



devices, abalone report card requirements, and minimum size. Red abalone may only be collected by skin diving (without SCUBA) or rock picking during low tides, so that a deep-water refuge population is maintained to enhance productivity of the fishery. The recreational red abalone season is scheduled to open April 1, 2018.

In 2005, the Commission adopted the Abalone Recovery and Management Plan (ARMP) pursuant to requirements in statute (Fish and Game Code Section 5522), to provide a cohesive framework for recovering depleted abalone populations in southern California, and for managing the northern California fishery and future fisheries, including red abalone. The ARMP articulates a framework for sustaining red abalone populations based largely on densities, catch, size, and reproductive success which serve as triggers for adjusting total allowable catch (TAC) and engaging other management measures. Using criteria described in the ARMP, the TAC is adjusted when specific triggers are met, through various management actions such as changes to daily bag/possession limits, seasonal limits, and season length.

In 2013, when average densities in northern California fell below established ARMP triggers, the Commission took action to adjust the TAC from 280,000 to 190,000, with the goal to sufficiently reduce take such that densities would stop declining and eventually recover to target densities. The Commission also took management action to meet the adjusted TAC by amending the annual limit for red abalone north of the Mendocino/Sonoma county line from 24 to 18, amending the annual limit south of the Mendocino/Sonoma county line from 24 to 9, and moving the start time for fishing from one half hour before sunrise to 8:00 a.m. The Fort Ross area was closed to red abalone fishing as a result of hitting the site closure trigger. The new regulations went into effect in 2014, resulting in a 35 percent decline in take to approximately 148,000 in 2015.

In 2015, a combination of unprecedented environmental and biological stressors began to take their toll on red abalone populations, including warmer-than-normal waters and decreasing food resources, leading to starvation conditions. In 2016 the California Department of Fish and Wildlife (Department) determined from surveys that deep water red abalone densities were below ARMP minimum sustainable levels, which prompted the Commission to take emergency action to reduce the season by two months and the annual limit from 18 to 9 for the 2017 season. Throughout 2016 and 2017, the Department conducted surveys, visual assessments, and histological sampling of red abalone along the north coast, and documenting citizen reports of unhealthy or moribund red abalone within the fishery. The Department has identified wide-sweeping changes in the density, occurrence, depth distribution, size and health of

red abalone and the kelp upon which it depends for food. Specifically, the Department has found:

- **Warm Water Conditions and Kelp and Algae Declines.** Red abalone are herbivores that live on rocky reefs in kelp forests, eating red and brown algae. In 2014, the kelp forests in the abalone fishery region declined by 93 percent from known maximum potential due to (1) extreme warm water conditions, (2) a dramatic decline in sea stars, important sea urchin predators, due to sea star disease, and (3) an unprecedented 60 percent increase in herbivorous purple sea urchin populations. Unlike red abalone, sea urchin populations are generally resilient to food shortages and can survive longer, such that even if water conditions cool, grazing pressure from surviving sea urchins may still keep kelp from wide-spread recovery. Warm water conditions persisted through 2015, impacting kelp recovery and red abalone health. Recently there has been some improvement in kelp growth with cooler water this year, but current kelp canopies are still very sparse compared to the long-term average.
- **Starvation Conditions.** Red abalone are susceptible to starvation when kelp and algal abundances decline. Kelp and other algal species are being actively cleared from rocky bottom habitat that is dominated by grazing purple sea urchins, which are at least sixty times more abundant now than prior to 2013. Urchin populations increased, in part, to large-scale loss of predatory starfish species in 2013 due to sea star wasting disease. Bull kelp and other algal food sources for red abalone have remained at extremely low levels since 2014; the large number of purple urchins is likely keeping kelp recovery confined to very limited areas.

Red abalone have been observed stacked on top of each other in shallow water, which could be attributed to either red abalone moving from deeper water to shallower water where algae is slightly more abundant, or red abalone trying to graze whatever algae is growing on the shells of other red abalone; shells were observed to be unusually clean of algal growth. Recent evidence indicates the starvation conditions have not yet abated; additional impacts have been observed in 2017 and are expected to continue through the 2018 season.

- **Density Declines.** In spite of the Commission's 2013 actions to reduce take and allow for recovery, densities continued to decline from an average of 0.47 red abalone per square meter (m<sup>2</sup>) in 2013 to 0.44 per m<sup>2</sup> in 2016. The Department believes the density decline is largely due to the environmental conditions described herein. The emergency action taken by the Commission last year was made with a level of optimism about environmental conditions that are not being realized. Recent Department

surveys conducted in August of this year (2017) in Sonoma and Mendocino counties show a large decline in densities at seven of the ten index sites, to an average of 0.16 per m<sup>2</sup> (Table 1).

**Table 1. Sonoma County and Mendocino County index site red abalone densities past (2012-2016) and current (2017) with percentage decline.**

<b>Index Site (Sonoma-SC or Mendocino-MC)</b>	<b>Past Density (abalone/m<sup>2</sup>) (year sampled)</b>	<b>2017 Density (abalone/m<sup>2</sup>)</b>	<b>Decline</b>
Fort Ross (SC)	0.44 (2015)	0.20	-55%
Timber Cove (SC)	0.38 (2015)	0.15	-60%
Ocean Cove (SC)	0.44 (2016)	0.17	-61%
Salt Point (SC)	0.38 (2016)	0.06	-84%
Sea Ranch (SC)	0.37(2012)	0.27	-27%
<b>Sonoma Average</b>	<b>0.39</b>	<b>0.17</b>	<b>-46%</b>
Point Arena (MC)	0.66 (2014-15)	Not sampled	NA
Van Damme (MC)	0.33 (2016)	0.14	-58%
Russian Gulch (MC)	0.60 (2014)	Not sampled	NA
Caspar Cove (MC)	0.35 (2013)	Not sampled	NA
Todd's Point (MC)	0.47 (2013)	0.16	-60%
<b>Mendocino Average</b>	<b>0.49</b>	<b>0.15</b>	<b>-69%</b>
<b>Overall Average</b>	<b>0.44</b>	<b>0.16*</b>	<b>-58%</b>

\* The ARMP fishery closure is 0.3 abalone/m<sup>2</sup>. The overall average, when including past densities as a proxy for sites not sampled in 2017, is 0.28.

- Deep-Water Refuge.** Deep-water refuge is believed to be a critical component in maintaining a highly productive recreational fishery. Deep-water red abalone are generally safe from take and can be a source of both adults to replace red abalone removed from shallower waters and larvae to enhance red abalone reproduction rates. Surveys in summer of 2016 showed large reductions in red abalone densities in deep water refuges (greater than 28 foot depths). The average density of deep-water red abalone populations over the past four years has declined below the ARMP management trigger and increases the risk that the fishery is not sustainable. It should be noted that red abalone movement from deep water into shallow water or from cryptic locations to exposed shallow areas can give the impression that red abalone populations are stable or have increased if the absence of red abalone in deeper waters is not considered.

- Abalone Health, Reproduction, and Mortality.** The abundance of warm water, coupled with a lack of algae, has severely impacted the health and reproductive development of red abalone. Fishermen and the public have reported weak, shrunken, and dying red abalone, as well as unusually high numbers of empty shells of all size classes throughout 2016, which has continued into the 2017 season. Department surveys in 2016 revealed that more than 25 percent of catch at 10 survey sites had body mass that was shrunken (foot observably smaller than the size of the shell), a sign of starvation conditions. The first survey of the 2017 season at nine survey sites show similar results with approximately 25 percent of the catch continuing to show starvation conditions. Reductions in body mass lead to reduced reproductive fitness; just a 20 percent reduction in body mass can reduce reproduction by 60-90 percent. Red abalone require approximately 12 years to grow to minimum legal size, so that multi-year gaps in reproduction will be observed in the fishery for years to come. Furthermore, recent laboratory feeding studies of starved wild red abalone indicate that reproductive capability may take more than one year to recover to normal levels after algal conditions improve.
- The weakened condition of red abalone may also reduce their ability to withstand normal storm waves during the winter months, and increase mortality. 2017 appears to be the third consecutive year of poor reproduction compared with previous average or good years, which is likely to put future sustainability of the fishery at risk. Four plus years of no or little reproduction (three consecutive years plus one year to recover to normal if conditions improve) will have very significant effects on the red abalone fishery in the future. Lack of kelp and other algae greatly reduces cover for red abalone, making them easier to locate by fishermen. In addition, fishermen are able to select the healthiest of the remaining red abalone from declining populations.

On December 7, 2016, the Commission took emergency action to reduce the annual limit for the take of red abalone from 18 to 12 (except for Sonoma County, which remains at 9) and reduce the months open to fishing from 7 to 5 by closing April and November. The emergency actions, along with the reductions in the fishery from action taken in 2014, have not had the desired effect of stopping the decline in red abalone densities during this unprecedented environmental disaster for red abalone in northern California's nearshore rocky reef habitats.

The ARMP adopted by the Commission in 2005 outlines management triggers (also known as control rules) to help guide fishery management.

- Fishery Reduction Density: The ARMP prescribes a 25% reduction in the catch when the density drops by 25%. **The fishery reduction trigger of 0.5 red abalone/m<sup>2</sup> has been met.** The next trigger for a 25% reduction in the catch is when the overall density of the fishery drops below 0.375 red abalone/m<sup>2</sup>, which current densities are well below, **thereby triggering further reduction under the ARMP.**
- Fishery Closure Density: The ARMP prescribes a fishery closure if the average density of the index sites falls below 0.3 red abalone/m<sup>2</sup>. Average density in this case is calculated using the most recent data from all ten index sites. **The fishery closure density of 0.3 red abalone/m<sup>2</sup> has been met (Table 1).**

### Proposed Regulatory Options to Reduce Catch

The proposed regulations respond to continued dramatic decline of the red abalone population following severe, wide-spread, starvation conditions throughout the fishery. The proposals are grouped into two options:

- **Option 1– Full Fishery Closure**, until it recovers, due to continued decline of red abalone densities below the ARMP fishery closure density trigger of 0.30 red abalone/m<sup>2</sup>.
  - The Department has not observed any significant improvement to the environmental conditions and health of the red abalone resource in 2017. This option is consistent with the ARMP.
- **Option 2 - Limited Fishery Option**, with four sub-options for limiting the fishery, which are not consistent with the ARMP. This option was included at the request of the Commission at the August 2017 meeting for further discussion. The four sub-options include:
  - Sub-Option A: Re-open Fort Ross for Abalone Fishing
  - Sub-Option B: Reduce Daily Bag/Possession and Annual Limits
  - Sub-Option C: Increase Minimum Size Limit to 8 inches
  - Sub-Option D: Limit the Number of Report Cards to within a Range of 5,000 to 25,000.

Estimates of the reduction in catch for some management sub-options are presented below, and are based on past fishing behavior and catch from report card data; however, these estimates are highly uncertain due to changes in the fishery and environment. Because past experience does not necessarily predict future behavior, especially when combining multiple sub-options, there are varying degrees of uncertainty associated with these estimates.

**Option 1 - Full Fishery Closure:** Amend Section 29.15 to close the fishery until it recovers.

*Pros*

- Consistent with the ARMP
- Consistent with general policies of the MLMA to ensure conservation, sustainable use, and restoration of state marine living resources for the benefit of all citizens of the state
- Easy to understand and enforce
- Maintains red abalone populations in shallow water since there are functionally none in deep water, which previously acted as a refuge population
- Population and fishery recovery rate maximized
  - Long-term economic impacts may be minimized
  - Maximizes future sustainable fishing opportunities
- Provides language for red abalone legally taken prior to the April 1, 2018 closure and still in possession at a residence.

*Cons*

- Eliminates all fishing opportunity in the near-term until recovery
- Will adversely affect local businesses in the-near term until recovery
- May increase illegal fishing
- Ceases Department funding from abalone report card sales to support biological research and enforcement

**Option 2 – Limited Fishery Option:** Amend Section 29.15 to establish a limited fishery to reduce take.

The limited fishery option uses as baseline the regulations that existed prior to the 2016 emergency action that modified the 2017 season. For example, the proposal assumes the season length is 7 months, April – June plus August through November. The limited fishery option has four sub-options that can be selected individually or in any combination. Some of the sub-options have ranges that must be selected at the adoption hearing.

*Pros*

- Allows limited red abalone fishing opportunity in the short-term
- Provides some economic benefits as compared to a complete closure

*Cons*

- Not consistent with the ARMP

- Not consistent with the MLMA objectives of conducting sustainable fisheries
- Allows continued targeting of healthiest remaining red abalone from declining populations
- Increases risk of collapse of California's last red abalone fishery

#### Sub-Option A: Re-open Fort Ross for Abalone Fishing

Fort Ross was closed through regulatory action in 2014 due to a severe decline in density following a toxic harmful algal bloom (HAB) in 2011. The most recent surveys from 2017 show an additional 18% density reduction from 2012 values, despite nearly four years of no fishing allowed in the area. Density at Fort Ross remains low (Table 1), below the site closure threshold, although it is higher than most of the other sites in Sonoma County. The sub-option to re-open Fort Ross acknowledges that all of the Sonoma County sites are now at similarly very low densities, and seeks to reduce fishing impacts at any given location by further distributing effort. In the past, a newly-opened site (e.g. Sea Lion Cove at Stornetta Ranch) experienced higher fishing pressure than surrounding sites and local densities were severely reduced (>65%) in just three years. The response of fishers to re-opening a very low-density site is not predictable.

##### *Pros*

- See Option 2 pros above
- May help spread fishing pressure so that most sites may experience somewhat reduced fishing pressure
- Re-introduce red abalone fishing access to the historically most-popular fishing site

##### *Cons*

- See Option 2 cons above
- Allows fishing of a population that is not self-sustaining. The density at Fort Ross has declined even in the absence of fishing. Opening this site to fishing pressure while starvation conditions persist will drive densities to decline more rapidly.
- Continued density declines at Fort Ross will severely hinder future population recovery through reduced reproduction.

#### Sub-Option B: Reduce Daily Bag/Possession and Annual Limits

The proposed regulation to reduce the daily bag/possession and annual limits is to allow limited fishing effort under the current conditions; a reduction in these limits is relatively simple to enforce and the regulation is easy to understand. A range of 1 to 3 red abalone per day (daily bag/ possession limit) and 2 to 9 red abalone per year (annual limit) is proposed. Some combinations of reduced

bag/possession and annual limits are listed in Table 2 with corresponding estimates of possible catch reductions. The estimates are based on data from abalone report cards returned in 2016 and are provided to frame take that could occur as a result of this sub-option. However, behavior of the fishers under these regulations are unknown. Estimates assume people will not increase or decrease the number of trips they made in 2016. Actual reductions in catch could be significantly different because of changes in availability of red abalone, the reluctance of fishers to buy abalone report cards under more restrictive limits, or a change in the numbers of trips per individual to take red abalone.

**Table 2. Examples of estimated catches for reduced bag/possession and annual limits (Sub-Option B) using 2016 abalone report card data.**

Daily Bag/ Possession Limit	Annual Limit	Estimated Catch
3	9	120,000
3	6	94,000
2	6	82,000
1	5	52,000
2	4	63,000
3	3	54,000
1	3	42,000
2	2	37,000
1	2	32,000

*Pros*

- See Option 2 pros above

*Cons*

- See Option 2 cons above
- Allows fishing on a resource that is not self-sustaining
- May increase illegal fishing. The demand for black market red abalone is already high and any further restrictions that limit take will increase the value of black market red abalone creating a greater incentive for poaching. In particular, poaching under the guise of recreational fishing (i.e., altering report card information) may increase.
- Lower annual limits may increase violations of card alteration, failure to complete card, or false application for lost card
- Fishers accustomed to taking larger annual limits might decide greatly reduced annual limits are not worth the cost of a report card
- Fishers from outside the region who are accustomed to taking larger bag/possession limits might decide that the necessary travel and costs are not worth the effort, impacting fishing-related businesses

### Sub-Option C: Increase Minimum Size Limit to 8 Inches

Increasing the minimum size limit is often used to allow more time for animals to reproduce before fishing. However, during this starvation event most red abalone are starving and are not reproductive. It is unclear if increasing the size limit to 8-inch red abalone under these conditions will result in the expected benefits. In addition, there is evidence that increasing the size limit will likely increase incidental fishing mortality as fishers remove red abalone searching for larger animals that are less common. Red abalone have no blood clotting mechanisms and so injury with an abalone iron can lead to mortality even when sublegal red abalone are returned to the ocean. Another potential negative effect of an increased size limit is that fishing effort will focus on larger animals, which produce exponentially more gametes, and would therefore hinder the recovery of populations once ocean conditions improve.

This option is often proposed as a way to lower the number of red abalone taken without reducing daily or annual limits. While the total number of red abalone taken would be lower, the number of larger red abalone taken will increase along with the mortality of sublegal red abalone; the overall effect would be reduced reproductive capacity of the population. A reduction in daily/possession and annual limits should also be included with an increase in size limit to reduce the negative effects.

#### *Pros*

- See Option 2 pros above

#### *Cons*

- See Option 2 cons above
- Allows fishing on a resource that is not self-sustaining
- Increases fishing-related injuries and incidental mortality to red abalone
- Targets most valuable (large) red abalone needed for recovery when conditions improve
- Requires every fisher to buy or make new fixed gauges, increasing compliance costs

### Sub-Option D: Limit the Number of Report Cards to within a range of 5,000 to 25,000.

The number of fishery participants since the 2014 regulation change has averaged around 25,500 annually. The estimated total catch for 2016 was

154,000 red abalone (25,129 participants). Limiting the number of report cards sold is one alternative to potentially reducing the fishery catch and still allow a limited fishery under current conditions. Current regulations limit the number of cards an individual can purchase per season to one. There is also a provision for limited replacement due to lost cards.

Table 3 shows estimated catch for various limits on abalone report cards sold. The estimated catch is based on a season with an annual limit of 18, but the actual estimate of catch may be lower with a lower annual and/or bag/possession limit. Similar to Sub-option B, the estimates are based on data from abalone report cards returned in 2016 and provide a framework of the potential take that could occur. As with Sub-option B, behavior of the fishers under these regulations are unknown and assume that people will not increase or decrease the number of trips they made in 2016. Actual reductions in catch could be significantly different because of changes in availability of red abalone or the demographic group of fishers that are likely to purchase a limited number of cards on a first-come-first-serve basis (i.e., fishery highliners versus casual participants).

**Table 3. Examples of estimated catches from limiting report cards (Sub-Option D) using straight percentage reductions (2016 catch is the basis for catch estimate)**

Number of Report Cards	Estimated Catch
5,000 (20%)	30,800
10,000 (40%)	61,600
15,000 (60%)	92,400
20,000 (80%)	123,200
25,000 (2016)	154,000

*Pros*

- See Option 2 pros above

*Cons*

- See Option 2 cons above
- Allows fishing on a resource that is not self-sustaining
- The fishery is no longer an open access fishery and access will be first-come-first-serve until the report card sales quota is reached
- May increase illegal fishing. The demand for black market red abalone is already high and any further restrictions that limit take will increase the value of black market red abalone creating a greater incentive for poaching. In particular, poaching under the guise of recreational fishing (i.e., altering report card information) may increase.

## **Necessity of Regulation Changes**

This regulatory proposal is necessary to facilitate the red abalone population's recovery from the multi-year poor environmental conditions and massive losses of red abalone in both shallow and deep-water habitats. The Department finds the following detrimental red abalone resource conditions:

- (1) A dramatic decline in sea stars, important sea urchin predators, due to sea star disease.
- (2) A dramatic decline (93 percent) of the kelp canopy in Sonoma and Mendocino counties in 2014 which continues to persist.
- (3) A dramatic increase (60 times) in the density of purple sea urchins in 2015, increasing competition with red abalone for food.
- (4) An increased efficiency of fishing efforts in shallow habitats due to the lack of kelp and movement of red abalone into shallow fishing areas.
- (5) A decline in deep-water red abalone densities.
- (6) Continued decline in overall average red abalone densities in spite of significant take reductions implemented in 2014 and in 2017.
- (7) Visual body health scores for red abalone taken in the fishery during the spring of 2016 show that more than 25 percent of red abalone were shrunken in body mass at sites in northern California. Similar body health scores have been seen in the fishery in the spring of the 2017.
- (8) Body condition index was very low in both Sonoma and Mendocino county sites in 2016 and 2017 (60 red abalone per county per year).
- (9) Department staff and red abalone fishermen have observed weak red abalone washed up on shore and easy to remove from the rocks.
- (10) Department staff and red abalone fishermen have observed many new shells of all size classes, indicating significant increases in natural mortality.
- (11) Gonad index was very low in both Sonoma and Mendocino county sites in 2016 and 2017 (60 red abalone per county per year).
- (12) Low numbers of larval red abalone observed in plankton surveys in Sonoma and Mendocino counties in 2015.
- (13) Low numbers of newly settled red abalone observed in coralline-covered rock samples from Sonoma and Mendocino counties in 2015 and 2016.
- (14) No juvenile (< 21 millimeter) red abalone observed in artificial reefs in Van Damme State Park in 2016 and 2017.

## **Department Recommendation**

The red abalone fishery is in an unprecedented state and its future is at risk. The possibility of a complete fishery collapse is unknown; however, this period of extreme natural mortality (>50%) is ongoing and has not yet begun to subside.

The risk of fishery collapse increases when abalone densities fall below levels identified in the ARMP at the fishery closure density trigger. For example, Southern California's abalone fisheries collapsed after densities fell below 0.3 abalone per m<sup>2</sup>. MLMA requires that fisheries are managed to meet specific objectives, including that the fishery is conducted sustainably so that the long-term health of the resource is not sacrificed in favor of short-term benefits (Fish and Game Code Section 7056(a)).

Based on the sustainability mandates in the MLMA and the fishery management measures outlined in the ARMP, the Department's recommendation is to close the fishery (Option 1) which is consistent with the management triggers of the ARMP.

Option 2 consists of four sub-options for a limited fishery that are not consistent with the management triggers in the ARMP; as such, the Department does not recommend Option 2.

## **Updates to Authority and Reference Citations Based on Recent Legislation**

Senate Bill 1473 (Stats. 2016, Ch. 546) made organizational changes to the Fish and Game Code that became effective January 1, 2017. The changes included moving the Commission's exemptions from specified Administrative Procedure Act time frames from Section 202 to Section 265 of the Fish and Game Code, moving the Commission's notice requirements from Section 210 to Section 260 of the Fish and Game Code, and moving the Commission's authority to adopt emergency regulations from Section 240 to Section 399 of the Fish and Game Code. These were organizational changes only. In accordance with these changes to the Fish and Game Code, sections 202, 210 and 240 are removed from, and sections 260, 265 and 399 are added to, the authority and reference citations for Section 29.15. Senate Bill 1473 also repealed subdivision (b) of Section 220 of the Fish and Game Code; therefore, Section 220 is removed from the list of authority and reference citations in Section 29.15.

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

Authority: Sections 200, 205, 260, 265, 399, 5520, 5521, and 7149.8, Fish and Game Code.

Reference: Sections 200, 205, 265, 5520, 5521, 7145 and 7149.8, Fish and Game Code.

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

None.

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

*Abalone Recovery and Management Plan*  
<https://www.wildlife.ca.gov/Conservation/Marine/ARMP>

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

November 5, 2016, Cotati, California  
December 3, 2016, Fort Bragg, California  
December 7, 2016, San Diego, California  
February 8, 2017, Rohnert Park, California  
March 18, 2017, Sacramento, California.  
March 23, 2017, San Clemente, California  
June 22, 2017, Crescent City, California  
July 20, 2017, Petaluma, California  
August 16, 2017, Sacramento, California

IV. Description of Reasonable Alternatives to Regulatory Action:

- (a) Alternatives to Regulation Change:

Site closures were considered but rejected because it would concentrate fishers to a smaller number of locations, be complicated and confusing to enforce, and would most likely put excessive pressure on the open sites.

- (b) No Change Alternative:

Without the proposed regulatory change, red abalone fishery regulations will revert back to those that existed before the 2016 emergency rulemaking. Evidence exists that levels of take prior to the emergency rulemaking will be unsustainable under current environmental and stock health conditions. The no change alternative is not consistent with established ARMP triggers and management measures.

- (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 will not 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 regulatory action is not likely to significantly increase compliance costs, may or may not significantly impact fishery activity, and only applies to a fishery that is unique to the state of California.

(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 Commission anticipates limited impacts on the creation or elimination of jobs within the state; no impact on the creation of new businesses or the elimination of existing businesses; generalized benefits to the health and welfare of California residents; no effects on worker safety; and benefits to the State's environment. The proposed action is designed to ensure the sustainability and quality of the fishery, promoting participation, fishing activity, and economic activity. However, a complete closure of the red abalone fishery could result in up to 250 direct job losses.

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

Except for Option 2, Sub-Option C: Increase Minimum Size Limit, wherein

fishers may have to spend from \$5 -\$15 to purchase a new abalone measuring gauge, 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:

No costs or savings; however, the Department has the potential to lose revenue from abalone report card sales, from \$103,750 to \$520,825. Federal funding to the state would not be impacted by this proposed change in recreational abalone fishing regulations.

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

No costs or savings, however local governments have the potential to receive less sales tax and transient occupancy tax revenue.

- (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:

The proposed regulations are designed to serve the objectives of resource management and the interests of the recreational fishing community, while minimizing the potential for adverse economic impacts to fishery area businesses and throughout the state. Restrictive actions are only proposed to preserve the sustainability of the resource and thus the long-term viability of the fishery that should continue to draw economic benefits to the relatively isolated coastal communities in the fishery area.

The proposed Full Fishery Closure (Option 1) is anticipated to eliminate all recreational abalone fishers' visits, along with their spending traveling to and spending in the fishery areas on food and accommodations, equipment, and

other retail. In the absence of the unique draw of recreational abalone fishing, a 100% drop in direct expenditures of \$18.6 million is estimated; this drop is estimated to reduce the total (direct, indirect, and induced) economic impact by \$26.7 million. A maximum of 250 direct jobs could be eliminated.

The Limited Fishery (Option 2) with an array of sub-options that may be applied singularly or combined is anticipated to reduce direct expenditures by varying degrees. The degree by which each sub-option impacts fishing trips, days and spending is difficult to predict. Conjecture about the extent to which abalone fishers reduce fishing trips, days, overnight stays, and/or opt out of abalone fishing for the entire season would be speculative. Additionally, the combination of sub-options that may be chosen is not known. Given that, we present estimates for how a 25%, 50%, 75% and 100% decline in fishery activity could impact the local and statewide economies.

Table 4. Economic Impact of Incremental Reductions in Abalone Fishing

Percent Change in Direct Expenditure	Total Seasonal Direct Expenditure	Total Economic Output	Change in Total Output	Job Direct Impacts
2014*	\$18.6	\$26.7	\$0.0	250
-25%	\$14.0	\$20.0	-\$6.7	-63
-50%	\$9.3	\$13.4	-\$13.4	-125
-75%	\$4.7	\$6.7	-\$20.0	-188
-100%	\$0.0	\$0.0	-\$26.7	-250

\* 2014 season had a reduced bag/possession limit, later start time, and the closure of Fort Ross (Reid, et al., 2016). Dollar figures are in millions of 2016\$.

While reaction of abalone fishers to Option 2 sub-options is difficult to predict, previous emergencies and restrictive actions taken in 2014 and 2016 have shown drops in abalone report cards sales only as large as 15.6%. If sub-option C, a limit on the number of cards, is implemented alone, then the anticipated economic impact could be more predictable. However, the reduction in daily and/or annual bag/possession limits, the opening of Fort Ross, and/or the increase in size limits may have various influences on the extent that fishery participants may be inclined to reduce fishing trips. Other factors may also influence participation in the fishery, such as the quality of the red abalone, the weather, gas prices, and other unknowns. That said, the impacts may range from a \$6.7 to \$20 million reduction in red abalone-associated spending and 63 to 188 potential job losses.

## **Fiscal Impact Assessment**

### Local Government Tax Impact

Abalone regulatory options were evaluated as if visits and spending to the fishery

areas were to drop by 25%, 50%, 75%, or 100%. Abalone fishers introduce expenditures in the retail, food and accommodations, automotive service and fuel, sporting equipment sales/rent/lease, and recreational services sectors; these direct expenditures generate local sales taxes and transient occupancy taxes for the fishery area local governments. The California State Board of Equalization reports local sales tax rates for the areas under evaluation. Local sales tax rates in Sonoma, Marin, Mendocino, Humboldt, and Del Norte counties range from 1.5% to 2.5%. Reduced spending due to reduced numbers of visits and reductions in the length of stay could result in sales tax revenue losses that range from \$66,750 to \$267,000 over the season.

Transient occupancy tax (TOT) fishers' survey responses reveal that those who travel a greater distance to the fishery area are more likely to choose to stay overnight in the area. Those who live in the closest proximity to harvest sites and those who harvest in the earliest hours of the day show a lower likelihood of staying overnight. Overnight stays are often at private campgrounds, motels, and hotels, all of which collect TOTs. County treasurer tax collectors report the county transient occupancy taxes. TOT rates in Sonoma, Marin, Mendocino, Humboldt, and Del Norte counties range from 9% to 10%. The projected losses in overnight stays range from 1,000 to 10,000 nights, which could result in losses in local TOT revenues to local governments from \$7,600 to \$76,000 over a season.

State Government Fiscal Impact

Fiscal impacts to the state via Department revenue could occur through reduced abalone report card sales, with limits on card sales (Option 2, Sub-option D), declines due to changes in bag/possession and size limits (sub-options B, C), and/or the full closure of the fishery (Option 1).

Abalone report card sales from 2012 to the partial year 2017 show that the 2016 emergency action did not precipitate a substantial drop in abalone report card sales revenue to the Department. Notably, the 2014 regulation change that targeted a 25% reduction in red abalone take elicited the largest drop of 15.6% in card sales.

Table 5. Abalone Report Card Sales 2012 – 2017

Abalone Report	2012	2013	2014	2015	2016	2017
Cards Sold	29,202	30,579	25,798	25,542	25,129	21,062*
% Change	-6.35%	4.72%	-15.63%	-0.99%	-1.62%	N/A

\*Partial 2017 data – as of 6/30/2017.

Reductions in abalone report card sales are estimated to range from about 5,000 to 25,000 cards, which could result in card sales revenue losses from \$103,750 to \$520,825 at the 2017 card price of \$20.75. Assuming similar decreases in report card sales both years, potential losses in revenues for fiscal years 2018 and 2019 are projected below.

Table 6. Projected Revenue Loss

Fiscal Year	Projected Report Card Revenue Loss
2018	\$103,750 to \$520,825
2019	\$131,775 to \$527,100

Federal funding to the state would not be impacted by this proposed change in recreational abalone fishing regulations.

(a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State:

The Commission anticipates limited negative impacts on the creation or elimination of jobs within the state. The proposed action is designed to ensure the sustainability and quality of the fishery, promoting participation, fishing activity, and economic activity. However, a complete closure of the red abalone fishery could result in up to 250 direct job losses.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State:

The Commission does not anticipate the impact of take limitations or potential seasonal closure of the red abalone fishery to be a principle impetus for the creation of new businesses or the elimination of existing businesses within the state. Restrictive seasonal actions are only proposed to preserve the sustainability of the resource and thus the long-term viability of the fishery that may then continue to support fishery-related businesses.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State:

The Commission does not anticipate the impact of take limitations or potential seasonal closure of the red abalone fishery to have a significant impact on the expansion of businesses currently doing business within the state. Restrictive seasonal actions are only proposed to preserve the sustainability of the resource and thus the long-term viability of the fishery that may then continue to support fishery-related businesses.

(d) Benefits of the Regulation to the Health and Welfare of California Residents:

The Commission anticipates generalized benefits to the health and welfare of California residents through the sustainable management of the red abalone fishery.

(e) Benefits of the Regulation to Worker Safety: None

(f) Benefits of the Regulation to the State's Environment:

The Commission anticipates benefits to the State's environment. It is the policy of this State to ensure "the conservation, sustainable use, and, where feasible, restoration of California's marine living resources for the benefit of all the citizens of the State" (Fish and Game Code sections 1700, 7050(b)).

(g) Other Benefits of the Regulation: None

### Informative Digest (Plain English Overview)

The recreational red abalone (*Haliotis rufescens*) fishery is one of California's most successful and popular fisheries, and is economically important, particularly to Sonoma and Mendocino counties where approximately 95 percent of the multi-million dollar fishery takes place. Over 25,000 fishermen participate in the fishery each year. Red abalone may be taken with a sport fishing license subject to regulations prescribed by the Fish and Game Commission (Commission).

Under existing statute (Fish and Game Code Section 5521) and regulation (Section 29.15, Title 14, CCR), red abalone may only be taken for recreational purposes north of a line drawn due west magnetic from the center of the mouth of San Francisco Bay, except in the closed Fort Ross area. The current regulation also specifies the season, hours, a combined daily and possession limit, daily limit, special gear provisions, measuring devices, abalone report card requirements, and minimum size. Red abalone may only be collected by skin diving (without SCUBA) or rock picking during low tides. The recreational red abalone season is scheduled to open April 1, 2018.

The California Department of Fish and Wildlife (Department) has identified major changes in the density, occurrence, size and health of red abalone and the kelp upon which it depends for food. Specifically, the Department has found no meaningful changes in three red abalone resource conditions: fishing grounds, health and reproduction.

Critical negative impacts to red abalone fishing grounds:

- (1) A dramatic decline in sea stars, important sea urchin predators, due to sea star disease.
- (2) A dramatic increase (60 times) in the density of purple sea urchins in 2015, increasing competition with red abalone for food.
- (3) A lack of kelp, a vital food for red abalone and which has resulted in increasing the efficiency of fishing efforts in shallow habitats.
- (4) A decline in deep-water red abalone densities.
- (5) Continued decline in overall average red abalone densities in spite of significant take reductions implemented in 2014. 2017 Department surveys in Sonoma and Mendocino counties show a dramatic decline in densities at seven of the 10 index sites, to an average of 0.16 per m<sup>2</sup>. This average is below the ARMP fishery closure trigger of 0.3 per m<sup>2</sup>

Critical negative impacts to red abalone health:

- (1) Visual red abalone body health scores for red abalone taken in the fishery during the spring of 2016 show that more than 25 percent of red abalone were shrunken in body mass at sites in northern California.

- (2) Body condition index declined at Van Damme State Park by 20 percent, but no significant difference was observed at Fort Ross in summer of 2016 (60 red abalone per site).
- (3) Department staff and abalone fishermen have observed weak red abalone washed up on shore and easy to remove from the rocks as well as many new shells of all size classes, indicating increased natural mortality.

Critical negative impacts to red abalone reproduction:

- (1) Gonad index declined significantly at Van Damme State Park and at Fort Ross in the summer of 2016 (60 red abalone per site).
- (2) Small numbers of larval red abalone observed in plankton surveys in Sonoma and Mendocino counties in 2015.
- (3) Small numbers of newly settled red abalone observed in coralline-covered rock samples from Sonoma and Mendocino counties in 2015.
- (4) No juvenile (< 21 millimeter) red abalone observed in artificial reefs in Van Damme State Park in 2016 and 2017.

### **Proposed Regulatory Action**

At the August 16, 2017 Commission meeting, the Department presented its recommendation that the fishery be closed due to hitting the trigger as set forth in the ARMP (Option 1). The Commission added additional regulatory options to protect the tradition of abalone fishing. These additional options are presented as Option 2 with sub-options that can be selected individually or in any combination. Some of the sub-options have ranges that must be selected from at the adoption hearing. Option 2 is not consistent with the ARMP.

Option 1 is consistent with the ARMP and protects the fishery during poor environmental conditions without the addition of fishing mortality. The Department recommends this regulatory proposal as a necessary step to facilitate the red abalone population's recovery from the multi-year poor environmental conditions and massive losses of red abalone fishery stock.

Option 2 is a set of regulatory options to maintain some fishing opportunity to maintain the tradition of abalone fishing. This option is divided into sub-options that allow limited take as follows:

Sub-Option A: Open Fort Ross to abalone fishing

Sub-Option B: Reduce the daily bag/possession limits within the range of [1 to 3] and the annual limit within the range of [2 to 9]

Sub-Option C: Increase the size limit to 8 inches

Sub-Option D: Limit the number of report cards sold annually within the range of [5,000 to 25,000]

The Commission may adopt one or more sub-options from Option 2 and must specify a specific number for sub-options B and D.

### **Updates to Authority and Reference Citations Based on Recent Legislation**

Senate Bill 1473 (Stats. 2016, Ch. 546) made organizational changes to the Fish and Game Code that became effective January 1, 2017. The changes included moving the Commission's exemptions from specified Administrative Procedure Act time frames from Section 202 to Section 265 of the Fish and Game Code, moving the Commission's notice requirements from Section 210 to Section 260 of the Fish and Game Code, and moving the Commission's authority to adopt emergency regulations from Section 240 to Section 399 of the Fish and Game Code. These were organizational changes only. In accordance with these changes to the Fish and Game Code, sections 202, 210 and 240 are removed from, and sections 260, 265 and 399 are added to, the authority and reference citations for Section 29.15. Senate Bill 1473 also repealed subdivision (b) of Section 220 of the Fish and Game Code; therefore, Section 220 is removed from the list of authority and reference citations in Section 29.15.

### **Benefits of the Regulation**

The proposed reduction within the red abalone fishery will benefit the valuable red abalone resource by protecting it from excessive fishing mortality during the current poor environmental conditions. Further conserving the red abalone resource now will allow it the opportunity to rebuild and be sustainable for the future.

### **Consistency and Compatibility with Existing State Regulations**

The Legislature has delegated authority to the Commission to promulgate recreational fishing regulations (Fish and Game Code, sections 200, 205, and 265); no other state agency has the authority to promulgate such regulations. The Commission has conducted a search of Title 14, CCR and determined that the proposed regulation is neither inconsistent nor incompatible with existing State regulations and that the proposed regulations are consistent with other recreational fishing regulations and marine protected area regulations in Title 14, CCR.