

2019 AND 2020 GROUND FISH HARVEST SPECIFICATIONS

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Stock	Cat.	2019 OFL	2020 OFL	SPR HR	Year of Assessment	Type of Assessment	Additional Basis
OVERFISHED STOCKS							
COWCOD S. of 40°10' N. lat.		74	76	NA			Sum of Conception and Monterey OFLs
<i>COWCOD (Conception)</i>	2	60.9	62.4	50%	2013	Catch-only Update in 2015 of the 2013 Rebuilding Analysis based on 2013 Full (XDBSRA) Assessment	E = 0.007 exploitation rate
<i>COWCOD (Monterey)</i>	3	13.3	13.3	NA	2014	DBSRA	Appendix C in the 2013 assessment
YELLOWEYE ROCKFISH	1	82	84	50%	2017	Rebuilding Analysis Based on 2017 Full Assessment	Assumes 13 mt (65% of ACL) taken in 2017 and 2018
NON-OVERFISHED STOCKS							
Arrowtooth Flounder	2	18,696	15,306	30%	2017	Update of 2007 Full Assessment	
Big skate	2	541	541	50%	2013	Trawl survey biomass * M	
Black Rockfish (CA)	1	344	341	50%	2015	Full	
Black Rockfish (OR)	2	565	561				
Black Rockfish (WA)	1	312	311				
Blackgill Rockfish S. of 40°10'	2	174	174	50%	2017	Update of 2011 Full Assessment	
Bocaccio S. of 40°10' N. lat.	1	2,194	2,125	50%	2017	Update of 2015 Full Assessment	7.4% reduction to subtract the portion of the assessed stock north of 40°10' N. lat.
Cabazon (CA)	1	154	153	45%	2009	Full	
Cabazon (OR)	1	49	49	45%	2009	Full	
California scorpionfish	1	337	331	50%	2017	Full	
Canary Rockfish	1	1,517	1,431	50%	2017	Catch-only Update of the 2015 Full Assessment	
Chilipepper S. of 40°10' N. lat.	1	2,652	2,521	50%	2017	2017 Catch-only Update of 2015 Update of the 2011 Full Assessment	The portion of the coastwide stock south of 40°10' N. lat. (93%) is based on average historical landings.
Darkblotched Rockfish	1	800	853	50%	2017	Update of 2015 Full Assessment	
Dover Sole	1	91,102	92,048	30%	2011	2015 Catch-only Update of the 2011 Full Assessment	Catch-only update in 2015 of the 2011 full assessment assuming actual catches since 2011.
English Sole	2	11,052	11,101	30%	2013	2015 Catch-only Update of the 2013 Data-moderate (exSSS) Assessment in 2015 assuming recent year average catch for removals (Table 2 in Agenda Item I.4, Supplemental Attachment 8, November 2015)	
Lingcod N. of 42° N. lat. (OR & WA)	1	4,690	4,459	45%	2017	Full	OFLs are projected from the 2017 assessment, which assessed two stocks north and south of 42° N lat. The relative biomass and OFLs are reapportioned north and south of the 40°10' N lat. management line by using the most recent 5-year average percentage of survey biomass of lingcod between 40°10' and 42° N lat., which is 21.3% of the survey biomass in California.
Lingcod S. of 42° N. lat. (CA)	1	1,253	1,136	45%	2017	Full	
Lingcod N. of 40°10' N. lat.	1	4,957	4,701	45%	2017	Full	
Lingcod S. of 40°10' N. lat.	1	986	894	45%	2017	Full	
Longnose skate	1	2,499	2,474	50%	2007	2015 Catch-only Update of 2007 Full Assessment	
Longspine Thornyhead (coastwide)	2	4,112	3,901	50%	2013	Full	

Stock	Cat.	2019 OFL	2020 OFL	SPR HR	Year of Assessment	Type of Assessment	Additional Basis
Pacific Cod	3	3,200	3,200	NA	NA	NA	
Pacific Ocean Perch	1	4,753	4,632	50%	2017	Full	Presumed rebuilt - need BSIA determination: Coastwide OFL or N. of 40°10' N lat.?
Petrale Sole	1	3,042	2,976	30%	2015	Update of the 2013 Full Assessment	
Sablefish (coastwide)	1	8,489	8,648	45%	2015	Update of the 2011 Full Assessment	
Shortbelly	2	6,950	6,950	50%	2007	Full a/	MSY estimated from 2007 assessment
Shortspine Thornyhead (coastwide)	2	3,089	3,063	50%	2013	Full	
Spiny dogfish	2	2,486	2,472	50%	2011	2015 Catch-only Update of 2011 Full Assessment	
Splitnose S. of 40°10' N. lat.	1	1,831	1,810	50%	2009	Full	The portion of the coastwide stock south of 40°10' N. lat. (64.2%) is based on average historical (1916-2008) landings.
Starry flounder	3	652	652	30%	2017	DBSRA	DBSRA = 370 mt in CA and 298 mt in OR & WA
Widow Rockfish	1	12,375	11,714	50%	2015	Full	
Yellowtail N. of 40°10' N. lat.	1	6,568	6,261	50%	2017	Full	
STOCK COMPLEXES							
Nearshore Rockfish North		203	200				Sum of OFL contributions of component stocks in the complex
<i>Black and yellow</i>	3	0.01	0.01				
Blue/Deacon (CA)	2	31.0	32.4	50%	2017	Full	10% of the CA OFL is apportioned north of 40°10' N lat. (see Appendix D of the 2017 Assessment)
Blue/Deacon (OR)	2	112.3	108.8	50%	2017	Full	
Blue/Deacon (WA)	3	8.7	8.4	50%	2017		WA catches added to OR BDR assessment and resulting OFL from OR subtracted from the total to get WA OFLs (Appendix E of the 2017 BDR assessment)
<i>Brown</i>	2	2.1	2.1	50%	2013	Catch-only Update of the 2013 Data-moderate (XDBSRA) Assessment in 2015	The portion of the coastwide stock north of 40°10' N lat. based on the proportion of cumulative removals by area during 1916-2012 (1.2%).
<i>Calico</i>	3	-	-			NA	No harvest contribution (3a stock) Max. landings <2 mt, 1928-2008; mainly a discard species
<i>China</i>	2	28.6	27.9	50%	2015	Full	Sum of North and Central model estimates
<i>Copper</i>	2	11.9	12.2	50%	2013	Data-moderate	The portion of the coastwide stock north of 40°10' N lat. based on the proportion of cumulative removals by area during 1916-2012 (4.9%).
<i>Gopher</i>	3	-	-		2011	DBSRA	
<i>Grass</i>	3	0.7	0.7		2011	DBSRA	
<i>Kelp</i>	3	0.01	0.01		2011	DBSRA	
<i>Olive</i>	3	0.3	0.3		2011	DBSRA	
<i>Quillback</i>	3	7.4	7.4		2011	DBSRA	
<i>Treefish</i>	3	0.2	0.2		2011	DBSRA	
Shelf Rockfish North		2,309	2,302				Sum of OFL contributions of component stocks in the complex
<i>Bronzespotted</i>	3	-	-			NA	No harvest contribution in the north (3a stock)

Stock	Cat.	2019 OFL	2020 OFL	SPR HR	Year of Assessment	Type of Assessment	Additional Basis
<i>Bocaccio</i>	3	284.0	284.0		2011	DBSRA	
<i>Chameleon</i>	3	-	-				<i>No harvest contribution (3a stock)</i>
<i>Chilipepper</i>	1	199.6	189.8				<i>The portion of the coastwide stock north of 40°10' N. lat. (7%) is based on average historical landings.</i>
<i>Cowcod</i>	3	0.4	0.4				<i>No harvest contribution (3a stock)</i>
<i>Flag</i>	3	0.1	0.1		2011	DBSRA	
<i>Freckled</i>	3	-	-				<i>No harvest contribution (3a stock)</i>
<i>Greenblotched</i>	3	1.3	1.3		2011	DBSRA	
<i>Greenspotted 40°10' to 42° N. lat.</i>	2	9.3	9.3	50%	2015	2015 catch-only update of the 2011 full assessment	<i>The portion of the assessed area north of 40°10' N lat. (22.2% of OFL from northern California model) based on average historical catch.</i>
<i>Greenspotted N. of 42 N. lat. (OR & WA)</i>	3	6.1	6.1		2011	DCAC	<i>Appendix L of the 2011 Assessment</i>
<i>Greenstriped</i>	2	1,311.4	1,314.8	50%	2009	Full	<i>The portion of the coastwide stock north of 40°10' N. lat. (84.5%) is based on the mean of the 2003-2008 swept area biomass estimates from the NMFS trawl survey.</i>
<i>Halfbanded</i>	3	-	-			NA	<i>No harvest contribution (3a stock) Max. landings <2 mt, 1928-2008; mainly a discard species</i>
<i>Harlequin</i>	3	-	-			NA	<i>DB-SRA estimate calculated in 2012 for 2013 and beyond</i>
<i>Honeycomb</i>	3	-	-			NA	<i>No harvest contribution in the north (3a stock)</i>
<i>Mexican</i>	3	-	-			NA	<i>No harvest contribution in the north (3a stock)</i>
<i>Pink</i>	3	0.004	0.004		2011	DBSRA	
<i>Pinkrose</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Puget Sound</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Pygmy</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Redstripe</i>	3	269.9	269.9		2011	DBSRA	
<i>Rosethorn</i>	3	12.9	12.9		2011	DBSRA	
<i>Rosy</i>	3	3.0	3.0		2011	DBSRA	
<i>Silvergray</i>	3	159.4	159.4		2011	DBSRA	
<i>Speckled</i>	3	0.2	0.2		2011	DBSRA	
<i>Squarespot</i>	3	0.2	0.2		2011	DBSRA	
<i>Starry</i>	3	0.004	0.004		2011	DBSRA	
<i>Stripetail</i>	3	40.4	40.4		2011	DBSRA	
<i>Swordspine</i>	3	0.0001	0.0001		2011	DBSRA	
<i>Tiger</i>	3	1.0	1.0		2011	DBSRA	
<i>Vermilion</i>	3	9.7	9.7		2011	DBSRA	
Slope Rockfish North		1,887	1,873				Sum of OFL contributions of component stocks in the complex
<i>Aurora</i>	1	17.5	17.5	50%	2013	Full	<i>The portion of the coastwide stock north of 40°10' N lat. (19%) is based on average survey biomass.</i>

Stock	Cat.	2019 OFL	2020 OFL	SPR HR	Year of Assessment	Type of Assessment	Additional Basis
<i>Bank</i>	3	17.2	17.2		2011	DBSRA	
<i>Blackgill</i>	3	4.7	4.7		2011	DCAC	DCAC estimate.
<i>Redbanded</i>	3	45.3	45.3		2011	DBSRA	
<i>Rougheye/Blackspotted</i>	2	217.6	219.5	50%	2013	Full	The coastwide OFLs are apportioned north (98%) and south (2%) based on average landings during 1985-2012.
<i>Sharpchin</i>	2	352.8	348.0	50%	2015	Catch-only Update of the 2013 Data-moderate (exSSS) Assessment in 2015	OFLs are apportioned north and south of 40°10' N lat. (80% N, 20% S) based on average swept area biomass estimates from the triennial survey.
<i>Shortraker</i>	3	18.7	18.7		2011	DBSRA	
<i>Splitnose</i>	1	1,021.0	1,009.6	50%	2009	Full	The portion of the coastwide stock north of 40°10' N lat. (35.8%) is based on average historical (1916-2008) landings.
<i>Yellowmouth</i>	3	192.4	192.4		2011	DBSRA	
Nearshore Rockfish South		1,300	1,322				Sum of OFL contributions of component stocks in the complex
<i>Shallow Nearshore Species</i>		NA	NA				
<i>Black and yellow</i>	3	27.5	27.5		2011	DBSRA	
<i>China</i>	2	14.3	14.8	50%	2015	Full	Projected using a 50% SPR from the 2015 full assessment (South model estimate)
<i>Gopher (N of Pt. Conception)</i>	3	101.0	101.0		2011		Estimated MSY (using the proxy SPR = 50%) from the 2005 assessment
<i>Gopher (S of Pt. Conception)</i>	3	25.6	25.6		2011	DCAC	DCAC estimate.
<i>Grass</i>	3	59.6	59.6		2011	DBSRA	
<i>Kelp</i>	3	27.7	27.7		2011	DBSRA	
<i>Deeper Nearshore Species</i>		NA	NA				
<i>Blue/Deacon (N. of 34°27' N lat.)</i>	2	278.8	291.5	50%	2017	Full	90% of the CA OFL is apportioned south of 40°10' N lat. (see Appendix D of the 2017 Assessment)
<i>Blue/Deacon (S. of 34°27' N lat.)</i>	3	21.8	21.8	50%	2017	DCAC	
<i>Brown</i>	2	177.9	181.9	50%	2013	Data-moderate	The portion of the coastwide stock north of 40°10' N lat. based on the proportion of cumulative removals by area during 1916-2012 (98.8%).
<i>Calico</i>	3	-	-			NA	No harvest contribution (3a stock) Max. landings <2 mt, 1928-2008; mainly a discard species
<i>Copper</i>	2	322.1	327.3	50%	2013	Data-moderate	The portion of the coastwide stock north of 40°10' N lat. based on the proportion of cumulative removals by area during 1916-2012 (95.1%).
<i>Olive</i>	3	224.6	224.6		2011	DBSRA	
<i>Quillback</i>	3	5.4	5.4		2011	DBSRA	
<i>Treefish</i>	3	13.2	13.2		2011	DBSRA	
Shelf Rockfish South		1,919	1,919				Sum of OFL contributions of component stocks in the complex
<i>Bronzespotted</i>	3	3.6	3.6		2011	DBSRA	
<i>Chameleon</i>	3	-	-			NA	No harvest contribution (3a stock)

Stock	Cat.	2019 OFL	2020 OFL	SPR HR	Year of Assessment	Type of Assessment	Additional Basis
<i>Flag</i>	3	23.4	23.4		2011	DBSRA	
<i>Freckled</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Greenblotched</i>	3	23.1	23.1		2011	DBSRA	
<i>Greenspotted</i>	2	78.3	78.1	50%	2015	2015 catch-only update of the 2011 full assessment	<i>The portion of the assessed area south of 40°10' N lat. (77.8% of OFL from northern California model from average historical catch + the OFL from the southern California model)</i>
<i>Greenstriped</i>	2	240.6	241.2	50%	2009	Full	<i>The portion of the coastwide stock south of 40°10' N. lat. (15.5%) is based on the mean of the 2003-2008 swept area biomass estimates from the NMFS trawl survey.</i>
<i>Halfbanded</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Harlequin</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Honeycomb</i>	3	9.9	9.9		2011	DBSRA	
<i>Mexican</i>	3	5.1	5.1		2011	DBSRA	
<i>Pink</i>	3	2.5	2.5		2011	DBSRA	
<i>Pinkrose</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Pygmy</i>	3	-	-			NA	<i>No harvest contribution (3a stock)</i>
<i>Redstripe</i>	3	0.5	0.5		2011	DBSRA	
<i>Rosethorn</i>	3	2.1	2.1		2011	DBSRA	
<i>Rosy</i>	3	44.5	44.5		2011	DBSRA	
<i>Silvergray</i>	3	0.5	0.5		2011	DBSRA	
<i>Speckled</i>	3	39.4	39.4		2011	DBSRA	
<i>Squarespot</i>	3	11.1	11.1		2011	DBSRA	
<i>Starry</i>	3	62.6	62.6		2011	DBSRA	
<i>Stripetail</i>	3	23.6	23.6		2011	DBSRA	
<i>Swordspine</i>	3	14.2	14.2		2011	DBSRA	
<i>Tiger</i>	3	0.04	0.04		2011	DBSRA	
<i>Vermilion</i>	3	269.3	269.3		2011	DBSRA	
<i>Yellowtail</i>	3	1,064.4	1,064.4		2011	DBSRA	
Slope Rockfish South		682	681				Sum of OFL contributions of component stocks in the complex
<i>Aurora</i>	1	74.6	74.6	50%	2013	Full	<i>The portion of the coastwide stock south of 40°10' N lat. (81%) is based on average survey biomass.</i>
<i>Bank</i>	3	503.2	503.2		2011	DBSRA	
<i>Pacific ocean perch</i>	3	-	-	-	-	NA	<i>No harvest contribution (3a stock)</i>
<i>Redbanded</i>	3	10.4	10.4		2011	DBSRA	
<i>Rougeye/Blackspotted</i>	2	4.4	4.5		2013	Full	<i>OFLs are apportioned north (98%) and south (2%) based on average landings during 1985-2012.</i>
<i>Sharpchin</i>	2	88.2	87.0	50%	2013	Catch-only Update of the 2013 Data-moderate (exSSS) Assessment in 2015	<i>OFLs are apportioned north and south of 40°10' N lat. (80%N, 20% S) based on average swept area biomass estimates from the triennial survey.</i>

Stock	Cat.	2019 OFL	2020 OFL	SPR HR	Year of Assessment	Type of Assessment	Additional Basis
<i>Shorthead</i>	3	0.1	0.1		2011	DBSRA	
<i>Yellowmouth</i>	3	0.8	0.8		2011	DBSRA	
Other Flatfish		8,750	8,202				Sum of OFL contributions of component stocks in the complex
<i>Butter sole</i>	3	4.6	4.6			NA	Based on the average catch during 1994-1998 + a 60% discard rate estimated from the EDCP study.
<i>Curlfin sole</i>	3	8.2	8.2			NA	Based on the average catch during 1994-1998 + a 60% discard rate estimated from the EDCP study.
<i>Flathead sole</i>	3	35.0	35.0			NA	Max. catch = 35 mt in 2005
<i>Pacific sanddab</i>	3	4,801.0	4,801.0		2011	DBSRA	
<i>Rex sole</i>	2	3,060.9	2,512.8	30%	2013	Catch-only Update of the 2013 Data-moderate (exSSS) Assessment in 2015	
<i>Rock sole</i>	3	66.7	66.7		2011	DBSRA	
<i>Sand sole</i>	3	773.2	773.2		2011	DBSRA	
Other Fish		480	465				Sum of OFL contributions of component stocks in the complex
<i>Cabezon (WA)</i>	3	5.5	5.4		2017	DBSRA	
<i>Kelp greenling (CA)</i>	3	118.9	118.9		2011	DBSRA	
<i>Kelp greenling (OR)</i>	1	180.9	166.5	45%	2015	Full	Default HCR: $ACL = ABC (P^* = 0.45; \sigma = 0.44; ABC \text{ buffer} = 5.4\%)$
<i>Kelp greenling (WA)</i>	3	7.1	7.1		2015	DBSRA	DB-SRA estimate calculated in 2015 using a low vulnerability prior.
<i>Leopard shark</i>	3	167.1	167.1		2011	DBSRA	

a/ A shortbelly rockfish assessment was done as an academic exercise in 2007 to understand the potential environmental determinants of fluctuations in the recruitment and abundance of an unexploited rockfish population in the California Current ecosystem (Field, et al. 2008). This assessment was not reviewed in a STAR Panel; however, the estimated MSY was used to determine the OFL.

Table 2. The range of alternative 2019 ABCs (mt) varied by the probability of overfishing (P*) for west coast groundfish stocks (overfished stocks in CAPS; stocks with new assessments in bold; component stocks in status quo stock complexes in *italics*).

Stock	2019 OFL	Cat.	Range of Alternative 2019 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
OVERFISHED STOCKS							
COWCOD S. of 40°10' N. lat.	74	NA	67	60	54	48	42
<i>COWCOD (Conception)</i>	<i>61</i>	2	<i>56</i>	<i>51</i>	<i>46</i>	<i>42</i>	<i>37</i>
<i>COWCOD (Monterey)</i>	<i>13</i>	3	<i>11</i>	<i>9</i>	<i>8</i>	<i>6</i>	<i>5</i>
YELLOWEYE ROCKFISH	82	1	78	74	71	67	64
NON-OVERFISHED STOCKS							
Arrowtooth Flounder	18,696	2	17,069	15,574	14,172	12,825	11,498
Big skate	541	2	494	451	410	371	333
Black Rockfish (CA)	344	1	329	314	299	285	270
Black Rockfish (OR)	565	2	516	471	428	388	347
Black Rockfish (WA)	312	1	298	285	271	258	245
Blackgill Rockfish S. of 40°10'	174.0	2	158.9	144.9	131.9	119.4	107.0
Bocaccio S. of 40°10' N. lat.	2,194	1	2,097	2,003	1,909	1,817	1,720
Cabazon (CA)	154	1	147	141	134	128	121
Cabazon (OR)	49	1	47	45	43	41	38
California scorpionfish	337	1	313	290	269	248	227
Canary Rockfish	1,517	1	1,450	1,385	1,320	1,256	1,189
Chilipepper S. of 40°10' N. lat.	2,652	1	2,536	2,422	2,308	2,196	2,079
Darkblotched Rockfish	800	1	765	730	696	662	627
Dover Sole	91,102	1	87,094	83,176	79,259	75,433	71,424
English Sole	11,052	2	10,090	9,206	8,377	7,582	6,797
Lingcod N. of 42° N. lat. (OR & WA)	4,690	1	4,484	4,282	4,080	3,883	3,677
Lingcod S. of 42° N. lat. (CA)	1,253	1	1,198	1,144	1,090	1,038	983
Lingcod N. of 40°10' N. lat.	4,957	1	4,739	4,526	4,313	4,104	3,886
Lingcod S. of 40°10' N. lat.	986	1	943	901	858	817	773
Longnose skate	2,499	1	2,389	2,282	2,174	2,069	1,959
Longspine Thornyhead (coastwide)	4,112	2	3,754	3,425	3,117	2,821	2,529
Pacific Cod	3,200	3	2,669	2,221	1,837	1,504	1,213
Pacific Ocean Perch	4,753	2	4,340	3,959	3,603	3,261	2,923
Petrale Sole	3,042	1	2,908	2,777	2,647	2,519	2,385
Sablefish (coastwide)	8,489	1	8,115	7,750	7,385	7,029	6,655
Shortbelly	6,950	2	6,345	5,789	5,268	4,768	4,274
Shortspine Thornyhead (coastwide)	3,089	2	2,820	2,573	2,341	2,119	1,900
Spiny dogfish	2,486	2	2,270	2,071	1,884	1,705	1,529
Splitnose S. of 40°10' N. lat.	1,831	1	1,750	1,672	1,593	1,516	1,435
Starry flounder	652	3	543	452	374	306	247
Widow Rockfish	12,375	1	11,831	11,298	10,766	10,247	9,702
Yellowtail N. of 40°10' N. lat.	6,568	2	5,997	5,471	4,979	4,506	4,039
STOCK COMPLEXES							
Nearshore Rockfish North	203		183	165	148	132	116
<i>Black and yellow</i>	<i>0.014</i>	3	<i>0.011</i>	<i>0.009</i>	<i>0.008</i>	<i>0.006</i>	<i>0.005</i>
<i>Blue/Deacon (CA)</i>	<i>31.0</i>	2	<i>28.1</i>	<i>25.4</i>	<i>22.9</i>	<i>20.5</i>	<i>18.3</i>
<i>Blue/Deacon (OR)</i>	<i>112.3</i>	2	<i>101.5</i>	<i>91.6</i>	<i>82.4</i>	<i>73.7</i>	<i>65.4</i>
<i>Blue/Deacon (WA)</i>	<i>8.7</i>	3	<i>7.3</i>	<i>6.0</i>	<i>5.0</i>	<i>4.1</i>	<i>3.3</i>
<i>Brown</i>	<i>2.1</i>	2	<i>1.9</i>	<i>1.7</i>	<i>1.6</i>	<i>1.4</i>	<i>1.3</i>
<i>Calico</i>	-	3	-	-	-	-	-

Stock	2019 OFL	Cat.	Range of Alternative 2019 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
<i>China</i>	28.6	2	26.1	23.8	21.7	19.6	17.6
<i>Copper</i>	11.9	2	10.9	9.9	9.0	8.2	7.3
<i>Gopher</i>	-	3	-	-	-	-	-
<i>Grass</i>	0.7	3	0.5	0.5	0.4	0.3	0.2
<i>Kelp</i>	0.009	3	0.008	0.006	0.005	0.004	0.003
<i>Olive</i>	0.3	3	0.3	0.2	0.2	0.1	0.1
<i>Quillback</i>	7.4	3	6.2	5.1	4.2	3.5	2.8
<i>Treefish</i>	0.2	3	0.2	0.2	0.1	0.1	0.1
Shelf Rockfish North	2,309		2,054	1,830	1,628	1,442	1,268
<i>Bronzespotted</i>	-	3	-	-	-	-	-
<i>Bocaccio</i>	284.0	3	236.9	197.1	163.0	133.5	107.6
<i>Chameleon</i>	-	3	-	-	-	-	-
<i>Chilipepper</i>	199.6	1	190.9	182.3	173.7	165.3	156.5
<i>Cowcod</i>	0.4	3	0.3	0.3	0.3	0.3	0.3
<i>Flag</i>	0.07	3	0.06	0.05	0.04	0.03	0.03
<i>Freckled</i>	-	3	-	-	-	-	-
<i>Greenblotched</i>	1.3	3	1.1	0.9	0.7	0.6	0.5
<i>Greenspotted 40°10' to 42° N. lat.</i>	9.3	2	8.5	7.8	7.1	6.4	5.7
<i>Greenspotted N. of 42 N. lat. (OR & WA)</i>	6.1	3	5.1	4.2	3.5	2.9	2.3
<i>Greenstriped</i>	#####	2	1,197.3	1,092.4	994.1	899.6	806.5
<i>Halfbanded</i>	-	3	-	-	-	-	-
<i>Harlequin</i>	-	3	-	-	-	-	-
<i>Honeycomb</i>	-	3	-	-	-	-	-
<i>Mexican</i>	-	3	-	-	-	-	-
<i>Pink</i>	0.004	3	0.003	0.003	0.002	0.002	0.001
<i>Pinkrose</i>	-	3	-	-	-	-	-
<i>Puget Sound</i>	-	3	-	-	-	-	-
<i>Pygmy</i>	-	3	-	-	-	-	-
<i>Redstripe</i>	269.9	3	225.1	187.3	154.9	126.9	102.3
<i>Rosethorn</i>	12.9	3	10.8	9.0	7.4	6.1	4.9
<i>Rosy</i>	3.0	3	2.5	2.1	1.7	1.4	1.1
<i>Silvergray</i>	159.4	3	133.0	110.6	91.5	74.9	60.4
<i>Speckled</i>	0.17	3	0.14	0.12	0.10	0.08	0.06
<i>Squarespot</i>	0.17	3	0.14	0.12	0.10	0.08	0.07
<i>Starry</i>	0.00	3	0.003	0.003	0.002	0.002	0.001
<i>Stripetail</i>	40.4	3	33.7	28.0	23.2	19.0	15.3
<i>Swordspine</i>	0.0001	3	0.00008	0.00007	0.00006	0.00005	0.00004
<i>Tiger</i>	1.0	3	0.8	0.7	0.6	0.5	0.4
<i>Vermilion</i>	9.7	3	8.1	6.7	5.6	4.6	3.7
Slope Rockfish North	1,887		1,746	1,616	1,495	1,382	1,270
<i>Aurora</i>	17.5	1	16.7	15.9	15.0	14.3	13.5
<i>Bank</i>	17.2	3	14.4	12.0	9.9	8.1	6.5
<i>Blackgill</i>	4.7	3	3.9	3.3	2.7	2.2	1.8
<i>Redbanded</i>	45.3	3	37.7	31.4	26.0	21.3	17.2
<i>Rougheye/Blackspotted</i>	217.6	2	199	181	165	149	134
<i>Sharpchin</i>	352.8	2	322.1	293.9	267.4	242.0	217.0
<i>Shorthead</i>	18.7	3	15.6	13.0	10.7	8.8	7.1
<i>Splinoose</i>	#####	1	976.1	932.2	888.3	845.4	800.5
<i>Yellowmouth</i>	192.4	3	160.5	133.6	110.5	90.4	72.9
Nearshore Rockfish South	1,300		1,145	1,009	887	776	673

Stock	2019 OFL	Cat.	Range of Alternative 2019 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
<i>Shallow Nearshore Species</i>							
<i>Black and yellow</i>	27.5	3	23.0	19.1	15.8	12.9	10.4
<i>China</i>	14.3	2	13.1	11.9	10.9	9.8	8.8
<i>Gopher (N of Pt. Conception)</i>	101.0	3	84.2	70.1	58.0	47.5	38.3
<i>Gopher (S of Pt. Conception)</i>	25.6	3	21.4	17.8	14.7	12.0	9.7
<i>Grass</i>	59.6	3	49.7	41.4	34.2	28.0	22.6
<i>Kelp</i>	27.7	3	23.1	19.2	15.9	13.0	10.5
<i>Deeper Nearshore Species</i>							
<i>Blue/Deacon (N. of 34°27' N lat.)</i>	278.8	2	252.6	228.6	206.3	184.9	164.5
<i>Blue/Deacon (S. of 34°27' N lat.)</i>	21.8	3	18.2	15.1	12.5	10.2	8.3
<i>Brown</i>	177.9	2	162.4	148.2	134.9	122.1	109.4
<i>Calico</i>	-	3	-	-	-	-	-
<i>Copper</i>	322.1	2	294.1	268.3	244.1	221.0	198.1
<i>Olive</i>	224.6	3	187.4	155.9	128.9	105.6	85.1
<i>Quillback</i>	5.4	3	4.5	3.7	3.1	2.5	2.0
<i>Treefish</i>	13.2	3	11.0	9.2	7.6	6.2	5.0
<i>Shelf Rockfish South</i>							
<i>Bronzespotted</i>	3.6	3	3.0	2.5	2.1	1.7	1.4
<i>Chameleon</i>	-	3	-	-	-	-	-
<i>Flag</i>	23.4	3	19.5	16.3	13.4	11.0	8.9
<i>Freckled</i>	-	3	-	-	-	-	-
<i>Greenblotched</i>	23.1	3	19.3	16.1	13.3	10.9	8.8
<i>Greenspotted</i>	78.3	2	71.5	65.2	59.3	53.7	48.2
<i>Greenstriped</i>	240.6	2	219.6	200.4	182.3	165.0	147.9
<i>Halfbanded</i>	-	3	-	-	-	-	-
<i>Harlequin</i>	-	3	-	-	-	-	-
<i>Honeycomb</i>	9.9	3	8.2	6.8	5.7	4.6	3.7
<i>Mexican</i>	5.1	3	4.2	3.5	2.9	2.4	1.9
<i>Pink</i>	2.5	3	2.1	1.8	1.5	1.2	1.0
<i>Pinkrose</i>	-	3	-	-	-	-	-
<i>Pygmy</i>	-	3	-	-	-	-	-
<i>Redstripe</i>	0.5	3	0.4	0.3	0.3	0.2	0.2
<i>Rosethorn</i>	2.1	3	1.8	1.5	1.2	1.0	0.8
<i>Rosy</i>	44.5	3	37.1	30.9	25.5	20.9	16.9
<i>Silvergray</i>	0.5	3	0.4	0.4	0.3	0.3	0.2
<i>Speckled</i>	39.4	3	32.8	27.3	22.6	18.5	14.9
<i>Squarespot</i>	11.1	3	9.2	7.7	6.4	5.2	4.2
<i>Starry</i>	62.6	3	52.2	43.4	35.9	29.4	23.7
<i>Stripetail</i>	23.6	3	19.7	16.4	13.6	11.1	9.0
<i>Swordspine</i>	14.2	3	11.9	9.9	8.2	6.7	5.4
<i>Tiger</i>	0.04	3	0.03	0.03	0.02	0.02	0.02
<i>Vermilion</i>	269.3	3	224.6	186.9	154.6	126.6	102.1
<i>Yellowtail</i>	#####	3	887.7	738.7	611.0	500.3	403.4
<i>Slope Rockfish South</i>							
<i>Aurora</i>	74.6	1	71.0	67.6	64.1	60.8	57.4
<i>Bank</i>	503.2	3	419.7	349.2	288.8	236.5	190.7
<i>Pacific ocean perch</i>	-	3	-	-	-	-	-
<i>Redbanded</i>	10.4	3	8.7	7.2	6.0	4.9	3.9
<i>Rougheye/Blackspotted</i>	4.4	2	4.1	3.7	3.4	3.0	2.7
<i>Sharpchin</i>	88.2	2	80.5	73.5	66.9	60.5	54.2

Stock	2019 OFL	Cat.	Range of Alternative 2019 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
<i>Shortraker</i>	0.10	3	0.09	0.07	0.06	0.05	0.04
<i>Yellowmouth</i>	0.8	3	0.7	0.6	0.5	0.4	0.3
Other Flatfish	8,750		7,539	6,498	5,586	4,774	4,039
<i>Butter sole</i>	4.6	3	3.9	3.2	2.7	2.2	1.8
<i>Curlfin sole</i>	8.2	3	6.9	5.7	4.7	3.9	3.1
<i>Flathead sole</i>	35.0	3	29.2	24.3	20.1	16.5	13.3
<i>Pacific sanddab</i>	#####	3	4,004.0	3,331.9	2,755.8	2,256.5	1,819.6
<i>Rex sole</i>	#####	2	2,794.6	2,549.8	2,320.2	2,099.8	1,882.5
<i>Rock sole</i>	66.7	3	55.6	46.3	38.3	31.3	25.3
<i>Sand sole</i>	773.2	3	644.8	536.6	443.8	363.4	293.0
Other Fish	TBD		420	369	324	284	248
<i>Cabezon (WA)</i>	5.5	3	4.6	3.8	3.2	2.6	2.1
<i>Kelp greenling (CA)</i>	118.9	3	99.2	82.5	68.2	55.9	45.1
<i>Kelp greenling (OR)</i>	180.9	1	171.1	161.7	152.7	143.6	134.4
<i>Kelp greenling (WA)</i>	7.1	3	5.9	4.9	4.1	3.3	2.7
<i>Leopard shark</i>	167.1	3	139.4	116.0	95.9	78.5	63.3

Table 3. The range of alternative 2020 ABCs (mt) varied by the probability of overfishing (P*) for west coast groundfish stocks (overfished stocks in CAPS; stocks with new assessments in bold; component stocks in status quo stock complexes in *italics*).

Stock	2020 OFL	Cat.	Range of Alternative 2020 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
OVERFISHED STOCKS							
COWCOD S. of 40°10' N. lat.	76	NA	68	61	55	49	43
<i>COWCOD (Conception)</i>	62	2	57	52	47	43	38
<i>COWCOD (Monterey)</i>	13	3	11	9	8	6	5
YELLOW EYE ROCKFISH	84	1	80	77	73	70	66
NON-OVERFISHED STOCKS							
Arrowtooth Flounder	15,306	2	13,974	12,750	11,602	10,500	9,413
Big skate	541	2	494	451	410	371	333
Black Rockfish (CA)	341	1	326	311	297	282	267
Black Rockfish (OR)	561	2	512	467	425	385	345
Black Rockfish (WA)	311	1	297	284	271	258	244
Blackgill Rockfish S. of 40°10'	174	2	158.9	144.9	131.9	119.4	107.0
Bocaccio S. of 40°10' N. lat.	2,125	1	2,032	1,940	1,849	1,760	1,666
Cabazon (CA)	153	1	146	140	133	127	120
Cabazon (OR)	49	1	47	45	43	41	38
California scorpionfish	331	1	307	286	264	244	223
Canary Rockfish	1,431	1	1,368	1,307	1,245	1,185	1,122
Chilipepper S. of 40°10' N. lat.	2,521	1	2,410	2,302	2,193	2,088	1,977
Darkblotched Rockfish	853	1	815	779	742	706	669
Dover Sole	92,048	1	87,998	84,040	80,082	76,216	72,166
English Sole	11,101	2	10,135	9,247	8,415	7,615	6,827
Lingcod N. of 42° N. lat. (OR & WA)	4,459	1	4,484	4,282	4,080	3,883	3,677
Lingcod S. of 42° N. lat. (CA)	1,136	1	1,198	1,144	1,090	1,038	983
Lingcod N. of 40°10' N. lat.	4,701	1	4,739	4,526	4,313	4,104	3,886
Lingcod S. of 40°10' N. lat.	894	1	943	901	858	817	773
Longnose skate	2,474	1	2,365	2,259	2,152	2,048	1,940
Longspine Thornyhead (coastwide)	3,901	2	3,562	3,250	2,957	2,676	2,399
Pacific Cod	3,200	3	2,669	2,221	1,837	1,504	1,213
Pacific Ocean Perch	4,632	2	4,229	3,859	3,511	3,178	2,849
Petrale Sole	2,976	1	2,845	2,717	2,589	2,464	2,333
Sablefish (coastwide)	8,648	1	8,267	7,896	7,524	7,161	6,780
Shortbelly	6,950	2	6,345	5,789	5,268	4,768	4,274
Shortspine Thornyhead (coastwide)	3,063	2	2,797	2,551	2,322	2,101	1,884
Spiny dogfish	2,472	2	2,257	2,059	1,874	1,696	1,520
Splitnose S. of 40°10' N. lat.	1,810	1	1,731	1,653	1,575	1,499	1,419
Starry flounder	652	3	543	452	374	306	247
Widow Rockfish	11,714	1	11,199	10,695	10,191	9,699	9,184
Yellowtail N. of 40°10' N. lat.	6,261	2	5,716	5,215	4,746	4,295	3,851
STOCK COMPLEXES							
Nearshore Rockfish North	200		180	162	146	130	115
<i>Black and yellow</i>	<i>0.014</i>	3	<i>0.011</i>	<i>0.009</i>	<i>0.008</i>	<i>0.006</i>	<i>0.005</i>
<i>Blue/Deacon (CA)</i>	<i>32.4</i>	2	<i>29.3</i>	<i>26.6</i>	<i>24.0</i>	<i>21.5</i>	<i>19.1</i>
<i>Blue/Deacon (OR)</i>	<i>108.8</i>	2	<i>98.4</i>	<i>88.8</i>	<i>79.9</i>	<i>71.4</i>	<i>63.3</i>
<i>Blue/Deacon (WA)</i>	8.4	3	7.0	5.8	4.8	3.9	3.2
<i>Brown</i>	2.1	2	1.9	1.8	1.6	1.5	1.3
<i>Calico</i>	-	3	-	-	-	-	-

Stock	2020 OFL	Cat.	Range of Alternative 2020 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
<i>China</i>	27.9	2	25.5	23.2	21.1	19.1	17.2
<i>Copper</i>	12.2	2	11.2	10.2	9.3	8.4	7.5
<i>Gopher</i>	-	3	-	-	-	-	-
<i>Grass</i>	0.7	3	0.5	0.5	0.4	0.3	0.2
<i>Kelp</i>	0.009	3	0.008	0.006	0.005	0.004	0.003
<i>Olive</i>	0.32	3	0.26	0.22	0.18	0.15	0.12
<i>Quillback</i>	7.4	3	6.2	5.1	4.2	3.5	2.8
<i>Treefish</i>	0.22	3	0.18	0.15	0.12	0.10	0.08
Shelf Rockfish North	2,302		2,048	1,824	1,622	1,436	1,262
<i>Bronzespotted</i>	-	3	-	-	-	-	-
<i>Bocaccio</i>	284.0	3	236.9	197.1	163.0	133.5	107.6
<i>Chameleon</i>	-	3	-	-	-	-	-
<i>Chilipepper</i>	189.8	1	181.4	173.3	165.1	157.1	148.8
<i>Cowcod</i>	0.4	3	0.3	0.3	0.3	0.3	0.3
<i>Flag</i>	0.07	3	0.06	0.05	0.04	0.03	0.03
<i>Freckled</i>	-	3	-	-	-	-	-
<i>Greenblotched</i>	1.3	3	1.1	0.9	0.7	0.6	0.5
<i>Greenspotted 40°10' to 42° N. lat.</i>	9.3	2	8.5	7.7	7.0	6.4	5.7
<i>Greenspotted N. of 42 N. lat. (OR & WA)</i>	6.1	3	5.1	4.2	3.5	2.9	2.3
<i>Greenstriped</i>	1,314.8	2	1,200.4	1,095.2	996.6	902.0	808.6
<i>Halfbanded</i>	-	3	-	-	-	-	-
<i>Harlequin</i>	-	3	-	-	-	-	-
<i>Honeycomb</i>	-	3	-	-	-	-	-
<i>Mexican</i>	-	3	-	-	-	-	-
<i>Pink</i>	0.004	3	0.003	0.003	0.002	0.002	0.001
<i>Pinkrose</i>	-	3	-	-	-	-	-
<i>Puget Sound</i>	-	3	-	-	-	-	-
<i>Pygmy</i>	-	3	-	-	-	-	-
<i>Redstripe</i>	269.9	3	225.1	187.3	154.9	126.9	102.3
<i>Rosethorn</i>	12.9	3	10.8	9.0	7.4	6.1	4.9
<i>Rosy</i>	3.0	3	2.5	2.1	1.7	1.4	1.1
<i>Silvergray</i>	159.4	3	133.0	110.6	91.5	74.9	60.4
<i>Speckled</i>	0.17	3	0.14	0.12	0.10	0.08	0.06
<i>Squarespot</i>	0.17	3	0.14	0.12	0.10	0.08	0.07
<i>Starry</i>	0.004	3	0.003	0.003	0.002	0.002	0.001
<i>Stripetail</i>	40.4	3	33.7	28.0	23.2	19.0	15.3
<i>Swordspine</i>	0.0001	3	0.00008	0.00007	0.00006	0.00005	0.00004
<i>Tiger</i>	1.0	3	0.8	0.7	0.6	0.5	0.4
<i>Vermilion</i>	9.7	3	8.1	6.7	5.6	4.6	3.7
Slope Rockfish North	1,873		1,732	1,603	1,483	1,370	1,259
<i>Aurora</i>	17.5	1	16.7	15.8	15.0	14.3	13.5
<i>Bank</i>	17.2	3	14.4	12.0	9.9	8.1	6.5
<i>Blackgill</i>	4.7	3	3.9	3.3	2.7	2.2	1.8
<i>Redbanded</i>	45.3	3	37.7	31.4	26.0	21.3	17.2
<i>Rougheye/Blackspotted</i>	219.5	2	200	183	166	151	135
<i>Sharpchin</i>	348.0	2	317.7	289.9	263.8	238.7	214.0
<i>Shorthead</i>	18.7	3	15.6	13.0	10.7	8.8	7.1
<i>Spliose</i>	1,009.6	1	965.1	921.7	878.3	835.9	791.5
<i>Yellowmouth</i>	192.4	3	160.5	133.6	110.5	90.4	72.9
Nearshore Rockfish South	1,322		1,165	1,027	904	791	686

Stock	2020 OFL	Cat.	Range of Alternative 2020 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
<i>Shallow Nearshore Species</i>							
	NA		NA	NA	NA	NA	NA
<i>Black and yellow</i>	27.5	3	23.0	19.1	15.8	12.9	10.4
<i>China</i>	14.8	2	13.5	12.3	11.2	10.2	9.1
<i>Gopher (N of Pt. Conception)</i>	101.0	3	84.2	70.1	58.0	47.5	38.3
<i>Gopher (S of Pt. Conception)</i>	25.6	3	21.4	17.8	14.7	12.0	9.7
<i>Grass</i>	59.6	3	49.7	41.4	34.2	28.0	22.6
<i>Kelp</i>	27.7	3	23.1	19.2	15.9	13.0	10.5
<i>Deeper Nearshore Species</i>							
	NA		NA	NA	NA	NA	NA
<i>Blue/Deacon (N. of 34°27' N lat.)</i>	291.5	2	264.1	239.0	215.7	193.3	172.0
<i>Blue/Deacon (S. of 34°27' N lat.)</i>	21.8	3	18.2	15.1	12.5	10.2	8.3
<i>Brown</i>	181.9	2	166.1	151.5	137.9	124.8	111.9
<i>Calico</i>	-	3	-	-	-	-	-
<i>Copper</i>	327.3	2	298.8	272.6	248.1	224.5	201.3
<i>Olive</i>	224.6	3	187.4	155.9	128.9	105.6	85.1
<i>Quillback</i>	5.4	3	4.5	3.7	3.1	2.5	2.0
<i>Treefish</i>	13.2	3	11.0	9.2	7.6	6.2	5.0
<i>Shelf Rockfish South</i>							
	1,919		1,626	1,376	1,160	971	803
<i>Bronzespotted</i>	3.6	3	3.0	2.5	2.1	1.7	1.4
<i>Chameleon</i>	-	3	-	-	-	-	-
<i>Flag</i>	23.4	3	19.5	16.3	13.4	11.0	8.9
<i>Freckled</i>	-	3	-	-	-	-	-
<i>Greenblotched</i>	23.1	3	19.3	16.1	13.3	10.9	8.8
<i>Greenspotted</i>	78.1	2	71.3	65.1	59.2	53.6	48.0
<i>Greenstriped</i>	241.2	2	220.2	200.9	182.8	165.4	148.3
<i>Halfbanded</i>	-	3	-	-	-	-	-
<i>Harlequin</i>	-	3	-	-	-	-	-
<i>Honeycomb</i>	9.9	3	8.2	6.8	5.7	4.6	3.7
<i>Mexican</i>	5.1	3	4.2	3.5	2.9	2.4	1.9
<i>Pink</i>	2.5	3	2.1	1.8	1.5	1.2	1.0
<i>Pinkrose</i>	-	3	-	-	-	-	-
<i>Pygmy</i>	-	3	-	-	-	-	-
<i>Redstripe</i>	0.5	3	0.4	0.3	0.3	0.2	0.2
<i>Rosethorn</i>	2.1	3	1.8	1.5	1.2	1.0	0.8
<i>Rosy</i>	44.5	3	37.1	30.9	25.5	20.9	16.9
<i>Silvergray</i>	0.5	3	0.4	0.4	0.3	0.3	0.2
<i>Speckled</i>	39.4	3	32.8	27.3	22.6	18.5	14.9
<i>Squarespot</i>	11.1	3	9.2	7.7	6.4	5.2	4.2
<i>Starry</i>	62.6	3	52.2	43.4	35.9	29.4	23.7
<i>Stripetail</i>	23.6	3	19.7	16.4	13.6	11.1	9.0
<i>Swordspine</i>	14.2	3	11.9	9.9	8.2	6.7	5.4
<i>Tiger</i>	0.04	3	0.03	0.03	0.02	0.02	0.02
<i>Vermilion</i>	269.3	3	224.6	186.9	154.6	126.6	102.1
<i>Yellowtail</i>	1,064.4	3	887.7	738.7	611.0	500.3	403.4
<i>Slope Rockfish South</i>							
	681		584	501	429	365	309
<i>Aurora</i>	74.6	1	71.0	67.6	64.1	60.8	57.3
<i>Bank</i>	503.2	3	419.7	349.2	288.8	236.5	190.7
<i>Pacific ocean perch</i>	-	3	-	-	-	-	-
<i>Redbanded</i>	10.4	3	8.7	7.2	6.0	4.9	3.9
<i>Rougheye/Blackspotted</i>	4.5	2	4.1	3.7	3.4	3.1	2.8
<i>Sharpchin</i>	87.0	2	79.4	72.5	65.9	59.7	53.5

Stock	2020 OFL	Cat.	Range of Alternative 2020 ABCs				
			Overfishing Probability (P*)				
			0.45	0.40	0.35	0.30	0.25
<i>Shortraker</i>	0.10	3	0.09	0.07	0.06	0.05	0.04
<i>Yellowmouth</i>	0.8	3	0.7	0.6	0.5	0.4	0.3
Other Flatfish	8,202		7,039	6,041	5,170	4,398	3,701
<i>Butter sole</i>	4.6	3	3.9	3.2	2.7	2.2	1.8
<i>Curlfin sole</i>	8.2	3	6.9	5.7	4.7	3.9	3.1
<i>Flathead sole</i>	35.0	3	29.2	24.3	20.1	16.5	13.3
<i>Pacific sanddab</i>	4,801.0	3	4,004.0	3,331.9	2,755.8	2,256.5	1,819.6
<i>Rex sole</i>	2,512.8	2	2,294.2	2,093.2	1,904.7	1,723.8	1,545.4
<i>Rock sole</i>	66.7	3	55.6	46.3	38.3	31.3	25.3
<i>Sand sole</i>	773.2	3	644.8	536.6	443.8	363.4	293.0
Other Fish	465		406	356	312	273	237
<i>Cabezon (WA)</i>	5.4	3	4.5	3.8	3.2	2.6	2.1
<i>Kelp greenling (CA)</i>	118.9	3	99.2	82.5	68.2	55.9	45.1
<i>Kelp greenling (OR)</i>	166.5	1	157.5	148.9	140.5	132.2	123.7
<i>Kelp greenling (WA)</i>	7.1	3	5.9	4.9	4.1	3.3	2.7
<i>Leopard shark</i>	167.1	3	139.4	116.0	95.9	78.5	63.3

Table 4. 2019 and 2020 harvest specifications (overfishing limits (OFLs in mt), acceptable biological catches (ABCs in mt), and annual catch limits (ACLs in mt)) under default harvest control rules for determining these specifications, for west coast groundfish stocks and stock complexes (overfished stocks in CAPS; stocks with new assessments in bold; component stocks in stock complexes in *italics*; highlighted values are presumptive harvest specifications recommended to the SSC and Council for their November deliberations).

Stock or Stock Complex	2019			2020			Harvest Control Rule
	OFL	ABC	ACL	OFL	ABC	ACL	
OVERFISHED STOCKS							
COWCOD S. of 40°10'	74	67	10	76	68	10	ABCs sum of Con. and Mont. area ABCs, ACLs projected from 2013 rebuilding analysis (SPR = 82.7% (F = 0.007)) + Mont. area ABC contrib., ACT = 4 mt
<i>COWCOD (Conception)</i>	61	56	NA	62	57	NA	ABC (P* = 0.45)
<i>COWCOD (Monterey)</i>	13.3	11.1	NA	13.3	11.1	NA	ABC (P* = 0.45)
YELLOWEYE ROCKFISH	82	78	29	84	80	30	Projections from a new rebuilding analysis needed; ABC (P* = 0.4), ACL (SPR = 76.0%)
NON-OVERFISHED STOCKS							
Arrowtooth Flounder	18,696	15,574	15,574	15,306	12,750	12,750	ACL = ABC (P* = 0.4)
Big skate	541	494	494	541	494	494	ACL = ABC (P* = 0.45)
Black Rockfish (CA)	344	329	329	341	326	326	ACL = ABC (P* = 0.45)
Black Rockfish (OR)	565	516	516	561	512	512	ACL = ABC (P* = 0.45)
Black Rockfish (WA)	312	298	298	311	297	297	ACL = ABC (P* = 0.45)
Blackgill Rockfish S. of 40°10'	174	159	159	174	159	159	ACL = ABC (P* = 0.45); Managed w/ stock-specific harvest specifications in 2019 and 2020?
Bocaccio S. of 40°10'	2,194	2,097	2,097	2,125	2,032	2,032	ACL = ABC (P* = 0.45)
Cabezon (CA)	154	147	147	153	146	146	ACL = ABC (P* = 0.45)
Cabezon (OR)	49	47	47	49	47	47	ACL = ABC (P* = 0.45)
California scorpionfish	337	313	150	331	307	150	150 mt constant catch ACL
Canary Rockfish	1,517	1,450	1,450	1,431	1,368	1,368	ACL = ABC (P* = 0.45)
Chilipepper S. of 40°10'	2,652	2,536	2,536	2,521	2,410	2,410	ACL = ABC (P* = 0.45)
Darkblotched Rockfish	800	765	765	853	815	815	ACL = ABC (P* = 0.45)
Dover Sole	91,102	87,094	50,000	92,048	87,998	50,000	ABC (P* 0.45), ACL = 50,000 mt annually
English Sole	11,052	10,090	10,090	11,101	10,135	10,135	ACL = ABC (P* = 0.45)
Lingcod N. of 40°10'	4,957	4,728	4,704	4,701	4,483	4,459	ACL = ABC (P* = 0.45 in OR & WA; P* = 0.4 in CA) w/ 40-10 adj. for the CA contribution to the ABC and ACL
Lingcod S. of 40°10'	986	901	812	894	816	724	ACL = ABC (P* = 0.4) w/ 40-10 adj.
Longnose skate	2,499	2,389	2,000	2,474	2,365	2,000	ABC (P* = 0.45), ACL = 2,000 mt annually
Longspine Thornyhead N. of 34°27'	4,112	3,425	2,603	3,901	3,250	2,470	ACL = 76% of coastwide ABC (P* = 0.4)
Longspine Thornyhead S. of 34°27'			822			780	ACL = 24% of coastwide ABC (P* = 0.4)
Pacific Cod	3,200	2,221	1,600	3,200	2,221	1,600	ABC (P* = 0.4), ACL = 50% of OFL
Pacific Ocean Perch	4,753	4,340	4,340	4,632	4,229	4,229	ACL = ABC (P* = 0.45); Coastwide or N. of 40°10' N lat.?
Petrale Sole	3,042	2,908	2,908	2,976	2,845	2,845	ACL = ABC (P* = 0.45)
Sablefish N. of 36°	8,489	7,750	5,606	8,648	7,896	5,723	ACL: 40-10 rule applied to 73.8% of coastwide ABC (P* = 0.4)
Sablefish S. of 36°			1,990			2,032	ACL: 40-10 rule applied to 26.2% of coastwide ABC (P* = 0.4)
Shortbelly	6,950	5,789	500	6,950	5,789	500	ABC (P* = 0.4), ACL = 500 mt annually
Shortspine Thornyhead N. of 34°27'	3,089	2,573	1,683	3,063	2,551	1,669	ACL = 65.4% of coastwide ABC (P* = 0.4)
Shortspine Thornyhead S. of 34°27'			890			883	ACL = 34.6% of coastwide ABC (P* = 0.4)

Stock or Stock Complex	2019			2020			Harvest Control Rule
	OFL	ABC	ACL	OFL	ABC	ACL	
Spiny dogfish	2,486	2,071	2,071	2,472	2,059	2,059	ACL = ABC (P* = 0.4)
Splitnose S. of 40°10'	1,831	1,750	1,750	1,810	1,731	1,731	ACL = ABC (P* = 0.45)
Starry flounder	652	452	452	652	452	452	Est. MSY from E.J.'s DBSRA analysis
Widow Rockfish	12,375	11,831	11,831	11,714	11,199	11,199	ACL = ABC (P* = 0.45)
Yellowtail N. of 40°10'	6,568	5,997	5,997	6,261	5,716	5,716	ACL = ABC (P* = 0.45)
STOCK COMPLEXES							
Nearshore Rockfish North	203	183	183	200	180	180	Sum of component species specifications
<i>Black and yellow</i>	0.0	0.0	0.0	0.0	0.0	0.0	ACL = ABC (P* = 0.45)
Blue/Deacon (CA)	31.0	28.1	28.1	32.4	29.3	29.3	ACL = ABC (P* = 0.45)
Blue/Deacon (OR)	112.3	101.5	101.5	108.8	98.4	98.4	ACL = ABC (P* = 0.45)
<i>Blue/Deacon (WA)</i>	8.7	7.3	7.3	8.4	7.0	7.0	ACL = ABC (P* = 0.45)
<i>Brown</i>	2.1	1.9	1.9	2.1	1.9	1.9	ACL = ABC (P* = 0.45)
<i>Calico</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>China</i>	28.6	26.1	26.1	27.9	25.5	25.5	ACL = ABC (P* = 0.45)
<i>Copper</i>	11.9	10.9	10.9	12.2	11.2	11.2	ACL = ABC (P* = 0.45)
<i>Gopher</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Grass</i>	0.7	0.5	0.5	0.7	0.5	0.5	ACL = ABC (P* = 0.45)
<i>Kelp</i>	0.0	0.0	0.0	0.0	0.0	0.0	ACL = ABC (P* = 0.45)
<i>Olive</i>	0.3	0.3	0.3	0.3	0.3	0.3	ACL = ABC (P* = 0.45)
<i>Quillback</i>	7.4	6.2	6.2	7.4	6.2	6.2	ACL = ABC (P* = 0.45)
<i>Treefish</i>	0.2	0.2	0.2	0.2	0.2	0.2	ACL = ABC (P* = 0.45)
Shelf Rockfish North	2,309	2,054	2,054	2,302	2,048	2,048	Sum of component species specifications
<i>Bronzespotted</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Bocaccio</i>	284.0	236.9	236.9	284.0	236.9	236.9	ACL = ABC (P* = 0.45)
<i>Chameleon</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Chilipepper</i>	199.6	190.9	190.9	189.8	181.4	181.4	ACL = ABC (P* = 0.45)
<i>Cowcod</i>	0.4	0.3	0.3	0.4	0.3	0.3	ACL = ABC (P* = 0.45)
<i>Flag</i>	0.1	0.1	0.1	0.1	0.1	0.1	ACL = ABC (P* = 0.45)
<i>Freckled</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Greenblotched</i>	1.3	1.1	1.1	1.3	1.1	1.1	ACL = ABC (P* = 0.45)
<i>Greenspotted 40°10' to 42° N. lat.</i>	9.3	8.5	8.2	9.3	8.5	8.2	ACL: 40-10 rule applied to 22.2% of northern model (CA N of 34°27' N latitude) ABC (P* = 0.45)
<i>Greenspotted N. of 42 N. lat. (OR & WA)</i>	6.1	5.1	5.1	6.1	5.1	5.1	ACL = ABC (P* = 0.45)
<i>Greenstriped</i>	1,311.4	1,197.3	1,197.3	1,314.8	1,200.4	1,200.4	ACL = ABC (P* = 0.45)
<i>Halfbanded</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Harlequin</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Honeycomb</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Mexican</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Pink</i>	0.0	0.0	0.0	0.0	0.0	0.0	ACL = ABC (P* = 0.45)

Stock or Stock Complex	2019			2020			Harvest Control Rule
	OFL	ABC	ACL	OFL	ABC	ACL	
<i>Pinkrose</i>	-	-	-	-	-	-	$ACL = ABC (P^* = 0.45)$
<i>Puget Sound</i>	-	-	-	-	-	-	$ACL = ABC (P^* = 0.45)$
<i>Pygmy</i>	-	-	-	-	-	-	$ACL = ABC (P^* = 0.45)$
<i>Redstripe</i>	269.9	225.1	225.1	269.9	225.1	225.1	$ACL = ABC (P^* = 0.45)$
<i>Rosethorn</i>	12.9	10.8	10.8	12.9	10.8	10.8	$ACL = ABC (P^* = 0.45)$
<i>Rosy</i>	3.0	2.5	2.5	3.0	2.5	2.5	$ACL = ABC (P^* = 0.45)$
<i>Silvergray</i>	159.4	133.0	133.0	159.4	133.0	133.0	$ACL = ABC (P^* = 0.45)$
<i>Speckled</i>	0.2	0.1	0.1	0.2	0.1	0.1	$ACL = ABC (P^* = 0.45)$
<i>Squarespot</i>	0.2	0.1	0.1	0.2	0.1	0.1	$ACL = ABC (P^* = 0.45)$
<i>Starry</i>	0.0	0.0	0.0	0.0	0.0	0.0	$ACL = ABC (P^* = 0.45)$
<i>Stripetail</i>	40.4	33.7	33.7	40.4	33.7	33.7	$ACL = ABC (P^* = 0.45)$
<i>Swordspine</i>	0.0	0.0	0.0	0.0	0.0	0.0	$ACL = ABC (P^* = 0.45)$
<i>Tiger</i>	1.0	0.8	0.8	1.0	0.8	0.8	$ACL = ABC (P^* = 0.45)$
<i>Vermilion</i>	9.7	8.1	8.1	9.7	8.1	8.1	$ACL = ABC (P^* = 0.45)$
Slope Rockfish North	1,887	1,746	1,746	1,873	1,732	1,732	Sum of component species specifications
<i>Aurora (assuming sigma = 0.39)</i>	17.5	16.7	16.7	17.5	16.7	16.7	$ACL = ABC (P^* = 0.45)$
<i>Bank</i>	17.2	14.4	14.4	17.2	14.4	14.4	$ACL = ABC (P^* = 0.45)$
<i>Blackgill</i>	4.7	3.9	3.9	4.7	3.9	3.9	$ACL = ABC (P^* = 0.45)$
<i>Redbanded</i>	45.3	37.7	37.7	45.3	37.7	37.7	$ACL = ABC (P^* = 0.45)$
<i>Rougheye/Blackspotted</i>	217.6	198.6	198.6	219.5	200.4	200.4	$ACL = ABC (P^* = 0.45)$
<i>Sharpchin</i>	352.8	322.1	322.1	348.0	317.7	317.7	$ACL = ABC (P^* = 0.45)$
<i>Shortraker</i>	18.7	15.6	15.6	18.7	15.6	15.6	$ACL = ABC (P^* = 0.45)$
<i>Splitnose</i>	1,021.0	976.1	976.1	1,009.6	965.1	965.1	$ACL = ABC (P^* = 0.45)$
<i>Yellowmouth</i>	192.4	160.5	160.5	192.4	160.5	160.5	$ACL = ABC (P^* = 0.45)$
Nearshore Rockfish South	1,300	1,145	1,142	1,322	1,165	1,163	Sum of component species specifications
<i>Shallow Nearshore Species</i>	NA	NA	NA	NA	NA	NA	NA
<i>Black and yellow</i>	27.5	23.0	23.0	27.5	23.0	23.0	$ACL = ABC (P^* = 0.45)$
<i>China</i>	14.3	13.1	10.8	14.8	13.5	11.5	$ACL = ABC (P^* = 0.45)$
<i>Gopher (N of Pt. Conception)</i>	101.0	84.2	84.2	101.0	84.2	84.2	$ACL = ABC (P^* = 0.45)$
<i>Gopher (S of Pt. Conception)</i>	25.6	21.4	21.4	25.6	21.4	21.4	$ACL = ABC (P^* = 0.45)$
<i>Grass</i>	59.6	49.7	49.7	59.6	49.7	49.7	$ACL = ABC (P^* = 0.45)$
<i>Kelp</i>	27.7	23.1	23.1	27.7	23.1	23.1	$ACL = ABC (P^* = 0.45)$
<i>Deeper Nearshore Species</i>	NA	NA	NA	NA	NA	NA	NA
<i>Blue/Deacon (N. of 34°27' N lat.)</i>	278.8	252.6	252.6	291.5	264.1	264.1	$ACL = ABC (P^* = 0.45)$
<i>Blue/Deacon (S. of 34°27' N lat.)</i>	21.8	18.2	18.2	21.8	18.2	18.2	$ACL = ABC (P^* = 0.45)$
<i>Brown</i>	177.9	162.4	162.4	181.9	166.1	166.1	$ACL = ABC (P^* = 0.45)$
<i>Calico</i>	-	-	-	-	-	-	$ACL = ABC (P^* = 0.45)$
<i>Copper</i>	322.1	294.1	294.1	327.3	298.8	298.8	$ACL = ABC (P^* = 0.45)$
<i>Olive</i>	224.6	187.4	187.4	224.6	187.4	187.4	$ACL = ABC (P^* = 0.45)$
<i>Quillback</i>	5.4	4.5	4.5	5.4	4.5	4.5	$ACL = ABC (P^* = 0.45)$

Stock or Stock Complex	2019			2020			Harvest Control Rule
	OFL	ABC	ACL	OFL	ABC	ACL	
<i>Treefish</i>	13.2	11.0	11.0	13.2	11.0	11.0	ACL = ABC (P* = 0.45)
Shelf Rockfish South	1,919	1,625	1,625	1,919	1,626	1,625	Sum of component species specifications
<i>Bronzespotted</i>	3.6	3.0	3.0	3.6	3.0	3.0	ACL = ABC (P* = 0.45)
<i>Chameleon</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Flag</i>	23.4	19.5	19.5	23.4	19.5	19.5	ACL = ABC (P* = 0.45)
<i>Freckled</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Greenblotched</i>	23.1	19.3	19.3	23.1	19.3	19.3	ACL = ABC (P* = 0.45)
<i>Greenspotted</i>	78.3	71.5	70.9	78.1	71.3	70.7	ACL: 40-10 rule applied to 77.8% of northern model (CA N of 34°27' N latitude) ABC plus the southern model ABC (P* = 0.45)
<i>Greenstriped</i>	240.6	219.6	219.6	241.2	220.2	220.2	ACL = ABC (P* = 0.45)
<i>Halfbanded</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Harlequin</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Honeycomb</i>	9.9	8.2	8.2	9.9	8.2	8.2	ACL = ABC (P* = 0.45)
<i>Mexican</i>	5.1	4.2	4.2	5.1	4.2	4.2	ACL = ABC (P* = 0.45)
<i>Pink</i>	2.5	2.1	2.1	2.5	2.1	2.1	ACL = ABC (P* = 0.45)
<i>Pinkrose</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Pygmy</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Redstripe</i>	0.5	0.4	0.4	0.5	0.4	0.4	ACL = ABC (P* = 0.45)
<i>Rosethorn</i>	2.1	1.8	1.8	2.1	1.8	1.8	ACL = ABC (P* = 0.45)
<i>Rosy</i>	44.5	37.1	37.1	44.5	37.1	37.1	ACL = ABC (P* = 0.45)
<i>Silvergray</i>	0.5	0.4	0.4	0.5	0.4	0.4	ACL = ABC (P* = 0.45)
<i>Speckled</i>	39.4	32.8	32.8	39.4	32.8	32.8	ACL = ABC (P* = 0.45)
<i>Squarespot</i>	11.1	9.2	9.2	11.1	9.2	9.2	ACL = ABC (P* = 0.45)
<i>Starry</i>	62.6	52.2	52.2	62.6	52.2	52.2	ACL = ABC (P* = 0.45)
<i>Stripetail</i>	23.6	19.7	19.7	23.6	19.7	19.7	ACL = ABC (P* = 0.45)
<i>Swordspine</i>	14.2	11.9	11.9	14.2	11.9	11.9	ACL = ABC (P* = 0.45)
<i>Tiger</i>	0.0	0.0	0.0	0.0	0.0	0.0	ACL = ABC (P* = 0.45)
<i>Vermilion</i>	269.3	224.6	224.6	269.3	224.6	224.6	ACL = ABC (P* = 0.45)
<i>Yellowtail</i>	1,064.4	887.7	887.7	1,064.4	887.7	887.7	ACL = ABC (P* = 0.45)
Slope Rockfish South	682	585	585	681	584	584	Sum of component species specifications
<i>Aurora</i>	74.6	71.0	71.0	74.6	71.0	71.0	ACL = ABC (P* = 0.45)
<i>Bank</i>	503.2	419.7	419.7	503.2	419.7	419.7	ACL = ABC (P* = 0.45)
<i>Pacific ocean perch</i>	-	-	-	-	-	-	ACL = ABC (P* = 0.45)
<i>Redbanded</i>	10.4	8.7	8.7	10.4	8.7	8.7	ACL = ABC (P* = 0.45)
<i>Rougheye/Blackspotted</i>	4.4	4.1	4.1	4.5	4.1	4.1	ACL = ABC (P* = 0.45)
<i>Sharpchin</i>	88.2	80.5	80.5	87.0	79.4	79.4	ACL = ABC (P* = 0.45)
<i>Shortraker</i>	0.1	0.1	0.1	0.1	0.1	0.1	ACL = ABC (P* = 0.45)
<i>Yellowmouth</i>	0.8	0.7	0.7	0.8	0.7	0.7	ACL = ABC (P* = 0.45)
Other Flatfish	8,750	6,498	6,498	8,202	6,041	6,041	Sum of component species specifications
<i>Butter sole</i>	4.6	3.2	3.2	4.6	3.2	3.2	ACL = ABC (P* = 0.4)
<i>Curfin sole</i>	8.2	5.7	5.7	8.2	5.7	5.7	ACL = ABC (P* = 0.4)

Stock or Stock Complex	2019			2020			Harvest Control Rule
	OFL	ABC	ACL	OFL	ABC	ACL	
<i>Flathead sole</i>	35.0	24.3	24.3	35.0	24.3	24.3	$ACL = ABC (P^* = 0.4)$
<i>Pacific sanddab</i>	4,801.0	3,331.9	3,331.9	4,801.0	3,331.9	3,331.9	$ACL = ABC (P^* = 0.4)$
<i>Rex sole</i>	3,061	2,550	2,550	2,513	2,093	2,093	$ACL = ABC (P^* = 0.4)$
<i>Rock sole</i>	66.7	46.3	46.3	66.7	46.3	46.3	$ACL = ABC (P^* = 0.4)$
<i>Sand sole</i>	773.2	536.6	536.6	773.2	536.6	536.6	$ACL = ABC (P^* = 0.4)$
Other Fish	480	420	420	465	406	406	Sum of component species specifications
<i>Cabezon (WA)</i>	5.5	4.6	4.6	5.4	4.5	4.5	$ACL = ABC (P^* = 0.45)$
<i>Kelp greenling (CA)</i>	118.9	99.2	99.2	118.9	99.2	99.2	$ACL = ABC (P^* = 0.45)$
<i>Kelp greenling (OR)</i>	180.9	171.1	171.1	166.5	157.5	157.5	$ACL = ABC (P^* = 0.45)$
<i>Kelp greenling (WA)</i>	7.1	5.9	5.9	7.1	5.9	5.9	$ACL = ABC (P^* = 0.45)$
<i>Leopard shark</i>	167.1	139.4	139.4	167.1	139.4	139.4	$ACL = ABC (P^* = 0.45)$

Table 5. Alternative 2019 and 2020 harvest specifications for select groundfish stocks decided for detailed analysis.

Stock	Alternative	2019			2020			Harvest Control Rule
		OFL	ABC	ACL	OFL	ABC	ACL	
CA Scorpionfish	No Action	337	313	150	331	307	150	150 mt constant catch ACL
	Alt. 1	337	313	313	331	307	307	$ACL = ABC (P^* = 0.45)$
Lingcod N of 40°10' N lat.	No Action	4,957	4,728	4,704	4,701	4,483	4,459	$ACL = ABC (P^* = 0.45 \text{ in OR \& WA; } P^* = 0.4 \text{ in CA}) \text{ w/ 40-10 adj. for the CA contribution to the ABC and ACL}$
Lingcod S. of 40°10' N lat.		986	901	812	894	816	724	
Lingcod N of 40°10' N lat.	Alt. 1	4,957	4,739	4,713	4,699	4,492	4,466	$ACL = ABC (P^* = 0.45) \text{ w/ 40-10 adj. for the CA contribution to the ABC and ACL}$
Lingcod S. of 40°10' N lat.		986	943	847	888	849	750	

Table 6. Alternative 2019 and 2020 harvest specifications for new groundfish stock complexes decided for detailed analysis.

Stock or Stock Complex	Alternative	2019			2020		
		OFL	ABC	ACL	OFL	ABC	ACL
Black Rockfish (OR) Nearshore Rockfish N Complex	No Action	565	516	516	561	512	512
		203	183	183	200	180	180
Black Rockfish/BDR (OR) Complex Nearshore Rockfish N Complex	Alt. 1	677	617	617	670	611	611
		91	81	81	92	82	82
BDR (OR) Complex Nearshore Rockfish N Complex	Alt. 2	112	102	102	109	98	98
		91	81	81	92	82	82
Cabazon (OR) Other Fish Complex	No Action	49	47	47	49	47	47
		480	420	420	465	406	406
Cabazon/Kelp Greenling (OR) Complex Other Fish Complex	Alt. 1	230	218	218	216	204	204
		299	249	249	298	249	249
Slope Rockfish S Complex	No Action?	856	744	744	855	743	743
Blackgill Rockfish S. of 40°10' N lat. Slope Rockfish S Complex	Alt. 1	174	159	159	174	159	159
		682	585	585	681	584	584