Fisheries Management Law & Economics

Economics and Fisheries

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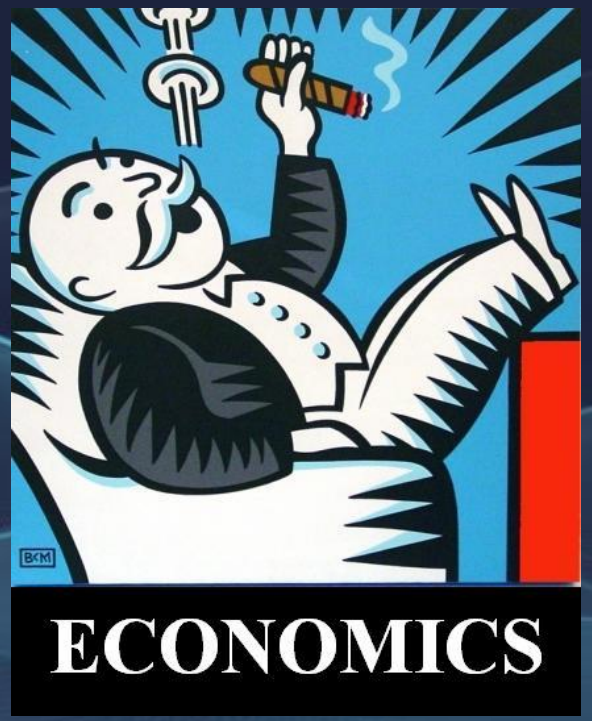
Outline

- Recap –Applying MGMT to Alaskan Fisheries
  - PWS Salmon
  - Bering Sea King Crab
  - Southeast Sac Roe Herring
- Economics Overview
- Supply
- Demand
- Global Fisheries Economy
- Alaska Fisheries Economy

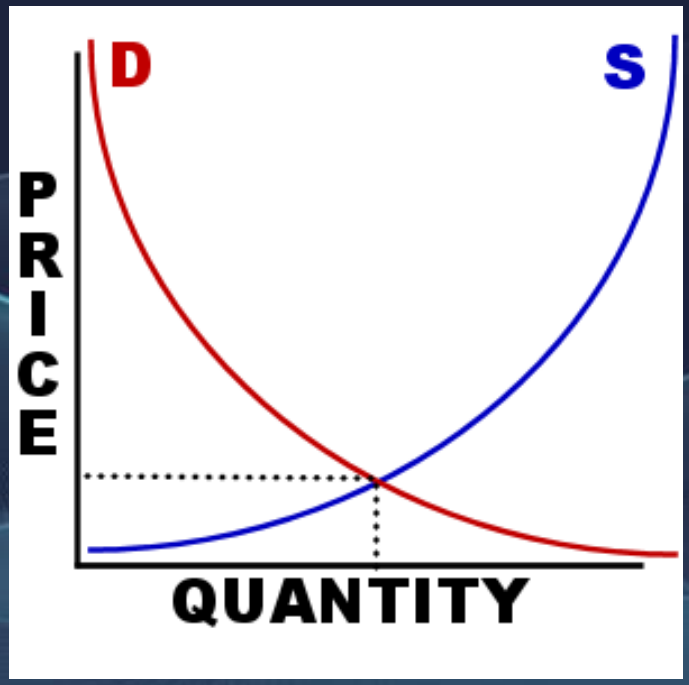
Fishery Economics

- What is Economics?
- Economics is the social science that studies economic activity to gain an understanding of the processes that govern the production, distribution and consumption of goods and services in an economy.
- A Study of Choices



Economics Basics

- Broken down into 2 categories
  - Micro vs. Macro
- Microeconomics
  - Basic elements in the economy
  - individual agents and markets
  - Interactions
    - outcomes of interactions
  - households, firms, buyers, and sellers



Economic Basics

- Macroeconomics
  - Analyzes the entire economy
    - Gross domestic product (GDP), Inflation, Unemployment, Savings, Investment, Economic growth
  - and the policies that address these issues
    - Janet Yellen & Ben Bernanke - Chair Fed Reserve
  - Taxation
  - Stimulus
  - Unemployment

Law of Demand

- **All else being equal**, as the price of a product increases, quantity demanded falls
  - Inversely Related

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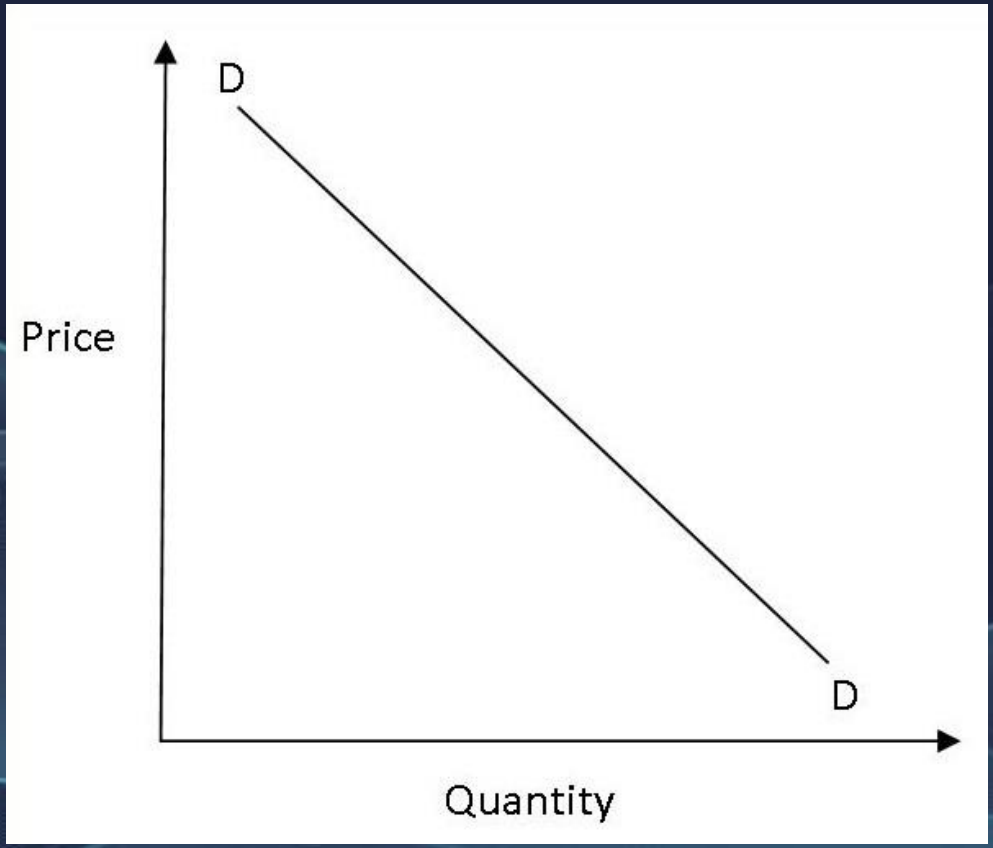
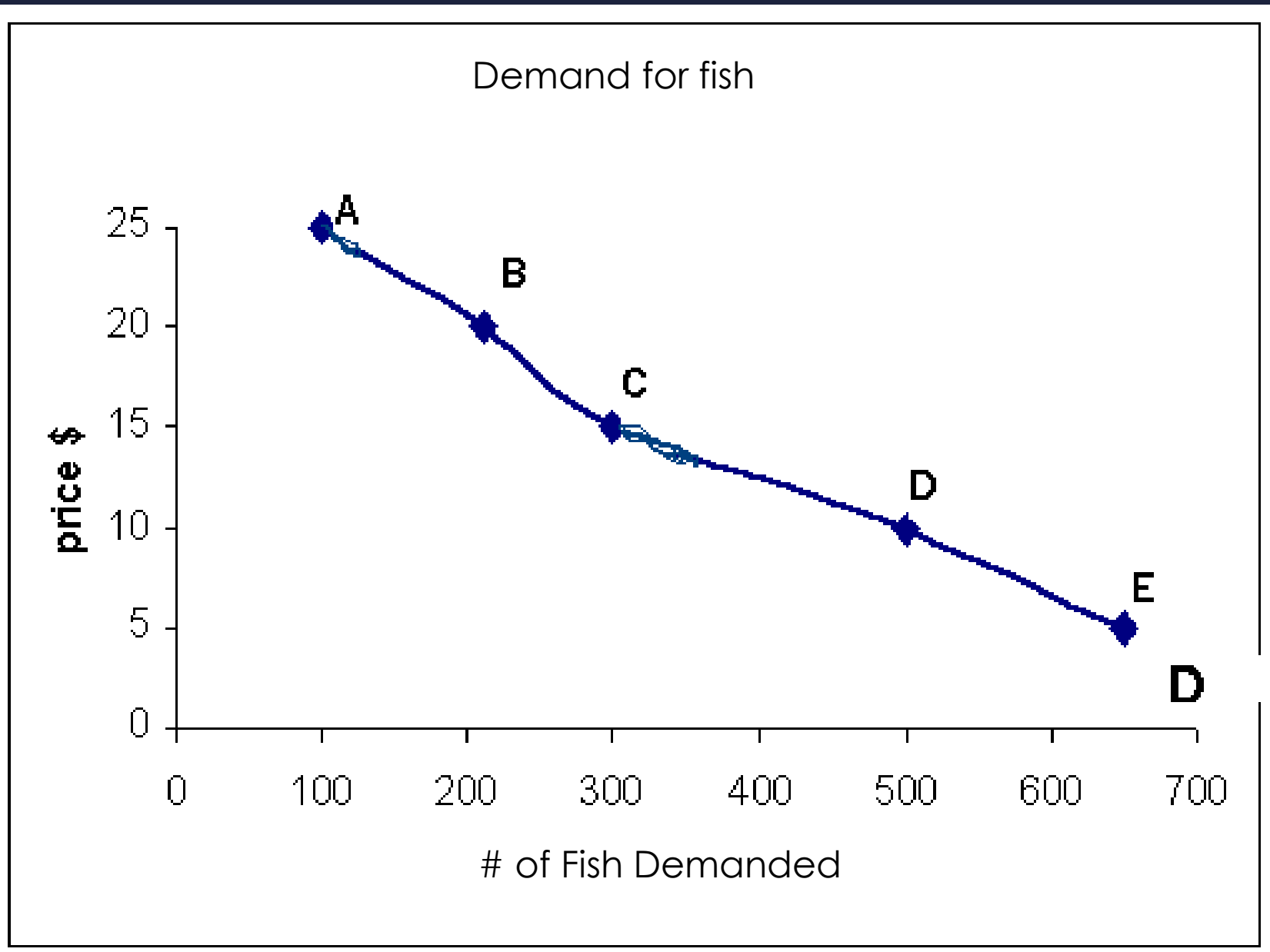


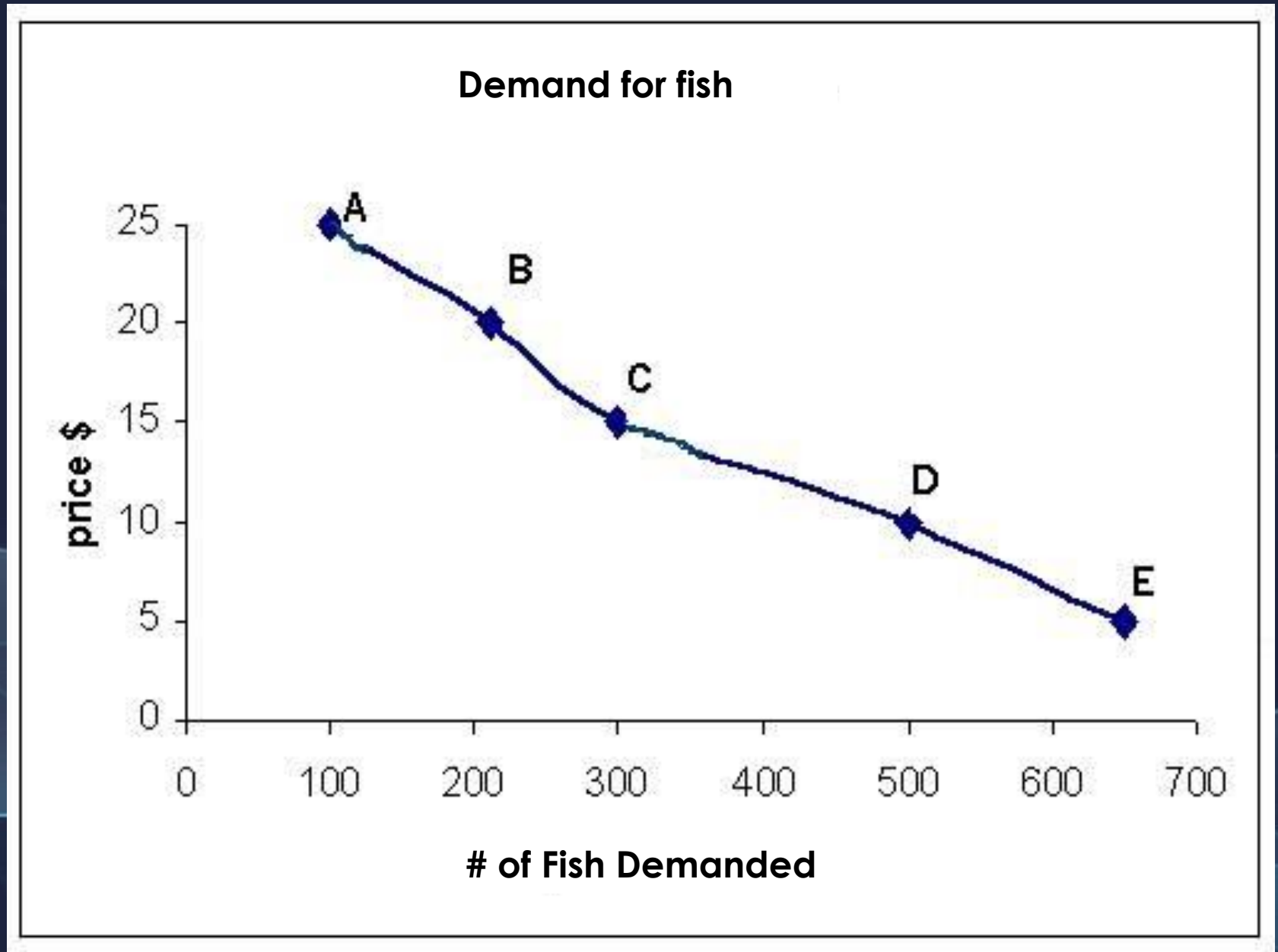
Demand


Demand for fish
price $
25
20
15
10
5
0
A
B
C
D
E
D
0
100
200
300
400
500
600
700
# of Fish Demanded

Demand

- The demand relationship is not static!
- Things that affect demand
  - Price of related products
    - Price of farmed fish falls Demand for wild salmon decreases
  - Change in Income
    - More money to buy more fish
  - Population
    - More people eat more fish
  - Preference
    - More people want cool things

Demand Shifts



Self Check

- The law of demand states as the price of a product decreases, quantity demanded falls
  - True
  - False
- If income rises the demand for products will
  - Increase
  - Decrease

Law of Supply

- **All else equal**, an increase in price results in an increase in quantity supplied
  - Positively related

Law of Supply

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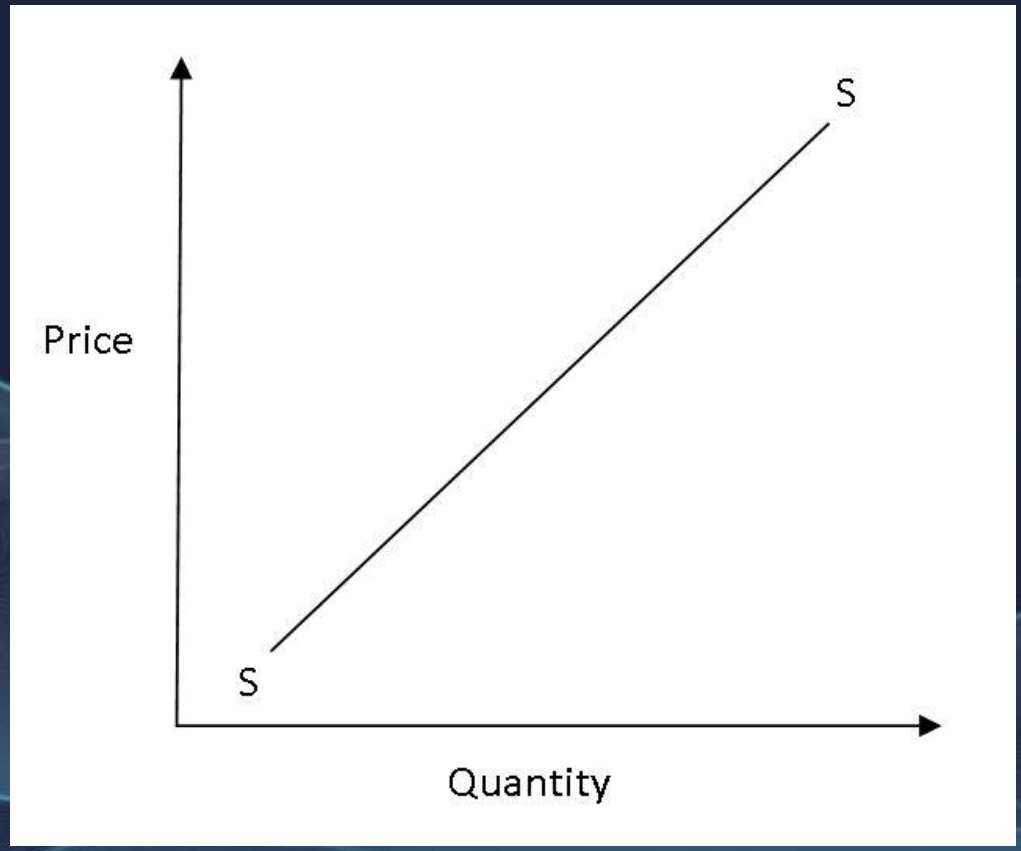
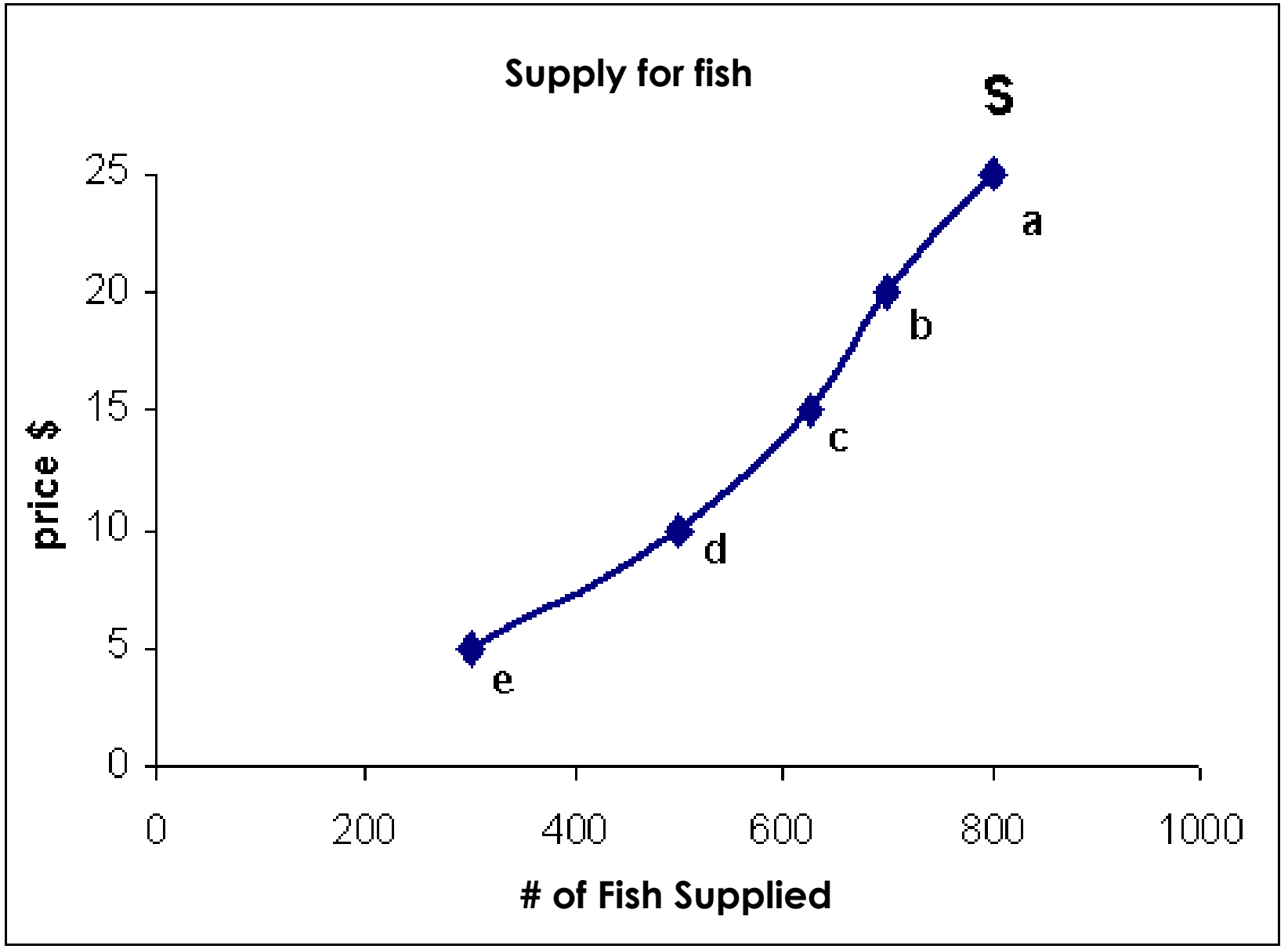
  - Positively related



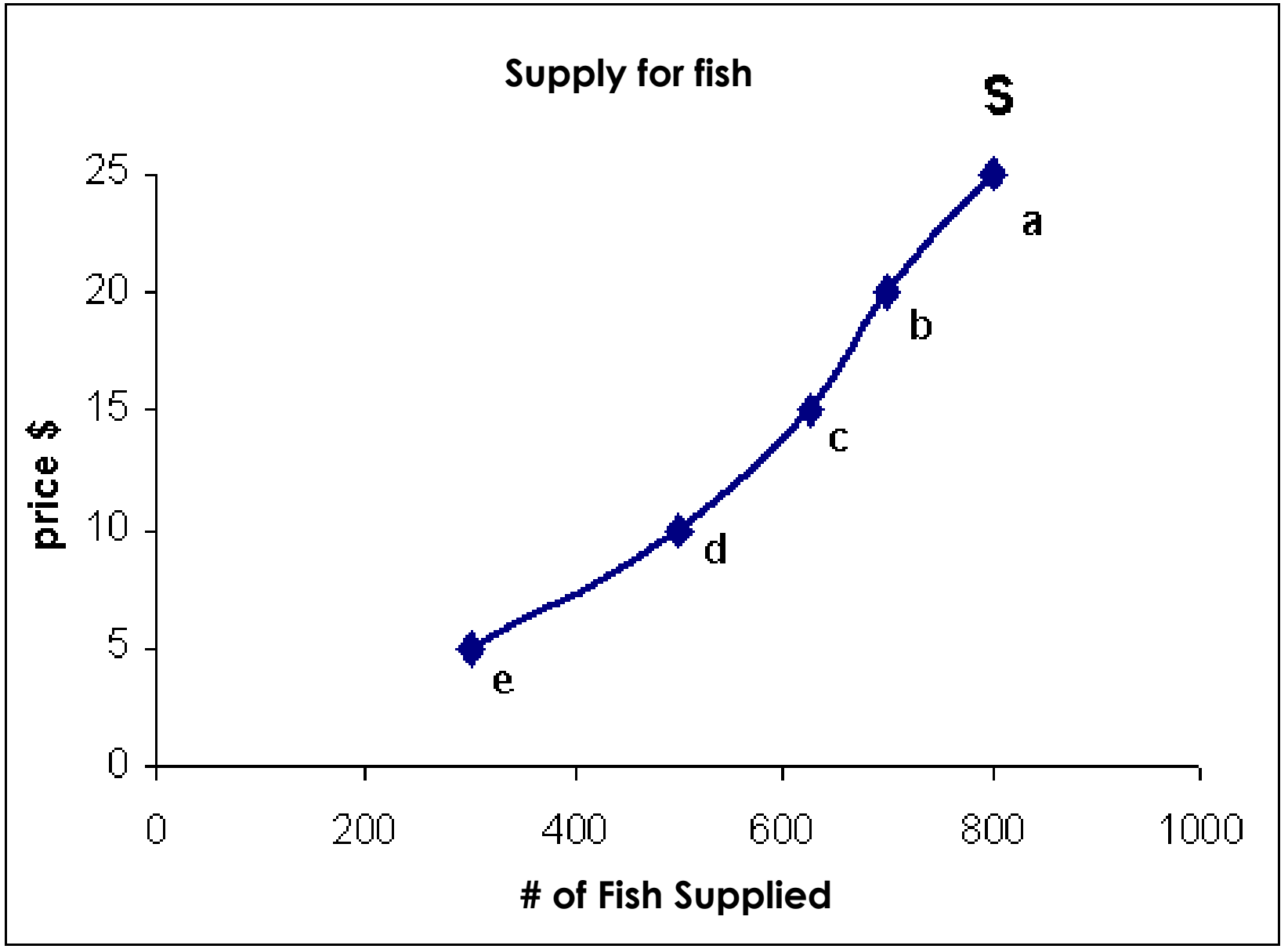
Supply


Supply for fish
S
a
b
c
d
e
price $
25
20
15
10
5
0
0
200
400
600
800
1000
# of Fish Supplied

Supply

- The Supply relationship is not static either
- Things that affect Supply
  - Price of production (catch fish)
    - ↑ $$ Production = ↓ Supply
  - Price of related goods (substitutes)
    - Crab vs. Cod
      - If a fisherman makes more $ for one species likely to fish for more valuable species
  - # of Suppliers (number of fisherman)
    - ↑ fishers - ↑ Fish supplied

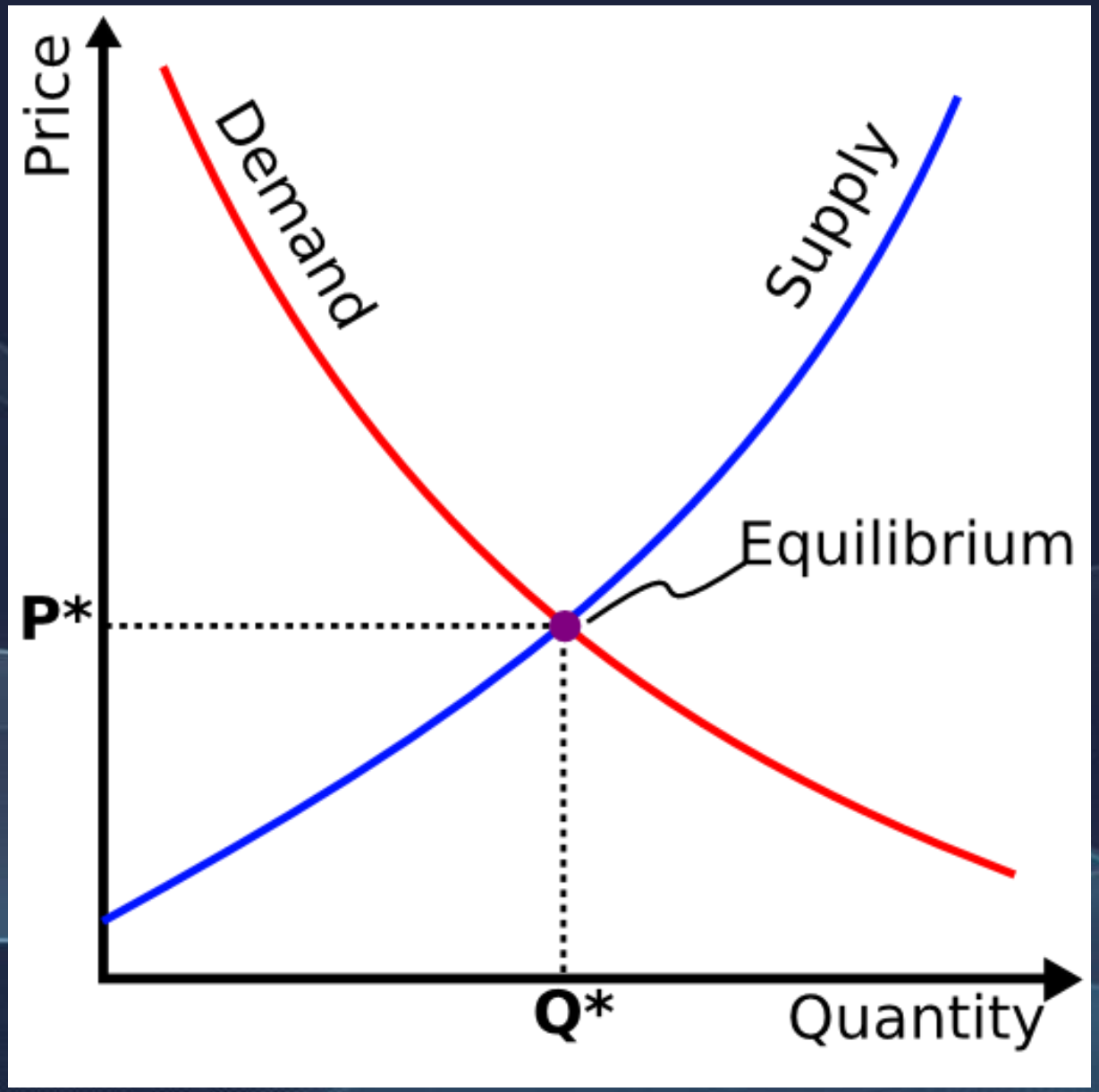
Supply Shifts



Self Check

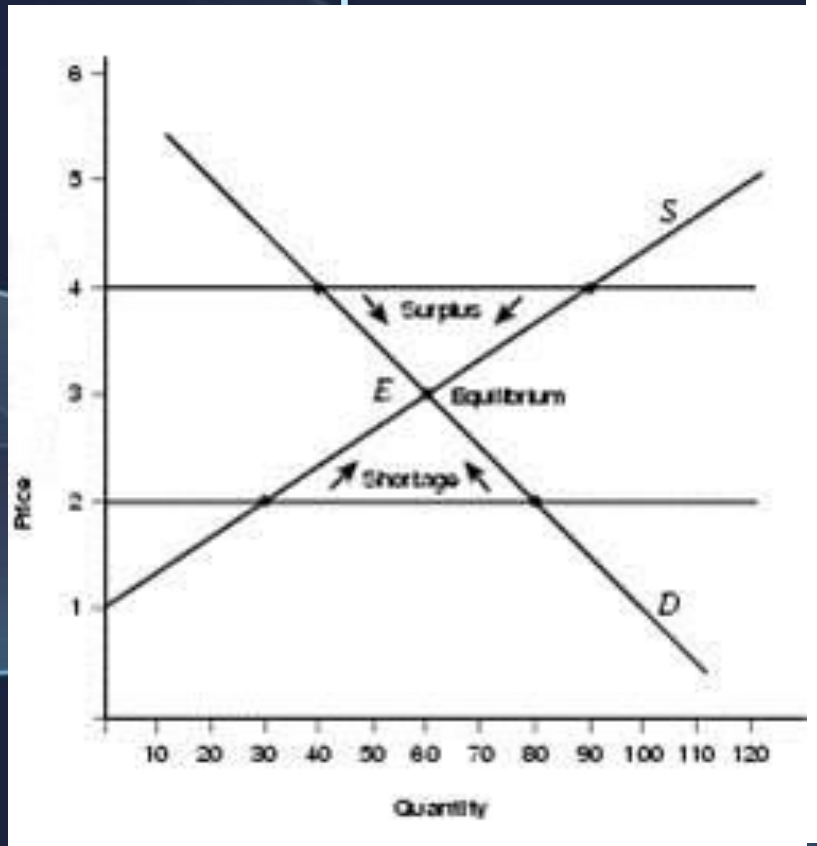
- The law of supply states an increase in price results in an increase in quantity supplied
  - True
  - False
- If the Price of production (fuel to catch fish) increases supply will
  - Increase
  - Decrease

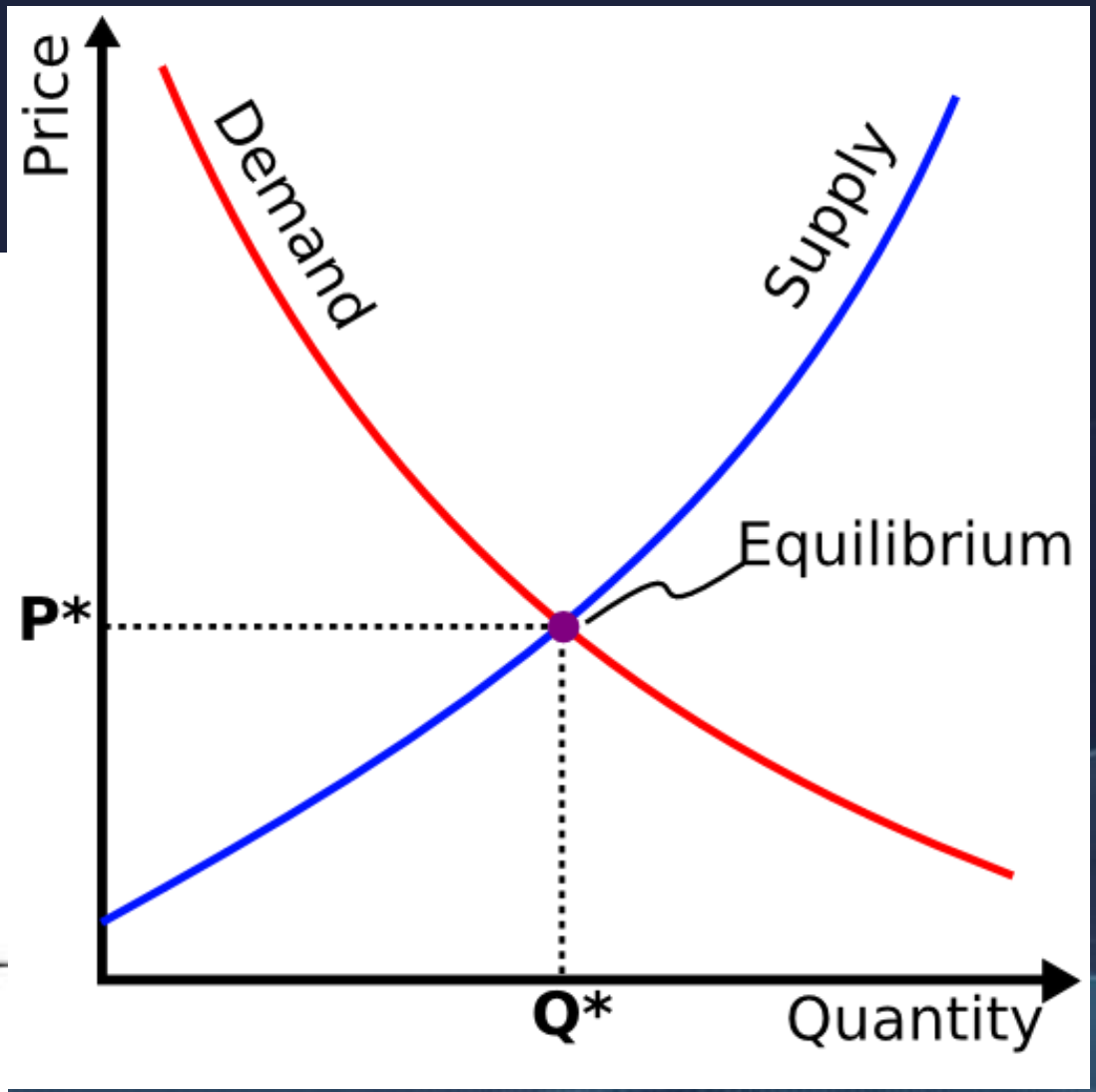
Supply and Demand



Equilibrium

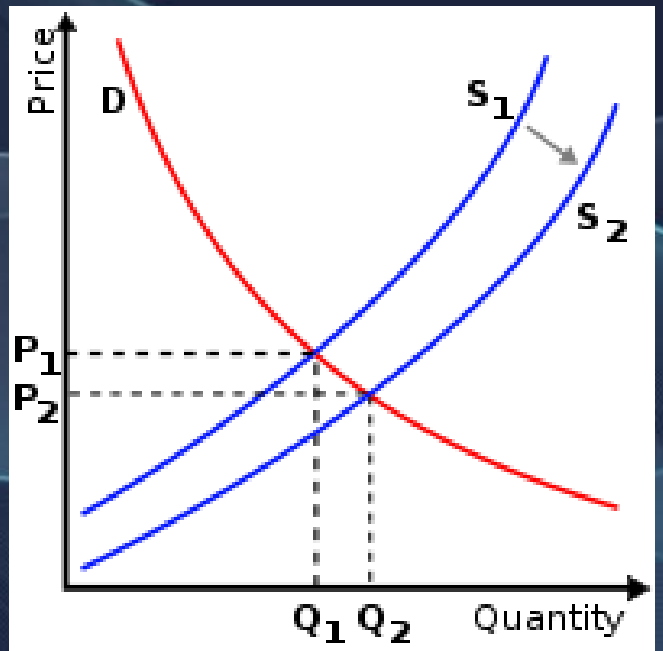
- Surpluses
- Shortages
- S & D will adapt

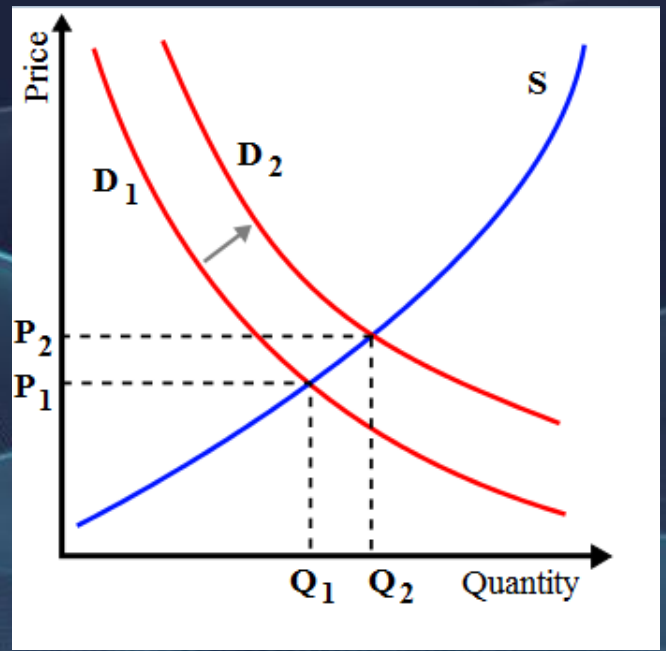




Shifts in Supply & Demand

- Large fish return and easy to catch fish
- Fukeshima Nuclear disaster
- ↑ price of fuel
- α 3 fatty acids in the news
- Competition from other fish species
- Increased hatchery production





Self Check

- A surplus means that there is more supplied than demanded and price will likely
  - Decrease to equilibrium
  - Increase to equilibrium
- If there is a large fish return and the fish are easier to catch there will likely be a change in
  - The Supply curve
  - The Demand curve

The Fisheries Economy

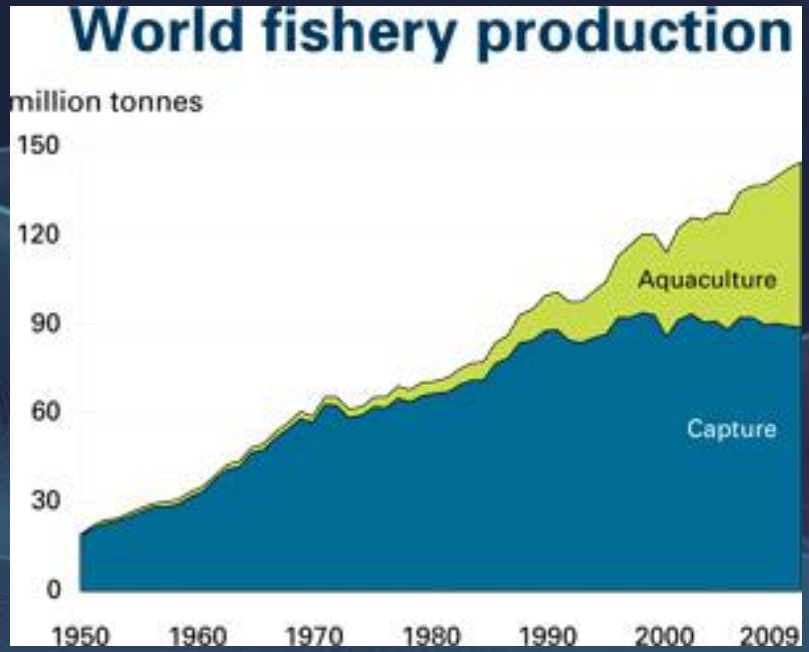
A GLOBAL PERSPECTIVE

- Export Value $136 Billion (2013)
  - More than rice,
  - coffee, sugar, tea
- 260 Million Livelihoods
- ½ comes from developing countries

The Fisheries Economy

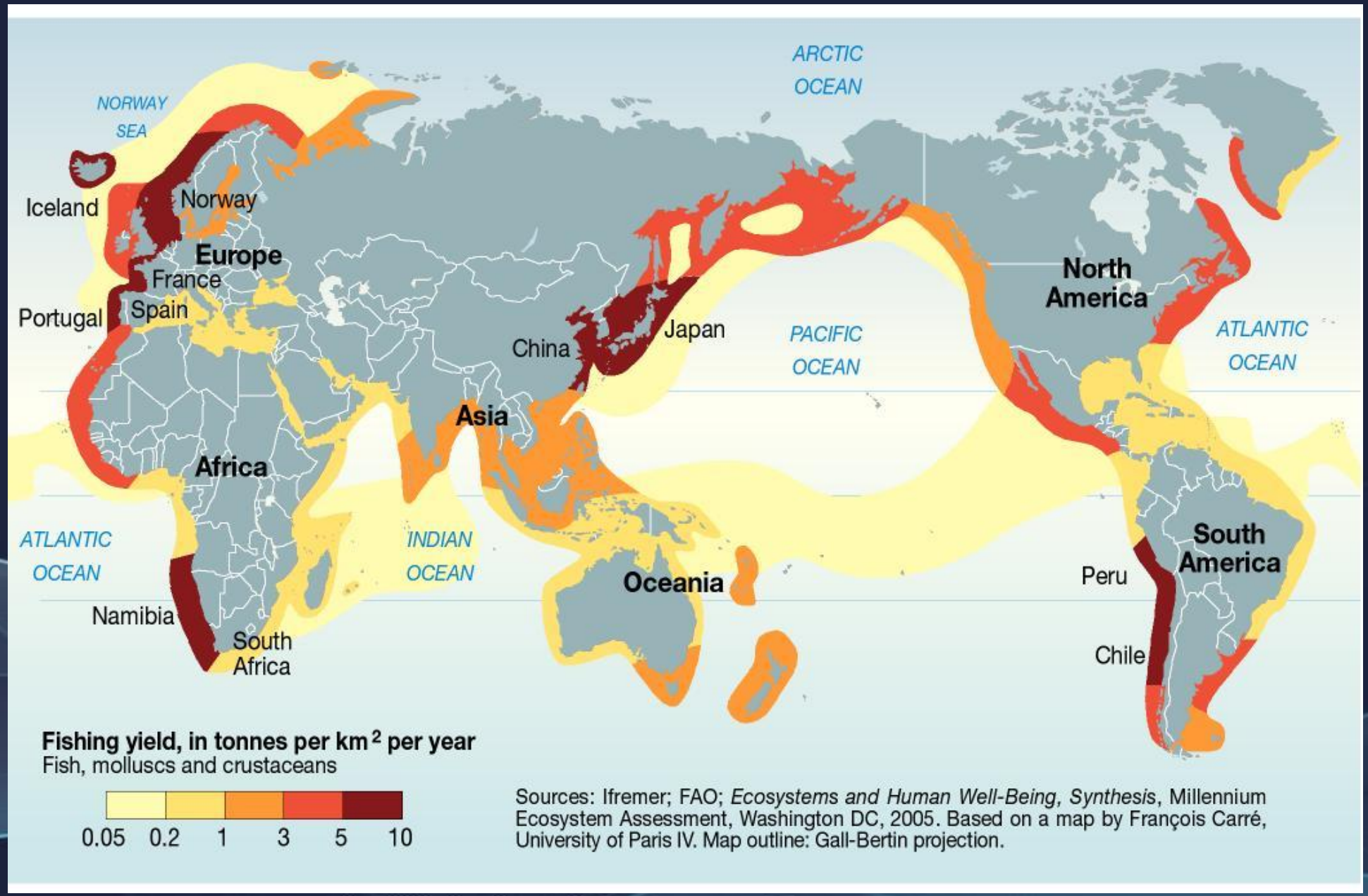
A GLOBAL PERSPECTIVE

- World Capture and Aquaculture 157 m tonnes
  - Aquaculture ~47%
  - 18.4 kg/person globally
  - 10 – 12% of global population Livelihood



Global Fisheries Economies

- Top 10 Fisheries Producers (2006)
  - China, Peru, United States, Indonesia, Japan, Chile, India, Russian Federation, Thailand and Philippines.
- Top 10 Species (2006)
  - Anchoveta, Alaska Pollock, skipjackm, tuna, Atlantic herring, blue whiting, chub mackerel, Chilean jack mackerel, Japanese anchovy, largehead hairtail and yellowfin tuna.


ARCTIC OCEAN
NORWAY SEA
Iceland
Norway
Europe
France
Spain
Portugal
China
Japan
PACIFIC OCEAN
North America
ATLANTIC OCEAN
Asia
Africa
ATLANTIC OCEAN
INDIAN OCEAN
Oceania
South America
Peru
Chile
Namibia
South Africa
Fishing yield, in tonnes per km 2 per year
Fish, molluscs and crustaceans
0.05 0.2 1 3 5 10
Sources: Ifremer; FAO; Ecosystems and Human Well-Being, Synthesis, Millennium Ecosystem Assessment, Washington DC, 2005. Based on a map by François Carré, University of Paris IV. Map outline: Gall-Bertin projection.

US Fisheries Economy

- U.S. commercial and recreational fishing
  - $199 billion in sales impacts
  - $89 billion to GDP
  - 1.7 million jobs.

Commercial Economic Impacts Trends for the United States
(thousands of dollars)

	2009	2010	2011	2012
Jobs	1,029,542	1,196,683	1,233,204	1,270,141
Income	31,556,643	36,269,724	36,568,695	38,721,983
Sales	116,224,548	133,135,986	129,386,335	140,660,993
Value Added	48,282,319	55,434,189	55,321,482	59,017,417
Total Revenue	3,926,583	4,528,964	5,335,522	5,099,456

All Sectors

Jobs supported by the U.S. Seafood Industry (2012)

State	Jobs	State	Jobs
United States	1,270,141	Oregon	16,051
California	145,433	Maryland	15,622
Massachusetts	107,064	Georgia	14,124
Florida	82,141	Hawai'i	10,544
Washington	60,955	Rhode Island	10,509
Alaska	55,890	Alabama	9,947
New York	51,681	North Carolina	8,800
New Jersey	50,754	Mississippi	8,532
Louisiana	33,391	New Hampshire	4,971
Maine	32,971	Connecticut	3,857
Texas	25,911	South Carolina	1,766
Virginia	19,052	Delaware	367

Sales All Sectors

Total sales generated by the U.S. Seafood Industry (2012)

(thousands of dollars)

State	In-State Sales	State	In-State Sales
United States	140,660,993	Maryland	1,800,489
California	24,043,813	Virginia	1,538,449
Florida	16,553,480	Rhode Island	1,224,565
Massachusetts	8,483,740	Oregon	1,174,111
New Jersey	7,921,903	Hawai'i	855,139
Washington	7,533,447	North Carolina	782,684
New York	6,366,436	New Hampshire	609,187
Alaska	4,232,307	Connecticut	603,308
Texas	2,499,832	Alabama	460,514
Georgia	1,962,985	Mississippi	377,374
Louisiana	1,927,986	South Carolina	119,975
Maine	1,875,020	Delaware	46,713

Revenue by State

Total Landings Revenue by State (2012)

(thousands of dollars)

State	Total Revenue	State	Total Revenue
Alaska	1,703,726	Rhode Island	80,787
Massachusetts	618,247	Maryland	77,859
Maine	448,544	North Carolina	72,912
Louisiana	331,165	East Florida	57,736
Washington	275,585	Mississippi	49,295
California	231,683	Alabama	46,340
Texas	194,044	New York	39,136
New Jersey	187,732	South Carolina	23,978
Virginia	175,640	New Hampshire	23,176
West Florida	141,671	Connecticut	20,608
Oregon	128,030	Georgia	16,315
Hawai'i	91,513	Delaware	7,897

Landings by State

Total Landings by State (2012)

(thousands of pounds)

State	Total Landings	State	Total Landings
Alaska	5,261,421	Maryland	73,415
Louisiana	1,217,453	West Florida	63,032
Virginia	461,944	North Carolina	56,673
California	352,700	New York	30,029
Massachusetts	297,561	Hawai'i	29,289
Oregon	295,892	East Florida	28,565
Mississippi	263,622	Alabama	26,347
Maine	262,581	South Carolina	12,260
Washington	213,578	New Hampshire	12,138
New Jersey	180,502	Georgia	10,304
Rhode Island	83,290	Connecticut	8,673
Texas	81,991	Delaware	5,239

US Fish spp Value

- Salmon, Scallops, Shrimp, Lobster

2011 Economic Impacts of the United States Seafood Industry (thousands of dollars)

	With Imports			Without Imports		
	Jobs	Sales	Value Added	Jobs	Sales	Value Added
Total Impacts	1,233,204	129,386,335	55,321,482	786,505	52,870,191	27,489,114
Commercial Harvesters	186,726	14,148,340	7,351,409	186,726	14,148,340	7,351,409
Seafood Processors & Dealers	198,001	27,231,326	11,946,661	59,752	8,309,304	3,645,377
Importers	176,037	48,424,097	14,761,785	0	0	0
Seafood Wholesalers & Distributors	54,273	7,478,706	3,516,426	27,711	3,818,492	1,795,423
Retail	618,166	32,103,866	17,745,201	512,317	26,594,055	14,696,905

Total Landings Revenue and Landings Revenue of Key Species/Species Groups (thousands of dollars)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total revenue	3,164,209	3,346,066	3,769,942	3,952,692	4,041,780	4,203,688	4,394,152	3,927,630	4,511,633	5,338,063
Finfish & other	1,374,489	1,518,330	1,777,802	1,860,060	1,950,757	2,068,233	2,254,846	1,887,456	2,183,578	2,590,197
Shellfish	1,789,720	1,827,736	1,992,140	2,092,632	2,091,023	2,135,455	2,139,306	2,040,174	2,328,055	2,747,866
American lobster	293,894	283,516	374,306	415,415	395,150	367,500	326,814	310,370	399,476	423,354
Blue crab	146,974	153,685	145,905	140,818	126,043	148,866	160,682	163,159	205,683	181,842
Menhaden	81,607	71,988	75,045	62,520	69,683	92,725	90,996	99,092	107,130	143,679
Pacific halibut	136,789	172,846	176,893	177,599	202,163	227,348	217,726	140,613	207,233	213,518
Pacific salmon	156,194	198,946	302,775	330,816	310,865	381,589	395,253	369,744	554,798	618,300
Sablefish	77,637	102,983	99,153	101,759	109,026	106,504	121,869	123,231	137,573	188,217
Sea scallop	202,092	229,097	320,039	432,514	384,758	386,044	370,057	376,331	455,694	585,090
Shrimp	523,882	441,622	446,043	412,718	454,610	429,993	444,522	379,152	416,976	535,509
Tunas	85,473	86,818	89,952	86,358	86,760	93,875	106,867	96,072	108,257	136,004
Walleye pollock	203,263	203,018	271,612	306,906	329,879	297,460	323,212	270,595	282,399	362,592

US Fish spp

- Landings in lbs
  - **Walleye Pollock**, Menhaden, Pacific Salmon

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

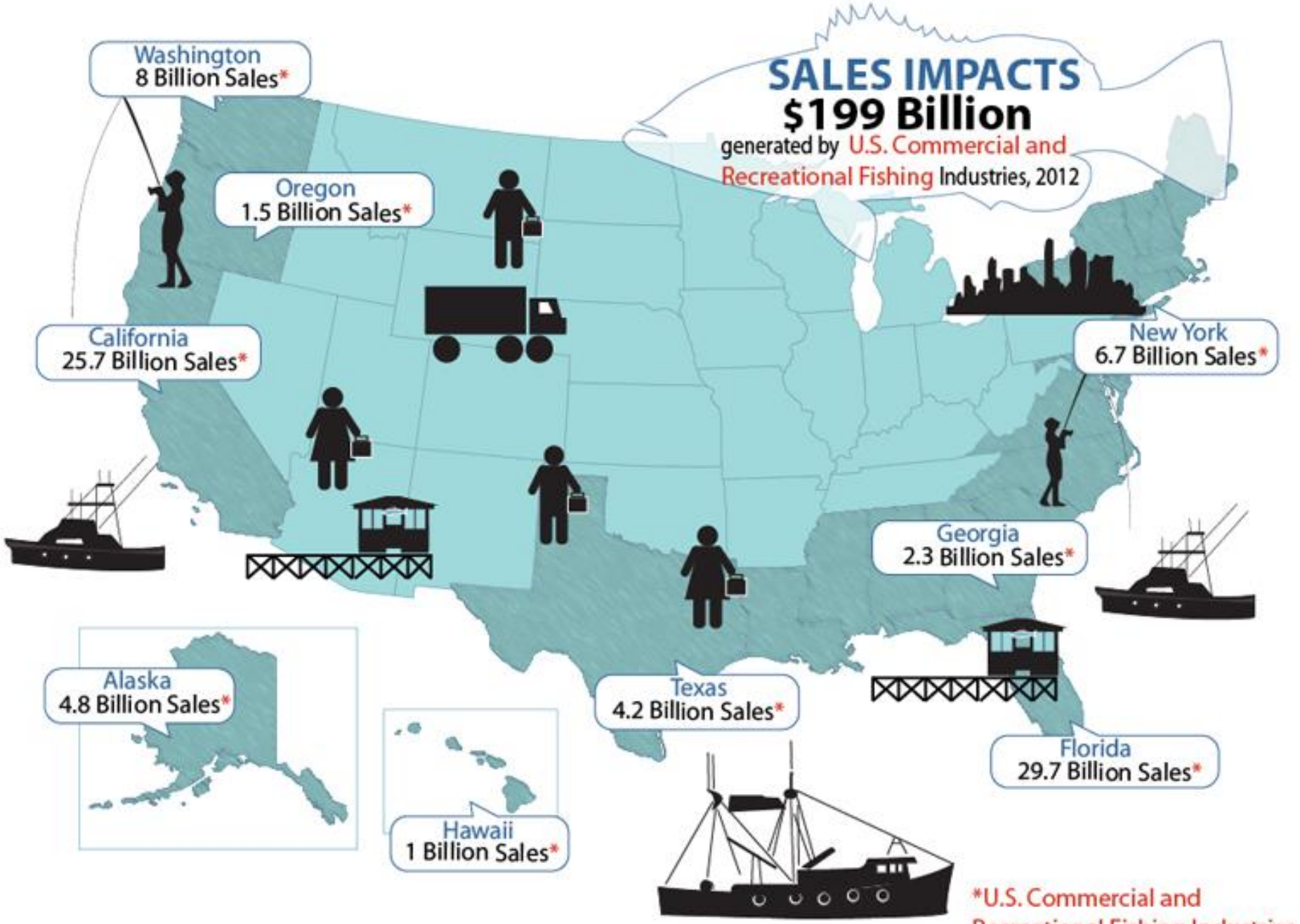
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total landings	9,436,477	9,505,337	9,688,745	9,712,427	9,484,055	9,309,281	8,357,614	8,060,769	8,248,510	9,867,148
Finfish & other	8,232,370	8,367,711	8,516,634	8,630,877	8,303,972	8,227,911	7,290,705	6,792,319	6,948,622	8,499,132
Shellfish	1,204,107	1,137,626	1,172,111	1,081,550	1,180,083	1,081,370	1,066,909	1,268,450	1,299,888	1,368,016
American lobster	83,087	71,683	90,073	87,809	92,609	80,842	88,106	100,507	116,248	126,264
Blue crab	175,574	170,890	174,561	159,242	166,133	156,599	162,192	176,184	199,334	199,149
Menhaden	1,755,398	1,590,510	1,495,240	1,243,807	1,304,250	1,484,230	1,344,468	1,570,733	1,473,329	1,874,995
Pacific halibut	80,977	78,862	79,181	76,264	71,897	69,967	67,000	59,812	56,460	42,877
Pacific salmon	561,489	669,998	738,746	899,759	663,567	886,054	659,196	705,063	787,712	780,066
Sablefish	40,734	47,998	52,851	51,296	46,842	43,884	43,314	42,826	40,318	41,284
Sea scallop	52,672	55,968	64,108	56,626	59,013	58,450	53,385	58,003	57,529	59,112
Shrimp	345,249	324,170	316,566	264,163	337,012	273,636	248,609	305,701	262,295	310,570
Tunas	49,632	61,762	56,323	44,252	49,923	50,642	47,878	49,062	48,001	49,708
Walleye pollock	3,333,647	3,361,261	3,353,236	3,410,065	3,400,810	3,066,600	2,276,144	1,866,171	1,947,578	2,810,787

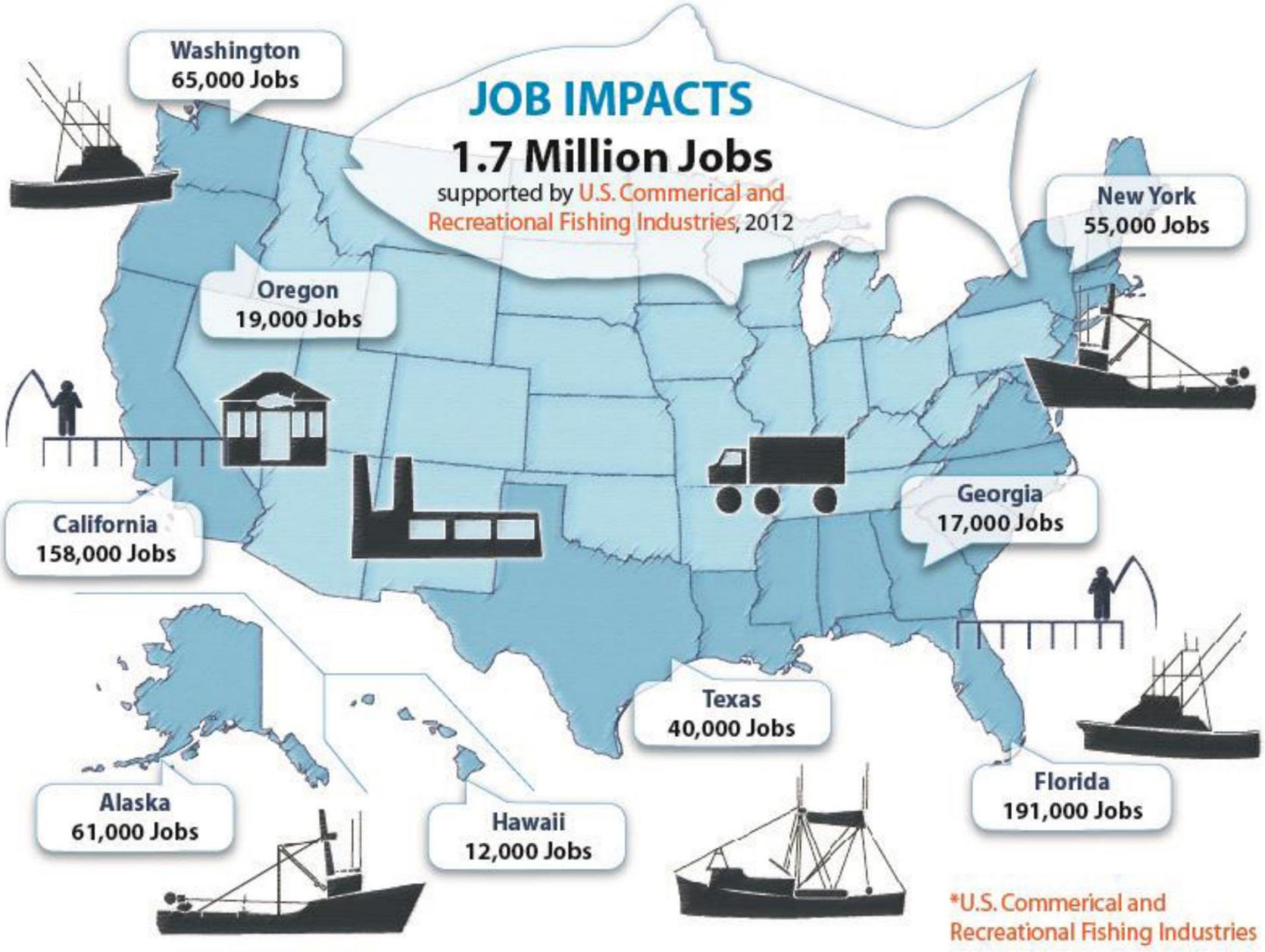
US Fish spp $/lb

- Scallops, Halibut, Sablefish

Average Annual Price of Key Species/Species Groups (dollars per pound)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
American lobster	3.54	3.96	4.16	4.73	4.27	4.55	3.71	3.09	3.44	3.35
Blue crab	0.84	0.90	0.84	0.88	0.76	0.95	0.99	0.93	1.03	0.91
Menhaden	0.05	0.05	0.05	0.05	0.05	0.06	0.07	0.06	0.07	0.08
Pacific halibut	1.69	2.19	2.23	2.33	2.81	3.25	3.25	2.35	3.67	4.98
Pacific salmon	0.28	0.30	0.41	0.37	0.47	0.43	0.60	0.52	0.70	0.79
Sablefish	1.91	2.15	1.88	1.98	2.33	2.43	2.81	2.88	3.41	4.56
Sea scallop	3.84	4.09	4.99	7.64	6.52	6.60	6.93	6.49	7.92	9.90
Shrimp	1.52	1.36	1.41	1.56	1.35	1.57	1.79	1.24	1.59	1.72
Tunas	1.72	1.41	1.60	1.95	1.74	1.85	2.23	1.96	2.26	2.74
Walleye pollock	0.06	0.06	0.08	0.09	0.10	0.10	0.14	0.15	0.15	0.13


SALES IMPACTS
$199 Billion
generated by U.S. Commercial and Recreational Fishing Industries, 2012
Washington
8 Billion Sales*
Oregon
1.5 Billion Sales*
California
25.7 Billion Sales*
New York
6.7 Billion Sales*
Georgia
2.3 Billion Sales*
Alaska
4.8 Billion Sales*
Texas
4.2 Billion Sales*
Florida
29.7 Billion Sales*
Hawaii
1 Billion Sales*
*U.S. Commercial and Recreational Fishing Industries



NOAA FISHERIES

Self Check

- Which state is highest in total ex-vessel revenue and landings
  - Alaska
  - California
  - Massachusetts
  - Louisiana
- By pound what is the most commercially caught fish species in the United States
  - Walleye Pollock
  - Menhaden
  - Pacific Salmon
  - Shrimp

Alaska Fisheries Economy

North Pacific

- Alaska

Alaska Fisheries

- 60,000 workers earn $1.6 billion in income
- $2.1 billion total labor income
- $5.9 billion economic activity

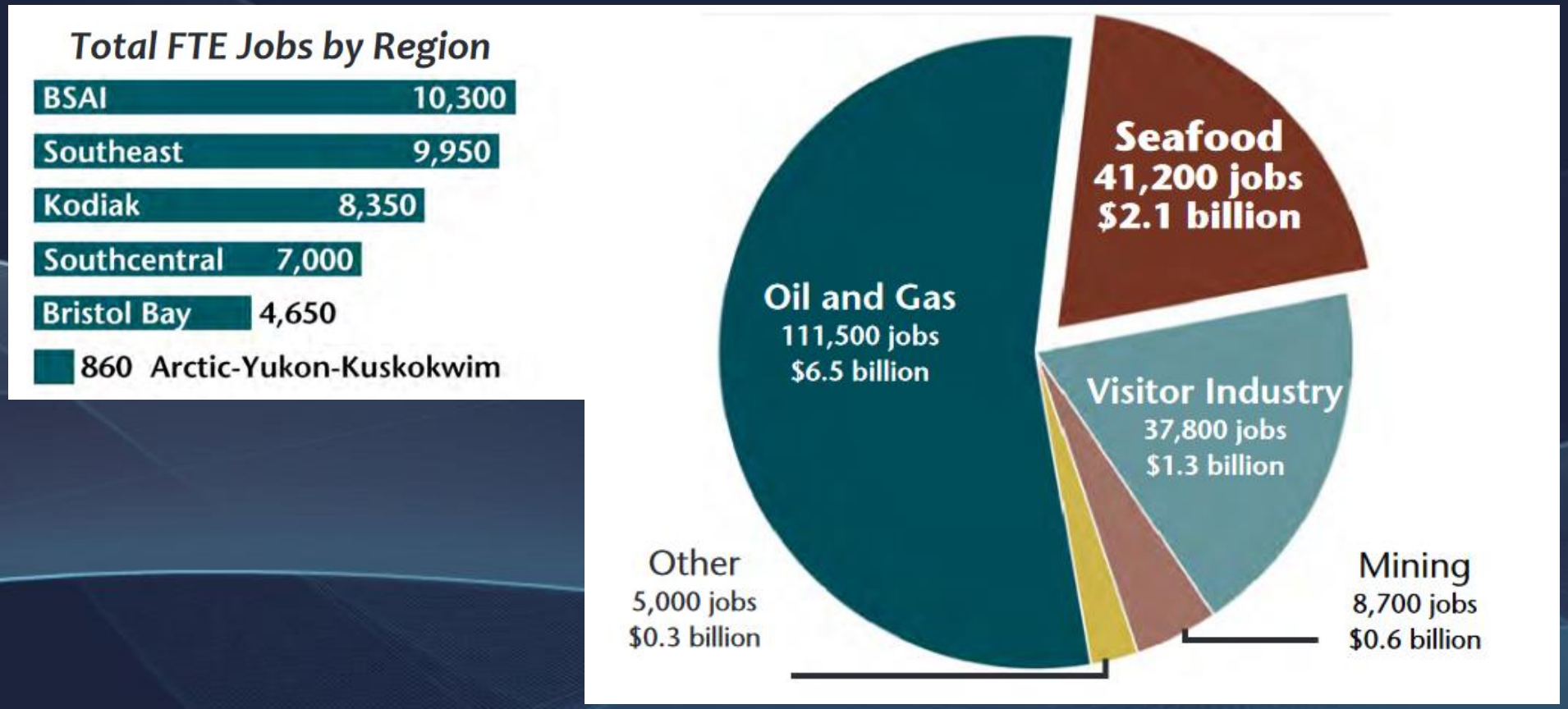
Data from 2015 study

Direct Impacts	Number of Workers	Labor Income ($Millions)
Commercial Fishing	31,580	$920
Processing	25,055	$460
Management/ Hatcheries/Other	2,904	$204
Total	**59,539**	**$1,584**

Total Impacts	
FTE (Full-Time Equivalent) Jobs	41,200
Labor Income	$2.1 Billion
Economic Output	$5.9 Billion

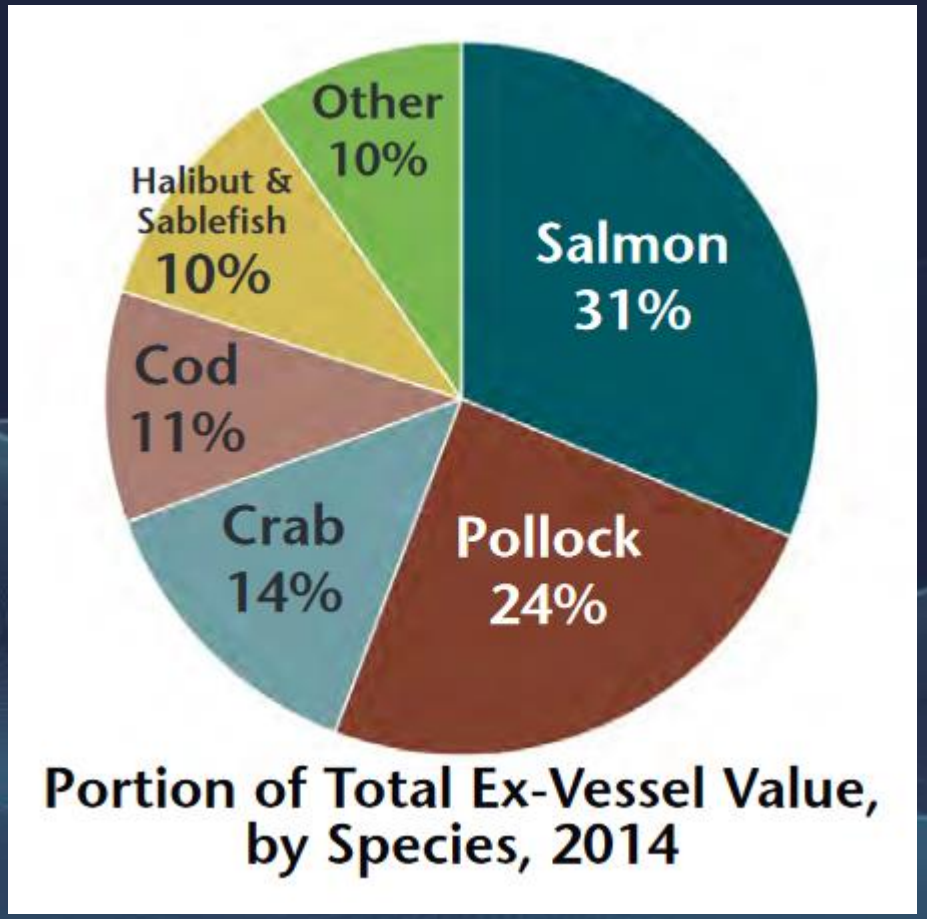
Alaska Seafood Jobs

- 20% of private sector Jobs (2013/2014)



Alaska Seafood Revenue

- **Salmon $2.1B**, Walleye Pollock $1.7B
  - Crab, Pacific Cod, Halibut



Landings (1k lbs)

- **Walleye Pollock**
  - Salmon, Pacific Cod, Flatfish

Total Landings and Landings of Key Species/Species Groups (thousands of pounds)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total Landings	5,019,820	5,276,714	5,306,169	5,610,287	5,373,085	5,253,164	4,471,034	4,005,498	4,275,477	5,272,554
Finfish & other	4,957,262	5,214,835	5,247,370	5,545,864	5,299,194	5,177,143	4,366,531	3,910,859	4,190,949	5,187,877
Shellfish	62,558	61,879	58,799	64,423	73,891	76,021	104,503	94,639	84,528	84,677
Atka mackerel	83,244	99,542	108,423	129,482	130,814	126,961	127,029	156,887	145,206	112,596
Pacific cod	509,574	568,660	583,747	547,849	520,955	488,496	494,429	490,568	538,201	662,976
Crab	57,879	56,956	52,434	57,310	69,002	70,700	99,445	89,532	79,875	80,463
Flatfish	284,767	290,926	270,675	341,699	383,194	423,338	599,882	506,393	564,170	649,689
Pacific halibut	77,939	76,616	76,558	73,922	69,154	67,242	64,639	57,749	54,857	41,291
Pacific herring	69,858	68,984	70,893	85,701	79,845	67,137	83,787	86,951	108,116	98,600
Rockfish	22,907	26,465	23,197	22,694	23,308	24,424	25,725	24,974	28,626	25,441
Sablefish	32,057	35,794	39,946	37,554	33,124	32,254	30,336	27,004	25,263	27,139
Salmon	523,057	630,527	697,897	872,318	634,227	861,254	640,070	671,181	756,826	738,122
Walleye pollock	3,333,647	3,361,261	3,353,236	3,410,065	3,400,810	3,066,600	2,276,144	1,866,171	1,947,578	2,810,787

Price / lb

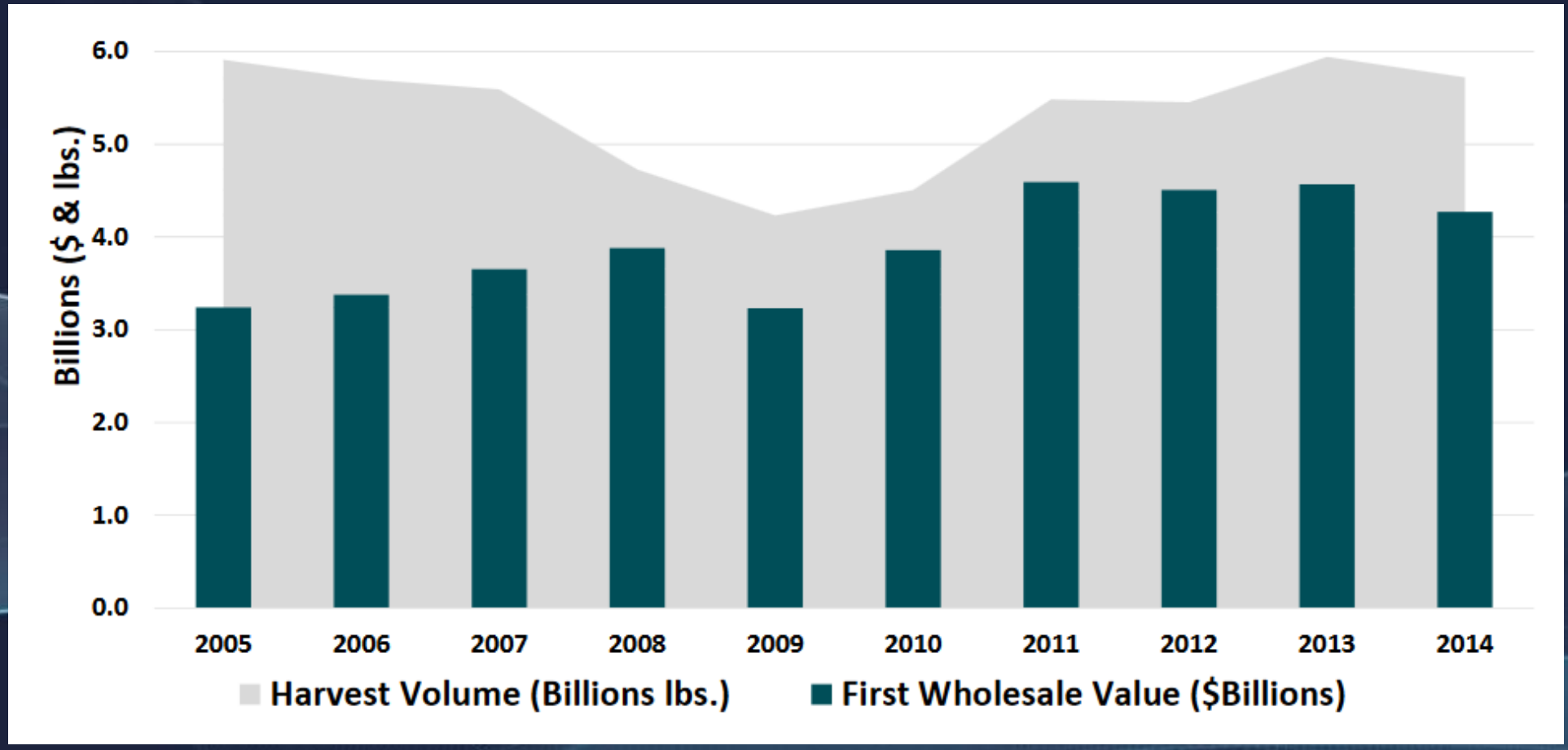
- Sablefish, Halibut, Crab

Average Annual Price of Key Species/Species Groups (dollars per pound)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Atka mackerel	0.03	0.03	0.10	0.12	0.12	0.11	0.15	0.17	0.19	0.21
Pacific cod	0.21	0.29	0.24	0.27	0.40	0.46	0.55	0.27	0.27	0.32
Crab	2.42	2.91	2.93	2.55	1.60	2.38	2.42	2.01	2.37	3.09
Flatfish	0.14	0.14	0.15	0.18	0.19	0.18	0.16	0.14	0.14	0.17
Pacific halibut	1.65	2.17	2.20	2.30	2.79	3.23	3.23	2.33	3.65	4.97
Pacific herring	0.13	0.13	0.20	0.16	0.09	0.22	0.27	0.34	0.21	0.12
Rockfish	0.28	0.30	0.28	0.25	0.31	0.29	0.31	0.30	0.32	0.27
Sablefish	2.04	2.35	2.05	2.17	2.60	2.65	3.12	3.29	4.02	5.28
Salmon	0.25	0.27	0.37	0.34	0.44	0.40	0.58	0.51	0.67	0.77
Walleye pollock	0.06	0.06	0.08	0.09	0.10	0.10	0.14	0.15	0.15	0.13

Alaska Harvest & Value

- 4.2 Billion in 2014



Self Check

- Seafood jobs are the largest private sector employer in the state
  - True
  - **False**
- Which represents the most valuable species landed in Alaska
  - Walleye Pollock
  - **Salmon**
  - Halibut
  - Crab

Rationalization

- One aspect of Fisheries Economics is Rationalization
- Who benefits, how, and what impact does this have on coastal communities

King Crab

Crab Rationalization Program

Share-based management program

- Implemented in 2005
- Allocates harvest among users (harvesters, processors, communities)

- Quota shares (QS): captains + vessel owners
- Processor shares (PS): processors
- Community development quotas (CDQ): rural Alaska communities

  Minimize negative social and economic impacts by promoting fishery involvement and economic development

Crab Rationalization Program

Individual allocation quota (Quota Share):

- Percentage of the total catch *based on historic landings from specific periods* (depending on the fishery)

Fisherman get IFQ (individual fishing quota)

- Based on quota share and total harvest:

QS x TAC = IFQ

Effects of Crab Rationalization

- Reduction in fishing effort
  - Fewer vessels in fleet, fewer people with quota shares
  - Increased profits for remaining vessels
- Extended season: greater flexibility in selecting fishing time + location
  - Safer: reduced Coast Guard search and rescue cases
  - Less bycatch: longer soak times allow escapement of small crabs
- Less gear, decreased pot lifts, less ghost fishing
  - Better crab conservation

Effects of Crab Rationalization

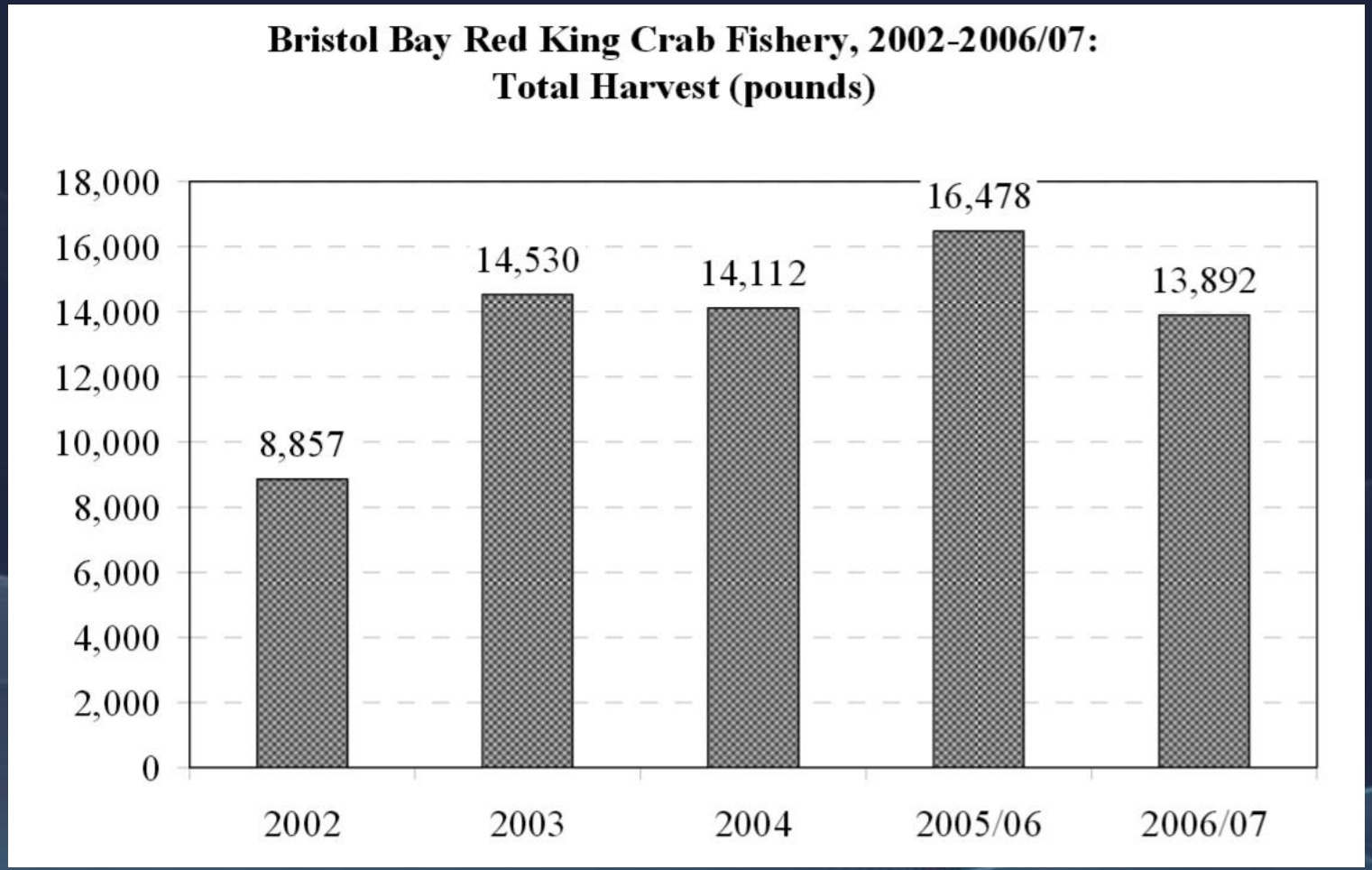
Fishermen form cooperatives: improves efficiency

- At end of season fisherman to consolidate remaining shares to single vessel
- Little un-harvested crab: maximizes TAC
- Efficient coordination with processors causes less down time between deliveries for processing crews
- A decision based on Economics

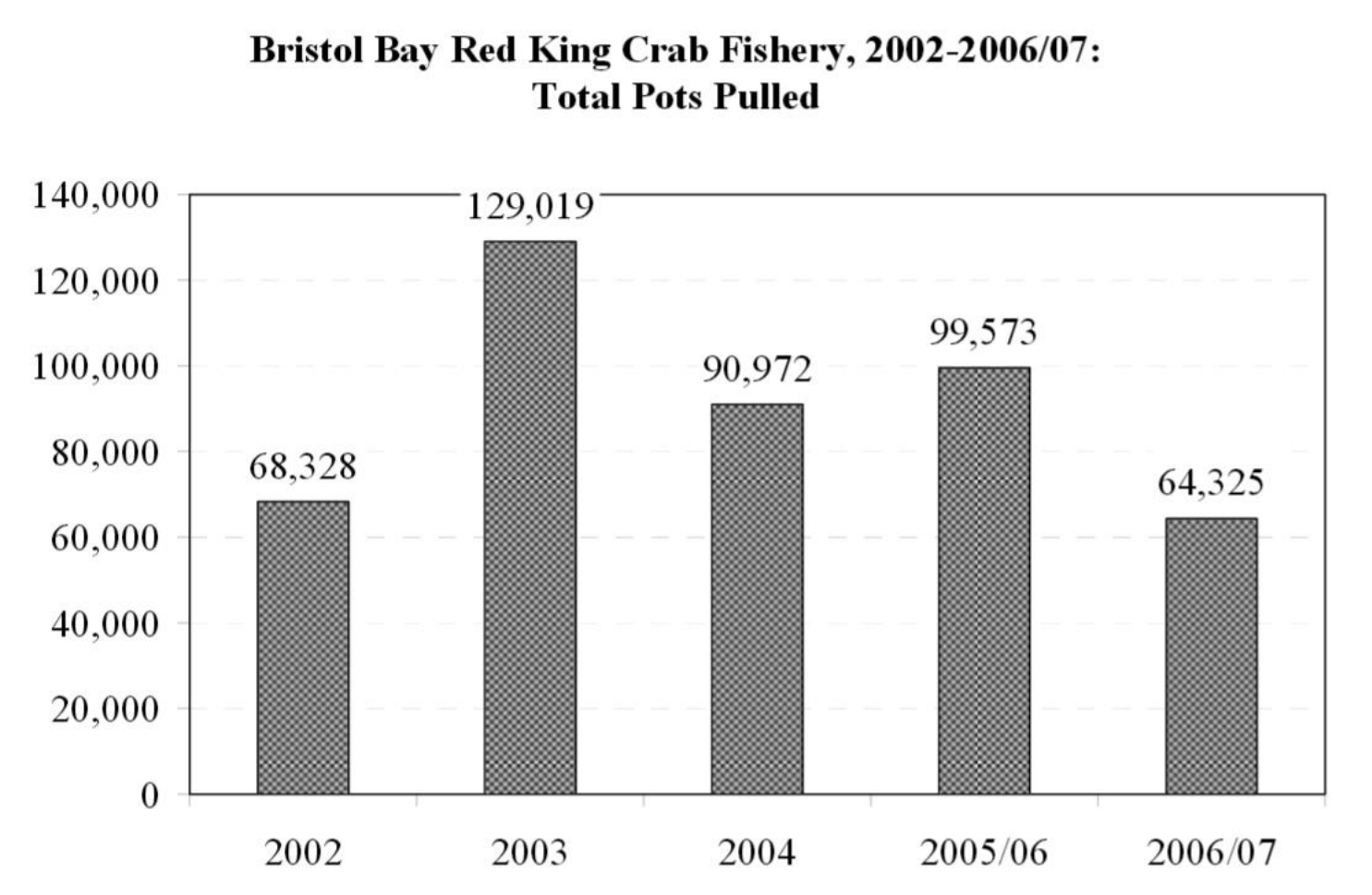
Socioeconomic Impacts

- Reduction in fleet decreases available jobs in coastal communities
- Restricts ability for young people to enter fishery
- Questions about “fairness”
  - Does limited access privatize a public resource?
  - Monopoly on crab
- Long-term social impacts
  - Loss of: identity, meaningful lifestyle, connection to the surrounding environment for some individuals

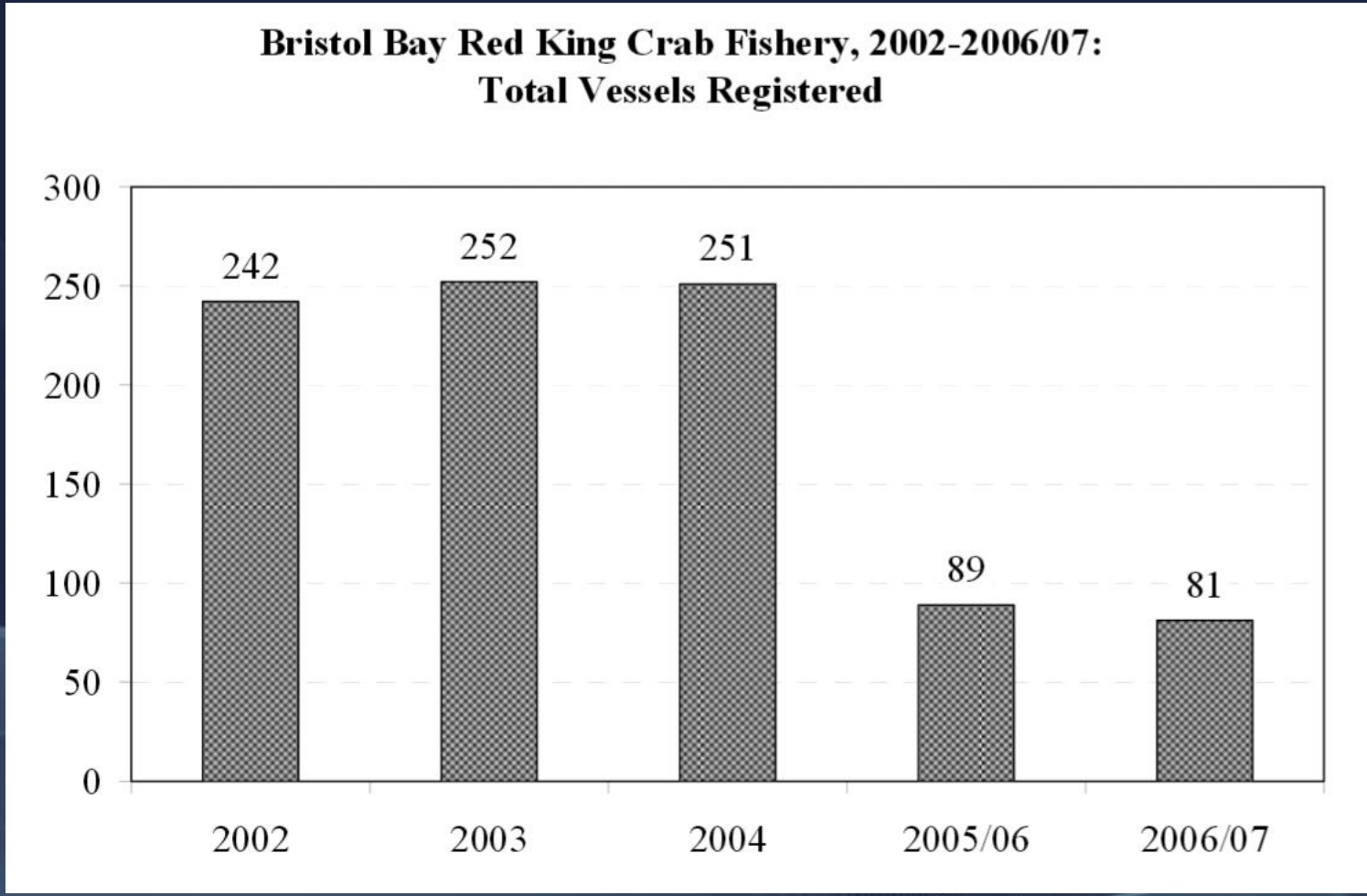
Crab Rationalization



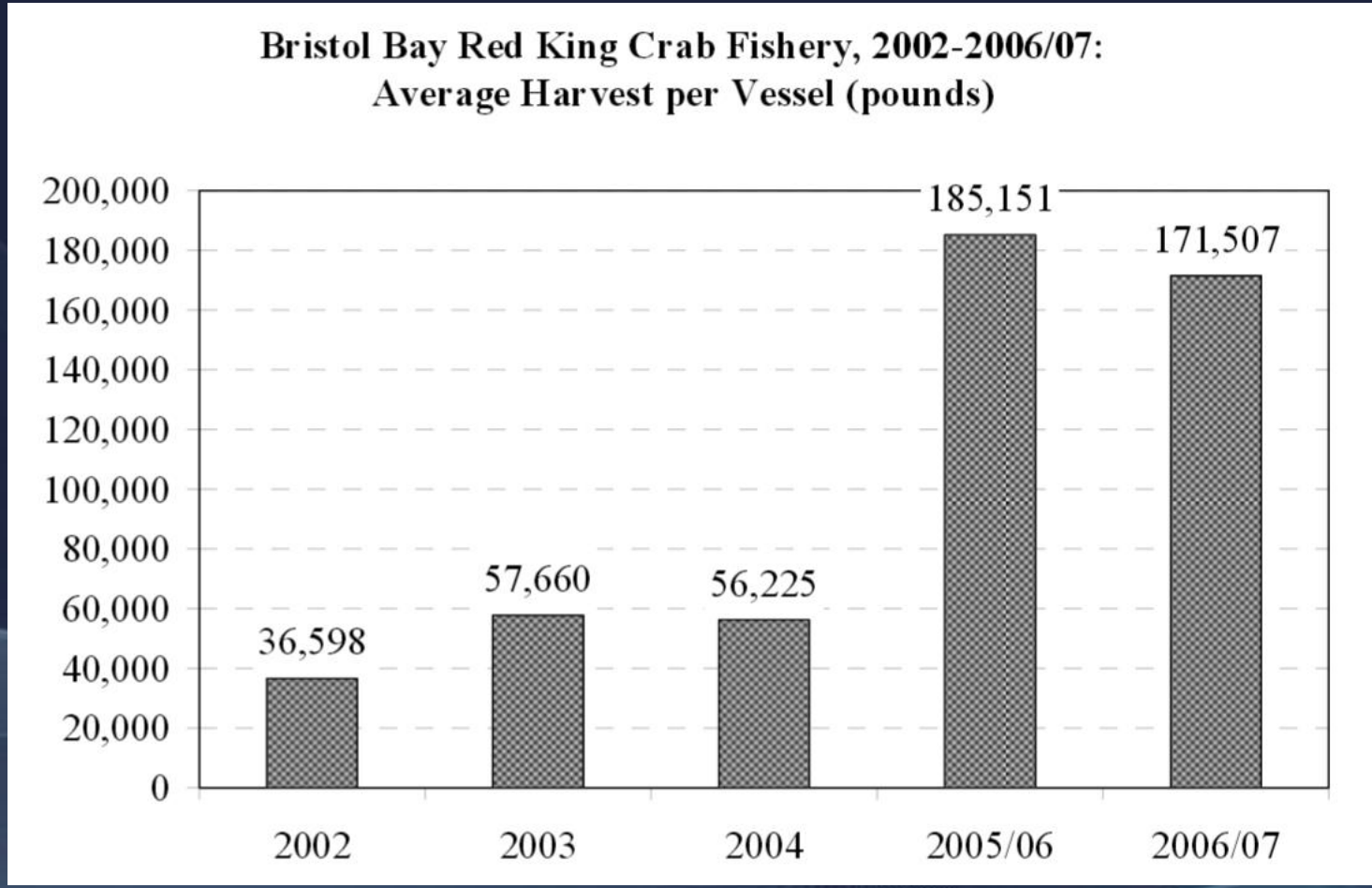
Effort


Bristol Bay Red King Crab Fishery, 2002-2006/07:
Total Pots Pulled
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
68,328
129,019
90,972
99,573
64,325
2002
2003
2004
2005/06
2006/07

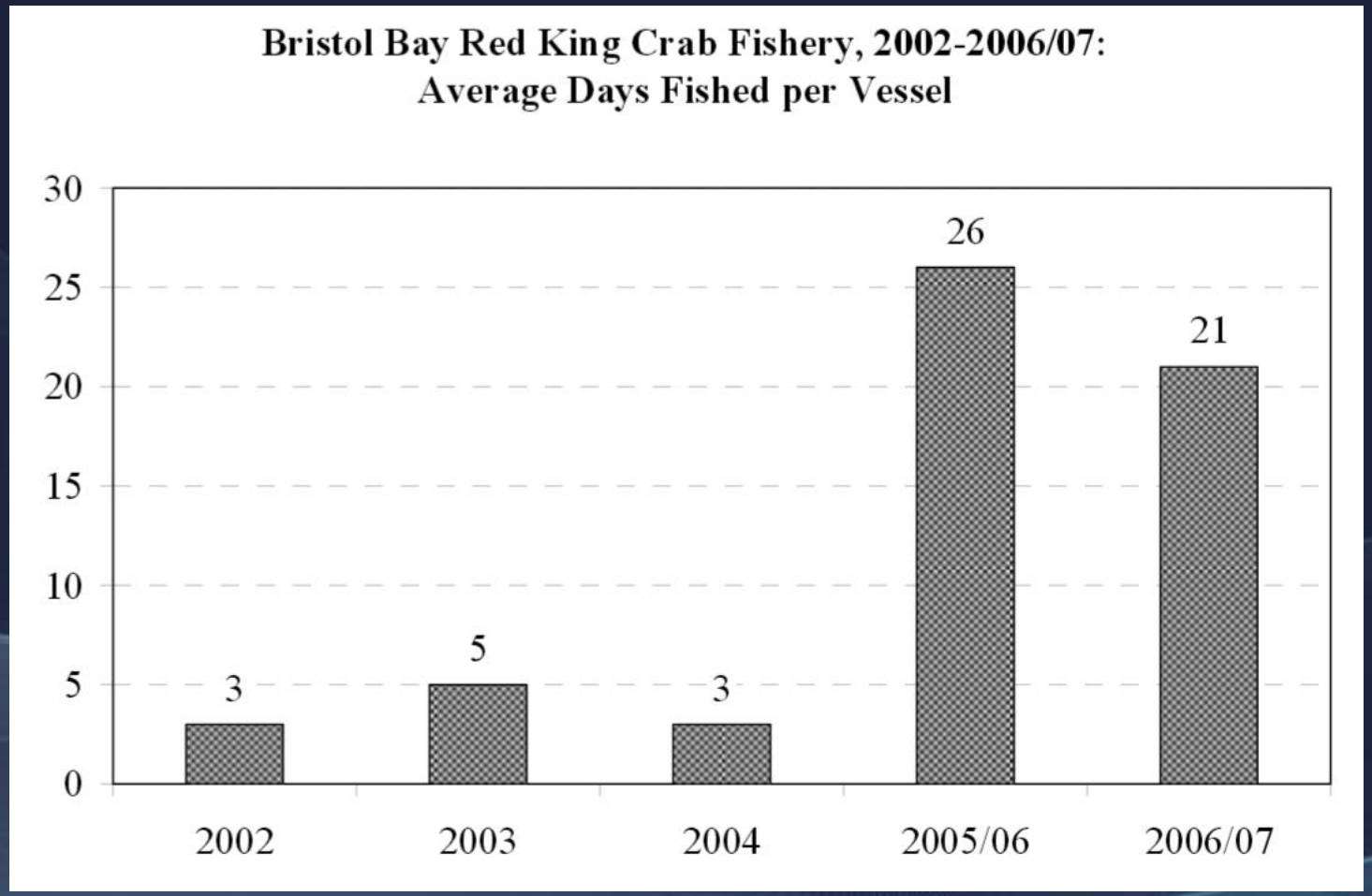
Boats Registered



Harvest / Boat



Days Fished


Bristol Bay Red King Crab Fishery, 2002-2006/07:
Average Days Fished per Vessel
30
25
20
15
10
5
0
3
5
3
26
21
2002
2003
2004
2005/06
2006/07

Job Losses

Estimated Job Losses in Major BSAI Crab Fisheries Between 2004/05 and 2005/06

		Bristol Bay Red King Crab Fishery	Bering Sea Snow Crab Fishery
Number of vessels	2004/05	251	164
	2005/06	89	80
	Change	-162	-84
Estimated fishing jobs	2004/05	1381	902
	2005/06	490	440
	Change	-891	-462
% of job losses attributable to rationalization*		85%	99%
Estimated job losses due to rationalization		**757**	**457**

- Based on this reasoning, crab rationalization accounted for about 85% of the decline in the number of vessels registering for the Bristol Bay Red King Crab season, and 99% of the decline in the number of vessels registering for the Bering Sea Snow Crab season. Similarly, crab rationalization accounted for about 94% of the decline in the number of “Kodiak Boats” registering for the Bristol Bay Red King Crab season, and 95% of the decline in the number of “Kodiak Boats” registering for the Bering Sea Snow Crab season.

Self Check

- One of the major benefits to the crab rationalization program were the economic benefits that most communities received
  - True
  - False

Herring

Herring Processing in Sitka

7 processors registered for the fishery in 2014
3 process in Sitka
Sitka Sound Seafoods
Silver Bay Seafoods
Alaska General Seafoods – Lease SPC Facility

In 2014 – Approximately 60% of sac roe harvest processed in Sitka

People employed to process herring in Sitka ~ 200 people

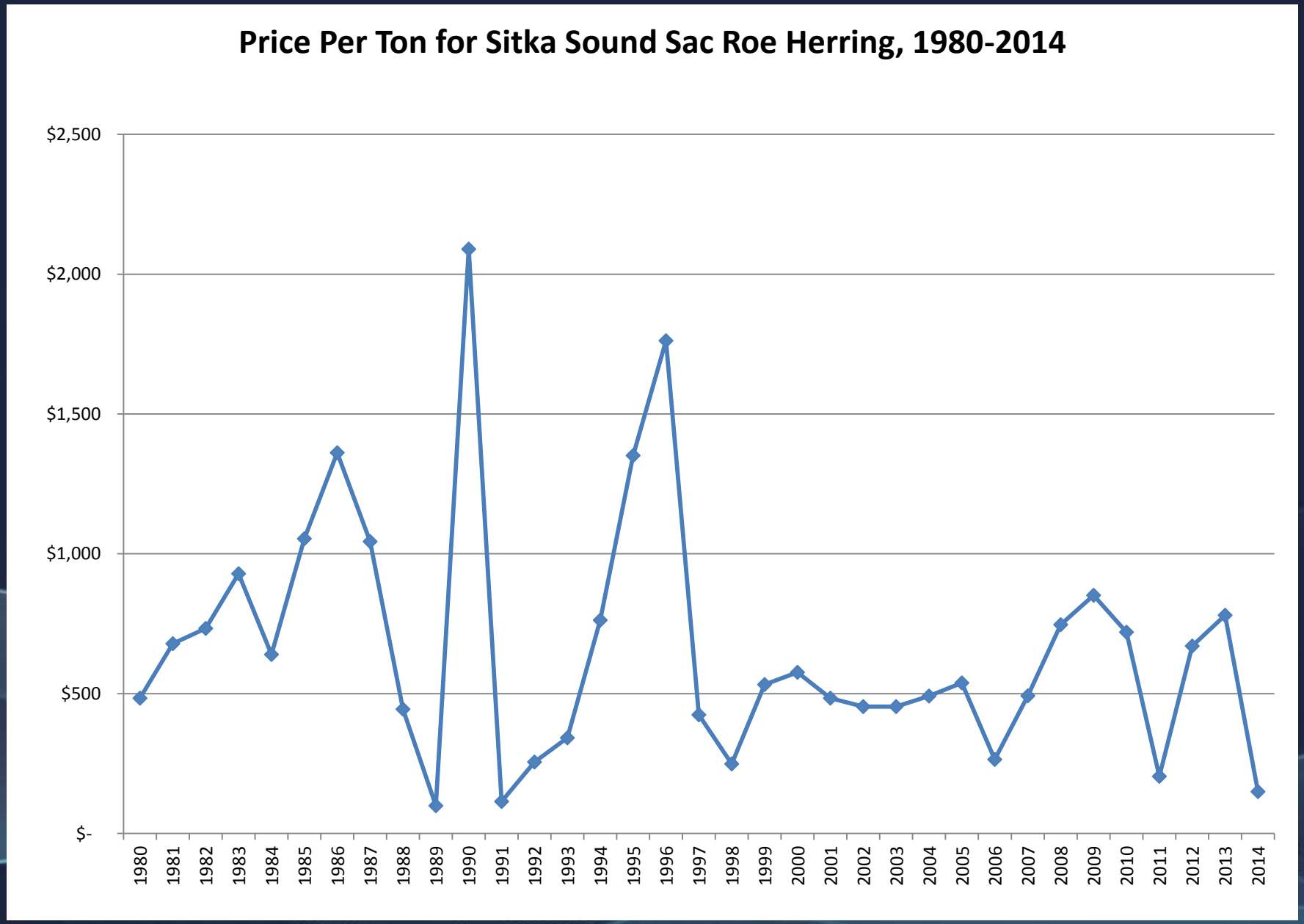
Estimate of influx of people to Sitka during fishery

Permit holders and crew –	180 people
Tenders and crew -	300 people
Spotter pilots -	20 people
Out of town processor mgt staff -	30 people
Kestrel/out of town ADF&G staff -	8 people
Japanese Technicians -	20 people
Total people from out of town -	558 people

Sitka Sound Herring Sac Roe Fishery

2005-2014 Average	
Harvest	13,600 tons
Price/Ton	$542/ton
Total Exvessel	$7.4 Million

2014 Estimated Total Value – VALUE PRELIMINARY!	
Harvest (tons)	16,957
Base Price	$150/ton
Roe %	12.4
Exvessel price/ton	$150/ton
Exvessel total	$ 2.5 M
Ex-Tender	$2.3 M
Wholesale	Preliminary ~ $8.5 M


Price Per Ton for Sitka Sound Sac Roe Herring, 1980-2014
$2,500
$2,000
$1,500
$1,000
$500
$-
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

2015 Herring Season

The fishery was Co-op’ed!

- 48 Permits to catch 8,712 tons
- 8,700 x $150/ton = 1.3 million
- 1.3 mil / 48 = $27K

2016 Season

- 15,674 tons based on a 20% harvest rate of a forecast mature biomass of 78,372 tons
- Almost 2X that of last year
- Co-op or not?
  - Question of Economics

Talk of Rationalizing of Herring

- Easier to manage
- Reduction in fleet decreases available jobs in coastal communities
- Restricts ability for young people to enter fishery
- Questions about “fairness”
  - Does limited access privatize a public resource?
- Long-term social impacts
  - Loss of: identity, meaningful lifestyle, connection to the surrounding environment for some individuals

Self Check

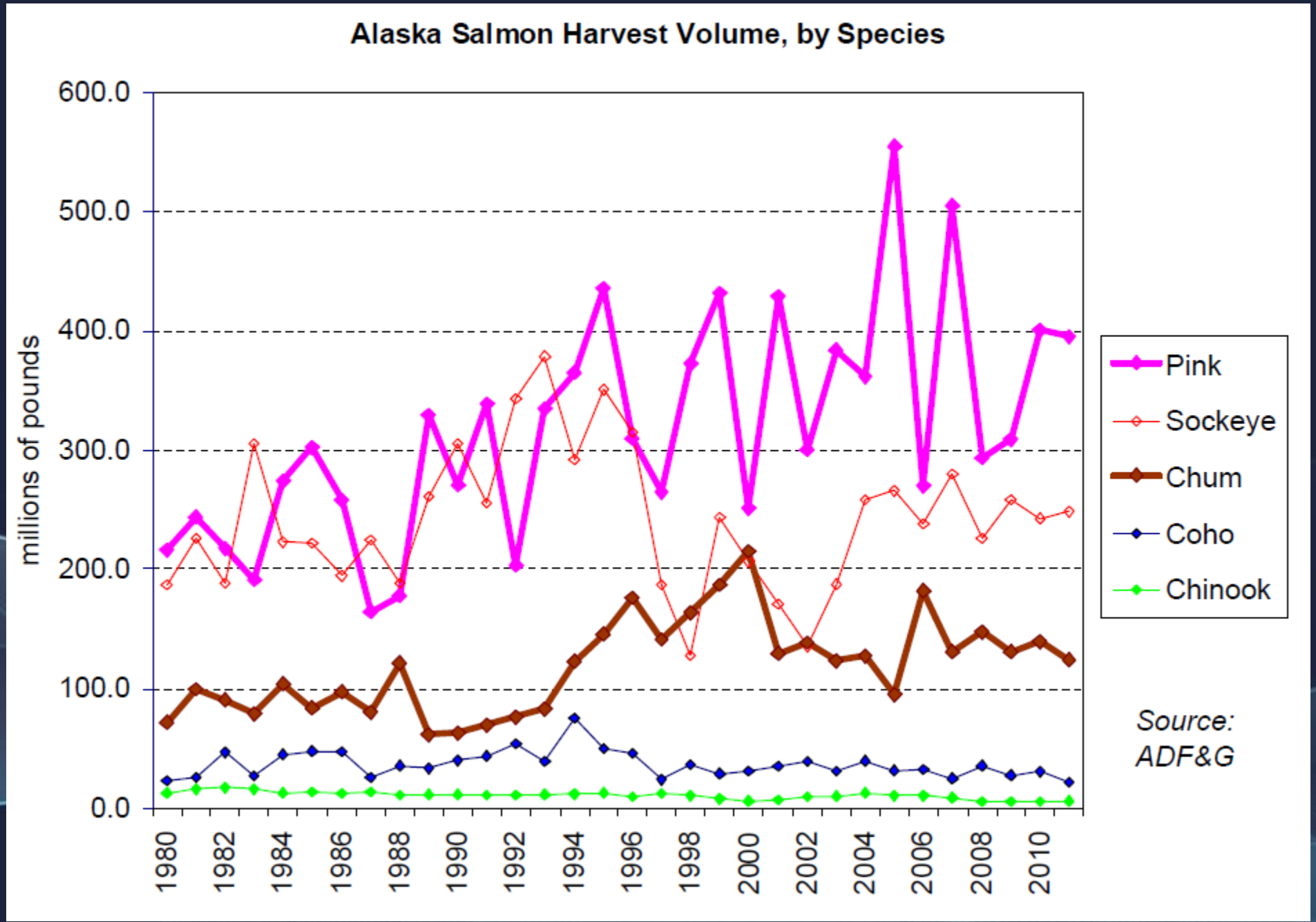
- The Herring Sac Roe fishery was co-oped in the 2015 season
  - True
  - **False**
- Rationalizing the Herring fishery easier on managers and it would allow for a more constant product flow to processors
  - **True**
  - False

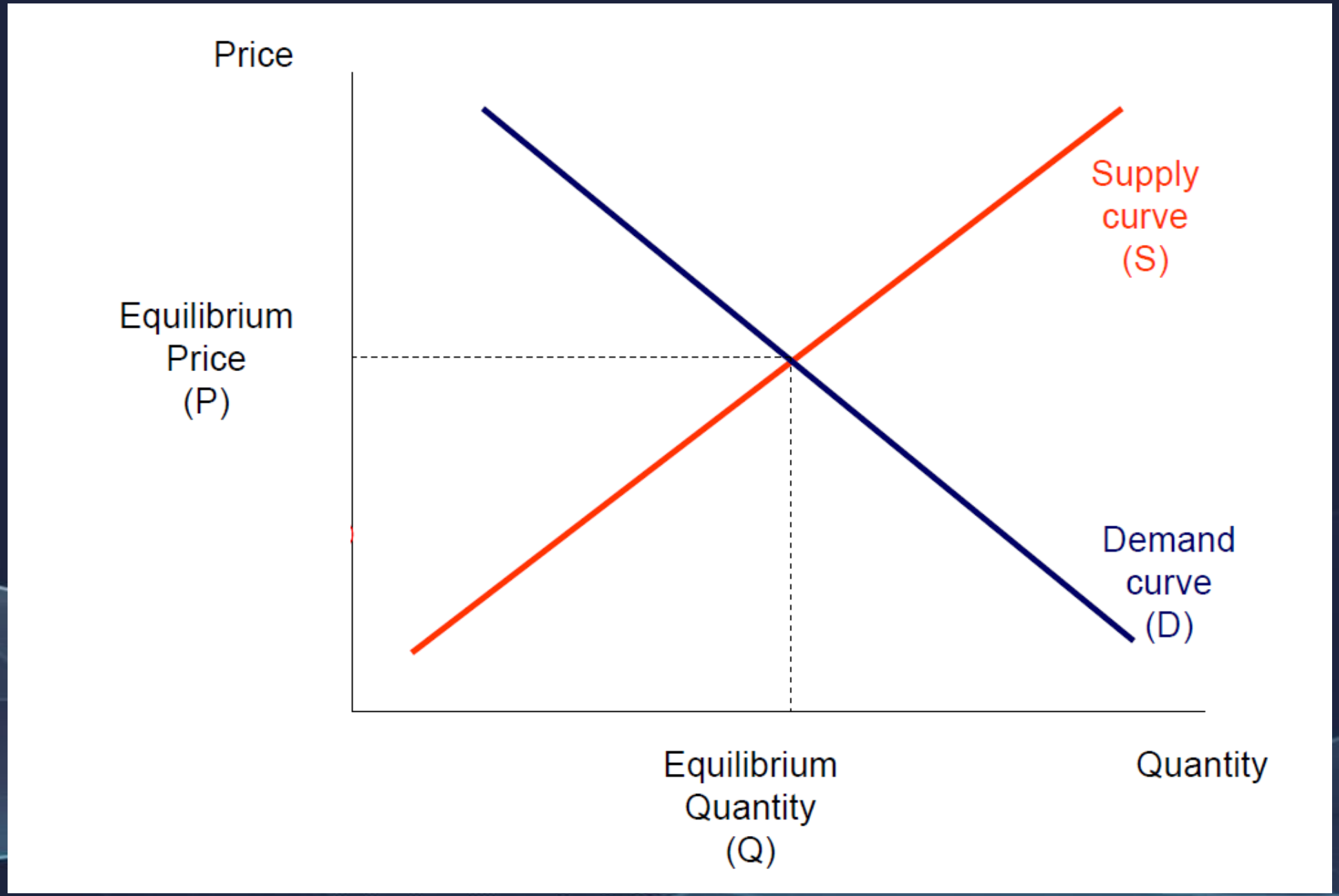
Salmon in Alaska

2015 Alaska Commercial Salmon Harvests and Exvessel Values					
Species	**Avg. Wt. (pounds)**	**Avg. Price per Pound**	**Number of Fish (thousands)**	**Lbs. of Fish (thousands)**	**Est. Value US$ (thousands)**
Alaska Totals					
Chinook	10.65	$3.01	474	5,050	$15,186
Sockeye	5.22	$0.71	53,748	280,385	$197,783
Coho	6.26	$0.65	3,574	22,389	$14,631
Pink	3.42	$0.20	190,492	651,280	$131,999
Chum	7.46	$0.48	15,177	113,232	$54,621
Totals			263,463	1,072,334	$414,219

Salmon in PWS

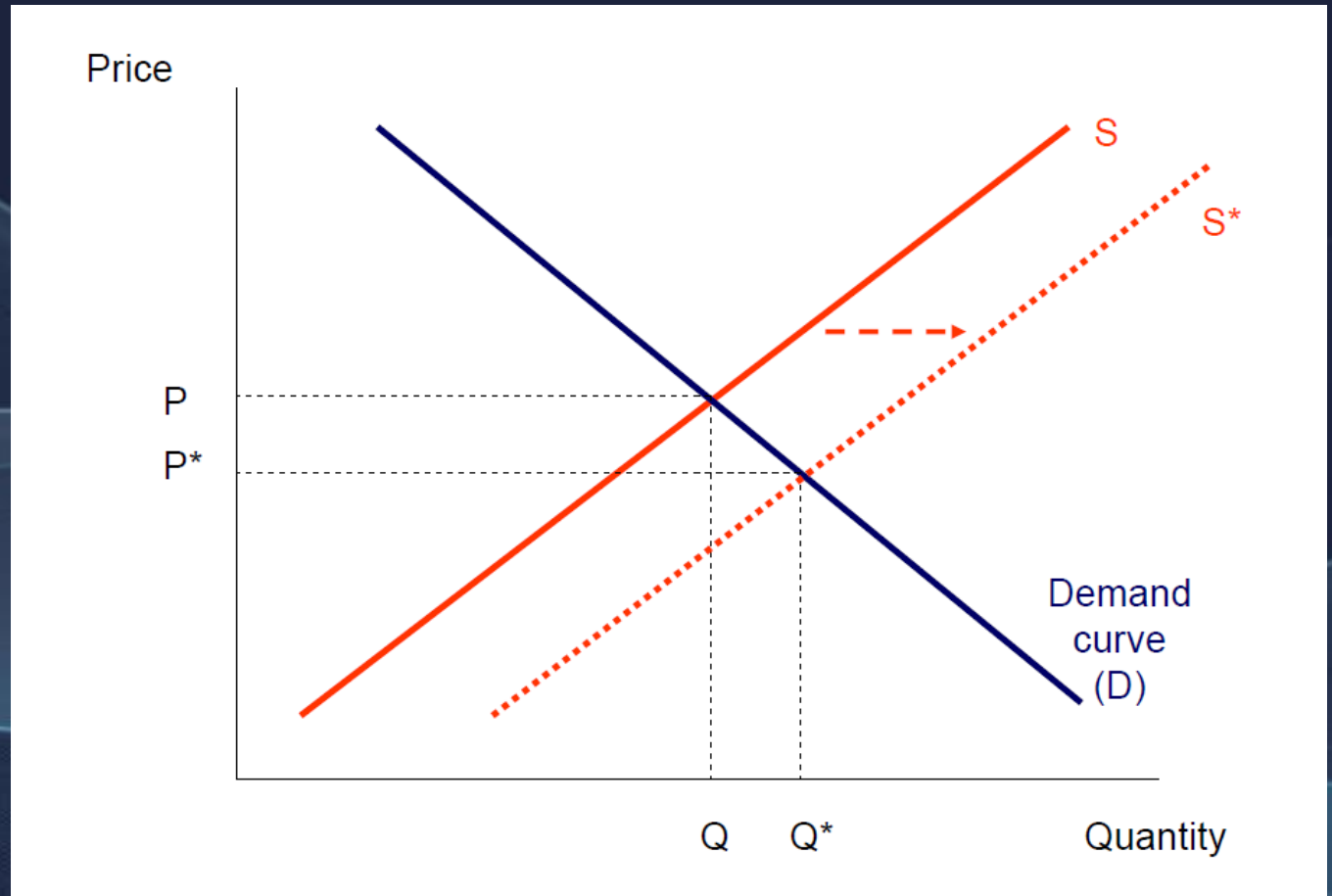
2015 Alaska Commercial Salmon Harvests and Exvessel Values					
Species	**Avg. Wt. (pounds)**	**Avg. Price per Pound**	**Number of Fish (thousands)**	**Lbs. of Fish (thousands)**	**Est. Value US$ (thousands)**
Prince William Sound					
Chinook	16.42	$5.65	24	388	$2,189
Sockeye	5.35	$2.01	3,210	17,183	$34,593
Coho	7.43	$0.66	198	1,469	$966
Pink	3.38	$0.22	98,254	332,085	$71,913
Chum	5.38	$0.61	2,544	13,679	$8,331
Totals			104,229	364,802	$117,990


Alaska Salmon Harvest Volume, by Species
millions of pounds
600.0
500.0
400.0
300.0
200.0
100.0
0.0
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
Pink
Sockeye
Chum
Coho
Chinook
Source:
ADF&G


Price
Supply curve (S)
Equilibrium Price (P)
Demand curve (D)
Equilibrium Quantity (Q)
Quantity

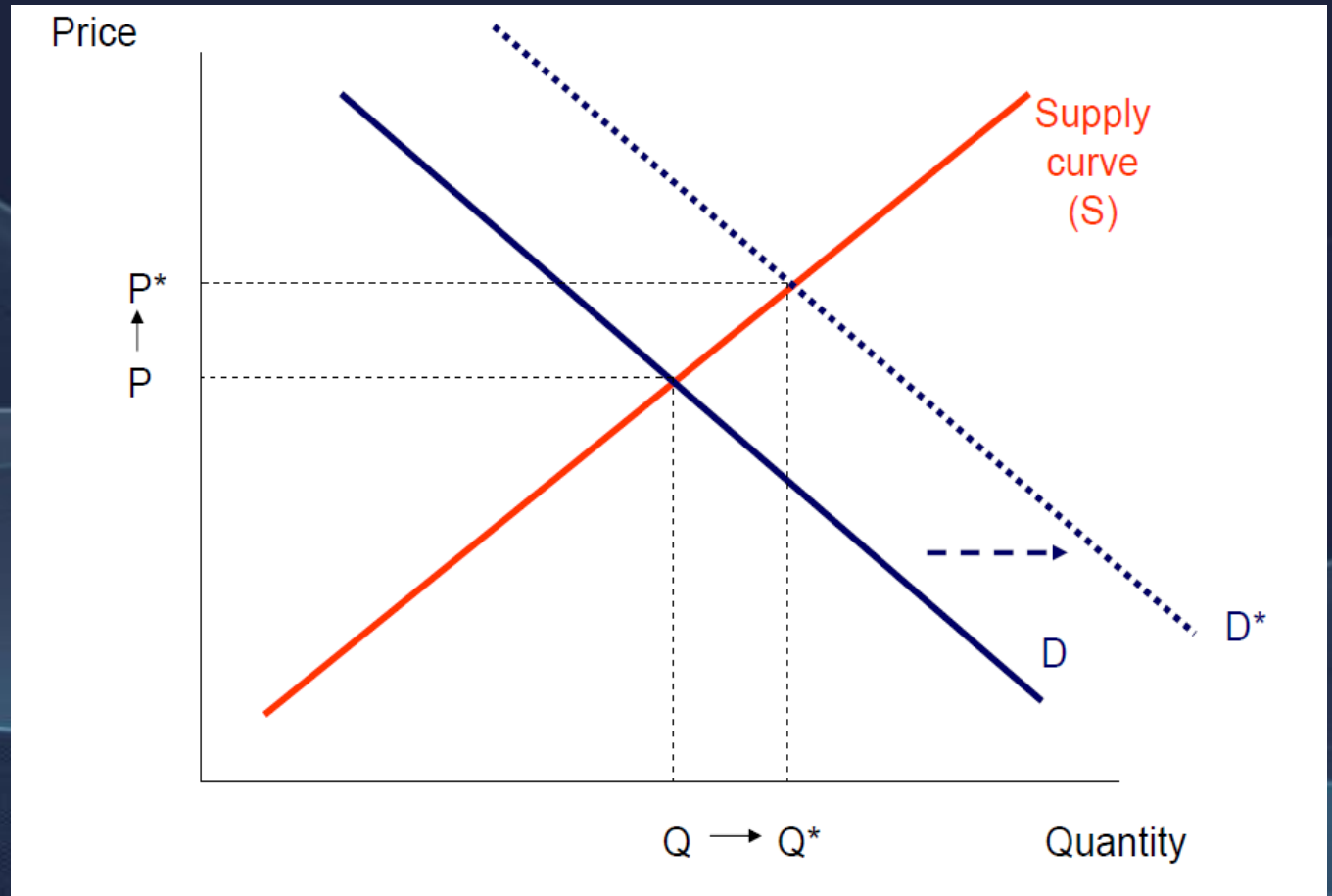
Supply & Demand

- Increase supply – Price Drops



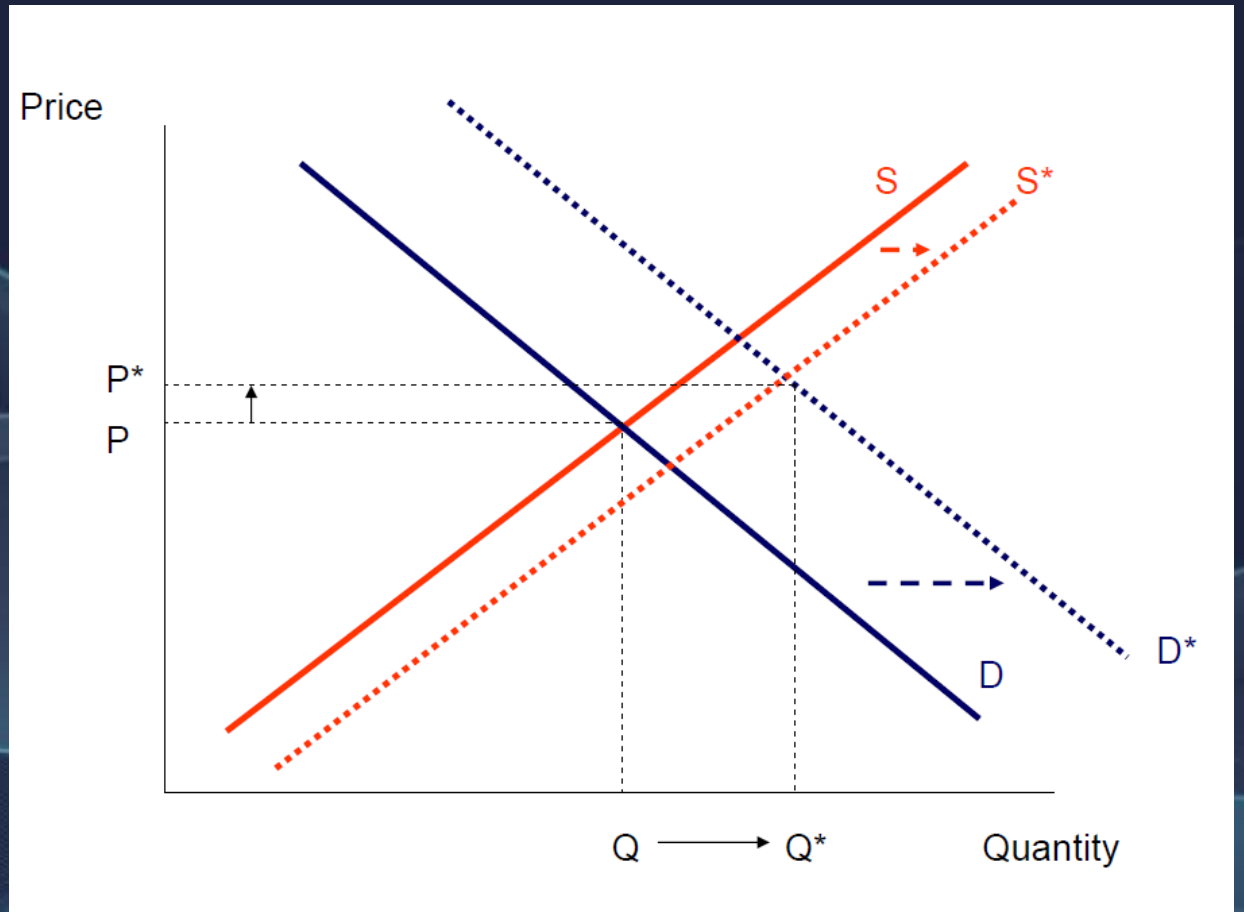
Supply & Demand

- Increase Demand– Price Increases



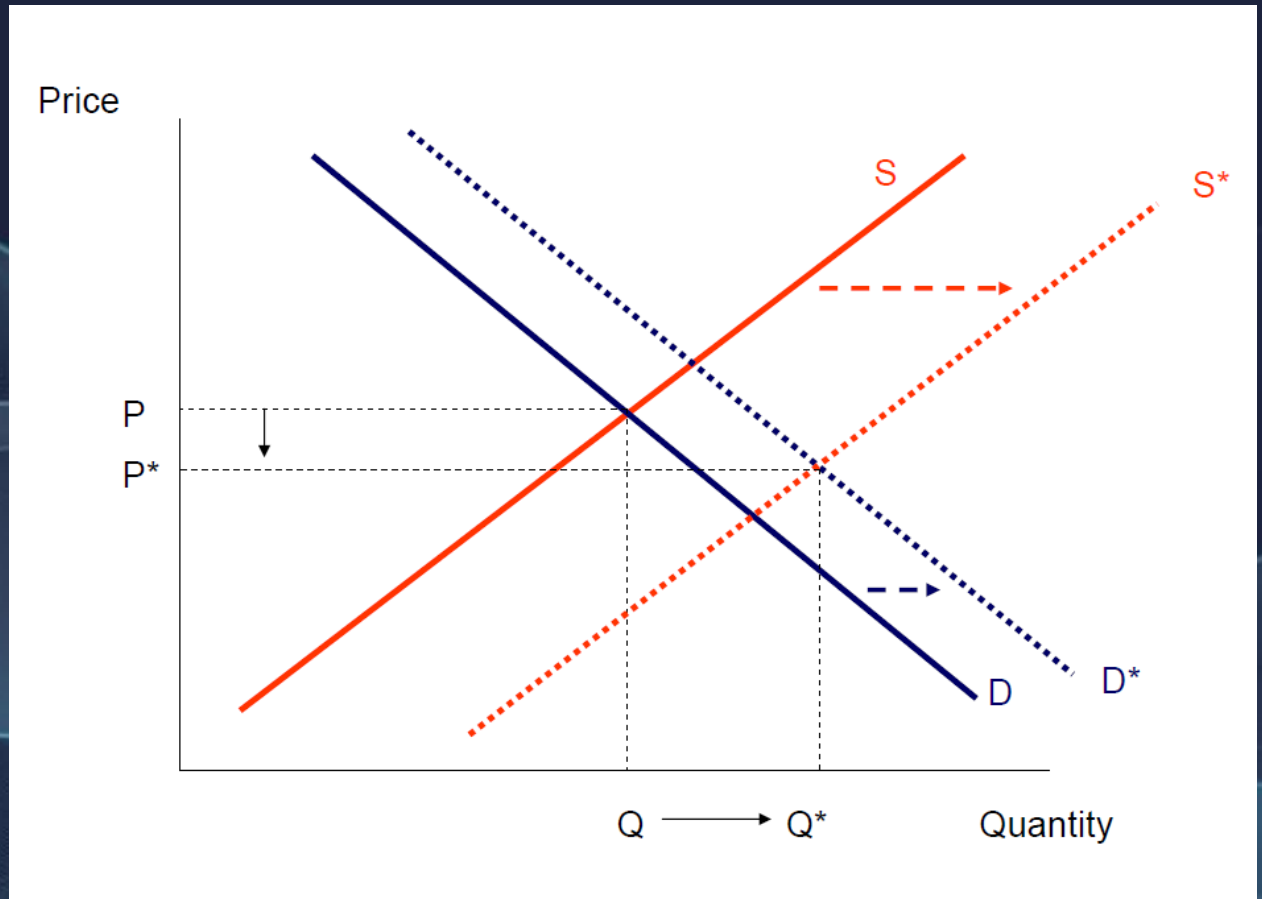
Supply & Demand

- Increase Demand more than Supply
- Price Increases



Supply & Demand

- Increase Supply more than Demand
- Price Drops



Future of Alaska's fisheries

Benefits

- Global demand likely to grow
  - Population Growth
  - Growing Incomes
  - Health Benefits of fish
- Wild salmon are limited in supply
- Limits to farmed salmon growth
  - Disease problems
  - Limits to fish meal food sources

Challenges

- Resource uncertainty
- Farmed salmon flood markets
- Other species compete with Alaskan (wild and farmed)
- Economic uncertainty

Other questions related to fishery economics

- Marketing – what will this do to supply / Demand?
- What role does economics play in Management
  - More and more management is moving toward market based approaches
    - Harvest less get more value
    - Same is true for processing
- How do hatcheries alter the economics of fisheries

Fishery Management

Fisheries management is a complex process that is ever-changing

- Laws
- Management Strategies
- Economics
  - Politics

Self Check