Economic Performance Metrics for the West Coast Groundfish Catch Share Program (Draft)

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June 2016 Pacific Fishery Management Council

West Coast Groundfish Trawl Catch Share Program

- West Coast Groundfish Trawl Catch Share Program was instituted in 2011 with a variety of goals, including economic goals:
  - provide for a viable, profitable, and efficient groundfish fishery
  - increase operational flexibility
  - minimize adverse effects on fishing communities and other fisheries to the extent practical
  - promote measurable economic and employment benefits through the seafood catching, processing, distribution, and support sectors of the industry

Economic Data Collection Program

- Mandatory Economic Data Collection (EDC) program was established at the Northwest Fisheries Science Center (NWFSC) to provide information to evaluate progress toward these goals
  - Vessel activities
  - Variable costs
  - Fixed costs
- EDC and supplementary data are used to develop a set of economic metrics to measure changes in the economic performance of the fishery

Choice of Metrics

NOAA NMFS Headquarter's Performance Indicators of U.S. Catch Share Programs (Brinson and Thunberg, 2013):

- Developed by a national working group of experts
- We started with this set of metrics, and expanded:
  - Additional data available for this fishery
  - Additional metrics particular to this fishery
  - Dissagregation along characteristics important to stakeholders
- Intended to provide accurate, understandable, and theoretically sound information

Choice of Metrics

A set of parallel indicators for each sector in the West Coast Groundfish Catch Share Program were developed:

1. Catcher vessels
2. Catcher processors
3. Motherships
4. Shore-based processors

Demographic indicators

- Number of active vessels/processors
- Length of active vessels
- Number of fisheries
- Proportion of revenue from catch share fishery
- Days at sea in the catch share fishery
- Total days at sea
- Exponential Shannon Index of revenue diversity
- Gini coefficient of catch share revenue
- Herfindahl-Hirschman Index of market concentration

Average economic indicators

- Revenue (or production value)
- Variable cost net revenue
- Total cost net revenue
- Revenue per crew day
- Revenue per day
- Variable cost net revenue per day
- Revenue per ton of catch
- Variable cost net revenue per ton of catch

Fleet-wide and Industry-wide economic indicators

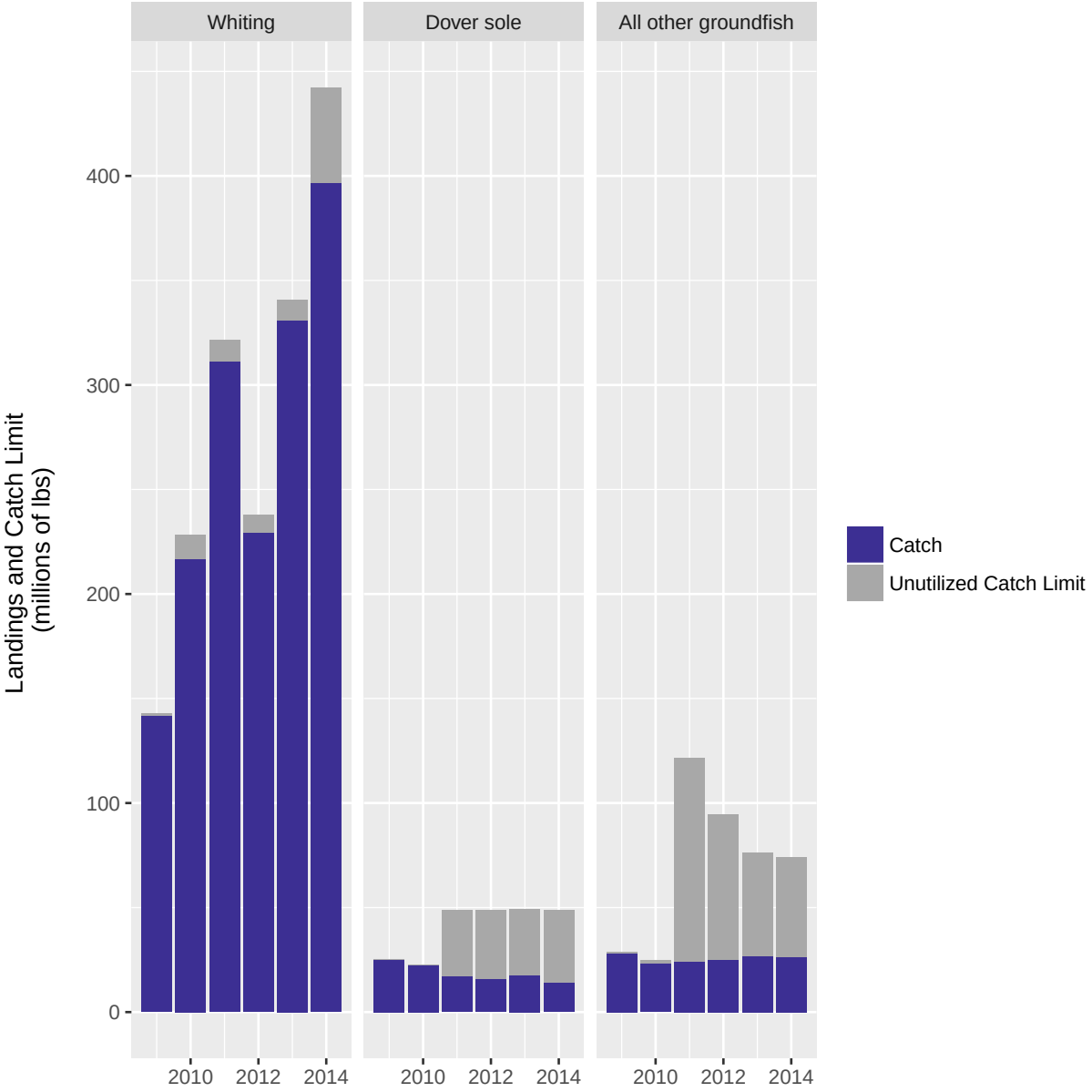
- Revenue (or production value)
- Variable cost net revenue
- Total cost net revenue
- Seasonality

Social and regional metrics

- Share of landings or production by state
- Number of positions
- Crew wages
- Income Input/Output Model impacts
- Employment Input/Output Model impacts

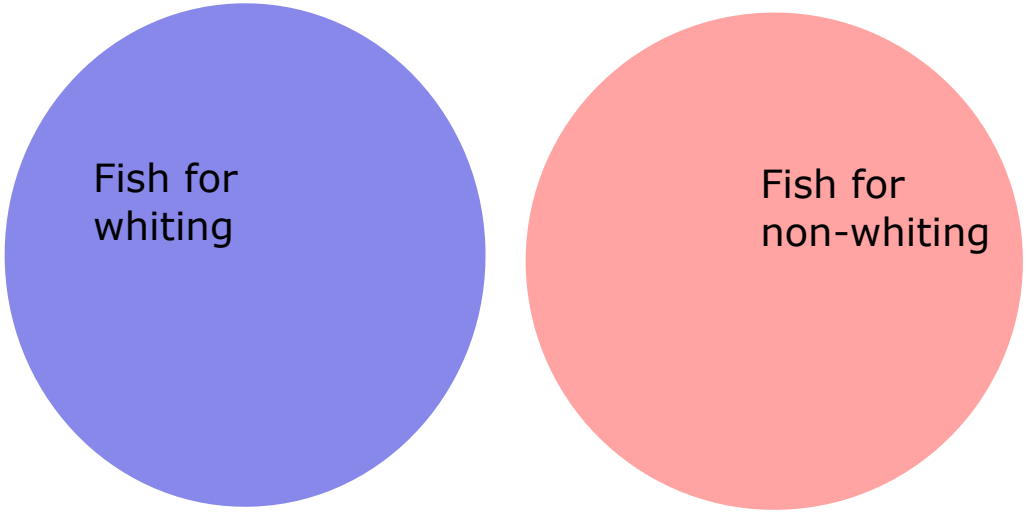
Whiting and non-whiting decomposition

- The participants in the West Coast groundfish catch share program are very diverse
- Whiting and non-whiting sectors are characteristically different
  - Whiting vessels tend to be larger, more likely to also fish in Alaska, and land a much higher volume of fish
  - Whiting TAC can vary considerably from year to year
  - Whiting processors were allocated a portion of the whiting quota (20%); no non-whiting quota was allocated to processors


Whiting
Dover sole
All other groundfish
Landings and Catch Limit
(millions of lbs)
0
100
200
300
400
2010
2012
2014
Catch
Unutilized Catch Limit

Whiting and non-whiting decomposition

- We separate catcher vessels into 2 categories:
  - Vessels that fish for Pacific whiting (*whiting vessels*)
  - Vessels that DO NOT fish for Pacific whiting (*non-whiting vessels*)



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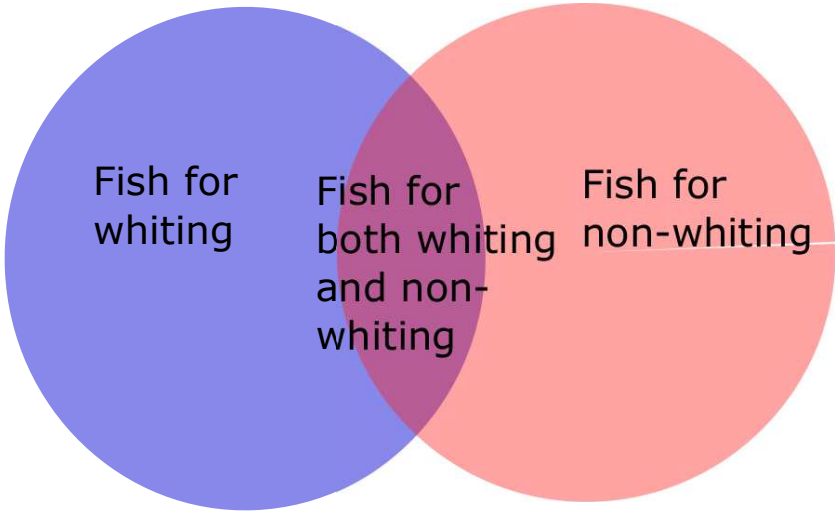

- Note that in some cases, vessels do both activities

Whiting and non-whiting decomposition

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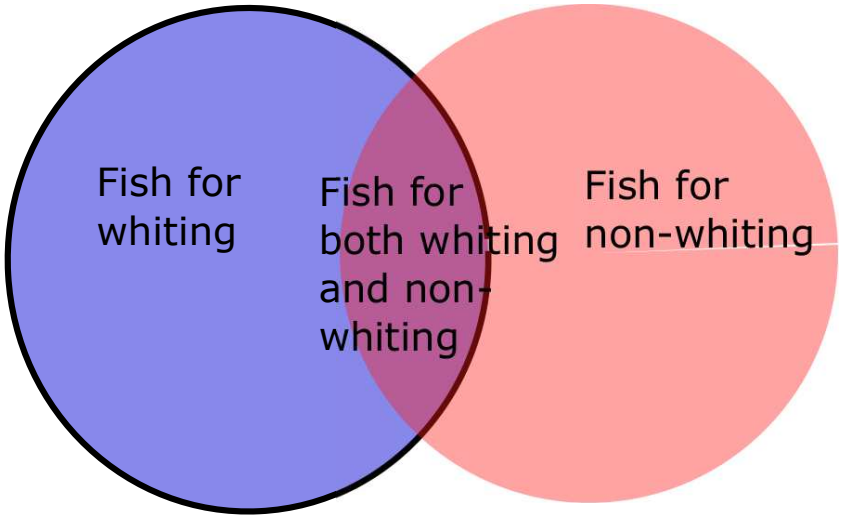
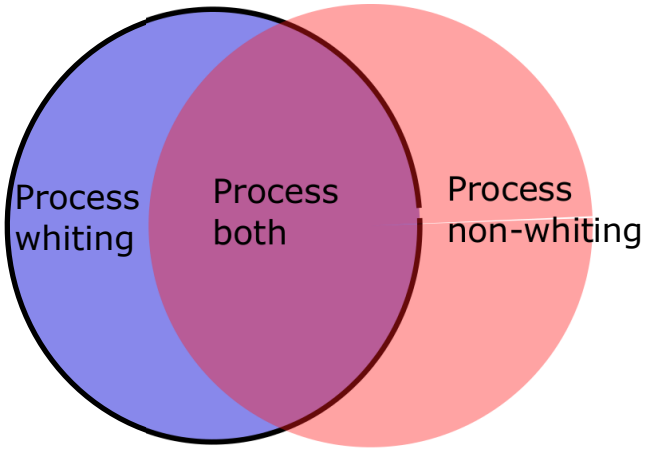
  - Vessels that DO NOT fish for Pacific whiting (*non-whiting vessels*)



- We group these vessels with the *whiting vessels*

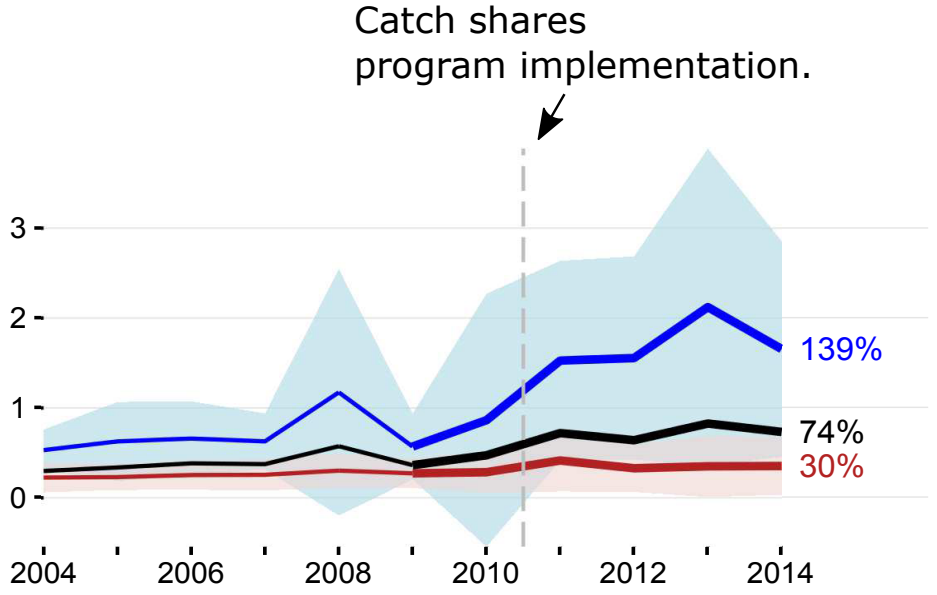
Whiting and non-whiting decomposition

- We separate shore-based processors into 2 categories:
  - Processors that process Pacific whiting (*whiting processors*)
  - Processors that DO NOT process Pacific whiting (*non-whiting processors*)



- Most whiting processors also process non-whiting groundfish species. We separate those from processors that process exclusively non-whiting as part of the catch share program.

Information in each metric

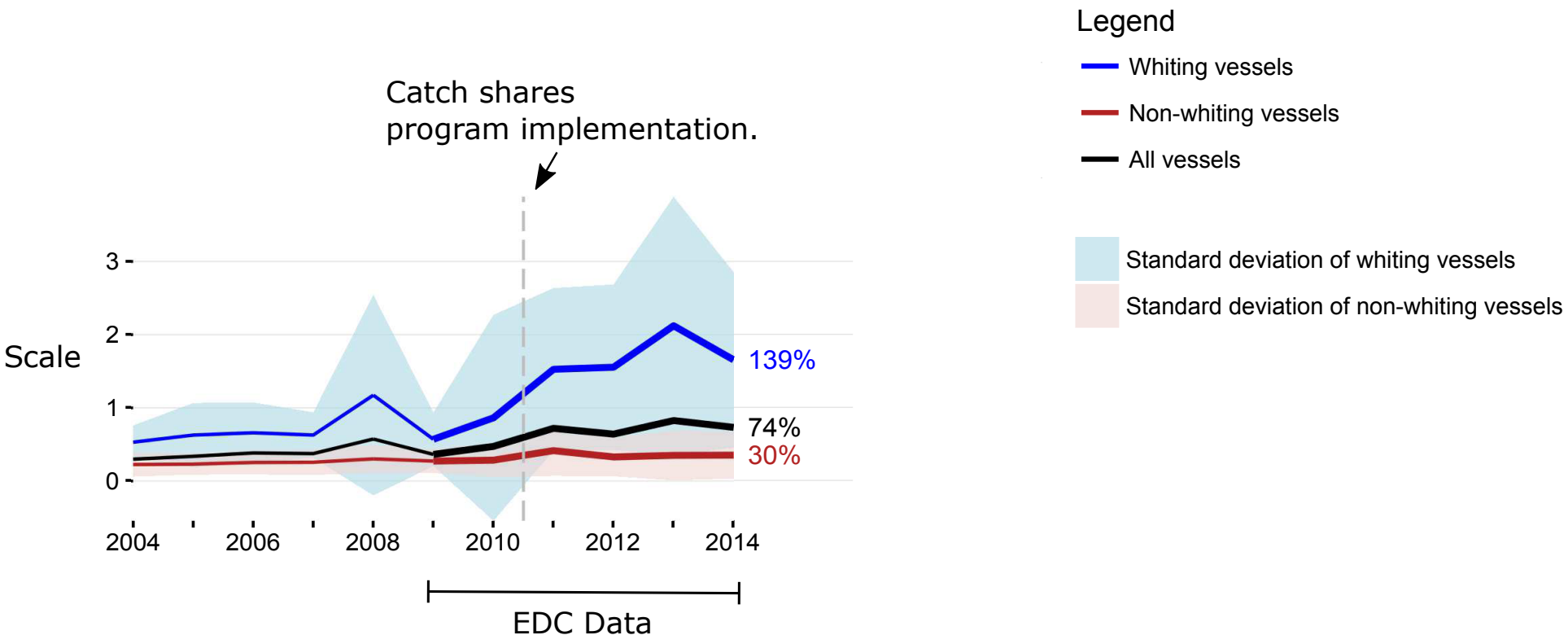


Legend

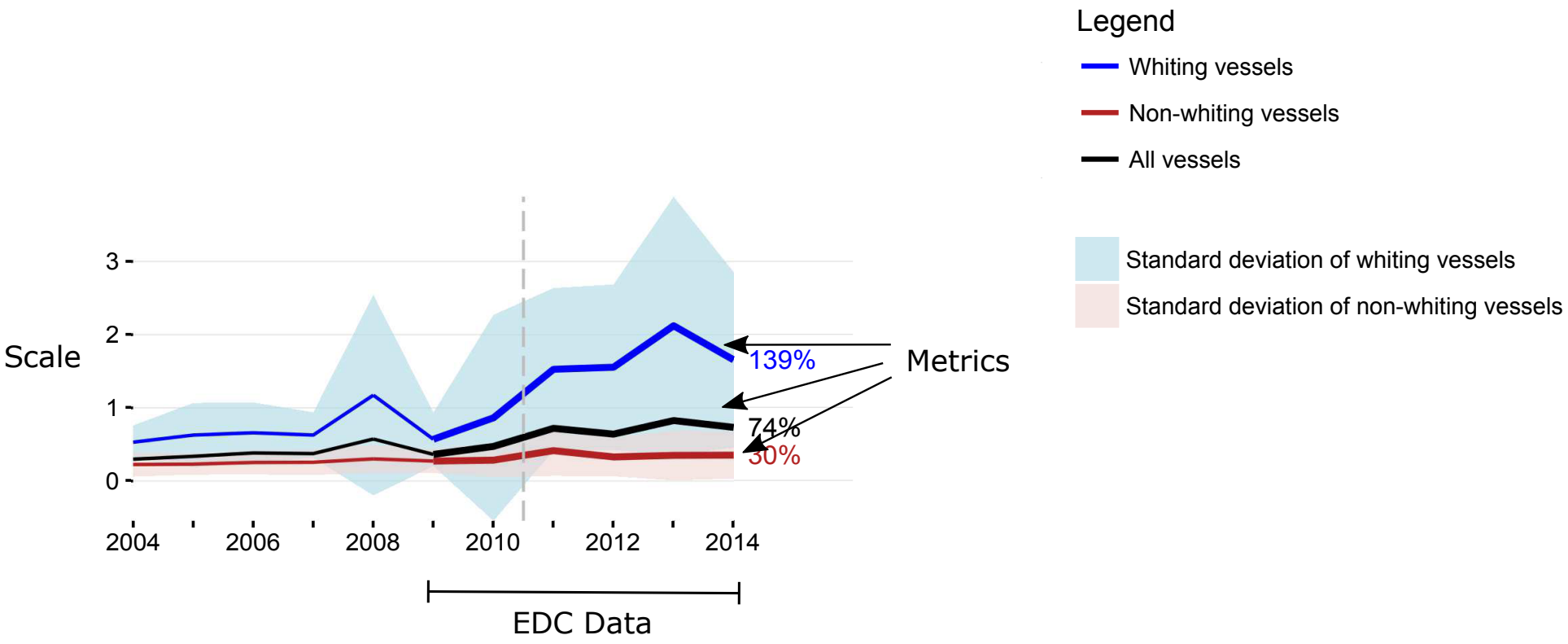
- Whiting vessels
- Non-whiting vessels
- All vessels

- Standard deviation of whiting vessels
- Standard deviation of non-whiting vessels

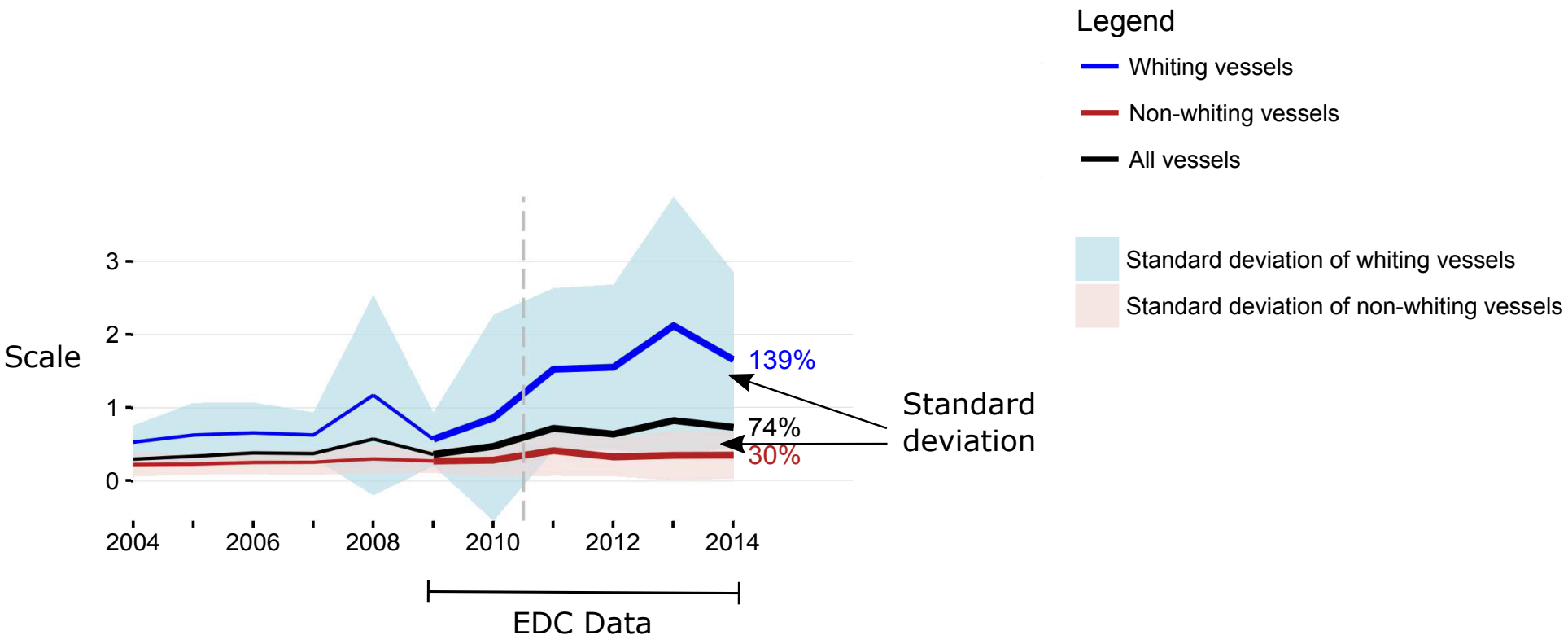
Information in each metric



Information in each metric

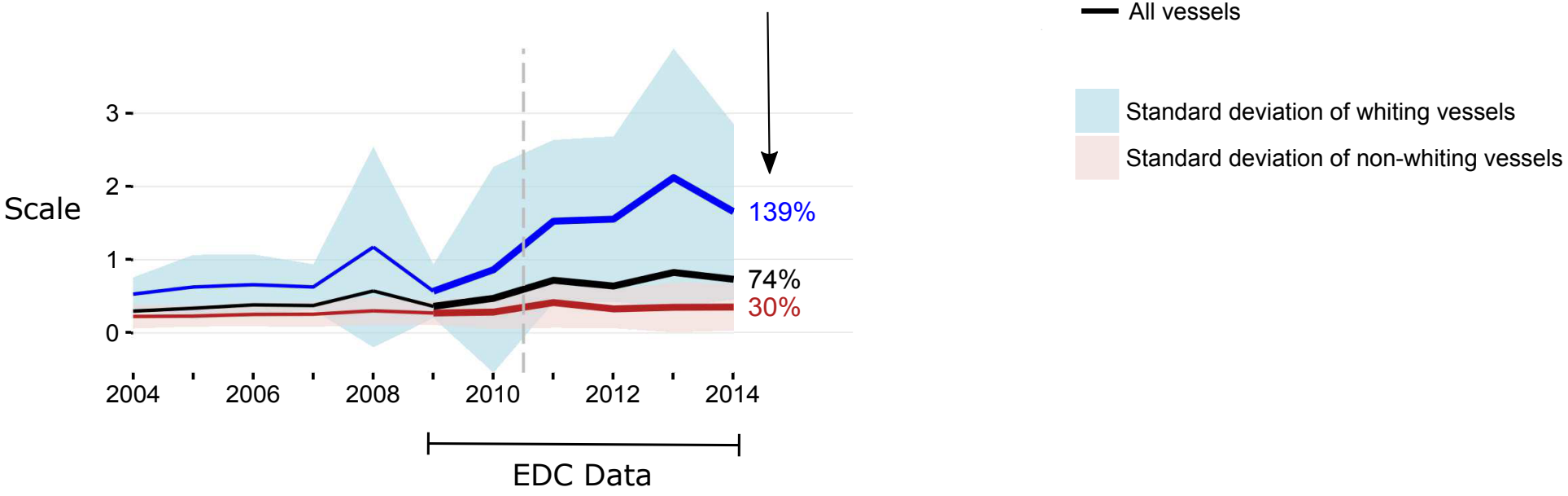


Information in each metric



Information in each metric

Percentage changes in the metric from the average of pre-catch shares years (2009-2010) to the average of post-catch shares years (2011-2014).



Other details

- Changes should not be interpreted as causal
- All dollar values are in real (inflation-adjusted) 2014 $
- Metrics include ONLY catch share program activities
- New data will be added as it becomes available (approx. 2-yr lag)

NWFSC has developed FISHEyE (Fisheries Economics Explorer), allowing users to interactively disaggregate these metrics by home port, state, fishery, and vessel length

Northwest Fisheries Science Center

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FISHEyE: FISHeries Economics Explorer

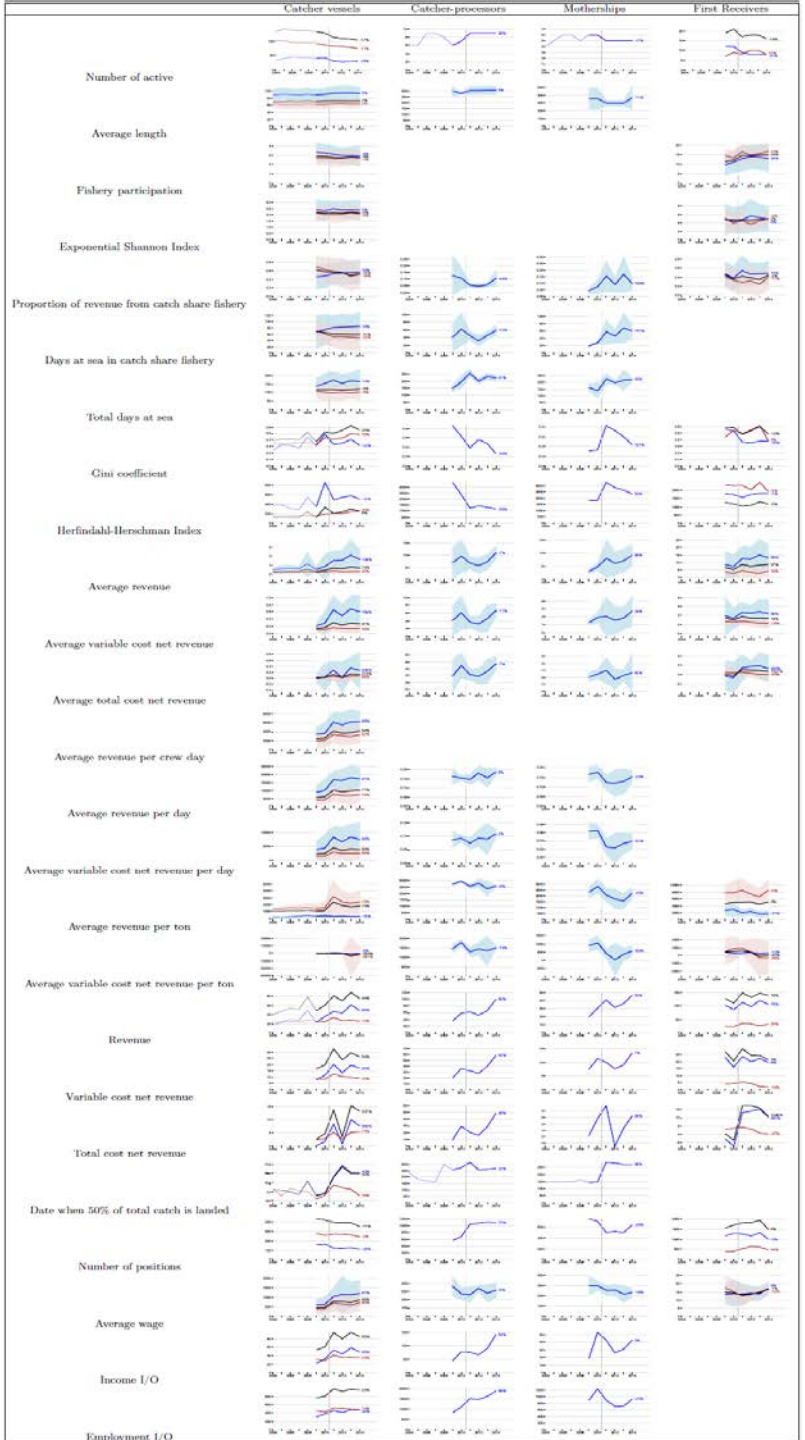
Exploring the Economics of the West Coast Groundfish Trawl Catch Share Program

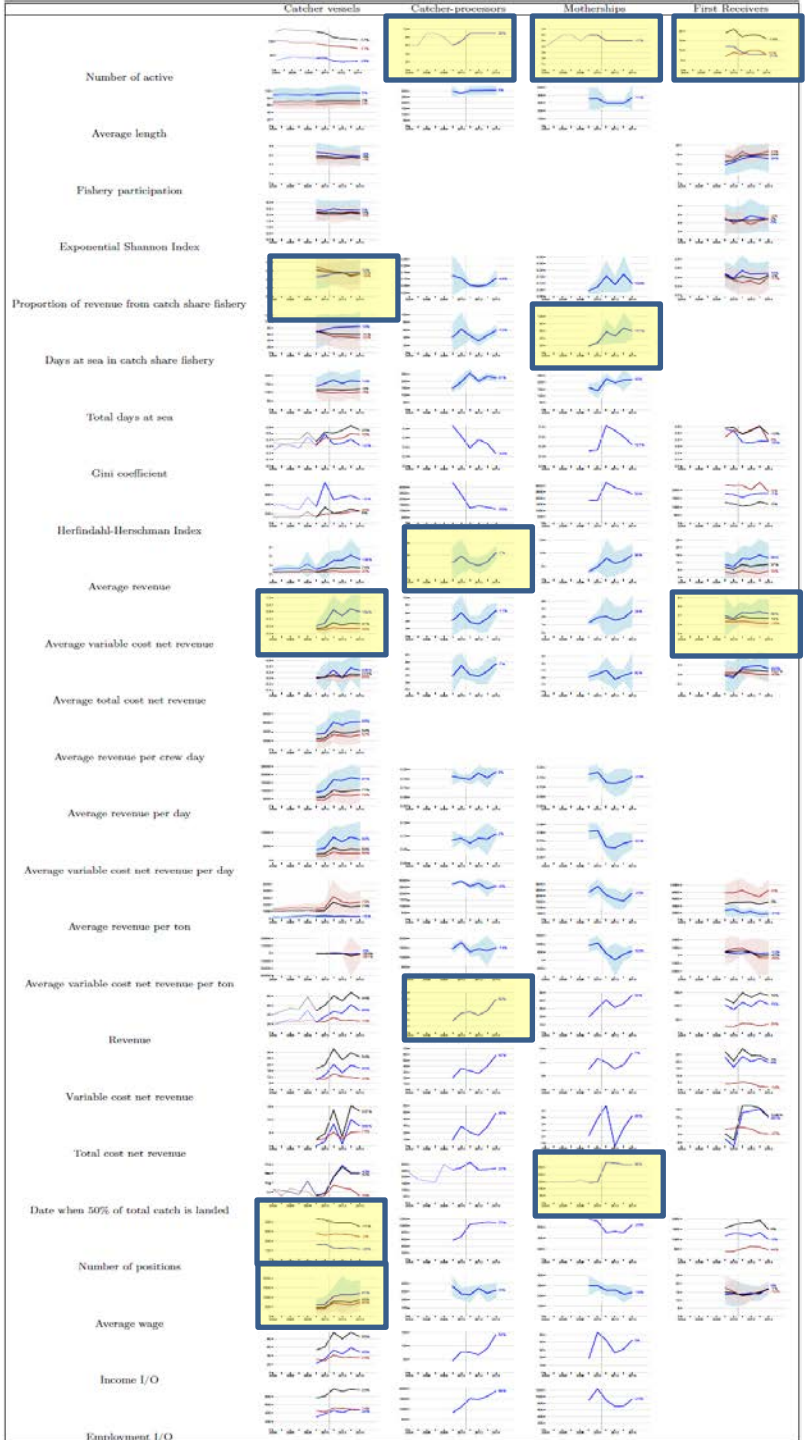
Scientists with the NWFSC's Economic Data Collection Program developed an interactive tool called FISHEyE (FISHeries Economics Explorer) for exploring, analyzing, and downloading data related to the West Coast Groundfish Trawl Catch Share Program.

FISHEyE is actively growing. FISHEyE currently allows for the comparison of revenue, costs, and net revenue of catcher vessels. Data for the other sectors that participate in the catch share program, including catcher-processors, motherships, and first receivers and shorebased processors, will be added soon. Additional metrics to assess the outcomes of the catch share program are also under development.

The data used in FISHEyE comes from the annual Economic Data Collection from participants in the West Coast Groundfish Trawl Fishery.

https://dataexplorer.northwestscience.fisheries.noaa.gov/fisheye/ (Supplemental NMFS Report 9)


Catcher vessels
Catcher-processors
Mothership
First Receivers
Number of active
Average length
Fishery participation
Exponential Shannon Index
Proportion of revenue from catch share fishery
Days at sea in catch share fishery
Total days at sea
Gini coefficient
Herfindahl-Herschman Index
Average revenue
Average variable cost net revenue
Average total cost net revenue
Average revenue per crew day
Average revenue per day
Average variable cost net revenue per day
Average revenue per ton
Average variable cost net revenue per ton
Revenue
Variable cost net revenue
Total cost net revenue
Date when 50% of total catch is landed
Number of positions
Average wage
Income I/O
Employment I/O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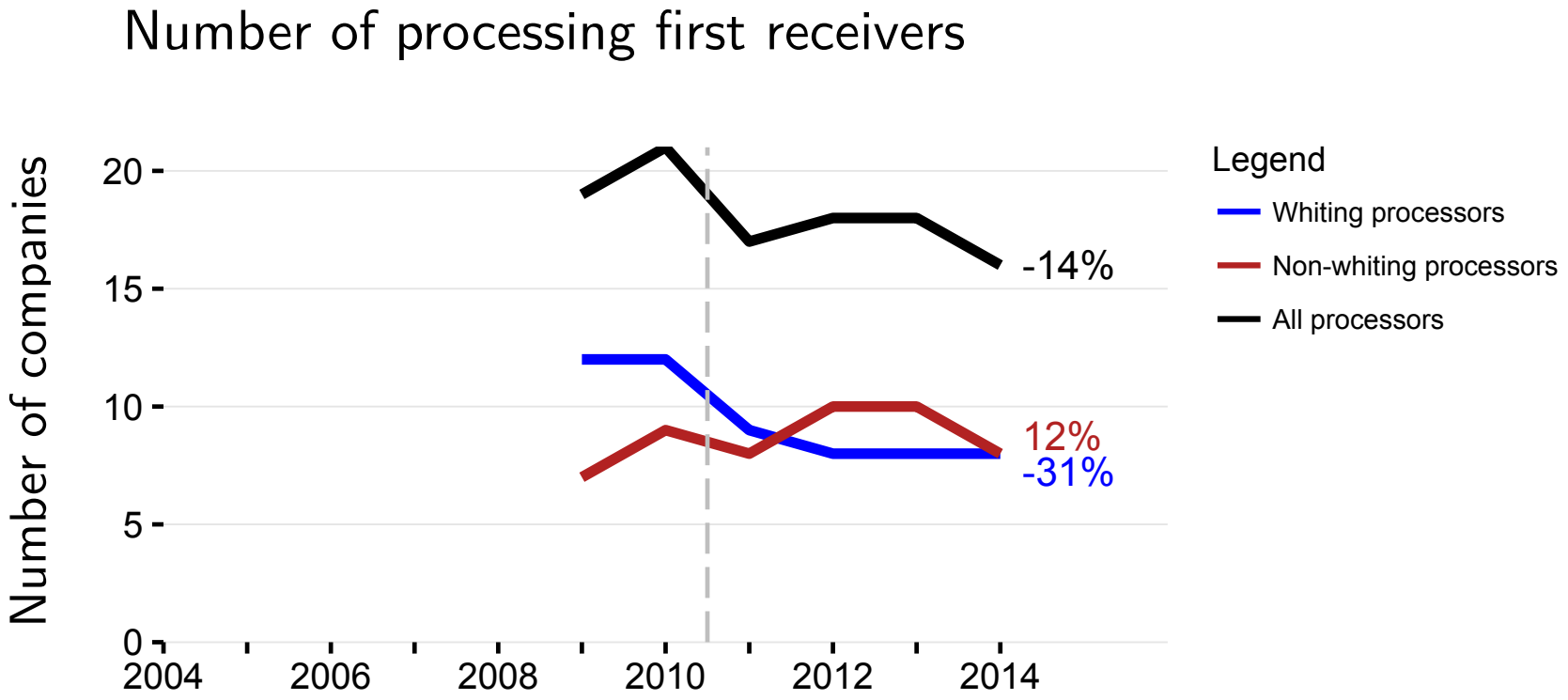
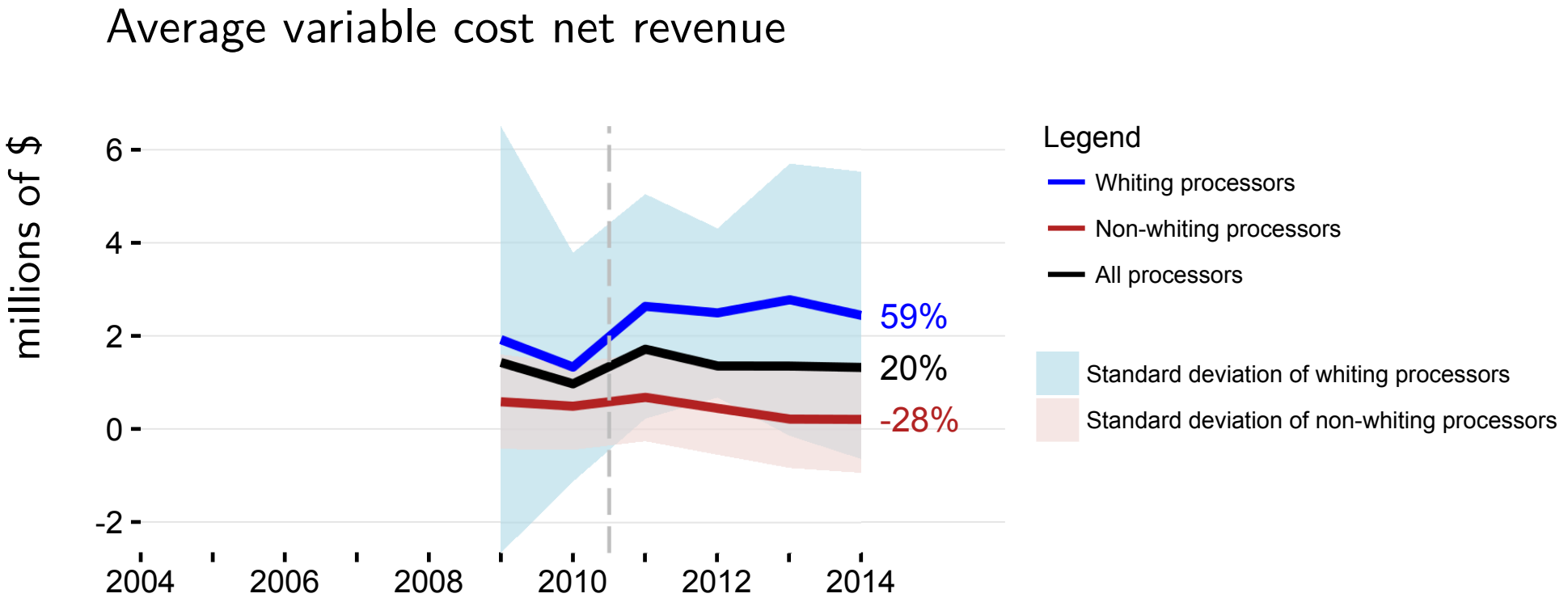
Revenue
Variable cost net revenue
Total cost net revenue
Date when 50% of total catch is landed
Number of positions
Average wage
Income I/O
Employment I/O

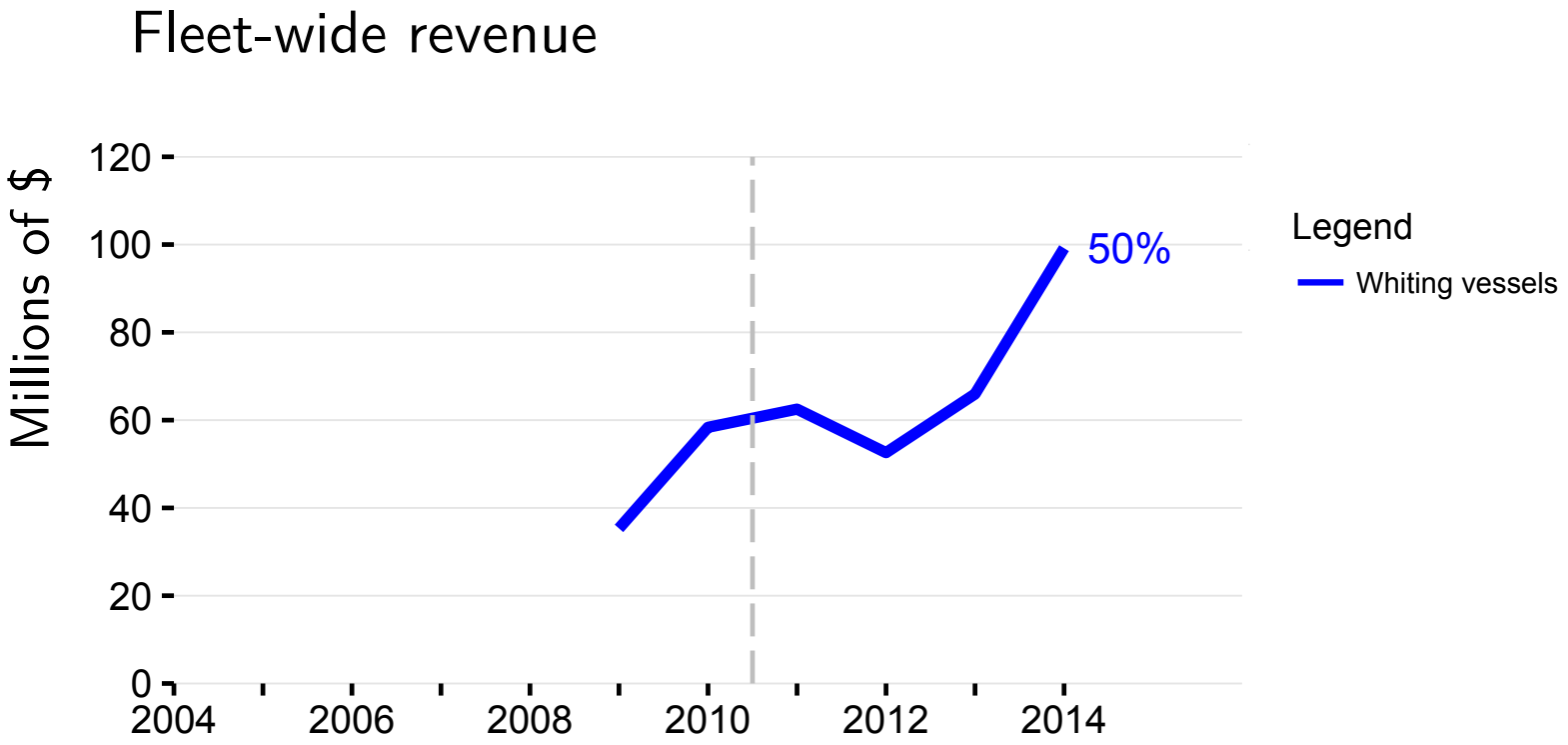
Processor metrics



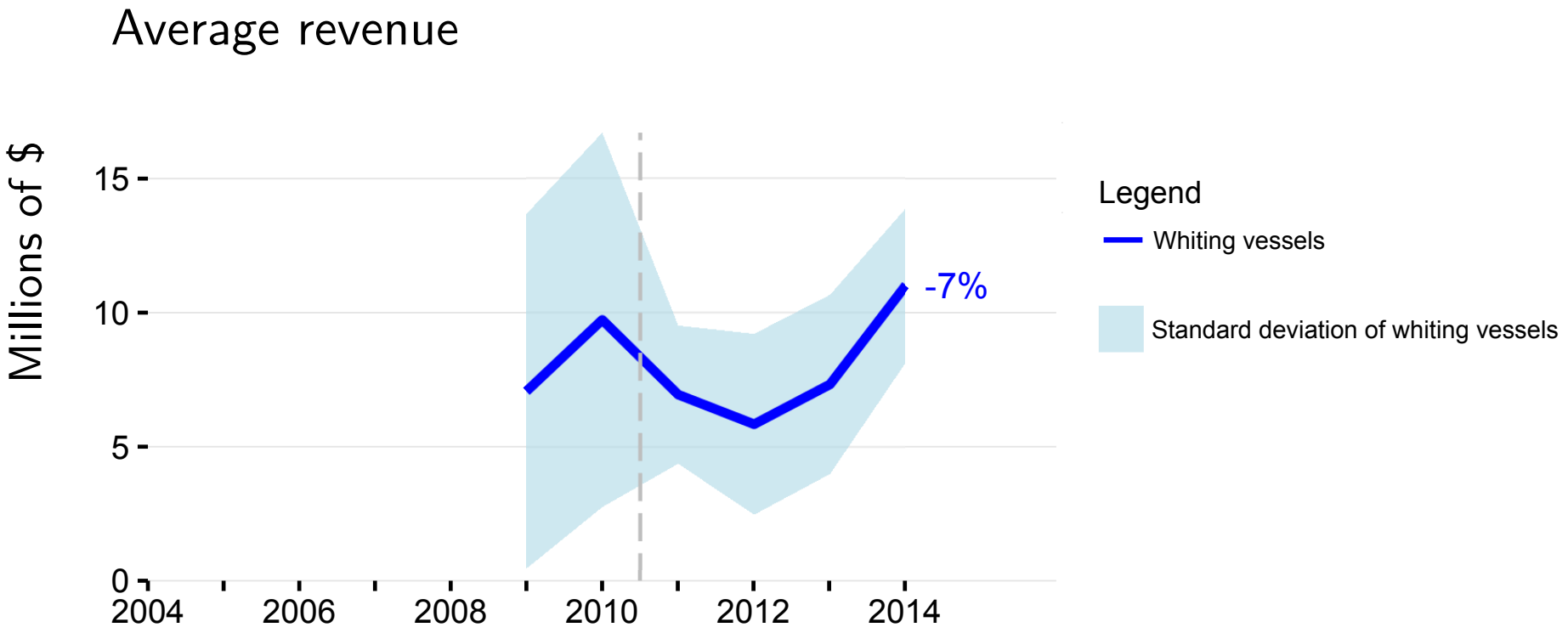
Processor metrics



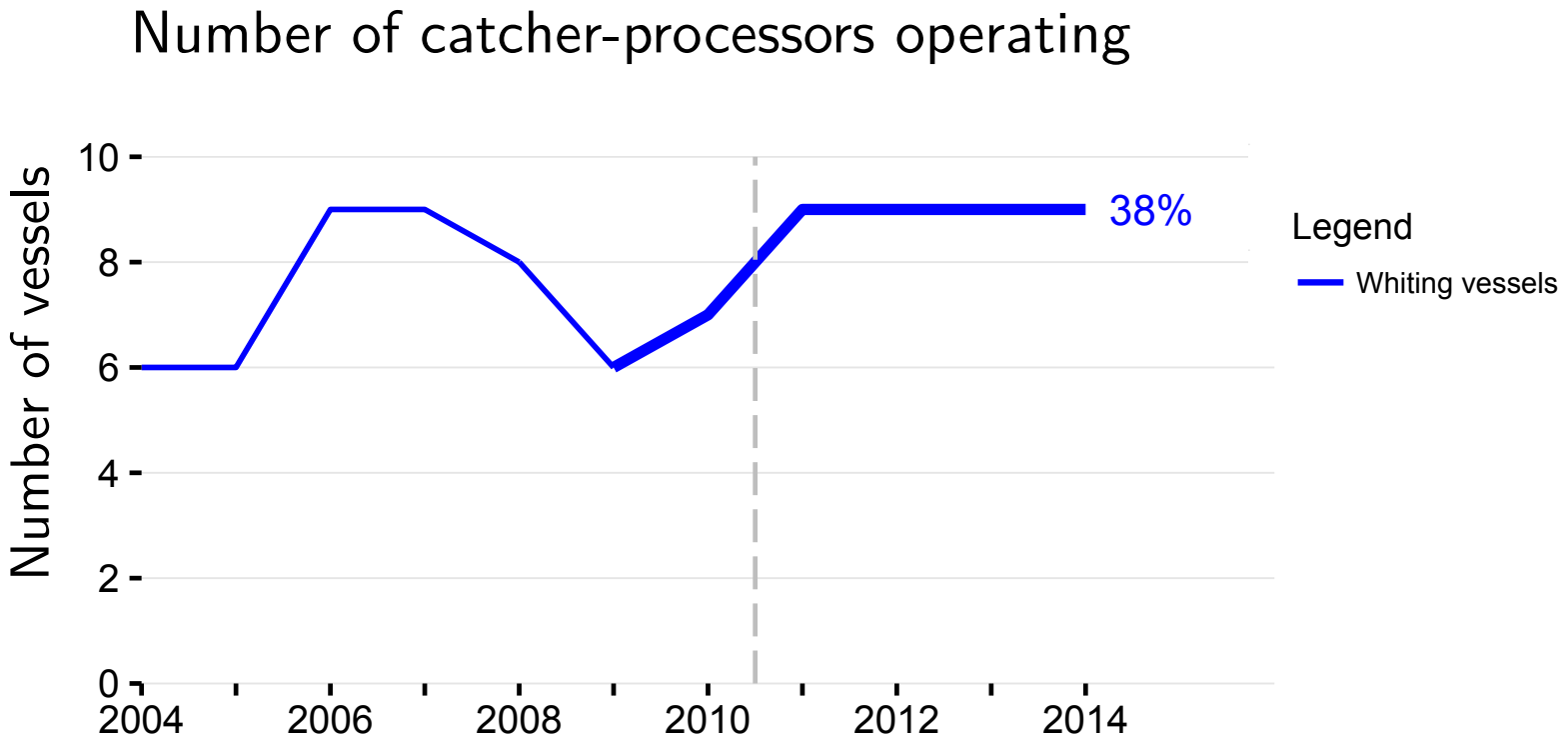
Catcher-processor metrics



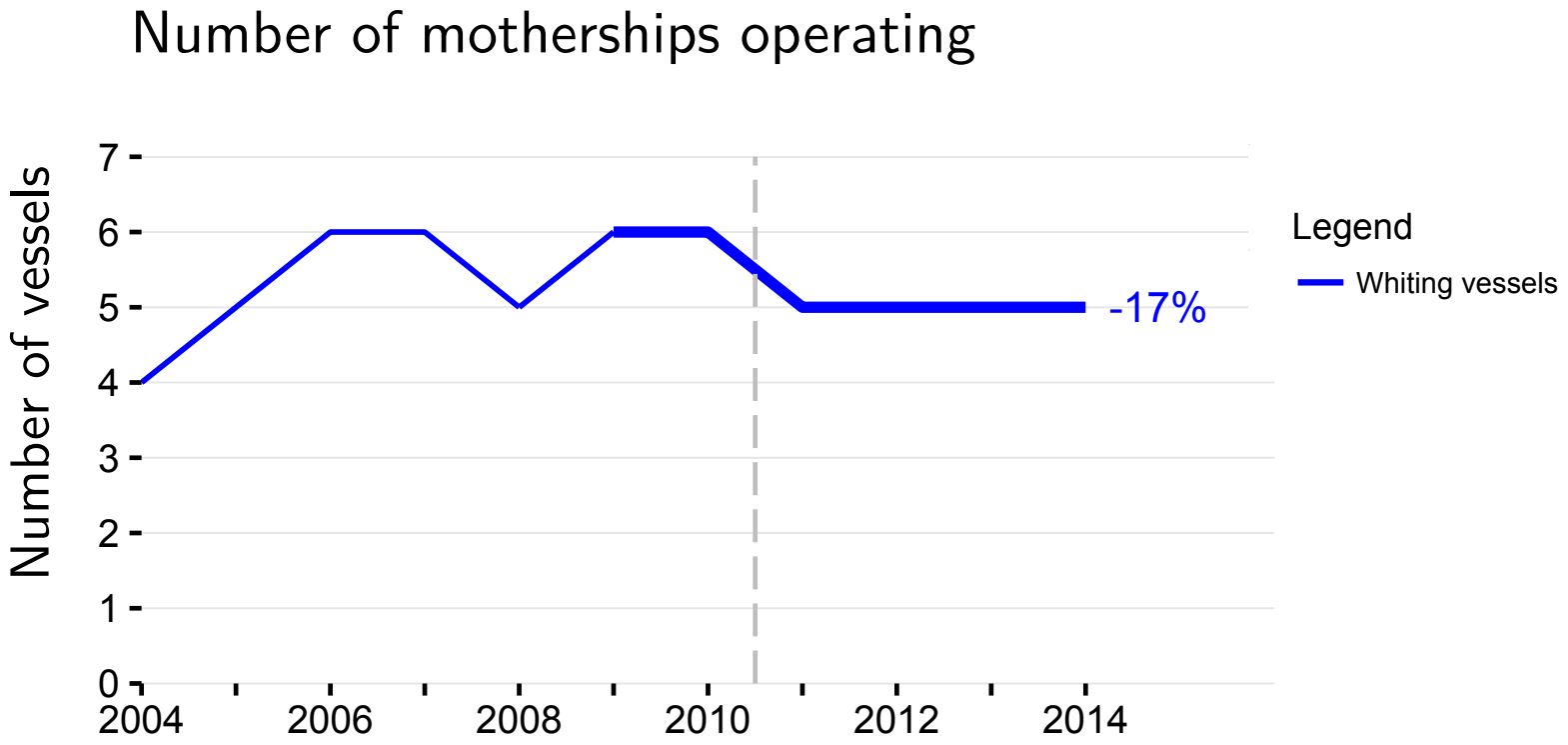
Catcher-processor metrics



Catcher-processor metrics



Mothership metrics



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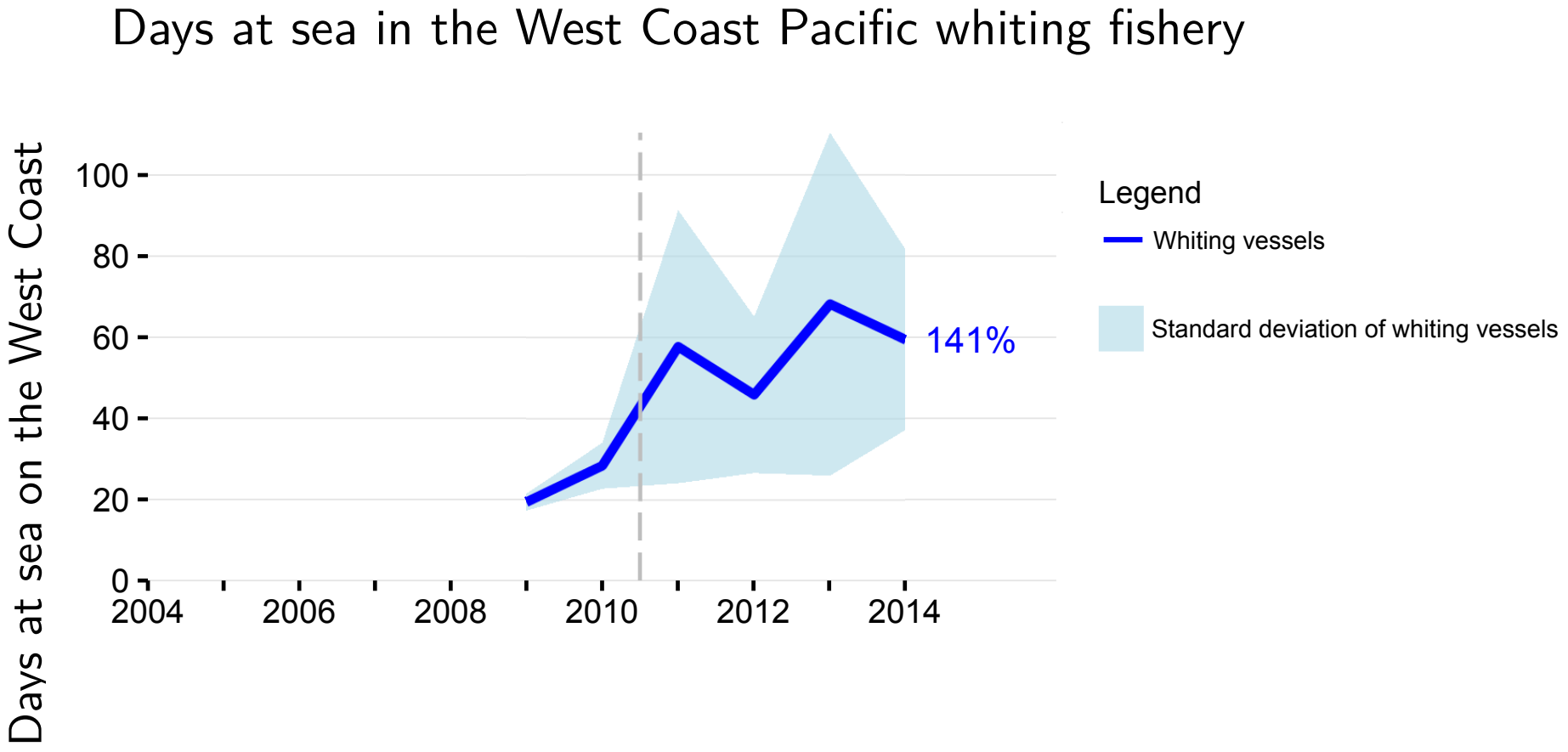
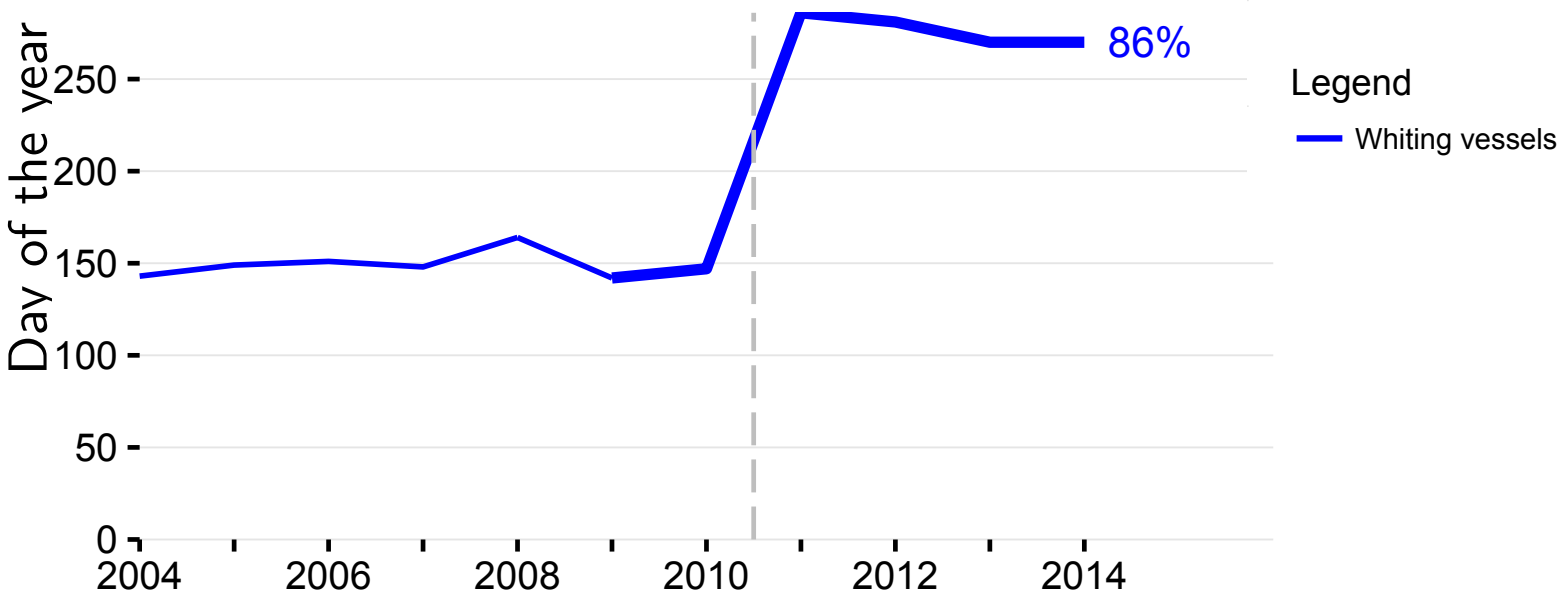
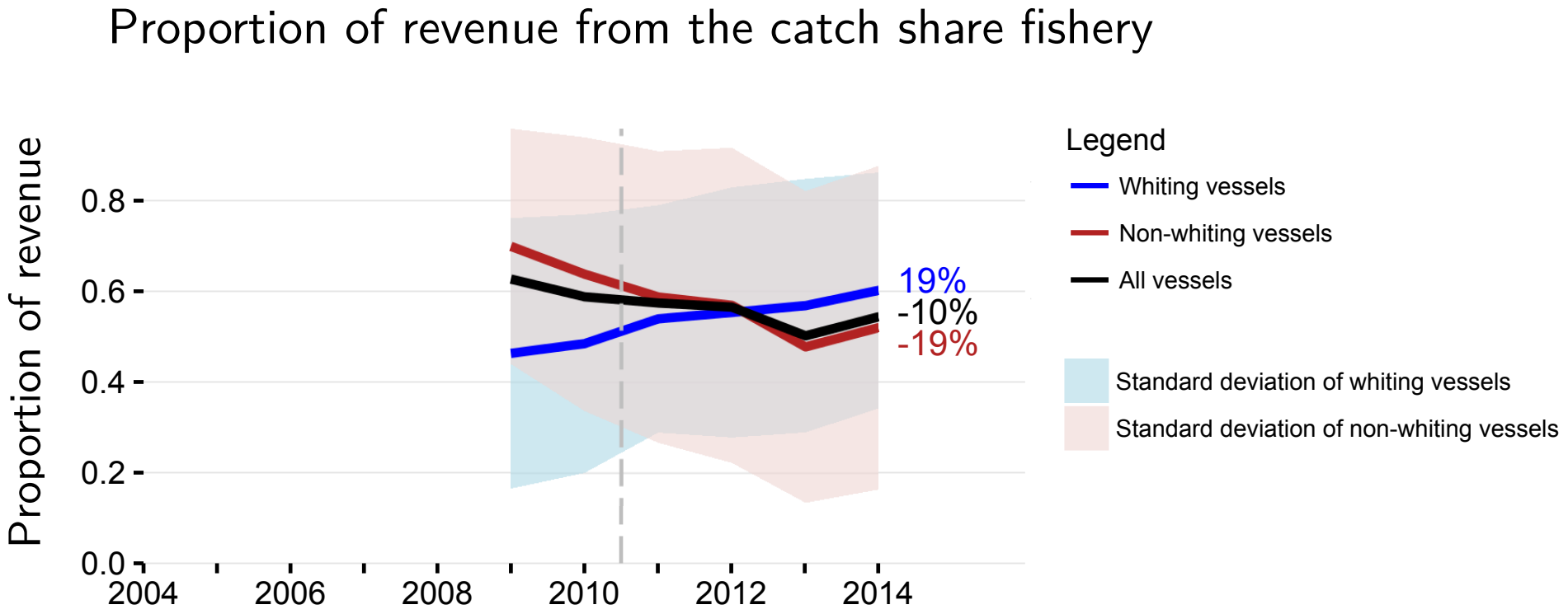


Mothership metrics

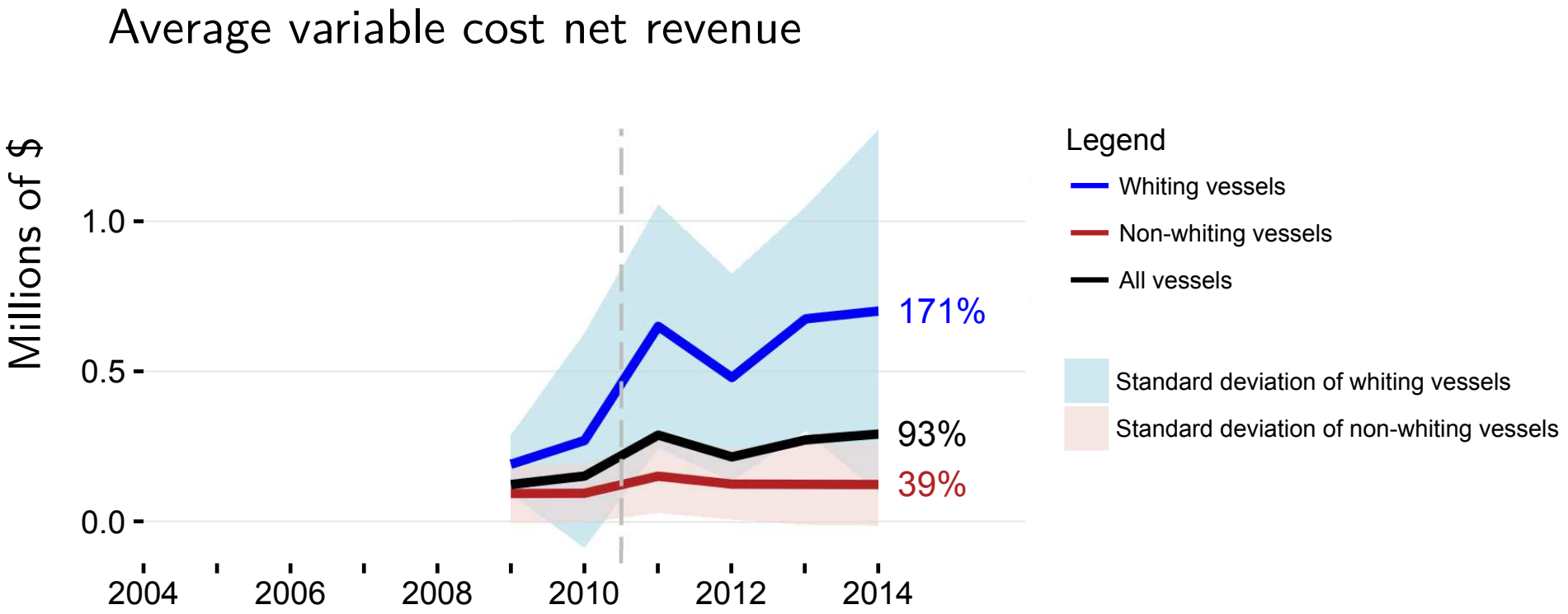
Date when 50% of the total catch was landed



Catcher vessel metrics



Catcher vessel metrics



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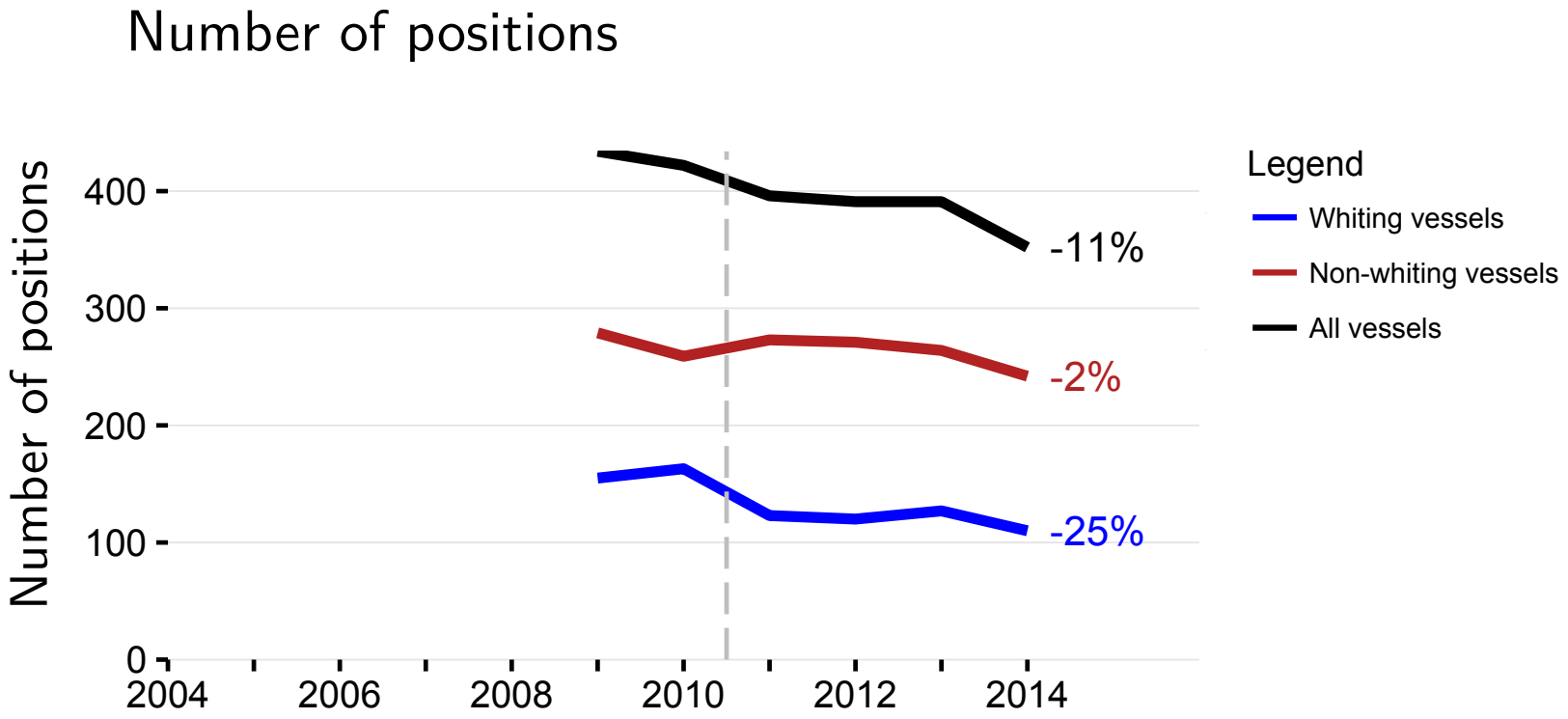
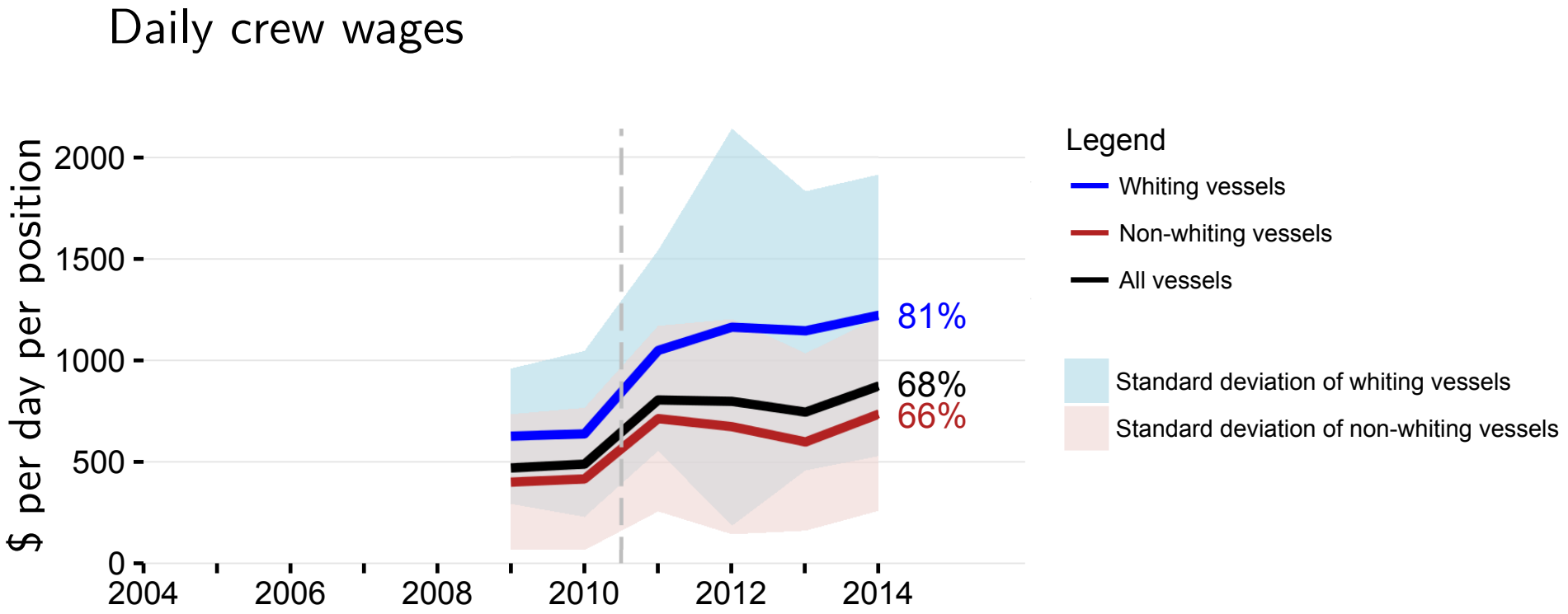


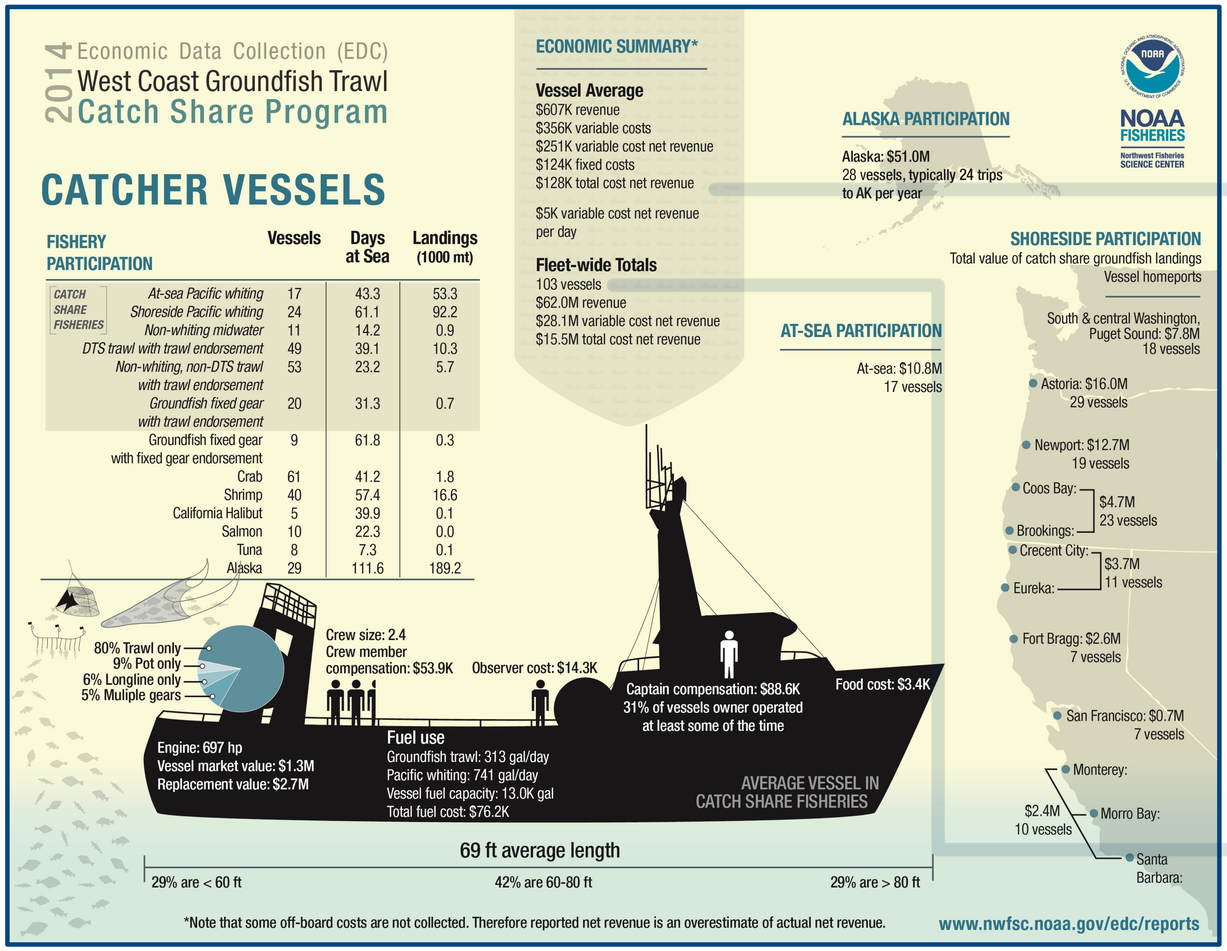
Catcher vessel metrics

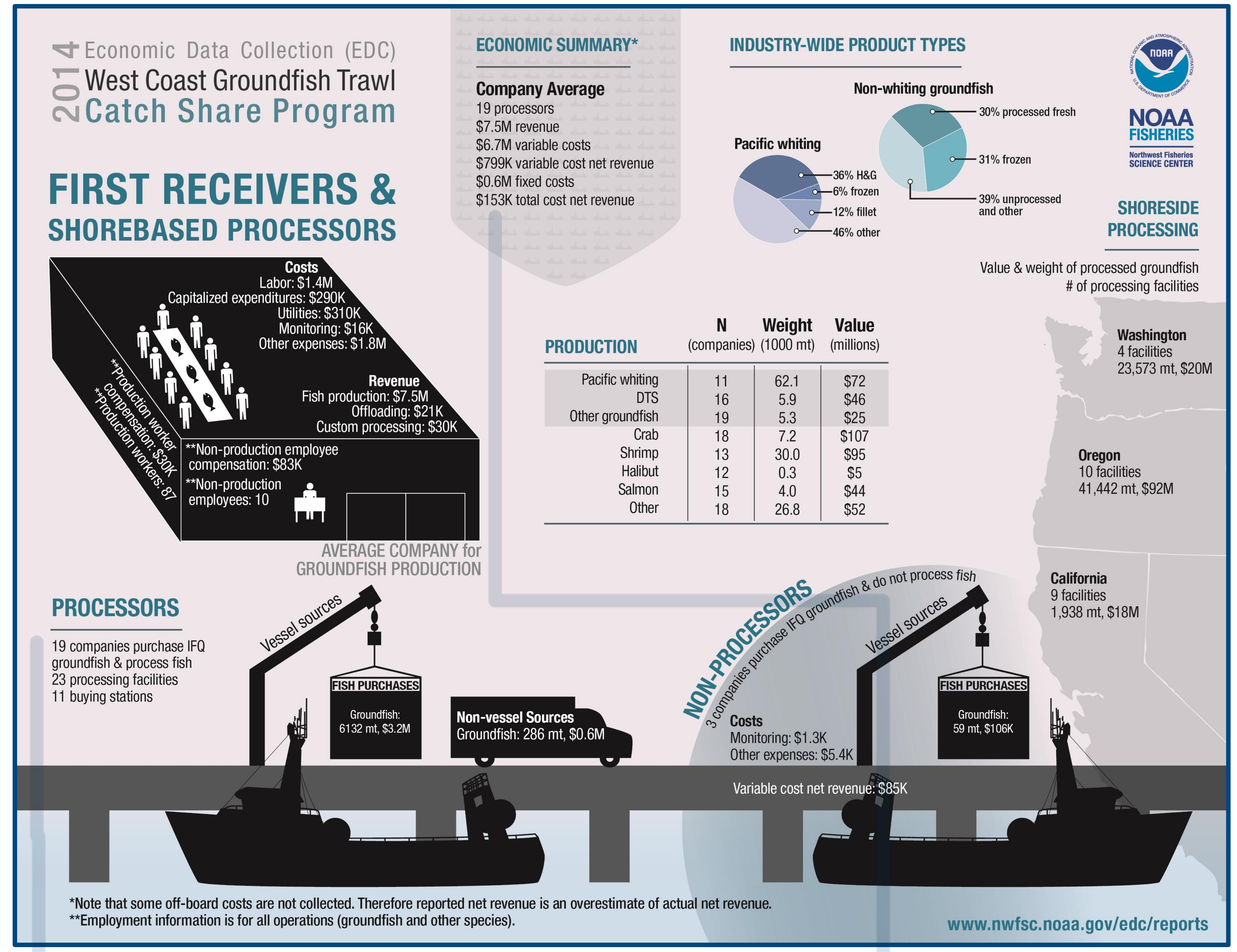


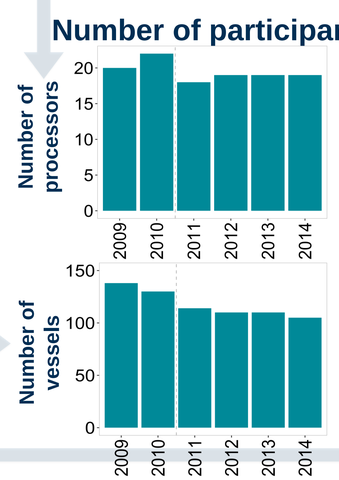
Economic Data Collection (EDC) Program Reports

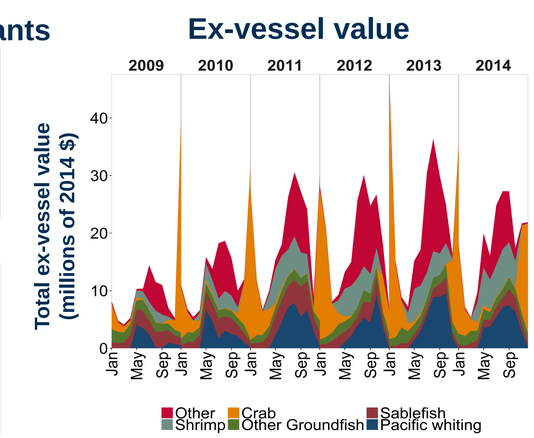
Agenda Item G.5.b NMFS Reports 3-6

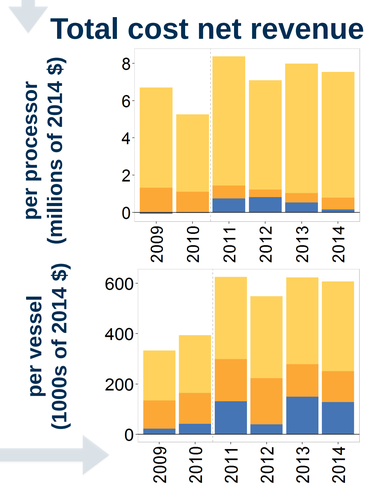
In 2011, the West Coast Groundfish Trawl Catch Share Program was implemented for the groundfish trawl fishery and Pacific whiting fishery. This program converted a fishery that was managed as a limited entry permit fishery to a quota fishery, allocating individual fishing quotas based on historical participation. The Economic Data Collection (EDC) program was implemented as part of these new regulations to monitor the economic effects of the catch share program. Annual economic data submissions are required from all fishery participants: catcher vessels, motherships, catcher-processors, and first receivers and shorebased processors.

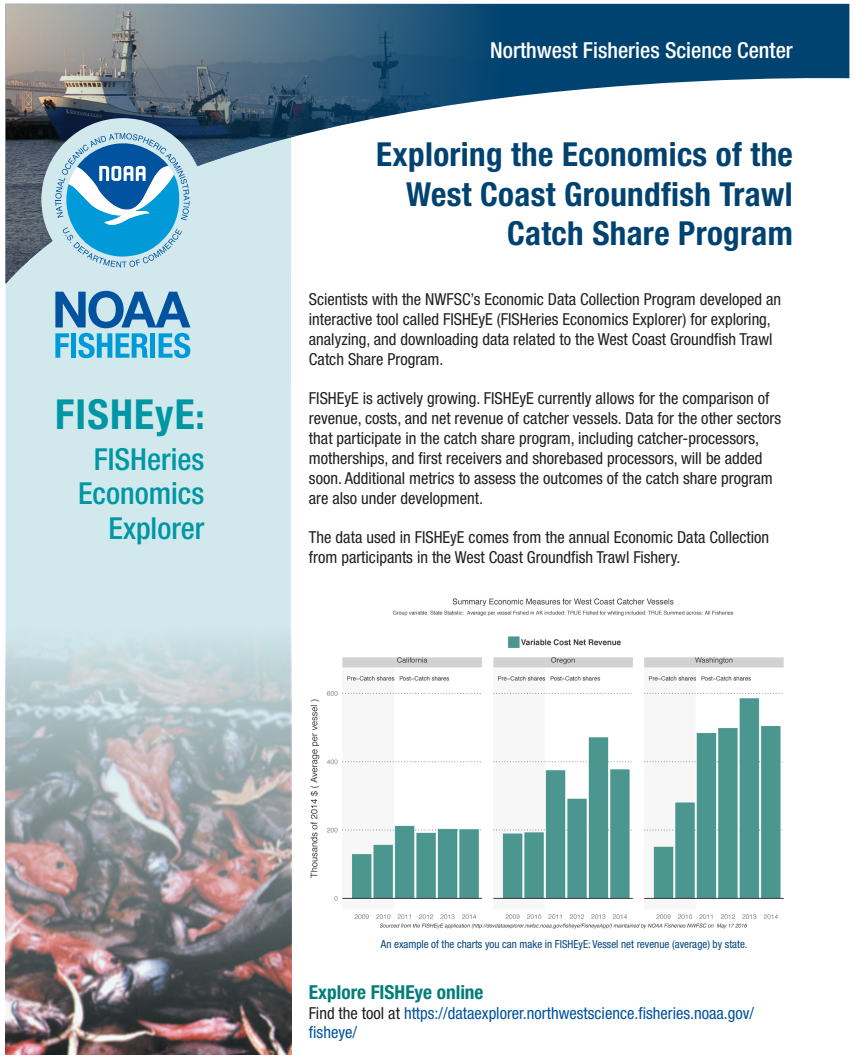












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The data used in FISHEyE comes from the annual Economic Data Collection from participants in the West Coast Groundfish Trawl Fishery.

An example of the charts you can make in FISHEyE: Vessel net revenue (average) by state.

Explore FISHEye online
Find the tool at https://dataexplorer.northwestscience.fisheries.noaa.gov/fisheye/

https://dataexplorer.northwestscience.fisheries.noaa.gov/fisheye/ (Supplemental NMFS Report 9)

Updates to IFQ Account System

- IFQ Contact System
- Quota Pounds price tool
- Transition from Flash to Apex

See briefing book document G.5.b, NMFS Report 7 for more information

Data Explorer

https://dataexplorer.northwestscience.fisheries.noaa.gov/fisheye/

NOAA FISHERIES

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

FISHeries Economics Explorer (FISHEyE)

FISHEyE is an interactive tool to help you examine the economic impacts of the West Coast Groundfish Trawl Catch Share Program on participants and regional economies.

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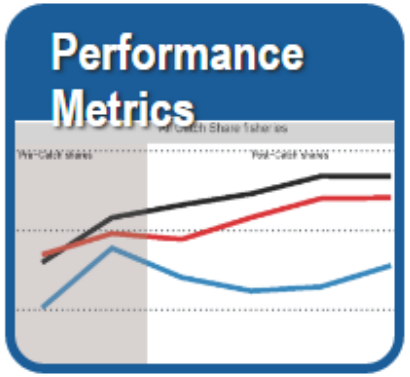
FISHEyE applications

Click on a button below to go to a FISHEyE application.



Definitions

Open Definitions in new browser tab

The variables and their definitions used in this application are from the 2012 Economic Data Collection (EDC) report.

Summary Variables

- **Fisheries:** The Performance Metrics application uses the same fisheries definitions as those used by the EDC program to characterize the US West Coast Groundfish fishery. Many vessels that participate in the Catch Share program also participate in other fisheries such as Dungeness crab or Alaskan fisheries. Please note that data from Alaskan fisheries are included in the combined non-Catch Share fisheries category when viewing results for homeport, state, and vessel length class. When viewing fisheries,activities from Alaskan fisheries are included in the *All non-Catch Share fisheries combined* category. Sample size is insufficient to show results for this fishery alone.

  Catch Share fisheries: At-sea Pacific whiting; Shoreside Pacific whiting; Groundfish fixed gear with trawl endorsement; DTS (Dover, Thornyhead, and Sablefish) trawl with trawl endorsement; Non-whiting, Non-DTS trawl with trawl endorsement (e.g., petrale sole, rockfish, and other flatfish), Non-whiting mid-water trawl (uses midwater trawl gear to target pelagic rockfish such as widow rockfish and yellowtail rockfish).

  Non-catch Share fisheries: Groundfish fixed gear with fixed gear endorsement; Crab; Shrimp; Other fisheries (e.g., tuna, salmon, and halibut), Alaskan fisheries (not shown separately).

- **Vessel length class:** Three categories of vessel length representing the range of catcher vessel length: large vessels (> 80 ft), medium vessels (> 60 ft, <= 80 ft), and small vessels (< 60 ft).
- **Homeport:** The homeport reported by each vessel on the EDC survey form aggregated to port groups. Vessels that fished of the West coast but report their homeport to be in Alaska are included. These vessels are included in the Puget Sound port.
- **State:** The state corresponding to each homeport. Vessels that fished of the West coast but report their homeport to be in Alaska are included. These vessels are included in Washington State.

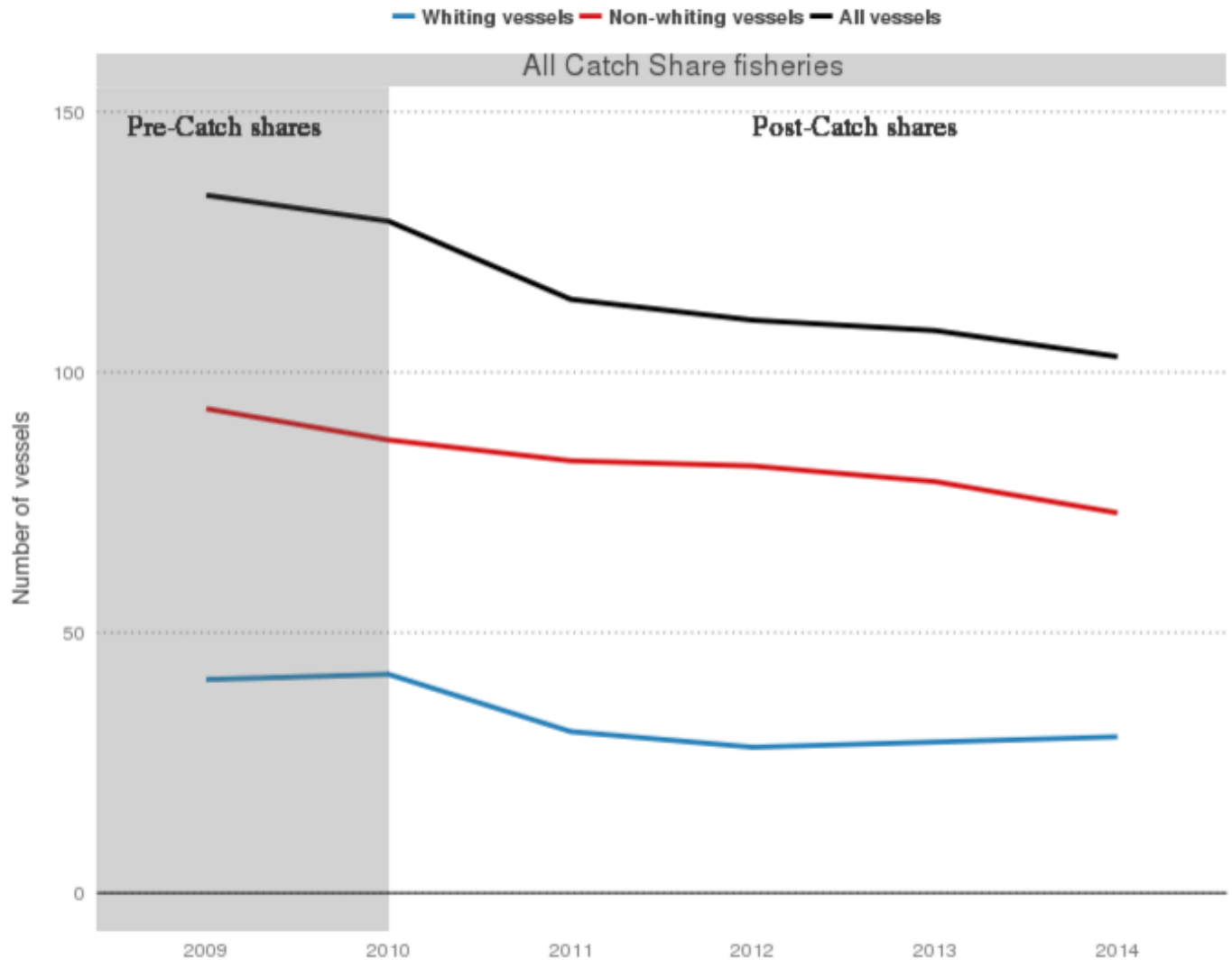
Start

Summary Plots and Data

Show Data

Performance Metrics for West Coast Catcher Vessels

Fisheries : All Catch Share fisheries Metric: Number of vessels



Control Panel

Clear selections & Return to Instructio

Make selections in each of the panels below

Group vessels according to:

- (•) Fisheries
- ( ) Homeport
- ( ) State
- ( ) Vessel length class

Show data summed across:

- [x] All vessels
- [x] Non-whiting vessels
- [x] Whiting vessels

Select one or more fisheries:

- [ ] All fisheries combined
- [x] All Catch Share fisheries combined
  - [ ] At-sea Pacific whiting
  - [ ] Shoreside Pacific whiting
  - [ ] DTS trawl with trawl endorsement
  - [ ] Non-whiting midwater trawl
  - [ ] Non-whiting, non-DTS trawl with trawl endorsement
  - [ ] Groundfish fixed gear with trawl

Select an indicator category:

Demographic

- (•) Number of vessels or processors
- ( ) Vessel length
- ( ) Fishery participation
- ( ) Proportion of revenue from Catch Share fishery
- ( ) Days at sea
- ( ) Exponential Shannon Index
- ( ) Gini coefficient
- ( ) Herfindahl-Hirschman Index

Statistic:

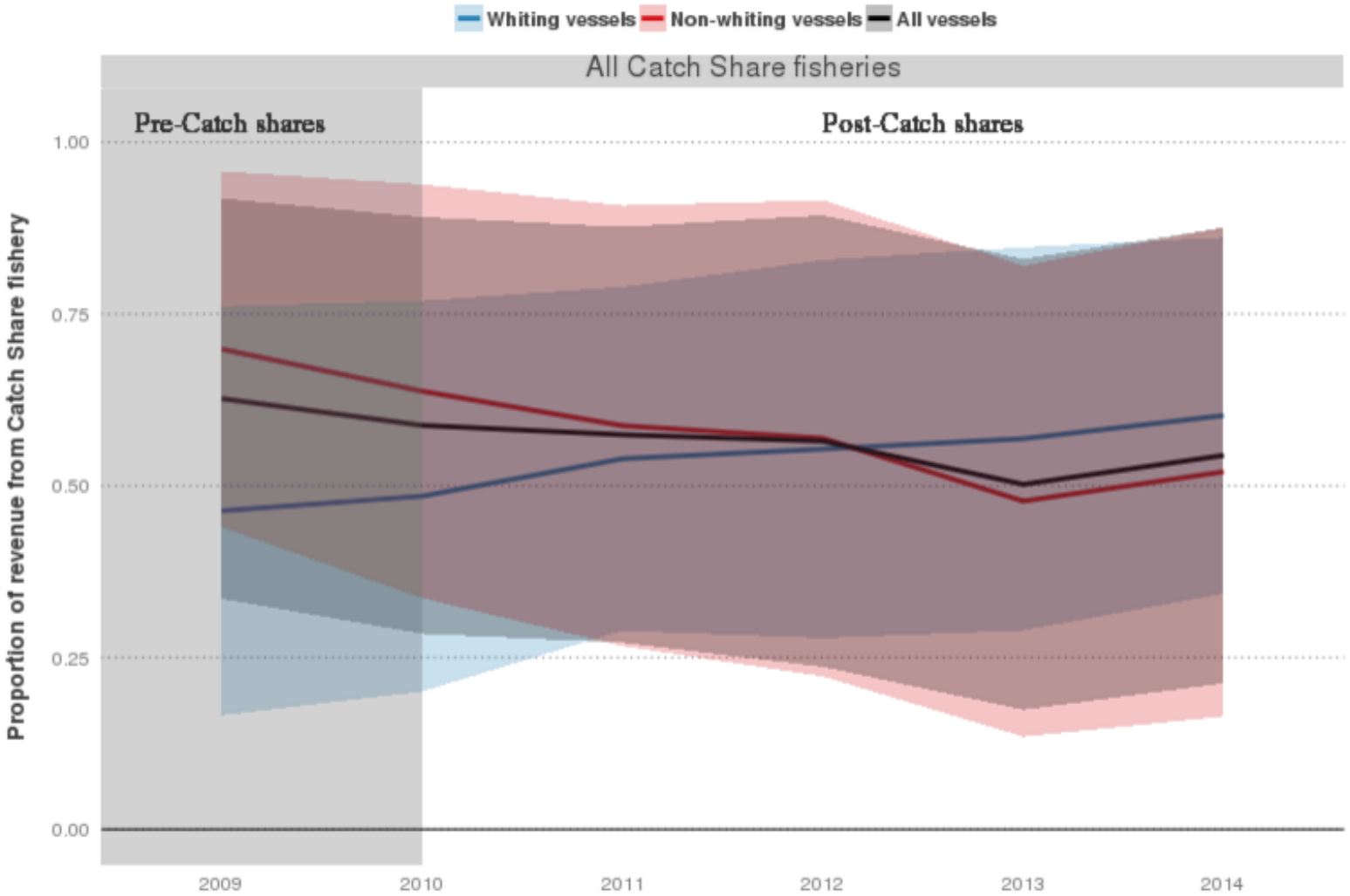
- (•) Total

Summary Plots and Data

Show Data

Performance Metrics for West Coast Catcher Vessels

Fisheries : All Catch Share fisheries Metric: Proportion of revenue from CS fishery



For individual fisheries and the Proportion of revenue from CS fishery metric, we show all activities for vessels that fished in the selec not just their activity in the selected fishery,
For example, the plot above shows the Average Proportion of revenue from CS fishery for all vessels that fished for All Catch Share

Control Panel

Clear selections & Return to Instructi

Make selections in each of the panels below

Group vessels according to:

- (•) Fisheries
- ( ) Homeport
- ( ) State
- ( ) Vessel length class

Show data summed across:

- [x] All vessels
- [x] Non-whiting vessels
- [x] Whiting vessels

Select one or more fisheries:

- [ ] All fisheries combined
- [x] All Catch Share fisheries combined
  - [ ] At-sea Pacific whiting
  - [ ] Shoreside Pacific whiting
  - [ ] DTS trawl with trawl endorsement
  - [ ] Non-whiting midwater trawl
  - [ ] Non-whiting, non-DTS trawl with trawl endorsement
  - [ ] Groundfish fixed gear with trawl

Select an indicator category:

Demographic

- ( ) Number of vessels or processors
- ( ) Vessel length
- ( ) Fishery participation
- (•) Proportion of revenue from Catch Share fishery
- ( ) Days at sea
- ( ) Exponential Shannon Index
- ( ) Gini coefficient
- ( ) Herfindahl-Hirschman Index

Statistic:

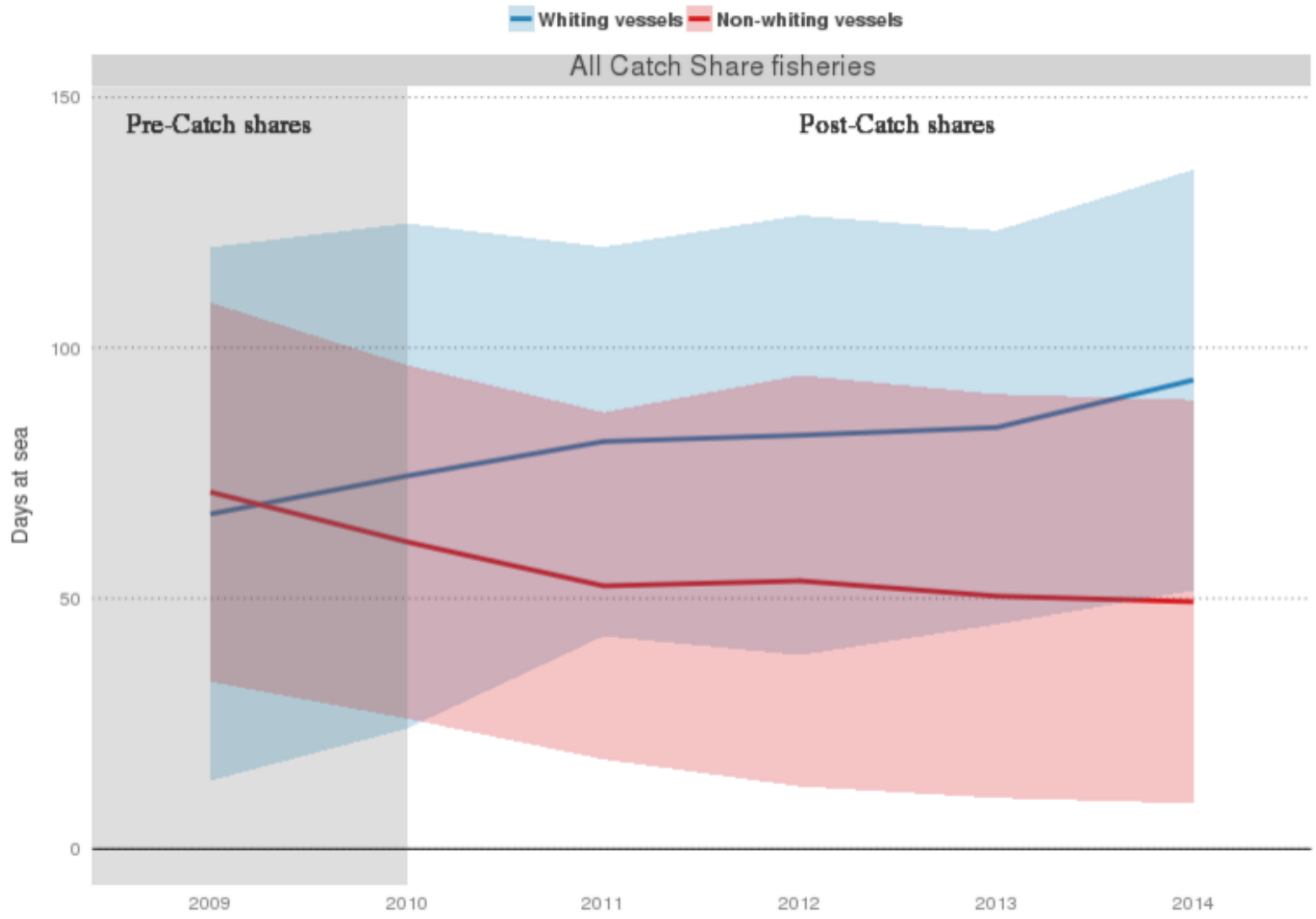
- (•) Average
- ( ) Median

Summary Plots and Data

Show Data

Performance Metrics for West Coast Catcher Vessels

Fisheries : All Catch Share fisheries Metric: Days at sea



Control Panel

Clear selections & Return to Instructions

Make selections in each of the panels below

Group vessels according to:

- (•) Fisheries
- ( ) Homeport
- ( ) State
- ( ) Vessel length class

Show data summed across:

- [ ] All vessels
- [x] Non-whiting vessels
- [x] Whiting vessels

Select one or more fisheries:

- [ ] All fisheries combined
- [x] All Catch Share fisheries combined
  - [ ] At-sea Pacific whiting
  - [ ] Shoreside Pacific whiting
  - [ ] DTS trawl with trawl endorsement
  - [ ] Non-whiting midwater trawl
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- ( ) Number of vessels or processors
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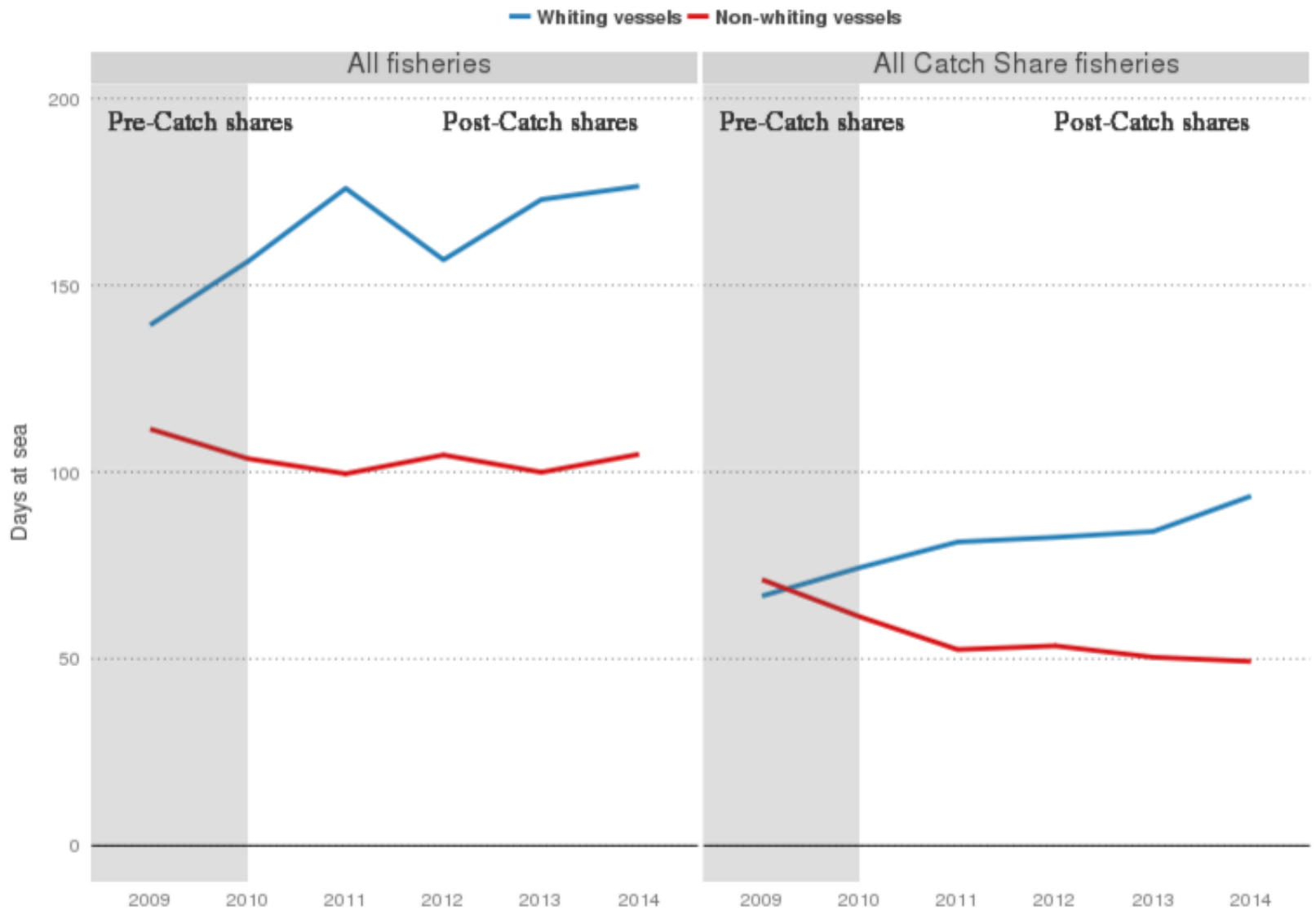
Summary Plots and Data

Show Data

Performance Metrics for West Coast Catcher Vessels

Fisheries : All fisheries Metric: Days at sea



Control Panel

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- [ ] All vessels
- [x] Non-whiting vessels
- [x] Whiting vessels

Select one or more fisheries:

- [x] All fisheries combined
- [x] All Catch Share fisheries combined
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  - [ ] DTS trawl with trawl endorsement
  - [ ] Non-whiting midwater trawl
  - [ ] Non-whiting, non-DTS trawl with trawl endorsement
  - [ ] Groundfish fixed gear with trawl

Select an indicator category:

Demographic

- ( ) Number of vessels or processors
- ( ) Vessel length
- ( ) Fishery participation
- ( ) Proportion of revenue from Catch Share fishery
- (•) Days at sea
- ( ) Exponential Shannon Index
- ( ) Gini coefficient
- ( ) Herfindahl-Hirschman Index

Statistic:

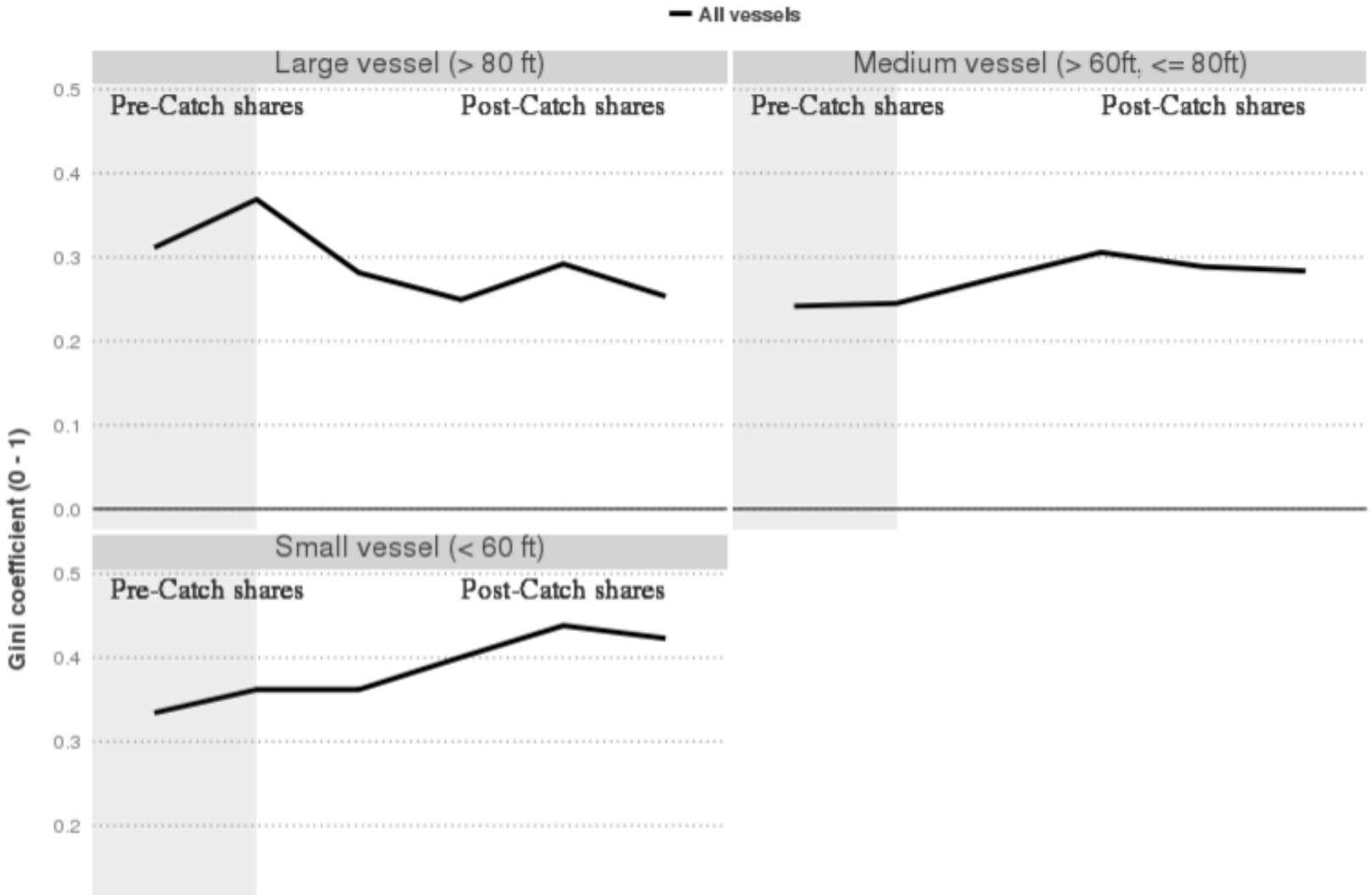
- (•) Average
- ( ) Median

Summary Plots and Data

Show Data

Performance Metrics for West Coast Catcher Vessels

Vessel length class : Large vessel (> 80 ft) Metric: Gini coefficient Summed across: All fisheries



Control Panel

Clear selections
Return to Instruct

Make selections in each of the panels below

Group vessels according to:

- Fisheries
- Homeport
- State
- Vessel length class

Show data summed across:

- [x] All vessels
- [ ] Non-whiting vessels
- [ ] Whiting vessels

Show data summed across these fisheries:

All fisheries

Select one or more vessel length class:

- [x] Large vessel (> 80 ft)
- [x] Medium vessel (> 60ft, <= 80ft)
- [x] Small vessel (< 60 ft)

Select an indicator category:

Demographic

- Number of vessels or processors
- Vessel length
- Fishery participation
- Proportion of revenue from Catch Share fishery
- Days at sea
- Exponential Shannon Index
- Gini coefficient
- Herfindahl-Hirschman Index

Summary Plots and Data

Show Plot(s)

Show 25 entries

Search:

Year	Summary Variable	Fisheries Category	Statistic	Metric	Data summed across	Number of vessels	Value	Variance (MAD, SD)
2009	Large vessel (> 80 ft)	All fisheries	Average	Gini coefficient	All vessels	35	0.31144	NA
2010	Large vessel (> 80 ft)	All fisheries	Average	Gini coefficient	All vessels	36	0.36878	NA
2011	Large vessel (> 80 ft)	All fisheries	Average	Gini coefficient	All vessels	30	0.28143	NA
2012	Large vessel (> 80 ft)	All fisheries	Average	Gini coefficient	All vessels	29	0.24929	NA
2013	Large vessel (> 80 ft)	All fisheries	Average	Gini coefficient	All vessels	29	0.29193	NA
2014	Large vessel (> 80 ft)	All fisheries	Average	Gini coefficient	All vessels	29	0.25333	NA
2009	Medium vessel (> 60ft, <= 80ft)	All fisheries	Average	Gini coefficient	All vessels	57	0.24157	NA
2010	Medium vessel (> 60ft, <= 80ft)	All fisheries	Average	Gini coefficient	All vessels	55	0.24485	NA

Control Panel

Clear selectio
Return to Instr

Make selections in each of the panels below

Group vessels according to:

- Fisheries
- Homeport
- State
- Vessel length class

Show data summed across:

- [x] All vessels
- [ ] Non-whiting vessels
- [ ] Whiting vessels

Show data summed across these fisheries:

All fisheries

Select one or more vessel length class:

- [x] Large vessel (> 80 ft)
- [x] Medium vessel (> 60ft, <= 80ft)
- [x] Small vessel (< 60 ft)

Select an indicator category:

Demographic

- Number of vessels or processors
- Vessel length
- Fishery participation
- Proportion of revenue from Catch Share fishery
- Days at sea
- Exponential Shannon Index
- Gini coefficient
- Herfindahl-Hirschman Index

Net Revenue: Including quota cost and earnings

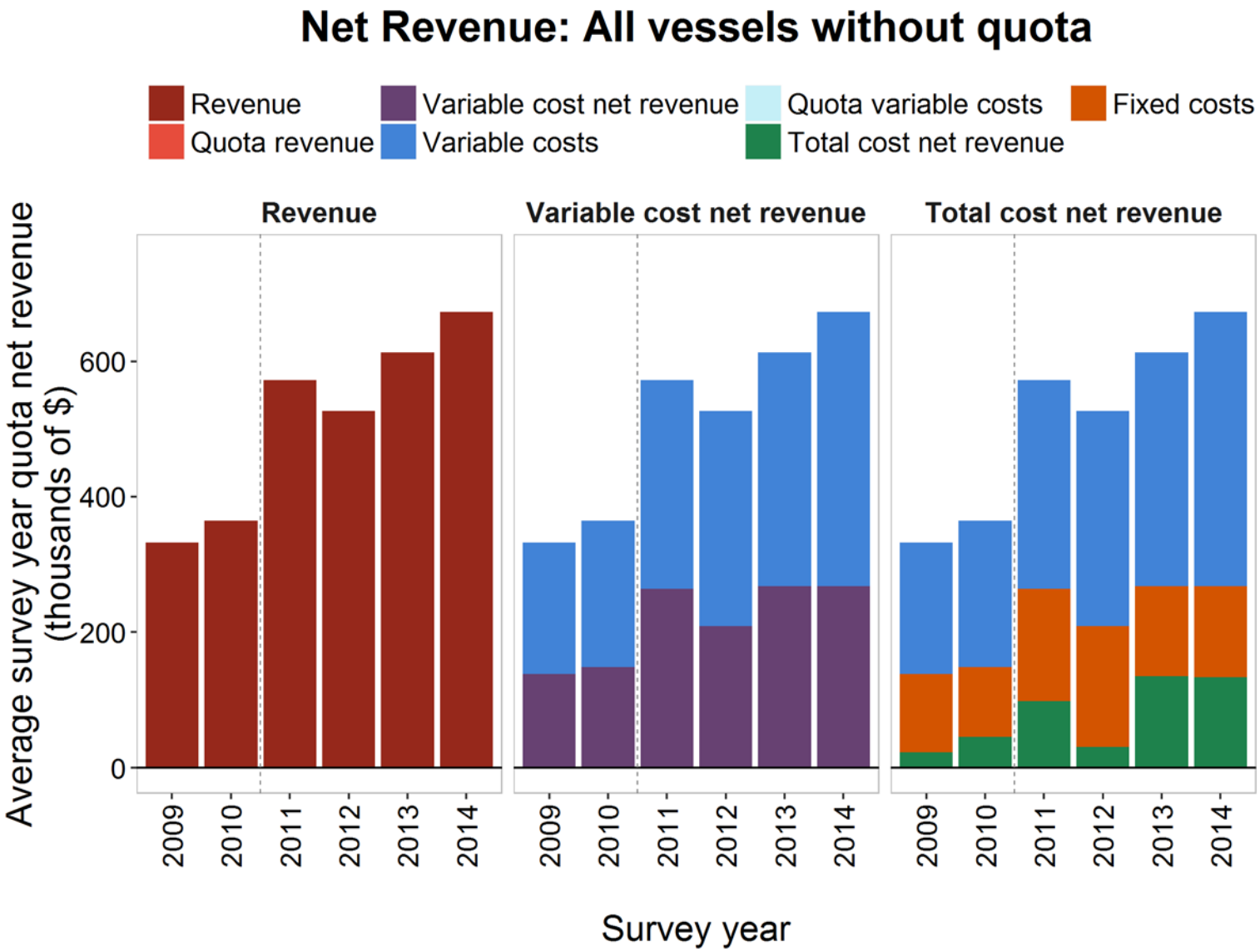
- Analysis in Reports
  - Short description of findings: p15
  - Tables and figures of “quota net revenue”: p164-174
- Limitations
  - Cannot allocate costs between whiting and non-whiting
  - Cannot reallocate costs from fiscal year to calendar year
  - Do not collect quota earnings from non-participants

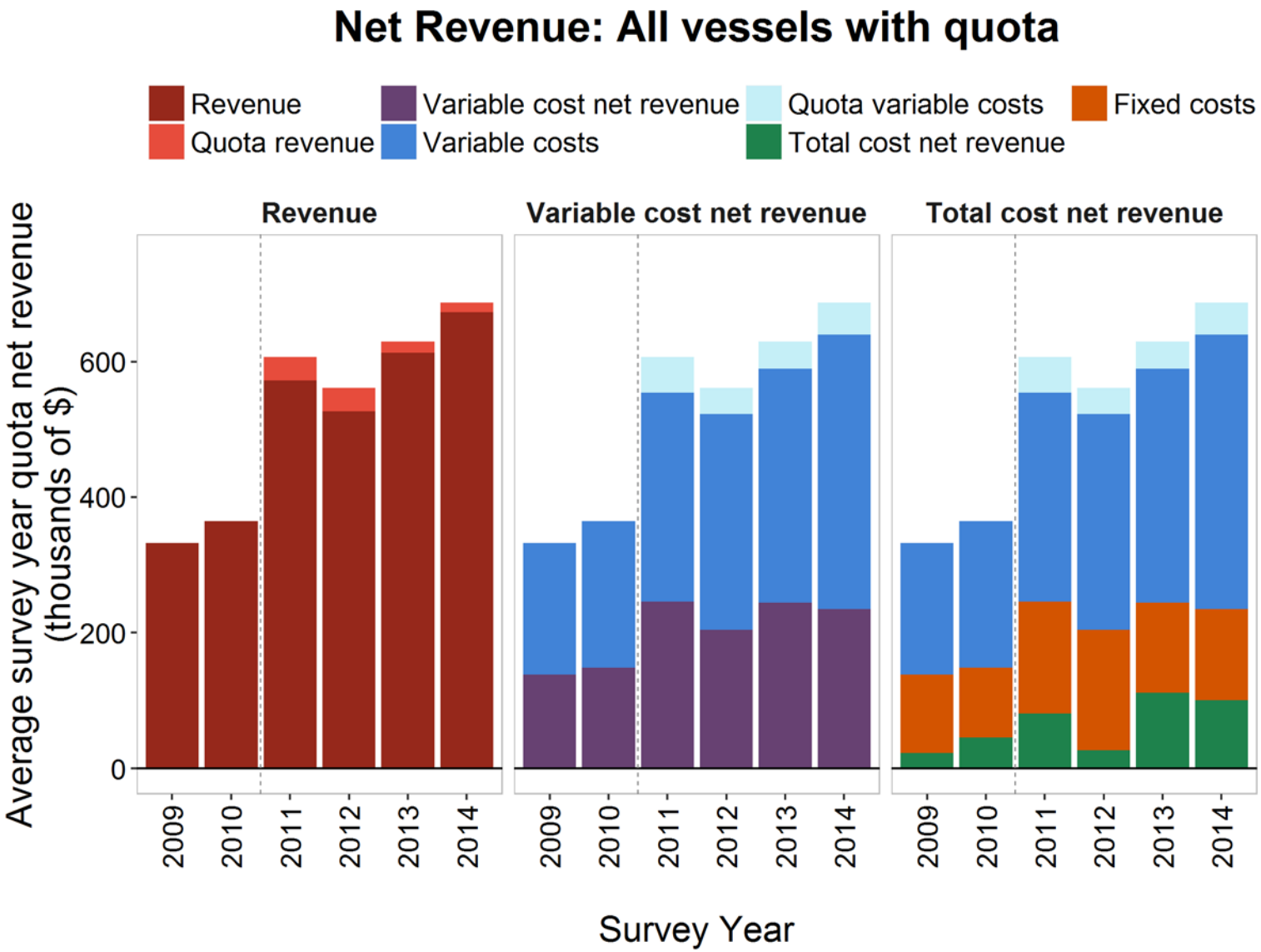
Net Revenue: Including quota cost and earnings

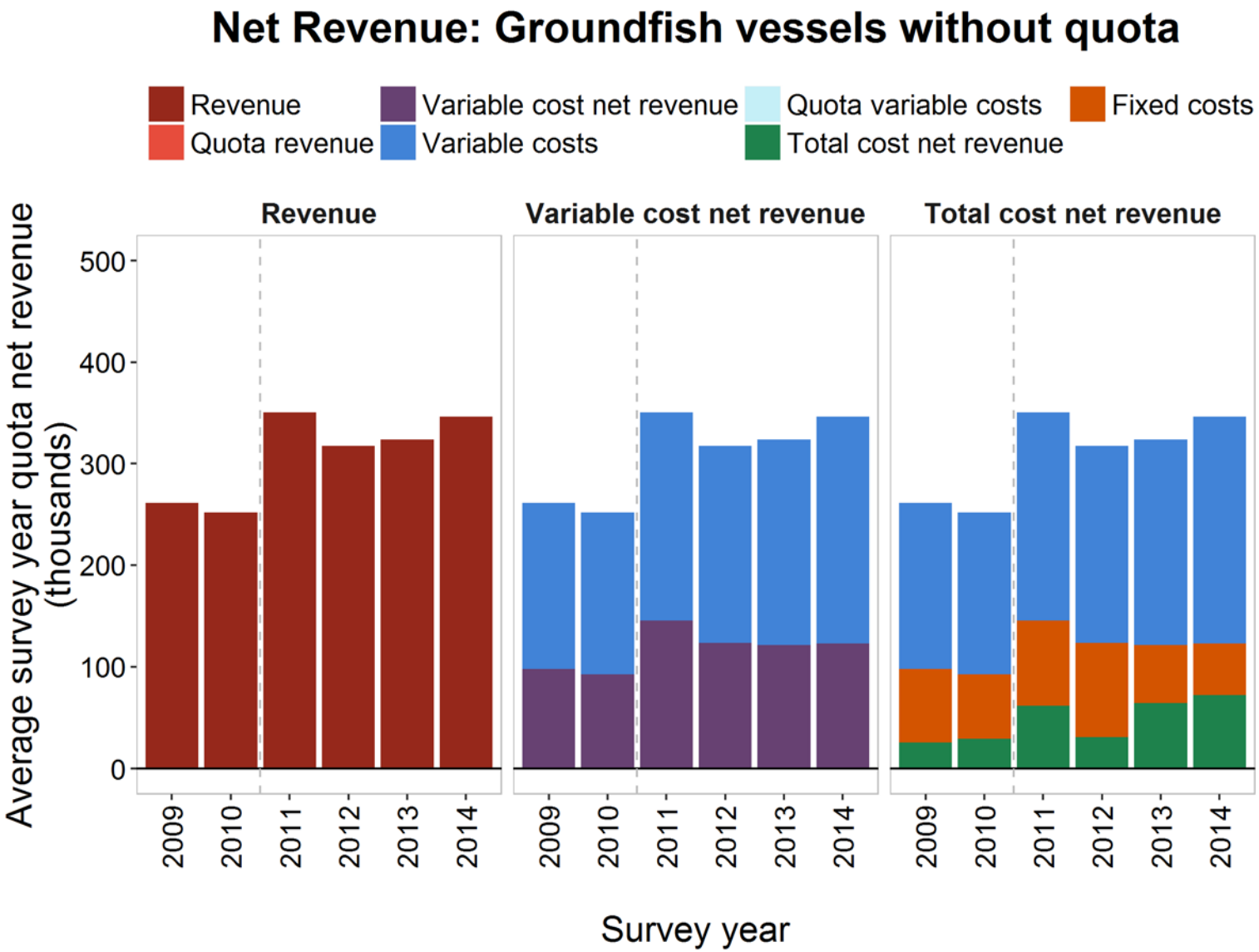
- Findings
  - All catch shares: the average variable cost net revenue when quota was included was between 1.9% and 13% less than the average variable cost net revenue when it was not included.
  - Whiting vessels: difference in average variable cost net revenue when including quota versus not including quota was largest in 2013 (8.5% less)
  - Groundfish vessels: the difference was highest in 2014 (25% less).

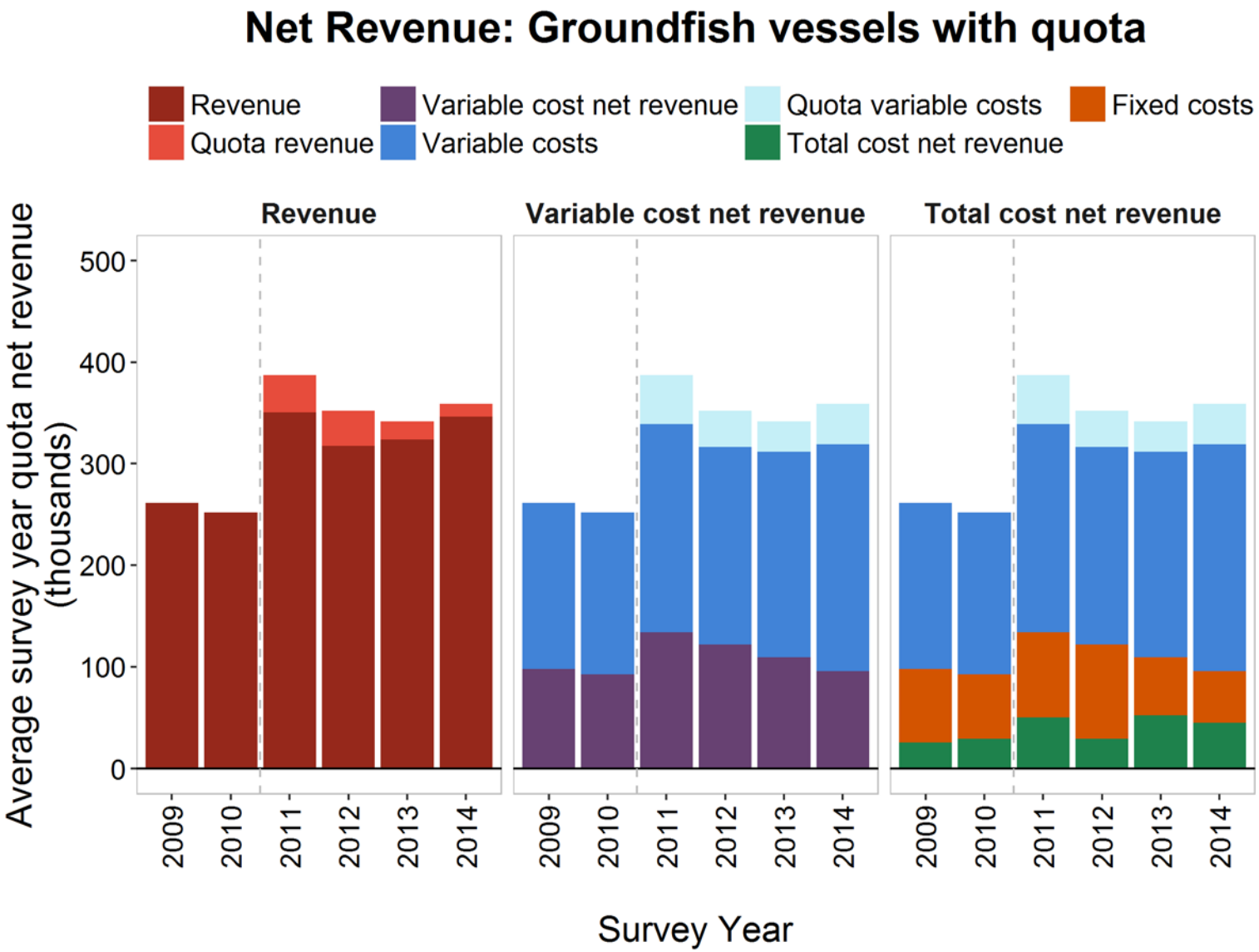
Net Revenue: Including quota cost and earnings

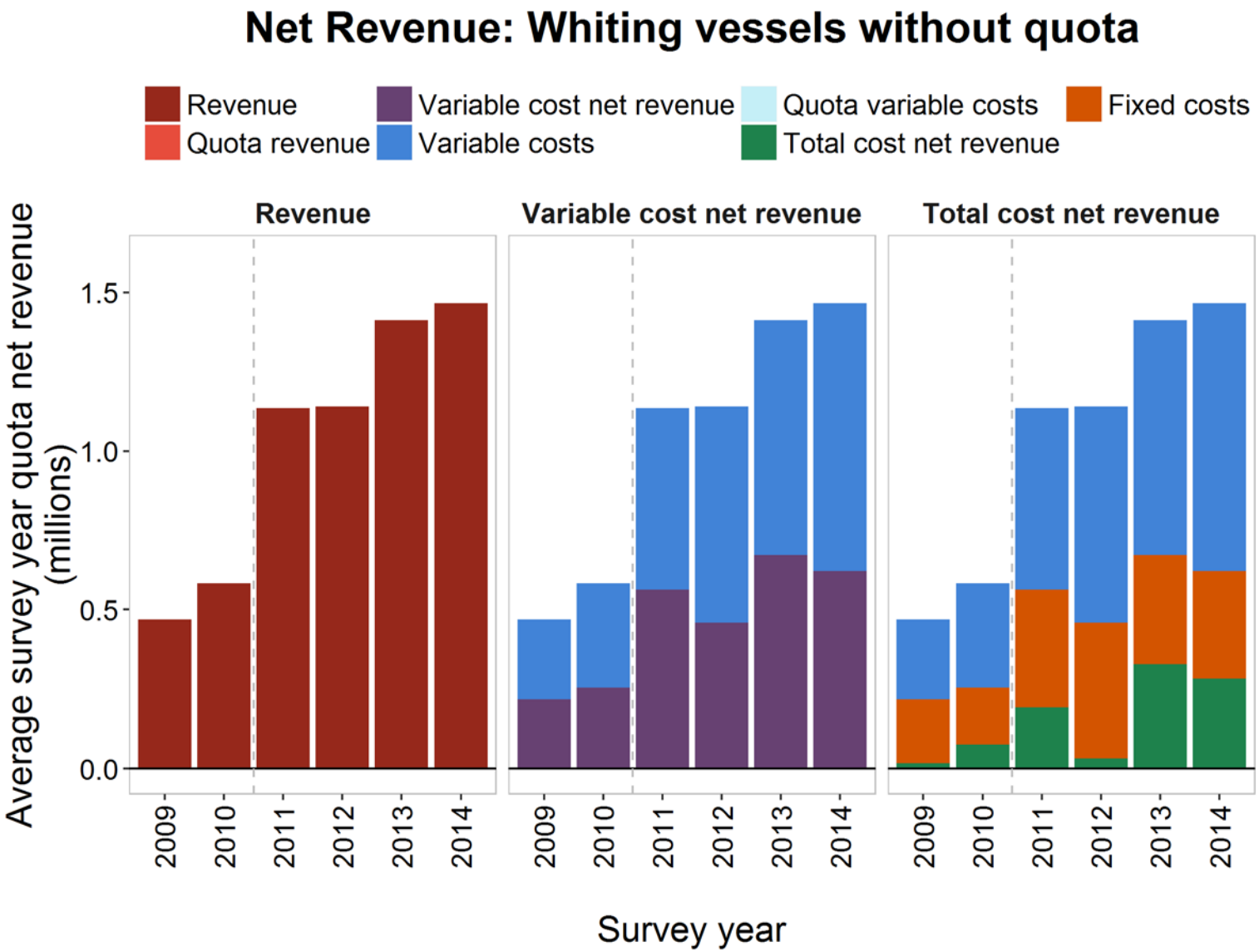
- The results are driven by whether quota sellers are also catch share participants
  - In 2011, 74% of all quota costs reported on EDC forms were reported as earnings for vessels currently participating in the catch share fisheries
  - In 2014, 45% of all quota costs were reported as earnings from current participants

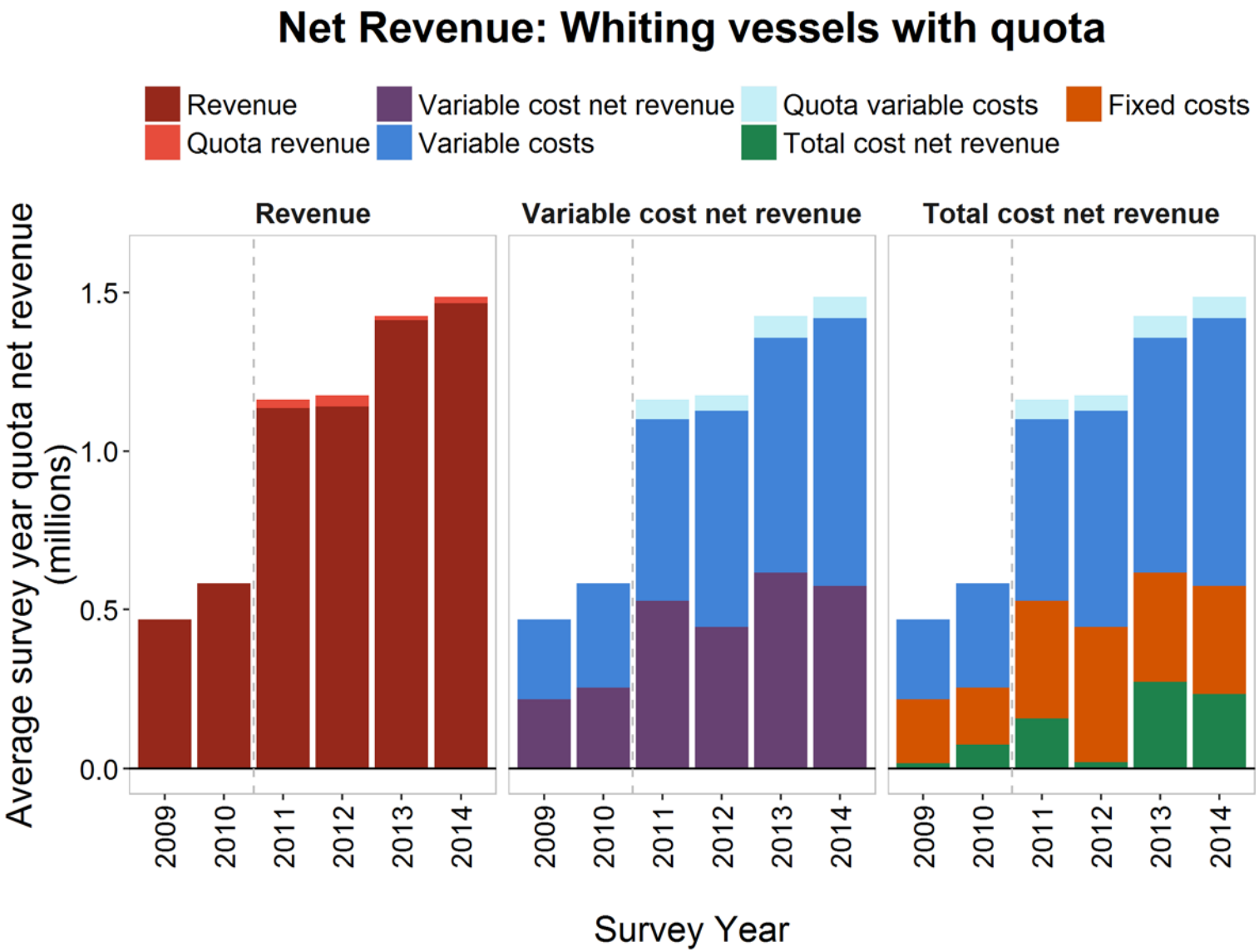

Net Revenue: All vessels without quota
Revenue
Quota revenue
Variable cost net revenue
Variable costs
Quota variable costs
Total cost net revenue
Fixed costs
Revenue
Variable cost net revenue
Total cost net revenue
Average survey year quota net revenue (thousands of $)
0
200
400
600
2009
2010
2011
2012
2013
2014
Survey year


Net Revenue: All vessels with quota
Revenue
Quota revenue
Variable cost net revenue
Variable costs
Quota variable costs
Total cost net revenue
Fixed costs
Revenue
Variable cost net revenue
Total cost net revenue
Average survey year quota net revenue (thousands of $)
0
200
400
600
2009
2010
2011
2012
2013
2014
Survey Year


Net Revenue: Groundfish vessels without quota
Revenue
Quota revenue
Variable cost net revenue
Variable costs
Quota variable costs
Total cost net revenue
Fixed costs
Revenue
Variable cost net revenue
Total cost net revenue
Average survey year quota net revenue (thousands)
0
100
200
300
400
500
2009
2010
2011
2012
2013
2014
Survey year


Net Revenue: Groundfish vessels with quota
Revenue
Quota revenue
Variable cost net revenue
Variable costs
Quota variable costs
Total cost net revenue
Fixed costs
Revenue
Variable cost net revenue
Total cost net revenue
Average survey year quota net revenue (thousands)
0
100
200
300
400
500
2009
2010
2011
2012
2013
2014
Survey Year


Net Revenue: Whiting vessels without quota
Revenue
Quota revenue
Variable cost net revenue
Variable costs
Quota variable costs
Total cost net revenue
Fixed costs
Revenue
Variable cost net revenue
Total cost net revenue
Average survey year quota net revenue (millions)
0.0
0.5
1.0
1.5
2009
2010
2011
2012
2013
2014
Survey year


Net Revenue: Whiting vessels with quota
Revenue
Quota revenue
Variable cost net revenue
Variable costs
Quota variable costs
Total cost net revenue
Fixed costs
Revenue
Variable cost net revenue
Total cost net revenue
Average survey year quota net revenue (millions)
0.0
0.5
1.0
1.5
2009
2010
2011
2012
2013
2014
Survey Year