Strawman Alternatives in Consideration of Establishing a Fishery Management Plan Framework to Allow a Mid-Biennium Increase in Harvest Specifications

Background

The Pacific Fishery Management Council (Council) is considering a Pacific Coast Groundfish Fishery Management Plan (FMP) amendment to allow an increase in harvest specifications (i.e., overfishing limits (OFLs), acceptable biological catches (ABCs), annual catch limits (ACLs), and optimum yields (OYs)) in the second year of a biennial management cycle when a new assessment indicates a substantial increase in the available harvest of a stock. Such an action would entail a work load cost in terms of analysis of impacts and an extra rulemaking by the National Marine Fisheries Service (NMFS). However, the Council is interested in advancing this initiative to be able to react more quickly to implement new higher specifications to mitigate socioeconomic impacts to the fishery and fishery-dependent communities.

This framework initiative, colloquially termed the "green light" policy, could be broad in scope such that any new stock assessment could compel consideration of a harvest specification increase or it could be more narrowly focused on a category of stocks such as overfished stocks managed under rebuilding plans. An analogous framework is already specified in the FMP. Colloquially termed the "red light" policy, there is an allowed process to decrease harvest specifications in the second year of a biennial management cycle when a new assessment indicates a healthy stock is now overfished or rebuilding progress is considered insufficient to meet rebuilding goals. The red light policy is described in section 5.5.1 in the FMP as follows, "If the Council determines that any of the OFLs, ABCs, ACLs, or OYs set in the prior management process are not adequately conservative to meet rebuilding plan goals for an overfished species, harvest specifications for that overfished species and/or for co-occurring species may be revised for the second fishing year of the then-current biennial management period."

Strawman Alternatives

The Council tasked staff to develop a range of strawman alternatives to help determine the scope of a green light policy. The Council gave guidance that any green light policy would not have an automatic trigger. That is, new harvest specifications would not be automatically implemented mid-biennium when a new assessment indicated improved stock status and a higher available harvest. Instead, the Council would deliberate after adoption of a new assessment on whether to trigger the green light process. The Council stated their intent to only use the green light process in cases where a harvest level increase would significantly benefit the fishery. The Council also stated any consideration of a mid-biennium increase in harvest specifications would not involve a change in the harvest control rule but would specify the new specifications under default harvest control rules. FMP Amendment 24, which implemented a management framework using default harvest control rules, specifies how new science indicating a change in stock status would affect harvest control rules. In cases where a new assessment indicates an overfished stock is rebuilt, the

default harvest control rule changes from that specified in the rebuilding plan to one where the ACL equals the ABC under the previously specified overfishing probability (P*). In cases where a new assessment indicates a healthy stock is now under the biomass target and in the precautionary zone, the 40-10 or 25-5 rule is the automatic default for setting an ACL. Likewise, when the status of a precautionary stock managed under the 40-10 or 25-5 rule changes to a healthy status, the 40-10 or 25-5 rule is automatically suspended as the default. The green light policy would therefore allow consideration of implementing these new default harvest control rules a year earlier.

The following section describes how strawman alternatives would be developed and follows Council guidance to explore two categories of stocks: 1) overfished stocks only and 2) overfished stocks and those stocks that tend to constrain access to the fishery. In all cases, the No Action alternative is to not have a green light policy.

The proposed strategy for the analysis of the green light framework is to range ACL alternatives for a subset of FMP stocks per the Council guidance above to do a socioeconomic cost-benefit analysis to inform the framework (i.e., weigh the socioeconomic benefits of adopting higher ACLs a year earlier than currently allowed in the FMP against the cost of extra workload to enable a mid-biennium ACL increase). Since the outcome of any new assessment is inherently unpredictable, the ACLs provided to analyze strawman alternatives range from the 2018 ACLs recommended for implementation[1] to the maximum values analyzed to advance FMP Amendment 24. One question to consider in the scoping process to adopt a range of alternatives is whether this range is adequately broad. The high end of the range of ACLs analyzed in the Amendment 24 process was based on the less likely high state of nature model projections available in the most recent stock assessments at the time of the analysis. However, new assessments conducted subsequent to the Amendment 24 analysis have in some cases (e.g., canary and widow rockfish) resulted in higher sustainable harvest levels than previously analyzed, even under older high state of nature model projections. There may not be a formulaic approach for deciding a range of ACLs that should be analyzed in advance of new assessments for a green light policy consideration.

Once the range of alternatives is decided for detailed analysis (i.e., the range of stocks to consider, the low and high ACL values to use in the analysis, etc.), the alternatives are proposed to be structured in an integrated analysis with a mix of low and high ACLs. Structuring the ACLs this way is intended to tease out the effects/impacts when the available harvest of one or more stocks is high and others are low. This is a common way new ACLs are analyzed in the biennial specifications process. This analytical approach is proposed as a way to better understand how the green light framework, if implemented, might affect fishing opportunities in a mixed stock fishery.

Green Light Alternatives for Overfished Stocks Only

There are five overfished stocks currently managed under rebuilding plans, four of which are scheduled for assessment in 2017. The five stocks are bocaccio south of 40°10’ N lat., cowcod south of 40°10’ N lat., darkblotched rockfish, Pacific ocean perch (POP) north of 40°10’ N lat., and yelloweye rockfish. Of these stocks, only cowcod will not have a new assessment in 2017.

[1] Since 2017 and 2018 harvest specifications have not been officially adopted by NMFS in a final rule, 2018 ACLs should be considered presumptive at this stage.

The Amendment 24 analysis indicated that the harvest levels across the range of alternatives for these overfished stocks (≤ the High ACL in Table 1) did not cause any significant ecological impacts in the California Current Ecosystem. There are, however, significant socioeconomic impacts across this range of harvest levels due to the constraining nature of the low harvest levels specified to rebuild these stocks.

Table 1. The ACLs proposed to form the basis of strawman alternatives for the five overfished west coast groundfish stocks that range from 2018 annual catch limits to the highest annual catch limit analyzed to advance FMP Amendment 24.

Stock	Low ACL (2018 ACL in mt)	High ACL (Highest ACL in A24 Analysis in mt)	Default Harvest Control Rule
Bocaccio S of 40°10' N lat.	741	1,700	SPR = 77%; ACL = ABC (P* = 0.45) if rebuilt
Cowcod S of 40°10' N lat.	10	102	(SPR = 82.7% (F = 0.007)) + Mont. area ABC contrib.
Darkblotched Rockfish	653	2,348	ACL = ABC (P* = 0.45)
Pacific Ocean Perch N of 40°10' N lat. a/	176	1,828	281 mt in 2018, SPR = 86.4% thereafter
Yelloweye Rockfish	20	78	SPR = 76%

a/ The 2018 POP ACL is 281 mt. However, the Low ACL alternative proposed for the analysis uses the projected ACL under the harvest control rule specified in the rebuilding plan (SPR = 86.4%).

Predicted Impacts Associated with the Available Harvest of Bocaccio Rockfish

Bocaccio rockfish south of 40°10' N lat. can constrain all nearshore and shelf groundfish fisheries south of Cape Mendocino. They are readily caught in recreational, as well as commercial fixed gear and trawl fisheries, especially south of Pt. Conception. The stock was declared overfished in 1999.

Bocaccio were last assessed in 2015 and the stock was estimated to be at 36.8% of initial, unfished spawning biomass at the start of 2015 or just under the biomass target of 40 percent (He, Field et al. 2015). Exploitation rates have been well below those specified under the rebuilding plan. Coupled with strong recent recruitments, the stock was estimated to be rebuilt by the start of 2016. A 2017 update assessment is anticipated to confirm the stock's rebuilt status.

The improved status and expected biomass increase are not anticipated to trigger a green light increase in 2018 if only constraining stocks are considered for a mid-biennium ACL increase, given that impacts have been well below constrained harvest levels. Cowcod co-occur in the Southern California Bight south of Pt. Conception and have been more constraining to shelf fishing opportunities.

Predicted Impacts Associated with the Available Harvest of Cowcod

While cowcod are not a major component of the groundfish fishery, they are highly desired by both recreational and commercial fishers because of their bright color and large size. The cowcod stock in the Conception area was first assessed in 1998 (Butler, Jacobson et al. 1999). Abundance indices decreased approximately tenfold between the 1960s and the 1990s, based on commercial passenger fishing vessel (CPFV) logs (Butler, Jacobson et al. 1999). Recreational and commercial catch also declined substantially from peaks in the 1970s and 1980s, respectively.

Cowcod in the Conception and Monterey management areas was declared overfished in 2000, after Butler et al. (1999) estimated the 1998 spawning biomass depletion to be at 7%, well below the 25% minimum stock size threshold. Because cowcod is a fairly sedentary species, closed areas were established in 2002 to reduce cowcod mortality. Two Cowcod Conservation Areas (CCAs), in the Southern California Bight were selected due to their high density of cowcod. The larger of the two areas (CCA West) is a 4,200 square mile area west of Santa Catalina and San Clemente Islands. A smaller area (CCA East) is about 40 miles offshore of San Diego, and covers about 100 square miles. Bottom fishing is prohibited deeper than 20 fm within the CCAs.

A cowcod assessment of the stock south of Pt. Conception was conducted in 2013, which estimated stock depletion to be 33.9% of unfished spawning biomass at the start of 2013 (Dick and MacCall 2013). The 2013 assessment suggested that cowcod in the Southern California Bight constitute a smaller, but more productive stock than was estimated from previous assessments. A cowcod catch report was provided in 2015 (Agenda Item D.8, Attachment 9, June 2015), which indicated 2012-2014 total catches were at 48% of the aggregate allowable catch over that period.

The very low available harvests of cowcod under rebuilding have severely constrained shelf fishing opportunities, especially in the Southern California Bight. Implementation of the CCAs has severely constrained access to many areas where important and healthy groundfish stocks occur. Cowcod are therefore a candidate for a green light process action in future years. However, cowcod will not be subject to a green light action in 2018 given an assessment is not planned for 2017.

Predicted Impacts Associated with the Available Harvest of Darkblotched Rockfish

Darkblotched rockfish is a trawl-dominant stock which was declared overfished in 2001. The low available harvests under the rebuilding plan have significantly constrained trawl fishing opportunities since implementation of the rebuilding plan. These constraints may be reduced for the at-sea whiting sectors once the Council action to manage the allocation of darkblotched to the at-sea whiting sectors as a yield set-aside rather than as a hard bycatch cap is implemented.

Darkblotched rockfish was last assessed in 2015 with an estimated depletion of 39.3%, or just under the biomass target of 40% of unfished biomass at the start of 2015 (Gertseva, Matson et al. 2015). The 2015 darkblotched assessment predicted the stock would successfully rebuild by the start of 2016. Given the fact the stock is just under the B_{MSY} target, the prediction of imminent stock recovery, and the fact that the low yields available under the darkblotched rebuilding plan have severely constrained access to healthy stocks, the Council amended the rebuilding plan by relaxing the harvest rate. The Council adopted 2017 and 2018 ACLs under a harvest control rule

where the ACL equals the ABC with a P* of 0.45. An update assessment of darkblotched is planned for 2017 to confirm the prediction the stock is successfully rebuilt.

It is likely the 2017 darkblotched assessment will indicate the stock is rebuilt. Further, the 2017 assessment will be an update of the 2015 assessment; therefore, there will be no substantive changes in stock biomass due to changes in the structure of the assessment such as the addition or removal of key abundance indices. However, there may be little need to implement the green light in this case since the stock is already very close to target biomass and the Council's harvest control rule for 2017 and beyond (ACL = ABC with a P* of 0.45) is already the highest allowed. While the allowable harvest will scale up (or down) with the exploitable biomass, it is not anticipated the scale will change dramatically in the two years since the last assessment.

Predicted Impacts Associated with the Available Harvest of Pacific Ocean Perch

Pacific ocean perch is a trawl-dominant stock that has been declared overfished since implementation of the FMP in 1982. The low available harvests under the POP rebuilding plan have significantly constrained trawl fishing opportunities since implementation of the rebuilding plan. These constraints may be reduced for the at-sea whiting sectors once the Council action to manage the allocation of POP to the at-sea whiting sectors as a yield set-aside rather than as a hard bycatch cap is implemented.

A full assessment of POP in 2011 estimated a stock depletion of 19.1% at the start of 2011 (Hamel and Ono 2011). The rebuilding plan has a specified target rebuilding year of 2051 with a constant SPR harvest rate of 86.4% as the harvest control rule.

Darkblotched and POP tend to co-occur on the continental slope north of 40°10' N lat. To the extent these stocks are incidentally caught together, an increase in the available harvest of one while maintaining a relatively low available harvest of the other may not provide as much benefit to trawl fisheries as might be expected since IFQ fishermen need to cover their bycatch of both species with quota. Unless there is adequate quota to pursue their main targets (Dover sole, thornyheads, sablefish, and, in some areas during winter months, petrale sole) they will tend to fish in other areas than where these species occur. Until set-aside management for these species is implemented for the at-sea whiting sectors, these fleets will have to more aggressively avoid bycatch of these species when targeting Pacific whiting. Recent experience has indicated these avoidance measures have significantly increased the cost in prosecuting their whiting fisheries and threatened early closure before attaining their whiting quotas.

The POP stock north of 40°10' N lat. has become a bigger constraint to trawl fishing opportunities in recent years, especially for the at-sea whiting sectors (the Mothership sector has had a particularly difficult time avoiding POP in 2016). The socioeconomic impacts associated with low POP quotas compelled the Council to depart from the rebuilding plan harvest control rule in 2017 and 2018. They recommended an ACL of 281 mt for those two years before resuming the 86.4% SPR harvest rate in 2019. This action was taken as a short term mitigation to trawl fishery impacts and was considered a reasonable measure since the target year did not change. A longer term solution to the impacts to the at-sea whiting trawl sectors caused by low POP (and darkblotched) quotas managed as hard bycatch caps was recently decided when the Council decided to manage these allocations as yield set-asides. A new assessment is scheduled for 2017. While the higher

2018 ACL may provide enough of a buffer against the fishery disruptions observed in 2016 from incidental POP bycatch to lessen the need to use the green light process in the next management cycle, the constraining nature of the stock makes this a good candidate for the green light policy going forward.

Predicted Impacts Associated with the Available Harvest of Yelloweye Rockfish

The 2011 yelloweye assessment (Taylor and Wetzel 2011), an update of the 2009 assessment, estimated stock depletion at 21.4% of initial, unfished biomass at the start of 2011. The rebuilding plan specifies a target rebuilding year of 2074 and an SPR harvest rate of 77%. Yelloweye rockfish is the most constraining stock to all nearshore and most shelf groundfish fisheries north of Pt. Conception. As such, this is the most likely FMP stock to trigger a green light in 2018 and in the foreseeable future in the event a new assessment indicates a substantially improved status and biomass. A full assessment is scheduled for 2017.

Green Light Alternatives for Overfished Stocks Plus Other Stocks That Tend to Constrain Fishing Opportunities

All stocks, especially overfished stocks, non-overfished stocks with high ACL attainment rates, and the major target stocks in west coast groundfish sectors and/or regions, are potentially constraining to fishing opportunities depending on the harvest level specified. The five overfished stocks are discussed in the previous section. Sablefish in all commercial groundfish fisheries and petrale sole in the trawl IFQ fishery, are the stocks with the consistently highest attainment rates. All stocks to be assessed in 2017 and other select stocks that tend to constrain west coast groundfish fisheries are discussed further below. The basis for this strawman alternative is informed by a proposed range of ACLs for the overfished stocks (Table 1) and a proposed range of ACLs for an assemblage of stocks that are scheduled to be assessed in 2017 plus a select number of stocks that tend to constrain groundfish fishing opportunities (**Error! Reference source not found.**). It is important to understand the stocks used to analyze the impacts of a green light policy for this category of stocks (i.e., stocks that tend to constrain fishing opportunities) are proposed for the cost-benefit analysis generally. The detailed analysis needs to show how increasing harvest specifications a year earlier for any constraining stock may mitigate negative socioeconomic impacts. The stocks chosen should be considered representative of this category of stocks and should not be construed as the particular stocks for which a green light policy would be considered in the future. In all cases, it is expected detailed analysis of the impact of increasing harvest specifications a year earlier for any particular stock would be needed in the future in the event a green light policy initiative is adopted. The choice of stocks scheduled for a 2017 assessment in Table 2 may be misleading since it will be a challenge to implement a green light action in 2018 regardless of how the implications of a green light policy are initially analyzed (see the section below entitled, Potential Schedule for NMFS Rulemaking to Implement a Mid-Biennium Increase of Harvest Specifications for a Newly Assessed Stock).

Those stocks with a highlighted empty cell in the High ACL column in Table 2 either did not contribute to the Amendment 24 analysis (i.e., blue/deacon rockfish and California scorpionfish) or the range of ACLs in the Amendment 24 analysis were not as high as used in current management (i.e., canary and widow rockfish). If these stocks are ultimately considered candidates for the green light process, then a High ACL alternative should be recommended for

detailed analysis. While canary rockfish is not scheduled for a 2017 assessment, blue/deacon rockfish and California scorpionfish will be assessed next year. It is probably a good strategy to maintain canary rockfish in the analysis if the Council intent is to broaden the scope of the green light policy beyond overfished species since the stock is caught by most groundfish gears and in all groundfish sectors north of Pt. Conception.

Table 2. The ACLs proposed to form the basis of strawman alternatives for stocks scheduled for assessment in 2017 plus select stocks that can constrain west coast fishing opportunities. The proposed ACL range is from 2018 annual catch limits to the highest annual catch limit analyzed to advance FMP Amendment 24.

Stock	Low ACL (2018 ACL in mt)	High ACL (Highest ACL in A24 Analysis in mt)	Default Harvest Control Rule
Arrowtooth Flounder	13,743	51,785	ACL = ABC (P* = 0.4)
Black Rockfish (WA)	301	672	ACL = ABC (P* = 0.45)
Black Rockfish (OR)	520	1,461	ACL = ABC (P* = 0.45)
Black Rockfish (CA)	332	889	ACL = ABC (P* = 0.45)
Blackgill Rockfish S of 40°10' N lat.	123	229	ACL = ABC (P* = 0.45)
Blue/Deacon Rockfish a/	338		ACL = ABC (P* = 0.45); 40-10 adj. for assessed area stock
California Scorpionfish	150		150 mt constant catch ACL
Canary Rockfish	1,526		ACL = ABC (P* = 0.45)
Chilipepper Rockfish S of 40°10' N lat.	2,507	2,753	Relative biomass estimated to be 93% of coastwide biomass; ACL = ABC (P* = 0.45)
Lingcod b/	4,254	7,531	ACL = ABC (P* = 0.45)
Petrale Sole	3,013	3,911	ACL = ABC (P* = 0.45)
Rougheye/Blackspotted Rockfish N of 40°10' N lat.	196	317	ACL = ABC (P* = 0.45)
Sablefish c/	7,419	12,812	ACL = ABC (P* = 0.4) w/ 40-10 adj.
Spiny Dogfish	2,083	5,722	ACL = ABC (P* = 0.45)
Widow Rockfish	12,655		ACL = ABC (P* = 0.45)
Yellowtail Rockfish N of 40°10' N lat.	6,002	11,806	ACL = ABC (P* = 0.45)

a/ The Low ACL alternative is the sum of the ACL contributions of blue/deacon rockfish in the northern and southern Nearshore Rockfish complexes.

b/ The Low ACL alternative is the sum of the 2018 lingcod ACLs north and south of 40°10' N lat.

c/ The Low ACL alternative is the sum of the 2018 sablefish ACLs north and south of 36° N lat.

Predicted Impacts Associated with the Available Harvest of Arrowtooth Flounder

The 2007 assessment of arrowtooth flounder estimated the stock was at 79% of its unfished spawning biomass at the start of 2007 (Kaplan and Helser 2008). Assessments conducted in 2007 assumed that future removals would be at the OFL level (then called ABC), which biased projections of biomass and sustainable yield low. A catch-only update of the 2007 arrowtooth assessment was therefore provided (Agenda Item I.4, Attachment 3, November 2015) to provide a less biased basis for harvest specifications in 2017 and beyond by assuming actual removals since 2007 rather than the estimated OFLs.

The catch-only update was especially important since trawlers were beginning to be constrained by the low quotas of arrowtooth, which were insufficient to cover their incidental bycatch in some cases. This problem was exacerbated by an apparent southern radiation of arrowtooth. Trawlers in southern Oregon were beginning to encounter arrowtooth in places they were never caught before. The November 2015 catch-only update provided much higher ACLs and may have mitigated potential impacts and lessened the need for the green light policy in 2018. An update assessment of arrowtooth is planned for 2017.

Predicted Impacts Associated with the Available Harvest of Black Rockfish

Black rockfish is an important target species in nearshore recreational fisheries off Washington and nearshore recreational and commercial fisheries Oregon and California (commercial fisheries are prohibited in Washington state waters). It is the most important target species in nearshore groundfish fisheries north of 40°10' N lat.

Full assessments of black rockfish in waters off Washington, Oregon, and California were conducted in 2015 with estimated stock depletions for the Washington, Oregon, and California black rockfish stocks at 60%, 61%, and 33%, respectively at the start of 2015 (Cope, Sampson et al. 2015). While the California stock was estimated to be below the biomass target of 40% and in the precautionary zone, the stock is projected to be above the biomass target by the start of 2017 due to the strength of very strong year classes in 2008 and 2009. State-specific ACLs were adopted for black rockfish for 2017 and beyond.

Black rockfish is a stock with relatively high attainment rates and, as such, this is a candidate for the green light policy in future years. Since there is no assessment scheduled for 2017, no green light process would occur in 2018 if this FMP initiative is adopted for black rockfish.

Predicted Impacts Associated with the Available Harvest of Blackgill Rockfish

Blackgill rockfish is currently managed in the Slope Rockfish complexes north and south of 40°10' N lat. It is a valuable target stock and readily caught in trawl and non-trawl commercial fisheries. It is more prevalent south of Cape Mendocino and is an important target species in commercial groundfish fisheries south of 40°10' N lat.

The most recent blackgill rockfish assessment estimated the stock was below target and in the precautionary zone with a depletion of 30% of its unfished biomass at the start of 2011 (Field and Pearson 2011). The precautionary status of blackgill compelled the Council to reduce impacts to prevent overfishing and allow the stock to rebuild back to its target biomass. The Council and

NMFS implemented stringent harvest guidelines and significantly lower cumulative landing limits to eliminate targeting of blackgill by non-trawl sectors starting in 2013. Landed catch of blackgill in non-trawl fisheries has been reduced significantly and fishermen report blackgill targeting is no longer occurring in that sector. The Council adopted Amendment 26 in November 2015 to remove blackgill from the Slope Rockfish complex south of 40°10' N lat. The amendment, proposed for a 2018 implementation, also specifies a different trawl:non-trawl sector allocation for blackgill and the other southern slope rockfish remaining in the complex. This action was designed to more precisely manage trawl impacts in the south, which cannot be easily done while the stock is managed in a complex.

Blackgill rockfish is scheduled for a 2017 update assessment. Given the constraining nature of blackgill in trawl and non-trawl commercial fisheries south of 40°10' N lat., this is a good candidate stock for the green light process in 2018 and in future years depending on assessment results.

Predicted Impacts Associated with the Available Harvest of Blue/Deacon Rockfish

Blue/deacon rockfish are important targets in nearshore recreational and commercial fisheries in waters off Oregon and California; blue/deacon rockfish are rare in waters off Washington. Blue rockfish and deacon rockfish are similar in appearance and deacon rockfish were not considered genetically distinct until recently. Frable et al. (2015) describe how catch histories of deacon and blue rockfish are conflated; historical catches of blue rockfish on the west coast are therefore mixed catches of both species.

The blue rockfish stock[2] in California waters north of Pt. Conception was assessed in 2007 and the stock's depletion was estimated to be 29.7% of its unfished spawning output at the start of 2007 (Key, MacCall et al. 2008); therefore, the stock is considered to be in the precautionary zone.

Blue/deacon rockfish are managed in the Nearshore Rockfish complexes north and south of 40°10' N lat. Harvest specifications for 2017 and 2018 of the assessed portion of the stock were based on a catch-only update of the 2007 blue rockfish assessment under the Expected Catch scenario (Agenda Item I.4, Attachment 3, November 2015). The OFL contribution of blue rockfish north of Pt. Conception to the southern complex is projected from the 2007 assessment by apportioning 87.3% of the OFL based on average catches of the assessed stock south of 40°10' N lat. The OFL contribution of blue rockfish south of Pt. Conception is based on a depletion-corrected average catch (DCAC) estimate. The OFL contribution of blue rockfish off California to the northern complex is based on the projections in the catch-only update of the 2007 assessment (at 12.7% of the assessed area OFL) and a DCAC estimate for the portion of the population(s) off Oregon and Washington. The Council has implemented precautionary management of the California population of blue rockfish since 2009 by setting a harvest guideline for California fisheries based on the sum of the 40-10 adjusted ACL contribution north of Pt. Conception and the ABC contribution south of Pt. Conception.

A full assessment of blue/deacon rockfish is scheduled for 2017. Catches of blue/deacon rockfish have a large interannual variability. They can constrain nearshore fisheries south of the Columbia

[2] Deacon rockfish was described as a separate species subsequent to the 2007 blue rockfish assessment. In hindsight, the 2007 assessment was an assessment of both species combined.

River in years with larger catches depending on the available harvest limits. As such, they may be a potential candidate for the green light policy initiative.

If blue/deacon rockfish are candidates for the green light policy, a High ACL alternative needs to be chosen for more detailed analysis.

Predicted Impacts Associated with the Available Harvest of California Scorpionfish

California scorpionfish are a nearshore species targeted primarily in recreational fisheries and a limited commercial fishery south of Pt. Conception.

California scorpionfish was assessed in 2005 (Maunder, Barnes et al. 2006) in the Southern California Bight south of Pt. Conception to the U.S.-Mexico border. The stock assessment indicated the California scorpionfish stock was healthy with an estimated spawning stock biomass of 79.8% of its initial, unfished biomass in 2005. A catch-only update of the 2005 assessment assuming the Expected Catch scenario for future removals was prepared in 2015 (Agenda Item I.4, Attachment 3, November 2015) to inform harvest specifications in 2017 and beyond. The Council adopted a 150 mt constant catch ACL for California scorpionfish for 2017 and beyond. The Council also adopted a 111 mt annual catch target (ACT) with the intent to maintain impacts close to recent year catches.

A full assessment of California scorpionfish is planned for 2017. This is a high attainment stock under the Council's current harvest control rule (the stock was subject to overfishing in 2014). Depending on the 2017 assessment results, there could be an incentive to consider the green light policy for this stock in 2018.

If California scorpionfish is a candidate for the green light policy, a High ACL alternative needs to be chosen for more detailed analysis.

Predicted Impacts Associated with the Available Harvest of Canary Rockfish

Canary rockfish is one of the most important groundfish stocks on the west coast since it is caught by most groundfish gears and by all sectors of the groundfish fishery north of Pt. Conception. The stock was declared overfished in 2000 and the low available harvests of canary rockfish under rebuilding caused the greatest disruption to west coast groundfish nearshore and shelf fisheries in the last 20 years[3] given its wide distribution and selectivity to a wide variety of trawl and non-trawl gears.

A full assessment of canary rockfish was conducted in 2015, which indicated the stock was rebuilt with a depletion of 56% at the start of 2015 (Thorson and Wetzel 2015). Under Amendment 24 rules, the default harvest control rules for an overfished stock declared rebuilt based on a new assessment transition from the harvest control rule specified in the rebuilding plan to one where the ACL equals the ABC under the default P*. In the case of canary, the default harvest control rule for 2017 and beyond is ACL = ABC with a P* of 0.45 or the most liberal harvest control rule allowed in the FMP. The available harvest increased by an order of magnitude in 2017, relieving

[3] Cumulative trawl and non-trawl landing limits for canary rockfish were significantly decreased in the late 1990s as stock abundance declined during that period.

the severe constraints imposed on the fishery under rebuilding. Given the stock's wide interaction with the various sectors of the fishery, canary rockfish is a candidate for the green light policy in the future. However, since there will be no new assessment conducted in 2017, canary will not be a consideration for the green light policy in 2018.

If canary rockfish is a candidate for the green light policy, a High ACL alternative needs to be chosen for more detailed analysis.

Predicted Impacts Associated with the Available Harvest of Chilipepper Rockfish

Chilipepper rockfish is an important shelf target in recreational and commercial fisheries south of 40°10' N lat. It is an aggregating mid-water rockfish. An update of the 2007 assessment of chilipepper rockfish south of 40° 10' N. lat. was conducted in 2015, which indicated the stock was at 64% of its unfished biomass at the start of 2015 (Field, Beyer et al. 2015).

The chilipepper stock is managed with stock-specific harvest specifications south of 40°10' N lat. and as a minor component to the Shelf Rockfish complex north of 40°10' N lat. Catches of chilipepper have been well below available harvest levels since implementation of trawl and non-trawl rockfish conservation areas (RCAs) in late 2002. While this is an important target species in the south, it is not likely to be the subject of a green light policy action in the foreseeable future while RCAs are still in place due to low attainment rates.

If chilipepper rockfish is a candidate for the green light policy, consider if the range of ACLs for detailed analysis is adequately broad.

Predicted Impacts Associated with the Available Harvest of Lingcod

Lingcod is an important recreational and commercial target stock coastwide. Lingcod were fished heavily and assessments of the northern and southern populations in 1997 and 1999 indicated stock depletions of 9% and 15%, respectively (Jagielo, Adams et al. 1997; Adams, Williams et al. 1999). Based on these results, lingcod was declared overfished in 1999. The stock was subsequently declared rebuilt in 2005 after successfully maintaining a low harvest under the rebuilding plan and aided by the recruitment of a very strong 1999 year class.

Lingcod were last assessed in 2009 (Hamel, Sethi et al. 2009). The 2009 lingcod assessment modeled two populations north and south of the California-Oregon border at 42° N. lat. Both populations were estimated to be healthy with stock depletions estimated at 62% and 74% for the northern and southern populations, respectively. The Council specified lingcod ACLs north and south of 40°10' N lat. based on the 2009 assessment results and the 2003-2010 average relative biomass in each area based on NMFS trawl survey swept area biomass estimates. This action was intended to not overly encumber the commercial fishing industry, which is required to fish within a single management area[4] within one trip.

Lingcod is scheduled for a full assessment in 2017. Given its importance to west coast groundfish fisheries and a history of relatively high attainment rates, lingcod is a good candidate for a green

[4] The 40°10' N lat. line is a major management line and closely approximates the biogeographic break at Cape Mendocino.

light policy action in future years, perhaps as early as 2018. However, much depends on the status and available harvest of co-occurring yelloweye rockfish since the low available harvest of yelloweye is a major constraint to lingcod target fishing opportunities.

Predicted Impacts Associated with the Available Harvest of Petrale Sole

Petrale sole are one of the most important target species in the trawl IFQ fishery and trawl quotas have been attained at a consistently high rate. The stock was declared overfished in 2010 following a 2009 assessment result indicating the spawning stock biomass was below the MSST (Haltuch and Hicks 2009). A 2015 assessment update (Stawitz, Hurtado-Ferro et al. 2015) indicated the stock was successfully rebuilt.

An update of the 2013 full petrale sole assessment was conducted in 2015 (Stawitz, Hurtado-Ferro et al. 2015). The update assessment indicated the coastwide petrale sole stock was successfully rebuilt with a depletion of 31% at the start of 2015. Improvement in the estimated stock status (relative to the 2013 model projection) is attributed to greater strength of the 2006-2008 year classes, and a consistent increasing trend in the NMFS trawl survey index. The SSC noted the NMFS trawl survey appears to be an excellent indicator of petrale sole trends, and should be monitored to evaluate the need for a new assessment in the future.

Given its importance in the trawl IFQ fishery and the consistently high attainment of ACLs, petrale sole is a good candidate for a future green light policy action. There will be no consideration for a green light action in 2018 since petrale sole will not be assessed in 2017.

If petrale sole is a candidate for the green light policy, consider if the range of ACLs for detailed analysis is adequately broad.

Predicted Impacts Associated with the Available Harvest of Rougheye/Blackspotted Rockfish

Rougheye rockfish are not often targeted by a specific fishery, but are desirable and marketable, thus are typically retained when captured. They are often captured in bottom trawl, mid-water trawl, and longline fisheries. Small numbers have been observed in pot, shrimp, and recreational fisheries. Blackspotted rockfish is a closely related, yet distinct species from rougheye rockfish. They are similar in appearance and blackspotted were only recently described. Historical catches of rougheye are now considered to be a mix of both species.

Hicks et al. (2013) conducted the first assessment of the U.S. west coast stocks of rougheye and blackspotted rockfish as a complex of two species. The predicted spawning biomass from the base model generally showed a slight decline over the entire time series (since 1916) with a period of steeper decline during the 1980s and 1990s. Since 2000, the spawning biomass has stabilized and possibly increased because of reduced catches and above average recruitment in 1999. The 2013 spawning biomass relative to unfished equilibrium spawning biomass was estimated to be 47% of its unfished equilibrium at the start of 2013. The stock has been estimated to be healthy throughout the time series in the new assessment. However, harvests have been above target levels in the past and close to target levels in recent years.

Rougheye/blackspotted rockfish are a candidate for future green light policy action given the high attainment of available harvest in recent years. There will be no consideration for a green light action in 2018 since rougheye/blackspotted rockfish will not be assessed in 2017.

Predicted Impacts Associated with the Available Harvest of Sablefish

Sablefish is one of the most important groundfish stocks on the west coast and the most commercially valuable groundfish stock on a per pound basis. Sablefish is a major target species in commercial trawl and non-trawl fisheries and is readily caught with trawls, longlines, and sablefish pots/traps on the shelf and slope.

An update of the 2011 sablefish assessment was conducted in 2015, which indicated the stock is in the precautionary zone with spawning biomass estimated to be 34.5% of its unfished level (Johnson, Rudd et al. 2015). Despite harvest rates that were below overfishing rates from 1988 to 2008 along with higher than average recruitments in 1995, 1999, and 2000, the spawning biomass increased only slightly during the early-2000s. Since 2005 the stock has continued to decline, in large part due to extremely poor recruitments from 2002 to 2007.

Sablefish is a major target species for all sectors of the west coast groundfish fishery, with the exception of those sectors targeting Pacific whiting. Sablefish is a stock with consistently high attainment rates and is so important to the fishery that any improvement in status and the available harvest of sablefish would allow consideration of a mid-biennium harvest increase. There will be no consideration for a green light action in 2018 since sablefish will not be assessed in 2017.

Predicted Impacts Associated with the Available Harvest of Spiny Dogfish

Spiny dogfish catches are largely incidental, but there has been targeting of this stock in the past. Spiny dogfish have a relatively low stock productivity due to slow growth, late maturation, and low fecundity. Gertseva and Taylor (2011) estimated the spawning stock output of spiny dogfish to be at 63% of the unfished spawning output level. While the stock is estimated to be healthy, the Council and NMFS specified stock-specific OFLs based on a conservative $F_{50\%}$ MSY harvest rate to prevent overfishing this stock.

Spiny dogfish may compel consideration of a green light action in the future; however, ACL attainment has been low. There will be no consideration for a green light action in 2018 since spiny dogfish will not be assessed in 2017.

Predicted Impacts Associated with the Available Harvest of Widow Rockfish

Widow rockfish is an important commercial species on the west coast from central California north to the U.S.-Canada border, particularly since 1979, when Oregon trawl fisherman demonstrated the ability to make large catches at night using mid-water trawl gear. Many additional participants entered the fishery resulting in a rapid increase in landings of widow rockfish and yellowtail rockfish, which are targeted in mid-water trawl fisheries. Widow rockfish is a minor component of the recreational groundfish fisheries. Widow rockfish was declared overfished in 2001. The mid-water trawl fishery was prohibited at the end of 2002 and a rebuilding plan was implemented. Widow rockfish became a major constraint to trawl fishing opportunities, including the at-sea whiting sectors where widow allocations are managed as total catch limits. Widow rockfish was

declared rebuilt in 2011; however the sector allocations have been maintained and the at-sea whiting sectors still manage their widow allocations as total catch limits. With the improved status of canary rockfish and the continued healthy status of yellowtail rockfish, the industry is developing a strategy to better target their allocations of yellowtail and widow rockfish.

The 2015 widow rockfish assessment indicated the stock was at 75.1% of unfished biomass (Hicks and Wetzel 2015). Based on the healthy status and the reduced uncertainty in the assessment results relative to previous assessments, the Council adopted a harvest control rule where the ACL equals the ABC under a P* of 0.45.

Widow rockfish may be a candidate for a green light action in the future, especially as the IFQ fishery ramps up mid-water trawl targeting of widow and yellowtail rockfish under their allocations. There will be no need for the green light policy for widow rockfish in 2018 since the stock will not be assessed in 2017.

If widow rockfish is a candidate for the green light policy, a High ACL alternative needs to be chosen for more detailed analysis.

Predicted Impacts Associated with the Available Harvest of Yellowtail Rockfish

Until late 2002, yellowtail rockfish were harvested as part of a directed mid-water trawl fishery. Yellowtail rockfish are common in both commercial and recreational fisheries throughout its range, and commonly occur with canary and widow rockfishes (Cope and Haltuch 2012). Despite its popularity in commercial and recreational fisheries, its association with those highly regulated species has greatly decreased removals over the last decade. From the end of 2002 through 2010, implementation of the RCAs and small landings limits designed to only accommodate incidental bycatch eliminated directed mid-water fishing opportunities for yellowtail (and widow) rockfish in non-tribal trawl fisheries. A limited opportunity to target yellowtail rockfish in the trawl fishery has been available since 2011 under the trawl rationalization program, yet low quotas for widow rockfish, canary rockfish, and for other constraining stocks had limited mid-water targeting of yellowtail rockfish. With the improved status of widow and canary rockfish, the industry is developing a strategy to better target their allocations of yellowtail and widow rockfish.

A data-moderate assessment of yellowtail rockfish north of 40°10’ N. latitude was conducted in 2013 (Cope, Dick et al. 2014). The estimated depletion at the start of 2013 was 67%. This was a large biomass increase relative to previous estimates and can be attributed to the low removals in the last 10 years.

A full assessment of yellowtail rockfish will be conducted in 2017. The results of the yellowtail rockfish assessment may compel consideration of implementing the green light policy for 2018 given the stock’s importance to the IFQ fishery.

Summary of Effects of Alternatives Informing a Green Light Policy

The choice of stocks for the analysis in consideration of analyzing the effects of a green light policy are ranked (Low, Medium, High) according to the following criteria:

- Relative probability of a high attainment rate. This criterion is ranked based on the recent history of ACL attainment rates and any expectations with respect to future harvest levels.
- Relative fishery value. The relative commercial or recreational value of a stock as a major target species is considered in this ranking. Overfished stocks are ranked here based on historical targeting practices prior to implementation of rebuilding plans.
- Relative probability of constraining fishing opportunities. This criterion is ranked based on the recent history of biennial specifications' analyses illustrating fishery constraints and any expectations with respect to harvest levels in the foreseeable future.

Are these criteria adequate? Are there other criteria that should be used in the analysis?

Are the rankings in Table 3 reasonable?

The range of alternatives decided for detailed analysis may affect the rankings of those stocks proposed in the strawman alternatives against the final criteria chosen to rank effects. Criteria for ranking effects should be evaluated in the scoping process. The rankings in Table 3 are also somewhat subjective and should be evaluated in the scoping process.

Table 3. Summary of effects based on a relative ranking of proposed criteria for informing a green light policy.

Stock	Relative Probability of a High Attainment Rate in the Near Future	Relative Fishery Value	Relative Probability of Constraining Fishing in the Near Future
Arrowtooth Flounder	L	L	L
Black Rockfish	H	H	H
Blackgill Rockfish	H	H	H
Blue/Deacon Rockfish	M	M	M
Bocaccio	L	M	L
California Scorpionfish	H	H	H
Canary Rockfish	M	H	M
Chilipepper Rockfish	M	H	L
Cowcod	M	H	H
Darkblotched Rockfish	M	H	M
Lingcod	H	H	M
Pacific Ocean Perch	M	H	M
Petrale Sole	H	H	H
Rougheye/Blackspotted Rockfish	H	H	M
Sablefish	H	H	H
Spiny Dogfish	M	L	M
Widow Rockfish	M	H	M
Yelloweye Rockfish	H	H	H
Yellowtail Rockfish	M	H	M

Schedule for Implementing a Green Light Policy

Council Schedule for Considering an FMP Framework for a Green Light Policy

The Council decided to begin scoping of the green light policy at their June 2016 meeting under the Omnibus Groundfish Workload Planning agenda item by scheduling this item for their September 2016 meeting. In September the Council decided to advance the green light policy consideration under the Mid-Biennium Annual Catch Limit Adjustment and Rebuilding Harvest Rate Adjustment Policies agenda item. The Council is scheduled to decide a range of alternatives for more detailed analysis and a preliminary preferred alternative for public review at their November 2016 meeting in Garden Grove, California. The Council is tentatively scheduled to

decide their final preferred alternative for the green light policy at their April 2017 meeting in Sacramento, California.

Potential Schedule for Council Deliberation of a Mid-Biennium Increase of Harvest Specifications for a Newly Assessed Stock

The Council provided guidance that any implementation of a mid-biennium increase in harvest specifications (i.e., a green light action) would not be an automatic action but would be deliberated by the Council after a new assessment has been adopted for management decision-making. The 2017 assessment schedule has been decided (Table 4) and can be used to illustrate a deliberative process for implementing a green light action. However, actual implementation of a green light policy action in 2018 is a challenge given the agency constraints detailed in the next section.

Any mid-biennium increase in harvest specifications can be implemented after January 1 without a significant disruption to the fishery. Fishery efficiency and the ability to plan fishing strategies is maximized the earlier in the year the increase is implemented. It is assumed it would take at least six months after Council initiation of a green light action to implement a mid-biennium increase in harvest specifications.

The update assessments (arrowtooth flounder, bocaccio, blackgill rockfish, and darkblotched rockfish) are scheduled for review by the SSC's Groundfish Subcommittee in June 2017. Pending SSC endorsement of the updates, the Council could potentially adopt these assessments at the June 2017 meeting. It is presumed a green light action for any of those stocks taken in June could result in implementation of higher 2018 harvest specifications by January 1 or soon thereafter. This presumes an adequate analysis has been provided for decision-making in time for the June 2017 meeting.

All the full assessments will be reviewed in STAR panels over the summer and presented for SSC review and potential Council adoption at the September 2017 meeting in Boise, Idaho. Implementation of any mid-biennium increase in harvest specifications decided in September 2017 is likely to be implemented later in the 2018 fishing season. Any assessments recommended for further review at the late September mop-up panel would not be scheduled for final SSC review and potential Council adoption until November 2017. Implementation of a mid-biennium increase in harvest specifications would be expected to occur even later in the 2018 season.

The 2017 assessment schedule is typical and it is rare to reconcile an assessment for potential Council adoption later than November in the first year of a biennial management cycle. Therefore, it is likely that any mid-biennium increase in harvest specifications as a result of initiating a green light action would occur in the first half of the second year in a biennium.

Table 4. Groundfish stock assessment review and Council adoption calendar for 2017.

Review Meeting	Stocks	STAR Panel Dates	Location	SSC Review and Potential Council Adoption Dates	Location
SSC GF Subcm. Update Assessment Review	Arrowtooth Flounder, Blackgill Rockfish, Bocaccio, Darkblotched Rockfish	June 5 or 6	Spokane, WA	June 7-14	Spokane, WA
GF STAR 1	Lingcod, Yelloweye Rockfish	June 26-30	Seattle, WA	Sept. 11-18	Boise, ID
GF STAR 2	Yellowtail Rockfish, Pacific Ocean Perch	July 10-14	Seattle, WA	Sept. 11-18	Boise, ID
GF STAR 3	Blue/Deacon Rockfish, CA Scorpionfish	July 24-28	Santa Cruz, CA	Sept. 11-18	Boise, ID
GF Mop-up, if needed	TBD	Sept. 25-29	Seattle, WA (?)	Nov. 13-18	Costa Mesa, CA

Potential Schedule for NMFS Rulemaking to Implement a Mid-Biennium Increase of Harvest Specifications for a Newly Assessed Stock

Under Agenda Item F.1a, NMFS Report 2, "Rulemaking Plan for 2016/2017, the agency provided a perspective on active, ongoing rulemakings, some of which have just been initiated. The report also identified a number of NMFS near-term priorities that require focus and significant amounts of work. Given current staffing constraints that Council has been informed about, NMFS has taken

a very conservative approach in preparing a preliminary timeline for addressing this matter. The Council is scheduled to select a final preferred alternative in April, 2017, assuming that the analytical documents to support a final decision are available at that time. As of this juncture, the party responsible for preparation of the NEPA analytical document has not been identified. The potential rulemaking schedule (below) assumes that Council staff will prepare the NEPA analytical document (following NEPA scoping) for Council consideration in reaching a final preferred alternative at the April 2017 Council meeting. The strawman alternatives identified in this document range from relatively straightforward (overfished species focus) to more complex. The final alternative selected will dictate the degree of complexity associated with the rulemaking. Finally, the Council is reminded that the staff work for the Council and NMFS associated with the 2019-2020 groundfish harvest specifications and management measures process begins in May/June of 2017. Given all of the caveats, the following rulemaking schedule (and possible FMP amendment) is proposed.

- Council takes final action – April 2017.
- Proposed Rule and FMP Amendment NOA publish: November 2017—January 2018.
- Final rule and FMP Amendment: Spring 2018.

New stock assessment results will inform the Council as to whether or not they want to utilize the new policy to increase harvest specifications mid-biennium. Given the proposed schedule above, it would be challenging to utilize this new policy prior to the availability of 2019 stock assessment results. If the Council desires the possibility to consider the green light policy in time for a 2018 action based on 2017 assessment results, this may compel a reassessment of workload priorities to make this happen.

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