



NOAA
FISHERIES

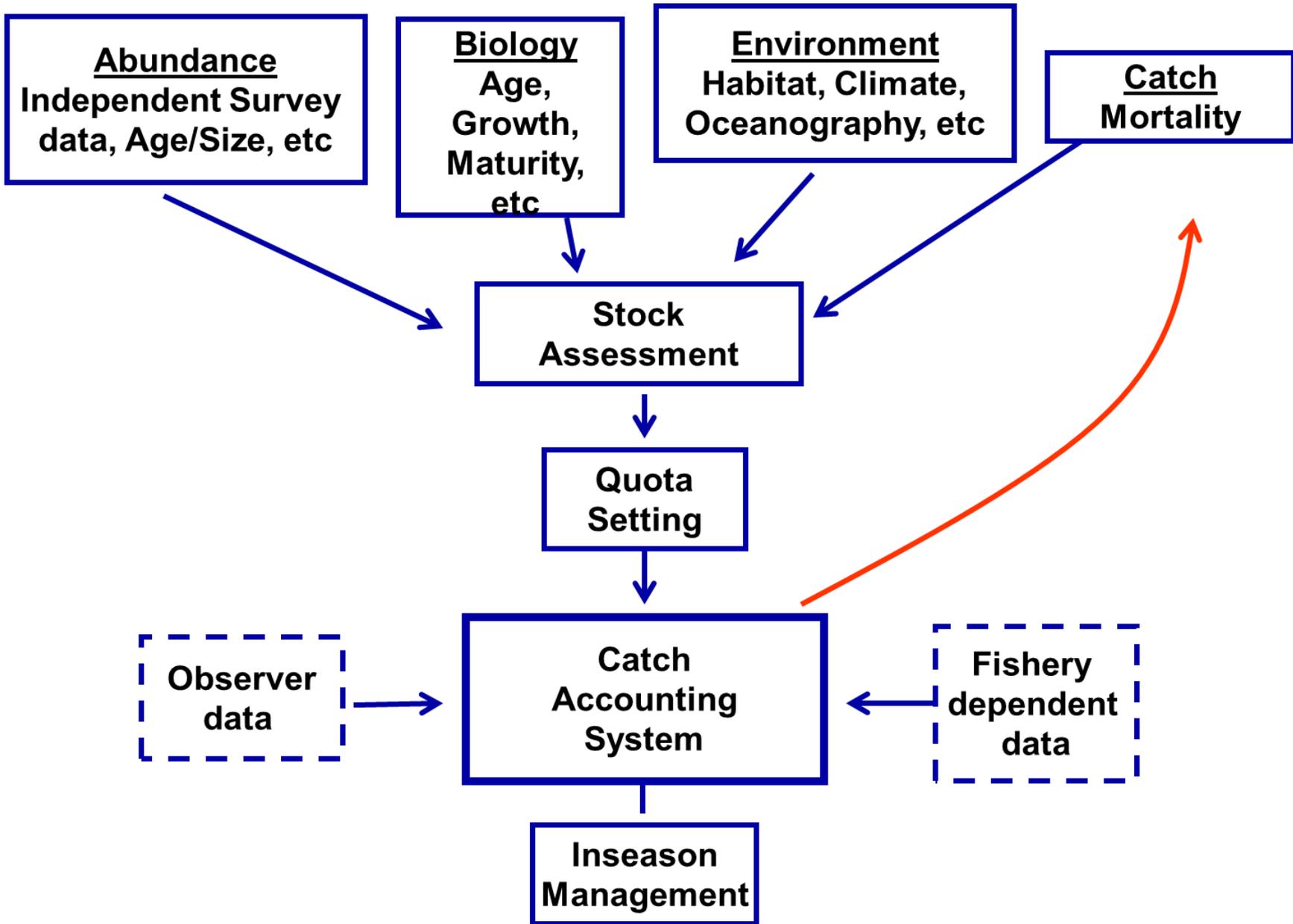
Alaska Region

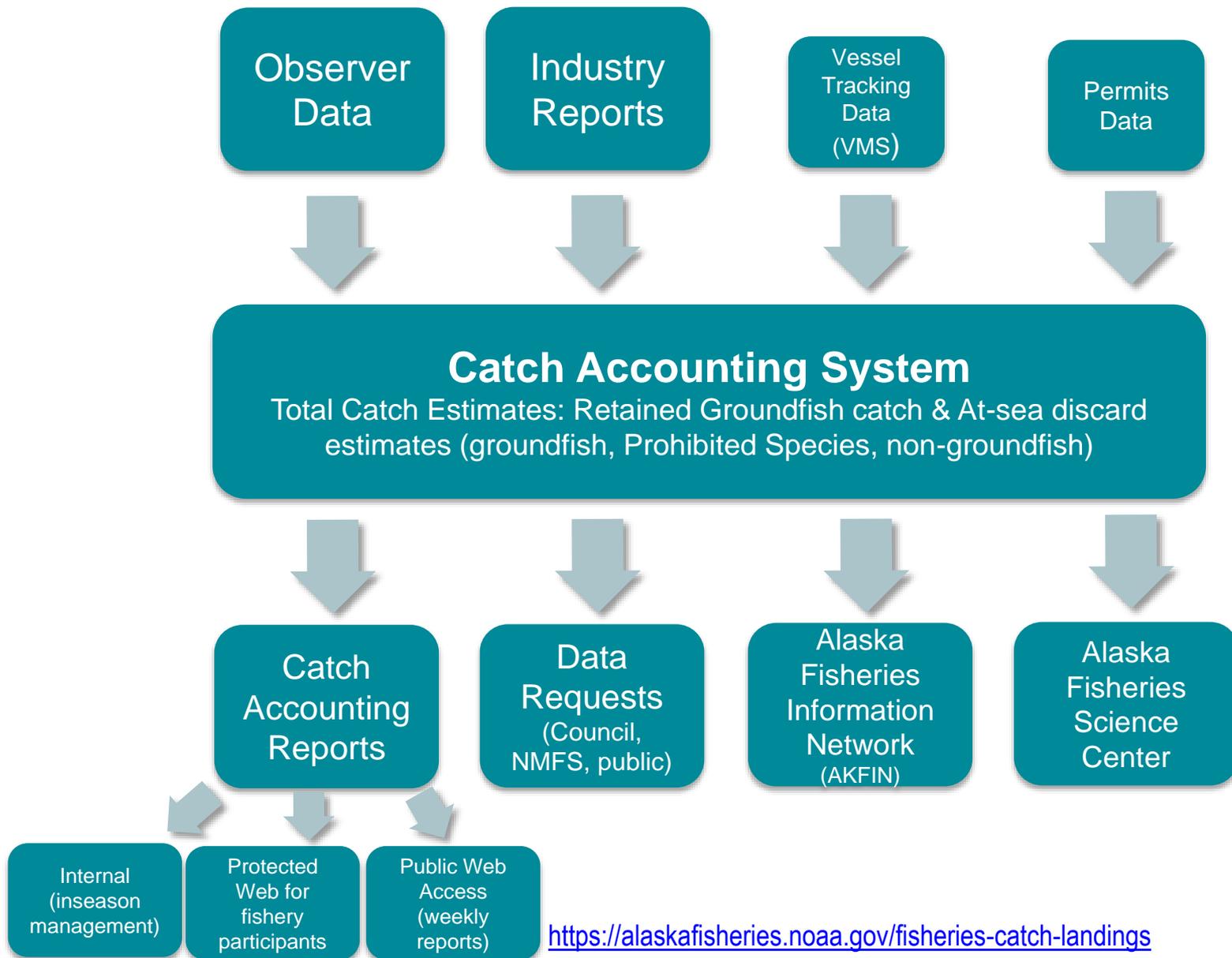
Pacific cod Catch Estimation and Management in Federal Groundfish Fisheries of the Bering Sea and Aleutian Islands - 2016

Catch Accounting System - purpose

- Total catch estimates for groundfish fisheries:
 - Retained groundfish catch
 - At-sea discards
 - Groundfish
 - Prohibited Species (e.g. halibut, crab, salmon)
 - Non-groundfish species (e.g. inverts, birds, etc.)
- Designed for timely estimates to support effective in-season management
 - Enable fisheries to stay within annual catch limits (“Accounts”) set by Annual Harvest Specifications
- Supports policy development, analysis, and stock assessment
 - Data access to stock assessment and NPFMC analysts through AKFIN Answers (online “data mart”)
 - Data access to fishery participants on web







<https://alaskafisheries.noaa.gov/fisheries-catch-landings>

Data Sources – Vessel Monitoring System

- NOAA Office of Law Enforcement maintains database
 - **Five updates** daily to Juneau database
 - Contains Lat/Long, vessel ID, spatially referenced date/time
- Catch Accounting uses information for spatial look-ups associated with special management areas
 - Assigns catch to special areas (e.g. critical habitat)
- Inseason uses information to gauge effort for management of quotas.

Data Sources – Industry Reports

Catcher Processors

- Logbook
 - Lat/long & time for each haul
 - Depth fished
 - Gear
 - Paper submitted to NMFS enforcement
 - eLogs submitted electronically each day
 - Logbook used by observers on vessels
- Daily Production Report
 - Gear, area fished
 - Weight of each species by product
 - “Product Recovery Rate” → round weight of fish caught
 - Weight of species that were discarded at sea
 - Submitted electronically each day
 - Used for economic analysis – product report on web



Data Sources – Industry Reports

Catcher Vessel

- Paper Logbooks – (13 electronic)

Shoreside Plant

- Landing Report (fish ticket)
 - For each catcher vessel delivery/trip
 - Weight of the delivered fish by species, gear, area fished
- Daily Production Report
 - Summarizes a day: weight of product for each species by FMP region (no vessel, no area fished)
 - Used for economic analysis — product report on web



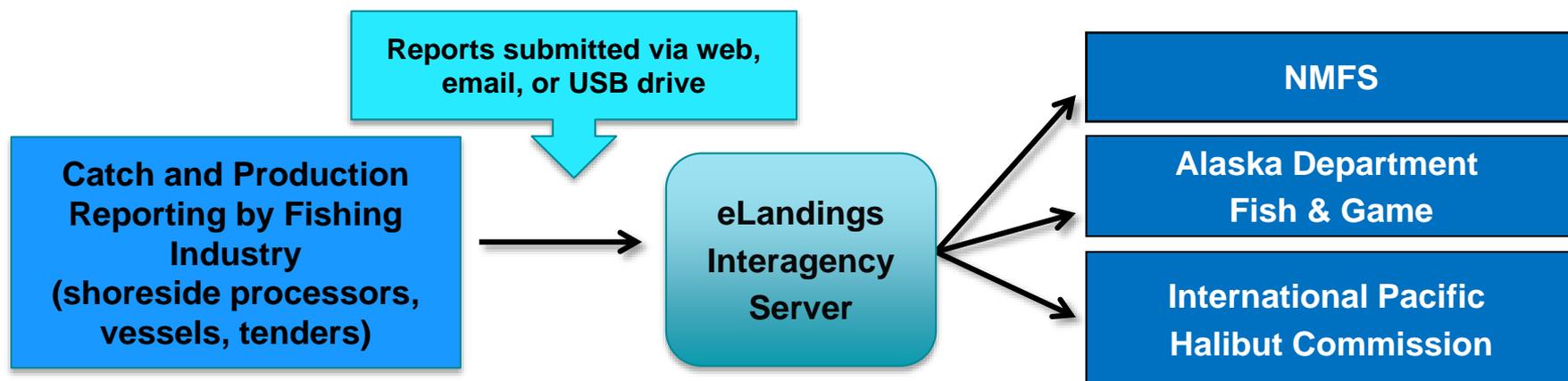
Mothership

- Daily Production Report
- Landing Report
 - For each catcher vessel delivery

Data Sources – Industry Reports

Alaska Interagency Electronic Reporting System:

- One-stop reporting to all 3 fishery management agencies in Alaska
- Single “authoritative” data source available to processors and agencies
- Increases timeliness and accuracy of fisheries data
- Electronic reporting required for all groundfish fisheries, IFQ halibut, and rationalized crab fisheries. Expanding to salmon fisheries.
- Electronic submission of landing reports (mandatory), production reports (mandatory), logbooks (not yet required for all vessels)



Data Sources – Observer Data

- Began 1990, “Restructured” in 2013
- North Pacific Groundfish and Halibut Observer Program:
 - Increased the statistical reliability of data
 - Addressed cost inequality among fishery participants
 - Expanded observer coverage to previously unobserved fisheries.
- Hierarchical design with randomization at all levels

Observer Deployment & Strata: 2013-2016

Deployment Category	Coverage Stratum	Fishing Sector	Sampled?	Sampling Unit	Sampling Design Defined by...
Partial Coverage	No Selection	Fixed gear CVs <40 ft and jig CVs	No	n/a	Annual Deployment Plan (ADP)
	Small Vessel	Fixed gear CVs 40-57.5 ft	Yes	2013-2014: Vessel 2015- 2016: Trip	ADP
	Large Vessel	All trawl CVs; and fixed gear CVs ≥57.5 ft	Yes	Trip	ADP
	Exempted CPs	2013-2015: 3 CPs that meet specific criteria Mid year 2016: changing “small CP” threshold, will exempt more CPs from 100% coverage	Yes	Trip	Regulations
Full Coverage	Full Coverage	CPs, motherships; CVs in certain fisheries (e.g., AFA, Rockfish Program)	Yes	Trip	Regulations



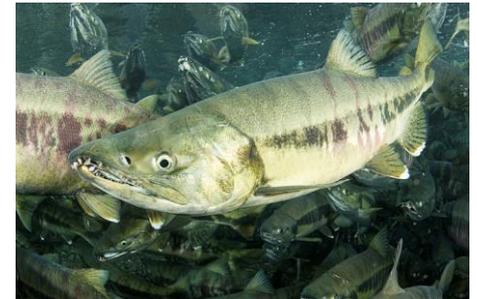
Data Sources to Estimate Total Catch

Coverage Stratum	Retained Catch	At-sea discard groundfish	At-sea discard non-FMP and PSC
No Selection	Landing Report	Discard rate from observer data in small vessel stratum applied to landing report	Discard rate from observer data in small vessel stratum applied to landing report
Small Vessel (partial coverage)	Landing Report	Discard rate from observer data applied to landing report	Discard rate from observer data applied to landing report
Large Vessel (partial coverage)	Landing Report	Discard rate from observer data applied to landing report	Discard rate from observer data applied to landing report
	Production Report	Production Report 2016 for CPs: Discard rate from observer data applied to landing report	Discard rate from observer data applied to production report
Full Coverage (CP, mothership)	Observer sample data	Observer sample data	Observer sample data AFA salmon – census done at offload



Discard Estimation

- Catcher Vessels
 - Observer sample data used to generate at-sea discard rate
 - At-sea discard rate applied to landings data using post-strata:
 - area, time, gear, trip 'target' (predominant retained species)
- Catcher/Processors and Motherships
 - Discard estimates come from vessel / trip-specific onboard observer information



BSAI Pacific cod Total Catch by Data Source

Year	Catcher Vessel Landings		Catcher/Processor Production		Catcher/Processor and Mothership Observer		Total
	MT	% of Total	MT	% of Total	MT	% of Total	
2011	56,237	26%	34,599	16%	128,977	59%	219,813
2012	63,949	26%	43,912	18%	137,800	56%	245,662
2013	64,715	26%	Included with CV	n/a	180,795	74%	245,510
2014	62,094	26%	1,353	0.6%	173,419	73%	236,866
2015	53,900	23%	1,067	0.5%	178,927	76%	233,893

More details.....

Description of catch estimation methods:

- Cahalan, J., J. Gasper, and J. Mondragon. 2014:
<http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-286.pdf>
- Cahalan, J., J. Gasper, and J. Mondragon. 2010:
<http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-205.pdf>

Strengths

- Timely data available for total catch estimation
 - Successful collaboration between 3 management agencies to accomplish one-stop electronic reporting of industry reports
 - Observer data reported and transmitted electronically
- Restructured observer program expanded to previously unobserved vessels and reduced bias by implementing sampling design to deploy observers
- QA/QC processes throughout the process increase data quality
 - Industry reports: validation (e.g. permits), auto fill (vessel name), sanity checks, hard errors
 - All 3 management agencies checking data
 - Observer data: debriefing, in-season advising, built in QC scripts
- Timely catch estimates enable effective in-season management and catch share management programs

Challenges and Next Steps

- Industry Reports

- Logbook data provide effort and detailed spatial information not otherwise available on unobserved trips;
- Paper logbooks not entered into database
- eLogbooks not required for all catcher/processors; very limited eLogbooks from catcher vessels
- Expand electronic reporting requirements for logbooks
- tLandings – electronic reporting for tenders

- Improvements to estimation

- Ongoing evaluation of catch estimation methods: collaboration between AFSC and AKRO
- Evaluating alternative estimators of catch and at-sea discards (ratio estimation, simple mean estimators, other)
 - Cahalan, J.A., J. Gasper, & J. Mondragon. In press. Catch estimation in the federal trawl fisheries off Alaska: A simulation approach to compare the statistical properties of the simple mean estimator, a deterministic imputation method, and the ratio estimator.
- Development of variance estimators
- Evaluate post-stratification, investigation of alternative post-stratification schemes

Changes in Management since 2011

- 2011-2014: Steller sea lion protection measures
 - no retention in Western Aleutian Island (area 543)
- 2013: Scales on longline C/Ps that participate in BSAI Pacific cod fisheries
- 2014: Separate Aleutian Islands annual catch limits
- 2015: Steller sea lion protection measures
 - Opened directed fishing in Western Aleutian Islands
 - Catch limit for Western Aleutian Islands based on ABC
 - Amendment 80 and trawl CDQ season extended from November 1 to December 31.

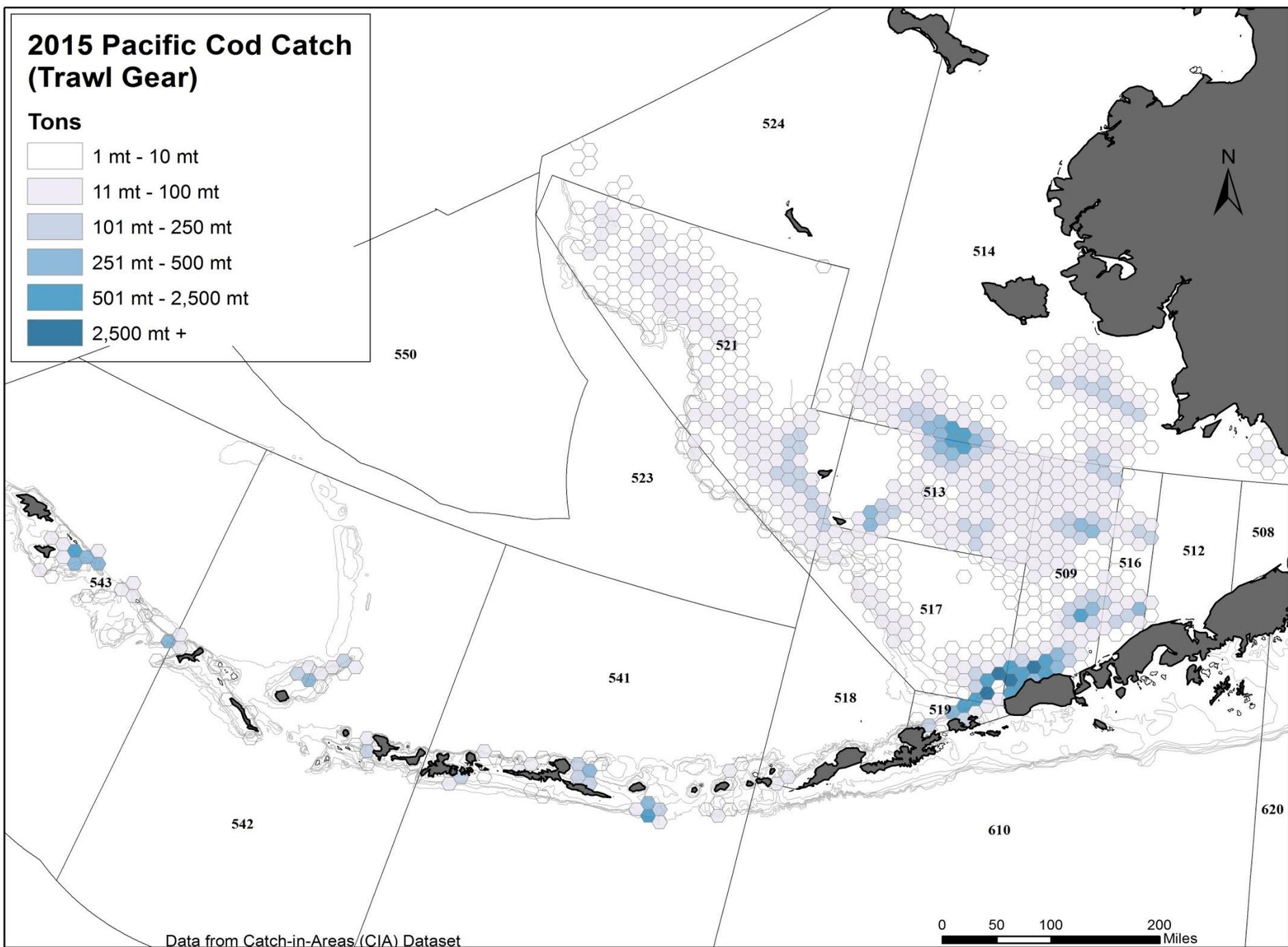
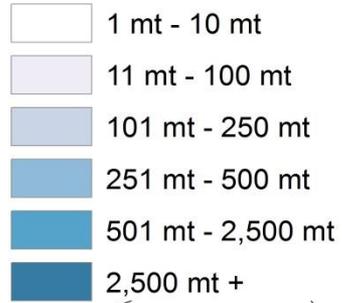
TABLE 8—FINAL 2016 GEAR SHARES AND SEASONAL ALLOWANCES OF THE BSAI PACIFIC COD TAC

[Amounts are in metric tons]

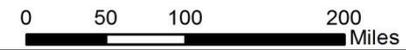
Gear sector	Percent	2016 share of gear sector total	2016 share of sector total	2016 seasonal apportionment	
				Seasons	Amount
BS TAC	n/a	238,680	n/a	n/a	n/a
BS CDQ	n/a	25,539	n/a	see § 679.20(a)(7)(i)(B)	n/a
BS non-CDQ TAC	n/a	213,141	n/a	n/a	n/a
AI TAC	n/a	12,839	n/a	n/a	n/a
AI CDQ	n/a	1,374	n/a	see § 679.20(a)(7)(i)(B)	n/a
AI non-CDQ TAC	n/a	11,465	n/a	n/a	n/a
Western Aleutian Island Limit	n/a	3,379	n/a	n/a	n/a
Total BSAI non-CDQ TAC ¹	100	224,606	n/a	n/a	n/a
Total hook-and-line/pot gear	60.8	136,561	n/a	n/a	n/a
Hook-and-line/pot ICA ²	n/a	500	n/a	see § 679.20(a)(7)(ii)(B)	n/a
Hook-and-line/pot sub-total	n/a	136,061	n/a	n/a	n/a
Hook-and-line catcher/processor	48.7	n/a	108,983	Jan 1-Jun 10	55,581
				Jun 10-Dec 31	53,402
Hook-and-line catcher vessel ≥ 60 ft LOA	0.2	n/a	448	Jan 1-Jun 10	228
				Jun 10-Dec 31	219
Pot catcher/processor	1.5	n/a	3,357	Jan 1-Jun 10	1,712
				Sept 1-Dec 31	1,645
Pot catcher vessel ≥ 60 ft LOA	8.4	n/a	18,798	Jan 1-Jun 10	9,587
				Sept 1-Dec 31	9,211
Catcher vessel < 60 ft LOA using hook-and-line or pot gear	2	n/a	4,476	n/a	n/a
Trawl catcher vessel	22.1	49,638	n/a	Jan 20-Apr 1	36,732
				Apr 1-Jun 10	5,460
				Jun 10-Nov 1	7,446
AFA trawl catcher/processor	2.3	5,166	n/a	Jan 20-Apr 1	3,874
				Apr 1- Jun 10	1,291
				Jun 10-Nov 1	0
Amendment 80	13.4	30,097	n/a	Jan 20-Apr 1	22,573
				Apr 1- Jun 10	7,524
				Jun 10-Nov 1	0
Alaska Groundfish Cooperative	n/a	n/a	4,751	Jan 20-Apr 1	3,563
				Apr 1- Jun 10	1,188
				Jun 10-Dec 31	0
Alaska Seafood Cooperative	n/a	n/a	25,346	Jan 20-Apr 1	19,010
				Apr 1- Jun 10	6,337
				Jun 10-Dec 31	0
Jig	1.4	3,144	n/a	Jan 1-Apr 30	1,887
				Apr 30-Aug 31	629
				Aug 31-Dec 31	629

2015 Pacific Cod Catch (Trawl Gear)

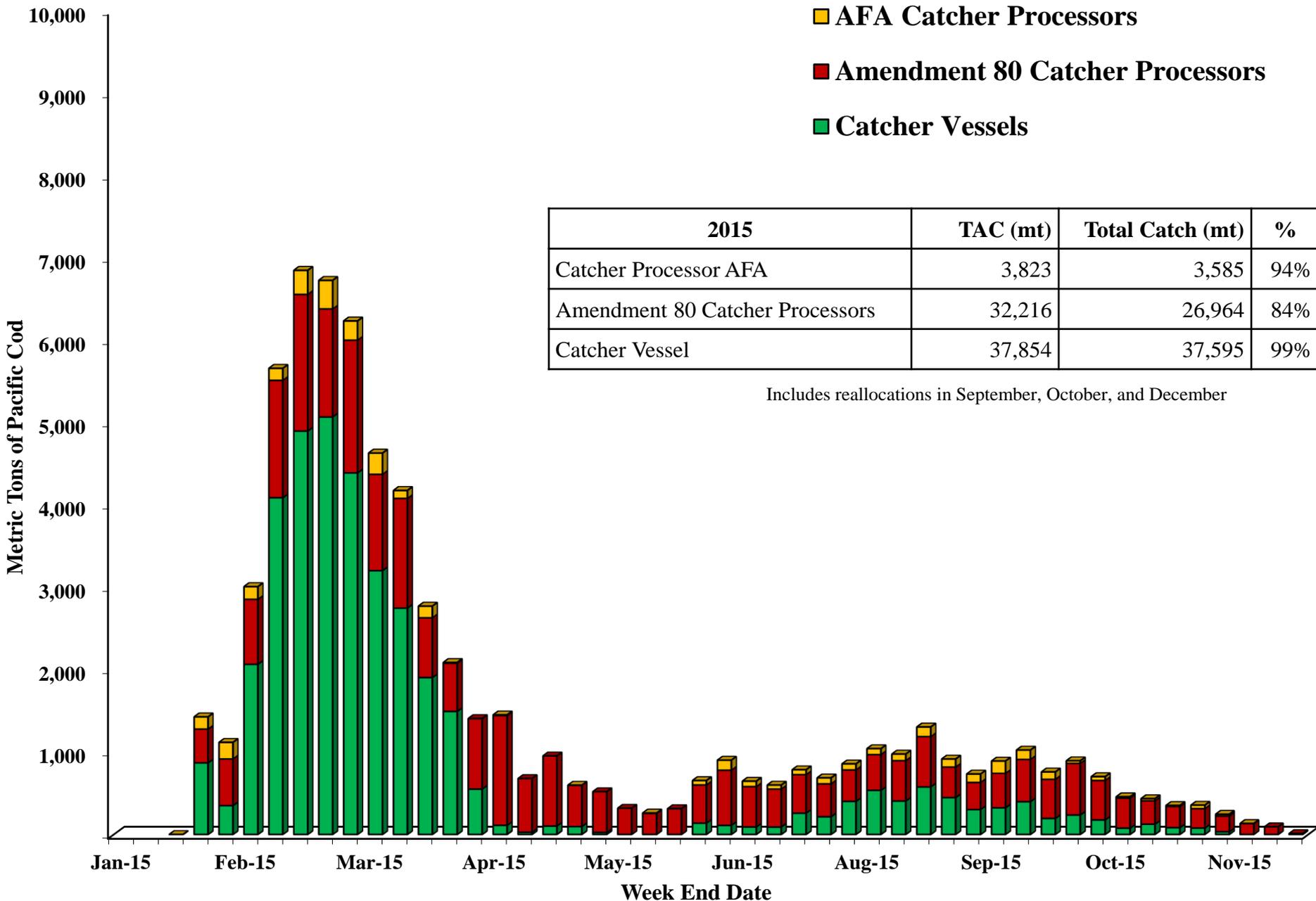
Tons



Data from Catch-in-Areas (CIA) Dataset

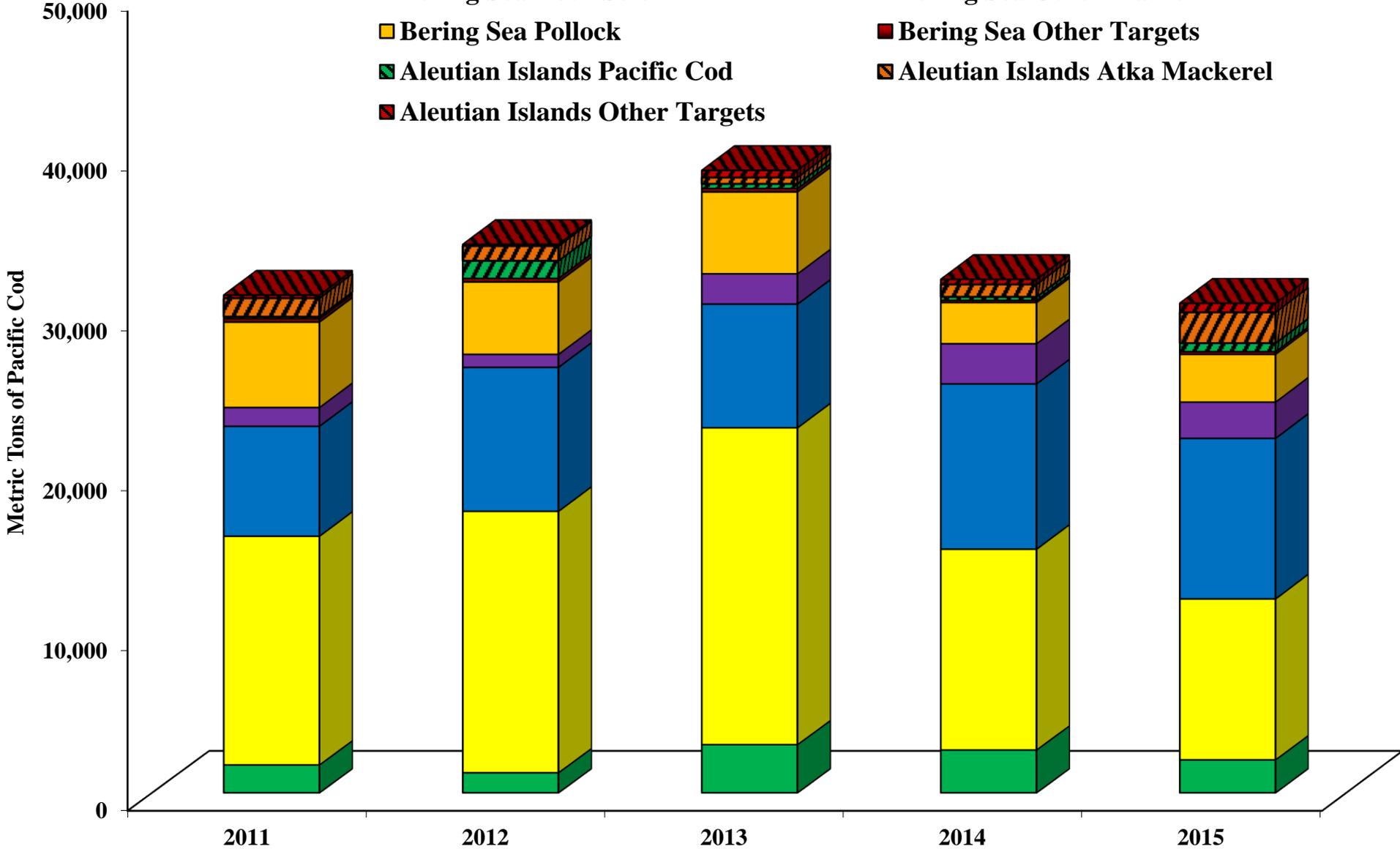


2015 BSAI Trawl Pacific Cod Catch

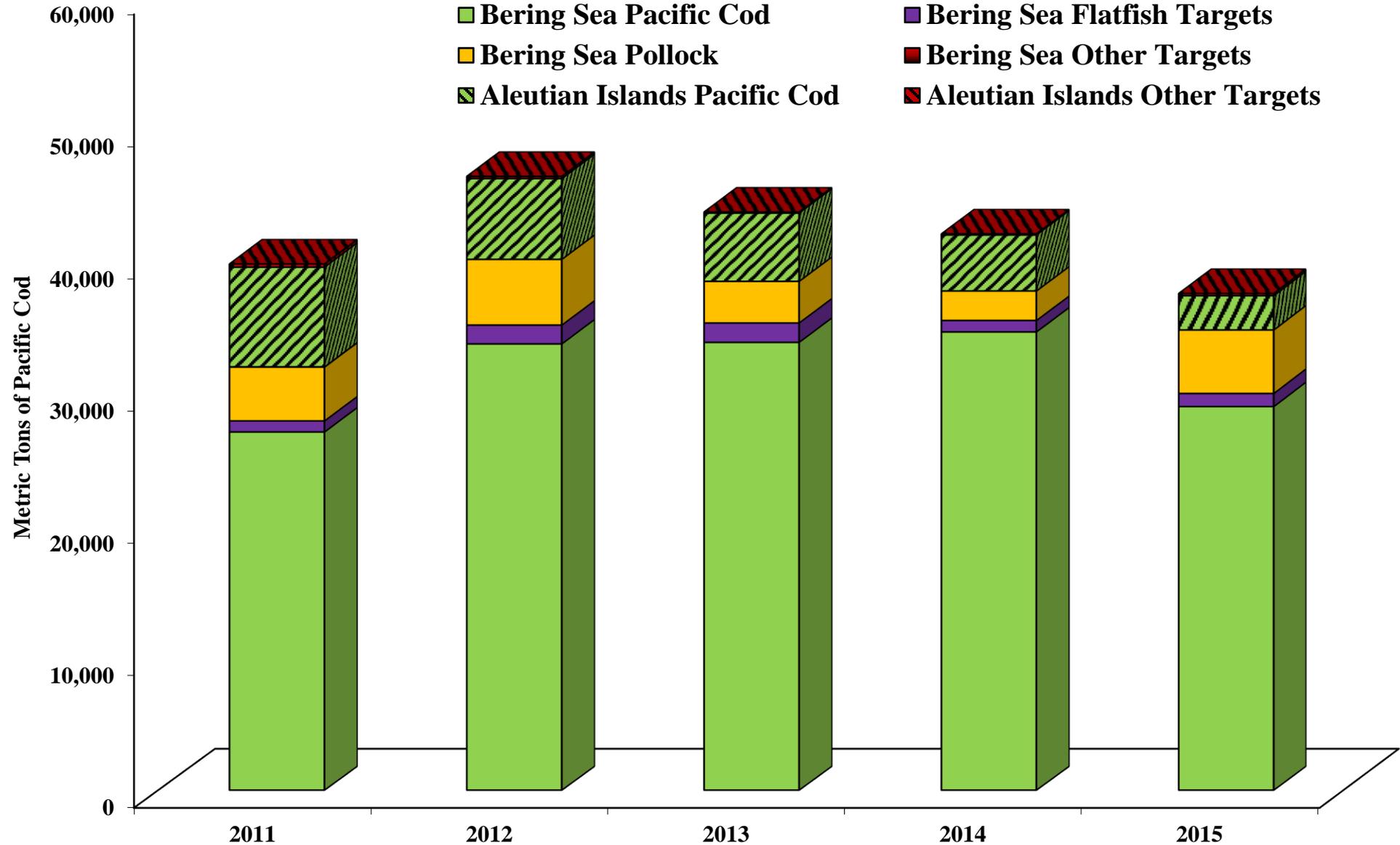


BSAI Trawl Catcher/Processor Pacific Cod Catch by Target

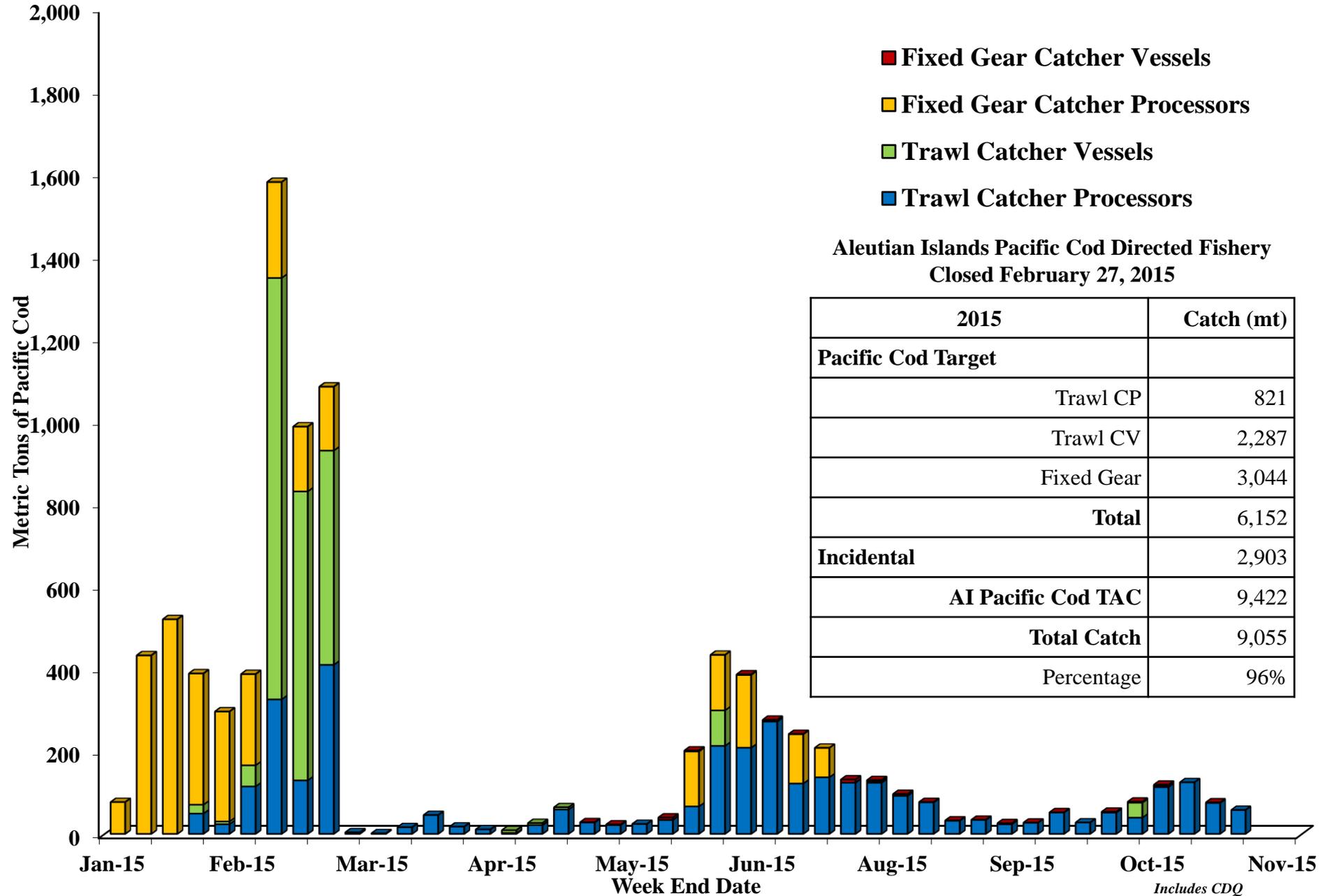
- Bering Sea Pacific Cod
- Bering Sea Rock Sole
- Bering Sea Pollock
- Aleutian Islands Pacific Cod
- Aleutian Islands Other Targets
- Bering Sea Yellowfin Sole
- Bering Sea Other Flatfish
- Bering Sea Other Targets
- Aleutian Islands Atka Mackerel



BSAI Trawl Catcher Vessel Pacific Cod Catch by Target

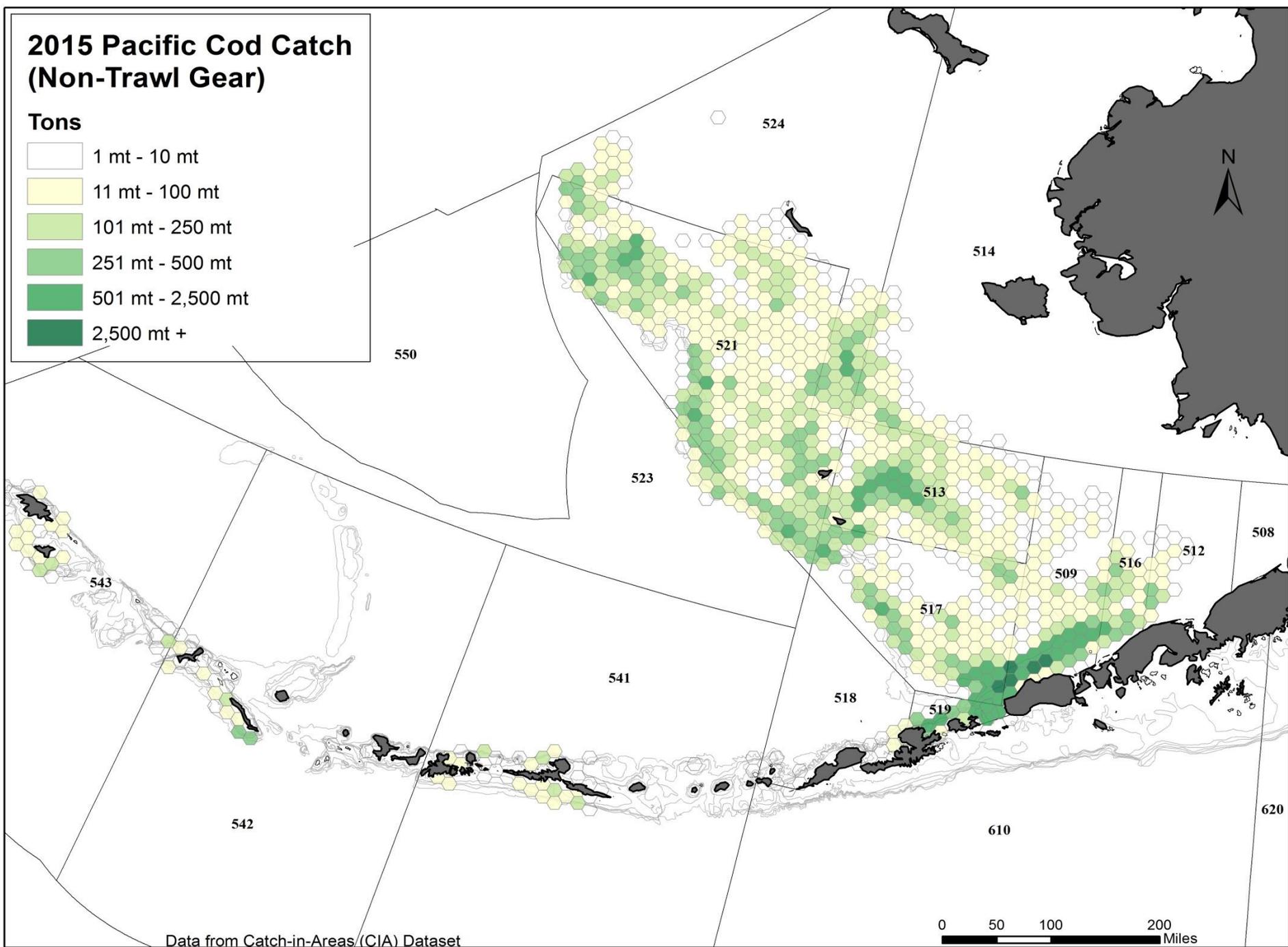
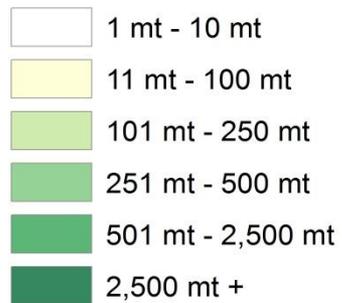


2015 Aleutian Islands Pacific Cod Catch



2015 Pacific Cod Catch (Non-Trawl Gear)

Tons



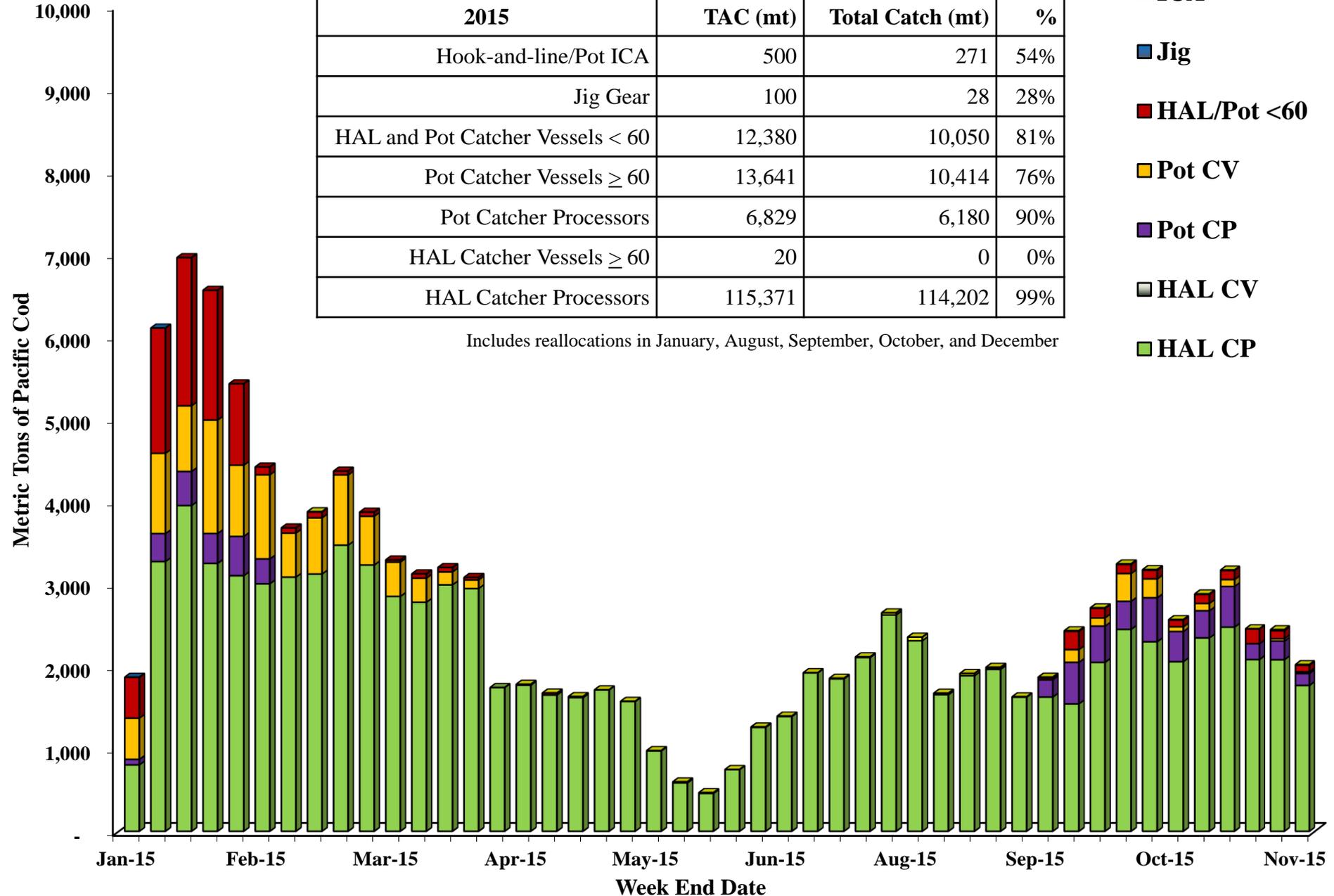
Data from Catch-in-Areas (CIA) Dataset

2015 BSAI HAL, Pot, Jig Pacific Cod Catch

2015	TAC (mt)	Total Catch (mt)	%
Hook-and-line/Pot ICA	500	271	54%
Jig Gear	100	28	28%
HAL and Pot Catcher Vessels < 60	12,380	10,050	81%
Pot Catcher Vessels ≥ 60	13,641	10,414	76%
Pot Catcher Processors	6,829	6,180	90%
HAL Catcher Vessels ≥ 60	20	0	0%
HAL Catcher Processors	115,371	114,202	99%

Includes reallocations in January, August, September, October, and December

- ICA
- Jig
- HAL/Pot <60
- Pot CV
- Pot CP
- HAL CV
- HAL CP



Future Changes in Management

- Amendment 109 allows small catcher vessels fishing CDQ to retain groundfish (e.g. Pacific cod) in the halibut CDQ fishery, or groundfish CDQ fisheries, without requirements for an LLP and full observer coverage.
- Amendment 111 reduces halibut PSC limits from 4,425 to 3,515 mt
- Aleutian Islands shoreplant delivery requirement – TAC set aside for catcher vessels delivering to shoreplants until March 15.
- Allow trawl catcher vessels currently assigned to partial observer coverage to voluntarily choose full (100%) observer coverage for all fishing in the BSAI.

State of Alaska Guideline Harvest Levels

Alaska Board of Fisheries, regulatory body for the State of Alaska, Department of Fish and Game, establishes GHGs in State waters

- 2006 – 2015: Aleutian Islands, 3% of the BSAI ABC
 - A season 70%, B season 30%
- 2014 – 2015: Bering Sea, 3% of BSAI ABC
 - 2014 - 8,103 mt, 2015 - 8,178 mt
 - No seasonal apportionment
 - Pot vessels < 58 feet
- 2016: Bering Sea, 6.4% of Bering Sea ABC
 - 16,320 mt
- 2016: Aleutian Islands, 27% of AI ABC
 - 4,752 mt, no seasonal apportionment
 - GHG reached then increases 4% each year until 39%

At-Sea Scale Program

- Began mid-1990's
- more precise and verifiable and less dependent on estimates generated by atsea observers.
- 2008 non AFA trawl C/Ps participating in BSAI trawl fisheries
- Since its inception, the Program has grown significantly, from fewer than 10 participating vessels in 1998 to over 60 vessels today.

Hook-and-line CP catch monitoring

- modified equipment and operational requirements for freezer longliners named on LLPs endorsed to catch and process Pacific cod at sea with hook-and-line gear in the BSAI.
- Two monitoring options:
 - carry two observers or carry one observer and use a motion-compensated scale to weigh Pacific cod before it is processed.
 - required when operating in BSAI or GOA groundfish fisheries when directed fishing for Pacific cod is open in the BSAI, or CDQ.

PSC Rates

- Precedence 50 / Vessel Specific / Catcher Vessels
- Precedence 50 / Vessel Specific / Catcher Processors
- Precedence 45 / Cooperative Specific
- Precedence 40 / Processing Sector (CP or CV)
- Precedence 30 / Three-Week Average
- Precedence 25 / Three-Month Average
- Precedence 20 / FMP Area

Hierarchical design

Trips

- Sector or fishery

Hauls

- Haul Weight,
- Time/Area

Samples

- Species Composition

Individual Specimens

- Sex, length, weight

Tissues

- Diet, Age



Observer sampling manual:

<http://www.afsc.noaa.gov/FMA/document.htm>

