

# **Fisheries Bycatch Consideration in the Amended Marine Life Management Act Master Plan:**

## **A Recommendations Report of the Fisheries Bycatch Workgroup to the California Fish and Game Commission's Marine Resources Committee**

*As approved by the workgroup on August 1, 2017*

### **Staff Overview**

The Fisheries Bycatch Workgroup (workgroup), composed of commercial and recreational fishermen and their representatives as well as non-governmental organizations, was convened by the California Fish and Game Commission (Commission) and its Marine Resources Committee (MRC) to review bycatch issues in California's fisheries management, as well as to help inform the California Department of Fish and Wildlife (Department) drafting of an amended Marine Life Management Act master plan.

The workgroup reviewed existing State bycatch guidance and definitions, and other relevant action items within the scope of Commission authority, and developed input to recommend to the MRC, Commission, and Department for consideration. The workgroup developed a report based on their input. The report, which follows this introduction, is an approved product of the workgroup and includes a draft bycatch section and appendix for consideration in developing the amended master plan. The report reflects areas of consensus in the workgroup and, where consensus was not reached, provides options that reflect the different viewpoints represented within the workgroup. At the direction of MRC and the Commission, the report was delivered directly to the Department for consideration and integration, where possible, into the draft amended master plan prior to delivery of the report to MRC (scheduled for November 9, 2017).

In October 2017, the Department completed its initial draft version of "2018 Master Plan for Fisheries: A Guide for Implementation of the Marine Life Management Act". Chapter 6, titled "Ecosystem-based objectives", includes a section on limiting bycatch to acceptable types and amounts, which largely draws from the workgroup report and incorporates the majority of consensus language. Non-consensus options within the report may be considered through the MRC and Commission.

The initial draft of the amended master plan is available for public review on the Department's website as of October 10, 2017, at [www.wildlife.ca.gov/Conservation/Marine/MLMA/Master-Plan/through November 9](http://www.wildlife.ca.gov/Conservation/Marine/MLMA/Master-Plan/through%20November%209). A revised draft version of the master plan, based on public comment, is expected to be delivered to the Commission in early 2018. The November 9, 2017 MRC meeting agenda will include a discussion of the initial draft amended master plan, as well as options in the workgroup report where consensus was not reached, to allow for further comment and possible recommendations from MRC to the Commission.

# Fisheries Bycatch Workgroup Report

*As approved by the workgroup on August 1, 2017*

## Background

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The Bycatch Working Group (BWG) is an information gathering group of stakeholders who volunteered to provide input and recommendations to the California Department of Fish and Wildlife (CDFW) and the Fish & Game Commission (FGC) regarding potential revisions to the content for section **2.5.2 Bycatch** of the Marine Life Management Act (MLMA) Master Plan.

MLMA objectives, as pertaining to bycatch, are based on: §7056: *In order to achieve the primary fishery management goal of sustainability, every sport and commercial marine fishery under the jurisdiction of the state shall be managed under a system whose objectives include...* In the context of sustainable ecosystem-based fishery management, one of the objectives of the MLMA that specifically addresses bycatch is §7056(d): *“The fishery limits bycatch to acceptable types and amounts, as determined for each fishery”*.

The FGC does not have the authority to amend statute. The Commission can provide clarification but cannot propose any regulations which would, in effect, change the intent of the Legislature. Against this backdrop, the BWG is limited to current definitions provided in the Fish and Game Code.

## Subgroup Deliverables

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**Expanded definition discussion (Work Plan Objective 1):** The subgroup has determined that a compilation of bycatch terminology from the Fish and Game Code, a comparison of how this terminology differs from other jurisdictions, and clarification of the phrase “target of the fishery” in the definition of bycatch, section **90.5**, would inform the process.

- **Deliverable 1:** Fish and Game Code §7085 requires, for fisheries in which bycatch occurs, an analysis of the amount and type of bycatch using four criteria. In order to effectively undertake this analysis, a determination has to be made regarding what is the target and what is bycatch. We will be including subgroup feedback that strives to inform this determination.
- **Deliverable 2:** Add Appendix A that includes definitions from other governing bodies (Federal and/or other State) where the same terms are defined elsewhere. Appendix A can be used to compare similarities and differences across these jurisdictions for reference purposes.

**Manager inquiries and scoring system (Work Plan Objective 2):**

The subgroup is proposing examples of manager inquiries that could be considered to assess bycatch. The intent is to suggest a non-species specific scoring system, using a series of manager inquiries, to inform what types and/or amounts of bycatch might be considered unacceptable. This scoring system would use a series of Yes/No questions along with *None/Low/Medium/High* probability scenarios that could inform if bycatch has a *None/Low/Medium/High* likelihood of being unacceptable.

This scoring system is to be based on the four criteria listed in **§7085(b)**:

- (1) *Legality of the bycatch under any relevant law.*
- (2) *Degree of threat to the sustainability of the bycatch species.*
- (3) *Impacts on fisheries that target the bycatch species.*
- (4) *Ecosystem impacts.*

- Deliverable 3: Provide feedback on more specific inquiries within each of the above four criteria for determining unacceptable types and amounts of bycatch
- Deliverable 4 (Not included here): Suggest a manager scoring system using these inquiry criteria to inform what types and amounts of bycatch are unacceptable. Please note this may be developed by BWG at a later point, depending on DFW's level of interest.
- Deliverable 5: Draft bycatch section for amended Master Plan - Integrate our suggestions/recommendations from deliverables 1 thru 3 above into the format of the Concepts document provided June 23<sup>rd</sup> by staff, with discussion points for the entire BWG to review and provide input.

## Draft Bycatch Concepts

### I. Relevant provisions of California statutes

#### Definitions:

§45. "Fish" means a wild fish, mollusk, crustacean, invertebrate, amphibian, or part, spawn, or ovum of any of those animals.

§86. "Take" means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.

§90.5. "Bycatch" means fish or other marine life that are taken in a fishery but are not the target of the fishery. Bycatch includes discards.

§91. "Discard" means fish that are taken in a fishery but are not retained because they are of an undesirable species, size, sex, or quality, or because they are required by law not to be retained.

§94. "Fishery" means both of the following:

- (a) One or more populations of marine fish or marine plants that may be treated as a unit for purposes of conservation and management and that are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics.
- (b) Fishing for, harvesting, or catching the populations described in (a).

§96. "Marine living resources" includes all wild mammals, birds, reptiles, fish, and plants that normally occur in or are associated with salt water, and the marine habitats upon which these animals and plants depend for their continued viability.

#### Requirement to minimize unacceptable bycatch:

§7056. In order to achieve the primary fishery management goal of sustainability, every sport and commercial marine fishery under the jurisdiction of the state shall be managed under a system whose objectives include all of the following: (Note that only subsection (d) applies to the issue of bycatch; others omitted for brevity)

...

(d) The fishery limits bycatch to acceptable types and amounts, as determined for each fishery.

§7085. Consistent with subdivision (b) of Section 7072, each fishery management plan or plan amendment prepared by the department, in fisheries in which bycatch occurs, shall include all of the following:

(a) Information on the amount and type of bycatch.

(b) Analysis of the amount and type of bycatch based on the following criteria:

- (1) Legality of the bycatch under any relevant law.
- (2) Degree of threat to the sustainability of the bycatch species.
- (3) Impacts on fisheries that target the bycatch species.
- (4) Ecosystem impacts.

(c) In the case of unacceptable amounts or types of bycatch, conservation and management measures that, in the following priority, do the following:

- (1) Minimize bycatch.
- (2) Minimize mortality of discards that cannot be avoided.

## **II. Understanding bycatch**

While fishers are participating in a fishery, the gear they use may capture marine life in addition to what they are targeting. For example, commercial and recreational fishermen using hook and line often cannot tell which species of fish they will catch. There are many terms used to describe this: bycatch, discards, non-target, incidental catch, and so forth. Sometimes these terms are used interchangeably, but their implications differ subtly. The California Fish and Game Code has definitions for “bycatch” and “discards” (See Appendix A for a comparison of bycatch-related terminology across California, federal law, and other states). In California, historically, the species or species-complex managed by a fishery management plan (FMP) has been considered the target of the fishery by the DFW. However, §90.5 defines any species that is not the target of the fishery as bycatch, whether it is discarded or retained. The MLMA’s definition of bycatch includes target species that are discarded because they are prohibited due to size, season, catch limit, or sex restrictions, as well as non-target species that are desirable and retained or discarded because they are undesirable or prohibited. Bycatch species may include fish or other marine living resources. The MLMA mandates that unacceptable amounts or types of bycatch be addressed through conservation and management measures to minimize the impacts.

## **III. Minimizing unacceptable bycatch**

*Assessing and addressing bycatch impacts*

### **Non-Consensus Option 1: (No text is desired here)**

Note: the members of the subgroup recommending this section not be included believe this is repetitive and covered below in addition to serving no real purpose other than to express an opinion.

**Alternative to Option 1:** If the DFW agrees that this section adds value, we would offer the following for consideration, “Bycatch that is discarded may include discards of the target species (§91). For bycatch that is deemed unacceptable the MLMA mandates management measures that result in a minimization of such.”

### **Non-Consensus Option 2**

Bycatch that is discarded may either be released alive or dead and includes discards of the target species. Bycatch that is released alive may or may not die after release, or may be injured or otherwise impaired. This discard mortality may or may not pose a risk to a species of bycatch, to the target species, to other fisheries, and/or to the marine ecosystem. In some cases, discards of live fish may be desirable and offer conservation benefits to the resource, for example in the case of size limits or recreational catch and release fishing. Of particular concern are vulnerable long-lived species with low reproductive rates such as birds, sea turtles, marine mammals, and some species of fish. Bycatch can also impact biodiversity and ecosystem function, for example, through the unintended removal of top predators or prey from ocean ecosystems. The capture of non-target species may also have negative impacts on the social and economic aspects of fisheries by increasing monitoring accountability costs, creating compliance burdens, reducing opportunities in other fisheries, harming public resources, and impacting the marketability of species.

Fish and Game Code §7085 requires a four-step process for identifying bycatch and determining whether or not it is unacceptable, as follows.

## **Step 1. Understanding the type and amount of catch**

### ***Non-Consensus Option 1***

As an initial step, available information on all the species caught in a fishery *should* be gathered. Reliable sources of this information include readily available government provided logbooks, landing receipts, Federal Stock Assessment and Fishery Evaluation (SAFE) reports, report cards, and recreational creel check/surveys. Additionally, for those fisheries that require observers or electronic monitoring, those reports/recordings can validate the aforementioned data sources. If information is unavailable, it should be obtained by any feasible means.

### ***Non-Consensus Option 2***

As an initial step, available information on all the species caught in a fishery *needs to be* gathered. Typically, the most reliable source of catch data is from an independent source such as a fishery observer or recordings from electronic monitoring equipment. However, other reliable information includes fishery logbook data, landings receipts, Federal Stock Assessment and Fishery Evaluation (SAFE) reports, report cards, and recreational creel check/surveys. If such information is not available, it should be prioritized for additional data collection, and managers should determine what species are likely to be caught in the fishery based on consultations with fishermen, the nature of the gear, the species present where the fishery operates, and other available information.

## **Step 2. Distinguishing target species from non-target species**

Once species that are caught in a fishery are identified, it is necessary to identify which are the targets of the fishery, and which are bycatch. The bycatch definition (§90.5) references “target of the fishery” where a fishery may contain one or more species as provided in FGC §94. California statute does not provide a definition of target, which leads to confusion in interpretation by those involved in the MLMA process. Federal law (see Appendix A) provides definitions for target stocks, economic discards, regulatory discards, and non-target stocks. BWG members agree on the following points about targets and discards:

- A target can be one or more species in a fishery.
- Declaration of a target when leaving the dock may be difficult and may change during the trip.
- Discards may be made at sea or during the landing process of a commercial fishery.
- Recreational catch and release fisheries are targeting many of the species they choose to release. There may be a discard of a target species.

### ***Non-Consensus Option 1***

A fishery may contain one or more species as provided in FGC §94. As alluded to in the Section entitled “Understanding bycatch”, historically, the species or group of species (complex) managed by an FMP or other regulations has been considered the target of the fishery by the Department. Some BWG members wonder if this historical perspective is still appropriate given advances in data collection, management and other measures designed to ensure sustainability and ecosystem health. The lack of definition of “target of the fishery” in California statute leads to confusion in interpretation by those involved in the MLMA process. While we are not free to recommend changes to statutory definitions, we are free to recommend definitions for those terms not defined in the Code.

With that in mind, we would suggest the term “**target of the fishery**” be defined as: *Any fish (§45) legally harvested by a specific gear type that is marketable and/or retained for personal use with this caveat: In the event that catches increase on a species legal to catch but unmanaged under state or federal regulations, managers should consider that species or species group under emerging fisheries policies as described in §7090(b).*

### ***Non-Consensus Option 2***

The definition of bycatch under the MLMA includes non-target catch that is retained. Further, any discards of a target species are considered bycatch under the MLMA and must be considered in Steps 3 and 4. Defining “**target species**” requires a series of inquiries which might include:

- Whether the species is managed as a target species under a state or federal FMP;
- Whether the species meets the definition of “Established Fishery<sup>1</sup>” (FGC §7090(b)(2)) under the MLMA;
- How often the species is present in the landings in the fishery;
- What percentage of the total landings of this fishery the species represents;
- What percentage of total landings of the species this fishery represents;
- The marketability/desirability of the species;
- Consultations with fishing participants regarding intended catch in the fishery;
- Whether the species is part of a biological assemblage with other target species; and
- Importance of the species to the overall profitability or composition of the fishery.

It’s important to note that while the MLMA creates a distinction between target species and bycatch, regardless of the determination, impacts to any species that is caught need to be understood and addressed. In the case of targets, impacts need to be managed so that “sustainability” is maintained. In the case of bycatch, impacts need to be managed so that they are “acceptable.” Therefore, if the species is not managed as a target species, it must be analyzed as bycatch under Steps 3 and 4 below. In addition, recreational catch and release fish may be considered target species. However, given that they are discarded, they must be analyzed in steps 3 and 4.

### ***Non-Consensus Option 3***

Fishery participants use the following terms in California:

- **Target:** Primary species or species-complex fishers seek to catch for sale or personal use. Managers should consider multi-species fisheries when determining target.
- **Incidental catch:** Species that are commonly, or occasionally, caught with the target that are legally retained for sale or personal use.
- **Bycatch:** Target species that are discarded because they are of an undesirable size, sex, or quality, or for other economic reasons, and those not retained because they are prohibited by statutory or regulatory requirements. Fish released alive under a recreational catch and release fishery under Federal code (16 USC § 1802(2)) are not considered bycatch. However, because they are discarded, step 3 would be required to determine if this is unacceptable for the species.

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<sup>1</sup> “Established fishery,” in regard to a marine fishery, means, prior to January 1, 1999, one or more of the following:  
(A) A restricted access fishery has been established in this code or in regulations adopted by the commission.  
(B) A fishery, for which a federal fishery management plan exists, and in which the catch is limited within a designated time period.  
(C) A fishery for which a population estimate and catch quota is established annually.  
(D) A fishery for which regulations for the fishery are considered at least biennially by the commission.  
(E) A fishery for which this code or regulations adopted by the commission prescribes at least two management measures developed for the purpose of sustaining the fishery. Management measures include minimum or maximum size limits, seasons, time, gear, area restriction, and prohibition on sale or possession of fish.

Defining a primary target requires a series of inquiries which might include:

- Consultations with fishing participants regarding intended catch in the fishery;
- How often the species is present in the landings in the fishery;
- What percentage of the total landings of this fishery the species represents;
- The marketability/desirability/value of the species in the fishery;
- Whether the species is part of a biological assemblage or regulatory grouping with the target species;

Incidental catch, as described above, might not be required to be analyzed as bycatch under Steps 3 and 4 below if it is already managed by any of the following:

- An "established fishery" (FGC §7090(b)(2));
- State or Federal law or regulation;
- Under another FMP;

All bycatch and unmanaged incidental catch, as described above, should be analyzed under Steps 3 and 4 below.

### **Step 3. Determining "unacceptable" types and amounts of bycatch**

The MLMA analyzes the amount and type of bycatch using four criteria (§7085(b)(1)-(4)), which have not been further defined in regulation. If the result of the analysis, considering all four criteria, is that the amount and type of bycatch is unacceptable, then further management action is required. Identifying a uniform definition of "unacceptable" that is appropriate across California's diverse suite of fisheries is challenging, and is ultimately based on a determination by managers. However, structured inquiries may provide a practical means of conducting fishery-specific analysis and identifying management measures for minimizing unacceptable types of bycatch. The questions provided below can be used to consistently analyze what is "unacceptable" bycatch within a particular fishery. Responses to these questions are not proposed to be used in a formulaic or prescriptive way, but are intended to provide a structured means for managers to consider the issue and articulate their findings.

#### **(A) Legality of take of bycatch species**

This criterion includes any species that might be illegal to take under any relevant state, federal, or international law.

#### **Manager inquiries:**

- Has retention of or interaction with this species been assessed based on the appropriate federal and state laws and regulations and does this catch comply with these laws and regulations?
- Is the species covered under the Endangered Species Act, Marine Mammal Protection Act, the Migratory Bird Treaty Act, the Billfish Conservation Act, Magnuson Stevens Fishery Conservation and Management Act, The Fish and Game Code, Title 14 of the California Code of Regulations, Title 50 of the Code of Federal Regulations, or another Fishery Management Plan?
- Are there prohibitions against the take of the bycatch species using a specific gear type employed in prosecuting the fishery?
- Are special permits required to retain or interact with the species (such as Incidental Take Permits), does the fishery currently have such permits, and do the levels of bycatch comply with such permits?
- Does the species have incidental catch allowance, annual catch limits, or other restrictions on the amount, size, or sex restrictions on catch allowed, and does the catch comply with such limits?



**Non-consensus proposed addition:**

- Does the Commission have a different standard of acceptability for bycatch than those inherent in federal laws?

**(B) Degree of threat to the sustainability of the bycatch specie**

***Non-Consensus Option 1***

This criterion considers the *relative* impact of the current level of bycatch *within the fishery*, on the biological health of the bycatch species: that is, does the type or amount of bycatch compromise the ability of a population to maintain sustainable levels.

***Non-Consensus Option 2***

This criterion considers the impact of both the *cumulative and relative* level of bycatch on the biological health of the bycatch species: that is, does the type or amount of bycatch compromise the ability of a population to maintain sustainable levels.

**Manager inquiries:**

- Does a population status/stock assessment exist for this species and is there confidence in that data such that a reasonable determination can be made if the stock considered healthy, overfished, or depleted?
- Is the species one you would typically encounter in the fishery?
- Are there regulatory (or other) limits on the amount of take of this particular species?
- Is the bycatch the product of recreational catch and release practices, and what is the scientific determination this interaction will have a negative impact on the species?
- Probability of mortality when discarded given characteristics of the fishery and gear type, do any post-release studies exist to verify the mortality rate?
- Are there any existing State/Federal management measures and are they effective in ensuring sustainability?
- What is the probability of mortality exceeding scientifically determined levels necessary for the continued viability of the species?

**Non-consensus proposed additions:**

- What data is available on the amount of bycatch of each species?
- If no stock assessment/estimate available, what is the vulnerability of the species to exploitation. This considers if there is life history data on the bycatch species, what is the replenishment/growth rate, and what is the likelihood the amount of catch will diminish the bycatch species, or existing vulnerability analysis (e.g., FishBase scores, PSA, etc.).
- How many species are caught as bycatch in the fishery? How many of these are highly vulnerable or high risk?
- Are there other gear types available for catching the target species that are more effective at avoiding (discarded) bycatch or do not catch protected species?
- What is the total fishing mortality (bycatch in this fishery plus mortality from all other fisheries) relative to sustainable limits? Is total mortality exceeding the ability of the population to reproduce?
- How much does this fishery contribute to mortality, relative to other fisheries?
- What portion of the total catch of each bycatch species is retained vs. discarded?
- What is the overall rate of discards in the fishery (by volume or by number of animals, as a percentage of total catch)?
- Is the bycatch species known to have low population levels or be depleted?

**(C) Impacts on fisheries that target the bycatch species**

This criterion considers whether the current level of bycatch *within the fishery* negatively impacts fishermen or the management of another fishery, that targets the bycatch species. Factors to consider may include increasing competition between fleets that target certain species, by capturing species managed under federal rebuilding plans, or by increasing mortality of juveniles targeted by another fishery.

**Manager inquiries:**

- Does a directed fishery exist on the species?
- Is the amount of bycatch having a negative socio-economic impact on fisheries/fishing communities which target or need incidental catch of this species?
- Have there been reductions in opportunities for participants in fisheries that target the bycatch species
- Have there been reductions in fishery quotas or opportunities (time and area closures for example) based on bycatch issues?
- Have there been early closures of a fishery based on higher than expected bycatch?
- Have there been changes in fishing, processing, and marketing costs due to bycatch?
- Is there a management allowance for percent of catch or a prohibition on retention (cognizant of §7704 waste)?

**Non-consensus proposed additions:**

- Have bycatch reduction measures made the fishery less economically attractive to new participants?
- Have there been changes in the social or cultural value of fishing activities due to bycatch?
- Is the bycatch mortality in this fishery accounted for in the management of the directed fishery?
- What is the economic value of the discard mortality of species targeted by other fisheries?
- Is there a conservation reason that incidental catch should be limited/prohibited/discouraged? (For example, there is strong conservation reasons why Dungeness crabs and lobsters shouldn't be targeted with trawls or gillnets, as such gears may not be able to select based on size, sex, seasonality, etc.)
- Is the fishery complying with all restrictions present on the directed fishery? Is the fishery operating in a closed season for the bycatch species?
- Have there been changes in marketing such that a previously discarded bycatch species is now landed kept and sold?

**(D) Ecosystem impacts**

***Non-Consensus Option 1***

This criterion explores whether the current level of bycatch *within the fishery* impedes the ability of the bycatch species to fulfill its functional role within the ecosystem. This is difficult to assess for most species, but tools such as Ecological Risk Assessment may eventually help provide useful guidance and qualitative information, even in data-poor circumstances.

***Non-Consensus Option 2***

This criterion explores whether the current *cumulative and relative* level of bycatch impedes the ability of the bycatch species to fulfill its functional role within the ecosystem. This is difficult to assess for most species, but tools such as Ecological Risk Assessment may eventually help provide useful guidance and qualitative information, even in data-poor circumstances.

**Manager inquiries:**

- What is the ecosystem role of the bycatch species: keystone species<sup>2</sup>, habitat forming, predator, prey, other?
- Does scientific evidence show the amount of bycatch significantly increases the risk that a bycatch species will be unable to serve its ecosystem role?

***Non-consensus proposed additions:***

- Bycatch which is discarded dead serves an ecosystem function as well - provides nutrients and feed for scavengers and other marine life. Are there studies showing this?
- How does the discard/bycatch rate compare to other methods of targeting the same species?
- Has the role of the species (and/or potential bycatch impacts) been evaluated in a food web or ecosystem model? (Atlantis, EcoPath, NOAA Integrated Ecosystem Assessment, etc.)
- What is the value of the bycatch species to industries other than fishing?
- Is there evidence that the bycatch is affecting the ability of the species to fully perform its ecological function? If not, what is the risk that such impairment is occurring (based on consultation with ecological experts, ecosystem models)?
- How many species of bycatch are there in the fishery?

**Step 4. Addressing unacceptable bycatch**

If the current type or amount of bycatch is determined to be unacceptable, conservation and management measures are required that minimize that bycatch, and in cases where discards are unavoidable, minimize the mortality of those discards (§7085c).

**Manager inquiries:**

- What is the economic impact of implementing management measures to reduce bycatch and bycatch mortality to those participating in the fishery in which the bycatch occurs?
- Have bycatch management measures been shown to be effective at reducing bycatch and/or bycatch mortality in similar fisheries?

***Non-consensus proposed additions:***

- What is the relative contribution of bycatch mortality in this fishery to bycatch mortality across other fisheries (where data is available) (i.e., what is magnitude of impact on the cumulative impact across all fisheries)?
- Are measures in place to minimize the impact of the fishery on bycatch species and ensure the fishery does not overfish or hinder the recovery of bycatch species?
- What are the benefits of implementing management measures to the bycatch species, marine ecosystem, and other fisheries and industries?
- How will management measures be enforced?

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<sup>2</sup> \* Note: A keystone species is a species that has a disproportionately large effect on its environment relative to its abundance. Paine, R.T. (1995). "A Conversation on Refining the Concept of Keystone Species". Conservation Biology. 9 (4): 962–964. doi:10.1046/j.1523-1739.1995.09040962.x

#### ***IV. Potential management measures for minimizing unacceptable amounts or types of bycatch***

Bycatch can affect the profitability of a fishery in terms of time taken away from harvesting target species, fuel used and damage to gear, and may have unintended impacts on the marine ecosystem. However, understanding and implementing effective means of reducing bycatch while maintaining target catch and economic viability of the fishery, typically requires input from all stakeholders.

##### ***Non-Consensus Option 1***

Close collaboration with participants in the various fisheries, with input from other stakeholders, has provided a number of strategies which have reduced unacceptable bycatch and/or reduced bycatch mortality. They can, generally, be grouped as follows:

- Gear modifications (escape ports, use of circle hooks, etc.)
- Management activities designed to minimize the potential for bycatch of certain species (time and area closures, incidental take caps, etc.)
- Increased and improved data collection (updating logbooks, increase DFW sampling of commercial landings, etc.)

##### ***Non-Consensus Option 2***

There are a number of frequently used strategies for minimizing bycatch, which have been developed in collaboration with the various fisheries. They include but are not limited to:

Management tools for minimizing unacceptable bycatch could include but are not limited to:

- Gear modifications e.g., barbless hooks, use of circle hooks, minimum mesh size requirements, escape ports, acoustic pingers, LED lights)
- Management measures to reduce the likelihood of interacting with bycatch species (e.g. effort limits, time/area closures, hard caps or limits on bycatch species, best practices guides,
- Increased and improved data collection (e.g. increasing observer coverage rates or implementing electronic monitoring systems); and
- Incentives (e.g. funding to transition to cleaner gear types).

To the extent that that unacceptable bycatch cannot be avoided, management tools for minimizing bycatch mortality may include but are not limited to:

- Best practices on handling/discarding bycatch (i.e., releasing rockfish at depth, dehooking turtles)
- Reducing or setting maximum tow or set times
- Further studies on post-release mortality

## Appendix A: Definitions

Table of definitions from California statutes compared to Federal and other state law.						
TERM	CALIFORNIA (FISH AND GAME CODE)	FEDERAL	OREGON (REVISED STATUTES)	ALASKA (ADMINISTRATIVE CODE)	RHODE ISLAND	CONNECTICUT
<b>Bycatch</b>	Means fish or other marine life that are taken in a fishery but which are not the target of the fishery. Bycatch includes discards. (FGC §90.5)	Fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. Such term does not include fish released alive under a recreational catch and release fishery management program. (16 USC §1802(2))	Unintended taking of a species of food fish that: (A) Occurs while targeting another species of food fish; and (B) Is prohibited due to time, place, manner, regulations or quota restrictions. (ORS §508.540)  OR  Commercially caught fish or a species that was not targeted for harvesting. (ORS §616.223)	Means any species or species group taken incidentally in the course of participating in a directed fishery for another species or species group. (AAC §28.975)	Means marine species which have been harvested, but which are not sold or kept for personal use, and includes species that are discarded while a fisher is directing his/her effort toward the harvest of another marine species.	That portion of a commercial fishery catch that is taken incidental to the directed fishing effort. Directed fishing is indicated by the primary species or group of species sought, the commercial gear utilized, the area and time of the year when the fishing occurs. Bycatch may include but not be limited to an amount of a species allowed to be taken during fishing with small mesh or a regulated gear type.
<b>Economic Discards (or Discretionary Discards)</b>	N/A	Economic Discard: Means fish which are the target of a fishery, but which are not retained because they are of an undesirable size, sex, or quality, or for other economic reasons. (16 USC §1802(9))	N/A	N/A	N/A	N/A

Table of definitions from California statutes compared to Federal and other state law.						
TERM	CALIFORNIA (FISH AND GAME CODE)	FEDERAL	OREGON (REVISED STATUTES)	ALASKA (ADMINISTRATIVE CODE)	RHODE ISLAND	CONNECTICUT
<b>Discards</b>	Means fish that are taken in a fishery but are not retained because they are of an undesirable species, size, sex, or quality, or because they are required by law not to be retained. (FGC § 91)	(See regulatory and economic discards)	N/A	N/A	N/A	N/A
<b>Regulatory Discards</b>	N/A	Means fish harvested in a fishery which fishermen are required by regulation to discard whenever caught, or are required by regulations to retain but not sell. (16 USC §1802(38))	N/A	N/A	N/A	N/A
<b>Stock of Fish</b>	"Population" or "stock" means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. (FGC §98.5)	Means a species, subspecies, geographical grouping, or other category of fish capable of management as a unit. (16 USC §1802(42))	N/A	N/A	N/A	N/A
<b>Target Stock</b>	N/A	Stocks that fishers seek to catch for sale or personal use, including "economic discards" as defined under MSA Sec. 3(9). (50 CFR §600.310(d)(3)&(4))	N/A	Means a species or species group for which there is sufficient data to allow that species or species group to be managed on its own biological merits (AAC §28.975)	N/A	N/A

Table of definitions from California statutes compared to Federal and other state law.						
TERM	CALIFORNIA (FISH AND GAME CODE)	FEDERAL	OREGON (REVISED STATUTES)	ALASKA (ADMINISTRATIVE CODE)	RHODE ISLAND	CONNECTICUT
<b>Non-Target Species and Non-Target Stocks / Incidental</b>	N/A	Non-Target: Fish caught incidentally during the pursuit of target stocks in a fishery, including "regulatory discards" as defined under Magnuson-Stevens Act section 3(38). They may or may not be retained for sale or personal use. Non-target species may be included in a fishery and, if so, they should be identified at the stock level. Some non-target species may be identified in an FMP as ecosystem component (EC) species or stocks. (50 CFR §600.310(d)(3)&(4))	Incidental: Means the unintended legal taking of a species of food fish that occurs while targeting another species of food fish (ORS §508.540)	N/A	N/A	N/A