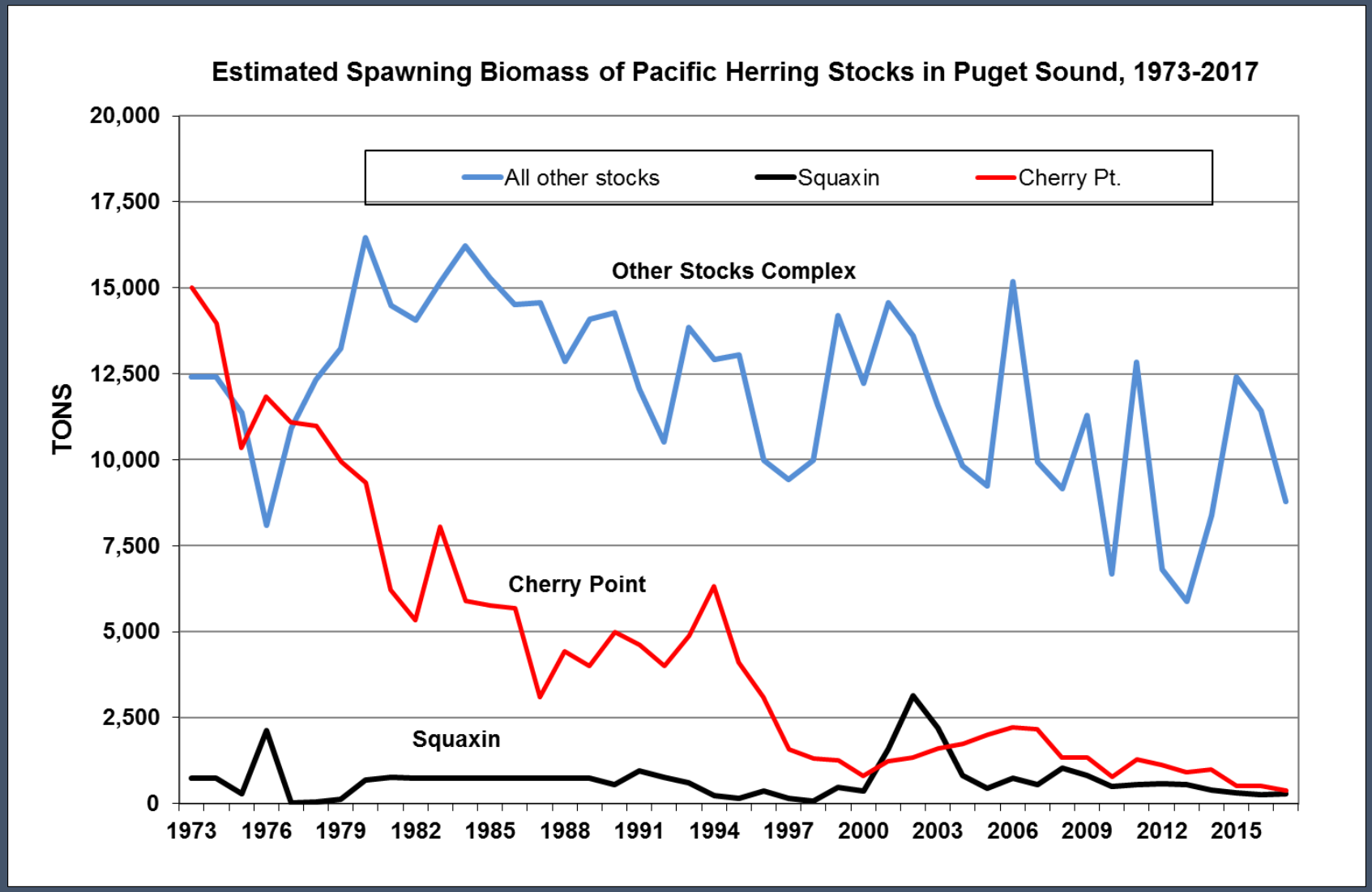
Cherry Point Herring Update, 2017

WDFW Forage Fish Program Contacts:
Todd Sandell (Todd.Sandell@dfw.wa.gov) Mill Creek office
Phill Dionne (Phillip.Dionne@dfw.wa.gov) Olympia office

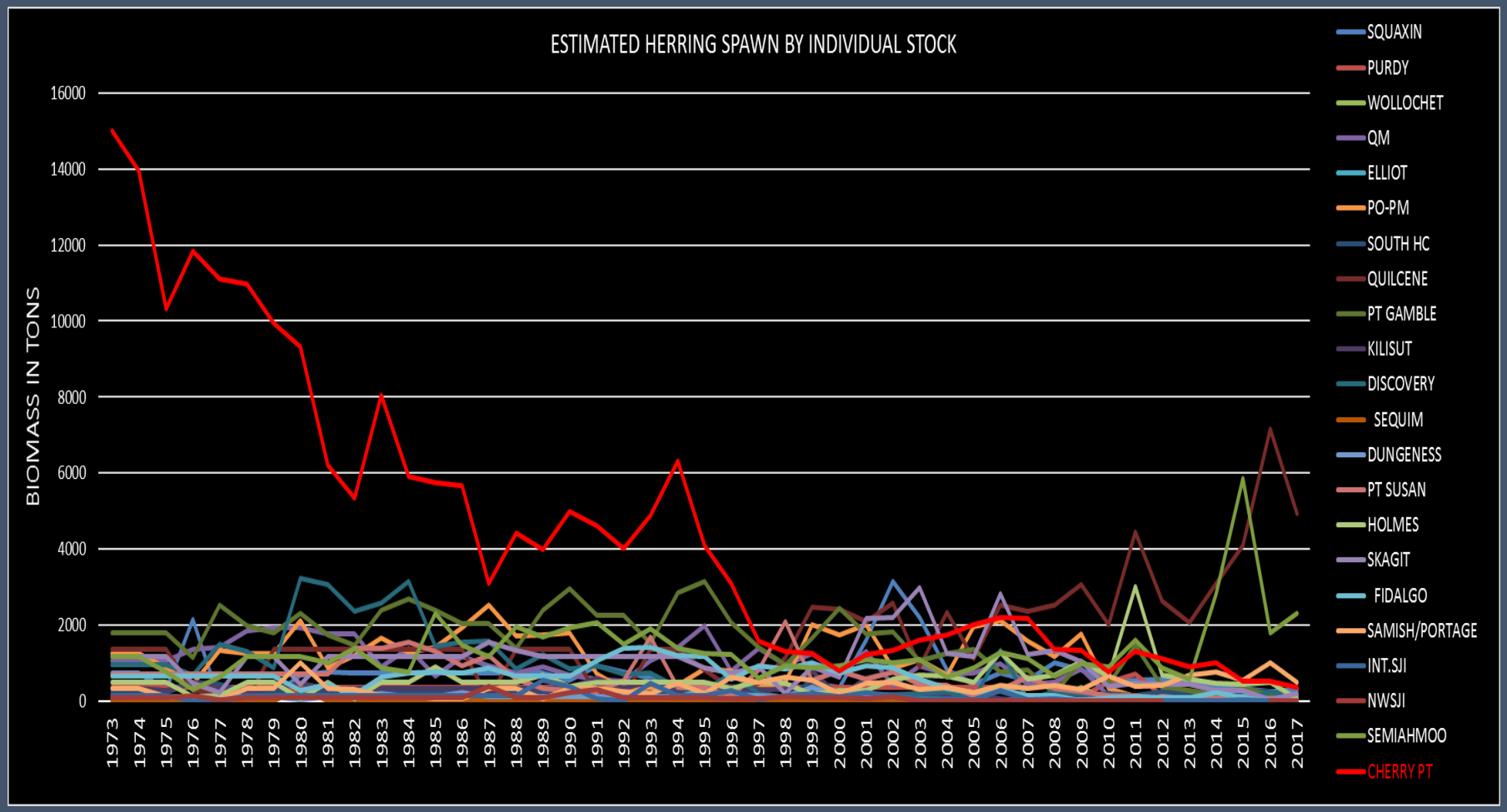
2017 Herring biomass summary

- Across the southern Salish Sea, overall herring spawn biomass was 9,466 metric tons
  - down from 12,192 tons in 2016 (~22% decline)
  - 2017 the 4th lowest year on record, after 2010, 2012, 2013.
- Survey effort was up ~21% in 2017 vs. 2016
- Cherry Pt. stocked declined from 516 to 372 metric tons (new low)
- 2017 survey effort at CP was reduced- high winds
  - 604 stations over 19 survey days at CP in 2016
  - 504 stations over 17 days in 2017

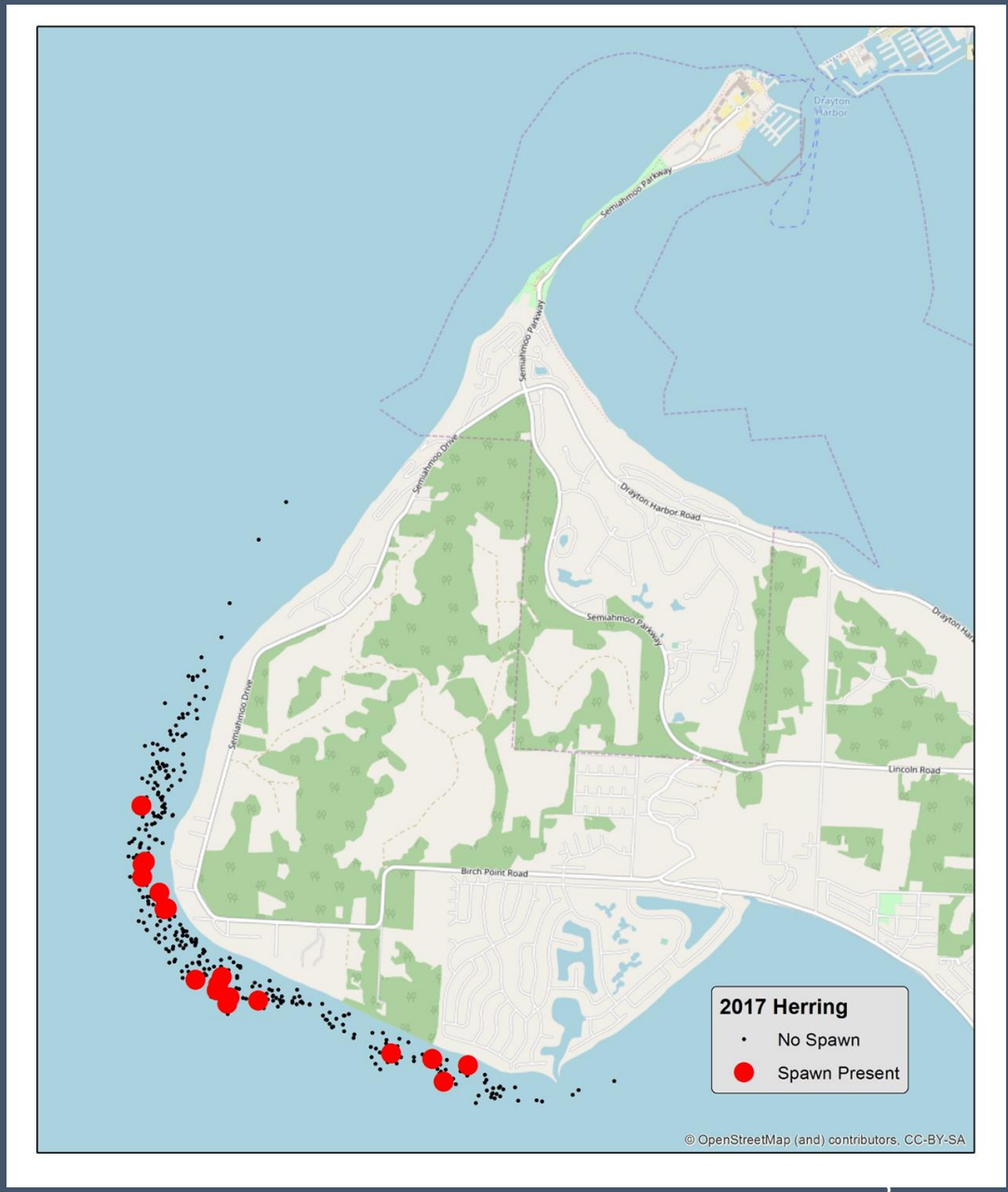
2017 PS Herring biomass summary



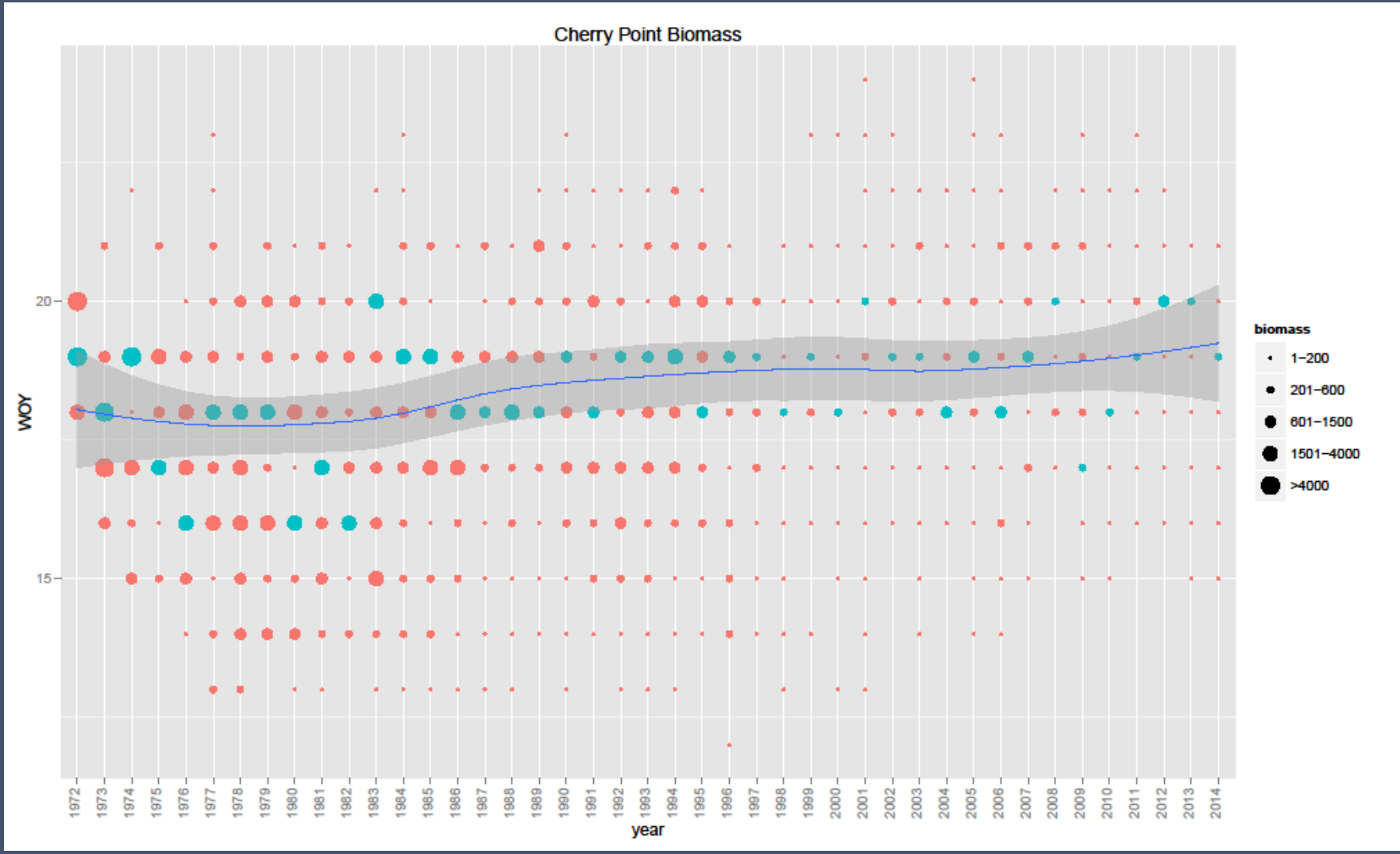
Herring biomass summary by “stocklet”



CP spawn in 2017

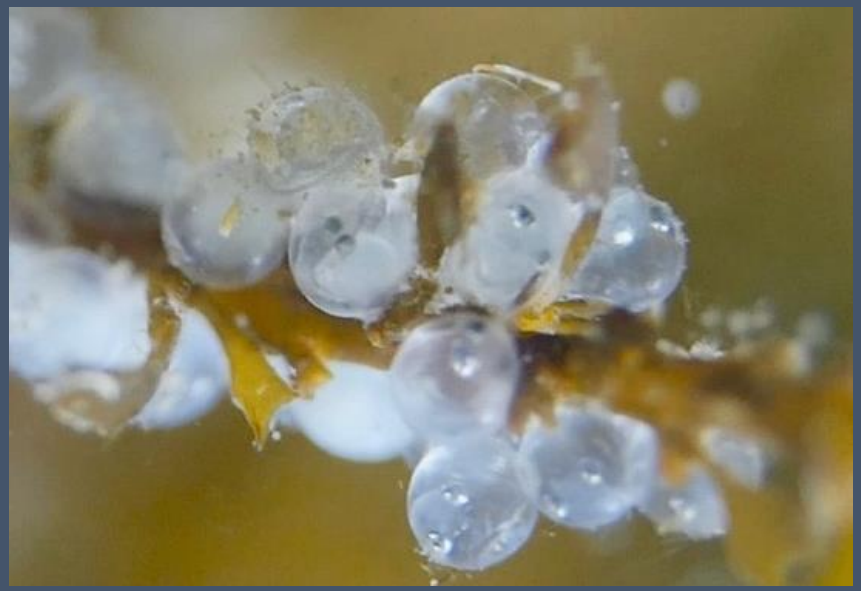


CP spawn timing, 1972-2014



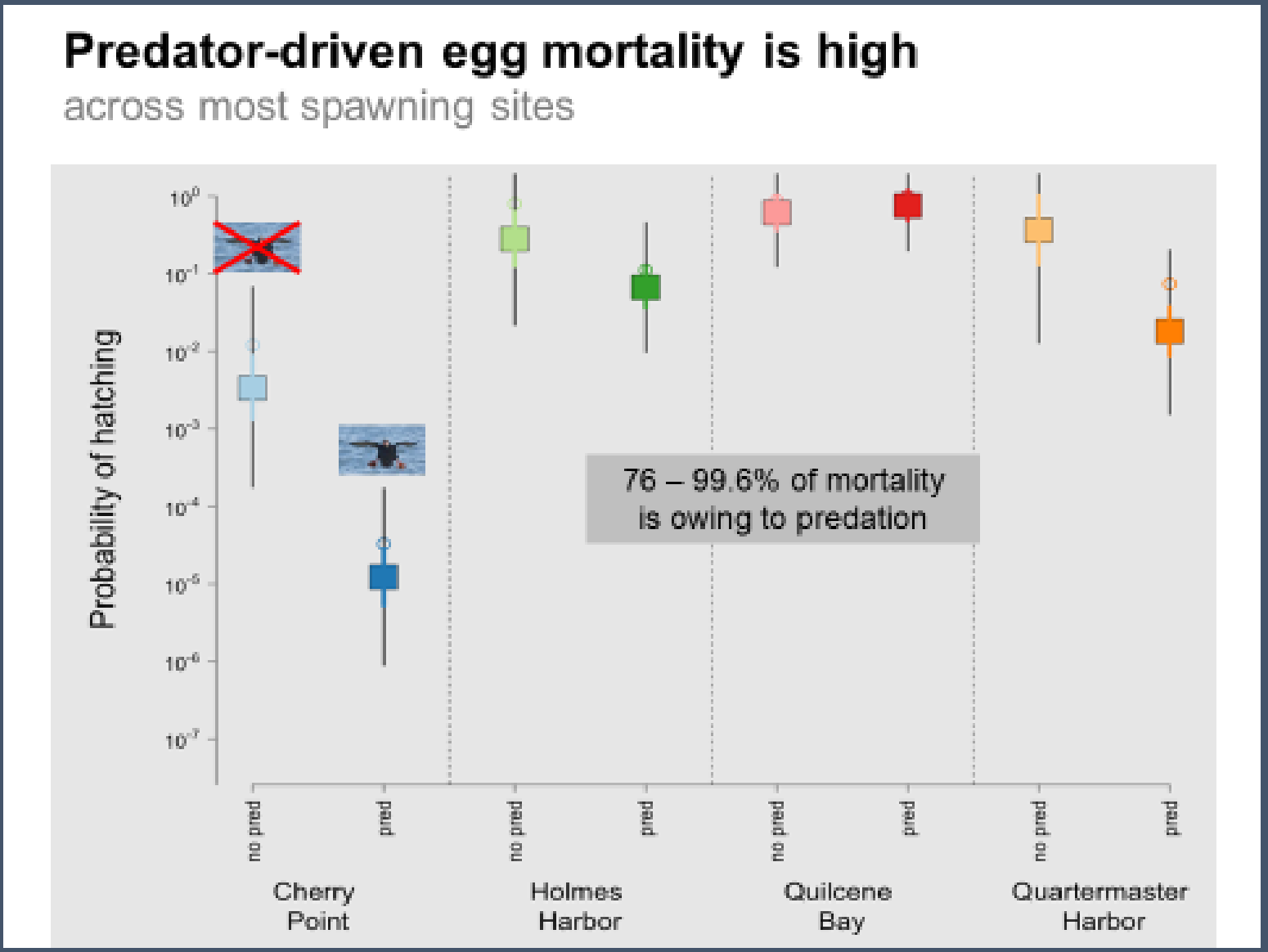
New Data on CP herring

- TBiOS (DFW Toxicology) work implies residency in SOG
- New data from USGS/NOAA (unpublished) suggests larval abnormalities are **NOT** common in recent years (Nat Scholz, Paul Hershberger, et. al.)
- Predation- work by Tessa Francis, Megsie Siple et al.



Eyed herring larvae from Alki Point
Photo by Laura Hanson

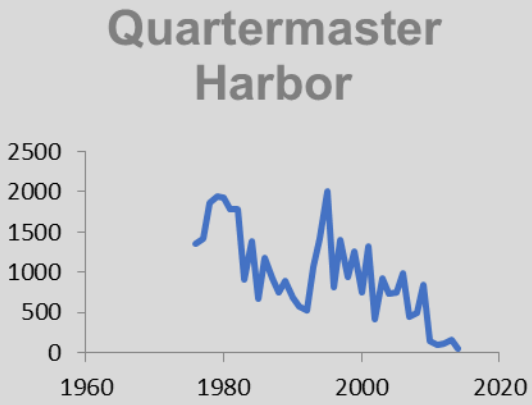
Predator-associated egg survival

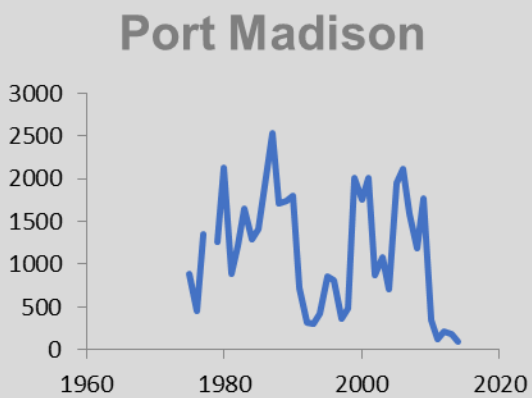


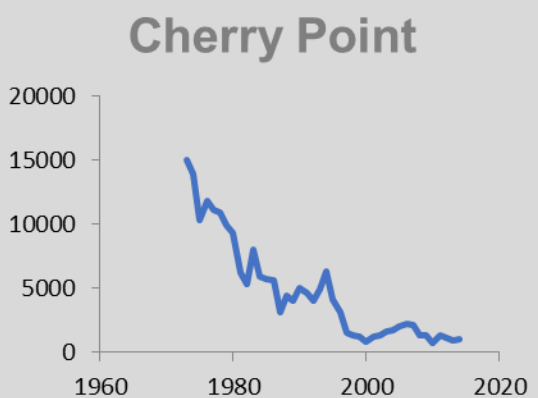
Slide from Tessa Francis, UW Ocean Modeling Forum and Puget Sound Institute

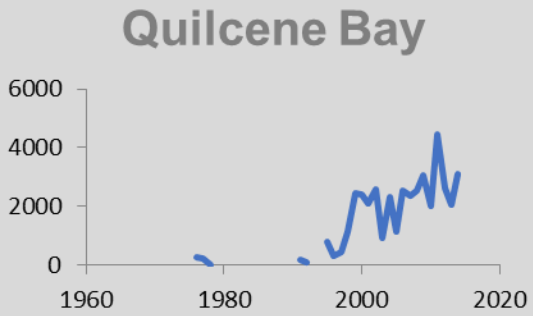
Low egg survival rates

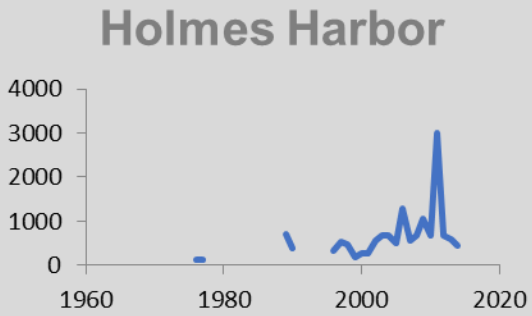
are associated with declining trends in biomass











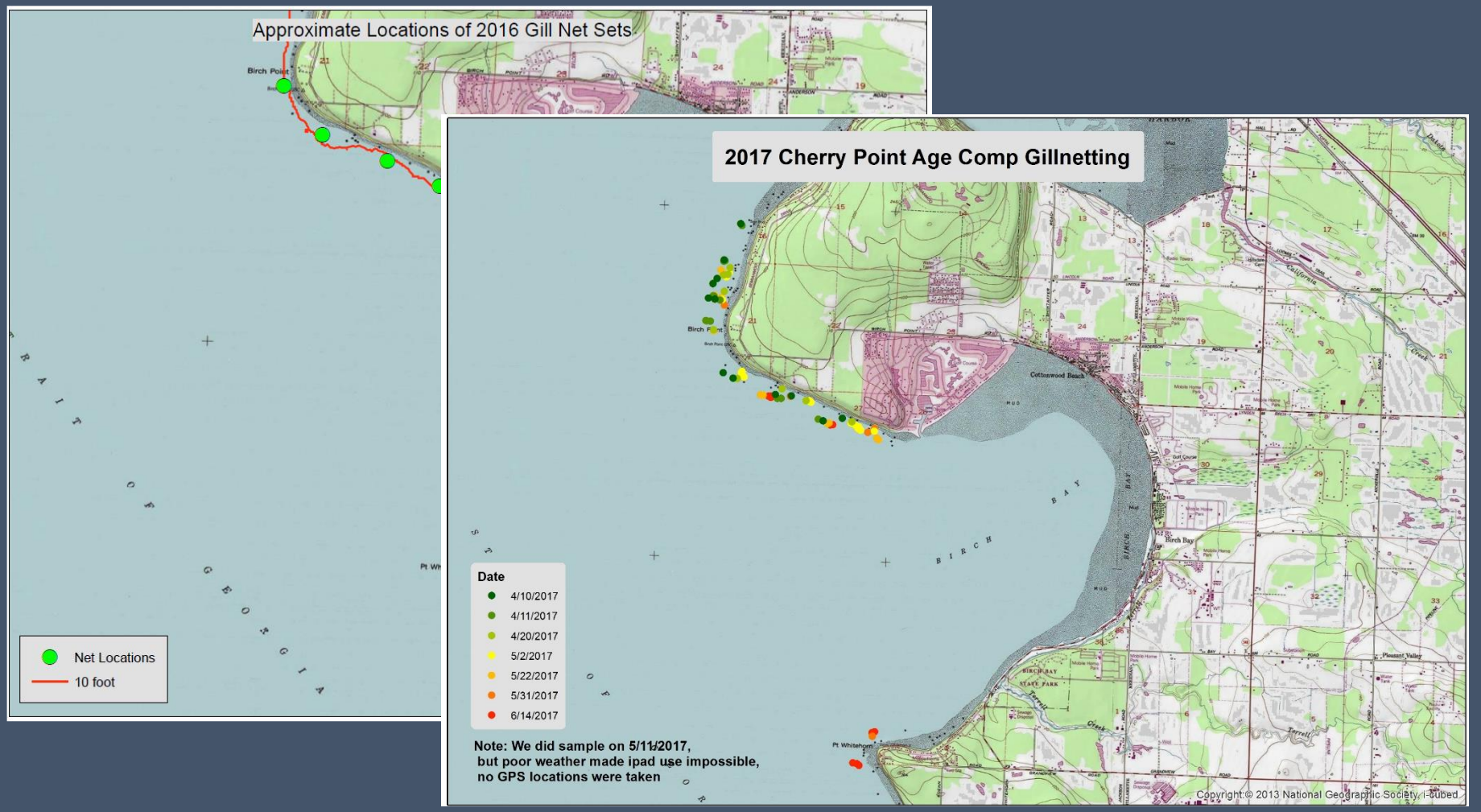
Slide from Tessa Francis, UW Ocean Modeling Forum and Puget Sound Institute

DNR/CP Reserve-funded gill net study

Spawning behavior of CP stock

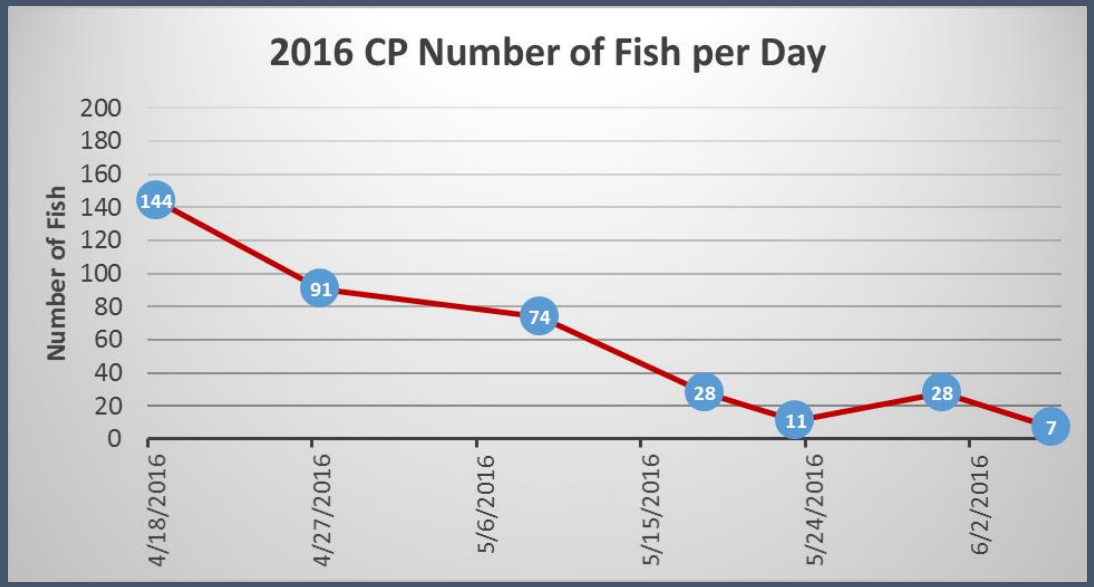
- Methods: Variable mesh gill net panels
- Timing
- Sex ratios, maturity stage, gonad wt, etc.
- Age structure vs. historical
- Genetic samples- were fish caught all CP fish? (2017 results expected in fall)
- Genetic samples- sequencing for SNP analysis

Gill net locations in 2016/17



Also collected samples for genetics studies (Eleni Petrou, UW) and toxicology/larval testing with this work

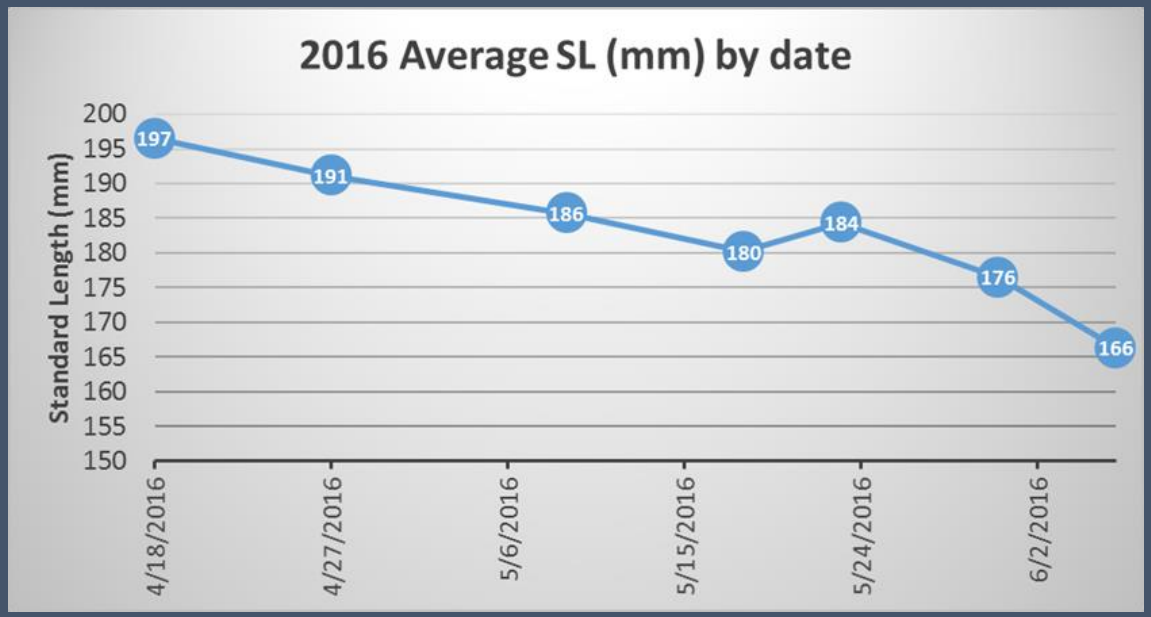
Gill net fish per sampling



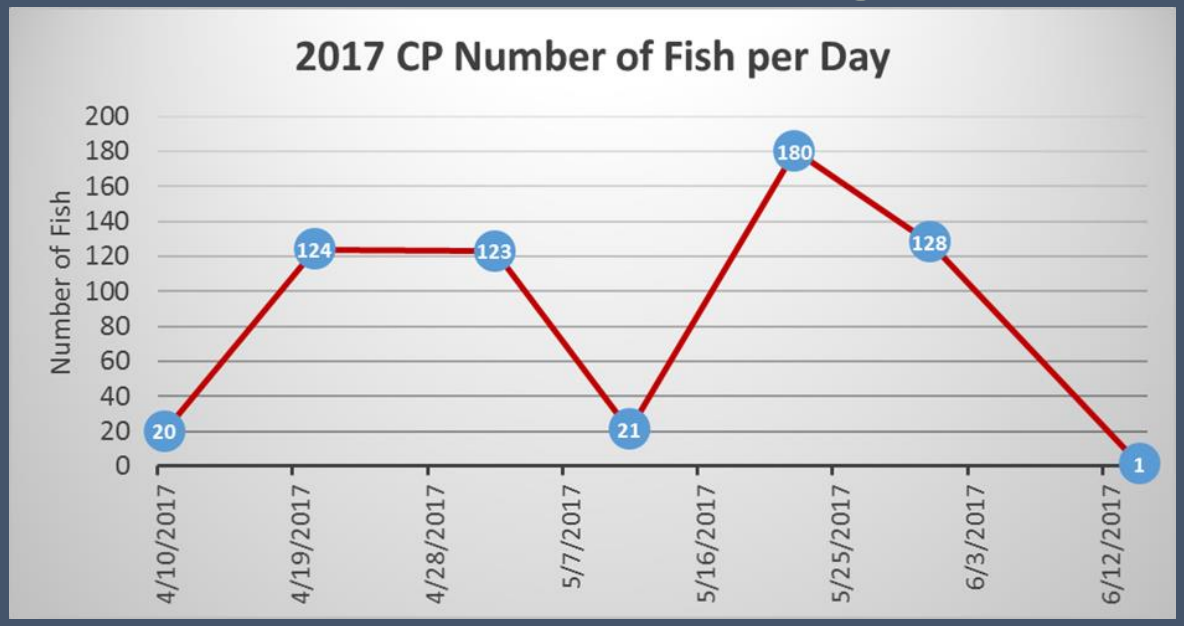
Sampled during daylight hours
Nets checked every 30-60 minutes to limit bycatch

2016

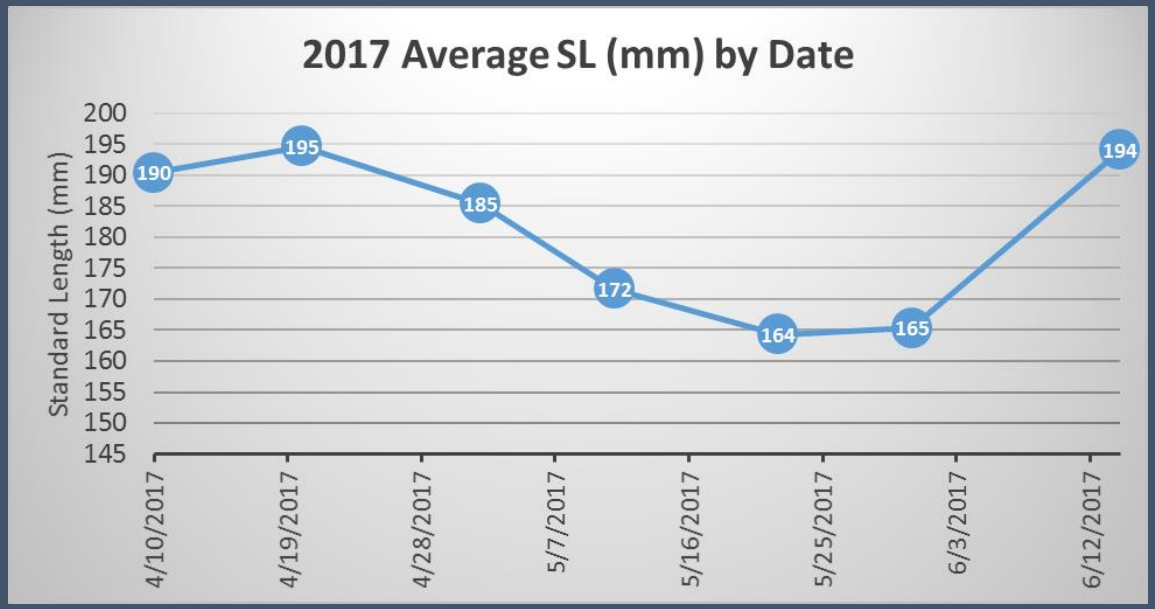
Sampling goal was 100 Herring per day



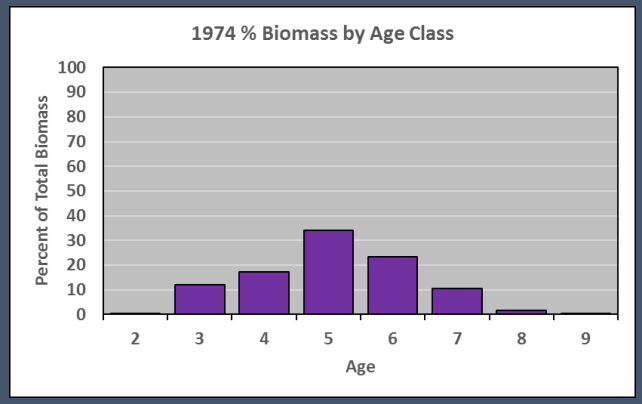
Gill net herring catch: length data

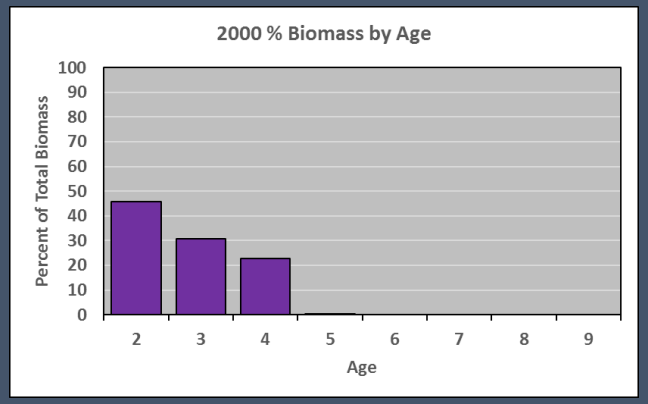


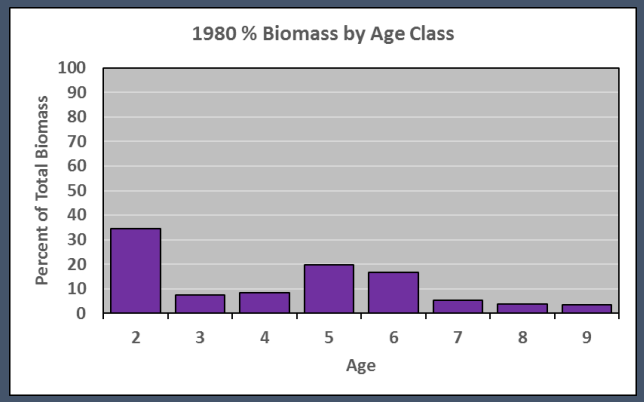
2017

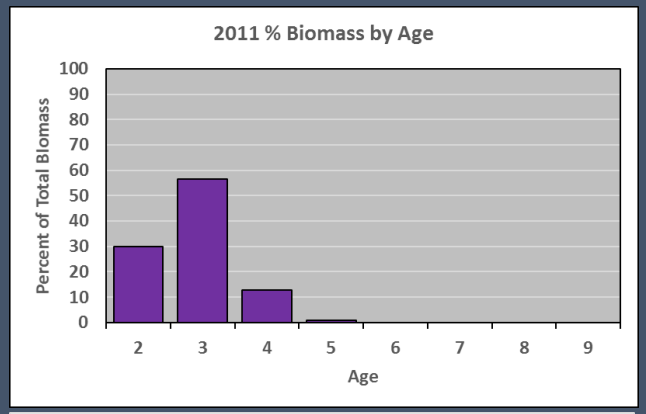


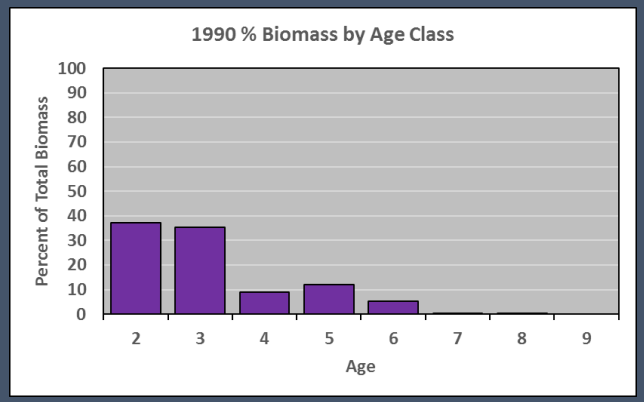
Historical Age Structure of CP Stock

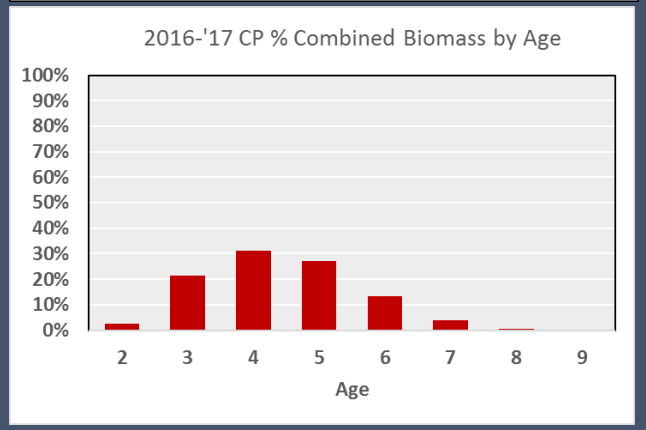










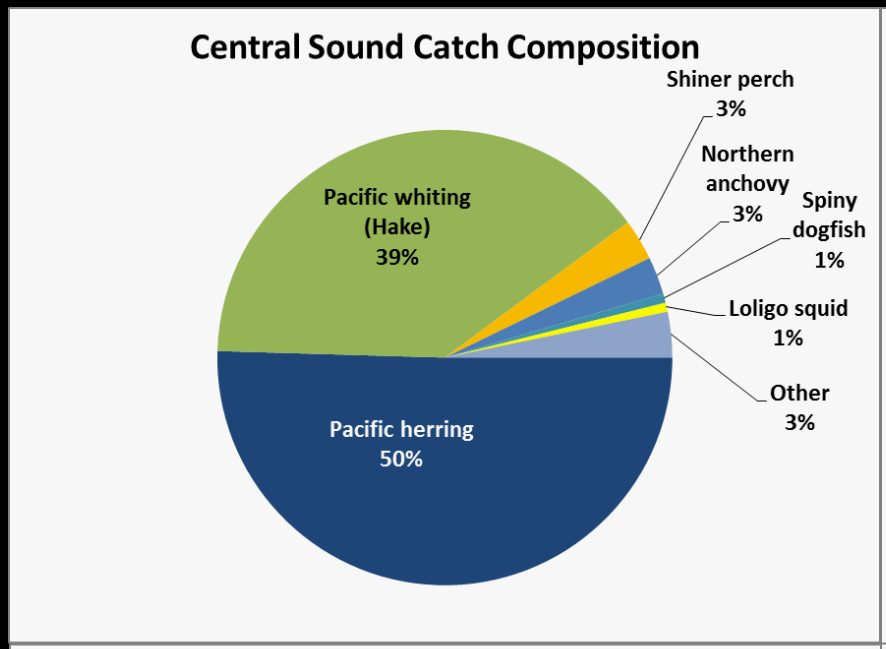


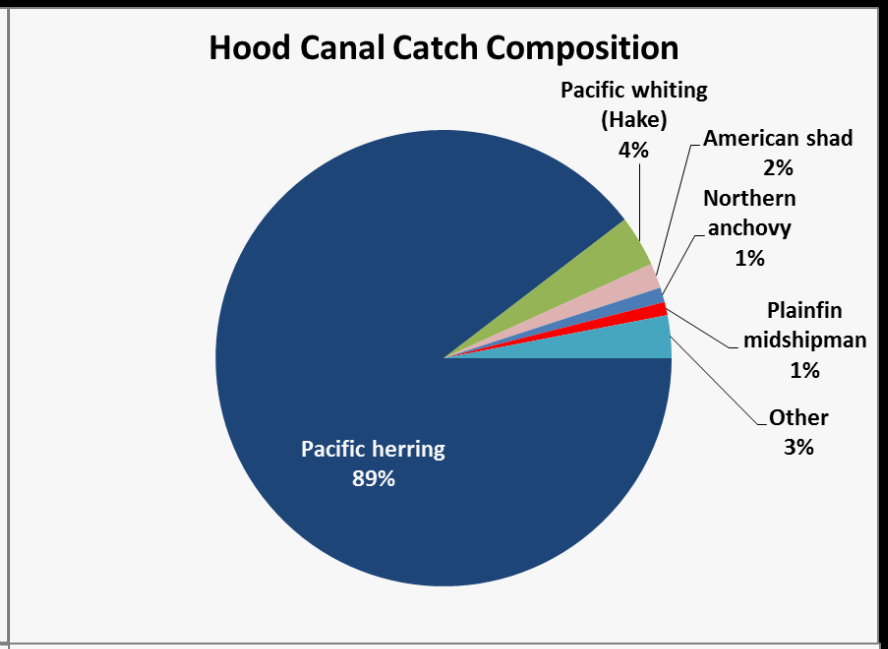
Other projects using CP herring

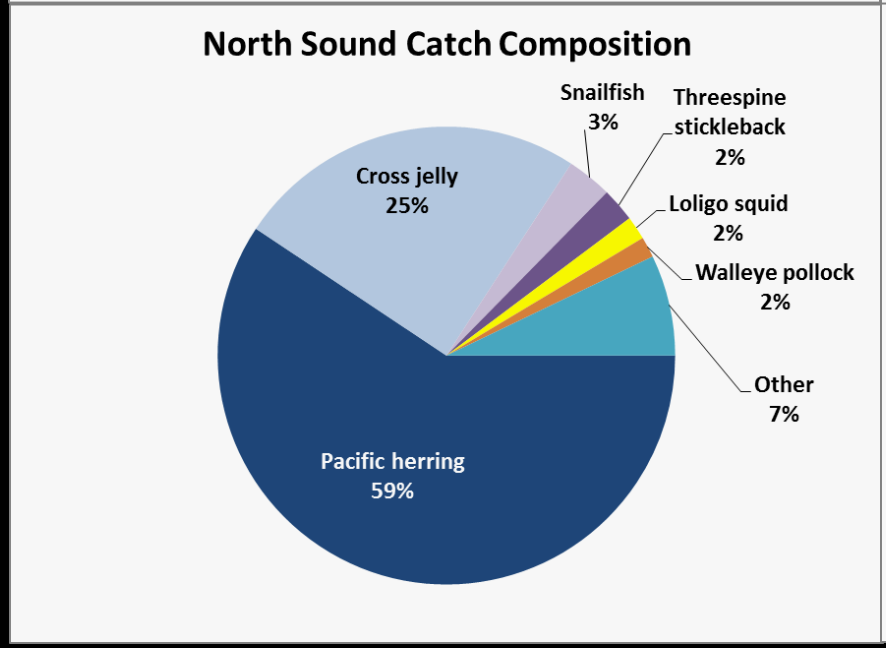
- **Supplemental projects: Eggs and gonads from Cherry Pt. herring were also collected for local researchers, including:**
  - **Christina Villalobos (WWU):**
    - **Effects of increased pH and temperature on larval performance and survival**
  - **Cat Currans, Nautilus Environmental lab (DOE):**
    - **Bioassays of larval temperature tolerance: CP herring have increased temp. tolerance and are most similar to San Francisco Bay stock**
  - **Paul Hershberger (USGS):**
    - **Laboratory work on herring parasites (mainly *Ichthyophonus* and viral hemorrhagic septicemia virus, VHSV).**

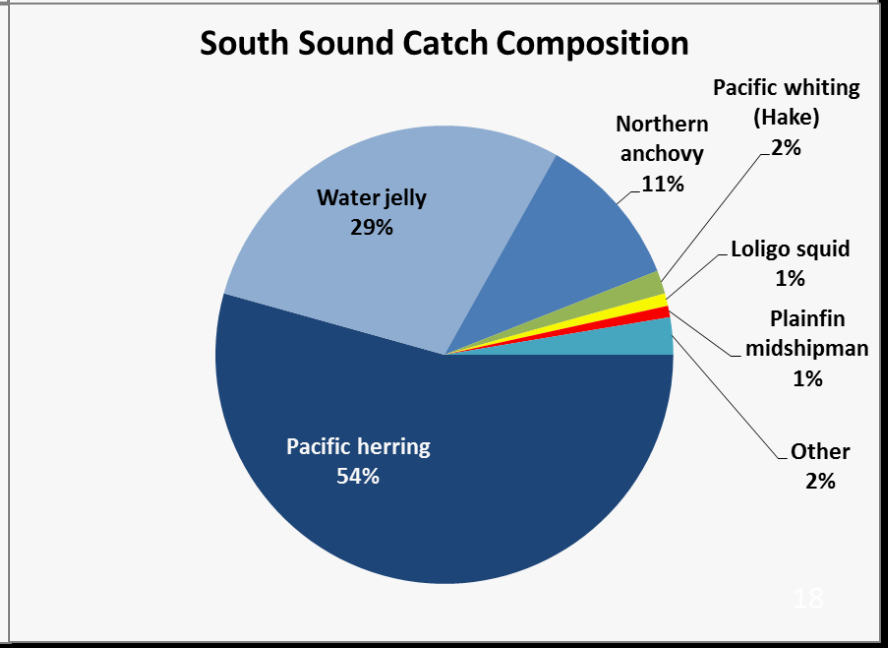
MWT Coverage: 18 stations in PS, HC, SJDF, SJI, SOG (2016-’17)

MWT Total Catch Composition by Basin, 2016-17



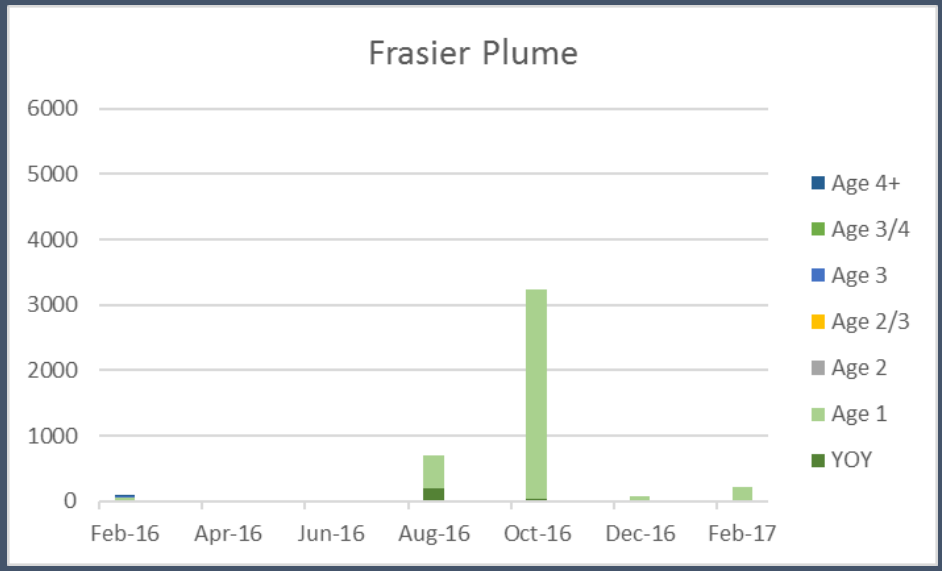


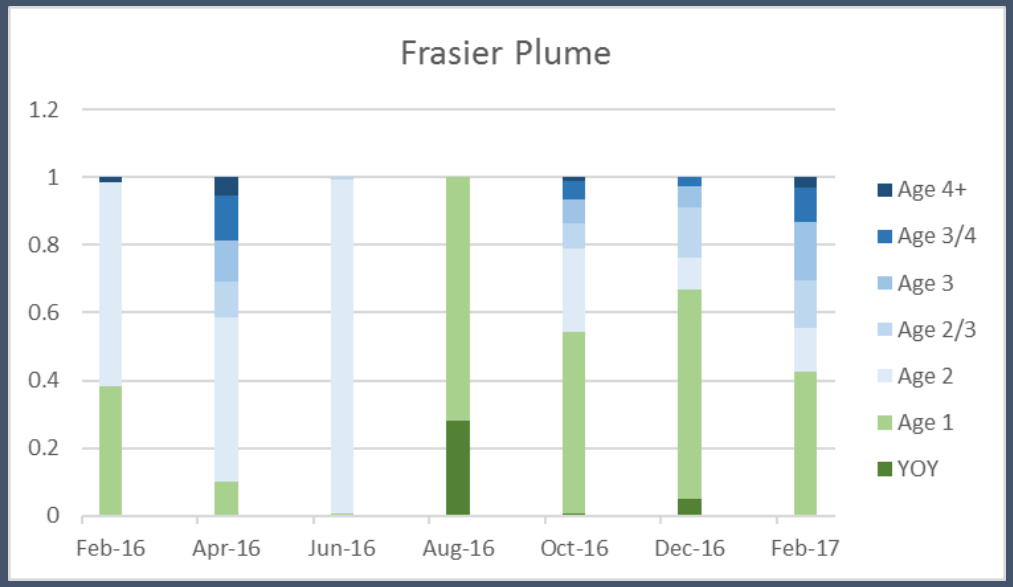




MWT herring catches relevant to CP

Actual herring catch by month →

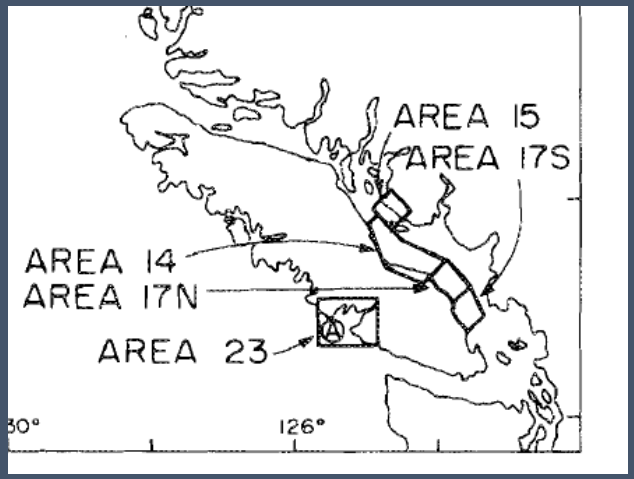




← Proportion of herring in each age class

Data Gaps for CP herring

- Age class (stock structure) – repeat at intervals?
- Residency/Migration: Toxics/Genetics/Tagging
- Egg survival (Francis and Siple paper)
- Larval dispersion and survival:
  Icthyoplankton surveys/ Bird aggregation data
- Spawn survey coverage in BC Strait of Georgia
  Apply for DFO permit, but still coverage gaps



Future Projects

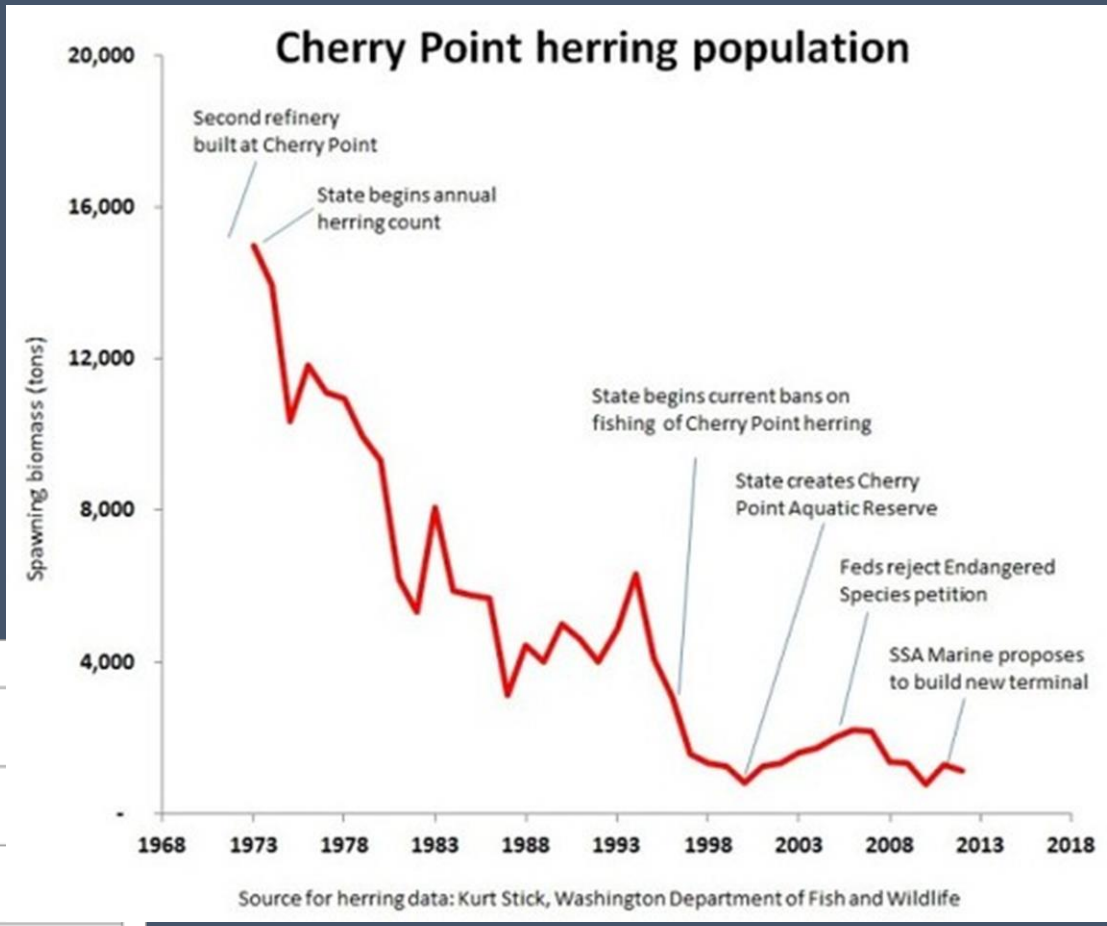
Genetics- SeaGrant award with Lorenz Hauser, UW!!

- Detect CP herring elsewhere in Puget Sound
- Do SOG herring (MWT) include CP stock? (residency)
- Detect CP herring in Canadian SOG research catch?
- Finer stock delineation for all of PS (beyond microsats)

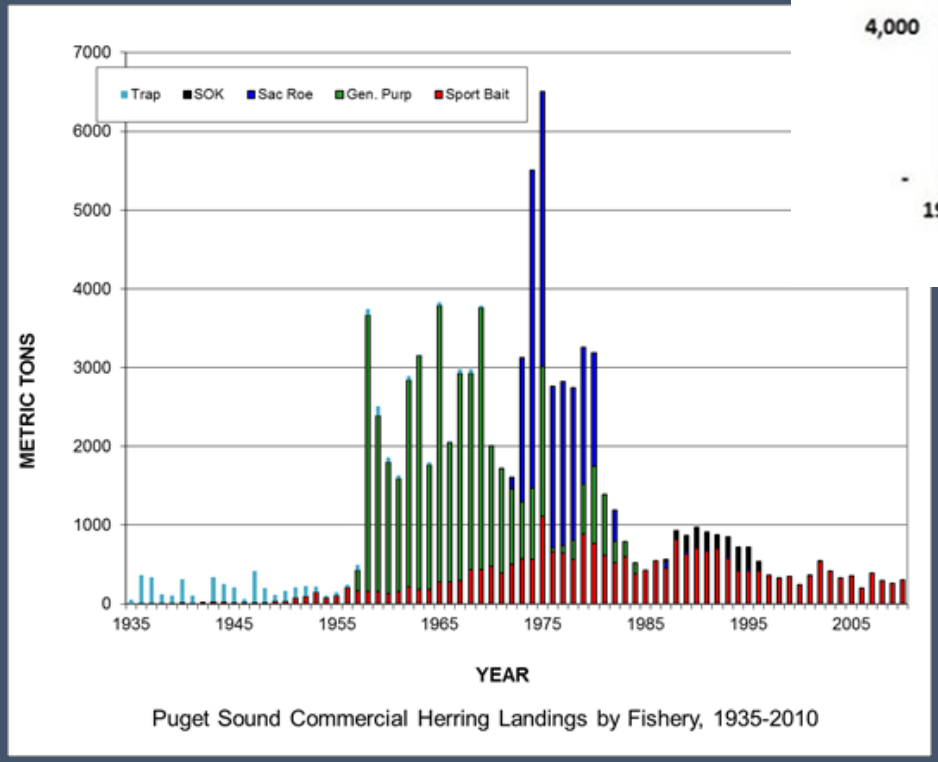
- Sampling in Canadian waters in 2018
- Sampling Fraser River estuary
- Larval fish surveys??

Questions?

(Todd.Sandell@dfw.wa.gov)



Source for herring data: Kurt Stick, Washington Department of Fish and Wildlife



Puget Sound Commercial Herring Landings by Fishery, 1935-2010

Herring in predator diets