CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE REPORT ON INSEASON ADJUSTMENTS FOR THE 2022 FISHING SEASON

Due to the results of the recent quillback rockfish length-based data moderate stock assessment off California (CA) indicating the stock is overfished and the combined length-based data moderate stock assessment for copper rockfish off CA indicating the stock is in the precautionary zone, the CA Department of Fish and Wildlife (CDFW) recommends the Council take inseason action to begin reducing total mortality of these CA stocks. Additionally, due to recent high catches of vermilion rockfish south of 40° 10' N. lat. that indicate 109 percent of 2021 Annual Catch Limit (ACL) contribution to the Shelf Rockfish Complex south of 40° 10' N. lat. has been taken (see Agenda Item E.7. CDFW Report 1), further reductions to the recreational sub-bag limit may be warranted. CDFW also requests that the decision tables for quillback rockfish off California and copper rockfish off California be re-run using the 2022 removal projections resulting from the harvest reductions proposed in this report.

CA Quillback Rockfish

The CA quillback rockfish length-based data moderate assessment currently assumes 2022 removals of 13.5 metric tons (mt). The 2023 and 2024 ACLs are not yet determined, though quillback rockfish in California will be removed from the nearshore complexes. CDFW proposes the following sub-bag and sub-trip limits for CA quillback rockfish to reduce projected mortality in 2022.

Recreational Fishery

Current recreational regulations provide various season lengths and fishing depths by Management Area (Table 1). Quillback rockfish are managed as part of the Rockfish, Cabezon, Greenling (RCG) complex, for which a 10-fish daily bag and possession limit exists. Anglers are limited to no more than one line with two hooks when fishing for rockfish.

Table 1. California recreational season structure and Rockfish Conservation Area depth boundaries by Management Area and month for 2021 and 2022.

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 1 – Oct 31 <30fm						All Depth	
Mendocino	Closed				May 1 – Oct 31 <30fm						All Depth	
San Francisco	Closed			April 1 – Dec 31 <50fm								
Central	Closed			April 1 – Dec 31 <50fm								
Southern	Closed		Mar 1 – Dec 31 <100 fm									

Projected total mortality of quillback rockfish in California's recreational fishery in 2022 is 10.4 mt (Table 2). This catch projection was calculated using the established RecFISH model with base year data from 2017-2019 and recent catch trend information and assumes management measures from 2021 are the same in 2022. Quillback rockfish are one of a number of nearshore rockfish species that contribute to a mixed-species bag, though they often aren't taken in large numbers even in the northern part of the state where they are more common. More than 50 percent of anglers who catch a quillback rockfish catch only one fish.

Table 2. Projected California recreational total mortality (mt) of quillback rockfish by Management Area under current regulations for 2022. Impacts were generated using the previously established RecFISH model with 2017-2019 base year data and evaluation of recent catch trends. Data are from CDFW.

Management Area	Total Mortality (mt)
Northern	4.5
Mendocino	1.9
San Francisco	3.7
Central	0.3
Southern	0.0
Statewide	**10.4**

Quillback rockfish are considered a deeper nearshore rockfish species, and while they are commonly found in waters shallower than 30 fathoms, can be encountered in waters deeper than that. Sample data from CDFW's California Recreational Fisheries Survey (CRFS) program indicates that between 2017 and mid-2021, approximately 87 percent of sampled quillback rockfish were from depths shallower than 30 fathoms (Table 3). It should be noted that in the northern areas of the state where quillback rockfish are more commonly found, the recreational fishery depth restrictions have generally been 30 fm or less in recent years, therefore the data showing encounter rates by depth bin are driven by the allowed fishing depth in regulation.

Table 3. Proportion of total sampled quillback rockfish by 10-fathom depth bin from 2017-mid-2021. Data are from CRFS.

Depth Bin (fm)	Proportion of Total Sampled Fish
0-10	25%
11-20	30%
21-30	32%
31-40	12%
41-50	1%
>50	0%

CDFW examined changes to recreational regulations for quillback rockfish that would minimize impacts on opportunities for other groundfish species. Under consideration is implementation of a new statewide 1-fish sub-bag limit within the 10-fish daily RCG bag limit, or no retention of quillback rockfish in the recreational fishery in California. Impacts under a 1-fish sub-bag limit and no retention were analyzed using the previously established bag limit tool available on RecFIN and Depth Dependent Mortality (DDM) rates. The analysis was conducted under the following assumptions: 1) anglers will continue to fish in the same depths and areas; 2) quillback rockfish caught in excess of the 1-fish sub-bag catch projections will be discarded; and 3) by apportioning the assumed discards to the depths in which quillback rockfish were historically caught in the recreational fishery, the recreational quillback rockfish DDM rates (Table 4) could be applied to the apportionments, then summed for a discard estimate. These assumptions are likely to generate overestimates of discard mortality as angler behavior will likely change to avoid the species as happened with other species of concern like yelloweye rockfish, cowcod, and canary rockfish.

Results of the analysis indicate a statewide 1-fish sub-bag limit could result in total mortality of 8.8 mt and 4.8 mt under no retention (Table 5).

Table 4. Recreational quillback rockfish depth dependent mortality rates.

Depth Bin	Mortality Rate
0-10	21%
11-20	35%
21-30	52%
31-40	100%
41-50	100%
>50	100%

Table 5. Projected recreational total mortality (mt) for quillback rockfish in California by Management Area under status quo regulations, with the implementation of a new 1-fish sub-bag limit, or no retention in 2022. Data are from RecFIN and CDFW.

Management Area	Status Quo Regulations	1-fish Sub-Bag Limit	No Retention
Northern	4.5	3.5	2.1
Mendocino	1.9	1.7	0.9
San Francisco	3.7	2.8	1.7
Central	0.3	0.3	0.1
Southern	0.0	0.0	0.0
Statewide	**10.4**	**8.3**	**4.8**

Due to uncertainties surrounding the analyses, and the need to reduce total mortality in 2022 and beyond, CDFW is increasing tracking and monitoring of quillback rockfish catch beginning in 2022. This will allow fishery managers to make timely changes to management measures if total mortality significantly exceeds projected total mortality. The CRFS supplies monthly catch estimates by area. Producing CRFS estimates requires information on catches and effort from several sources. As a result, there is a five- to eight-week lag time between when the catch data are collected and when catch estimates using angler effort are generated. During the intervening weeks, CDFW performs special tracking for several rockfish species of concern using preliminary CRFS weekly field reports. These preliminary reports are converted into an anticipated catch value (ACV) using catch and effort data from previous years. The weekly ACV value is used to approximate catch during the lag time, until the corresponding monthly CRFS estimates are available at which time the ACV for that month is replaced with the CRFS estimate. This combined total (ACV+CRFS estimates) represents CDFW's best inseason estimate of catch to date for rockfish species of concern. CDFW plans to add quillback rockfish to the list of species tracked using the ACV process in 2022.

Commercial Fishery

To harvest quillback rockfish commercially in California, a Deeper Nearshore Species Fishery Permit (DNSFP) is required. In the area between 42° and 40° 10' N. lat. quillback rockfish is part of the Minor Nearshore Rockfish trip limit. South of 40° 10' N. lat. quillback rockfish is part of the Deeper Nearshore trip limit. Quillback rockfish is primarily landed in the Crescent City, Eureka, and Fort Bragg port areas (Table 6), and is of great importance in the live fish fishery as indicated by the increasing ex-vessel revenue in the last few years (Table 7).

California's DNSFP was established in 2003 and includes black, blue, brown, calico, copper, olive, quillback and treefish rockfishes. The DNSFP was established by the Fish and Game Commission in 2003 amid concerns that the new Nearshore Fishery Permit limited entry program, for five shallow nearshore rockfish species, cabezon, California sheephead and greenlings, might shift effort to deeper nearshore rockfish as the Rockfish Conservation Areas (RCA) had already closed off much of the shelf to protect overfished shelf rockfish species.

The DNSFP was initially a nontransferable permit and the number of permits decreased 37 percent from 2003 to 2018 (281 to 178 DNSFPs) when the permits became transferable. Since 2018, the number of vessels catching quillback rockfish has increased 36 percent, likely due to activation of latent permits through the transfer process. Since 2018, landings of live quillback have increased 44 percent, while dead landings only increased 19 percent. Additionally, the proportion of quillback rockfish landed within the deeper nearshore species group from Crescent City to Fort Bragg has more than doubled going from 3.0 percent in 2017 to 7.7 percent in 2021.

Table 6. Landings of quillback rockfish (in mt) in California from 2017 through September 2021. Discards of quillback rockfish in the commercial Nearshore Fishery are minimal (< 0.01mt). Data are from PacFIN through September 2021.

Port Areas	**2017**	**2018**	**2019**	**2020**	**2021**
Crescent City	1.9	0.9	1.5	1.3	1.5
Eureka	--	0.5	0.6	0.8	0.3
Fort Bragg*	0.7	1.1	1.6	2.1	2.1
Crescent City to Fort Bragg sub total	*2.6*	*2.5*	*3.7*	*4.2*	*3.9*
South of Fort Bragg	0.1	0.1	0.1	0.0	0.0
Grand Total	**2.7**	**2.6**	**3.8**	**4.2**	**3.9**
Percent of landings					
Crescent City to Fort Bragg	96.3%	96.2%	97.4%	100%	100%
South of FB	3.7%	3.8%	2.6%	0%	0%

*Includes landings from Shelter Cove.

Table 7. Ex-vessel revenue of quillback rockfish and the other deeper nearshore rockfish from the dead and live fisheries. Data are from PacFIN through September 2021.

		2017		2018		2019		2020		2021	
Area	**Species**	**Dead**	**Live**	**Dead**	**Live**	**Dead**	**Live**	**Dead**	**Live**	**Dead**	**Live**
Crescent City to Fort Bragg	Quillback Rockfish	$4,538	$20,838	$4,962	$21,543	$6,888	$31,275	$8,281	$36,380	$8,168	$31,386
	Other Deeper Nearshore Rockfish*	$153,612	$201,517	$81,488	$177,013	$111,381	$202,786	$109,230	$158,099	$87,693	$125,388
Regional Sub total		*$158,150*	*$222,355*	*$86,450*	*$198,556*	*$118,269*	*$234,061*	*$117,511*	*$194,479*	*$95,861*	*$156,774*
South of Fort Bragg	Quillback Rockfish	$436	$13	$209	$45	$136	--	--	$37	$93	$67
	Other Deeper Nearshore Rockfish*	$134,465	$339,515	$131,047	$334,316	$118,736	$329,061	$143,644	$340,849	$100,071	$223,633
Regional Sub total		*$134,901*	*$339,528*	*$131,256*	*$334,361*	*$118,872*	--	--	*$340,886*	*$100,164*	*$223,700*
Grand Total		**$293,051**	**$561,883**	**$217,706**	**$532,917**	**$237,141**	**$563,122**	**$261,155**	**$535,365**	**$196,025**	**$380,474**
Percent of Quillback Rockfish Ex-vessel revenue of Total Ex-vessel revenue	Crescent City to Fort Bragg	2.90%	9.40%	5.70%	10.80%	5.80%	13.40%	7.00%	18.70%	8.50%	20.00%
	South of Fort Bragg	0.30%	0.00%	0.20%	0.00%	0.10%	--	--	0.00%	0.10%	0.00%

*Includes black rockfish, blue rockfish, brown rockfish, calico rockfish, copper rockfish, olive rockfish, and treefish.

In mid-2020 through inseason action, several trip limits were increased in an effort to provide economic relief to the fixed gear fleet from missed fishing opportunities earlier in the year due to the COVID-19 pandemic. Minor Nearshore Rockfish and Deeper Nearshore in California were two of the trip limits that were increased. The Minor Nearshore Rockfish north of 40° 10' N. lat. trip limit increased from 1,500 lbs. / 2 months to 2,000 lbs. / 2 months and the Deeper Nearshore south of 40° 10' N. lat. trip limit increased from 1,000 lbs. / 2 months to 2,000 lbs. / 2 months. In 2021, additional opportunity was offered south of 40° 10' N. lat. with the opening of the Mar-Apr (Period 2) closure for nearshore rockfish, shelf rockfish, and lingcod. Also in 2021, the shoreward boundary of the RCA was adjusted to provide 10 additional fathoms from the California/Oregon border (42° N. lat.) south to Point Arena (38° 57.5' N. lat.) to offer additional opportunities for the fixed gear fleet.

However, due to the results of the recent length-based data moderate stock assessment for CA quillback rockfish, these recently implemented increased limits and fishing depths may need to be revisited to reduce harvest levels of CA quillback rockfish in 2022 to provide for potential harvest opportunities in 2023. Under consideration for the commercial fishery is a sub-trip limit for quillback rockfish within the status quo Minor Nearshore Rockfish trip limit and the Deeper Nearshore trip limit (i.e., 2,000 lbs / 2 months). All other stocks within the Minor Nearshore Rockfish and Deeper Nearshore trip limits are healthy and modeling indicates that the 2,000 lbs. / 2 months can remain for 2022.

Since commercial discards of quillback rockfish are minor (i.e., less than 0.01 mt) in the Deeper Nearshore fishery, estimating the discard mortality from reducing the trip limit is difficult as model estimates rely on historical discarding behavior. To estimate discards associated with the reduced trip limits for quillback rockfish, the following assumptions were made: 1) the fleet will continue to fish in the same depths with the same gear; 2) quillback rockfish caught in excess of the sub trip limit landings projections will be discarded; and 3) by apportioning the assumed discards to the depths in which quillback rockfish were historically caught, the DDM rates (Table 8) could be applied to the apportionments, then summed for a discard estimate. The DDM rates that were applied are the same that are applied in the Groundfish Management Team (GMT) Nearshore Fishery Projection model and by the West Coast Groundfish Observer Program (WCGOP) for their mortality estimates.

These assumptions are likely to generate overestimates as the Deeper Nearshore fishery fleet tends to be fairly responsive when harvest limits are restricted and would adapt accordingly. However, until additional data can be gathered, CDFW provides the following landings and discard projections in Table 9 and Table 10.

Table 8. Depth dependent discard mortality rates for quillback rockfish.

Area/Depth	Discard Mortality Rate			
	0-10 fm	**11-20 fm**	**20-30 fm**	**30+ fm**
42° to 40° 10' N. lat.	27%	41%	64%	100%
South of 40° 10' N. lat.	58%	70%	79%	100%

Table 9 Proposed sub trip limit alternatives for quillback rockfish in the Minor Nearshore Rockfish trip limit north of 40° 10' N. lat.

Quillback Rockfish North of 40 10' N. lat.	Landings Projection (mt)	Discard Estimate with Mortality Rates Applied (mt)	Total Estimated Mortality (mt)
50 lbs. / 2 months	0.8	0.4	1.2
75 lbs. / 2 months	1.0	0.3	1.3

Table 10. Proposed sub trip limits for quillback rockfish in the Deeper Nearshore trip limit south of 40 10' N. lat.

Quillback Rockfish South of 40 10' N. lat.	Landings Projection (mt)	Discard Estimate with Mortality Rates Applied (mt)	Total Estimated Mortality (mt)
50 lbs. / 2 months	0.9	1.4	2.3
75 lbs. / 2 months	1.1	1.2	2.3

From discussions with industry, estimating the economic loss from reducing harvest limits on quillback rockfish would be difficult to quantify at this time. However, since quillback rockfish is one of the preferred species in the live market, it is expected that there will be loss of revenue until there is a shift in the demand for other species in the live fish market. To-date, the ex-vessel revenue for quillback rockfish in the live fish market is approximately $31,000 and approximately $39,500 for all landings, live and dead. In 2020, the ex-vessel revenue for quillback rockfish in the live fish market was approximately $36,000 and approximately $44,600 for all landings, live and dead Table 7.

Combined Recreational and Commercial Impacts for Quillback Rockfish

The combined projected impacts for quillback rockfish from both the California recreational and commercial fisheries would depend on the adopted management measures (Table 11).

Table 11. Combined recreational and commercial impacts for Quillback Rockfish based in varying management measures (Total Estimated Mortality in mt).

Alternative	Commercial - statewide 50 lbs. / 2 months	Commercial -statewide 75 lbs. / 2 months
Recreational - statewide no retention	8.3 mt	8.4 mt
Recreational - statewide one fish sub-bag limit	11.8 mt	11.9 mt

CDFW Recommended Inseason Action for Quillback Rockfish

The 2022 projections used in the CA quillback rockfish length-based data moderate assessment was 13.5 mt. For a meaningful reduction in total removals yet still allowing some opportunity for the Deeper Nearshore fishery, CDFW recommends the Council consider going to no retention for the recreational fishery statewide and a 75 lbs. / 2-month sub-trip limit within the Minor Nearshore Rockfish north of 40°10’ N lat. trip limit and the Deeper Nearshore south of 40°10’ N lat. trip limit. Therefore, the new 2022 removals projection would be 8.4 mt, 5.1 mt less than the original projection.

Copper Rockfish

The CA copper rockfish length-based data moderate assessment for the area between the Oregon/California border and Point Conception assumes 2022 total removals of 113.1 mt and from the area between Point Conception and the U.S./Mexico border currently assumes removals of 88.9 mt. The 2023 ABC in the area north of Point Conception is projected to be 78.76 mt and for South of Point Conception is 8.7 mt. These ABC contributions are expected to be managed within the respective minor nearshore complexes, and may possibly include species-specific harvest guidelines or other management measures. CDFW proposes the following sub-bag and sub-trip limits for CA copper rockfish to reduce mortality in 2022.

Recreational Fishery

Copper rockfish are a popular recreational groundfish species in California and are managed as part of the recreational RCG complex, for which various season lengths and fishing depths by Management Area (Table 1) exist. There is a 10-fish daily bag and possession limit for the RCG complex. Anglers are limited to no more than one line with two hooks when fishing for rockfish. Under current recreational regulations, the projected statewide total mortality for copper rockfish in 2022 is approximately 181 mt (Table 12). This catch projection was calculated using the established RecFISH model with base year data from 2017-2019 and is similar to annual total mortality in the recreational fishery from 2015-2019; actual catch in 2020 and 2021 has been significantly lower than projected, and there is uncertainty if the current 2022 projection is an over projection or not.

Table 12. Projected recreational copper rockfish total mortality (mt) in California by Management Area for 2022. Impacts were generated using the RecFISH model with 2017-2019 base year data. Data are from CDFW.

Management Area	Status Quo Regulations
Northern	5.4
Mendocino	9.2
San Francisco	28.0
Central	50.0
Southern	88.6
Statewide	**181.2**

Copper rockfish are a deeper nearshore rockfish species but can commonly be found both in shallow nearshore waters, and in deeper waters considered “shelf.” Approximately 61 percent of copper rockfish encounters statewide in the recreational fishery occur in depths shallower than 30 fm (Table 13). In the San Francisco, Central and Southern Management Areas, where recreational depth limits have been greater than 30 fm for several years, an additional 27 percent of encounters occurs between 30 and 40 fathoms. In the Southern Management Area, where the depth limit is currently 100 fm, approximately 39 percent of total sampled copper rockfish from 2017-present had reported depths greater than 30 fm.

Table 13. Proportion of total sampled copper rockfish by 10-fathom depth bin from 2017-mid 2021, with all California Groundfish Management Areas combined. Data are from CRFS/CDFW.

Depth (fm)	Proportion of Total Sampled Fish
0-10	15%
11-20	24%
21-30	22%
31-40	27%
41-50	11%
51-60	1%
61-70	0%
71-80	0%
81-90	0%
91-100	0%

Implementation of a new copper rockfish sub-bag limit for within the 10-fish RCG daily bag limit, or a new copper rockfish minimum size limit could reduce total mortality of copper rockfish without disproportionately impacting fishing opportunities for other rockfish species. Impacts under a 1-fish sub-bag limit and prohibition were analyzed using the bag limit tool available on RecFIN and previously established DDM rates. The analysis was conducted under the following assumptions: 1) anglers will continue to fish in the same depths and areas; 2) copper rockfish caught in excess of the 1-fish sub-bag catch projections will be discarded; and 3) by apportioning the assumed discards to the depths in which copper rockfish were historically caught in the recreational fishery, the recreational copper rockfish DDM rates (Table 14) could be applied to the apportionments, then summed for a discard estimate. These assumptions are likely to generate overestimates of discard mortality as angler behavior will likely change to avoid the species as happened with other species of concern like yelloweye rockfish, cowcod, and canary rockfish.

Results of the analysis indicate a statewide 1-fish sub-bag limit could result in total mortality of 137.5 mt and 110.6 mt under prohibited retention (Table 15).

Table 14. Recreational copper rockfish depth dependent mortality rates.

Depth Bin	Mortality Rate
0-10	19%
11-20	33%
21-30	48%
31-40	100%
41-50	100%
>50	100%

Table 15. Projected recreational total mortality (mt) for copper rockfish in California by Management Area under status quo regulations and with the implementation of a 1-fish sub-bag limit or prohibited retention in 2022. Data are from RecFIN and CDFW.

Management Area	Status Quo Regulations	1-Fish Sub-Bag Limit	Prohibited Retention
Northern	5.4	3.7	1.8
Mendocino	9.2	6.1	3.1
San Francisco	28.0	22.3	19.5
Central	50.0	38.0	30.0
Southern	88.6	67.3	56.2
Statewide	**181.2**	**137.4**	**110.6**

Currently there are no recreational minimum size limits for rockfish in California. Implementation of a minimum size limit often may offer reductions to catch and total mortality projections for some species, especially those with low release mortality. CDFW analyzed CRFS sample data for lengths of copper rockfish in 1-inch bins by Management Area from 2017-August 2021. The analysis indicates the average size of kept fish are generally larger in the northern areas of the state and smaller in the southern areas (Figure 1).

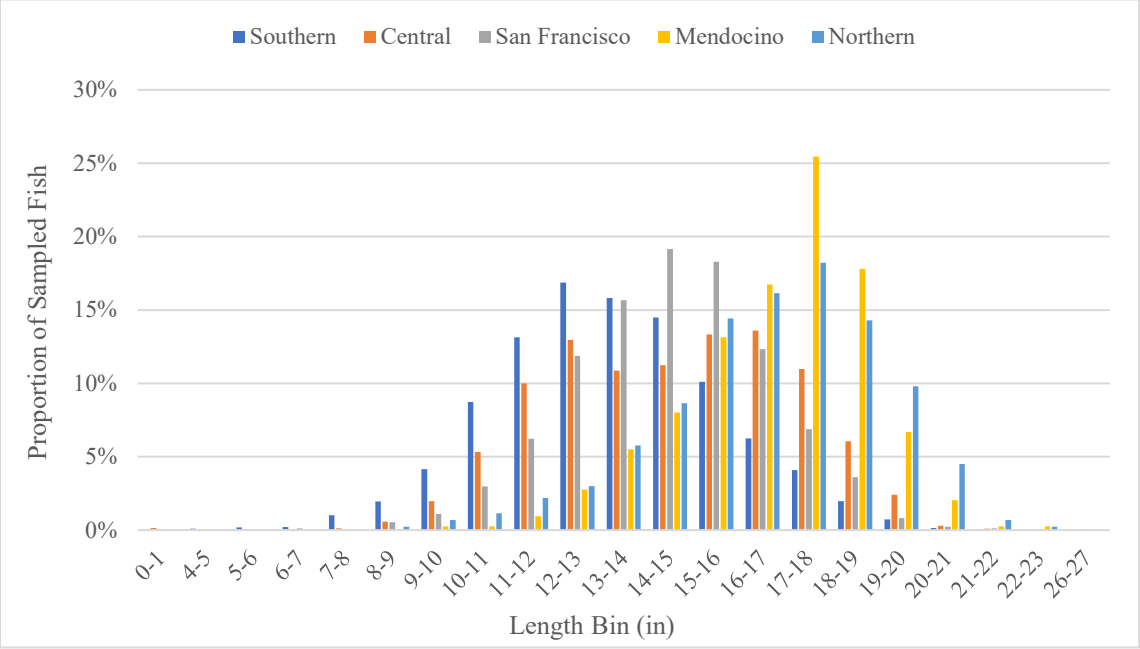

Figure 1. Proportion of sampled copper rockfish by 1-inch length bin and Management Area from 2017-August 2021. Data are from CRFS/CDFW.

As an example, the estimated size at 50 percent maturity for copper rockfish south of Point Conception is 13.4 inches (34 cm). If a minimum size limit of 12 inches in the Southern Management area were to be enacted, a reduction in catch of approximately 29 percent could be expected, but many fish between the 12-inch size limit and the size at 50 percent maturity would still be eligible for take. If a minimum size limit of 14-inches in the Southern Management Area were to be implemented, approximately 62 percent of catch could be reduced, and protections for immature fish would be realized (Table 16).

Table 16. Percent reduction to catch of copper rockfish by Management Area under implementation of a 12-inch or 14-inch minimum size limit. Data are from CDFW.

Management Area	Percent Reduction for 12-in size limit	Percent Reduction for 14-in size limit
Northern	4%	13%
Mendocino	1%	10%
San Francisco	11%	38%
Central	18%	42%
Southern	29%	62%

When a minimum size limit is implemented, regulatory discards of fish smaller than the size limit occur, and discard mortality increases. Using the recreational fishery DDM rates for copper rockfish (Table 14) and the same assumptions used for the sub-bag limit analysis, CDFW calculated projected total mortality of copper rockfish by Management Area for implementation of a 12-inch or 14-inch minimum size limit (Table 17), and implementation of a 1-fish sub-bag limit combined with 12 or 14-inch minimum size limits (Table 18). Outside of no retention, this analysis indicated the greatest reduction to projected total mortality of copper rockfish would be the combination of a 1-fish sub-bag limit and a 14-inch minimum size limit, statewide, with projected impacts of 125.6 mt. However, CDFW notes enforcing minimum size limits are extremely difficult. Therefore, between the potential for excess discarding and enforceability issues, CDFW does not recommend proceeding with a minimum size limit to attempt to reduce mortality of copper rockfish.

Table 17. Projected total mortality for copper rockfish by Management Area under status quo regulations and implementation of a 12-inch or 14-inch minimum size limit. Data are from CDFW.

Management Area	Status Quo	12-Inch Size Limit	14-Inch Size Limit
Northern	5.4	5.2	4.9
Mendocino	9.2	9.1	8.6
San Francisco	28.0	27.1	24.7
Central	50.0	46.4	41.6
Southern	88.6	79.1	68.5
Statewide	**181.2**	**166.9**	**148.3**

Table 18. Projected total mortality for copper rockfish by Management Area under status quo regulations and implementation of a 1-fish sub-bag limit combined with a 12-inch or 14-inch minimum size limit. Data are from CDFW.

Management Area	Status Quo	1-Fish Sub-Bag Limit	1-Fish Sub-Bag and 12-Inch Size Limit	1-Fish Sub-Bag and 14-Inch Size Limit
Northern	5.4	3.7	3.6	3.4
Mendocino	9.2	6.1	6.1	5.8
San Francisco	28.0	22.3	22.0	21.2
Central	50.0	38.0	36.5	34.6
Southern	88.6	67.3	64.1	60.4
Statewide	**181.2**	**137.4**	**132.3**	**125.4**

CDFW plans to monitor catch of copper rockfish weekly in 2022 using the previously established ACV process, described above in the quillback rockfish section, allowing fishery managers to make additional changes to management measures if catch significantly exceeds projected total mortality.

Commercial Fishery

Similar to quillback rockfish, a DNSFP is required to harvest copper rockfish in California. Copper rockfish is part of the same Minor Nearshore Rockfish and Deeper Nearshore trip limits as quillback rockfish and thus was subject to the same recent trip limit and RCA adjustments. Also, much like quillback rockfish, copper rockfish is an important species in the live fish market; however, due to the distribution of the species, copper rockfish is important to all port areas in California. Table 19 shows that landings of copper rockfish are slightly higher in the Central port area (i.e., Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay) yet, as seen in Table 20, the ex-vessel revenue from copper rockfish is significantly higher in the Southern port areas (i.e., Santa Barbara, Los Angeles, San Diego) where copper rockfish is nearly half of the ex-vessel revenue of the entire Deeper Nearshore Fishery. The number of vessels catching copper rockfish has increased 20 percent in the northern areas similar to quillback rockfish.

Table 19. Recent landings of copper rockfish into Northern (Crescent City and Eureka), Central (Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay), and Southern (Santa Barbara, Los Angeles, San Diego) port areas in California. Data are from PacFIN through September 2021.

Port Areas	**2017**	**2018**	**2019**	**2020**	**2021**
Northern (Crescent City and Eureka)	1.6	2.6	2.1	2.5	2.1
Central (Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay)	4.2	6.6	6.8	7.8	5.1
Southern (Santa Barbara, Los Angeles, San Diego)	4.4	4.9	5.5	6.4	3.7
Total	**10.2**	**14.1**	**14.4**	**16.7**	**10.9**

Table 20. Ex-vessel revenue of copper rockfish and the other deeper nearshore rockfish from the dead and live fisheries in Northern (Crescent City and Eureka), Central (Fort Bragg, Bodega Bay, San Francisco, Monterey, Morro Bay), and Southern (Santa Barbara, Los Angeles, San Diego) port areas in California. Data are from PacFIN through September 2021.

		2017		2018		2019		2020		2021	
Area	**Species**	**Dead**	**Live**	**Dead**	**Live**	**Dead**	**Live**	**Dead**	**Live**	**Dead**	**Live**
Northern	Copper Rockfish	$1,697	$13,306	$6,048	$12,236	$2,799	$12,608	$6,439	$10,346	$1,756	$14,304
	Other Deeper Nearshore Rockfish*	$142,531	$194,104	$63,065	$159,927	$83,569	$178,770	$87,273	$125,475	$63,560	$104,935
Regional Sub total		*$144,228*	*$207,410*	*$69,112*	*$172,163*	*$86,368*	*$191,378*	*$93,713*	*$135,821*	*$65,316*	*$119,239*
Central	Copper Rockfish	$8,672	$37,579	$12,044	$55,361	$10,410	$56,173	$15,963	$63,678	$16,245	$37,726
	Other Deeper Nearshore Rockfish*	$125,689	$317,183	$121,252	$331,599	$123,691	$331,577	$128,130	$354,762	$95,385	$246,242
Regional Sub total		*$134,361*	*$354,761*	*$133,296*	*$386,960*	*$134,102*	*$387,750*	*$144,093*	*$418,440*	*$111,630*	*$283,968*
Southern	Copper Rockfish	$14,869	$47,831	$21,460	$40,215	$20,830	$50,740	$25,788	$52,769	$17,656	$27,665
	Other Deeper Nearshore Rockfish*	$24,865	$50,596	$33,413	$41,515	$29,917	$52,775	$45,769	$55,137	$37,086	$29,337
Regional Sub total		*$39,734*	*$98,428*	*$54,873*	*$81,730*	*$50,747*	*$103,515*	*$71,557*	*$107,906*	*$54,742*	*$57,003*
Grand total		**$318,323**	**$660,599**	**$257,281**	**$640,853**	**$271,216**	**$682,643**	**$309,362**	**$662,167**	**$231,687**	**$460,209**
Percent of Copper Rockfish Ex-vessel Revenue of Regional Sub total	**Area**										
	42° to 40° 10' N. lat.	1.18%	6.42%	8.75%	7.11%	3.24%	6.59%	6.87%	7.62%	2.69%	12.00%
	40° 10' to 34° 27' N. lat.	6.45%	10.59%	9.04%	14.31%	7.76%	14.49%	11.08%	15.22%	14.55%	13.29%
	South of 34° 27' N. lat.	37.42%	48.60%	39.11%	49.20%	41.05%	49.02%	36.04%	48.90%	32.25%	48.53%

*Includes black rockfish, blue rockfish, brown rockfish, calico rockfish, copper rockfish, olive rockfish, and treefish.

Estimates of discards associated with reduced trip limits for copper rockfish were developed using the same methods as for quillback rockfish but applying species-specific DDMs. The assumptions in developing discard mortality estimates are likely to generate overestimates of discards as the fleet tends to be fairly responsive when harvest limits are restricted. As with quillback rockfish, CDFW used the same DDM rates used in the GMT Nearshore Fishery Projection Model and used by WCGOP (Table 21). Until additional data can be gathered, CDFW assumes the total estimated mortality projections in Table 22 and Table 23 are what is associated with the proposed lower trip limits.

Table 21. Depth dependent discard mortality rates for copper rockfish.

Area/Depth	Discard Mortality Rate			
	0-10 fm	**11-20 fm**	**20-30 fm**	**30+ fm**
North of 40° 10' N. lat.	27%	41%	64%	100%
South of 40° 10' N. lat.	57%	68%	77%	100%

Table 22. Proposed sub trip limit alternatives for copper rockfish in the Minor Nearshore Rockfish trip limit in the area between 42° N. lat. and 40° 10′ N. lat.

Copper Rockfish 42° N. lat. and 40° 10' N. lat.	**Landings Projection (mt)**	**Discard Estimate with Mortality Rates Applied (mt)**	**Total Estimated Mortality (mt)**
50 lbs. / 2 months	0.5	1.5	2.0
75 lbs. / 2 months	0.6	1.4	2.1
100 lbs. / 2 months	0.7	1.4	2.1

Table 23. Proposed sub trip limit alternatives for copper rockfish in the Deeper Nearshore trip limit south of 40° 10′ N. lat.

Copper Rockfish 40° 10' N. lat. to 34° 27' N. lat.	**Landings Projection (mt)**	**Discard Estimate with Mortality Rates Applied (mt)**	**Total Estimated Mortality (mt)**
50 lbs. / 2 months	1.8	4.8	6.6
75 lbs. / 2 months	2.3	4.4	6.8
100 lbs. / 2 months	2.7	4.1	6.8
Copper Rockfish South of 34° 27' N. lat.	**Landings Projection (mt)**	**Discard Estimate with Mortality Rates Applied (mt)**	**Total estimated mortality (mt)**
No retention	--	5.5	5.5
50 lbs. / 2 months	0.8	4.8	5.7
75 lbs. / 2 months	1.2	4.5	5.8
100 lbs. / 2 months	1.6	4.2	5.8

Combined Recreational and Commercial Impacts for Copper Rockfish

The combined projected impacts for copper rockfish from both the California recreational and commercial fisheries would depend on the selection of management measure alternatives (Table 24).

Table 24. Combined recreational and commercial projected impacts (mt) for copper rockfish based on varying management measures (The no-retention alternative for the commercial fishery South of Point Conception is not shown).

Alternative	Commercial - Statewide 50 lb. / 2 months	Commercial - Statewide 75 lb. / 2 months	Commercial – Statewide 100 lbs. / 2 months)
Recreational - Statewide no retention	124.9mt	130.7 mt	130.7 mt
Recreational - Statewide 1-fish sub-bag limit / no size limit	151.8mt	152.2 mt	152.2 mt
Recreational – Statewide 12-inch minimum size limit / no bag limit reduction	181.2mt	181.6 mt	181.6 mt
Recreational – Statewide 14-inch minimum size limit / no bag limit reduction	162.6mt	163 mt	163 mt
Recreational - Statewide 1-fish sub-bag limit and 12-inch minimum size limit	146.6mt	147 mt	147 mt
Recreational - Statewide 1-fish sub-bag limit and 14-inch minimum size limit	139.9mt	139.3 mt	139.3 mt

CDFW Recommended Inseason Action for Copper Rockfish

The 2022 projections used in the CA copper rockfish length-based data moderate assessments were 113.1 mt (North of Pt Conception) and 88.9 (South of Pt Conception). For a reduction in total removals yet still allowing some opportunity to the commercial and recreational fishery, CDFW recommends the Council consider recommending a 1-fish sub-bag for the recreational fishery statewide and a 75 lbs. / 2-month sub-trip limit within the Minor Nearshore Rockfish north of 40°10’ N lat. trip limit and the Deeper Nearshore south of 40°10’ N lat. trip limit. Therefore, the new 2022 removals projection for north of Point Conception would be 78 mt and for south of Point Conception the projection would be 73.1 mt.

CDFW notes that these projected 2022 impacts for south of Point Conception are nearly an order of magnitude greater than the 2023 copper rockfish ABC contribution for this area, and that projected impacts even under a no-retention scenario are not expected achieve the 2023 specifications without other regulatory modifications. This analysis suggests that area or seasonal closures will need to be analyzed in addition to prohibitions on retention within the 2023-24 biennial management measures.

Trip limit language

In addition to proposed new sub-trip limit alternatives, CDFW proposes changes to the Minor Nearshore Rockfish and CA Black Rockfish trip limits in the area between 40° and 40°10’ N lat. and the Deeper Nearshore trip limits south of 40° 10’ N lat. in the federal trip limit tables for Limited Entry Fixed Gear North of 40° 10' N. lat. [Table 2 (North)], Limited Entry Fixed Gear South of 40° 10' N. lat. [Table 2 (South)], Open Access Gears North of 40° 10' N. lat. [Table 3 (North)], and Open Access Gears South of 40° 10' N. lat. Table 3 (South)].

Table 25 below shows the status quo trip limit language for the Minor Nearshore Rockfish and CA black rockfish trip limit seen in Table 2 (North) and Table 3 (North). Table 26 is the proposed language for sub-limits of both quillback rockfish and copper rockfish.

Table 25. Status quo Limited Entry North of 40° 10’ N lat. and Open Access Gears North of 40° 10’ N lat. Minor Nearshore Rockfish and CA Black Rockfish trip limits for the area between, 42° N. lat. to 40° 10' N. lat. for 2022.

Stock	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
Minor Nearshore Rockfish and CA Black Rockfish	7,000 lbs. / 2 months, no more than 2,000 lbs. of which may be species other than black rockfish					

Table 26. Proposed language for Limited Entry North of 40° 10’ N lat. and Open Access Gears North of 40° 10’ N lat. Minor Nearshore Rockfish and CA Black Rockfish trip limits from the area between, 42° N. lat. to 40° 10' N. lat. for 2022.

Stock	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
Minor Nearshore Rockfish	2,000 lbs. / 2 months, of which no more than X lbs may be quillback rockfish and X lbs may be copper rockfish					
CA Black Rockfish	7,000 lbs. / 2 months					

Table 27 shows the status quo trip limit language for the Deeper Nearshore trip limit seen in federal trip limit tables Table 2 (North) and Table 3 (North). Table 28 is the proposed language for sub-limits of both quillback rockfish and copper rockfish.

Table 27. Status quo Limited Entry South of 40° 10’ N lat. and Open Access Gears South of 40° 10’ N lat. Deeper Nearshore trip limits.

Stock	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
Deeper Nearshore	2,000 lbs. / 2 months					

Table 28. Proposed language Limited Entry South of 40° 10’ N lat. and Open Access Gears South of 40° 10’ N lat. Deeper Nearshore trip limits.

Stock	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
Deeper Nearshore	2,000 lbs. / 2 months, of which no more than X lbs may be quillback rockfish and X lbs may be copper rockfish					

Vermilion/Sunset Rockfish

Vermilion rockfish is managed as part of the minor shelf rockfish complex south of 40° 10' N. lat. Total mortality of vermilion rockfish in California’s recreational fishery has recently been increasing such that the stock’s OFL contribution to the complex was exceeded each year from 2015-2019, however the overall complex ACL limit has not been exceeded in any year. The most recent catch update (recreational estimates through September, and commercial landings through November 8) of total vermilion rockfish take south of 40° 10' N. lat. in 2021 is 228.7 mt, or 109 percent of the ACL contribution to the complex ACL (Agenda Item E.7. CDFW Report 1, November 2021) and it is expected the OFL contribution to the complex will be exceeded once final 2021 values are available. Under status quo regulations CDFW expects total mortality of vermilion rockfish in 2022 to be similar to that in 2021. Consideration of additional reductions to the vermilion rockfish sub-bag limit may be warranted to keep catches from exceeding the OFL (269.3 mt) or ACL (209.5 mt) contribution in 2022.

As such, CDFW analyzed impacts under a 4-fish, 3-fish, and 2-fish sub-bag limit using the bag limit tool available on RecFIN and previously established DDM rates. The analysis was conducted under the following assumptions: 1) anglers will continue to fish in the same depths and areas; 2) vermilion rockfish caught in excess of the 4-fish, 3-fish, or 2-fish sub-bag catch projections will be discarded; and 3) by apportioning the assumed discards to the depths in which vermilion rockfish were historically caught in the recreational fishery, the recreational vermilion rockfish DDM rates (Table 29) could be applied to the apportionments, then summed for a discard estimate. These assumptions are likely to generate overestimates of discard mortality as angler behavior will likely change to avoid the species as happened with other species of concern like yelloweye rockfish, cowcod, and canary rockfish

Table 29. Recreational vermilion rockfish depth dependent mortality rates.

Depth Bin	Mortality Rate
0-10	20%
11-20	34%
21-30	50%
31-40	100%
41-50	100%
>50	100%

Approximately 59 percent of vermilion rockfish encounters statewide in the recreational fishery occur in depths shallower than 30 fm (Table 30). Mortality rates of less than 100 percent, are applied to these encounters according to the depth strata (Table 29). Approximately 41 percent of vermilion rockfish encounters are in depths greater than 30fm, where a 100% mortality rate is applied. Projections under the status quo (5-fish sub-bag limit), and proposed 4-fish, 3-fish, and 2-fish sub-bag limit alternatives are shown in Table 31. The commercial projection for 2022 is approximately 65 mt, and the combined recreational and commercial projections are shown in Table 32.

Table 30. Proportion of total sampled vermilion rockfish by 10-fathom depth bin from 2017-mid-2021. Data are from CRFS.

Depth Bin (fm)	Proportion of Total Sampled Fish
0-10	16%
11-20	22%
21-30	21%
>30	41%

Table 31. Projected recreational total mortality (mt) for vermilion rockfish in California by Management Area under status quo regulations, with the implementation of a 4-, 3-, or 2-fish sub-bag limit in 2022. Data are from RecFIN and CDFW.

Management Area	Status Quo Regulations	4-Fish Sub-Bag Limit	3-Fish Sub-Bag Limit	2-Fish Sub-Bag Limit
Northern	4.5	4.5	4.4	4.3
Mendocino	9.7	9.7	9.6	9.3
San Francisco	21.0	20.8	20.6	19.8
Central	83.6	74.1	70.4	65.8
Southern	91.3	81.6	77.6	72.3
Statewide	**210.0**	**190.7**	**182.6**	**171.6**

Table 32. Combined recreational and commercial impacts for Vermilion Rockfish south of 40°10' N lat. based in varying management measures (Total Estimated Mortality in mt).

Alternative	Commercial – status quo	Difference between bag limits	2022 OFL cont.	Percent of OFL cont.	2022 ACL cont.	Percent of ACL cont.
Recreational - statewide five fish sub-bag limit (status quo)	270.5 mt	--	269.3 mt	100.4%	209.5 mt	129.1%
Recreational - statewide four fish sub-bag limit	251.2 mt	19.3 mt		93.3%		119.9%
Recreational - statewide three fish sub-bag limit	243.2 mt	27.3 mt		90.3%		116.1%
Recreational - statewide two fish sub-bag limit	232.2 mt	38.3 mt		86.2%		110.8%

CDFW Recommended Inseason Action for Vermilion Rockfish

A Reduction to the vermilion rockfish sub-bag limit for 2022 may be warranted to keep catches from exceeding the OFL (269.3 mt) or ACL (209.5 mt) contribution. CDFW recommends a 4-fish sub-bag limit. Under this alternative, impacts are projected to exceed the ACL contribution by almost 20 percent; however, impacts are projected to remain under the OFL contribution. Further, the largest reduction in projected impacts when comparing sub-bag limit decreases is from the current 5-fish sub-bag to a 4-fish sub-bag; with savings of 19.3 mt. CDFW emphasizes that this proposed inseason action for 2022 is unlikely to be adequate to manage impacts from the recreational fishery under new specifications for vermilion rockfish in 2023, and additional reductions should be expected.

CDFW Recommendations for 2022 Fisheries

CDFW reiterates that all projections for 2022 are potentially overestimates as calculations were based on recent fishery performance. Copper and vermilion rockfishes are co-occurring species. Implementation of new and/or reduced sub-bag limits for these species may encourage anglers to change their behavior to avoid the areas with high encounter rates once their sub-bag limits have been reached. This could result in fewer regulatory discards than projected and estimates of total mortality in 2022 could be lower than projected in this document. Further, these species of concern will be monitored inseason and included as line items in the CDFW Inseason catch tracking report that is provided at every Council meeting. Additional management measures could be implemented inseason if catch exceeds or is projected to exceed harvest limits.

CDFW recommends the following inseason changes to California's non-trawl fisheries for 2022, with the goal of reducing total mortality for quillback rockfish, copper rockfish, and vermilion rockfish:

- Quillback rockfish
    - No retention of quillback rockfish in the recreational fishery statewide.
    - Implement a 75 lbs. / 2 months sub-trip limit to the 2,000 lbs. / 2-month Minor Nearshore Rockfish trip limit for the area between 42°-40°10' N lat. and a 75 lbs. / 2 months sub-trip limit to the 2,000 lbs. / 2-month Deeper Nearshore trip limit south of 40° 10' N lat.

- Copper rockfish
    - Implement a new statewide 1-fish copper rockfish sub-bag limit within the 10-fish daily RCG bag limit.
    - Implement a 75 lbs. / 2 months sub-trip limit to the 2,000 lbs. / 2-month Minor Nearshore Rockfish trip limit for the area between 42°-40°10’ N lat. and a 75 lbs. / 2 months sub-trip limit to the 2,000 lbs. / 2-month Deeper Nearshore trip limit south of 40° 10’ N lat.
- Vermilion rockfish
    - Reduce the vermilion rockfish 5-fish sub-bag limit to 4-fish within the 10-fish daily RCG bag limit within the recreational fishery statewide.