Pink Salmon Hatchery Proportions in Selected Lower Cook Inlet Commercial Fisheries, 2015–2018

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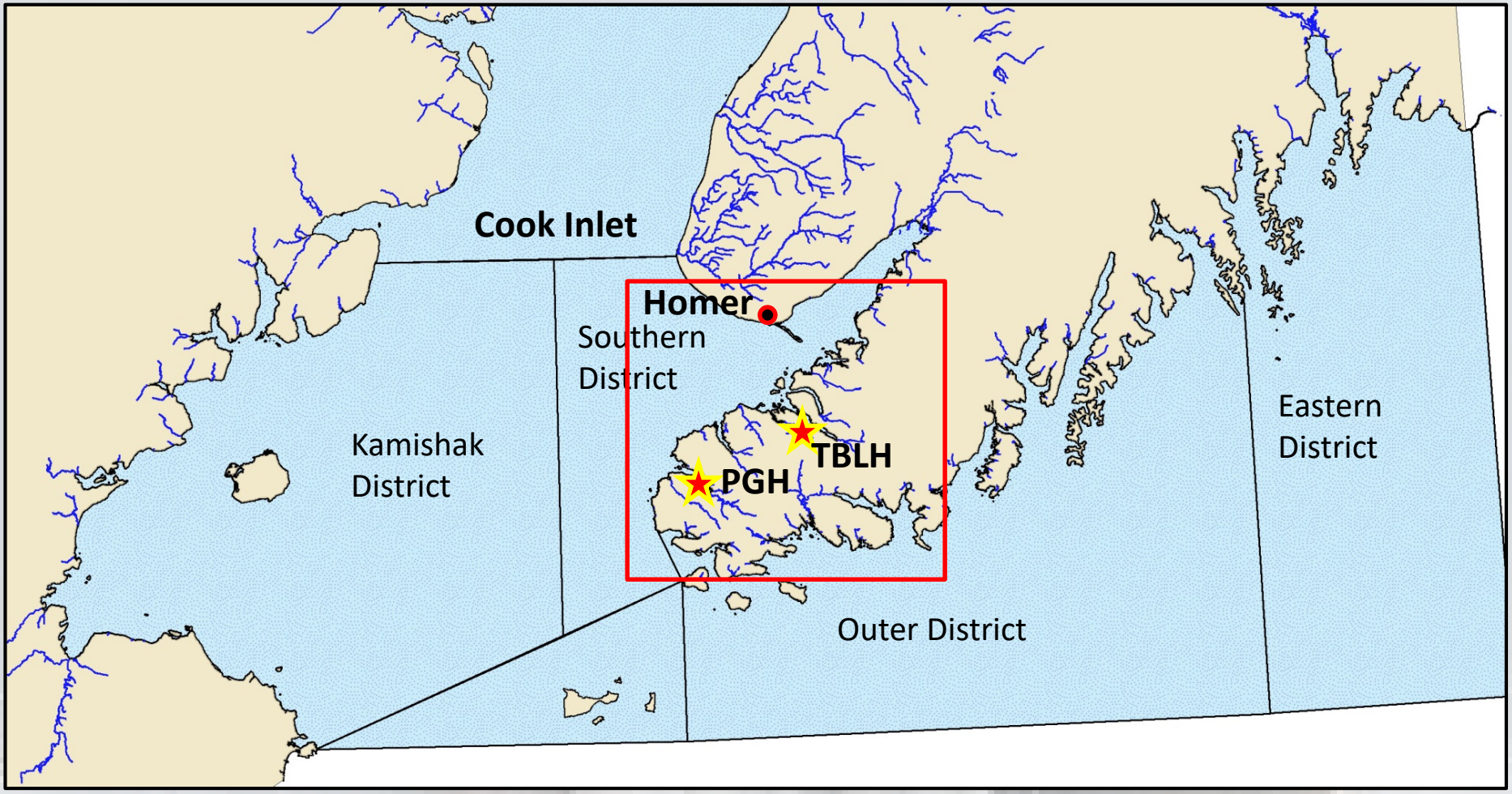
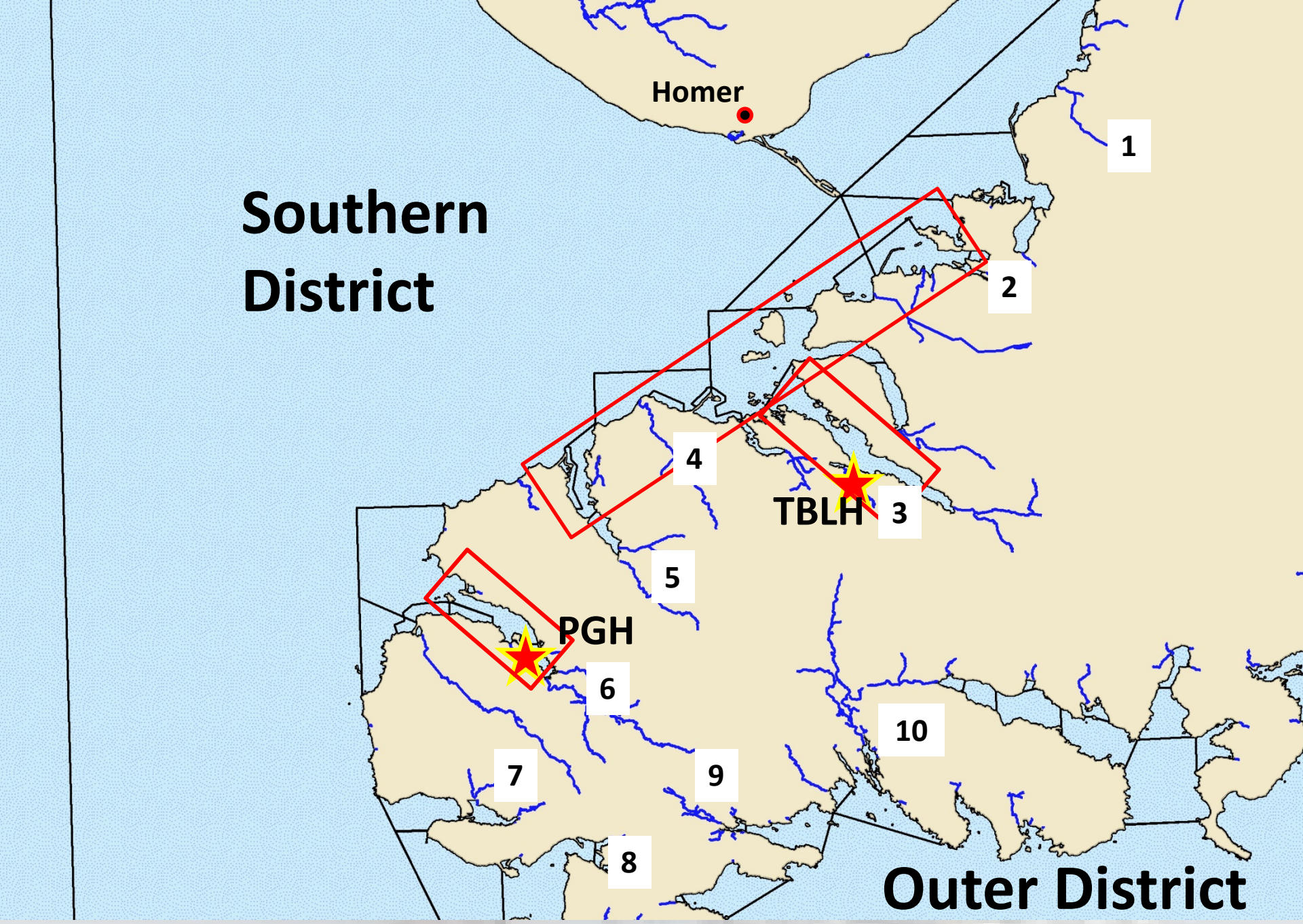
Lower Cook Inlet Management Area




Homer
Southern District
1
2
3
4
5
6
7
8
9
10
TBLH
PGH
Outer District

LCI Pink Salmon Hatcheries

Tutka Bay Lagoon Hatchery (TBLH)

- Permitted for 125 million pink salmon eggs
- Brood Stock: Tutka Lagoon Creek
- Annual pink releases of 320K (1977) – 105 million (1996); Avg. release 42.4 million
- Dormant 2004-2011
- 100% of pink salmon thermally marked beginning in 2012

Port Graham Hatchery (PGH)

- Permitted for 125 million pink salmon eggs
- Brood Stock: Port Graham River
- Annual pink releases of 358K (1995) – 57.2 million (2003); Avg. release: 11.5 million
- Dormant 2007–2014
- 100% of pink salmon thermally marked

Protection of Wild Stocks

- Private Non-Profit Hatchery Act (1974)
- ADF&G Genetics Policy (Davis et al. 1985; Davis and Burkett 1989)
- Mixed Stock Salmon Fishery Policy (5 AAC 39.220)
- Sustainable Salmon Fishery Policy (5 AAC 39.222)
- Salmon Escapement Goal Policy (5 AAC 39.223)

Purpose of LCI Study

Gather baseline data on the hatchery-wild composition of harvests and escapements in LCI as 2 recently reopened hatcheries began releasing marked fry.

Objectives:

1. **Estimate hatchery-wild composition of the commercial harvest**
   a. Hatchery cost-recovery targets hatchery fish
   b. Hatchery contribution to the common property harvest
2. **Monitor escapements to pink salmon index streams in the Southern and Outer districts**
   a. Are we making our escapement goals?

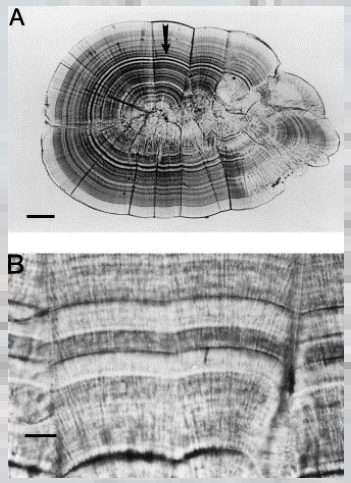
Study Design

Catch Sampling Goals

- **Sample directly from seiners**
  - get precise harvest locations
- **Sample wherever harvest occurs**
  - inside/outside hatchery SHAs
- **Sample 1-2 days per week**
- **96 otoliths per sample**
- **Tender operators kept set gillnet harvests separated by subdistrict**
- **Otoliths read 1x by ADF&G staff in Cordova**

Escapement Monitoring

- **Ground or aerial surveys of index streams with escapement goals**
- **Included streams inside hatchery SHAs and up to 40 miles away**
- **Survey ~1x per week thru run**
- **Use area-under-the-curve (AUC) method to convert periodic survey counts into an escapement index**
- **Compared escapements to goals**



Results

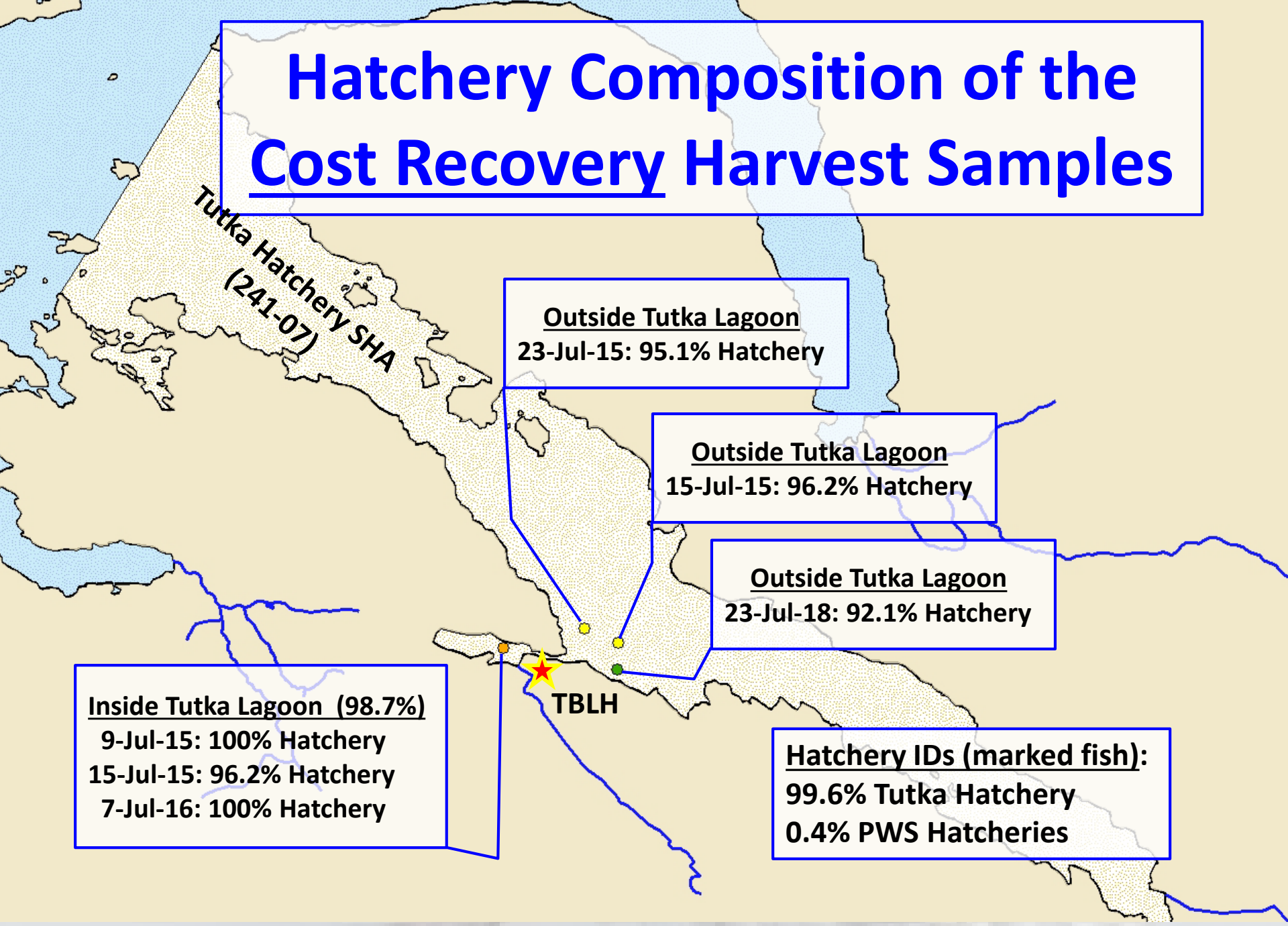
- **Objective 1: Harvest Composition**

  a. Estimate hatchery composition of cost-recovery harvest

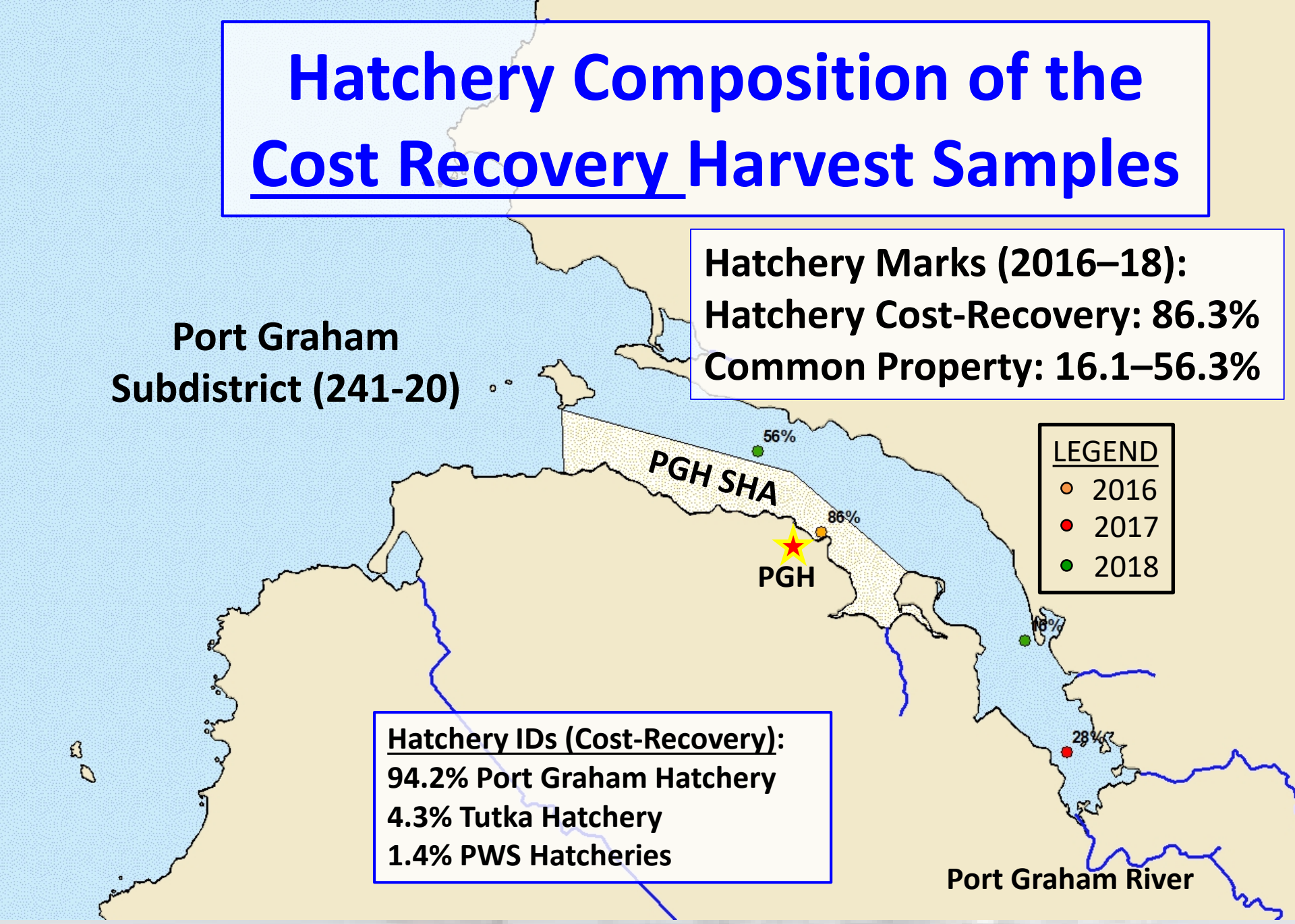
  b. Determine hatchery composition of common property harvest

- **Objective 2: Escapement Monitoring**
  - Did streams achieve their escapement goals?

Hatchery Composition of the Cost Recovery Harvest Samples



Hatchery Composition of the Cost Recovery Harvest Samples



Hatchery Contribution of the Common Property Harvest Samples

Hatchery Composition of CCP Catch:

Overall Average: 59.6% (0–99%); n=53 samples, 4,277 fish

Purse Seine Avg: 62.3% (0–99%); n= 45 samples, 3,514 fish

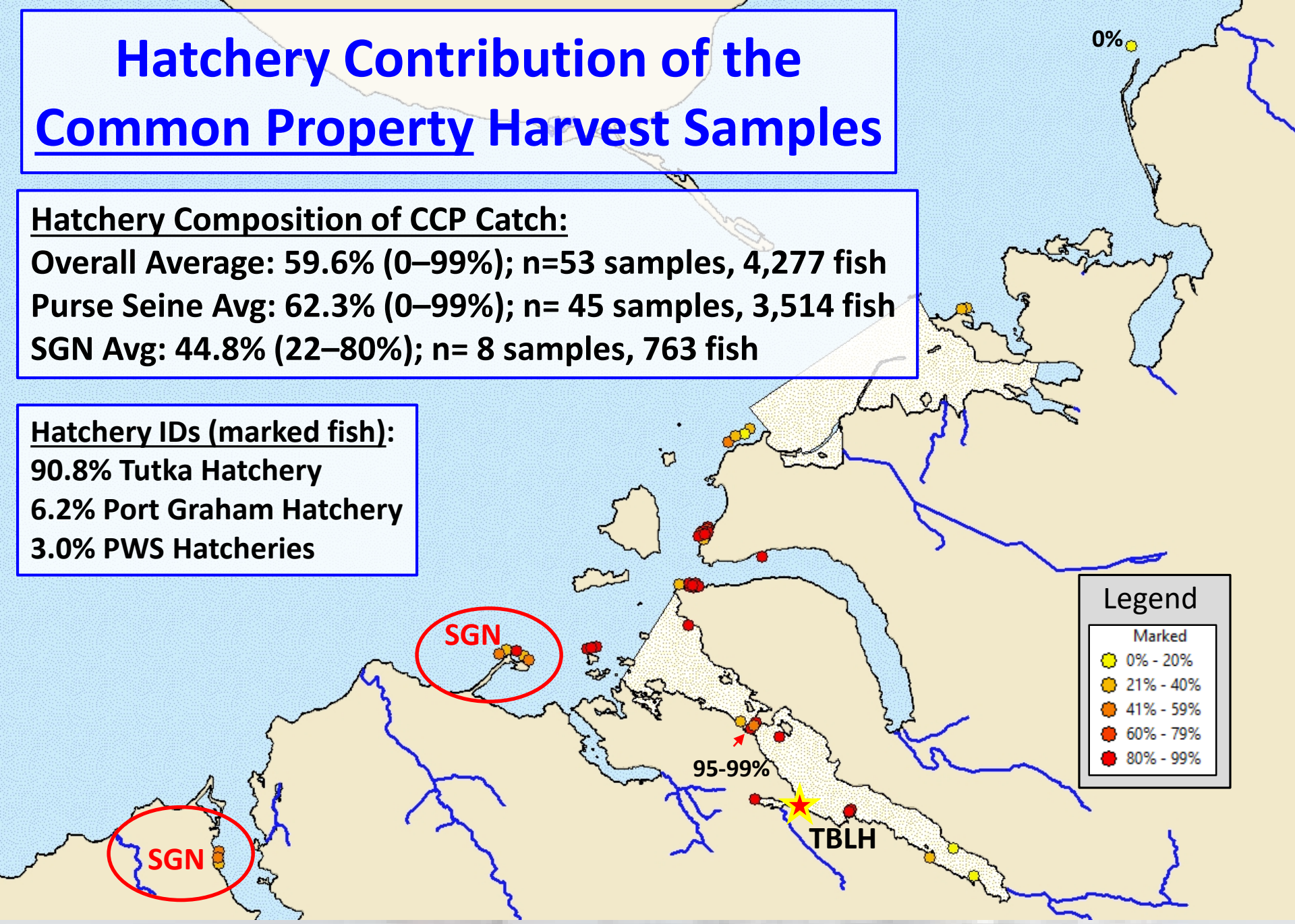
SGN Avg: 44.8% (22–80%); n= 8 samples, 763 fish

Hatchery IDs (marked fish):

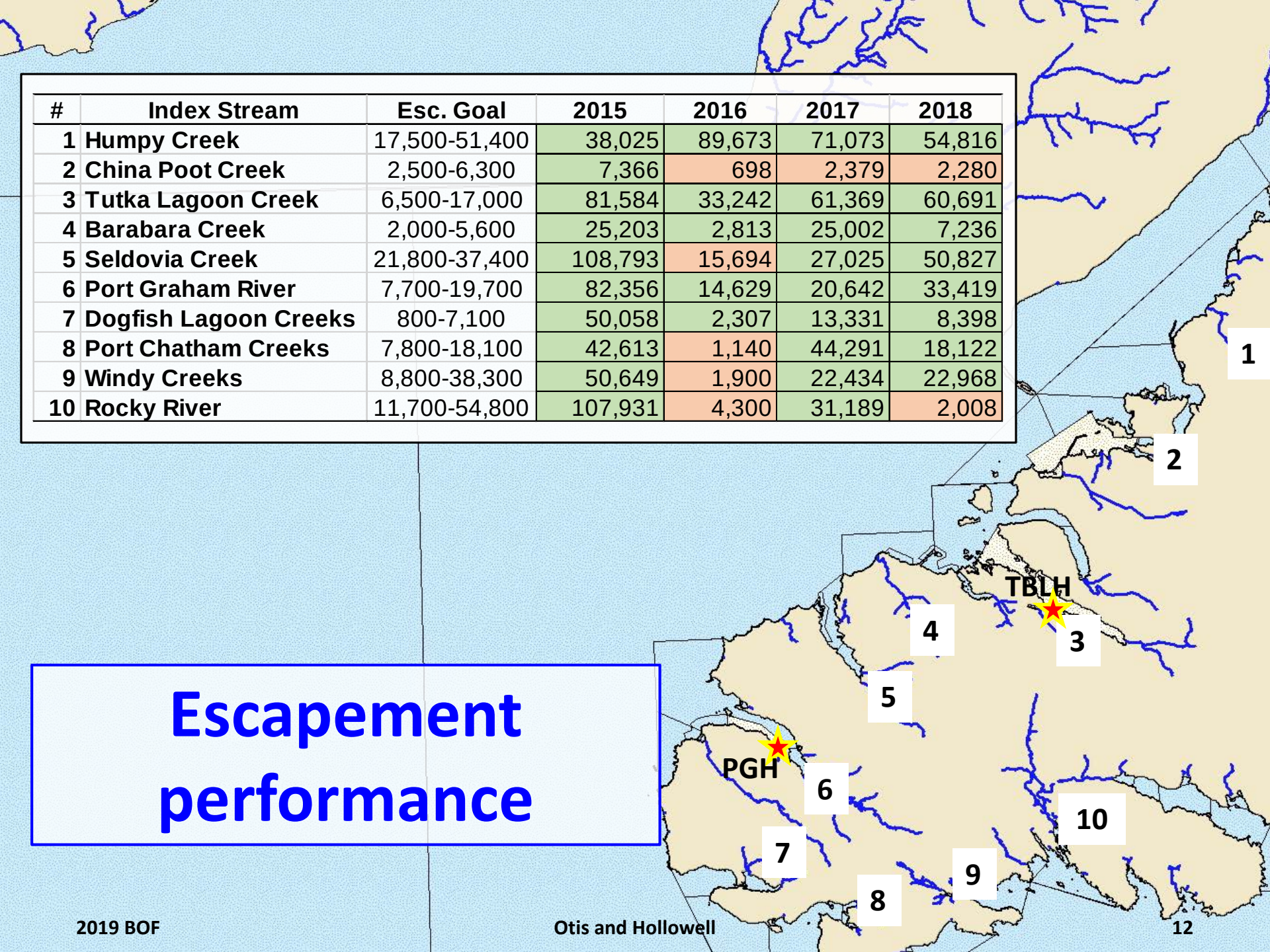
90.8% Tutka Hatchery

6.2% Port Graham Hatchery

3.0% PWS Hatcheries



#	Index Stream	Esc. Goal	2015	2016	2017	2018
1	Humpy Creek	17,500-51,400	38,025	89,673	71,073	54,816
2	China Poot Creek	2,500-6,300	7,366	698	2,379	2,280
3	Tutka Lagoon Creek	6,500-17,000	81,584	33,242	61,369	60,691
4	Barabara Creek	2,000-5,600	25,203	2,813	25,002	7,236
5	Seldovia Creek	21,800-37,400	108,793	15,694	27,025	50,827
6	Port Graham River	7,700-19,700	82,356	14,629	20,642	33,419
7	Dogfish Lagoon Creeks	800-7,100	50,058	2,307	13,331	8,398
8	Port Chatham Creeks	7,800-18,100	42,613	1,140	44,291	18,122
9	Windy Creeks	8,800-38,300	50,649	1,900	22,434	22,968
10	Rocky River	11,700-54,800	107,931	4,300	31,189	2,008



Escapement performance

Conclusions

- **> 95% of pink salmon collected from cost-recovery harvests in SHAs were hatchery marked (n=577)**
- **Hatcheries contributed substantially to the samples from common property pink salmon harvest in the Southern District:**
  - ~62% of CCP seine samples were marked (n=3,514);
  - ~45% of CCP SGN samples were marked (n=763)
- **Pink salmon index streams consistently met their escapement goals despite increased harvest effort on hatchery pink salmon**
- ***Escapement to most wild stock index streams included hatchery marked fish***

Thermally Marked Pink Salmon in Selected Lower Cook Inlet streams, 2014–2018

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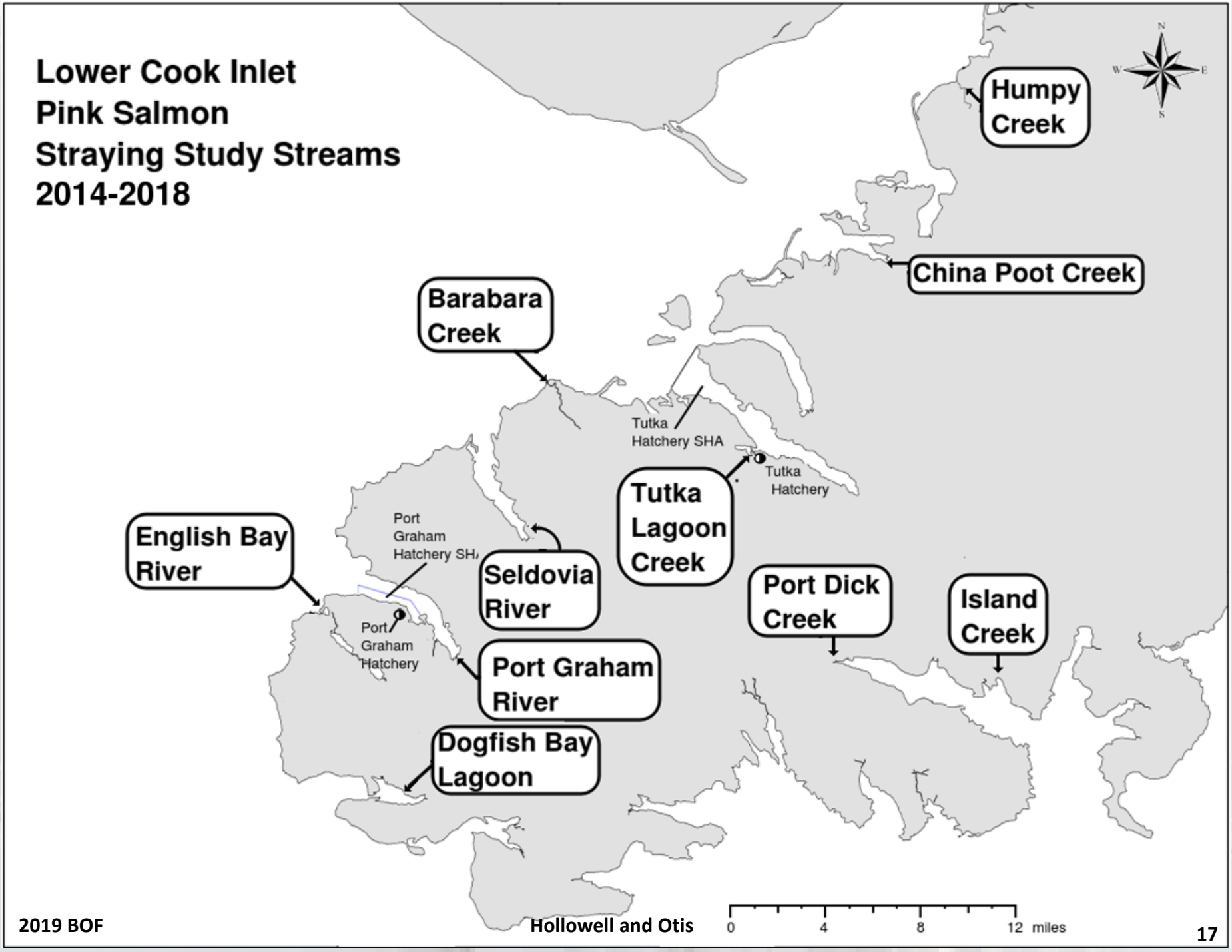
Project Goal(s)

1.) In 2014 the *initial* project goals were to determine the percentage of strays of Tutka and Port Graham hatchery produced pink salmon in select streams,

Project Goal(s)

1.) In 2014 the *initial* project goals were to determine the percentage of strays or Tutka hatchery produced pink salmon in select streams,

2.) Provide information to Department staff regarding levels of strayed LCI fish for use in managing the Tutka and Port Graham hatcheries to minimize straying and impacts to wild pink salmon. Primarily this would be through the Cook Inlet Area Regional Planning Team. This group is tasked with overseeing hatchery operations in the Lower Cook Inlet area, and advising the F&G Commissioner regarding hatchery operations.

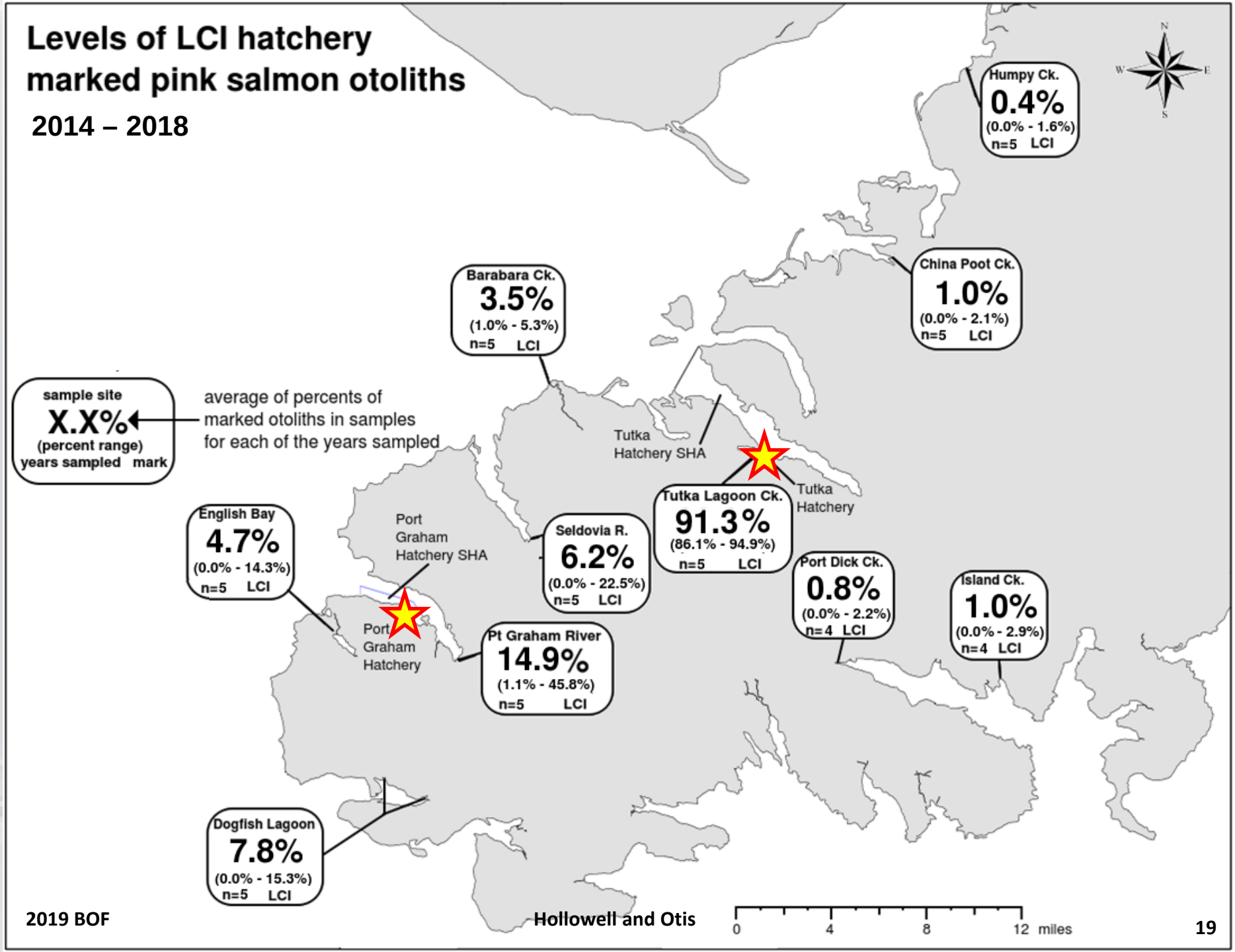

Lower Cook Inlet
Pink Salmon
Straying Study Streams
2014-2018
Humpy Creek
China Poot Creek
Barabara Creek
Tutka Hatchery SHA
Tutka Hatchery
Tutka Lagoon Creek
Port Graham Hatchery SHA
English Bay River
Seldovia River
Port Dick Creek
Island Creek
Port Graham Hatchery
Port Graham River
Dogfish Bay Lagoon
N
W
E
S
0
4
8
12 miles

Methods

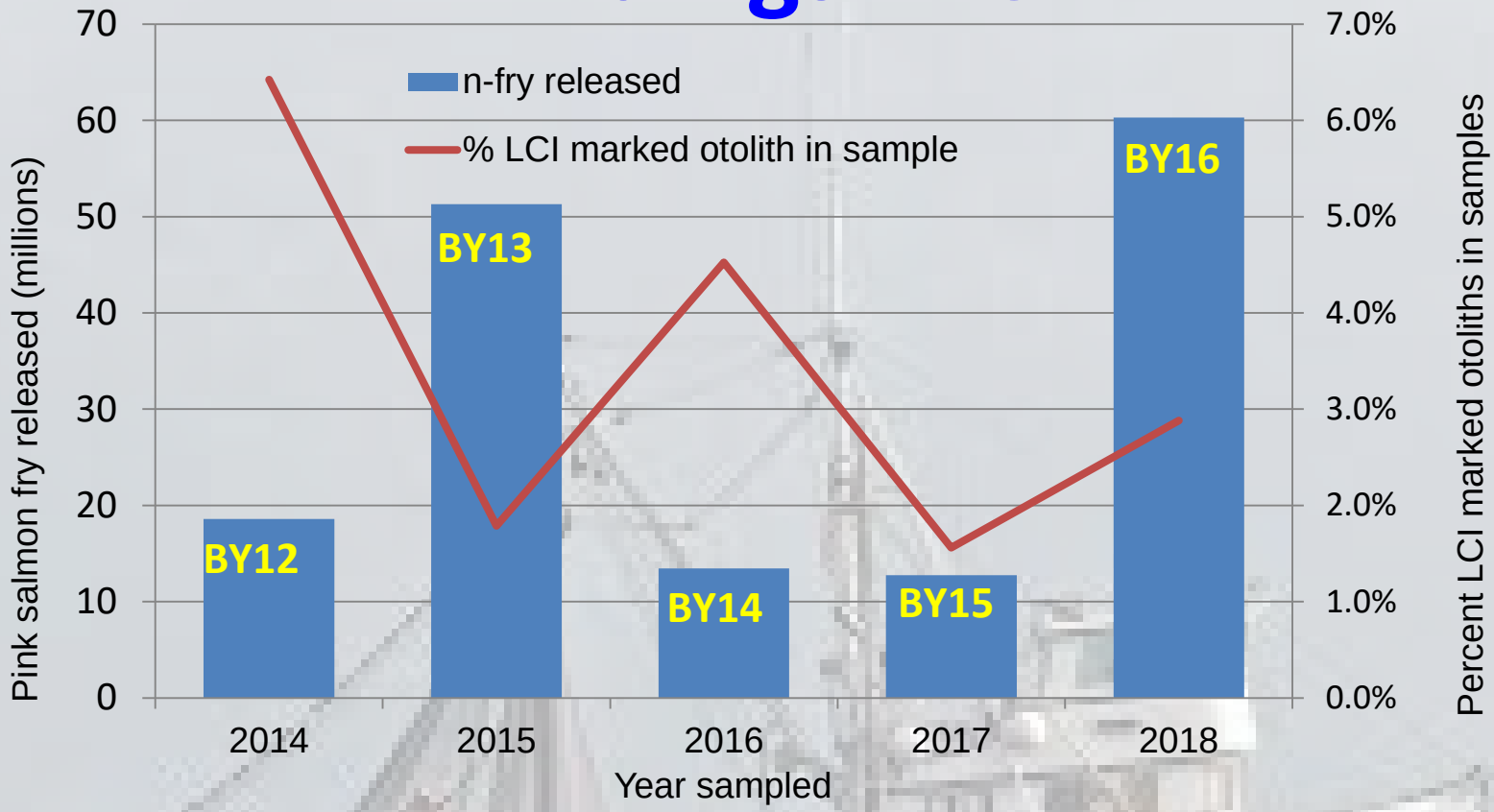
- Streams were visited throughout the run timing,
- Ideally 96 otoliths from each stream on each visit, with at least two samples collected each summer,
- Otoliths were only collected from spawned out carcasses,
- Ideally carcasses were sampled throughout the drainage

Levels of LCI hatchery marked pink salmon otoliths

2014 – 2018

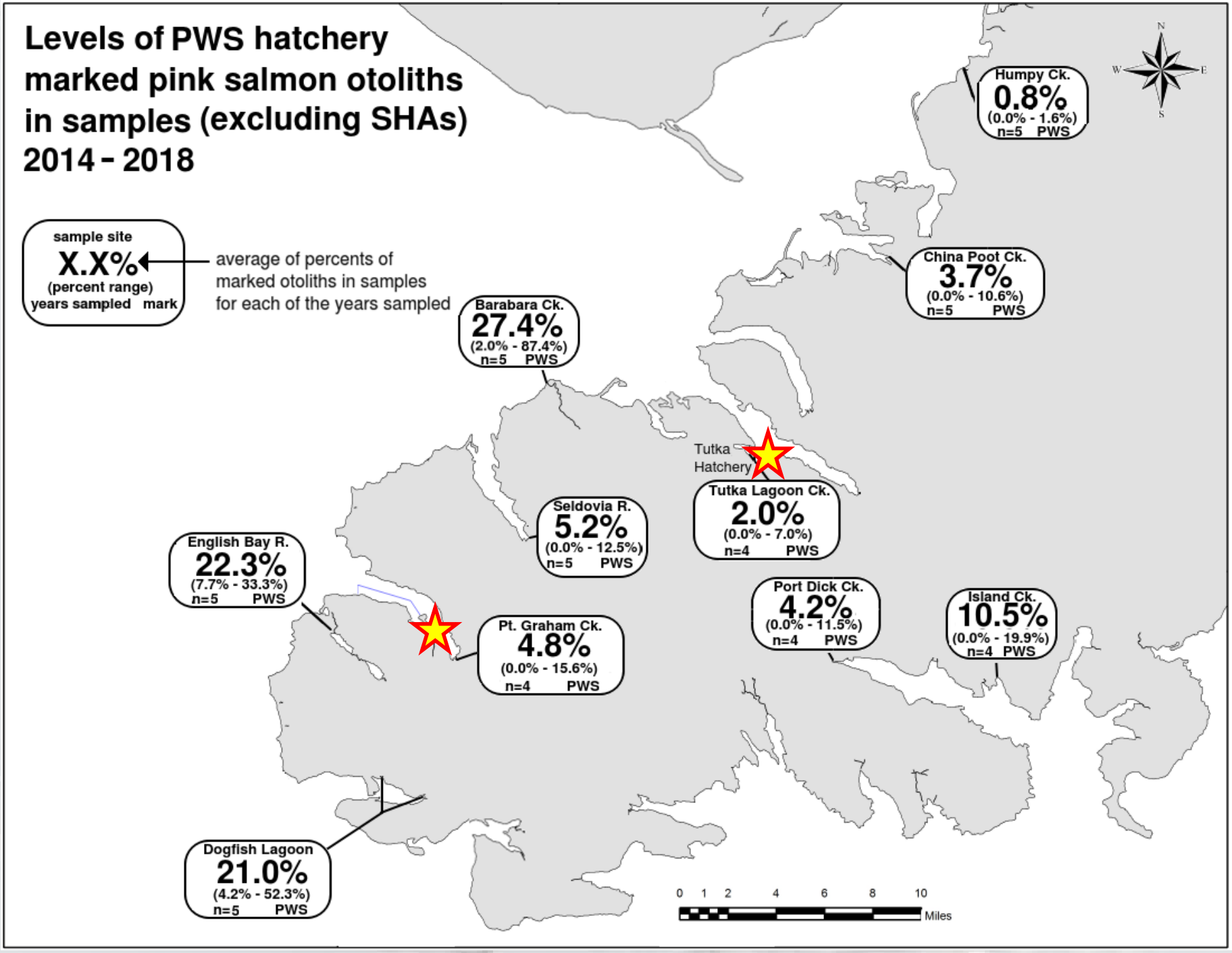


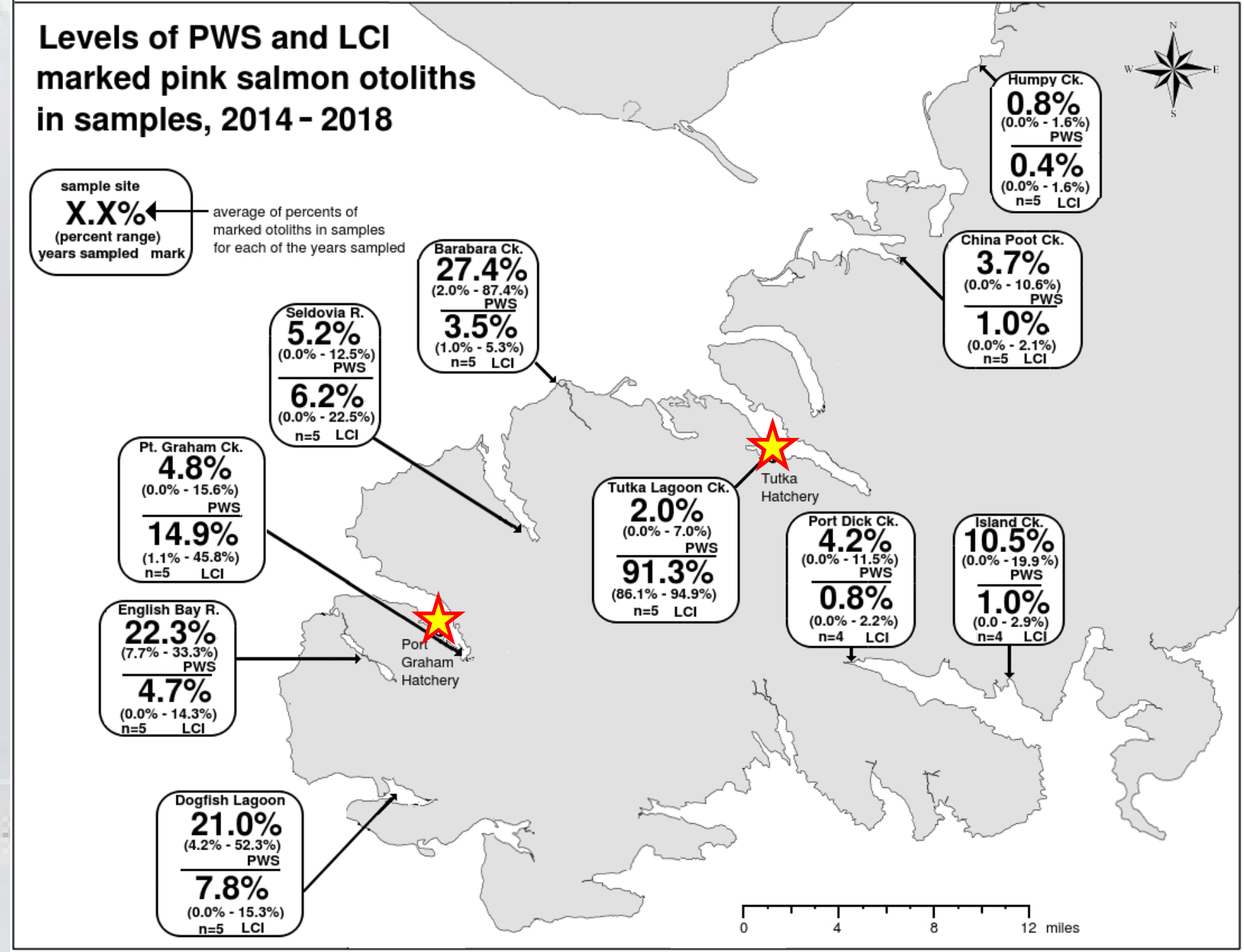
Findings - LCI

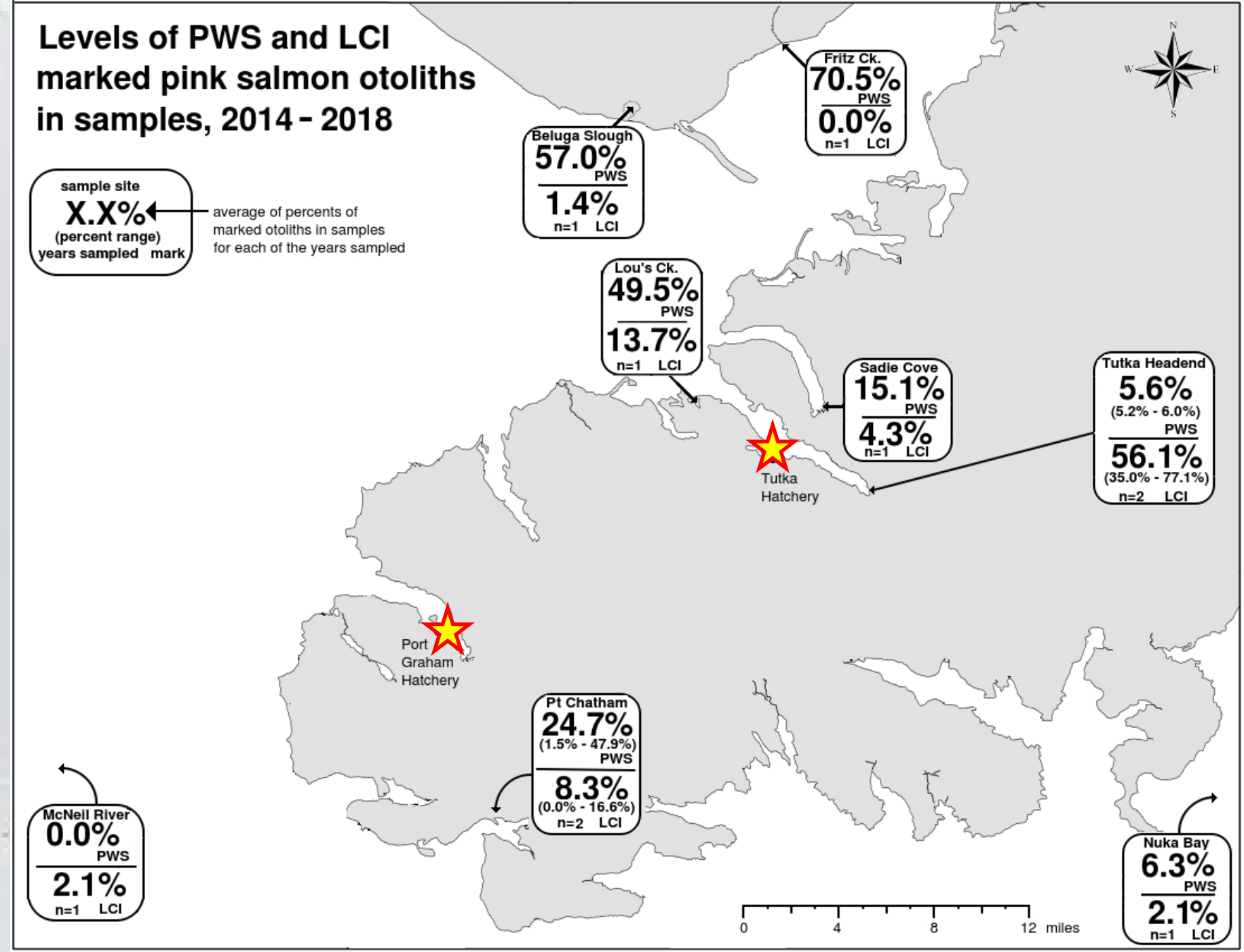


Levels of LCI marked otoliths sampled outside of hatchery special harvest areas (SHAs), and release size for that returning year class of pink salmon.

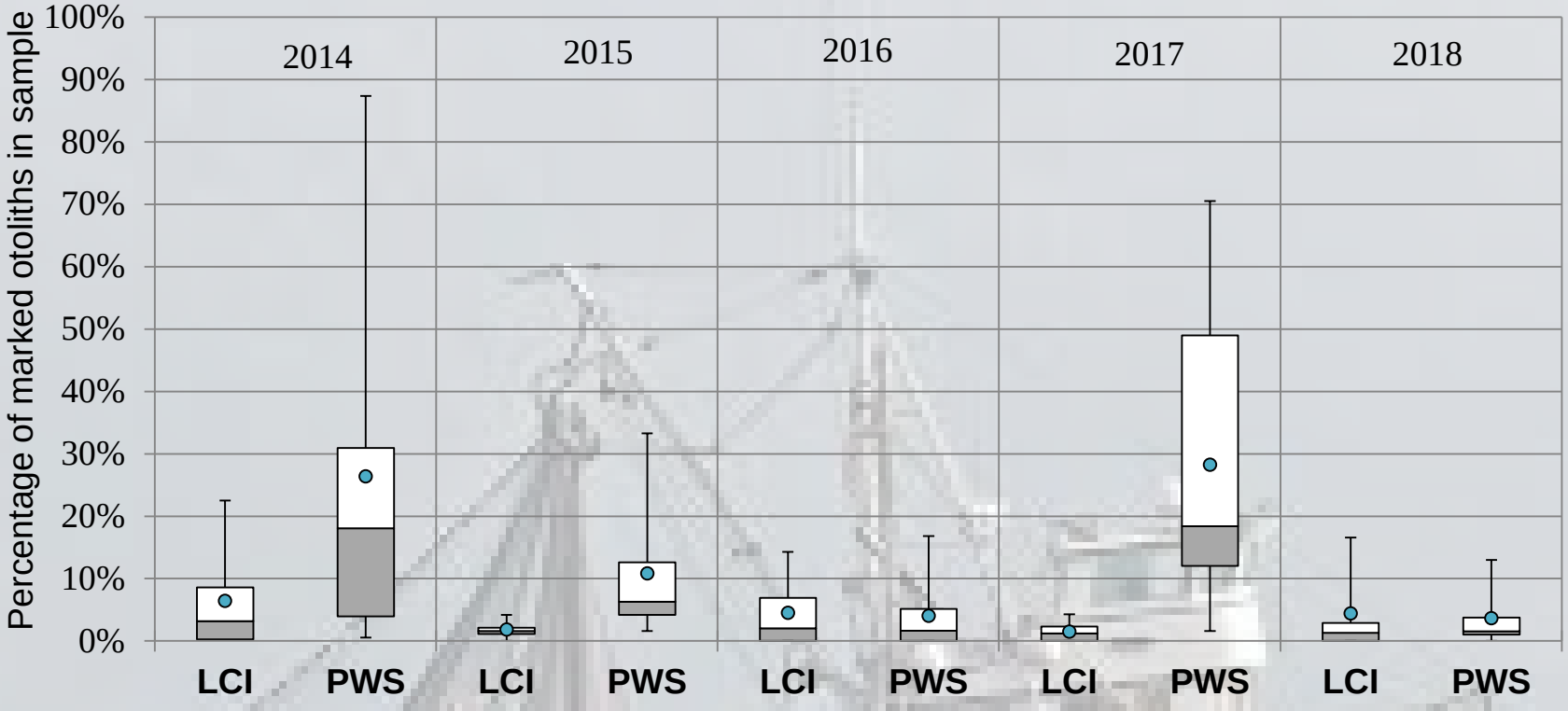
Levels of PWS hatchery marked pink salmon otoliths in samples (excluding SHAs) 2014 – 2018




Levels of PWS and LCI marked pink salmon otoliths in samples, 2014 – 2018
sample site
X.X%
(percent range)
years sampled mark
average of percents of marked otoliths in samples for each of the years sampled
Humpy Ck.
0.8%
(0.0% - 1.6%)
PWS
0.4%
(0.0% - 1.6%)
n=5 LCI
China Poot Ck.
3.7%
(0.0% - 10.6%)
PWS
1.0%
(0.0% - 2.1%)
n=5 LCI
Barabara Ck.
27.4%
(2.0% - 87.4%)
PWS
3.5%
(1.0% - 5.3%)
n=5 LCI
Seldovia R.
5.2%
(0.0% - 12.5%)
PWS
6.2%
(0.0% - 22.5%)
n=5 LCI
Pt. Graham Ck.
4.8%
(0.0% - 15.6%)
PWS
14.9%
(1.1% - 45.8%)
n=5 LCI
Tutka Lagoon Ck.
2.0%
(0.0% - 7.0%)
PWS
91.3%
(86.1% - 94.9%)
n=5 LCI
Tutka Hatchery
Port Dick Ck.
4.2%
(0.0% - 11.5%)
PWS
0.8%
(0.0% - 2.2%)
n=4 LCI
Island Ck.
10.5%
(0.0% - 19.9%)
PWS
1.0%
(0.0 - 2.9%)
n=4 LCI
English Bay R.
22.3%
(7.7% - 33.3%)
PWS
4.7%
(0.0% - 14.3%)
n=5 LCI
Port Graham Hatchery
Dogfish Lagoon
21.0%
(4.2% - 52.3%)
PWS
7.8%
(0.0% - 15.3%)
n=5 LCI
N
W
E
S
0
4
8
12 miles


Levels of PWS and LCI marked pink salmon otoliths in samples, 2014 – 2018
sample site
X.X%
(percent range)
years sampled mark
average of percents of marked otoliths in samples for each of the years sampled
Fritz Ck.
70.5%
PWS
0.0%
n=1 LCI
Beluga Slough
57.0%
PWS
1.4%
n=1 LCI
Lou's Ck.
49.5%
PWS
13.7%
n=1 LCI
Sadie Cove
15.1%
PWS
4.3%
n=1 LCI
Tutka Headend
5.6%
(5.2% - 6.0%)
PWS
56.1%
(35.0% - 77.1%)
n=2 LCI
Tutka Hatchery
Port Graham Hatchery
Pt Chatham
24.7%
(1.5% - 47.9%)
PWS
8.3%
(0.0% - 16.6%)
n=2 LCI
McNeil River
0.0%
PWS
2.1%
n=1 LCI
Nuka Bay
6.3%
PWS
2.1%
n=1 LCI
0
4
8
12 miles
N
W
E
S

Findings



Box and whisker plots showing percent occurrence of PWS and LCI hatchery marked otoliths in samples from pink salmon carcasses in LCI streams excluding hatchery special harvest areas, 2014-2018. Bottom and top of the box are 25th and 75th percentile. Horizontal line in the box is the 50th percentile, (median). Circle is the mean, (average).

Conclusions

- **Lower Cook Inlet produced pink salmon are present in streams**
  - sampled at a lower than expected level
- **Prince William Sound hatchery pink salmon are present in LCI collected samples.**
  - not expected when study was conceived
- **Interpretation of current data set is limited given small number of years sampled.**
  - need to continue sampling based on a comprehensive study design

Questions?