, immature hagfish.

BENEFITS OF THE PROPOSED ACTION:

The proposed regulation benefits the environment. Adoption of measures to ensure escapement of immature hagfish will help maintain sufficient populations of hagfish to ensure the continued sustainability of this resource.

EVALUATION OF INCOMPATIBILITY WITH EXISTING REGULATIONS:

The proposed regulation is neither inconsistent nor incompatible with existing State regulations. No other State agency has the authority to promulgate commercial fishing regulations.

Regulatory Language

Section 180.6, Title 14, CCR, is added to read:

§180.6. Hagfish Traps.

All openings in traps used to take hagfish, excluding the entrance funnel, shall have a minimum diameter of 9/16 inch in any dimension.

Authority cited: Sections 8403 and 9022, Fish and Game Code.
Reference: Sections 8403 and 9022, Fish and Game Code.