

Science, Service, Stewardship



The Anatomy of a Multispecies Individual Fishing Quota (IFQ) “Market” in Development

Dan Holland
Northwest Fisheries Science Center

**NOAA
FISHERIES
SERVICE**

Pacific Groundfish Limited Entry Trawl Fishery

- Implemented in 2011
- WA, OR and CA
- <100 active vessels in IFQ
- 30 separate IFQ stocks
- 100% observer coverage ensures all catch counted against quota



Role of Quota Markets

- Provide useful information
 - Prices should be indicator of current and future profits
- Allow quota to move to higher value users
- In multispecies fisheries retrospective balancing is required to allow landing of unexpected catch
- Quota prices should create incentives to avoid weak stocks

Quota Types

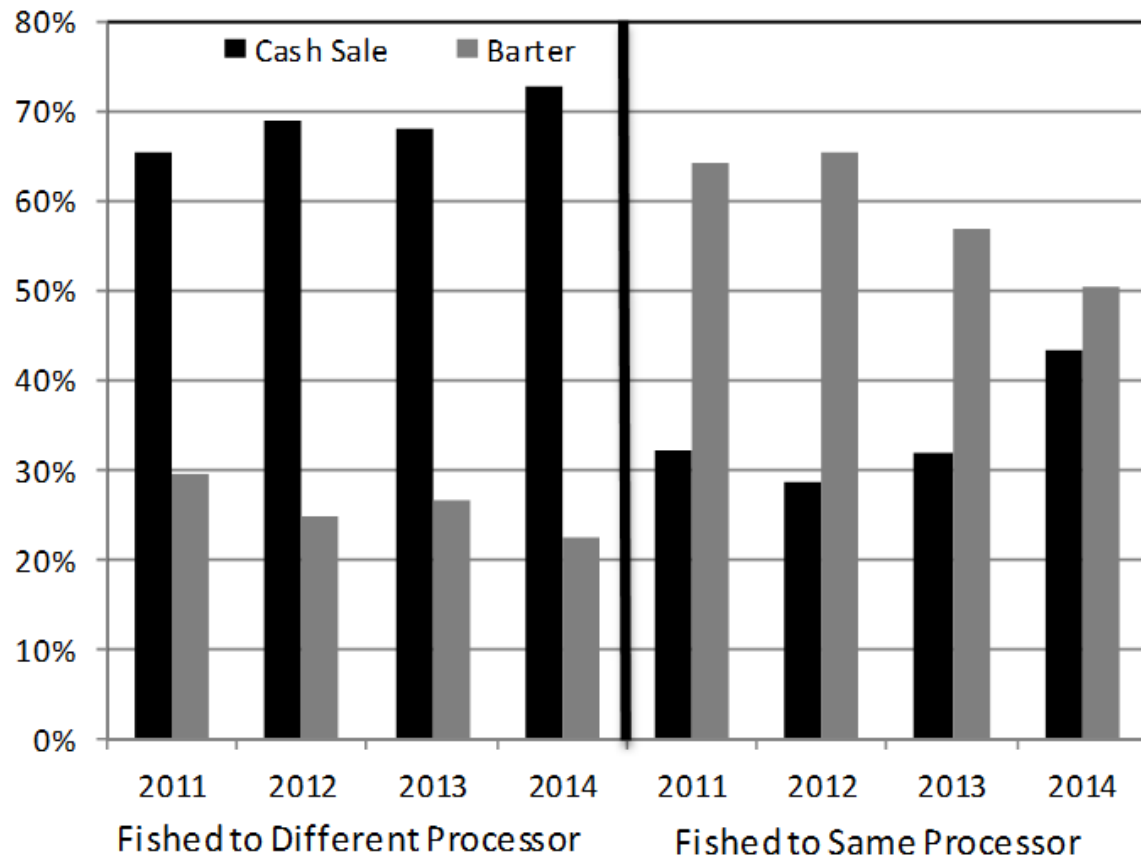
- *Quota Shares (QS): An ongoing entitlement to a percentage of the total allowable catch of a specific fish stock*
- *Quota Pounds (QP): An entitlement to catch a specific quantity of a particular fish stock over a single fishing year or season*
- *This study is focused on QP market only*

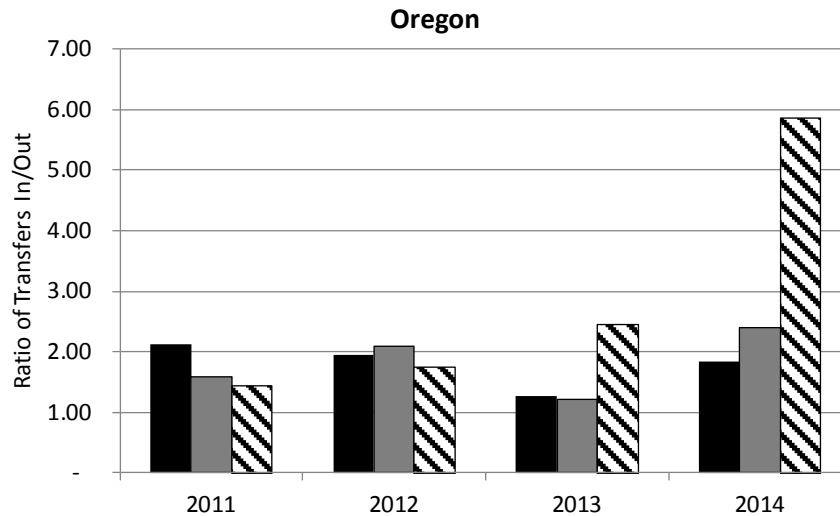
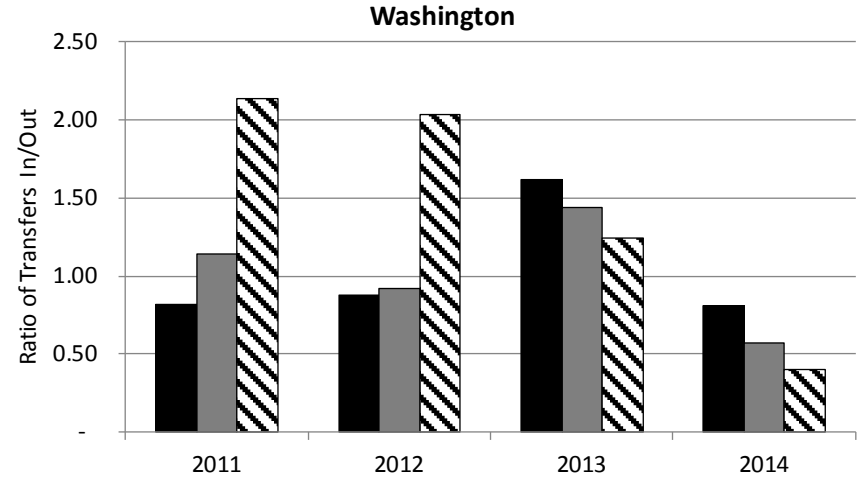
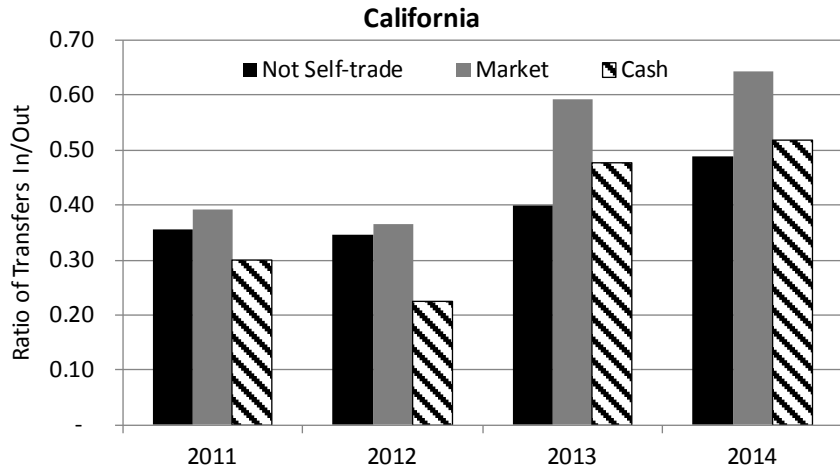
Catches Vs. Total IFQ Quota Pound Allocations	2011	2012	2013	2014	2014 Sector Quota Pounds
Arrowtooth flounder (TAC dropped 60% in 2013)	20%	26%	63%	50%	7,643,603
Bocaccio rockfish South of 40°10' N.	9%	15%	17%	11%	174,165
Canary rockfish	14%	28%	26%	26%	90,610
Chilipepper rockfish South of 40°10' N.	21%	22%	36%	29%	2,352,883
Cowcod South of 40°10' N.	1%	5%	22%	20%	2,205
Darkblotched rockfish	36%	36%	44%	35%	613,789
Dover sole	35%	33%	36%	29%	49,018,682
English sole	1%	2%	3%	5%	11,598,189
Lingcod (combined North and South of 40°10' N.)	16%	21%	21%	11%	3,592,323
Longspine thornyheads North of 34°27' N.	49%	48%	59%	50%	3,993,453
Minor shelf rockfish North of 40°10' N.	3%	8%	6%	7%	1,119,948
Minor shelf rockfish South of 40°10' N.	3%	15%	25%	12%	178,574
Minor slope rockfish North of 40°10' N.	17%	27%	25%	23%	1,740,285
Minor slope rockfish South of 40°10' N.	14%	33%	31%	26%	834,736
Other flatfish	17%	16%	19%	20%	9,245,746
Pacific cod	22%	35%	14%	15%	2,483,309
Pacific halibut (IBQ) North of 40°10' N.	28%	43%	31%	25%	236,660
Pacific ocean perch North of 40°10' N.	39%	45%	45%	36%	247,535
Pacific whiting	98%	96%	99%	83%	263,309,103
Petrale sole	93%	100%	92%	97%	5,242,593
Sablefish North of 36° N.	94%	91%	100%	95%	4,382,790
Sablefish South of 36° N.	86%	44%	15%	32%	1,439,839
Shortspine thornyheads North of 34°27' N.	50%	50%	60%	50%	3,025,822
Shortspine thornyheads South of 34°27' N.	17%	1%	7%	5%	110,231
Splitnose rockfish South of 40°10' N.	3%	4%	3%	4%	3,472,501
Starry flounder	2%	1%	0%	2%	1,665,592
Widow rockfish	40%	45%	41%	66%	2,191,020
Yelloweye rockfish	10%	6%	6%	6%	2,205
Yellowtail rockfish North of 40°10' N.	24%	32%	27%	40%	6,479,055

Transfer Activity

Transfer Type	2011		2012		2013		2014	
	Single	Multi	Single	Multi	Single	Multi	Single	Multi
Cash Sale	292	101	340	67	384	63	411	62
Barter	223	66	275	48	262	35	191	37
Cash and Barter	23	11	37	11	48	12	31	9
Other	409	201	606	260	663	400	596	360
Self-Trade	423	408	512	308	641	327	528	326
Not Self Transfers	2157		2464		2835		2551	

Percent of Annual Cash and/or Barter Transfers that were Cash Sales vs. Barter Depending on Whether the Parties Involved Landed Fish to the Same Processor or Not





Ratio of Transfers INTO the a State over Transfers OUT OF the State by Type of Transfer for Transfers occurring in the Years 2011-2013.

Prices, Price Dispersion and Counts for Cash Sales of Quota Pounds

OPTIMAL_YIELD_CATEGORY	2011			2012			2013			2014			Pounds Tranferred
	Price	C.V.	Count	Price	C.V.	Count	Price	C.V.	Count	Price	C.V.	Count	
Arrowtooth flounder		0%	-		80%	2	\$ 0.01	81%	8	\$0.00	76%	8	49,059
Bocaccio rockfish South of 40°10' N.		42%	3		0%	1	\$ 0.20	17%	4		15%	7	1,449
Canary rockfish		18%	4	\$ 1.49	57%	15	\$ 3.09	26%	12	\$2.12	35%	17	300
Chilipepper rockfish South of 40°10' N.		36%	3	\$ 0.03	62%	7	\$ 0.02	64%	8		32%	12	23,163
Cowcod South of 40°10' N.		10%	2		101%	2		54%	4		35%	2	13
Darkblotched rockfish	\$ 0.40	119%	4	\$ 0.22	49%	6	\$ 0.53	51%	10	\$1.08	22%	10	1,947
Dover sole	\$ 0.05	74%	5		0%	-	\$ 0.00	91%	3		0%	1	118,385
English sole		0%	-		0%	-		0%	-		0%	-	-
Lingcod		77%	2	\$ 0.05	38%	4		0%	-		0%	-	11,221
Lingcod North of 40°10' N.		0%	-		0%	-		0%	1		0%	1	16,123
Lingcod South of 40°10' N.		0%	-		0%	-		0%	-		0%	-	-
Longspine thornyheads North of 34°27' N.	\$ 0.04	84%	5	\$ 0.05	55%	12	\$ 0.05	45%	15	\$0.06	120%	20	15,004
Minor shelf rockfish North of 40°10' N.		0%	1		30%	2		0%	-		16%	9	3,246
Minor slope rockfish North of 40°10' N.		0%	1	\$ 0.04	11%	4	\$ 0.03	53%	3	\$0.02	58%	4	10,231
Minor shelf rockfish South of 40°10' N.		0%	-		0%	2	\$ 0.04	19%	5		48%	2	5,476
Minor slope rockfish South of 40°10' N.	\$ 0.05	85%	7	\$ 0.03	33%	7		13%	7		0%	-	8,286
Other flatfish		0%	-		0%	1		0%	-		0%	1	63,881
Pacific cod	\$ 0.05	28%	11	\$ 0.02	52%	9		0%	1		94%	4	25,791
Pacific halibut (IBQ) North of 40°10' N.	\$ 1.31	45%	5	\$ 1.19	19%	10	\$ 1.76	51%	21	\$0.58	64%	15	1,007
Pacific ocean perch North of 40°10' N.		69%	3		56%	3	\$ 0.75	45%	14	\$0.98	44%	15	1,073
Pacific whiting	\$ 0.02	70%	29	\$ 0.04	31%	65	\$ 0.04	43%	54	\$0.03	47%	29	179,150
Petrale sole	\$ 0.34	29%	38	\$ 0.40	12%	20	\$ 0.25	32%	50	\$0.28	16%	58	10,448
Sablefish North of 36° N.	\$ 1.06	41%	58	\$ 1.04	36%	47	\$ 0.88	17%	66	\$1.00	26%	62	10,303
Sablefish South of 36° N.	\$ 0.76	54%	62	\$ 1.05	9%	31	\$ 0.26	31%	8	\$0.16	37%	22	6,922
Shortspine thornyheads North of 34°27' N.		71%	2	\$ 0.05	59%	9	\$ 0.05	46%	10	\$0.06	35%	9	11,090
Shortspine thornyheads South of 34°27' N.	\$ 0.17	58%	3		0%	1		15%	3		48%	4	788
Splitnose rockfish South of 40°10' N.		0%	-		0%	1		0%	-		0%	-	16,500
Starry flounder		0%	-		0%	-		0%	-		0%	-	-
Widow rockfish	\$ 0.44	62%	6	\$ 0.34	57%	9	\$ 0.53	45%	10	\$0.23	45%	34	6,933
Yelloweye rockfish		105%	4	\$ 21.76	33%	9	\$ 29.58	53%	11	\$27.07	10%	12	10
Yellowtail rockfish North of 40°10' N.		0%	1	\$ 0.01	39%	10	\$ 0.03	10%	6	\$0.02	34%	21	28,301

Regression of Price Dispersion as a Function of Count of Single-species Cash Sales

<i>Variable</i>	<i>Coefficients</i>	<i>P-value</i>
Intercept	0.548	0.00
Transfer Count	-0.0043	0.01
R Square	.083	

This fitted relationship predicts that price dispersion would fall from 53% with five trades to 33% with 50 trades and 12% with 100 trades.

Prices, Price Dispersion and Counts for Cash Sales of Quota Pounds

OPTIMAL_YIELD_CATEGORY	2011			2012			2013			2014			Average Pounds Transferred
	Price	C.V.	Count	Price	C.V.	Count	Price	C.V.	Count	Price	C.V.	Count	
Bocaccio rockfish South of 40°10' N.		42%	3		0%	1	\$ 0.20	17%	4		15%	7	1,449
Canary rockfish		18%	4	\$ 1.49	57%	15	\$ 3.09	26%	12	\$2.12	35%	17	300
Cowcod South of 40°10' N.		10%	2		101%	2		54%	4		35%	2	13
Darkblotched rockfish	\$ 0.40	119%	4	\$ 0.22	49%	6	\$ 0.53	51%	10	\$1.08	22%	10	1,947
Pacific halibut (IBQ) North of 40°10' N.	\$ 1.31	45%	5	\$ 1.19	19%	10	\$ 1.76	51%	21	\$0.58	64%	15	1,007
Pacific ocean perch North of 40°10' N.		69%	3		56%	3	\$ 0.75	45%	14	\$0.98	44%	15	1,073
Widow rockfish	\$ 0.44	62%	6	\$ 0.34	57%	9	\$ 0.53	45%	10	\$0.23	45%	34	6,933
Yelloweye rockfish		105%	4	\$ 21.76	33%	9	\$ 29.58	53%	11	\$27.07	10%	12	10
Pacific whiting	\$ 0.02	70%	29	\$ 0.04	31%	65	\$ 0.04	43%	54	\$0.03	47%	29	179,150
Petrале sole	\$ 0.34	29%	38	\$ 0.40	12%	20	\$ 0.25	32%	50	\$0.28	16%	58	10,448
Sablefish North of 36° N.	\$ 1.06	41%	58	\$ 1.04	36%	47	\$ 0.88	17%	66	\$1.00	26%	62	10,303
Sablefish South of 36° N.	\$ 0.76	54%	62	\$ 1.05	9%	31	\$ 0.26	31%	8	\$0.16	37%	22	6,922

Conclusions on Pacific Groundfish Quota Market

- The quota pounds market is thin but is still developing
- Most transactions are barter, package sales or other trading mechanisms making price discovery difficult
- Barter is more common than cash trades when individuals fish to the same processor
- Brokers, cooperative managers and processors play critical roles as middlemen
- Quota pounds flowing into Oregon from other states
- Efficient market? Not yet.

Challenges to Efficient Market

- Joint production - interrelated values
- Dispersed bycatch quota but concentrated catch and highly uncertain needs
- Heterogeneous value and asymmetric information
- Constraints on quota accumulation limits role of processors to serve as clearinghouse
- Less catch balancing flexibility than other multispecies IFQ programs

IFQ Program Design

- Catch Balancing Mechanisms
 - Deemed Value (New Zealand)
 - Species Quota Conversions (Iceland)
 - Forfeiture (Iceland)
 - 30% carry forward/carry back (BC Groundfish)
- Aggregation Limits

Policy Options

- Risk pools and cooperatives
- Deemed value “Pool” with adaptive management quota
- Multi-year quotas for low mortality species