

NPFMC Salmon Bycatch Workshop  
April 15-16, 2019  
AFSC, Seattle

# Objectives

- *facilitate feedback on how stock composition reports can be improved to better inform industry bycatch avoidance efforts,*
- *discuss appropriate spatial and temporal resolution of stock identification,*
- *identify other associated analyses that could be used by stakeholders to better understand the causes of, and potential measures to minimize, salmon bycatch.*

# Overarching questions

- Can we gain efficiencies within the current system?
- What can be answered with the current design and are changes needed?
- What resources (funding etc) can be leveraged to make changes?

# Salmon Bycatch Programs

## Management

### EBS

#### Fisheries

- EBS Pollock

#### Cooperative Structure

- AFA

#### PSC limit

- No limits for other trawl fisheries  
Hard cap PSC limit annual level and performance standards contingent on estimate of Chinook status  
3-River index sum > and < 250,000  
Chinook

Allocated by sector and season

Transferability provisions between entities  
Flexibility to increase A season pollock catch to 45:55 to reduce Chinook catch  
100% observer coverage

Incentive Plan Agreements designed for bycatch reduction of Chinook and chum

### GOA

#### Fisheries

- GOA pollock trawl
- GOA non-pollock trawl

#### Cooperative Structure

- Rockfish cooperative management; all other fisheries are limited access-no catch share programs

#### PSC limit

- Hard cap PSC limits in CGOA and WGOA trawl fisheries

#### Pollock

- CGOA 18,316
- WGOA 6,683

#### Non-pollock

- CV 2,700
- CP 3,600
- Rockfish 1,200

NMFS has authority to reallocate between fisheries based on need and availability.  
Limited to 50% of initial cap.

Observer coverage is partial

No measures for chum salmon  
No mandatory excluder use



# Salmon Bycatch Programs

D1 Salmon workshop PRESENTATION  
JUNE 2019

## EBS Pollock

## GOA Pollock

## GOA non-pollock trawl

### Salmon enumeration and genetics sampling

- Full retention
- EM monitoring provisions to ensure full accountability
- Census of salmon
- Systematic genetics sampling

- Full retention
- Census shoreside when observed
- Opportunistic genetic sampling

- Full retention
- Voluntary census
- Systematic genetics sampling

### Annual Reports to Council

#### AFA Coop Report

- Monitoring
- Salmon #s

#### CGOA rockfish coop report

- Monitoring
- Salmon by season

#### IPA reports

- Measures to reduce Chinook bycatch at all levels of abundance
- Measure to reduce chum

#### Genetics reports

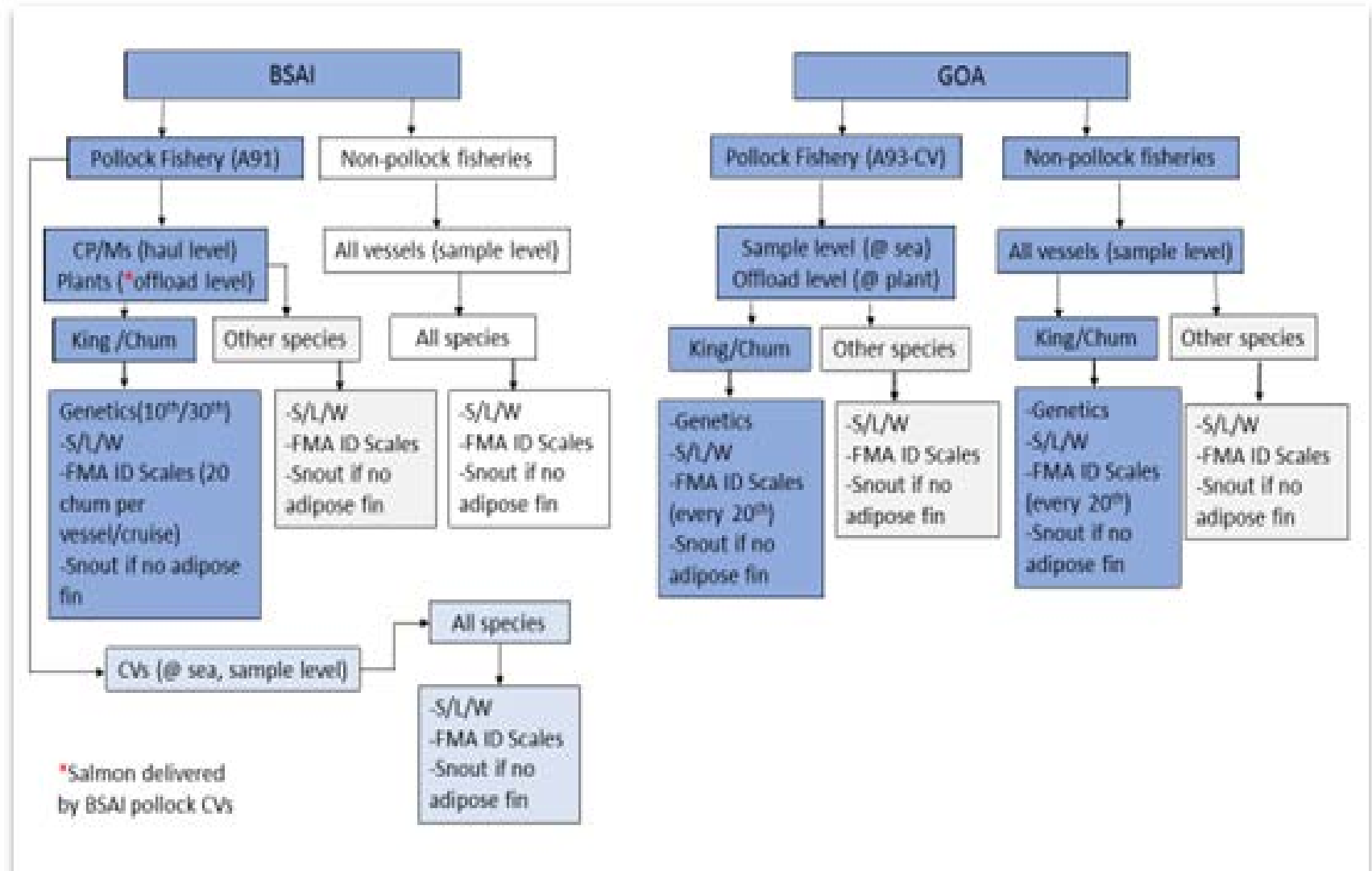
- GOA rockfish and ATF fishery chinook genetics
- Chum genetics (what fisheries?)

#### Genetics reports

- Chinook
- Chum



Summary of data collections for salmon species in BSAI and GOA trawl fisheries



## State of knowledge continued

- Primer on Mixed stock analysis
- Chinook salmon bycatch genetic stock composition: current capabilities and analyses
- Chum salmon bycatch genetic stock composition: current capabilities and analyses
- Age inventory and upcoming efforts (and limitations) to aging Chinook and chum scaled from EBS and GOA

# Developing capacities

- Looking for better ways to use genetic data to avoid critical Chinook and chum salmon stocks in groundfish fisheries
- Developing Capabilities: What else might be possible?
- Use of tags, thermal marks, and scales to determine origin and age of salmon
- Alternatives for updating AEQ analysis and prioritizing data needs
- Conservation engineering approaches to salmon bycatch mitigation





# Workshop recommendations

# 1) Chinook AEQ

1. GOA: Industry expressed interest in an AEQ in the GOA to look at the relative impact of the GOA pollock fishery on stocks of interest
  - Need to develop appropriate methods to account for large number of stock groups and possibly different growth than in BSAI
2. BSAI update: Need to account for potential changes in size-at-age and age-at-maturity which could impact results.
  - Backlog of scales available to develop more recent age-length key

# GOA AEQ information needs

The AEQ for the Bering Sea looks at the impacts of Chinook PSC on salmon runs of Western Alaska and the Yukon River in particular. An AEQ for the GOA would require that priority stocks/ regions be articulated.

Furthermore, genetic data will need to be capable of breaking out such regions. For example, currently the Copper River – a single system – is identified by genetics. A Taku/ Stikine group would also be feasible with existing genetic baselines. Other, additional river systems would need similarly differentiable genetic reporting groups.

An AEQ for the GOA would require (at the least):

- 1) Reporting Group - Genetically differentiable baseline for stocks or stock aggregations of interest
- 2) Time series of age of bycatch, age-specific bycatch
- 3) Time series of age-specific stock composition of bycatch
- 4) Time series of size-at-age from scales of bycatch by reporting group
- 5) Time series of age-at-maturity of adult returns by reporting group
- 6) Time series of run size estimates of adult salmon by reporting group

## 2) GOA Chinook hatchery contribution

1. Concern with ~20% increase in hatchery Chinook to support southern resident killer whales and impact on bycatch number
2. Need to compile hatchery contribution information as a baseline prior to production increases
  - Methods to be developed

### 3) Utility of comprehensive Chinook data collection efforts from rockfish fishery bycatch

- Tremendous effort has been directed at sampling 100% of the Chinook bycaught in the Central GOA Rockfish fishery for genetics, otoliths, CWTs, sex, and length.
- An evaluation of the utility of this information for management or policy decisions is warranted.

## 4) BSAI Chum variation in space and time

- Continuation of current efforts and spatial clusters
- Develop capacity to separate hatchery from wild
- Continued interest in separation of spatial strata over time
- In years of high bycatch some additional finer scale spatial and temporal strata possible
- Transition to mixed-stock analysis software, will be easier for staff to explore different spatial clusters over time quickly.
- Intent to explore more systematic approach to determine persistent boundaries for spatial clusters

5) Evaluate policy implications of increased proportion of Pacific Northwest/BC fish in BSAI Chinook bycatch as it relates to management under lower caps tied to 3 River index.

- WAK stock proportions have decreased while BC and PNW proportions increase
- Chinook managed to incentivize avoidance regardless of origin
- Recommend some analyses of the efficacy of current management structure as it relates to avoidance of WAK Chinook stocks and/or potential for perverse incentives given current cap structure
- Recommend continued update and monitoring of the WAK AEQ as it relates to previous estimates, WAK run sizes as represented by the 3 River index, and breakpoint analysis of the 250,000 fish threshold under the 3 River index relative to bycatch and PSC cap levels.

## 6) Evaluate utility of time and area genetic evaluations of Chinook

- Current management system in both the Bering Sea and GOA mandates that industry avoid all salmon regardless of origin.
- Spatio-temporal patterns in stock composition are interesting and informative, but not currently being used in bycatch avoidance efforts as the mandate is to avoid *all* Chinook salmon.
- The Council should consider how and if this information can be used in management under current or future revised management efforts for bycatch reduction.



## 7) Improved efficiency in sample collection and processing

- **Field.** Determine the feasibility of deploying detector wands in the field to determine whether CWTs are present.
- **Lab.** Expedite ageing by combining preparation/processing of scales and genetic tissue samples

## 8) Improving the use of the Chinook genetic baseline

- Present baseline developed independently of its current usage in management and could be improved to better address current and future policy objectives
- 11 stock groupings based on political boundaries.
- Some areas of PNW could be better defined on biological differences
- Improvements would include grouping stocks by hatchery production areas vs wild stocks



# Future Directions

# Future directions


1. Strategies for interactive data visualization
  - Suite of dimensions (year, season, spatial cluster of statistical areas, ages, stock origin) available and working on online visualizations (R shiny) to help answer questions
    - E.g., “in 2017, in which spatial cluster was the majority of age-3 Russian origin chum caught?”
  - Will be eventually made available to users for their exploration
2. Upgrade technological capacity in ABL
  1. Upgraded capacity to perform GBS
  2. Increased workflow
3. Continue to explore application of shipboard genetic stock identification
  1. 3 options discussed (1 day, 1 week, 1 year) only 1 day for chum of interest to industry (issues with Chinook management system)
  2. Study funded by PCCRC to investigate utility of MinION for shipside stock composition for chum

# Additional Council requests April 2018

- Status of Chinook salmon runs and escapement in Alaska, British Columbia, and the U.S. West Coast stocks;
- Progress of Pacific Treaty negotiations
- Performance (harvest, effort, timing) of GOA non-pollock trawl CV fisheries subject to Chinook PSC limits

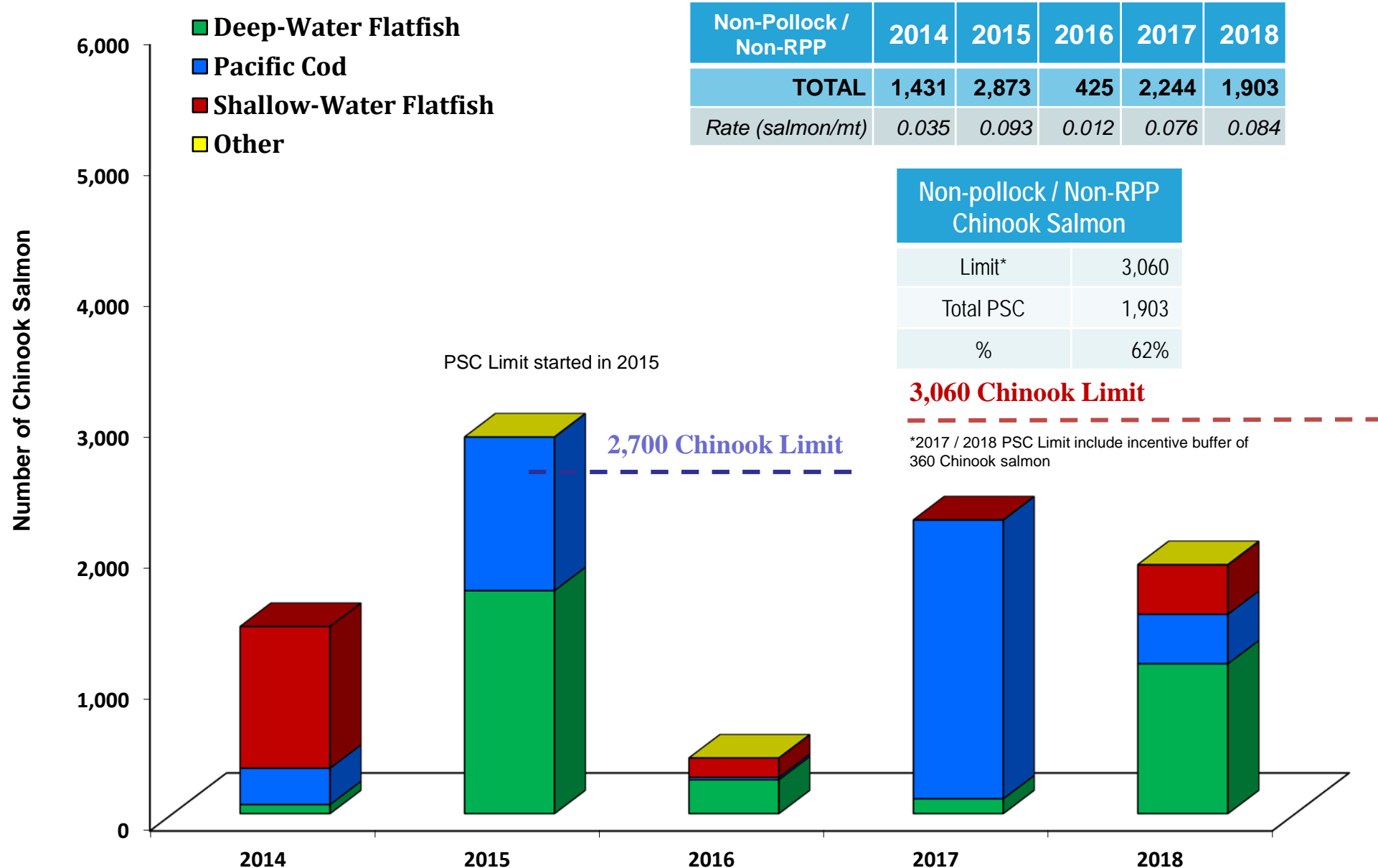
# Pacific salmon treaty changes

- The Pacific Salmon Commission has recommended to the governments of Canada and the United States a new 10-year conservation and harvest sharing agreement under the Pacific Salmon Treaty.
- The amendments were ratified and remain in force through December 31, 2028.
- Signed by Canada and the United States (U.S.) in 1985, the Pacific Salmon Treaty provides a framework for the two countries to cooperate on the management of Pacific salmon.
- The proposed agreement covers highly-migratory salmon stocks from Cape Falcon, Oregon in the south to Southeast Alaska in the north, including Pink, Coho, Sockeye, Chum and Chinook salmon.
- Changes recommended by the Commission are new conservation objectives for several salmon populations, as well as a renewed commitment to science and stock assessment to inform decision-makers in both countries. The proposed agreement also includes harvest reductions for Chinook fisheries in both countries that will help protect stocks while providing sustainable harvest opportunities for First Nations, Indian Tribes, and commercial and recreational fishers in both countries.



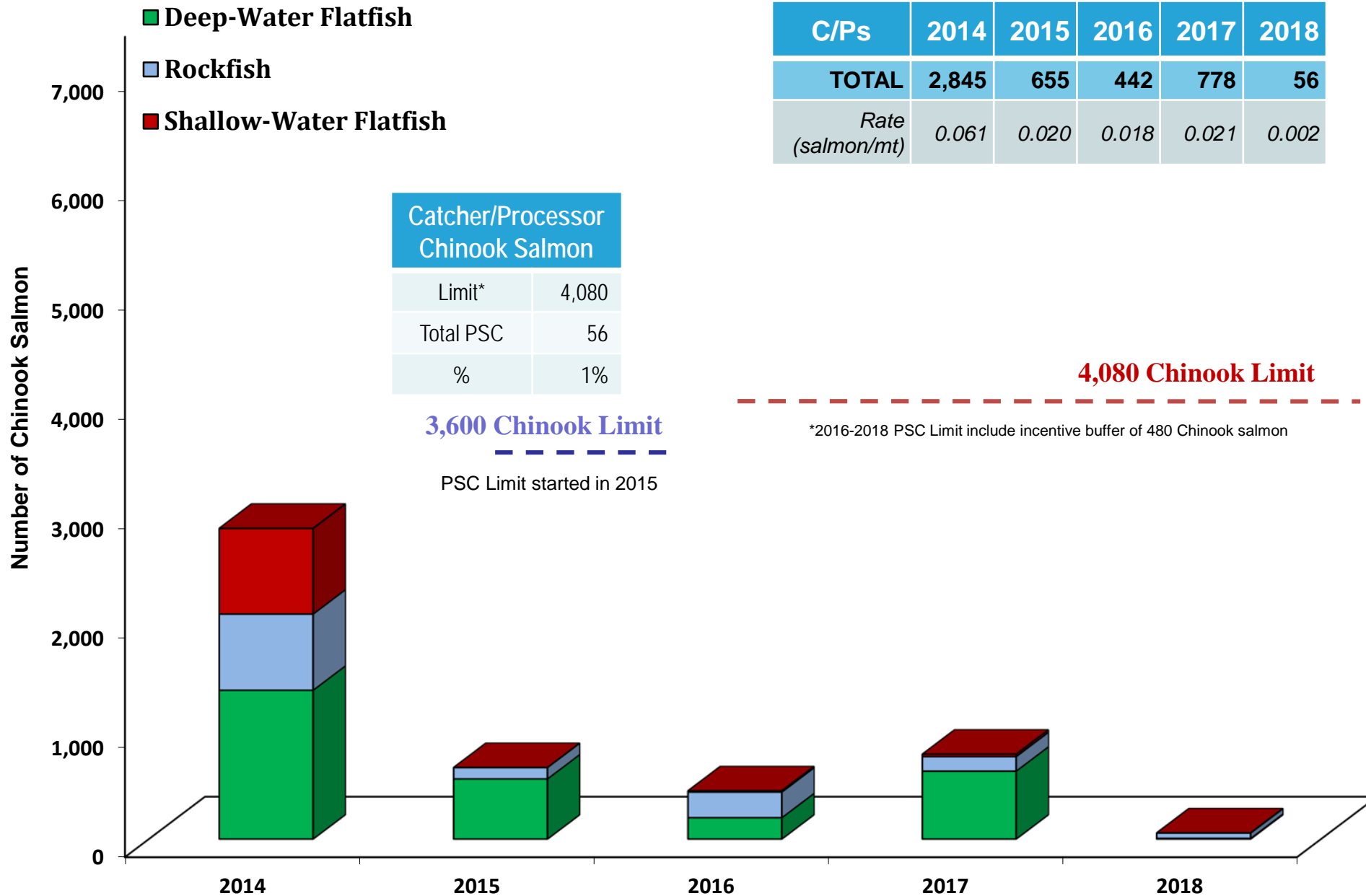
# GOA fishery performance relative to PSC limits

# 2014 – 2018 Chinook Salmon PSC in Non-Pollock / Non-Rockfish Program by Catcher Vessels

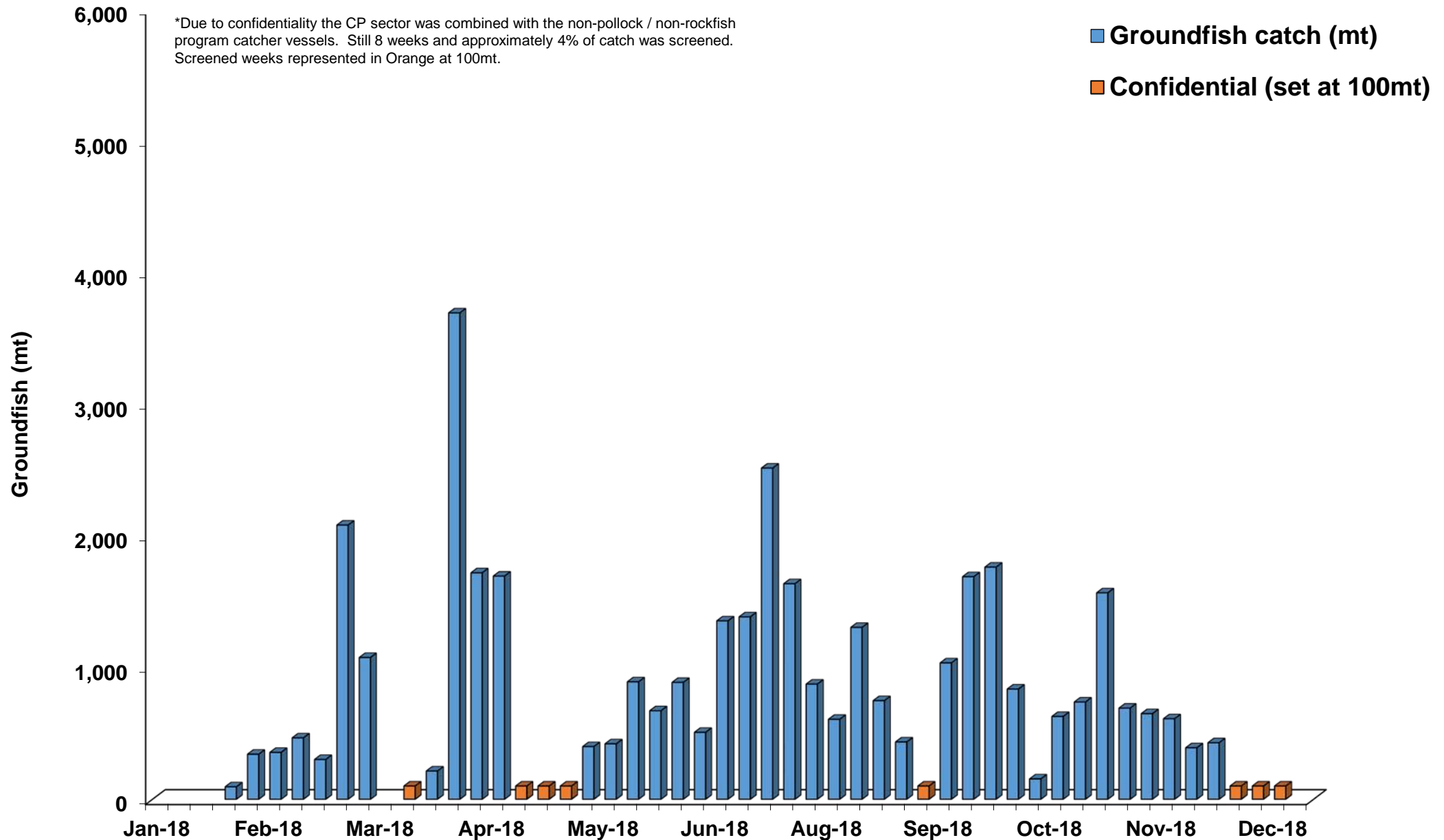




# 2014 – 2018 Chinook Salmon PSC by Catcher/Processors



# 2018 Weekly Groundfish Catch by Non-Pollock / Non-Rockfish Program Catcher Vessels and Trawl Catcher Processors



# 2018 Weekly Effort by Non-Pollock / Non-Rockfish Program Catcher Vessels and Trawl Catcher Processors

