

Supplemental Material. Fishery sector descriptions.

Text S1. Federally Managed U.S. West Coast Groundfish Fisheries

In addition to the Limited Entry (LE) trawl sector and the IFQ sector described in the paper, there are two other components to Federal groundfish fisheries off the U.S. Pacific coast.

The Pacific hake (*Merluccius productus*) fishery is a single-species fishery that is the largest groundfish fishery by landings on the West Coast. The federally permitted hake fishery uses pelagic trawl gear, and consists of several sectors, including: the shoreside hake fishery, which delivers unsorted catch to coastal processing plants; the at-sea catcher processors; and the at-sea mothership sector, which includes large motherships that process the catch delivered by smaller catcher vessels. In 2011, the hake fishery transitioned from a limited entry fishery to an IFQ fishery (Table S1). The at-sea hake fishery operates off the Washington and Oregon coasts from May 15 through December 31.

The Non-Nearshore Fixed Gear fleet consists of an OA and two LE sub-sectors (Table S1). Open access vessels can use any type of hook-and-line (e.g., longline, vertical longline) or pot/trap gear. Open access vessels are bound by cumulative trip limits which specify the amount of fish (by weight) that can be retained in an area during a particular time period. Trip limits do not restrict discarding.

Vessels participating in the LE Sablefish Endorsed sub-sector of the Non-Nearshore Fixed Gear fleet (Table S1) operate primarily out of ports in Oregon and Washington. Nearly all of the vessels deliver their iced catch (mainly sablefish, *Anoplopoma fimbria*) to shore-side processors. Sablefish endorsements provide the permit holder with an annual share of the sablefish catch and allow for up to three sablefish quota permits to be “tiered” on a single vessel. LE sablefish-endorsed fishing takes place over a seven-month period from April 1 to October 31.

Permit holders can land sablefish up to their tier limits at any time during the seven-month season. Once a vessel has attained their sablefish quota limits or when the primary season is closed, vessels can continue to fish under the daily trip limits (DTL) and thus shift into the LE Sablefish Non-Endorsed sub-sector of the Non-Nearshore Fixed Gear fleet.

Vessels in the LE Sablefish Non-Endorsed sub-sector (a.k.a., LE Fixed Gear DTL; Table S1) primarily operate out of southern California ports and are subject to daily trip limits of managed species. This fleet operates year-round, but the majority of fishing activity occurs during the summer. Nearly all of the vessels in this fleet deliver their multispecies, iced catch to fresh fish markets.

Text S2. State Managed U.S. West Coast Groundfish Fisheries

There are 3 state-managed fisheries that operate in one or more of the three U.S. West Coast states (Washington, Oregon, California) and either target or incidentally catch groundfish species managed under the WCGFMP. Therefore, these fisheries are subject to PFMC groundfish management, including mandatory observer coverage. Oregon and California operate a nearshore fixed gear fishery, California operates a California halibut fishery, and all three states (WA, OR, CA) operate pink shrimp (*Pandalus jordani*) fisheries.

The Nearshore Fixed Gear fleets (Table S1) operate off the coasts of Oregon and California, using a variety of fixed gear including longlines, hand-lines, cable gear, fishing poles, trolling gear, and pots. Gear is set and retrieved multiple times a day, catch is generally landed each day, and most catch is delivered alive to fish markets. Regulations for the nearshore fisheries are set by both the PFMC and the states. The Pacific Fishery Management Council sets harvest guidelines for groundfish species. Several fishing area closures designated in Federal groundfish management apply to the commercial nearshore fixed gear fisheries. In addition to

regulations set by the PFMC, each state manages its nearshore fleet independently by issuing state regulations on the cumulative trip limits of nearshore species in their state waters (Table S1). The State of Washington does not allow commercial groundfish fishing within its territorial waters (0-5.6 km offshore) and therefore a nearshore commercial fixed gear fleet does not operate in Washington.

The California halibut trawl sector generally operates from San Francisco, CA to Los Angeles, CA (Table S1). Vessels deliver iced California halibut (*Paralichthys californicus*) to shore-based processors or live fish markets. Commercial bottom trawling for California halibut requires a state-issued license to participate and fishing inside state waters (0 - 5.6 km) is limited to the state-designated California Halibut Trawl Grounds (CHTG) from Point Arguello to Point Mugu, California. California halibut are not managed under the WCGFMP, although it can co-occur with other WCGFMP flatfish species on the continental shelf.

The pink shrimp trawl fisheries operate off the coasts of Washington, Oregon, and Northern California, from April 1 through October 31, and deliver catch to shore-side processors (Table S1). Pink shrimp vessels are required to use bycatch reduction devices (BRDs) when targeting pink shrimp (Table S1). The primary goal of mandatory BRDs is to reduce the incidental take of groundfish species.

Table S1. A description of permits, gears used, target groups, vessel length range, fishing depth range, and management of fishery sectors and sub-sectors in U.S. West Coast groundfish fisheries. For brevity, management descriptors are generalized for the given time period and are not meant to be complete or comprehensive. Length = range of vessel lengths (m); Depths = range of fishing depths (m).

Sector	Sub-Sector	Permits	Gear(s)	Target(s)	Length (m)	Depths (m)	Management	
							2002-10	2011-14
Limited Entry (LE) Trawl, now IFQ non-hake		Federal LE permit ^a with trawl endorsement	Bottom Trawl, after Jan 1, 2011 also Hook & Line and Pot	Species assemblages	11-29	Wide range (upper limit ~1000)	Cumulative two-month trip limits; depth-based closures	Individual Fishing Quotas (IFQ)
LE California Halibut		CA Halibut permit ^b and LE permit with trawl endorsement	Bottom Trawl	California halibut ^e	9-22	< 55	Cumulative two-month trip-limits; depth-based closures	IFQ
At-Sea Hake	Catcher Vessels delivering to Motherships	LE permit with trawl endorsement	Midwater Trawl	Pacific hake ^f	26-45 ^d	53-460 ^d	Seasonal quotas for target and bycatch species of concern	IFQ; Seasonal
	Catcher-Processors	LE permit with trawl endorsement	Midwater Trawl	Pacific hake	82-115	60-570	Same as At-Sea Hake Motherships	IFQ; Seasonal
Shoreside Hake		LE permit with trawl endorsement	Midwater Trawl	Pacific hake	17-29	40-400	Same as At-Sea Hake Motherships	IFQ; Seasonal

Table S1. Continued.

Sector	Sub-Sector	Permits	Gear(s)	Target(s)	Length (m)	Depths (m)	Management
Non-Nearshore Fixed Gear	Sablefish endorsed	LE permit with fixed gear endorsement and sablefish quota	Longlines, Pots	Sablefish ^g	11-32	> 145	Sablefish tier quotas; seven month season
	Sablefish non-endorsed (a.k.a. Zero Tier)	LE permit with fixed gear endorsement w/o sablefish quota	Longlines, Pots	Sablefish, rockfish ^h and flatfish ⁱ	5-18	> 145	Trip limits
	Open Access	(none)	Longlines, Pots	Sablefish and other groundfish	3-30	> 64	Trip limits
Open Access (OA) California Halibut		CA Halibut permit ^b	Bottom Trawl	California halibut	9-22	< 55	Most fishing occurs within CA waters in the California Halibut Trawl Grounds with minimum mesh sizes, seven month season, and minimum fish size
Nearshore Fixed Gear^c		CA or OR state nearshore permits and endorsements	Variety of hand lines, pot gear, stick gear, rod and reel	Rockfish, Cabezon ^j , Greenlings ^k	3-15	< 110 (usu. < 55 in OR waters)	Federal and CA or OR state nearshore regulations; area closures; two-month trip limits; minimum size limits
Pink Shrimp		WA, OR, or CA state pink shrimp permit	Shrimp trawl	Pink shrimp ^l	11.5-33	91-256	WA, OR, or CA state pink shrimp regulations; Bycatch Reduction Devices required; trip limits on groundfish retained

^aa.k.a. LE permit; NOAA issues all LE permits.

^bIssued by the state of California.

^cThe state of WA does not conduct a nearshore fishery.

^dAverage values for catcher vessels delivering catch to motherships.

^e *Paralichthys californicus*

^f*Merluccius productus*

^g*Anoplopoma fimbria*

^h*Sebastes & Sebastolobus* spp.

ⁱPleuronectiformes

^j*Scorpaenichthys marmoratus*

^kHexagrammidae

^l*Pandalus jordani*

^g*Anoplopoma fimbria*

^h*Sebastes & Sebastolobus* spp.

ⁱPleuronectiformes

^j*Scorpaenichthys marmoratus*

^kHexagrammidae

^l*Pandalus jordani*

Table S2. Degrees of freedom (df), residual deviance, Akaike's Information Criterion (AIC) and D^2 (adjusted amount of deviance explained by the model, similar to R^2 but for generalized linear models) for each model examining the effects of fishery sector, ecomorphotype grouping, and time period on relative catch of elasmobranchs. See text for full description of data. n.a. = not applicable, no degrees of freedom

Model	df	Residual Deviance	AIC	D^2
null	209	5.09E-07		
sector*grouping + sector*time period	120	4.24E-08	-3910	0.85
all 2-way interactions	108	3.83E-08	-3907	0.85
sector*grouping	138	5.56E-08	-3889	0.83
sector*time period + grouping*time period	126	5.16E-08	-3881	0.83
main effects only	192	3.43E-07	-3615	0.26
grouping*time period	180	3.39E-07	-3593	0.22
sector*time period	174	3.30E-07	-3587	0.22
sector*grouping + grouping*time period	162	3.26E-07	-3566	0.17
all 3-way interactions	0	3.60E-35	-17358	n.a

Table S3. Coefficients from the final generalized linear model examining the effects of fishery sector, ecomorphotype grouping, and time period on relative catch of elasmobranchs. SE = standard error

	Estimate	SE	t	p
(Intercept)	-7.43E-06	1.23E-05	-0.604	0.547
At-sea CV	4.81E-06	1.74E-05	0.277	0.783
CA Halibut	4.66E-05	1.74E-05	2.679	0.008
LE Fixed Gear DTL	5.46E-06	1.74E-05	0.314	0.754
LE Sablefish	5.89E-06	1.74E-05	0.338	0.736
LE Trawl - IFQ	6.59E-06	1.74E-05	0.379	0.706
Nearshore	1.80E-05	1.74E-05	1.033	0.303
OA Fixed Gear	5.31E-06	1.74E-05	0.305	0.761
Pink Shrimp	7.43E-06	1.74E-05	0.427	0.670
Shoreside Hake	5.76E-06	1.74E-05	0.331	0.741
Deep Sea Skates	4.23E-10	1.53E-05	0.000	1.000
Deep Slope Sharks	4.00E-06	1.53E-05	0.260	0.795
Nearshore Skates & Rays	4.15E-08	1.53E-05	0.003	0.998
Ocean Sharks	6.64E-06	1.53E-05	0.432	0.666
Slope Sharks	7.63E-05	1.53E-05	4.968	0.000
Slope Skates	1.24E-08	1.53E-05	0.001	0.999
Period2007-10	9.23E-06	1.00E-05	0.919	0.360
Period2011-14	1.31E-05	1.00E-05	1.300	0.196
At-sea CV*Deep Sea Skates	-8.90E-09	2.17E-05	0.000	1.000
CA Halibut*Deep Sea Skates	-3.70E-05	2.17E-05	-1.707	0.090
LE Fixed Gear DTL*Deep Sea Skates	1.28E-05	2.17E-05	0.589	0.557
LE Sablefish*Deep Sea Skates	1.66E-06	2.17E-05	0.077	0.939
LE Trawl - IFQ*Deep Sea Skates	1.26E-04	2.17E-05	5.827	0.000
Nearshore*Deep Sea Skates	-8.40E-06	2.17E-05	-0.387	0.699
OA Fixed Gear*Deep Sea Skates	4.31E-06	2.17E-05	0.199	0.843
Pink Shrimp*Deep Sea Skates	1.04E-08	2.17E-05	0.000	1.000
Shoreside Hake*Deep Sea Skates	2.45E-09	2.17E-05	0.000	1.000
At-sea CV*Deep Slope Sharks	-3.02E-06	2.17E-05	-0.139	0.890
CA Halibut*Deep Slope Sharks	-4.06E-05	2.17E-05	-1.871	0.064
LE Fixed Gear DTL*Deep Slope Sharks	2.27E-05	2.17E-05	1.048	0.297
LE Sablefish*Deep Slope Sharks	1.97E-06	2.17E-05	0.091	0.928
LE Trawl - IFQ*Deep Slope Sharks	2.31E-05	2.17E-05	1.066	0.288
Nearshore*Deep Slope Sharks	-1.24E-05	2.17E-05	-0.571	0.569
OA Fixed Gear*Deep Slope Sharks	-1.50E-06	2.17E-05	-0.069	0.945
Pink Shrimp*Deep Slope Sharks	-4.00E-06	2.17E-05	-0.184	0.854
Shoreside Hake*Deep Slope Sharks	-4.00E-06	2.17E-05	-0.184	0.854
At-sea CV*Nearshore Skates & Rays	-1.13E-08	2.17E-05	-0.001	1.000

Table S3. Continued.

	Estimate	SE	t	p
CA Halibut*Nearshore Skates & Rays	1.14E-04	2.17E-05	5.247	0.000
LE Fixed Gear DTL*Nearshore Skates & Rays	8.06E-07	2.17E-05	0.037	0.970
LE Sablefish*Nearshore Skates & Rays	1.65E-08	2.17E-05	0.001	0.999
LE Trawl - IFQ*Nearshore Skates & Rays	8.35E-06	2.17E-05	0.385	0.701
Nearshore*Nearshore Skates & Rays	-3.98E-06	2.17E-05	-0.183	0.855
OA Fixed Gear*Nearshore Skates & Rays	-4.08E-07	2.17E-05	-0.019	0.985
Pink Shrimp*Nearshore Skates & Rays	-4.15E-08	2.17E-05	-0.002	0.998
Shoreside Hake*Nearshore Skates & Rays	-4.15E-08	2.17E-05	-0.002	0.998
At-sea CV*Ocean Sharks	-9.34E-07	2.17E-05	-0.043	0.966
CA Halibut*Ocean Sharks	-4.32E-05	2.17E-05	-1.990	0.049
LE Fixed Gear DTL*Ocean Sharks	1.68E-05	2.17E-05	0.773	0.441
LE Sablefish*Ocean Sharks	1.04E-04	2.17E-05	4.791	0.000
LE Trawl - IFQ*Ocean Sharks	-1.78E-06	2.17E-05	-0.082	0.935
Nearshore*Ocean Sharks	-1.40E-05	2.17E-05	-0.643	0.521
OA Fixed Gear*Ocean Sharks	4.10E-06	2.17E-05	0.189	0.851
Pink Shrimp*Ocean Sharks	-6.63E-06	2.17E-05	-0.306	0.760
Shoreside Hake*Ocean Sharks	-2.42E-06	2.17E-05	-0.111	0.911
At-sea CV*Slope Sharks	-5.72E-05	2.17E-05	-2.636	0.009
CA Halibut*Slope Sharks	-1.13E-04	2.17E-05	-5.206	0.000
LE Fixed Gear DTL*Slope Sharks	-2.70E-05	2.17E-05	-1.245	0.216
LE Sablefish*Slope Sharks	-7.25E-05	2.17E-05	-3.340	0.001
LE Trawl - IFQ*Slope Sharks	1.31E-04	2.17E-05	6.045	0.000
Nearshore*Slope Sharks	-8.47E-05	2.17E-05	-3.900	0.000
OA Fixed Gear*Slope Sharks	-6.07E-05	2.17E-05	-2.795	0.006
Pink Shrimp*Slope Sharks	-7.63E-05	2.17E-05	-3.513	0.001
Shoreside Hake*Slope Sharks	-6.60E-05	2.17E-05	-3.039	0.003
At-sea CV*Slope Skates	-1.95E-08	2.17E-05	-0.001	0.999
CA Halibut*Slope Skates	-3.36E-05	2.17E-05	-1.549	0.124
LE Fixed Gear DTL*Slope Skates	8.60E-07	2.17E-05	0.040	0.968
LE Sablefish*Slope Skates	2.90E-06	2.17E-05	0.134	0.894
LE Trawl - IFQ*Slope Skates	2.52E-04	2.17E-05	11.604	0.000
Nearshore*Slope Skates	-7.90E-06	2.17E-05	-0.364	0.716
OA Fixed Gear*Slope Skates	2.35E-07	2.17E-05	0.011	0.991
Pink Shrimp*Slope Skates	1.00E-07	2.17E-05	0.005	0.996
Shoreside Hake*Slope Skates	-1.24E-08	2.17E-05	-0.001	1.000
At-sea CV*Period2007-10	-7.74E-06	1.42E-05	-0.545	0.587
CA Halibut*Period2007-10	-1.48E-06	1.42E-05	-0.104	0.917
LE Fixed Gear DTL*Period2007-10	-9.52E-06	1.42E-05	-0.670	0.504

Table S3. Continued.

	Estimate	SE	t	p
LE Sablefish*Period2007-10	-7.45E-06	1.42E-05	-0.524	0.601
LE Trawl - IFQ*Period2007-10	2.41E-05	1.42E-05	1.699	0.092
Nearshore*Period2007-10	-1.22E-05	1.42E-05	-0.857	0.393
OA Fixed Gear*Period2007-10	-3.53E-06	1.42E-05	-0.248	0.804
Pink Shrimp*Period2007-10	-9.23E-06	1.42E-05	-0.649	0.517
Shoreside Hake*Period2007-10	-7.53E-06	1.42E-05	-0.530	0.597
At-sea CV*Period2011-14	-6.67E-06	1.42E-05	-0.469	0.640
CA Halibut*Period2011-14	-2.73E-05	1.42E-05	-1.919	0.057
LE Fixed Gear DTL*Period2011-14	-6.71E-06	1.42E-05	-0.472	0.638
LE Sablefish*Period2011-14	-1.02E-05	1.42E-05	-0.715	0.476
LE Trawl - IFQ*Period2011-14	-3.83E-05	1.42E-05	-2.693	0.008
Nearshore*Period2011-14	-1.66E-05	1.42E-05	-1.166	0.246
OA Fixed Gear*Period2011-14	-1.12E-05	1.42E-05	-0.789	0.432
Pink Shrimp*Period2011-14	-1.31E-05	1.42E-05	-0.920	0.360
Shoreside Hake*Period2011-14	-9.74E-06	1.42E-05	-0.686	0.494

Table S4. Degrees of freedom (df), residual deviance, and Akaike's Information Criterion (AIC) for each model examining the effects of fishery sector and species on IUCN species. IUCN species were split into habitats and each habitat modeled separately.

Habitat	Model	df	Residual Deviance	AIC
oceanic	null	149	3.67E-04	
	species*sector	100	8.32E-06	-1978
	main effects only	136	2.55E-04	-1537
slope	null	167	2.01E-03	
	species*sector	112	2.34E-04	-1675
	main effects only	154	1.53E-03	-1443
nearshore	null	104	6.27E-06	
	species*sector	70	2.65E-06	-1467
	main effects only	94	4.80E-06	-1453

Table S5. Coefficients from the final generalized linear model examining the effects of fishery sector and species on relative catch of IUCN listed oceanic sharks. SE = standard error

	Estimate	SE	t	p
(Intercept)	2.07E-18	1.67E-04	1.24E-14	1.000
At-sea CV	-3.65E-18	2.36E-04	-1.55E-14	1.000
CA Halibut	-1.04E-18	2.36E-04	-4.43E-15	1.000
LE Fixed Gear DTL	-4.45E-18	2.36E-04	-1.89E-14	1.000
LE Sablefish	-1.06E-17	2.36E-04	-4.50E-14	1.000
LE Trawl - IFQ	-1.37E-18	2.36E-04	-5.84E-15	1.000
Nearshore	2.10E-06	2.36E-04	8.90E-03	0.993
OA Fixed Gear	2.33E-18	2.36E-04	9.88E-15	1.000
Pink Shrimp	-1.19E-18	2.36E-04	-5.04E-15	1.000
Shoreside Hake	-9.62E-19	2.36E-04	-4.08E-15	1.000
Blue Shark	9.43E-05	2.36E-04	4.00E-01	0.690
Shortfin Mako Shark	-9.74E-19	2.36E-04	-4.14E-15	1.000
Common Thresher Shark	6.44E-05	2.36E-04	2.74E-01	0.785
Pelagic Thresher Shark	-9.92E-19	2.36E-04	-4.21E-15	1.000
At-sea CV*Blue Shark	-5.06E-05	3.33E-04	-1.52E-01	0.880
CA Halibut*Blue Shark	-9.43E-05	3.33E-04	-2.83E-01	0.778
LE Fixed Gear DTL*Blue Shark	1.95E-03	3.33E-04	5.87E+00	0.000
LE Sablefish*Blue Shark	1.08E-02	3.33E-04	3.25E+01	0.000
LE Trawl - IFQ*Blue Shark	3.90E-04	3.33E-04	1.17E+00	0.244
Nearshore*Blue Shark	-9.64E-05	3.33E-04	-2.89E-01	0.773
OA Fixed Gear*Blue Shark	9.58E-04	3.33E-04	2.87E+00	0.005
Pink Shrimp*Blue Shark	-9.39E-05	3.33E-04	-2.82E-01	0.779
Shoreside Hake*Blue Shark	5.66E-06	3.33E-04	1.70E-02	0.986
At-sea CV*Shortfin Mako Shark	2.57E-18	3.33E-04	7.70E-15	1.000
CA Halibut*Shortfin Mako Shark	1.35E-07	3.33E-04	4.06E-04	1.000
LE Fixed Gear DTL*Shortfin Mako Shark	2.39E-04	3.33E-04	7.19E-01	0.474
LE Sablefish*Shortfin Mako Shark	6.19E-18	3.33E-04	1.86E-14	1.000
LE Trawl - IFQ*Shortfin Mako Shark	1.15E-06	3.33E-04	3.46E-03	0.997
Nearshore*Shortfin Mako Shark	9.34E-05	3.33E-04	2.81E-01	0.780
OA Fixed Gear*Shortfin Mako Shark	5.01E-05	3.33E-04	1.50E-01	0.881
Pink Shrimp*Shortfin Mako Shark	1.55E-18	3.33E-04	4.66E-15	1.000
Shoreside Hake*Shortfin Mako Shark	9.76E-06	3.33E-04	2.93E-02	0.977
At-sea CV*Common Thresher Shark	1.14E-06	3.33E-04	3.41E-03	0.997
CA Halibut*Common Thresher Shark	-1.60E-05	3.33E-04	-4.80E-02	0.962
LE Fixed Gear DTL*Common Thresher Shark	-2.63E-05	3.33E-04	-7.89E-02	0.937
LE Sablefish*Common Thresher Shark	-6.36E-05	3.33E-04	-1.91E-01	0.849
LE Trawl - IFQ*Common Thresher Shark	-2.43E-05	3.33E-04	-7.29E-02	0.942

Table S5. Continued.

	Estimate	SE	t	p
Nearshore*Common Thresher Shark	-5.67E-05	3.33E-04	-1.70E-01	0.865
OA Fixed Gear*Common Thresher Shark	-5.35E-05	3.33E-04	-1.60E-01	0.873
Pink Shrimp*Common Thresher Shark	-6.44E-05	3.33E-04	-1.93E-01	0.847
Shoreside Hake*Common Thresher Shark	2.35E-04	3.33E-04	7.07E-01	0.481
At-sea CV*Pelagic Thresher Shark	2.45E-18	3.33E-04	7.35E-15	1.000
CA Halibut*Pelagic Thresher Shark	4.53E-07	3.33E-04	1.36E-03	0.999
LE Fixed Gear DTL*Pelagic Thresher Shark	2.04E-05	3.33E-04	6.13E-02	0.951
LE Sablefish*Pelagic Thresher Shark	1.54E-04	3.33E-04	4.62E-01	0.645
LE Trawl - IFQ*Pelagic Thresher Shark	1.46E-04	3.33E-04	4.39E-01	0.662
Nearshore*Pelagic Thresher Shark	-2.10E-06	3.33E-04	-6.30E-03	0.995
OA Fixed Gear*Pelagic Thresher Shark	-2.75E-18	3.33E-04	-8.25E-15	1.000
Pink Shrimp*Pelagic Thresher Shark	1.41E-18	3.33E-04	4.24E-15	1.000
Shoreside Hake*Pelagic Thresher Shark	1.24E-05	3.33E-04	3.72E-02	0.970

Table S6. Coefficients from the final generalized linear model examining the effects of fishery sector and species on relative catch of IUCN listed slope sharks, skates, and rays. SE = standard error

	Estimate	SE	t	p
Intercept	-2.78E-18	8.34E-04	-3.34E-15	1.00
At-sea CV	5.88E-18	1.18E-03	4.99E-15	1.00
CA Halibut	-6.34E-19	1.18E-03	-5.38E-16	1.00
LE Fixed Gear DTL	5.00E-05	1.18E-03	4.24E-02	0.97
LE Sablefish	1.41E-05	1.18E-03	1.19E-02	0.99
LE Trawl - IFQ	2.46E-04	1.18E-03	2.09E-01	0.84
OA Fixed Gear	8.79E-06	1.18E-03	7.45E-03	0.99
Pink Shrimp	1.59E-18	1.18E-03	1.35E-15	1.00
Longnose Cat Shark	3.07E-18	1.18E-03	2.60E-15	1.00
Pacific Black Dogfish	8.49E-19	1.18E-03	7.19E-16	1.00
Pacific Sleeper Shark	3.99E-04	1.18E-03	3.39E-01	0.74
Prickly Shark	2.56E-18	1.18E-03	2.17E-15	1.00
Sandpaper Skate	1.17E-06	1.18E-03	9.90E-04	1.00
Sixgill Shark	2.88E-07	1.18E-03	2.44E-04	1.00
At-sea CV*Longnose Cat Shark	-4.50E-18	1.67E-03	-2.70E-15	1.00
CA Halibut*Longnose Cat Shark	-1.06E-18	1.67E-03	-6.38E-16	1.00
LE Fixed Gear DTL*Longnose Cat Shark	1.65E-04	1.67E-03	9.87E-02	0.92
LE Sablefish*Longnose Cat Shark	1.71E-05	1.67E-03	1.02E-02	0.99
LE Trawl - IFQ*Longnose Cat Shark	5.10E-04	1.67E-03	3.06E-01	0.76
OA Fixed Gear*Longnose Cat Shark	1.43E-05	1.67E-03	8.55E-03	0.99
Pink Shrimp*Longnose Cat Shark	-2.85E-18	1.67E-03	-1.71E-15	1.00
At-sea CV*Pacific Black Dogfish	-5.14E-18	1.67E-03	-3.08E-15	1.00
CA Halibut*Pacific Black Dogfish	3.24E-19	1.67E-03	1.94E-16	1.00
LE Fixed Gear DTL*Pacific Black Dogfish	1.27E-04	1.67E-03	7.60E-02	0.94
LE Sablefish*Pacific Black Dogfish	-7.99E-06	1.67E-03	-4.79E-03	1.00
LE Trawl - IFQ*Pacific Black Dogfish	-2.46E-04	1.67E-03	-1.48E-01	0.88
OA Fixed Gear*Pacific Black Dogfish	3.53E-06	1.67E-03	2.12E-03	1.00
Pink Shrimp*Pacific Black Dogfish	-1.06E-18	1.67E-03	-6.35E-16	1.00
At-sea CV*Pacific Sleeper Shark	-3.01E-04	1.67E-03	-1.80E-01	0.86
CA Halibut*Pacific Sleeper Shark	-3.99E-04	1.67E-03	-2.39E-01	0.81
LE Fixed Gear DTL*Pacific Sleeper Shark	2.01E-03	1.67E-03	1.20E+00	0.23
LE Sablefish*Pacific Sleeper Shark	1.78E-04	1.67E-03	1.06E-01	0.92
LE Trawl - IFQ*Pacific Sleeper Shark	2.18E-03	1.67E-03	1.31E+00	0.19
OA Fixed Gear*Pacific Sleeper Shark	-1.49E-04	1.67E-03	-8.95E-02	0.93
Pink Shrimp*Pacific Sleeper Shark	-3.99E-04	1.67E-03	-2.39E-01	0.81
At-sea CV*Prickly Shark	-4.47E-18	1.67E-03	-2.68E-15	1.00
CA Halibut*Prickly Shark	2.80E-18	1.67E-03	1.68E-15	1.00

Table S6. Continued.

LE Fixed Gear DTL*Prickly Shark	-5.00E-05	1.67E-03	-3.00E-02	0.98
LE Sablefish*Prickly Shark	-1.41E-05	1.67E-03	-8.44E-03	0.99
LE Trawl - IFQ*Prickly Shark	-2.46E-04	1.67E-03	-1.47E-01	0.88
OA Fixed Gear*Prickly Shark	-8.79E-06	1.67E-03	-5.27E-03	1.00
Pink Shrimp*Prickly Shark	-1.07E-18	1.67E-03	-6.39E-16	1.00
At-sea CV*Sandpaper Skate	-1.03E-06	1.67E-03	-6.17E-04	1.00
CA Halibut*Sandpaper Skate	2.16E-05	1.67E-03	1.30E-02	0.99
LE Fixed Gear DTL*Sandpaper Skate	4.15E-05	1.67E-03	2.49E-02	0.98
LE Sablefish*Sandpaper Skate	2.49E-04	1.67E-03	1.49E-01	0.88
LE Trawl - IFQ*Sandpaper Skate	2.42E-02	1.67E-03	1.45E+01	0.00
OA Fixed Gear*Sandpaper Skate	5.31E-05	1.67E-03	3.18E-02	0.97
Pink Shrimp*Sandpaper Skate	9.90E-06	1.67E-03	5.94E-03	1.00
At-sea CV*Sixgill Shark	6.93E-08	1.67E-03	4.16E-05	1.00
CA Halibut*Sixgill Shark	4.31E-05	1.67E-03	2.59E-02	0.98
LE Fixed Gear DTL*Sixgill Shark	-4.63E-06	1.67E-03	-2.78E-03	1.00
LE Sablefish*Sixgill Shark	-1.24E-05	1.67E-03	-7.43E-03	0.99
LE Trawl - IFQ*Sixgill Shark	-1.68E-04	1.67E-03	-1.01E-01	0.92
OA Fixed Gear*Sixgill Shark	8.95E-06	1.67E-03	5.36E-03	1.00
Pink Shrimp*Sixgill Shark	-2.88E-07	1.67E-03	-1.73E-04	1.00

Table S7. Coefficients from the final generalized linear model examining the effects of fishery sector and species on relative catch of IUCN listed nearshore sharks, skates, and rays. SE = standard error

	Estimate	SE	t	p
Intercept	1.96E-20	1.12E-04	1.75E-16	1.00
CA Halibut	4.14E-08	1.59E-04	2.61E-04	1.00
LE Trawl - IFQ	7.21E-20	1.59E-04	4.54E-16	1.00
Nearshore	1.52E-20	1.59E-04	9.57E-17	1.00
OA Fixed Gear	1.13E-20	1.59E-04	7.10E-17	1.00
Diamond Stingray	-5.97E-20	1.59E-04	-3.76E-16	1.00
Horn Shark	2.48E-20	1.59E-04	1.56E-16	1.00
Pacific Angel Shark	-3.18E-19	1.59E-04	-2.00E-15	1.00
Pacific Sharpnose Shark	8.48E-07	1.59E-04	5.34E-03	1.00
Sevengill Shark	-1.82E-20	1.59E-04	-1.15E-16	1.00
Shovelnose Guitarfish	-1.27E-20	1.59E-04	-8.01E-17	1.00
CA Halibut*Diamond Stingray	-4.14E-08	2.25E-04	-1.84E-04	1.00
LE Trawl - IFQ*Diamond Stingray	7.37E-06	2.25E-04	3.28E-02	0.97
Nearshore*Diamond Stingray	8.29E-21	2.25E-04	3.69E-17	1.00
OA Fixed Gear*Diamond Stingray	-1.81E-21	2.25E-04	-8.07E-18	1.00
CA Halibut*Horn Shark	6.86E-06	2.25E-04	3.06E-02	0.98
LE Trawl - IFQ*Horn Shark	-9.23E-20	2.25E-04	-4.11E-16	1.00
Nearshore*Horn Shark	-2.42E-20	2.25E-04	-1.08E-16	1.00
OA Fixed Gear*Horn Shark	-1.86E-20	2.25E-04	-8.27E-17	1.00
CA Halibut*Pacific Angel Shark	9.46E-04	2.25E-04	4.21E+00	0.00
LE Trawl - IFQ*Pacific Angel Shark	1.03E-05	2.25E-04	4.60E-02	0.96
Nearshore*Pacific Angel Shark	3.75E-06	2.25E-04	1.67E-02	0.99
OA Fixed Gear*Pacific Angel Shark	3.20E-07	2.25E-04	1.42E-03	1.00
CA Halibut*Pacific Sharpnose Shark	-8.89E-07	2.25E-04	-3.96E-03	1.00
LE Trawl - IFQ*Pacific Sharpnose Shark	-8.48E-07	2.25E-04	-3.77E-03	1.00
Nearshore*Pacific Sharpnose Shark	-8.48E-07	2.25E-04	-3.77E-03	1.00
OA Fixed Gear*Pacific Sharpnose Shark	-8.48E-07	2.25E-04	-3.77E-03	1.00
CA Halibut*Sevengill Shark	4.84E-05	2.25E-04	2.15E-01	0.83
LE Trawl - IFQ*Sevengill Shark	2.40E-06	2.25E-04	1.07E-02	0.99
Nearshore*Sevengill Shark	4.81E-20	2.25E-04	2.14E-16	1.00
OA Fixed Gear*Sevengill Shark	-1.51E-21	2.25E-04	-6.71E-18	1.00
CA Halibut*Shovelnose Guitarfish	6.25E-04	2.25E-04	2.78E+00	0.01
LE Trawl - IFQ*Shovelnose Guitarfish	1.54E-06	2.25E-04	6.87E-03	0.99
Nearshore*Shovelnose Guitarfish	5.81E-05	2.25E-04	2.58E-01	0.80
OA Fixed Gear*Shovelnose Guitarfish	-5.23E-20	2.25E-04	-2.33E-16	1.00

Table S8. Coefficients from the final generalized linear model examining the effects of catch disposition (at-sea discard, landed at dock), time period (2002-06, 2007-10, 2011-14) and species on catch (weight, mt) of elasmobranchs in the Limited Entry Trawl – IFQ fishery sector. SE = standard error

	Estimate	SE	t	p
(Intercept)	0.007	1.474	0.005	0.996
Aleutian Skate	0.288	2.085	0.138	0.890
Bat Ray	0.082	2.085	0.040	0.968
Bering Skate	-0.007	2.085	-0.003	0.997
Black Skate	20.812	2.085	9.984	0.000
Blue Shark	0.076	2.085	0.037	0.971
Shortfin Mako Shark	-0.007	2.085	-0.003	0.997
Brown Cat Shark	44.431	2.085	21.314	0.000
Brown Smoothhound Shark	0.652	2.085	0.313	0.754
California Butterfly Ray	-0.007	2.085	-0.003	0.997
Common Thresher Shark	0.104	2.085	0.050	0.960
Deepsea Skate	0.524	2.085	0.251	0.802
Diamond Stingray	0.043	2.085	0.021	0.983
Filetail Cat Shark	4.204	2.085	2.016	0.044
Longnose Cat Shark	0.497	2.085	0.238	0.812
Pacific Angel Shark	-0.007	2.085	-0.003	0.997
Pacific Electric Ray	3.830	2.085	1.837	0.067
Pacific Sleeper Shark	3.035	2.085	1.456	0.146
Pelagic Thresher Shark	-0.007	2.085	-0.003	0.997
Prickly Shark	-0.002	2.085	-0.001	0.999
Roughshoulder/Broad Skate	-0.007	2.085	-0.003	0.997
Salmon Shark	-0.007	2.085	-0.003	0.997
Sandpaper Skate	59.756	2.085	28.666	0.000
Sevengill Shark	-0.007	2.085	-0.003	0.997
Shovelnose Guitarfish	0.003	2.085	0.001	0.999
Sixgill Shark	0.188	2.085	0.090	0.928
Starry Skate	0.866	2.085	0.415	0.678
Swell Shark	-0.003	2.085	-0.001	0.999
Thornback Guitarfish	0.010	2.085	0.005	0.996
White Skate	0.075	2.085	0.036	0.971
Retained.mt	-0.007	2.085	-0.003	0.997
2007-10	-0.007	2.211	-0.003	0.997
2011-14	0.000	2.211	0.000	1.000
Aleutian Skate*Retained.mt	-0.288	2.948	-0.098	0.922
Bat Ray*Retained.mt	-0.082	2.948	-0.028	0.978
Bering Skate*Retained.mt	0.007	2.948	0.002	0.998

Table S8. Continued.

	Estimate	SE	t	p
Black Skate*Retained.mt	-20.812	2.948	-7.059	0.000
Blue Shark*Retained.mt	-0.074	2.948	-0.025	0.980
Shortfin Mako Shark*Retained.mt	0.009	2.948	0.003	0.997
Brown Cat Shark*Retained.mt	-44.431	2.948	-15.071	0.000
Brown Smoothhound Shark*Retained.mt	-0.652	2.948	-0.221	0.825
California Butterfly Ray*Retained.mt	0.007	2.948	0.002	0.998
Common Thresher Shark*Retained.mt	-0.097	2.948	-0.033	0.974
Deepsea Skate*Retained.mt	-0.524	2.948	-0.178	0.859
Diamond Stingray*Retained.mt	-0.043	2.948	-0.015	0.988
Filetail Cat Shark*Retained.mt	-4.204	2.948	-1.426	0.154
Longnose Cat Shark*Retained.mt	-0.497	2.948	-0.168	0.866
Pacific Angel Shark*Retained.mt	0.056	2.948	0.019	0.985
Pacific Electric Ray*Retained.mt	-3.830	2.948	-1.299	0.194
Pacific Sleeper Shark*Retained.mt	-3.035	2.948	-1.029	0.304
Pelagic Thresher Shark*Retained.mt	0.011	2.948	0.004	0.997
Prickly Shark*Retained.mt	0.002	2.948	0.001	0.999
Roughshoulder/Broad Skate*Retained.mt	0.007	2.948	0.002	0.998
Salmon Shark*Retained.mt	0.007	2.948	0.002	0.998
Sandpaper Skate*Retained.mt	-59.756	2.948	-20.270	0.000
Sevengill Shark*Retained.mt	0.007	2.948	0.002	0.998
Shovelnose Guitarfish*Retained.mt	-0.003	2.948	-0.001	0.999
Sixgill Shark*Retained.mt	-0.188	2.948	-0.064	0.949
Starry Skate*Retained.mt	-0.866	2.948	-0.294	0.769
Swell Shark*Retained.mt	0.003	2.948	0.001	0.999
Thornback Guitarfish*Retained.mt	-0.010	2.948	-0.003	0.997
White Skate*Retained.mt	-0.075	2.948	-0.026	0.980
Aleutian Skate*2007-10	3.083	3.127	0.986	0.324
Bat Ray*2007-10	-0.076	3.127	-0.024	0.981
Bering Skate*2007-10	0.007	3.127	0.002	0.998
Black Skate*2007-10	26.547	3.127	8.490	0.000
Blue Shark*2007-10	-0.020	3.127	-0.006	0.995
Shortfin Mako Shark*2007-10	0.007	3.127	0.002	0.998
Brown Cat Shark*2007-10	8.524	3.127	2.726	0.007
Brown Smoothhound Shark*2007-10	-0.237	3.127	-0.076	0.940
California Butterfly Ray*2007-10	0.007	3.127	0.002	0.998
Common Thresher Shark*2007-10	-0.100	3.127	-0.032	0.974
Deepsea Skate*2007-10	0.108	3.127	0.035	0.972
Diamond Stingray*2007-10	-0.043	3.127	-0.014	0.989
Filetail Cat Shark*2007-10	-3.702	3.127	-1.184	0.237

Table S8. Continued.

	Estimate	SE	t	p
Longnose Cat Shark*2007-10	2.142	3.127	0.685	0.494
Pacific Angel Shark*2007-10	0.007	3.127	0.002	0.998
Pacific Electric Ray*2007-10	-2.428	3.127	-0.777	0.438
Pacific Sleeper Shark*2007-10	2.885	3.127	0.923	0.357
Pelagic Thresher Shark*2007-10	0.007	3.127	0.002	0.998
Prickly Shark*2007-10	0.002	3.127	0.001	0.999
Roughshoulder/Broad Skate*2007-10	0.007	3.127	0.002	0.998
Salmon Shark*2007-10	0.018	3.127	0.006	0.995
Sandpaper Skate*2007-10	14.018	3.127	4.483	0.000
Sevengill Shark*2007-10	0.021	3.127	0.007	0.995
Shovelnose Guitarfish*2007-10	-0.003	3.127	-0.001	0.999
Sixgill Shark*2007-10	0.099	3.127	0.032	0.975
Starry Skate*2007-10	-0.387	3.127	-0.124	0.901
Swell Shark*2007-10	0.003	3.127	0.001	0.999
Thornback Guitarfish*2007-10	-0.010	3.127	-0.003	0.997
White Skate*2007-10	-0.064	3.127	-0.020	0.984
Aleutian Skate*2011-14	1.517	3.127	0.485	0.628
Bat Ray*2011-14	0.419	3.127	0.134	0.893
Bering Skate*2011-14	0.001	3.127	0.000	1.000
Black Skate*2011-14	-0.515	3.127	-0.165	0.869
Blue Shark*2011-14	3.791	3.127	1.212	0.226
Shortfin Mako Shark*2011-14	0.000	3.127	0.000	1.000
Brown Cat Shark*2011-14	-9.251	3.127	-2.959	0.003
Brown Smoothhound Shark*2011-14	-0.526	3.127	-0.168	0.866
California Butterfly Ray*2011-14	0.001	3.127	0.000	1.000
Common Thresher Shark*2011-14	-0.035	3.127	-0.011	0.991
Deepsea Skate*2011-14	0.087	3.127	0.028	0.978
Diamond Stingray*2011-14	-0.050	3.127	-0.016	0.987
Filetail Cat Shark*2011-14	-0.681	3.127	-0.218	0.828
Longnose Cat Shark*2011-14	1.906	3.127	0.610	0.542
Pacific Angel Shark*2011-14	0.000	3.127	0.000	1.000
Pacific Electric Ray*2011-14	-2.443	3.127	-0.781	0.435
Pacific Sleeper Shark*2011-14	9.428	3.127	3.015	0.003
Pelagic Thresher Shark*2011-14	1.216	3.127	0.389	0.697
Prickly Shark*2011-14	-0.004	3.127	-0.001	0.999
Roughshoulder/Broad Skate*2011-14	0.011	3.127	0.004	0.997
Salmon Shark*2011-14	0.002	3.127	0.001	0.999
Sandpaper Skate*2011-14	-21.473	3.127	-6.867	0.000
Sevengill Shark*2011-14	0.003	3.127	0.001	0.999

Table S8. Continued.

	Estimate	SE	t	p
Shovelnose Guitarfish*2011-14	-0.008	3.127	-0.003	0.998
Sixgill Shark*2011-14	-0.134	3.127	-0.043	0.966
Starry Skate*2011-14	-0.786	3.127	-0.252	0.802
Swell Shark*2011-14	-0.004	3.127	-0.001	0.999
Thornback Guitarfish*2011-14	-0.005	3.127	-0.002	0.999
White Skate*2011-14	0.060	3.127	0.019	0.985
Retained.mt*2007-10	0.007	3.127	0.002	0.998
Retained.mt*2011-14	0.000	3.127	0.000	1.000
Aleutian Skate*Retained.mt*2007-10	-3.083	4.422	-0.697	0.486
Bat Ray*Retained.mt*2007-10	0.076	4.422	0.017	0.986
Bering Skate*Retained.mt*2007-10	-0.007	4.422	-0.002	0.999
Black Skate*Retained.mt*2007-10	-26.531	4.422	-6.000	0.000
Blue Shark*Retained.mt*2007-10	0.017	4.422	0.004	0.997
Shortfin Mako Shark*Retained.mt*2007-10	-0.004	4.422	-0.001	0.999
Brown Cat Shark*Retained.mt*2007-10	-8.524	4.422	-1.928	0.054
Brown Smoothhound Shark*Retained.mt*2007-10	0.237	4.422	0.054	0.957
California Butterfly Ray*Retained.mt*2007-10	-0.007	4.422	-0.002	0.999
Common Thresher Shark*Retained.mt*2007-10	0.176	4.422	0.040	0.968
Deepsea Skate*Retained.mt*2007-10	-0.108	4.422	-0.024	0.981
Diamond Stingray*Retained.mt*2007-10	0.043	4.422	0.010	0.992
Filetail Cat Shark*Retained.mt*2007-10	3.702	4.422	0.837	0.403
Longnose Cat Shark*Retained.mt*2007-10	-2.142	4.422	-0.484	0.628
Pacific Angel Shark*Retained.mt*2007-10	-0.035	4.422	-0.008	0.994
Pacific Electric Ray*Retained.mt*2007-10	2.428	4.422	0.549	0.583
Pacific Sleeper Shark*Retained.mt*2007-10	-2.885	4.422	-0.652	0.514
Pelagic Thresher Shark*Retained.mt*2007-10	-0.011	4.422	-0.003	0.998
Prickly Shark*Retained.mt*2007-10	-0.002	4.422	-0.001	1.000
Roughshoulder/Broad Skate*Retained.mt*2007-10	-0.007	4.422	-0.002	0.999
Salmon Shark*Retained.mt*2007-10	-0.018	4.422	-0.004	0.997
Sandpaper Skate*Retained.mt*2007-10	-13.836	4.422	-3.129	0.002
Sevengill Shark*Retained.mt*2007-10	-0.021	4.422	-0.005	0.996
Shovelnose Guitarfish*Retained.mt*2007-10	0.003	4.422	0.001	1.000
Sixgill Shark*Retained.mt*2007-10	-0.099	4.422	-0.022	0.982
Starry Skate*Retained.mt*2007-10	0.387	4.422	0.088	0.930
Swell Shark*Retained.mt*2007-10	-0.003	4.422	-0.001	0.999
Thornback Guitarfish*Retained.mt*2007-10	0.010	4.422	0.002	0.998
White Skate*Retained.mt*2007-10	0.064	4.422	0.014	0.988
Aleutian Skate*Retained.mt*2011-14	-1.517	4.422	-0.343	0.732
Bat Ray*Retained.mt*2011-14	-0.419	4.422	-0.095	0.924

Table S8. Continued.

	Estimate	SE	t	p
Bering Skate*Retained.mt*2011-14	-0.001	4.422	0.000	1.000
Black Skate*Retained.mt*2011-14	0.518	4.422	0.117	0.907
Blue Shark*Retained.mt*2011-14	-3.793	4.422	-0.858	0.391
Shortfin Mako Shark*Retained.mt*2011-14	-0.003	4.422	-0.001	0.999
Brown Cat Shark*Retained.mt*2011-14	9.375	4.422	2.120	0.034
Brown Smoothhound Shark*Retained.mt*2011-14	0.526	4.422	0.119	0.905
California Butterfly Ray*Retained.mt*2011-14	-0.001	4.422	0.000	1.000
Common Thresher Shark*Retained.mt*2011-14	0.036	4.422	0.008	0.994
Deepsea Skate*Retained.mt*2011-14	-0.087	4.422	-0.020	0.984
Diamond Stingray*Retained.mt*2011-14	0.050	4.422	0.011	0.991
Filetail Cat Shark*Retained.mt*2011-14	0.681	4.422	0.154	0.878
Longnose Cat Shark*Retained.mt*2011-14	-1.906	4.422	-0.431	0.667
Pacific Angel Shark*Retained.mt*2011-14	-0.049	4.422	-0.011	0.991
Pacific Electric Ray*Retained.mt*2011-14	2.443	4.422	0.552	0.581
Pacific Sleeper Shark*Retained.mt*2011-14	-9.428	4.422	-2.132	0.033
Pelagic Thresher Shark*Retained.mt*2011-14	-1.220	4.422	-0.276	0.783
Prickly Shark*Retained.mt*2011-14	0.004	4.422	0.001	0.999
Roughshoulder/Broad Skate*Retained.mt*2011-14	-0.011	4.422	-0.003	0.998
Salmon Shark*Retained.mt*2011-14	-0.002	4.422	-0.001	1.000
Sandpaper Skate*Retained.mt*2011-14	21.511	4.422	4.864	0.000
Sevengill Shark*Retained.mt*2011-14	-0.003	4.422	-0.001	0.999
Shovelnose Guitarfish*Retained.mt*2011-14	0.008	4.422	0.002	0.998
Sixgill Shark*Retained.mt*2011-14	0.134	4.422	0.030	0.976
Starry Skate*Retained.mt*2011-14	0.786	4.422	0.178	0.859
Swell Shark*Retained.mt*2011-14	0.004	4.422	0.001	0.999
Thornback Guitarfish*Retained.mt*2011-14	0.005	4.422	0.001	0.999
White Skate*Retained.mt*2011-14	-0.060	4.422	-0.014	0.989