



Interactions of Wild and Hatchery Pink Salmon and Chum Salmon in Prince William Sound and Chum Salmon in Southeast Alaska 2014 Progress

Prince William Sound Science Center

together with

Sitka Sound Science Center

For

Alaska Department of Fish and Game

Outline

- Introduction
- Overview 2014 Sampling Activities
 - PWS Ocean Sampling
 - PWS Stream Sampling
 - SEAK Stream Sampling
 - Alevin Sampling
- 2013 Hatchery-Wild Proportion Results
 - PWS Ocean Sampling
 - Streams
- Recommendations
- Discussion

Overarching Objectives

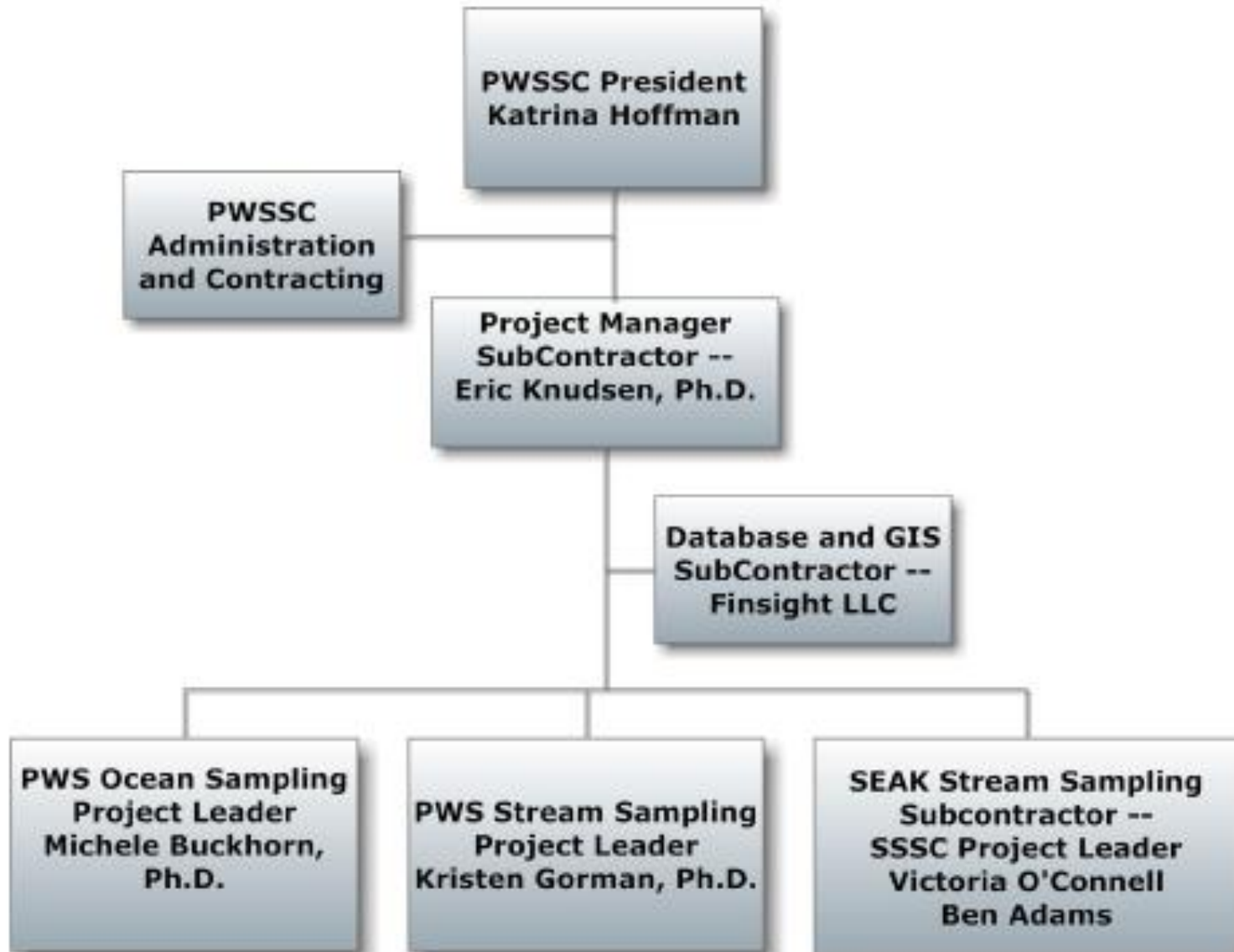
(for contracted parts of study)

- What is extent and annual variability in straying of hatchery pink salmon in Prince William Sound (PWS) and chum salmon in PWS and Southeast Alaska (SEAK)?
- What is the impact on fitness (productivity) of wild pink and chum salmon stocks due to straying of hatchery pink and chum salmon?

Scope of Project 2014

- Covers huge geography – all of Southeast and Prince William Sound
- Eleven field teams, directly employing 42 biologists and technicians
- Made 610 individual stream visits or ocean sampling days
- Collected 33,431 otolith samples and 11,567 DNA tissue samples

Project Organization



Overall Sampling Scheme

- PWS Ocean sampling – both species
- Hatchery-wild proportions of stream spawners:
 - PWS – Pink salmon and chum salmon (32 streams)
 - SEAK – Chum salmon (32 streams)
- Fitness study:
 - PWS – Pink salmon in 6 streams
 - SEAK – Chum salmon in 4 streams



HW Database and Field App

Finsight LLC

- SQL host database on server
- Apps for field data collection and uploading to database
 - Ocean sampling laptop app for
 - On board processing of catch and location information
 - Processing fish samples
 - Stream data collected with Android app for 10-in tablet
 - Daily back-up to laptop and data review
- Field data transmitted to host



2014 Activities

Preliminary Progress Report submitted to ADF&G



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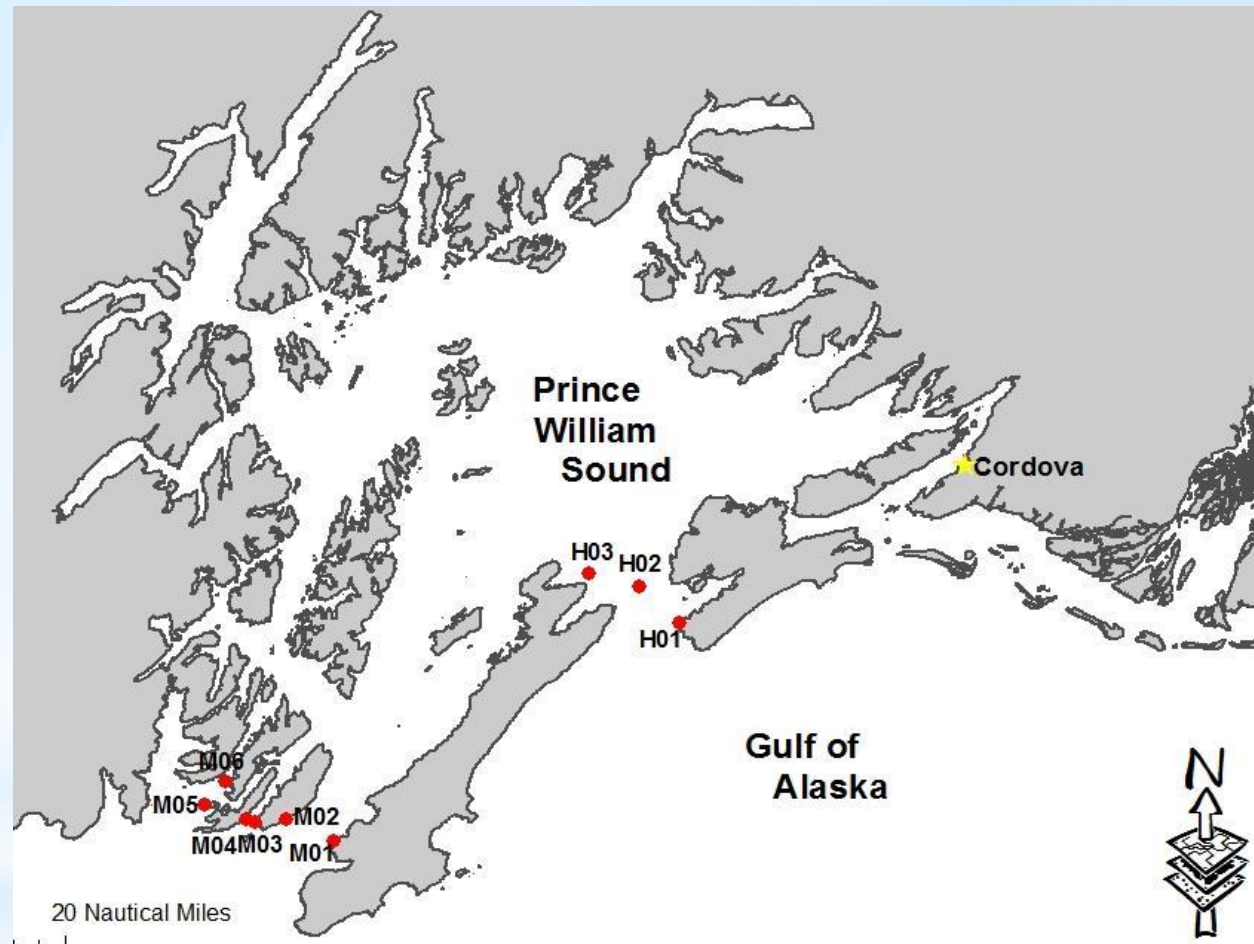
Prince William Sound Ocean Test Fishery

Michele Buckhorn, PhD

Prince William Sound Science Center

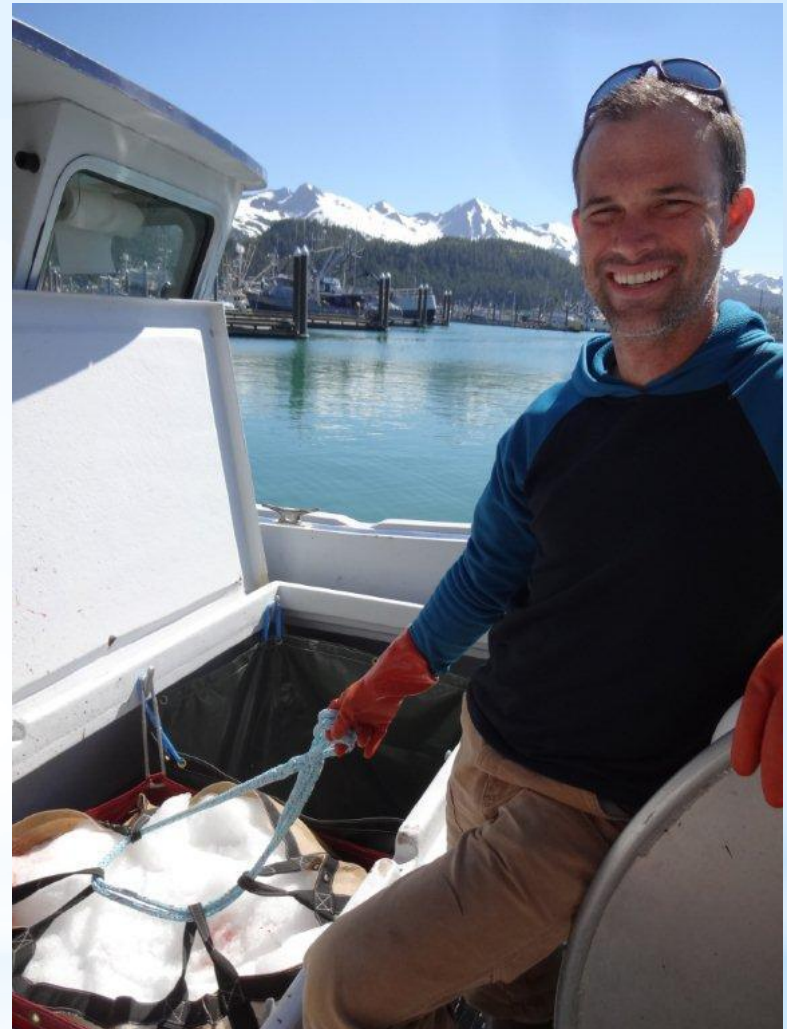
Test Fishery May 15-August 30, 2014

- 32' Bowpicker. 200 fathom net with $4\frac{3}{4}$, $4\frac{3}{8}$, $5\frac{1}{8}$, and $5\frac{1}{2}$ mesh
- 9 fixed stations (6 - Montague Strait; 3 - Hinchinbrook Entrance)
- 1 hour max sets. Whale pingers were attached to the net this year.
- Date, time, latitude and longitude were recorded in the database for each set.



Sample Collecting

- Fish were removed from the net and total catch recorded.
- Catches that exceeded the maximum sample number per station were systematically sampled to acquire the appropriate number.
- Catch from each station was tagged with a color coded floy tag, bled in the field, and put on ice.
- Chum and Pink samples beyond the maximum sample number were retained if it was determined they would not survive release.

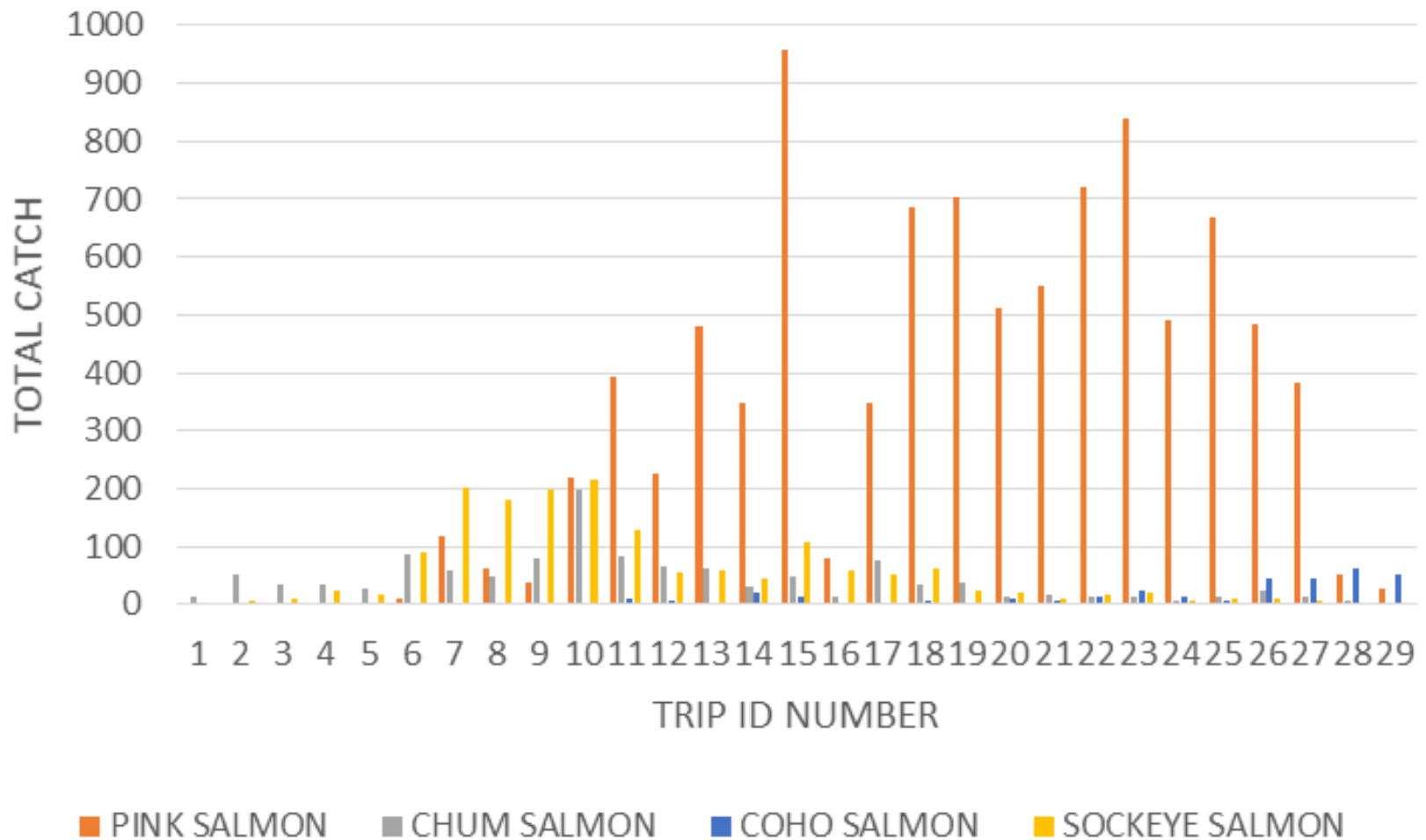


Sample Processing

- Fish delivered to PWSSC personnel and separated by station and species.
- Morphometric data: total length (TL), standard length (SL), mid-eye socket to hypural bone length (MEH), total weight (TW), and sex (S).
- Otoliths were extracted and placed in individual cells in labeled trays provided by ADF&G
- Fish in good condition were gutted and returned to ice to be sold under the ADF&G commercial fishing permit.

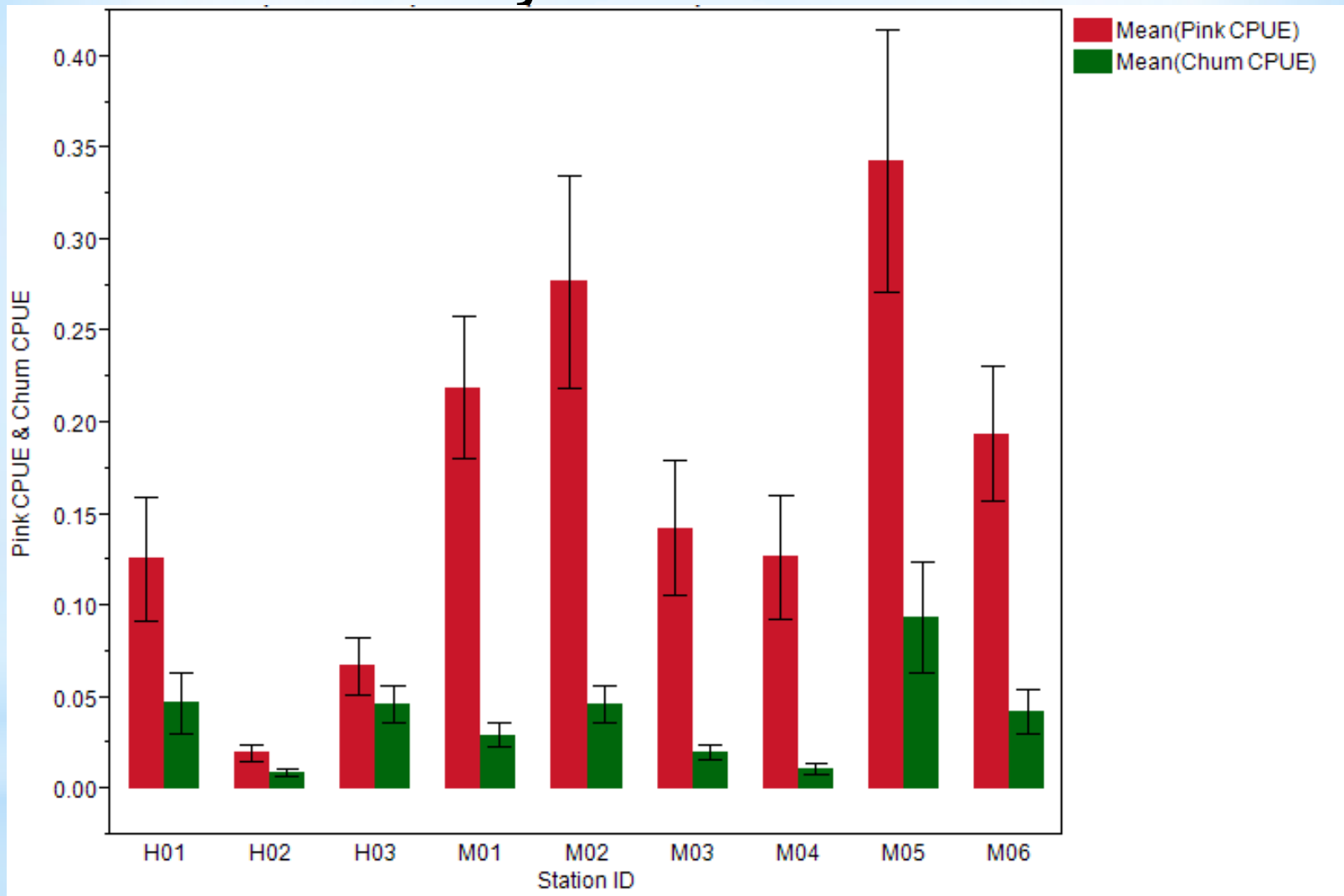


2014 Preliminary Results



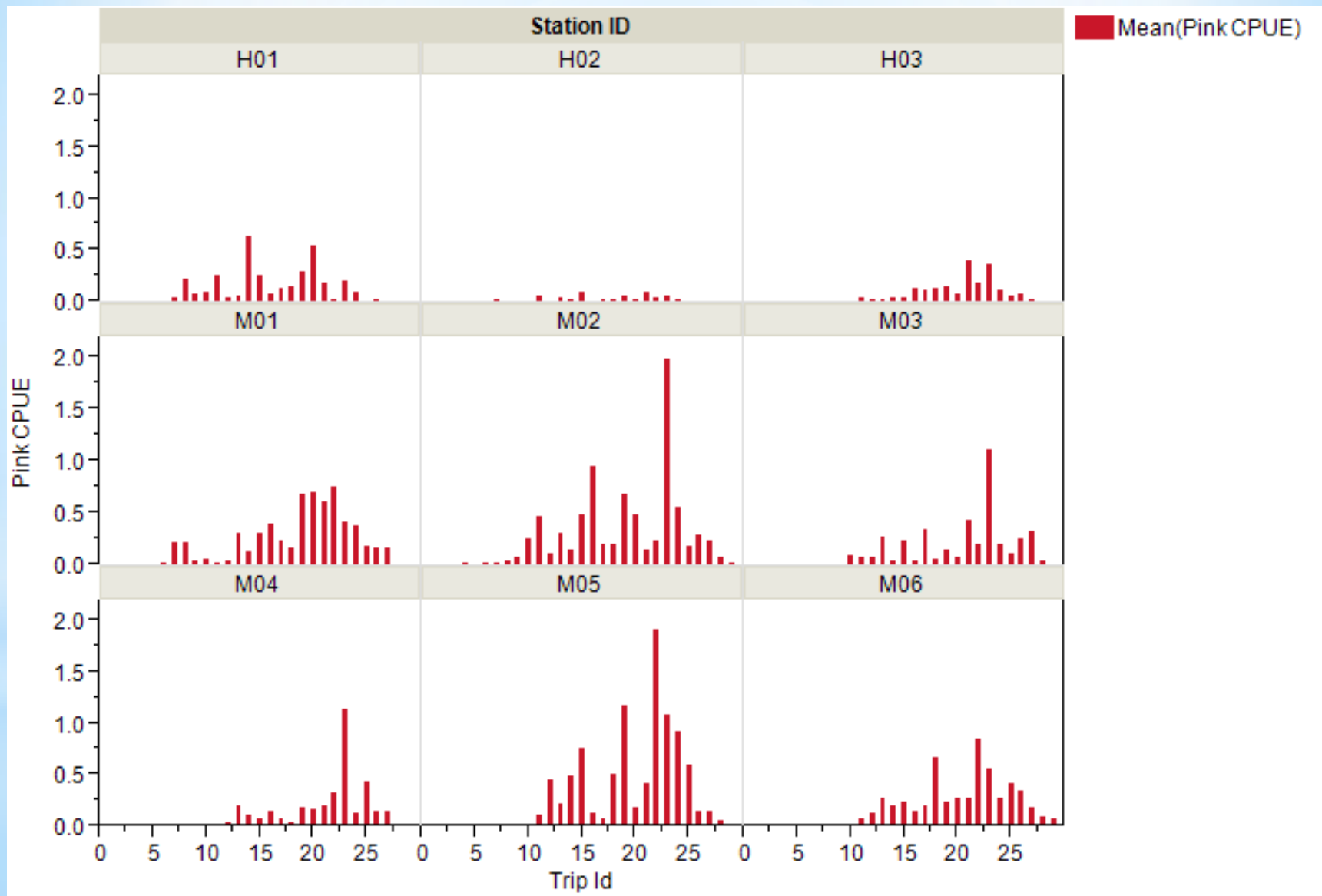
- 12,607 salmon were caught in the ocean test fishery. 10 Chinook caught and 9 released
- Pink Salmon (9,400)
- Chum (1,198)
- Sockeye Salmon (1,644)
- Coho Salmon (355).
- 85% of catch from the Montague stations (10,732)

2014 Preliminary Results

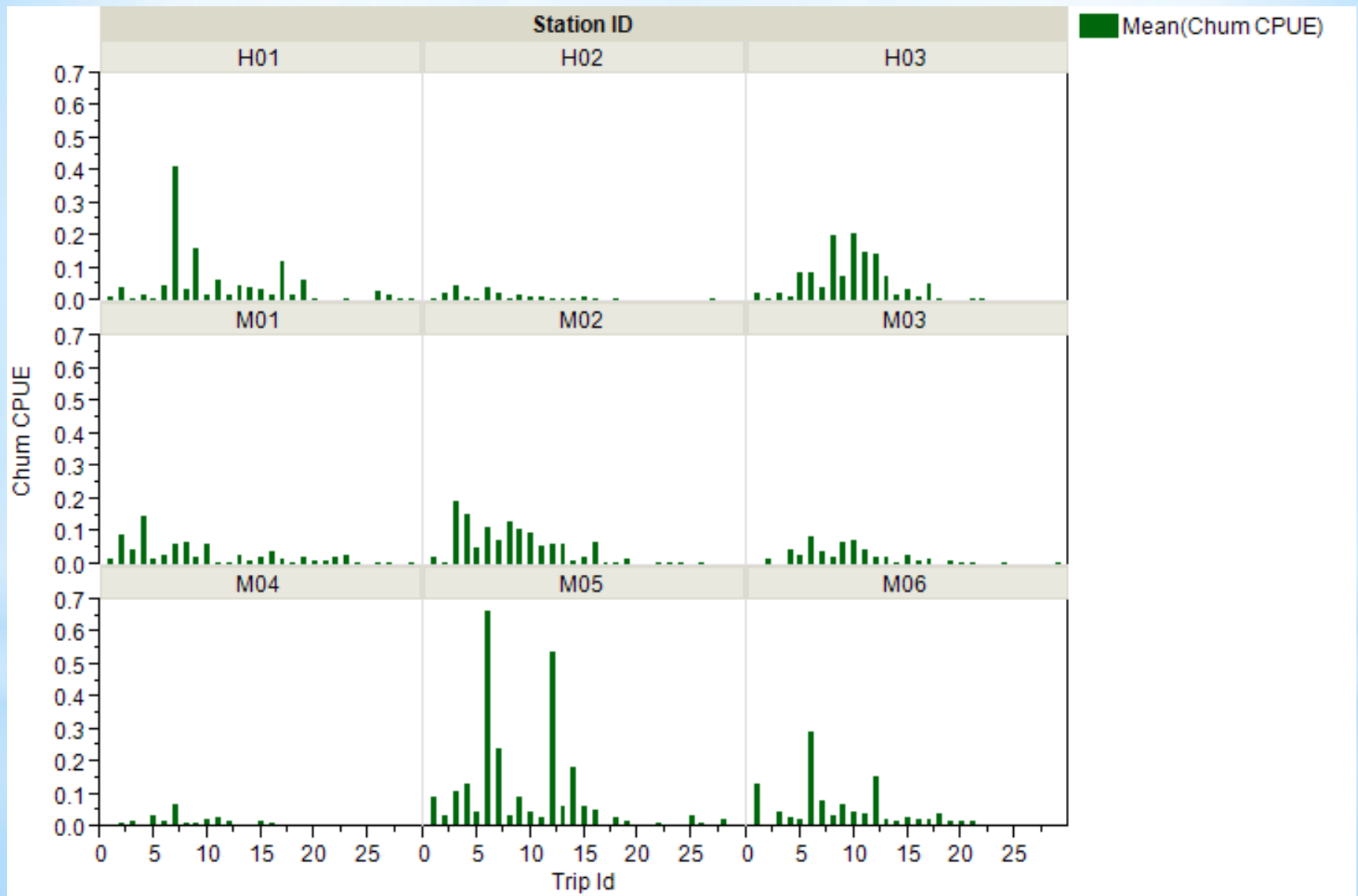


- Mean CPUE (fish caught per fathom hour)
- Pink salmon: H02 0.020; M05 0.343
- Chum salmon: H02 0.009; M05 0.094

2014 Pink Salmon CPUE



2014 Chum Salmon CPUE



2014 Sex Ratios

Species Common Name	count/percent	Female	Male	Unknown	Grand Total
Chum Salmon	count	496	411	1	908
	percent	54.63%	45.26%	0.11%	
Coho Salmon	count	2	7		9
	percent	22.22%	77.78%		
Pink Salmon	count	640	973	2	1615
	percent	39.63%	60.25%	0.12%	
Sockeye Salmon	count	157	140		297
	percent	52.86%	47.14%		

- 2,831 salmon processed for weight-length measurements and otoliths extracted.
- Pink Salmon (1,615), Chum (908), sockeye (297), and Coho (9).
- Pink Salmon catch averaged about 60% male. Coho Salmon was highly skewed towards males, but this could be due to the small sample size. The remaining two species had close to 50/50 sex ratios

Stream Sampling

- Adult sampling 2013-2015
 - Each stream visited at least three times per season in PWS and twice in SEAK
 - Straying Study --Otoliths and other data collected from spawned out adults in all streams
 - Fitness Study – DNA also collected
- Alevin sampling 2014-2016
 - Spring redd pumping for fry in fitness streams
 - Test run on Fish and Stockdale creeks spring 2014

Consistent Stream Sampling Methods

- Written, detailed protocols
- Pre-season training
- Field app helped to guide sampling
- Fish collection – spawn outs or carcasses
 - Otoliths, sex, length, by processing area location with lat-lons
 - Rough live/dead counts on most survey dates
- Fitness streams
 - DNA tissues (all fish)
 - Scales (chum only)



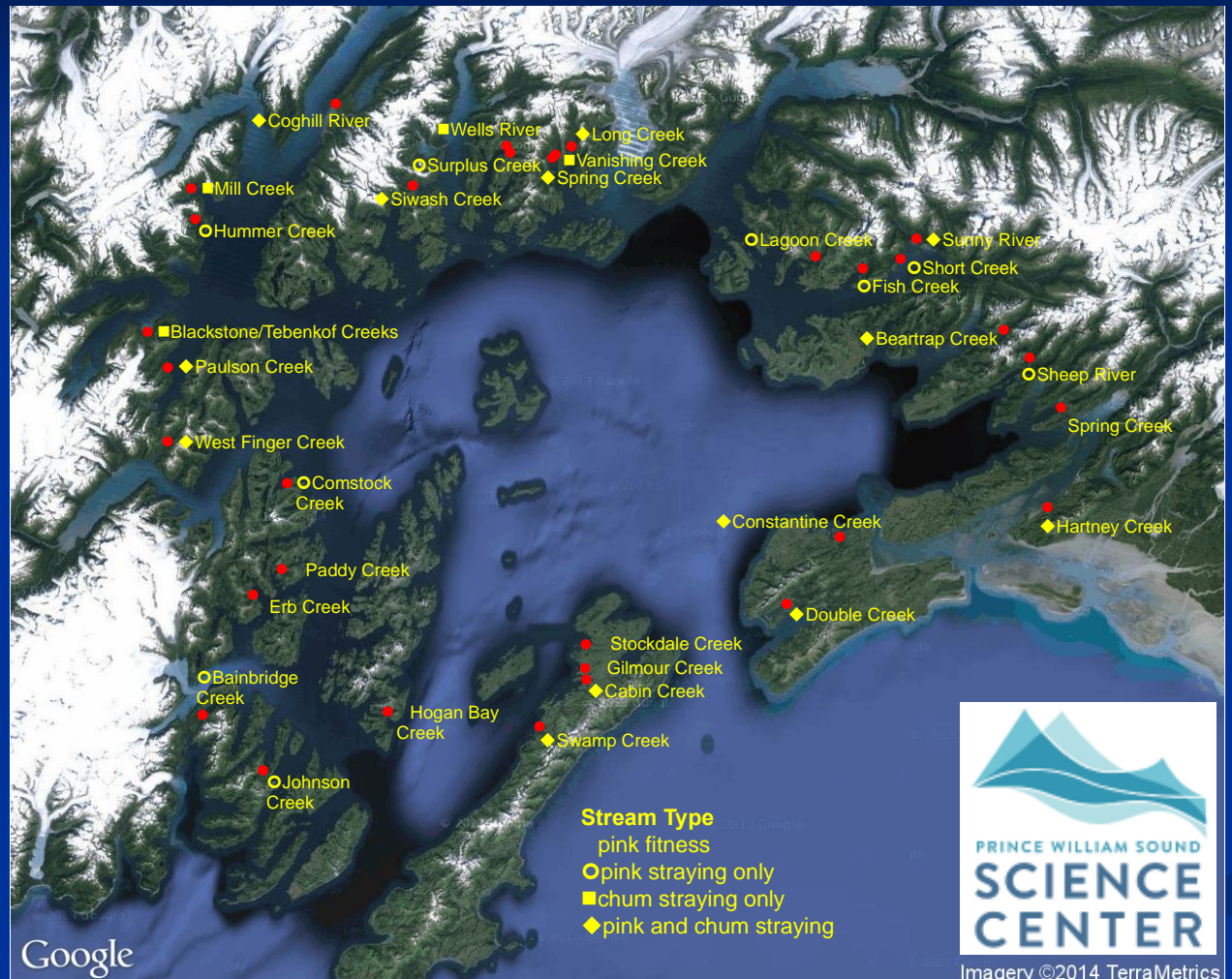
Stream studies of hatchery-wild pink and chum salmon interactions in Prince William Sound, Alaska, 2014



Kristen Gorman and Eric Knudsen
Prince William Sound Science Center, Cordova, AK

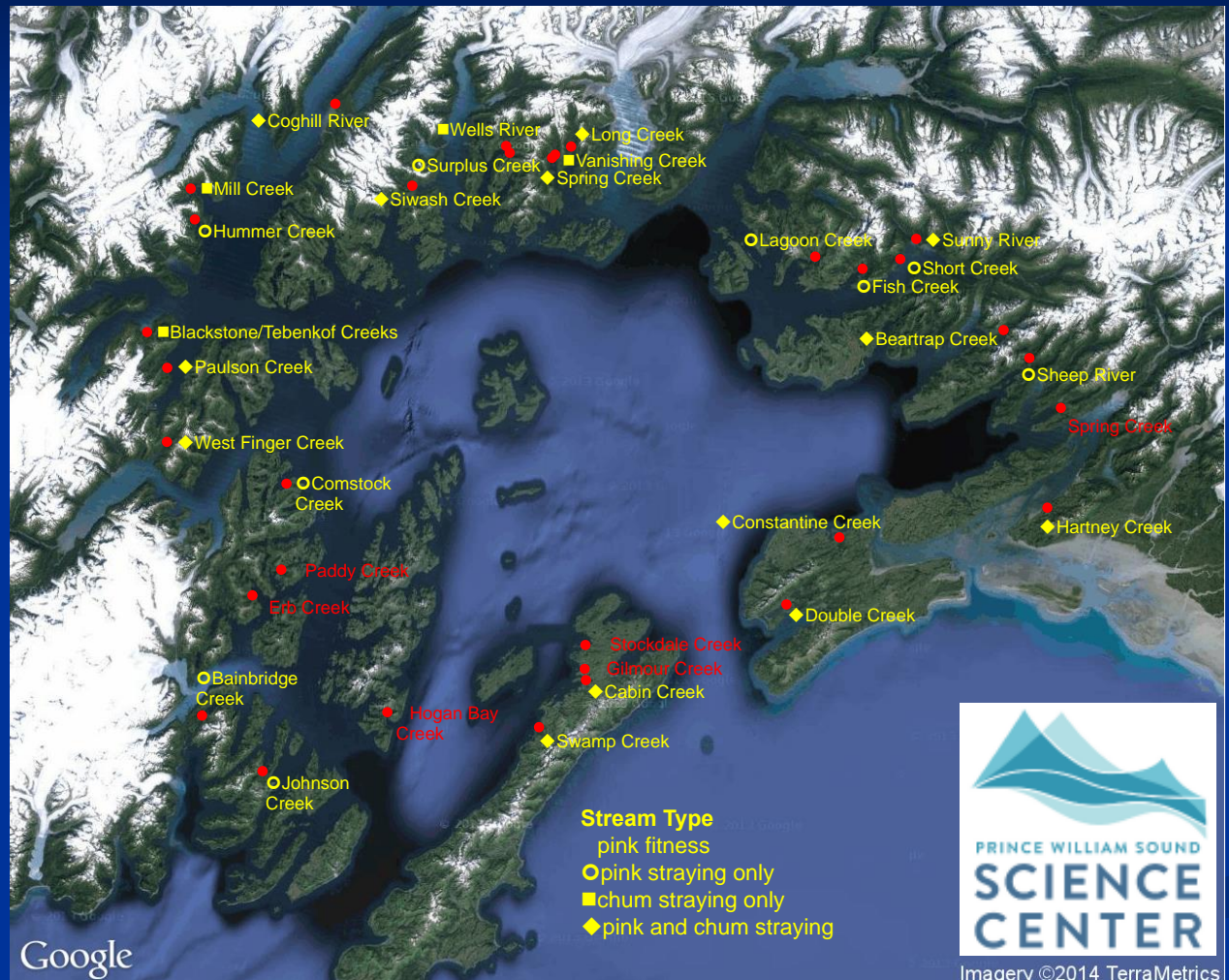
2014 Field Campaign PWS

- 32 study streams throughout PWS.



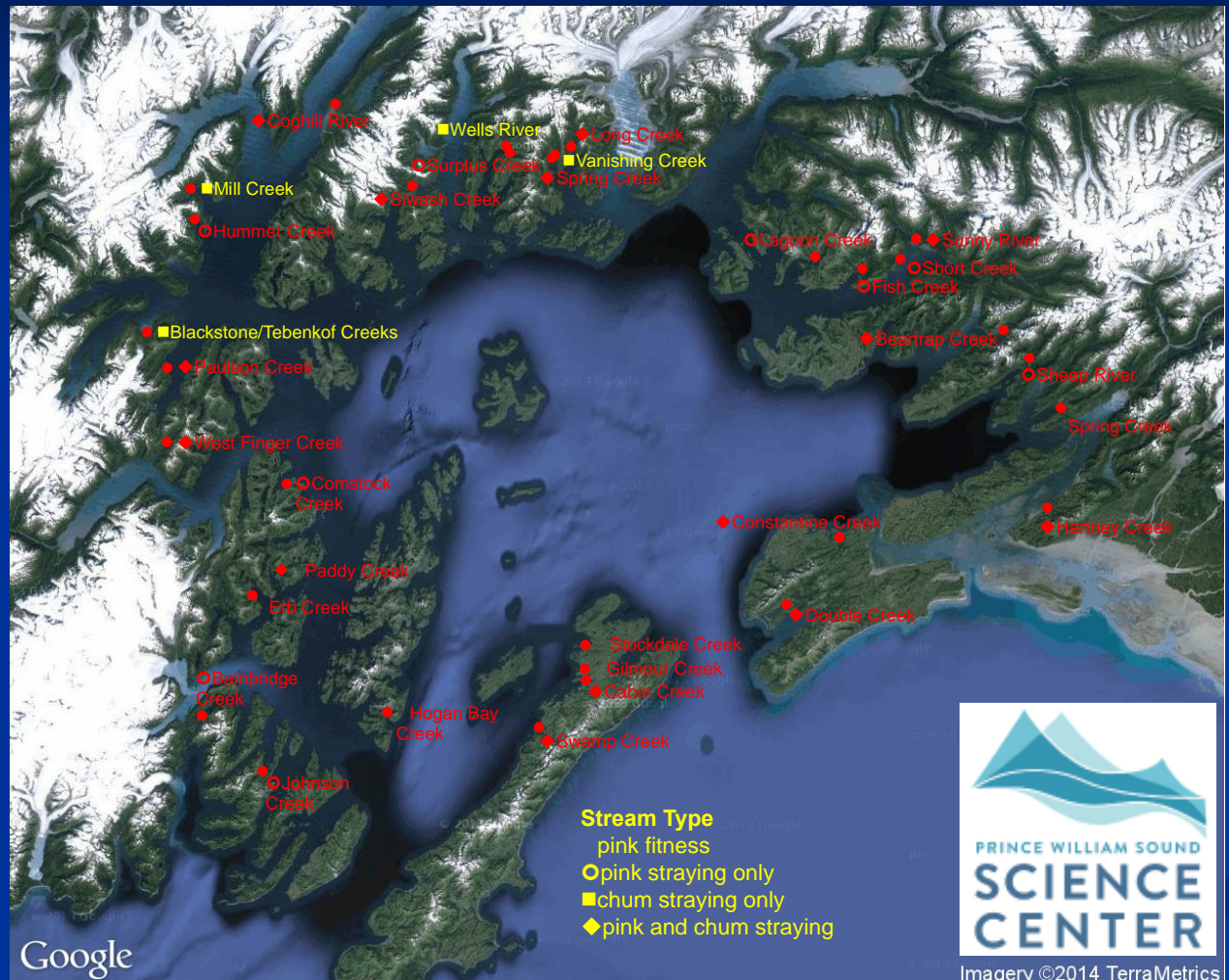
2014 Field Campaign PWS

- 32 study streams throughout PWS.
- 6 pedigree fitness streams for pinks.
 - Sampled every 3 days.



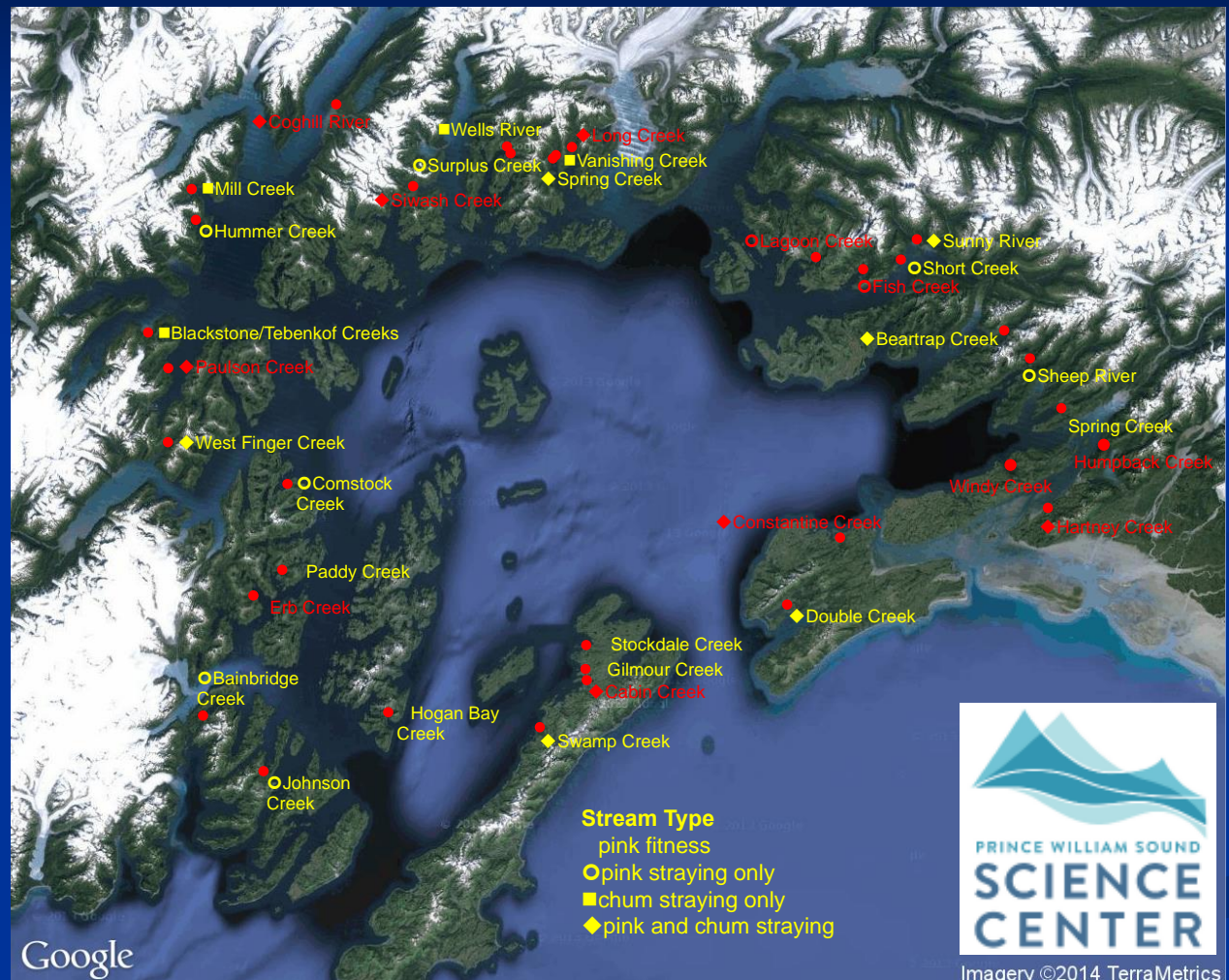
2014 Field Campaign PWS

- 32 study streams throughout PWS.
- 6 pedigree fitness streams for pinks.
 - Sampled every 3 days.
- 28 pink straying streams.



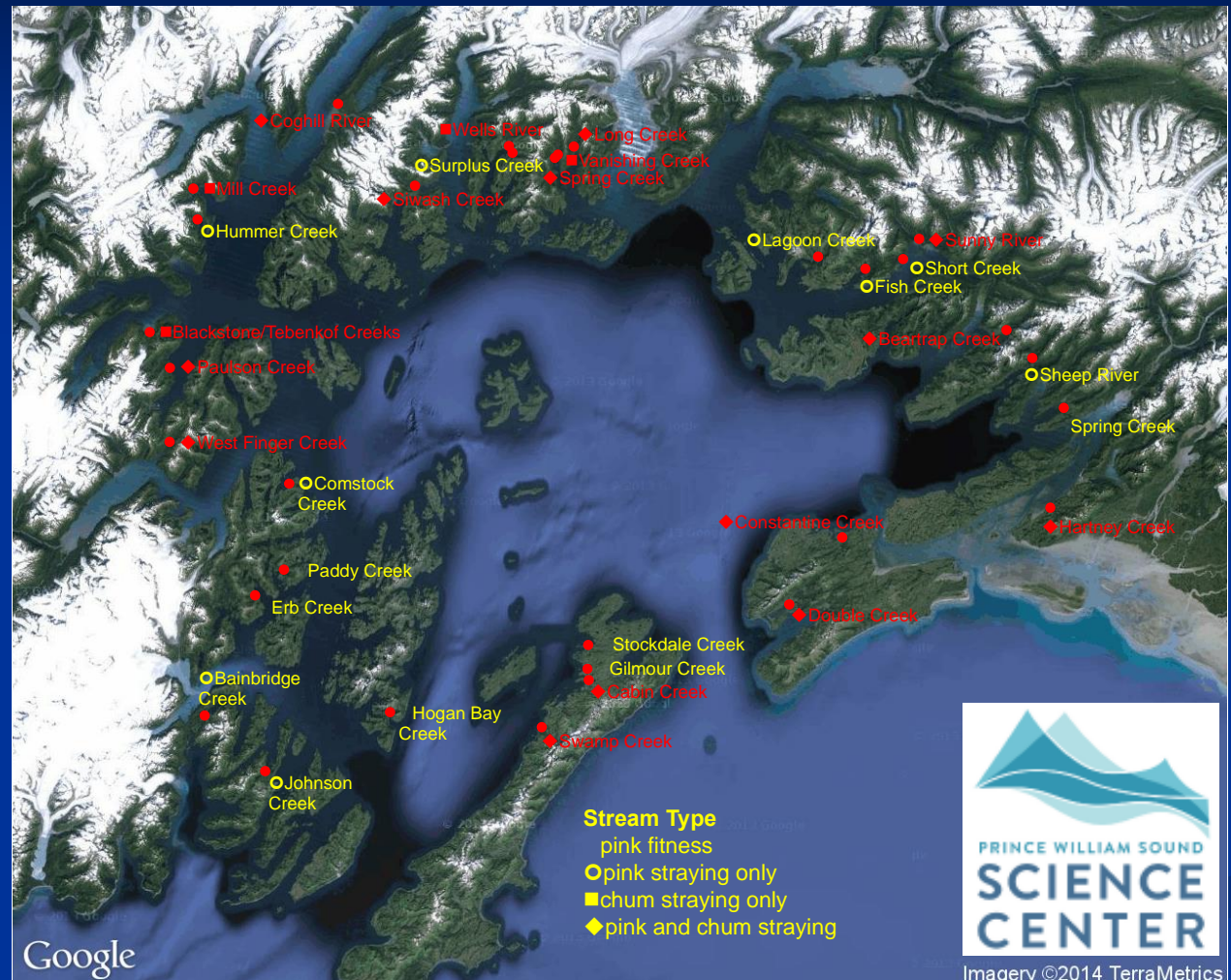
2014 Field Campaign PWS

- 32 study streams throughout PWS.
- 6 pedigree fitness streams for pinks.
 - Sampled every 3 days.
- 28 pink straying streams.
 - 12 streams for stock structure analysis.



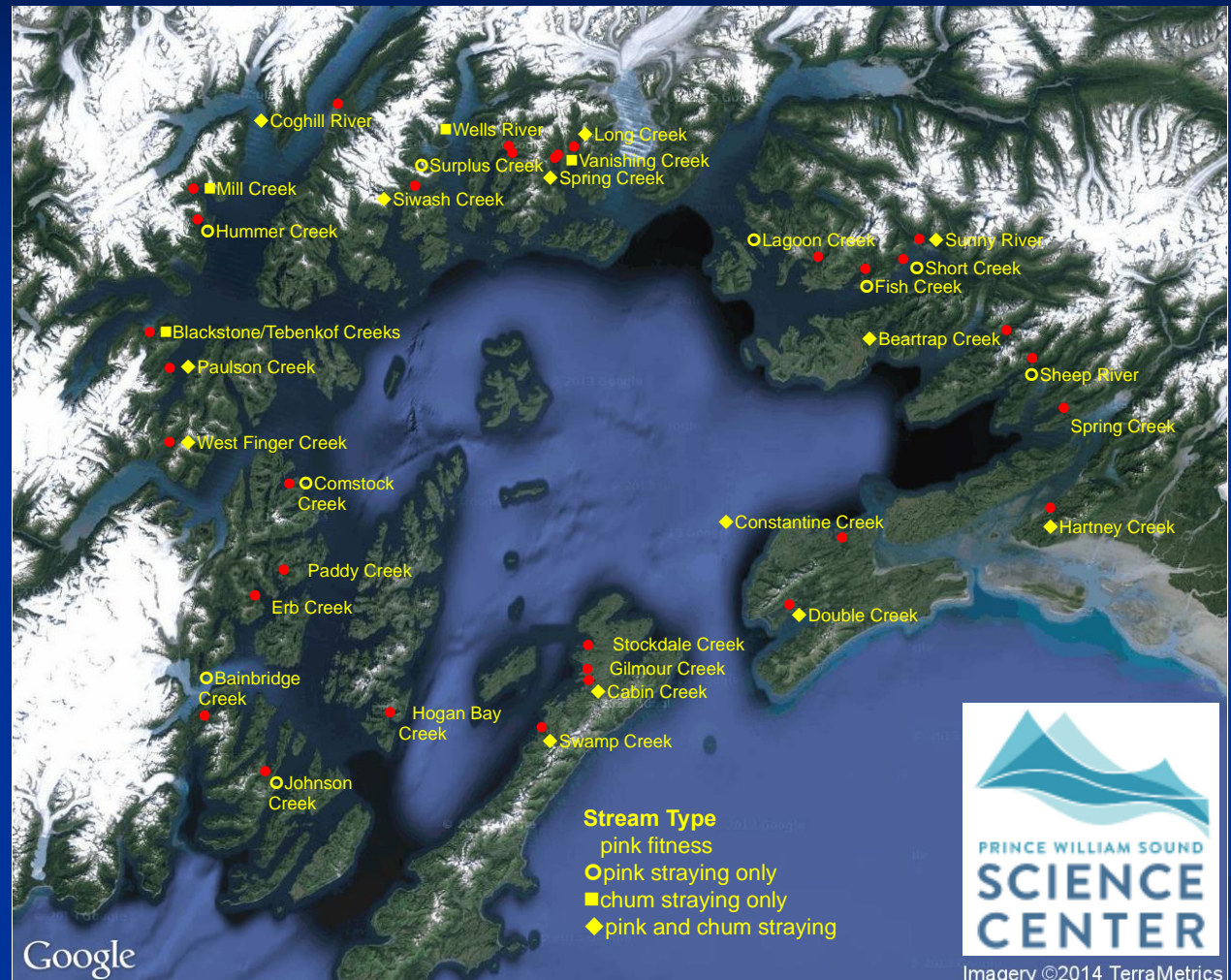
2014 Field Campaign PWS

- 32 study streams throughout PWS.
- 6 pedigree fitness streams for pinks.
 - Sampled every 3 days.
- 28 pink straying streams.
- 18 chum straying streams.



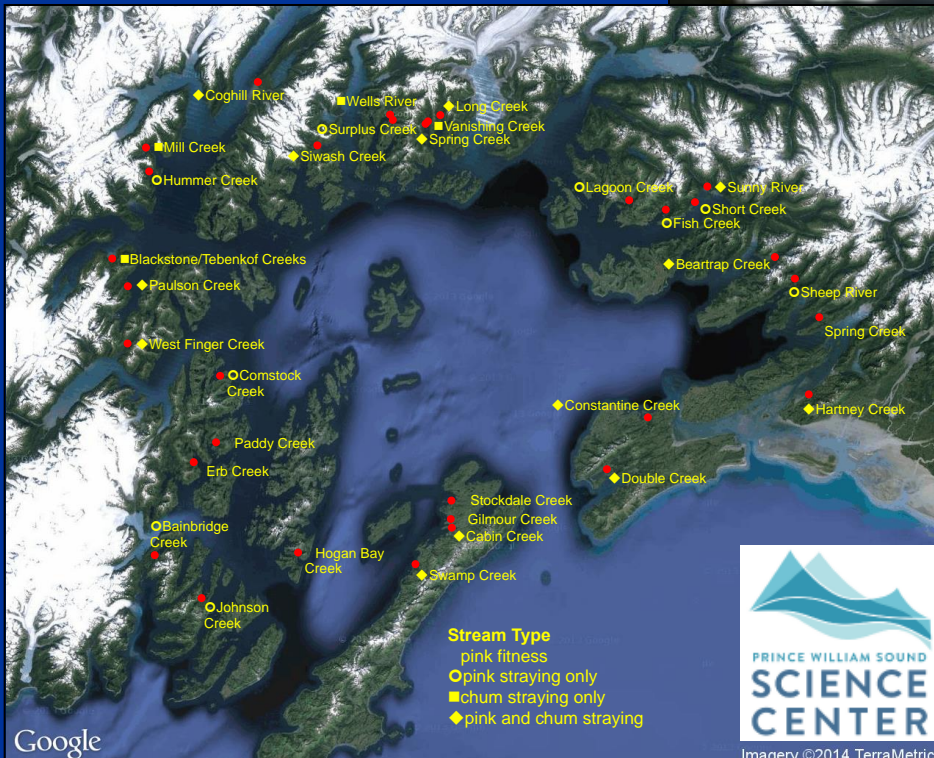
2014 Field Campaign PWS

- 32 study streams throughout PWS.
- 6 pedigree fitness streams for pinks.
 - Sampled every 3 days.
- 28 pink straying streams.
- 18 chum straying streams.
- 5 field crews operating in PWS



PWS Vessel-Based Crews 2014: Cathy G and Auklet

- July 18 – September 20, 2014
- 3 port calls
 - ~Every 2 weeks
- Focus: stray streams



PWS Vessel-Based Crews 2014: Cathy G and Auklet

- August 3 – September 15, 2014
- 1 port call
- Focus: pedigree streams

Photo Credit: A. Chastan

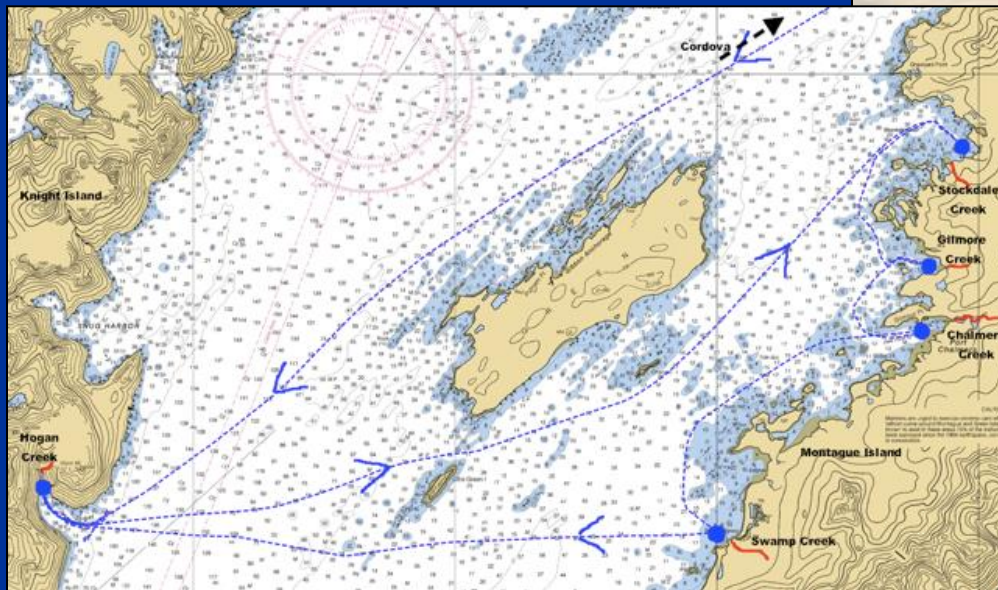


Chart: D. Janka



Photo Credit: D. Janka

PWS Camping Crew: Paddy Bay



- August 3 –
September 15, 2014
- Resupply via Cathy G
- Focus: pedigree
streams

Photo Credit: D. Janka



Additional Field Crews: Texas A&M and Cordova-based

TAMU Crew

- Mid-July – August 20, 2014
- Focus:
Spring Creek (pedigree),
Sheep River,
Windy Creek (Wei)

CDV Crew

- Mid-July – September 20, 2014
- Focus:
Hartney Creek,
Spring Creek (pedigree),
2 trips to Coghill River,
Humpback Creek (Wei)

Field Collections: Otoliths and Genetic Samples



Photo Credit: D. Janka

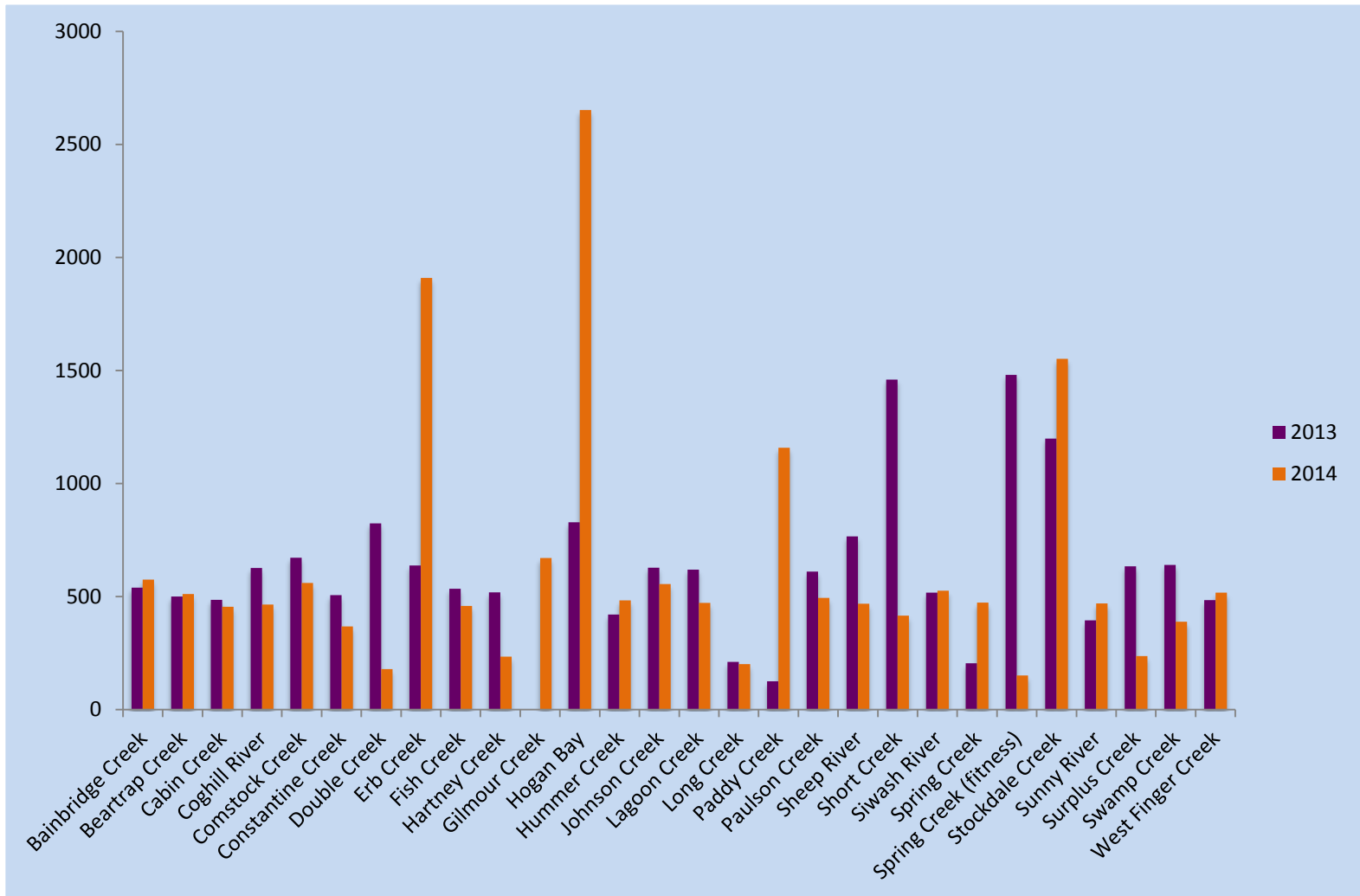
Field Collections: Otoliths and Genetic Samples



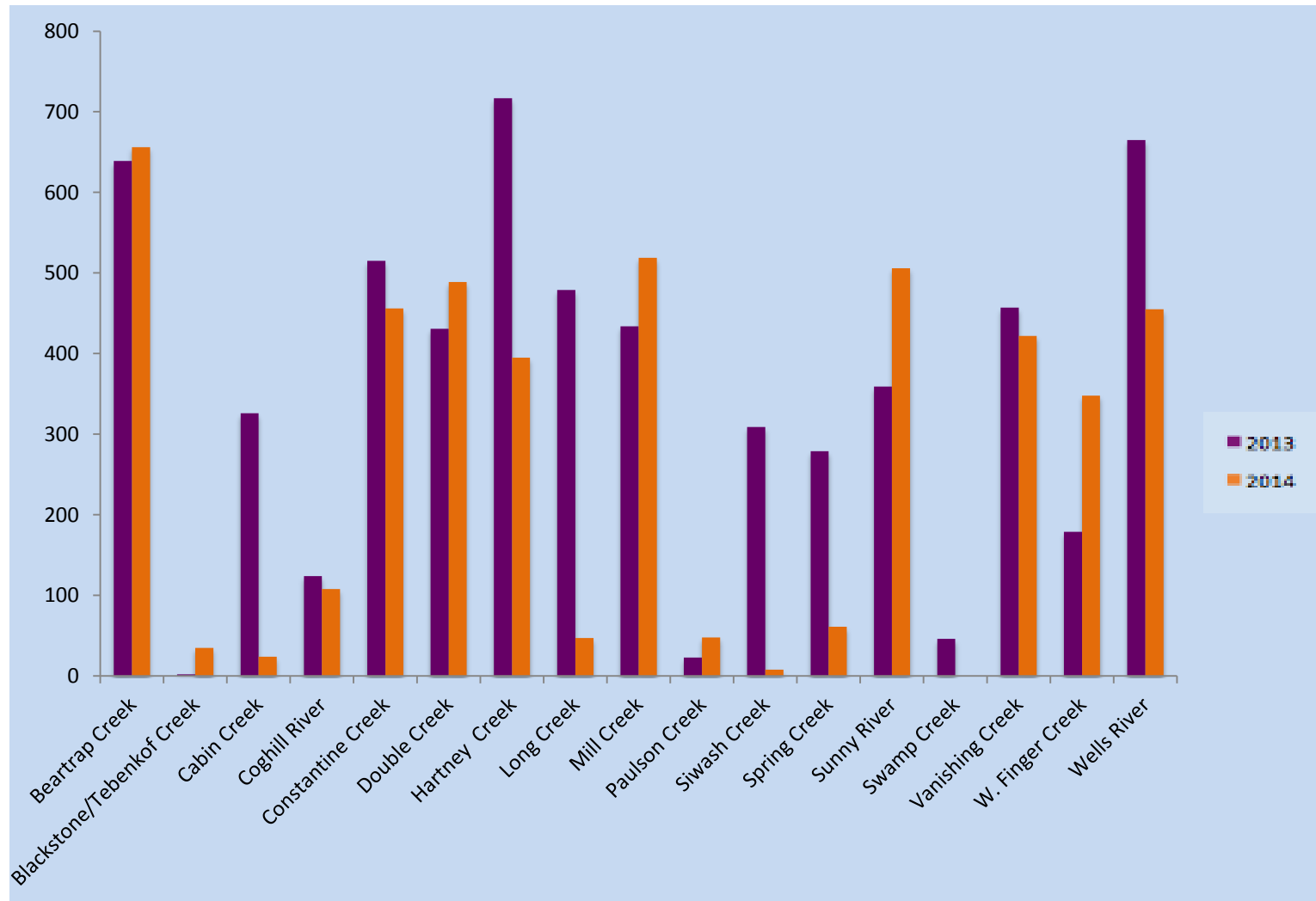
2014 PWS Sample Summary

	Pink	Chum	Pink-Stock Structure (Windy & Humpback)	Total
Otoliths	17,595	4,577	187	22,359
DNA- Pedigree	8090	N/A	N/A	8090
Stream Visits				285
Sampling Goal	23/28 streams >384	8/18 streams >384		

PWS 2013 & 2014 Pink Otolith Collections



PWS 2013 & 2014 Chum Otolith Collections

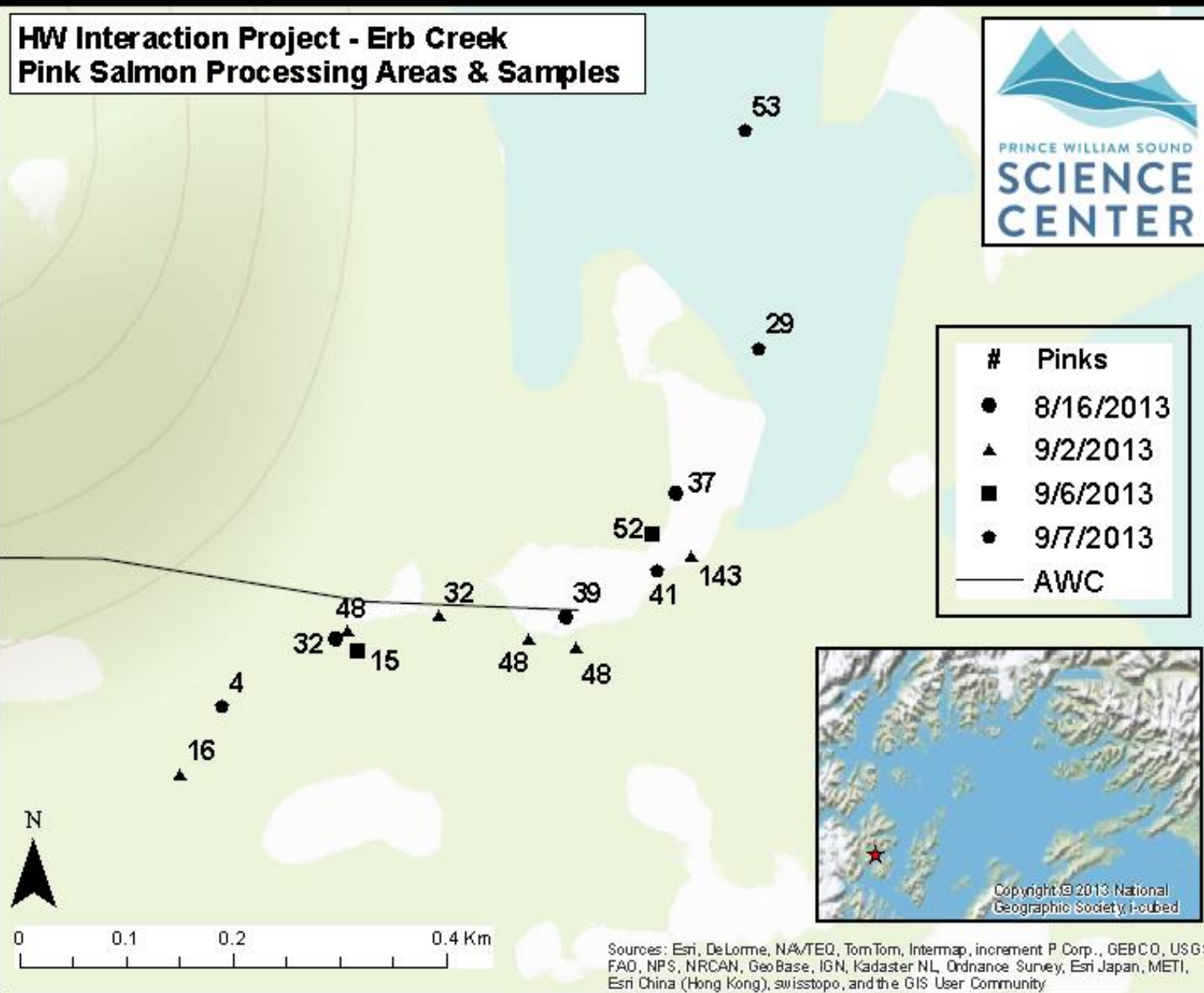


Stream Sampling PWS 2013

**HW Interaction Project - Erb Creek
Pink Salmon Processing Areas & Samples**



- | # | Pinks |
|---|-----------|
| ● | 8/16/2013 |
| ▲ | 9/2/2013 |
| ■ | 9/6/2013 |
| ◆ | 9/7/2013 |
| — | AWC |



Southeast Alaska Summer 2014



Photo: Bryan Ferguson



Southeast Alaska Summer 2014

- More effective
 - More visits
 - Longer portions of stream
 - Good visit timing
- Major challenges
 - Low returns
 - Heavy Rainfall - Floods
 - Access
 - Marten, Chuck Rivers



Photo: Dale Adams

Summer Field Crews

- Sampled July 22 – Sept 2
- Pedigree crews
 - Juneau
 - Vessel
- Otolith crews
 - North
 - South
 - Tenakee Springs



Photo: Madison Kosma, Dylan Rhea-Fournier

Summer Field Crews

- Pedigree crews

- Juneau

- Vessel

- Otolith crews

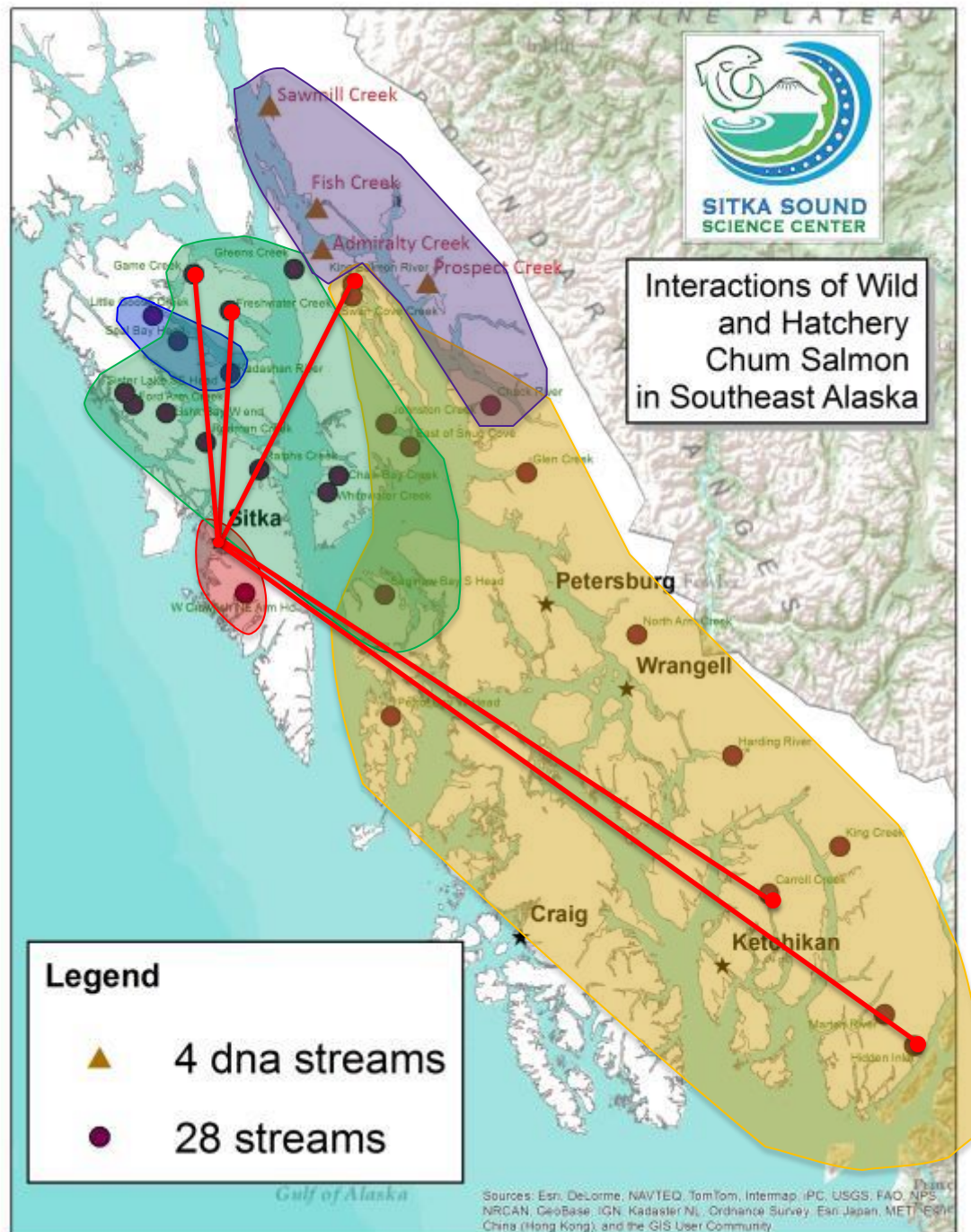
- North

- South

- Tenakee Springs



Photos: Alaska Coastal Outfitters, Adams Alaskan Safaris, Molly Kemp

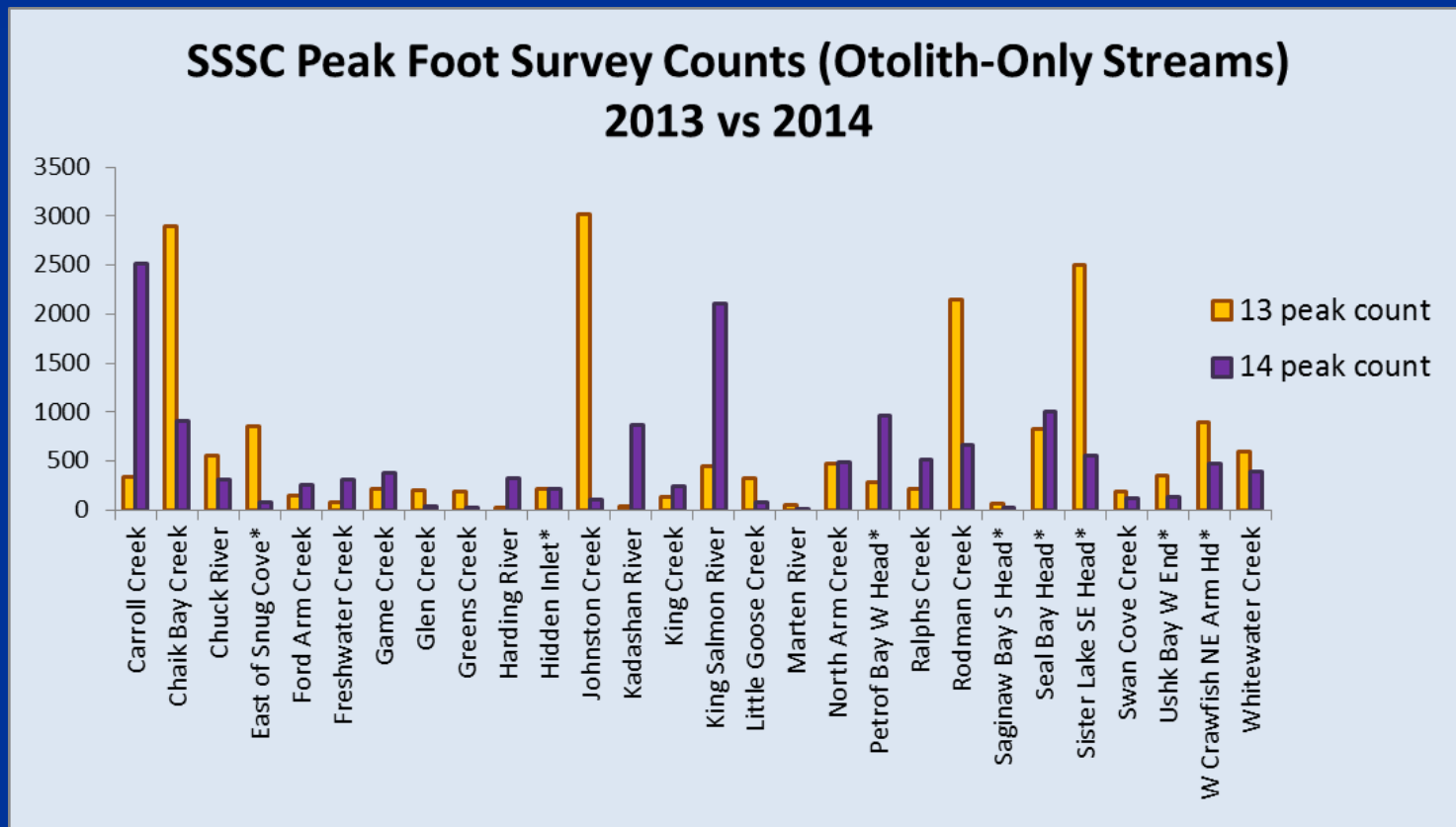


Pedigree Streams



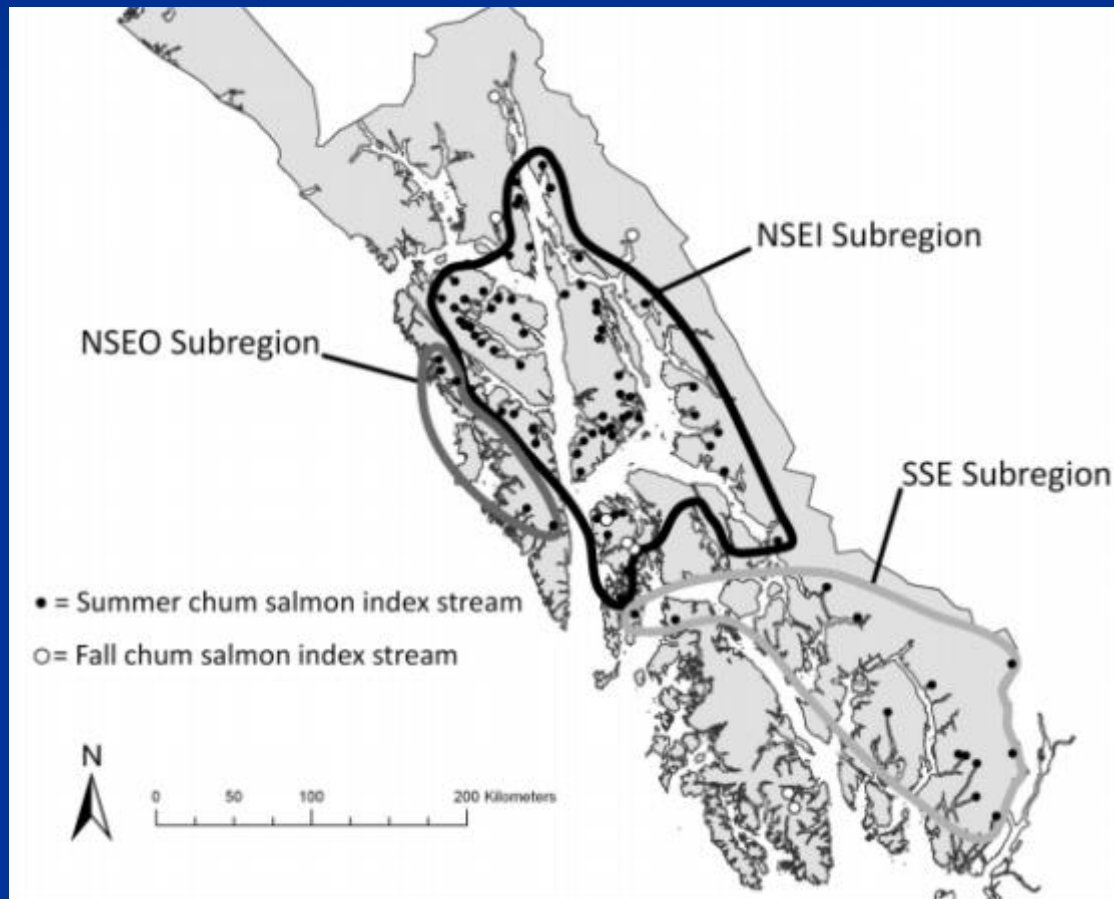
Low Chum Returns

- Far fewer chums observed on many streams
 - Fewer samples available
 - Difficult to distinguish run timing



Low Chum Returns

- ADF&G Index counts - escapement below goals
 - Only Northern Outside met goal

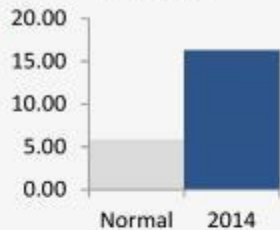


Source: Piston, Heintz 2012

Record High rainfall June-August 2014 SE Alaska

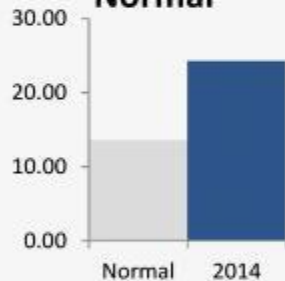
Haines

278% Above
Normal



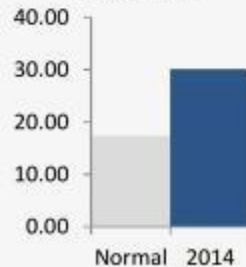
Juneau

179 % Above
Normal



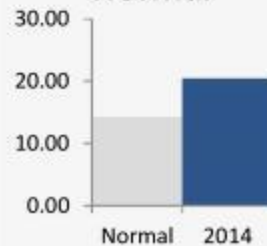
Petersburg

174 % Above
Normal



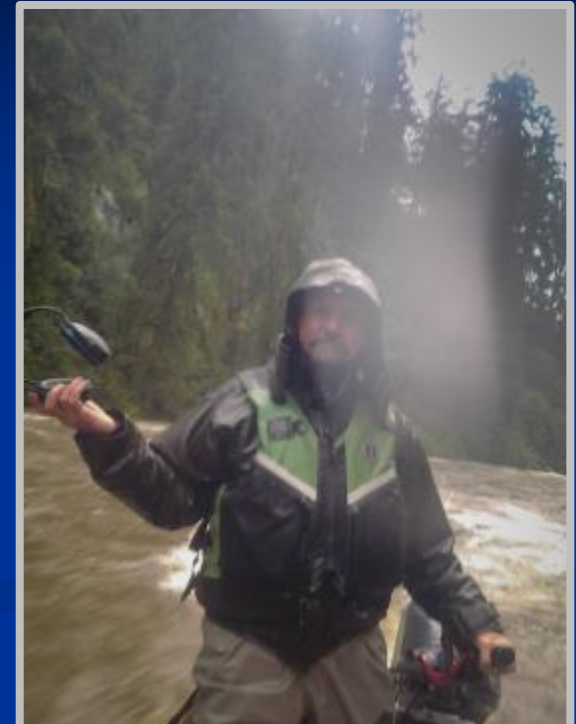
Klawock

144 % Above
Normal



High Water

- Unsafe
- Visibility issues
 - Can't see/catch chum
 - Can't get accurate counts
 - Difficult to assess run timing
- Washed away carcasses



Field Sampling

- Crews more effective in 2014
 - More visits
 - Pedigree streams – Every 3 days
 - Otolith streams – 2-5 visits/stream
 - Better coverage
 - More stream length
 - Visits corresponded with run timing



Otolith-only Field Sampling

- Dynamic/flexible approach
 - Schedule more efficient
 - In season changes
- Communication
 - Crewmembers in field
 - ADF&G Management Biologists
 - Aerial surveys



Otolith-only Field Sampling

- Fly-In
 - Sisters, Harding
- Accompanying ADF&G foot surveys
 - King Salmon River, Hidden Inlet, Carroll Cr.



Photos: Dale Adams, Ben Adams

Otolith-only Field Sampling

- Pedigree crews covered otolith streams
 - Chuck, Game, Freshwater
- Experienced/Motivated crews
 - Worked around tides/obstacles
 - Covered more stream length

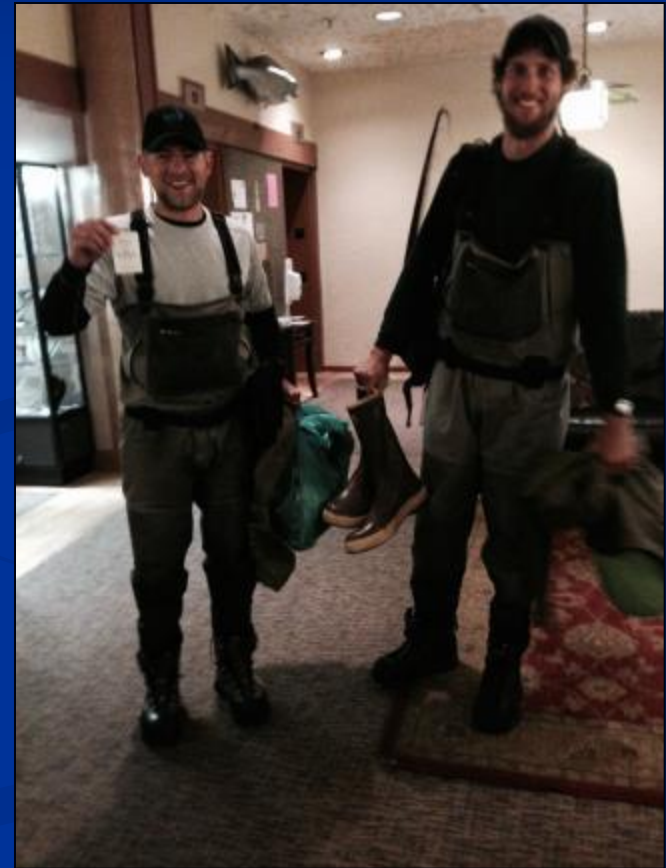
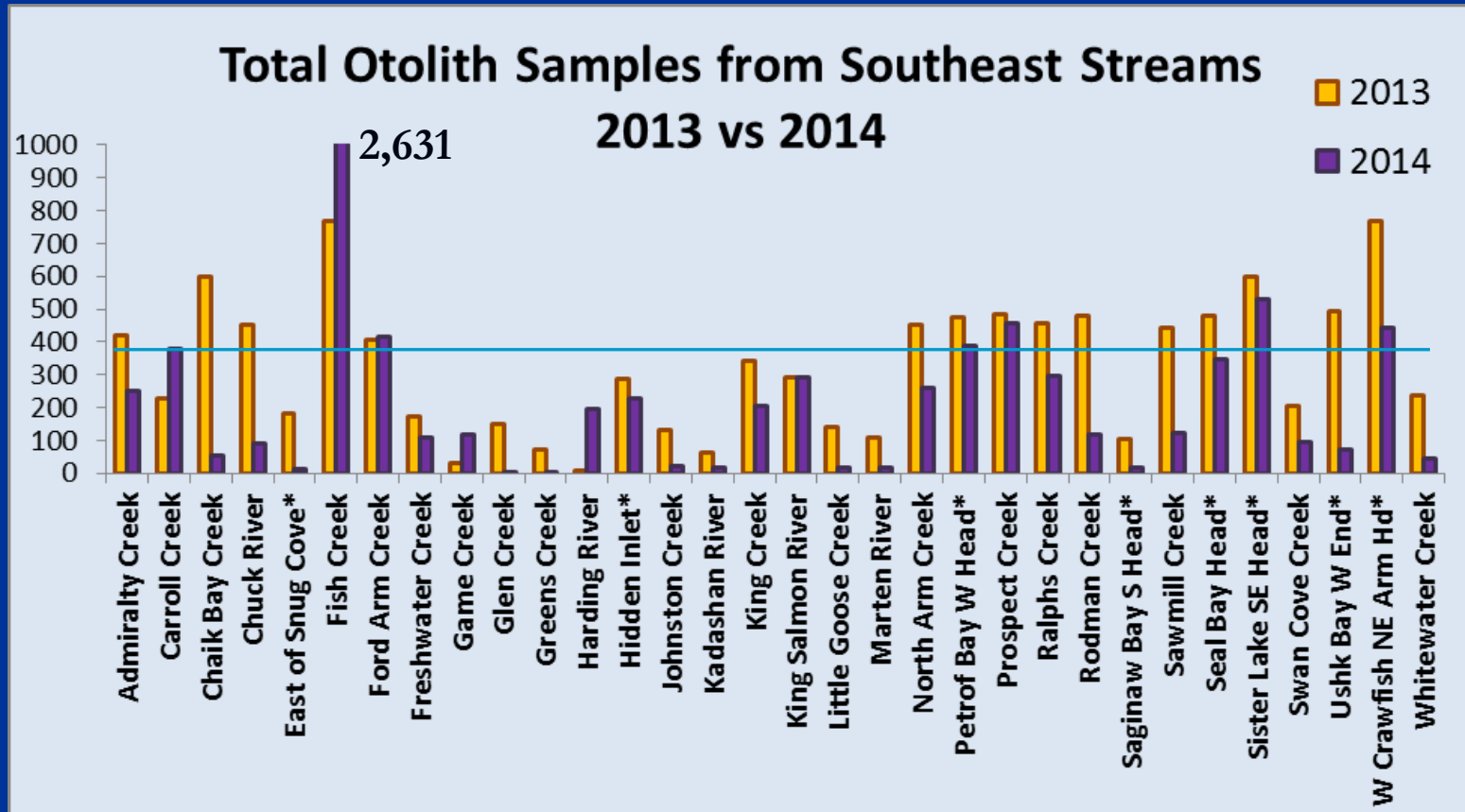


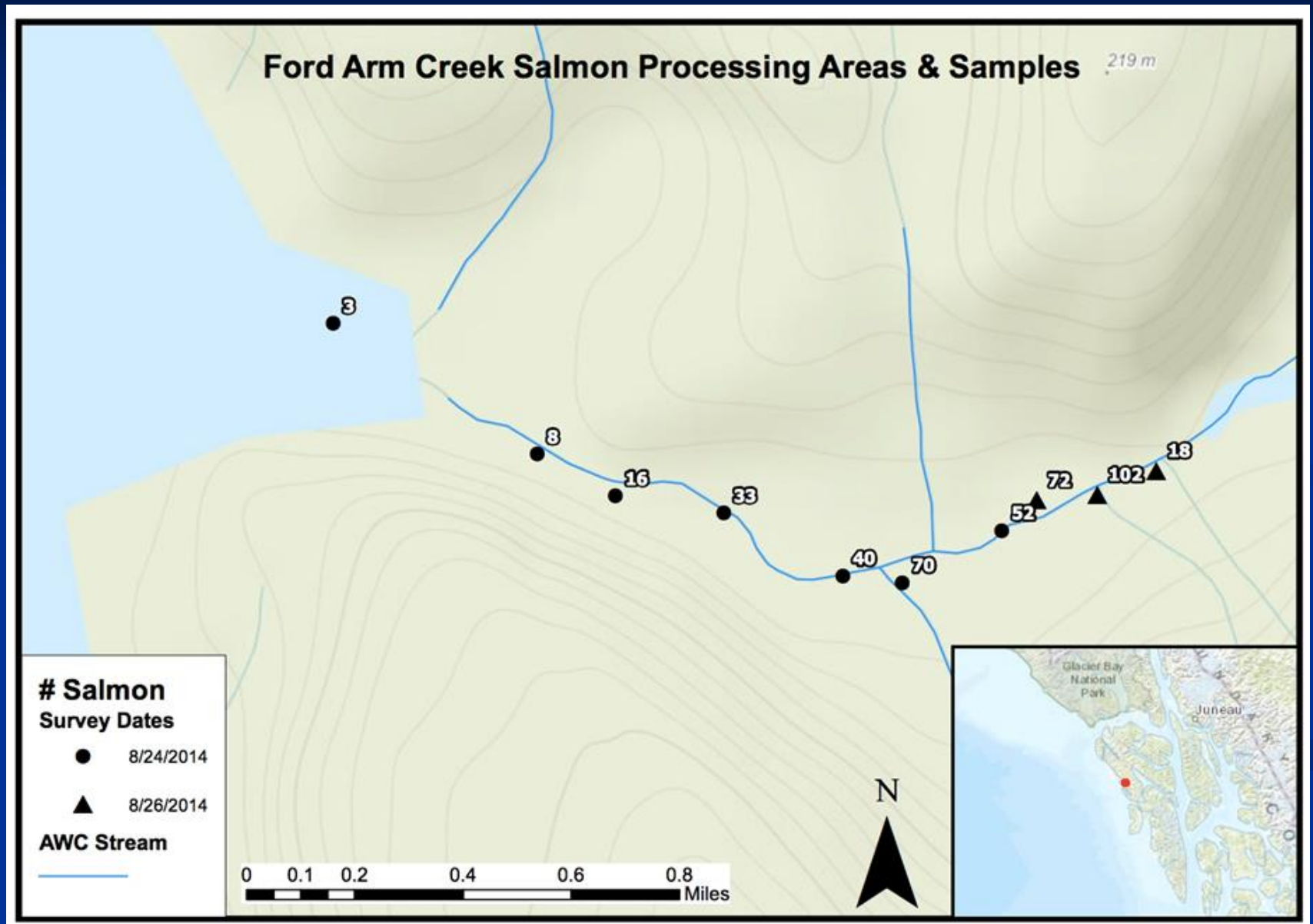
Photo: Tory O'Connell

Results: Straying Study

- Visited all otolith-only streams 2-5 times
 - 81 otolith-only visits (2014) vs 65 visits (2013)
- Collected 8,241 total (4,761 from otolith-only)
 - Met goals at 6 of 28 streams



Data is Geo-referenced





Interactions of Wild
and Hatchery
Chum Salmon
in Southeast Alaska

Legend



4 dna streams



28 streams

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Pedigree Field Sampling

- 2 field crews – more flexibility
 - 3rd vessel addition
 - Visits every 3 days
 - Except during high water
- Crewmembers rotated when needed
 - Fish Creek most productive



Results: Pedigree Streams

- Visited all Pedigree streams 13-19 times
 - 63 visits (2014) vs 25 visits (2013)
 - 3,477 Otolith/Tissue samples
 - Sampled longer portions of stream, duration of run

Stream	Visits	Otolith total	Tissue total	Scale Total
Prospect Creek	15	473	471	315
Admiralty Creek	16	260	260	236
Fish Creek	19	2623	2622	396
Sawmill Creek	13	124	124	123
Total	63	3480	3477	1070

Thank You

■ ADF&G

- Southeast Alaska Area Management Biologists & Staff
- Gene Conservation Lab
- Mark, Tag, and Age Lab
- Dave Harris, Scott Forbes, Norm Miller - Whaler
- Mark Stopha, Michelle Morris- Fish Cr help
- Andy Piston, Malika Brunette, Phil Richards, Troy Jaecks, Jeff Williams

■ Sitka Sound Seafoods

■ Sealaska Corporation

■ Misty Bay Lodge

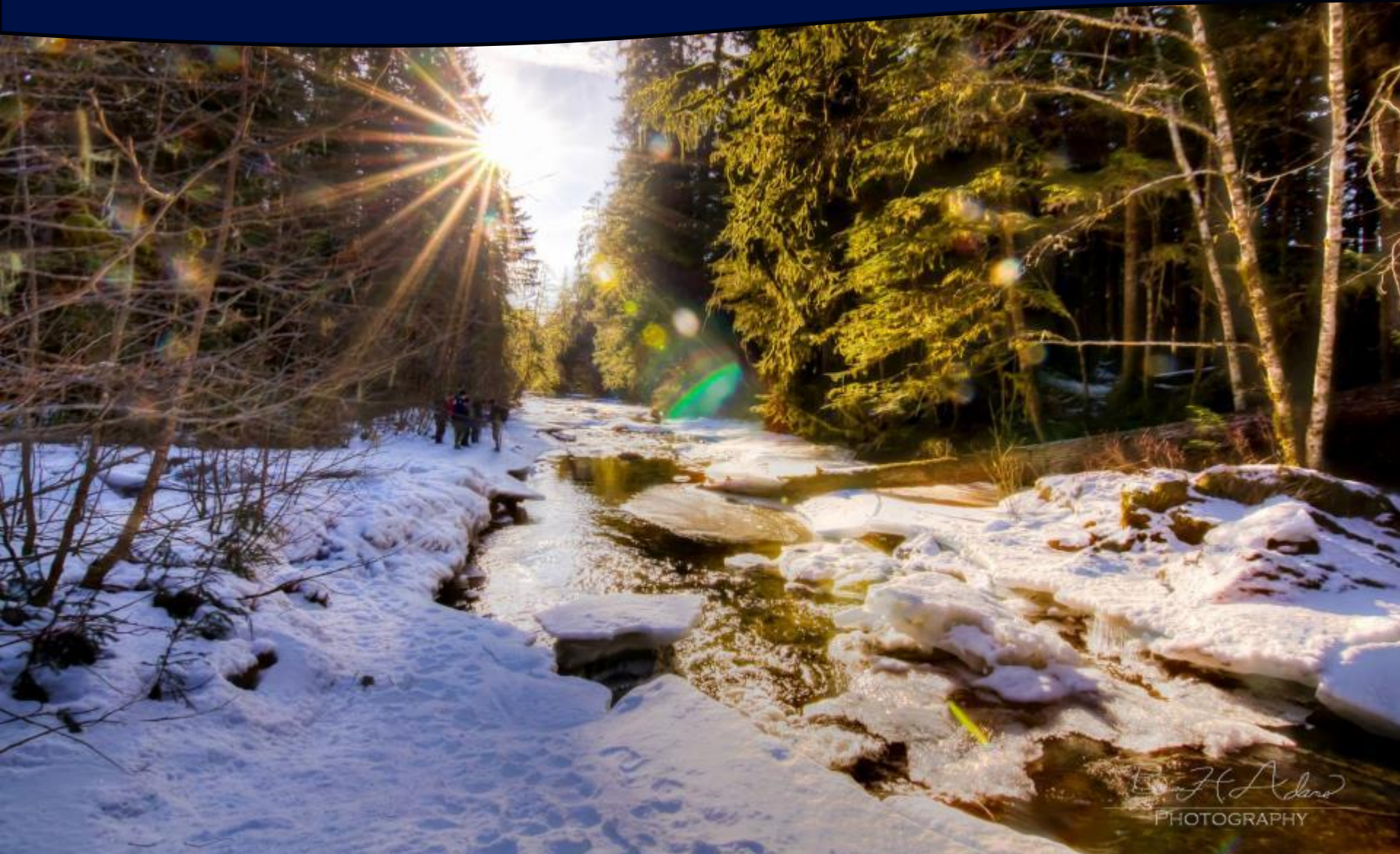
■ Lucas Clark

■ Temsco Helicopters



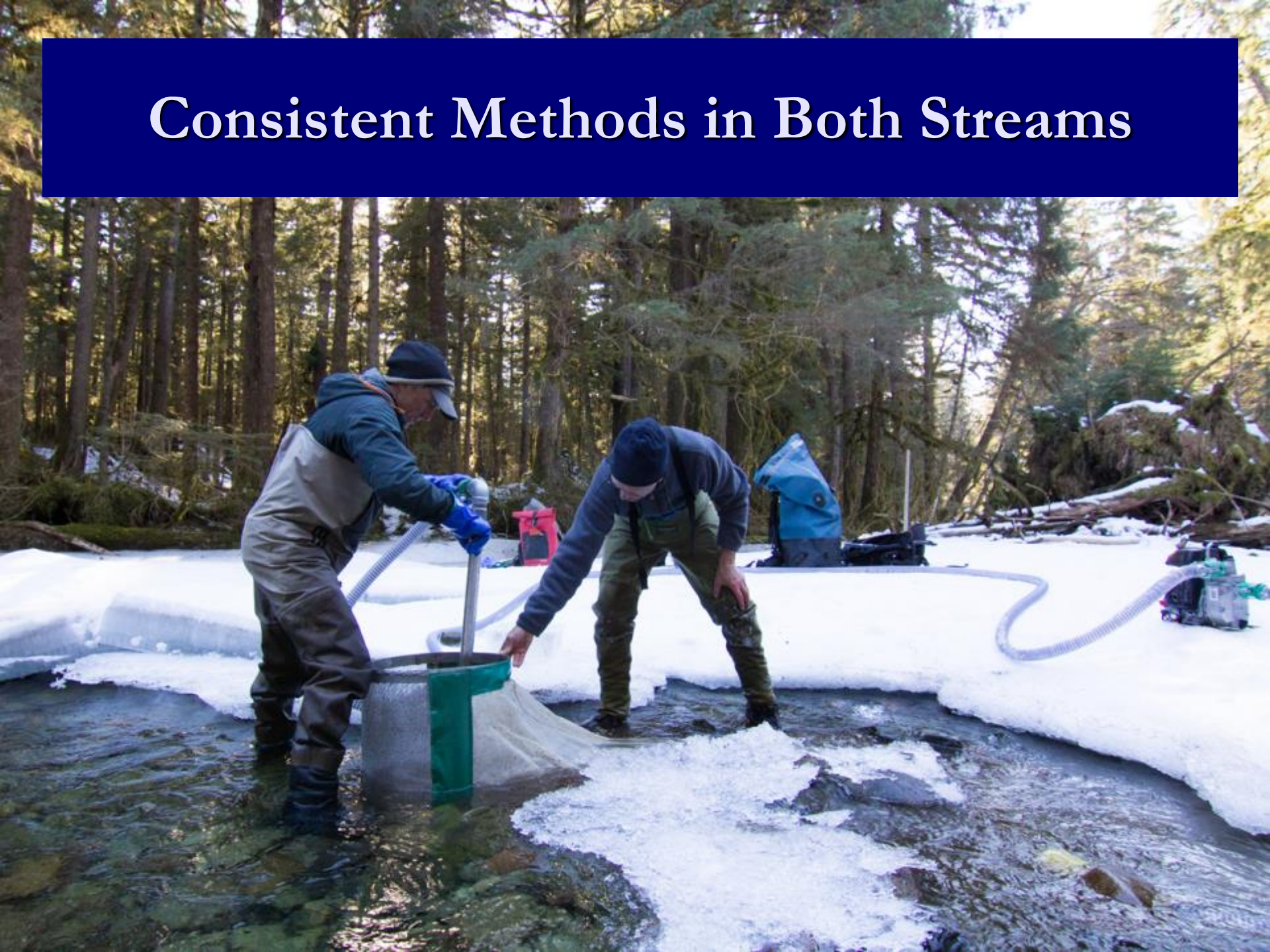
Photo: Bryan Ferguson

Alevin Sampling Fish Creek - 2014



Tim H. Adens
PHOTOGRAPHY

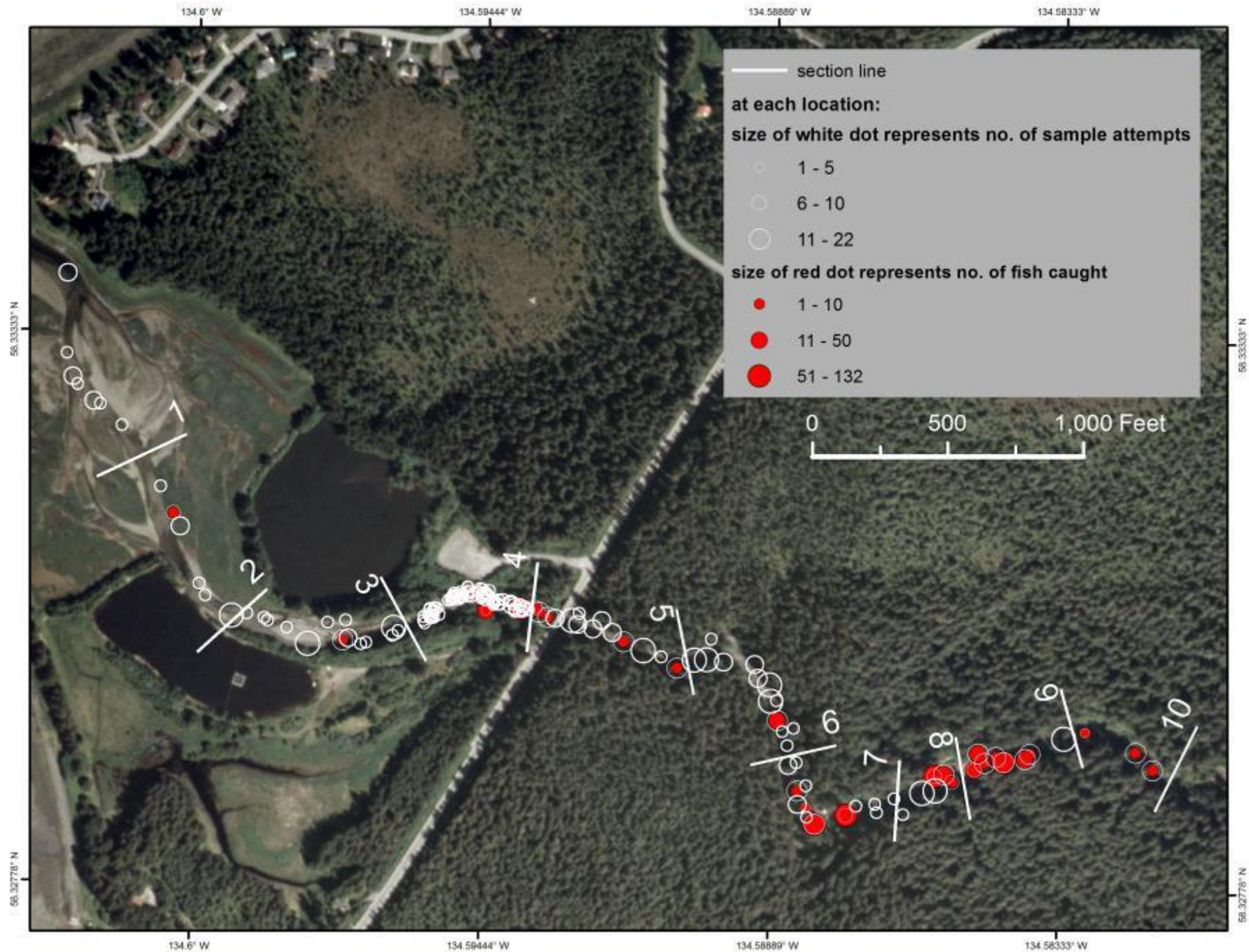
Consistent Methods in Both Streams



Spring Alevin Sampling – Fish Creek

- Sampled Fish Creek March 25 – 31
 - Subdivided into 10 sections
 - Sampled all areas
 - Focused more intensely where heavy spawning was seen
- Alevins present in small clusters
 - Fine substrate
- Obstacles
 - Thick ice
 - Large substrate





Spring Alevin Sampling

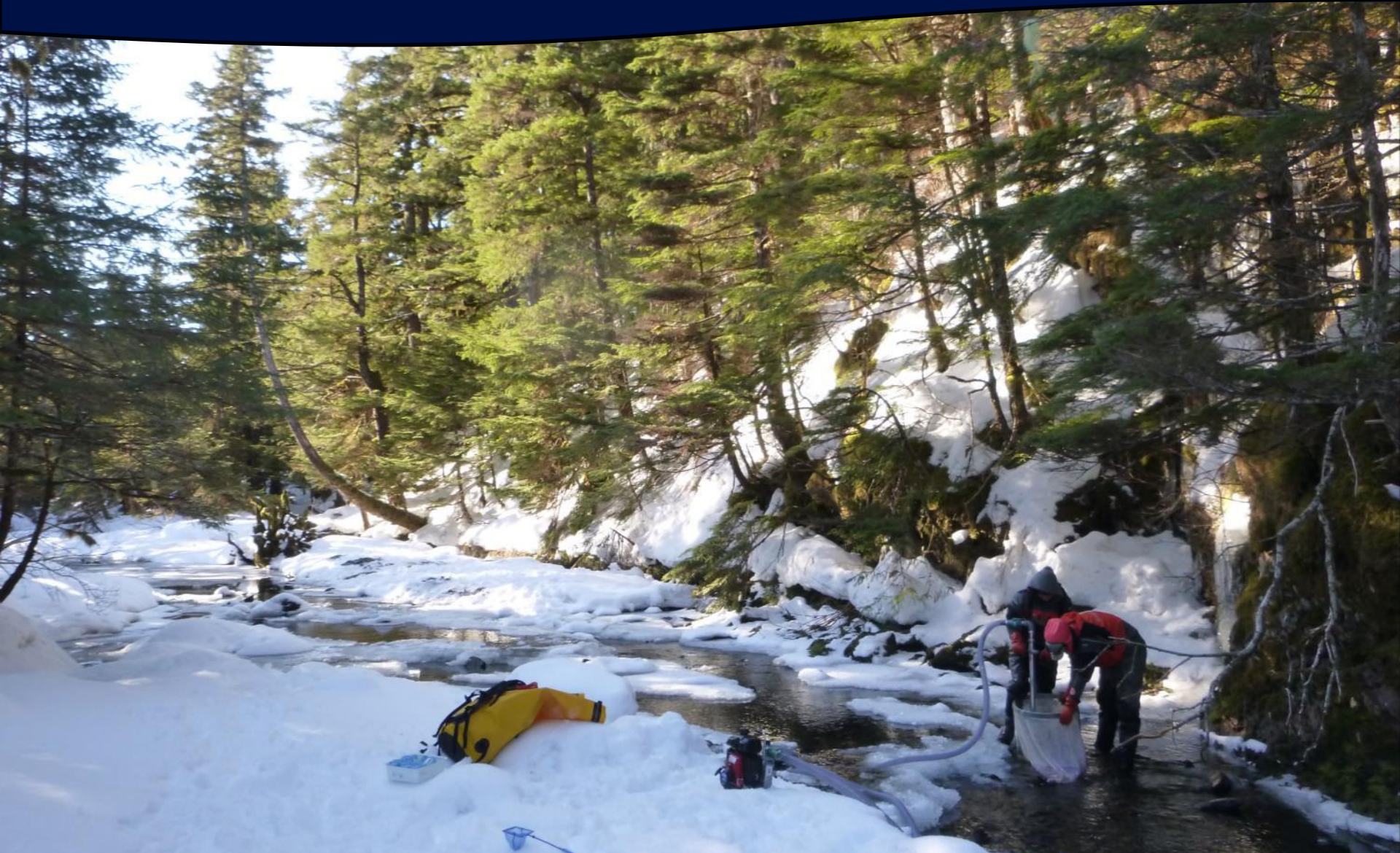
774 sample attempts (digs)

69 positive samples (757 alevins caught)

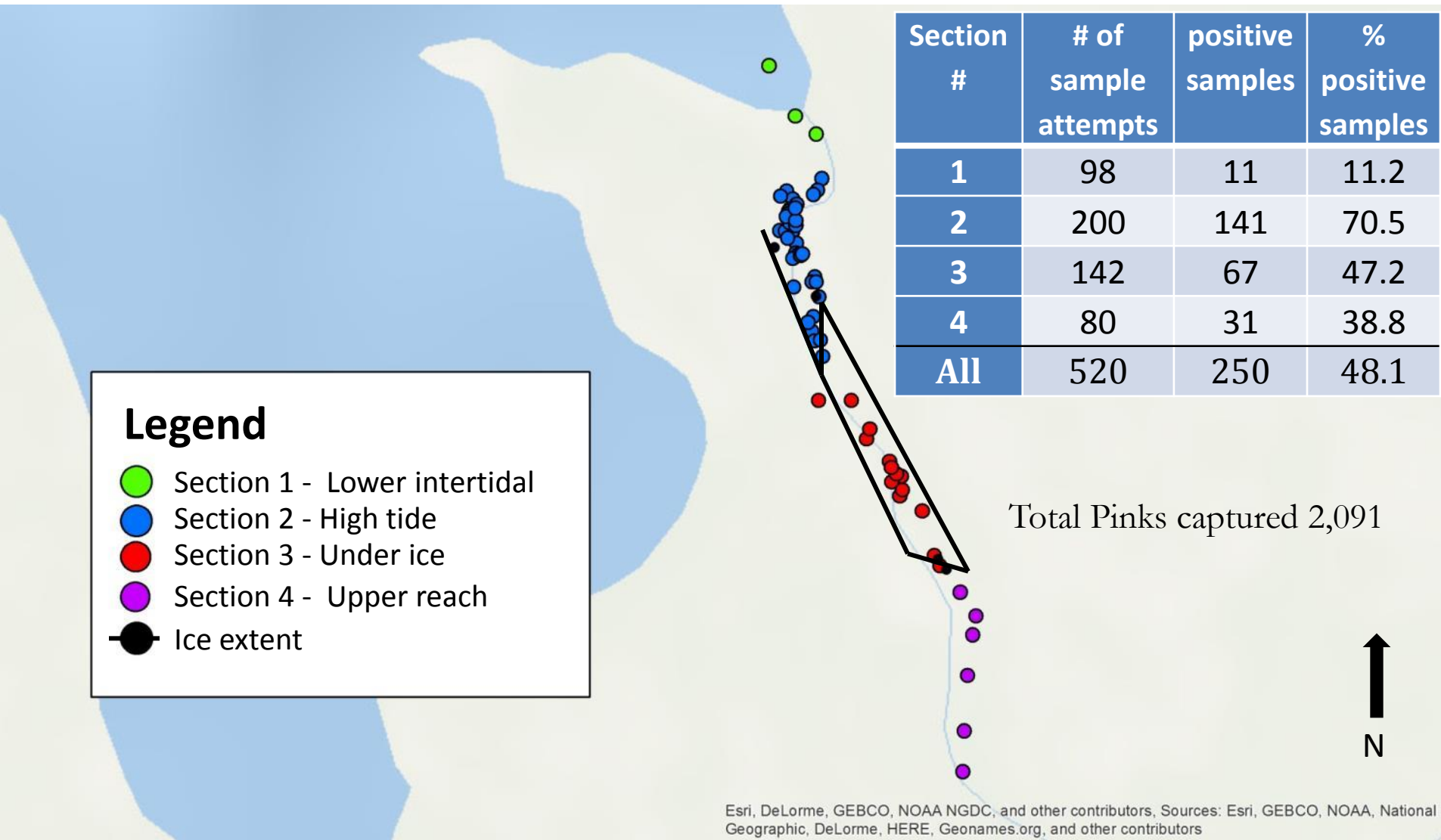
Section #	# of sample attempts	Avg. pump time (sec)	positive samples	% positive samples	# chum caught	# chum collected	# pink caught
1	33	57.5	0	0.0%	0	0	27
2	39	72.7	1	1.4%	1	1	155
3	75	110.0	1	1.3%	1	1	112
4	104	84.4	14	13.5%	145	119	336
5	140	84.4	9	6.4%	92	71	86
6	103	81.7	3	2.9%	33	32	73
7	77	77.4	16	20.8%	215	168	244
8	59	91.0	12	20.3%	101	65	18
9	122	84.9	12	9.8%	162	106	286
10	32	86.5	1	3.1%	7	6	1

Alevin Stockdale Creek

April 4-6, 2014



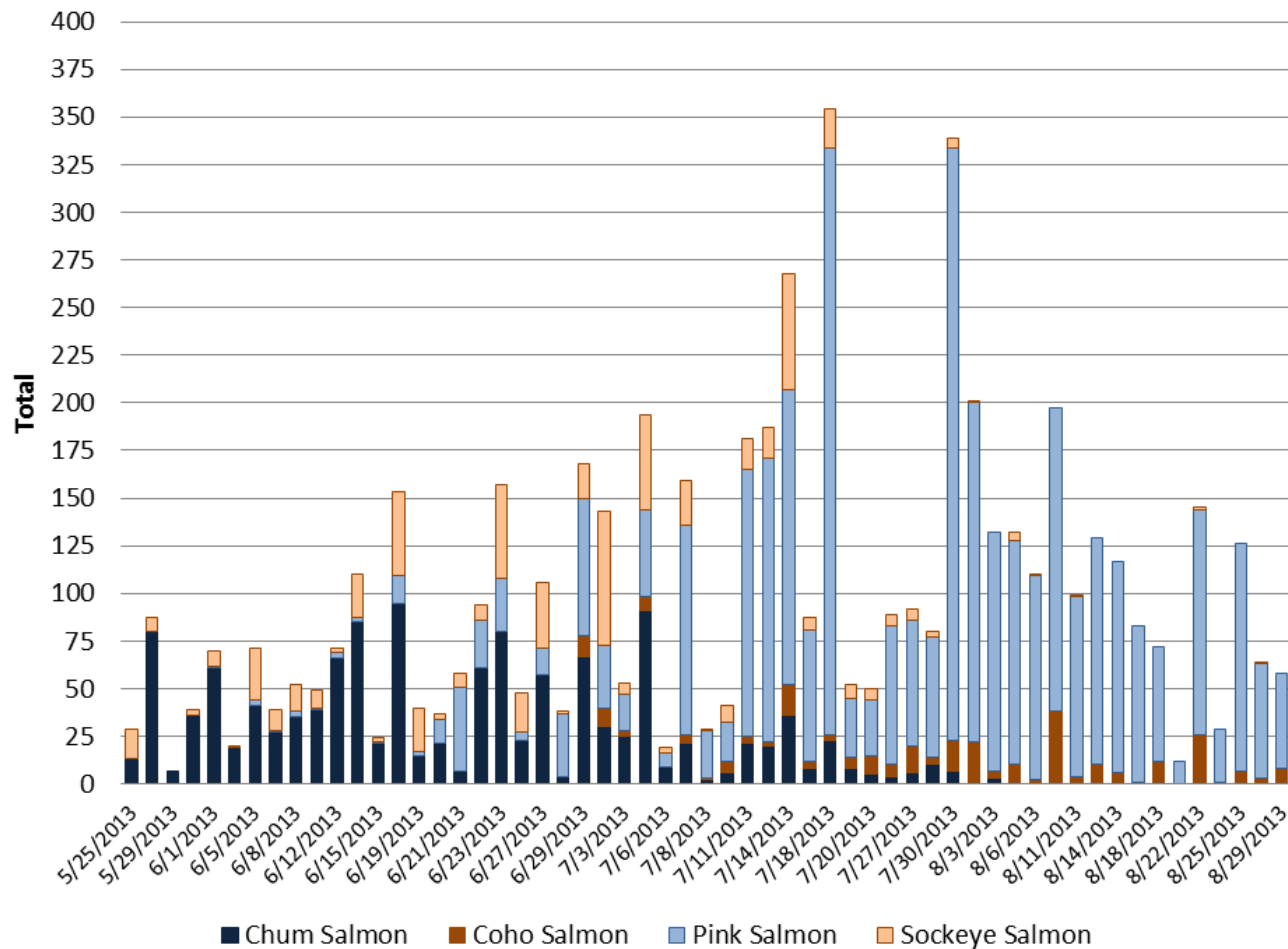
Stockdale Creek Positive Pink Alevin Samples by Section



2013 Preliminary Results

- Ocean Sampling H-W Proportions
- Stream H-W Proportions

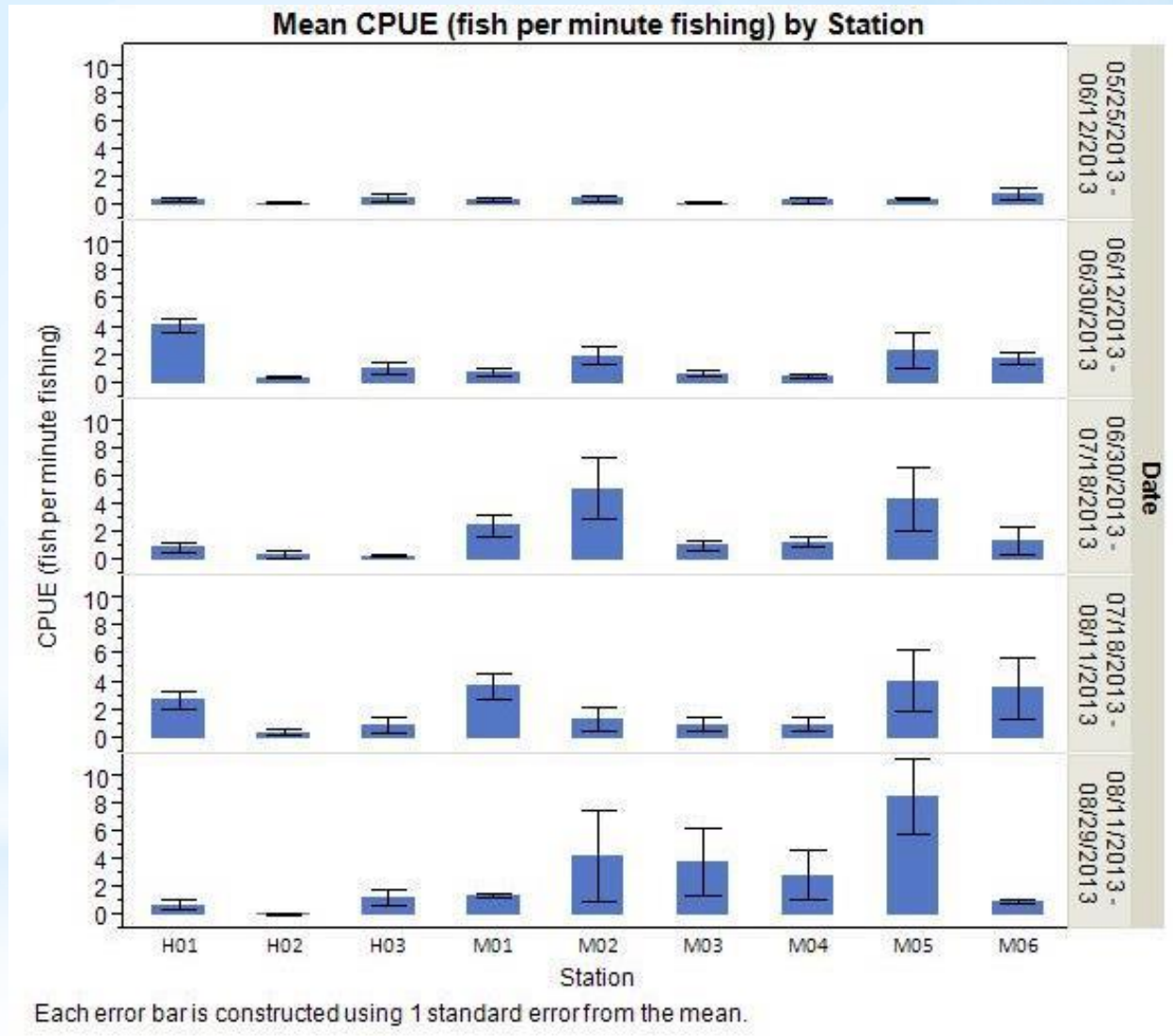
2013 Results



- 5,691 salmon were caught in the ocean test fishery.
- Pink Salmon (3,458)
- Chum (1,305)
- Sockeye Salmon (655)
- Coho Salmon (272).
- 75% of catch from the Montague stations (4,251)

2013 CPUE

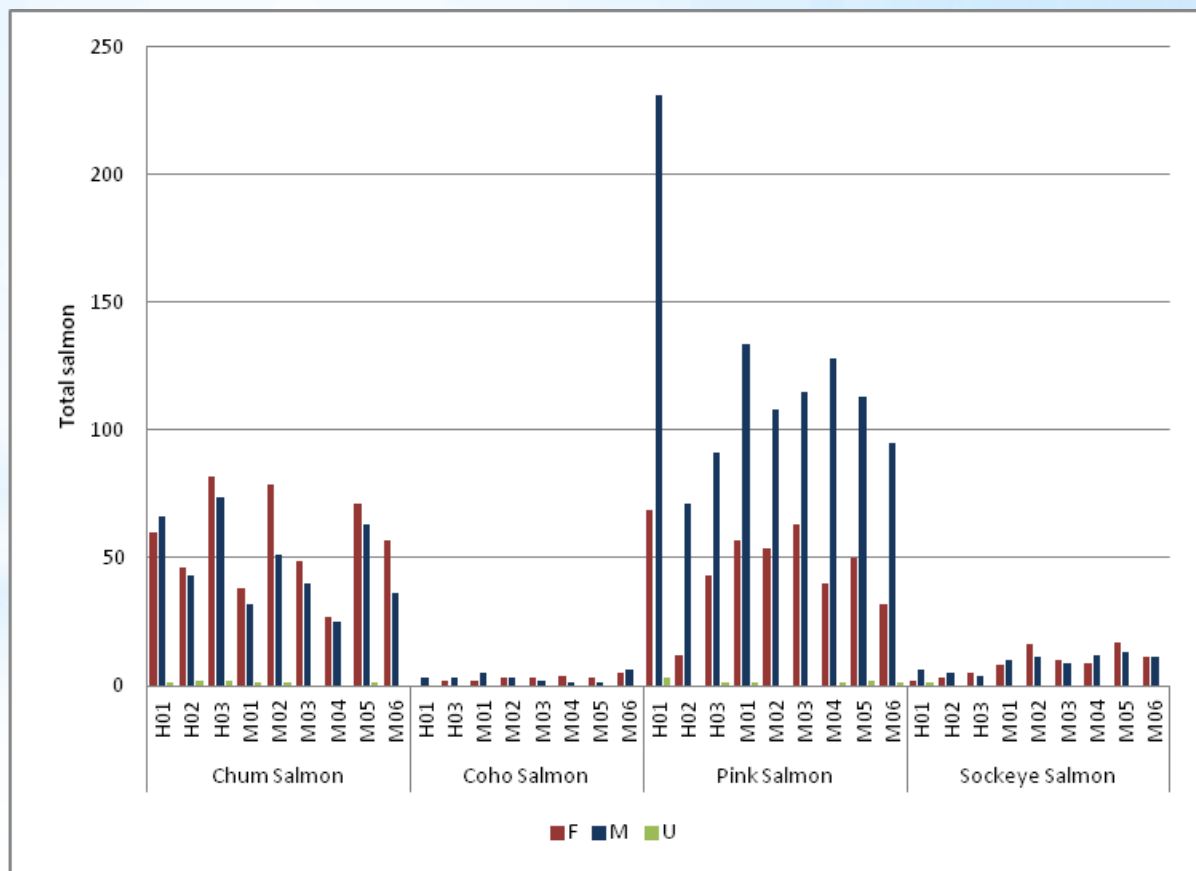
- Mean CPUE (fish caught per fathom hour) ranged from 0.344 (H02) to 3.54 (M05)
- CPUE peaked at different stations at different times
- H01 peaked early in the season while M05 slowly increased and then peaked towards the end of the season.
- H02 was consistently low the entire season - location in the middle of Hinchinbrook Entrance.



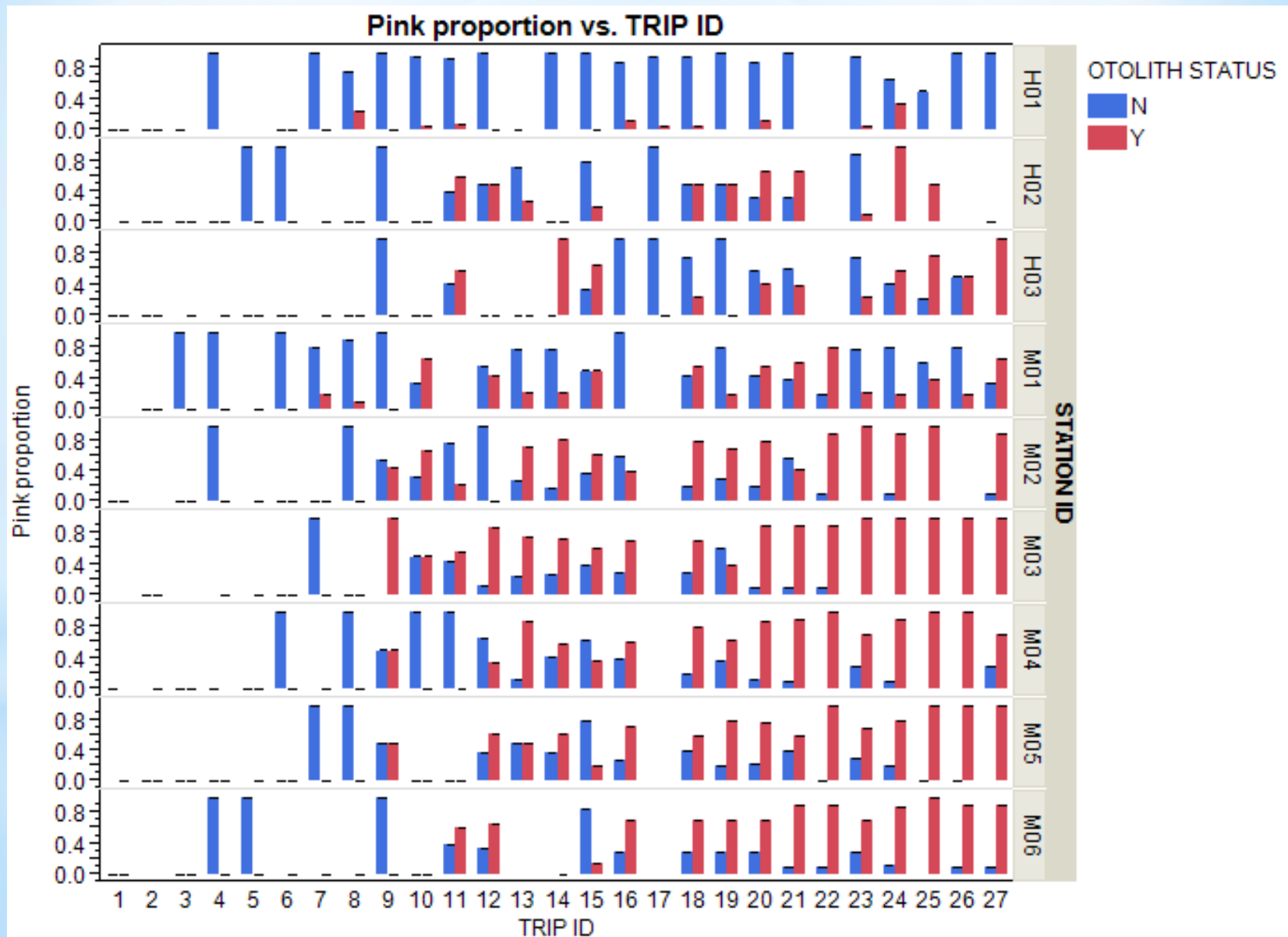
2013 SEX RATIOS

- 2,671 salmon processed for weight-length measurements and otoliths extracted.
- Pink Salmon (1,515), Chum (947), sockeye (163), and Coho (46).
- Pink Salmon catch averaged about 75% male while the remaining three species had close to 50/50 sex ratios

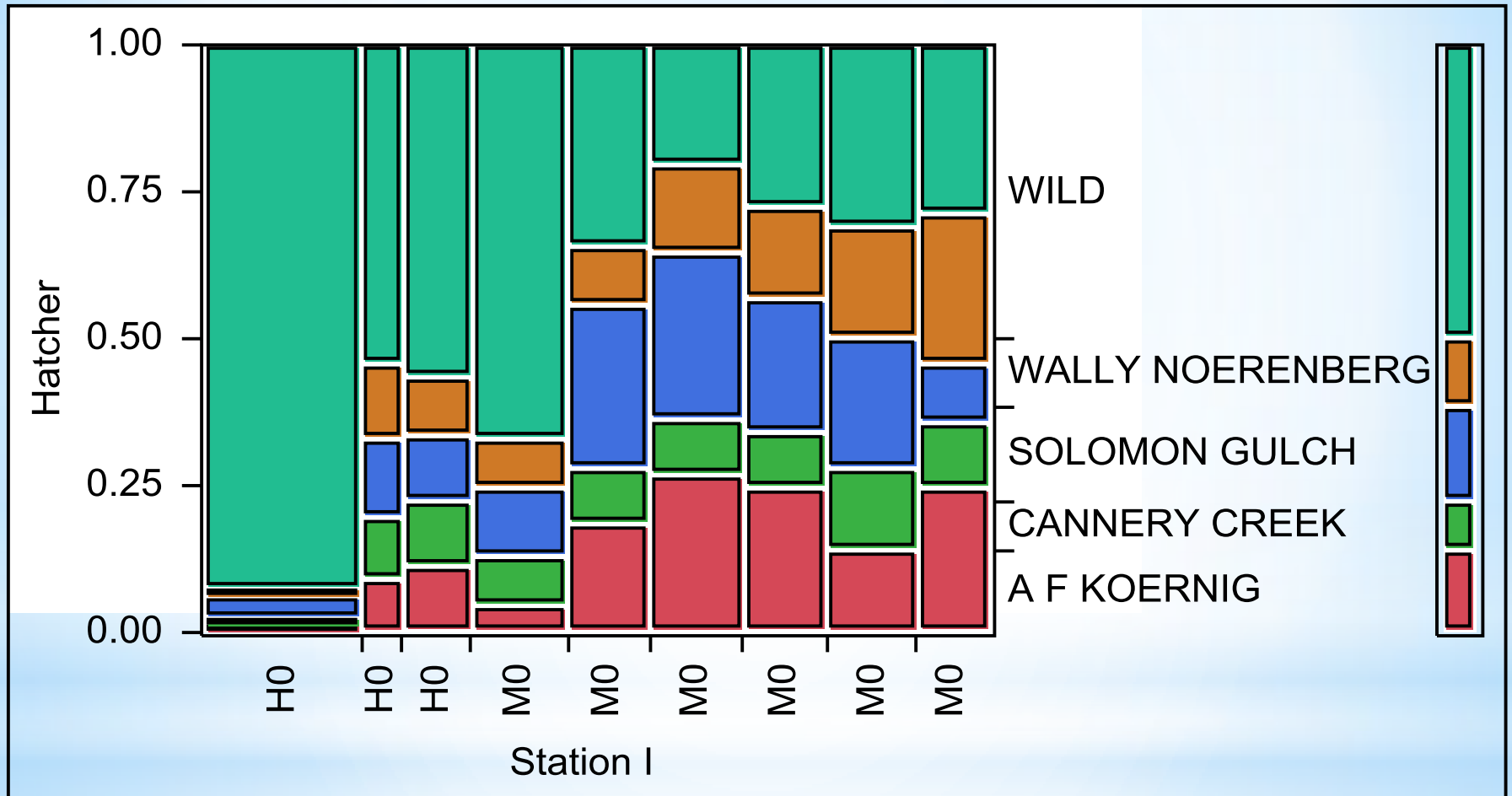
CommonName	Count/Percent	Female	Male	Unknown
Chum Salmon	Count	509	430	8
	Percent	53.75	45.41	0.84
Coho Salmon	Count	22	24	0
	Percent	47.83	52.17	0
Pink Salmon	Count	420	1086	11
	Percent	27.69	71.59	0.73
Sockeye Salmon	Count	81	82	1
	Percent	49.39	50	0.61



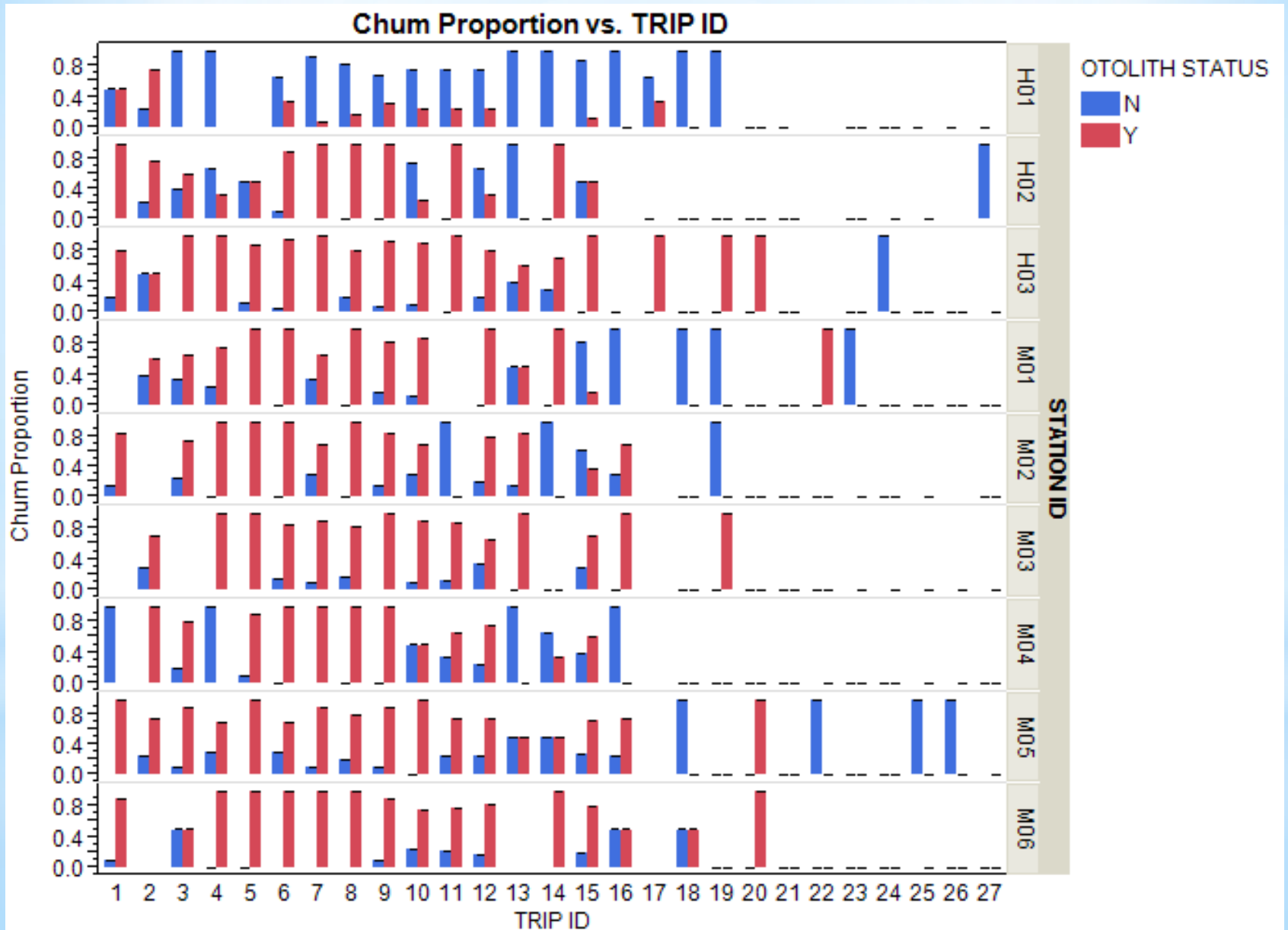
2013 Pink Salmon Hatchery Wild Proportions



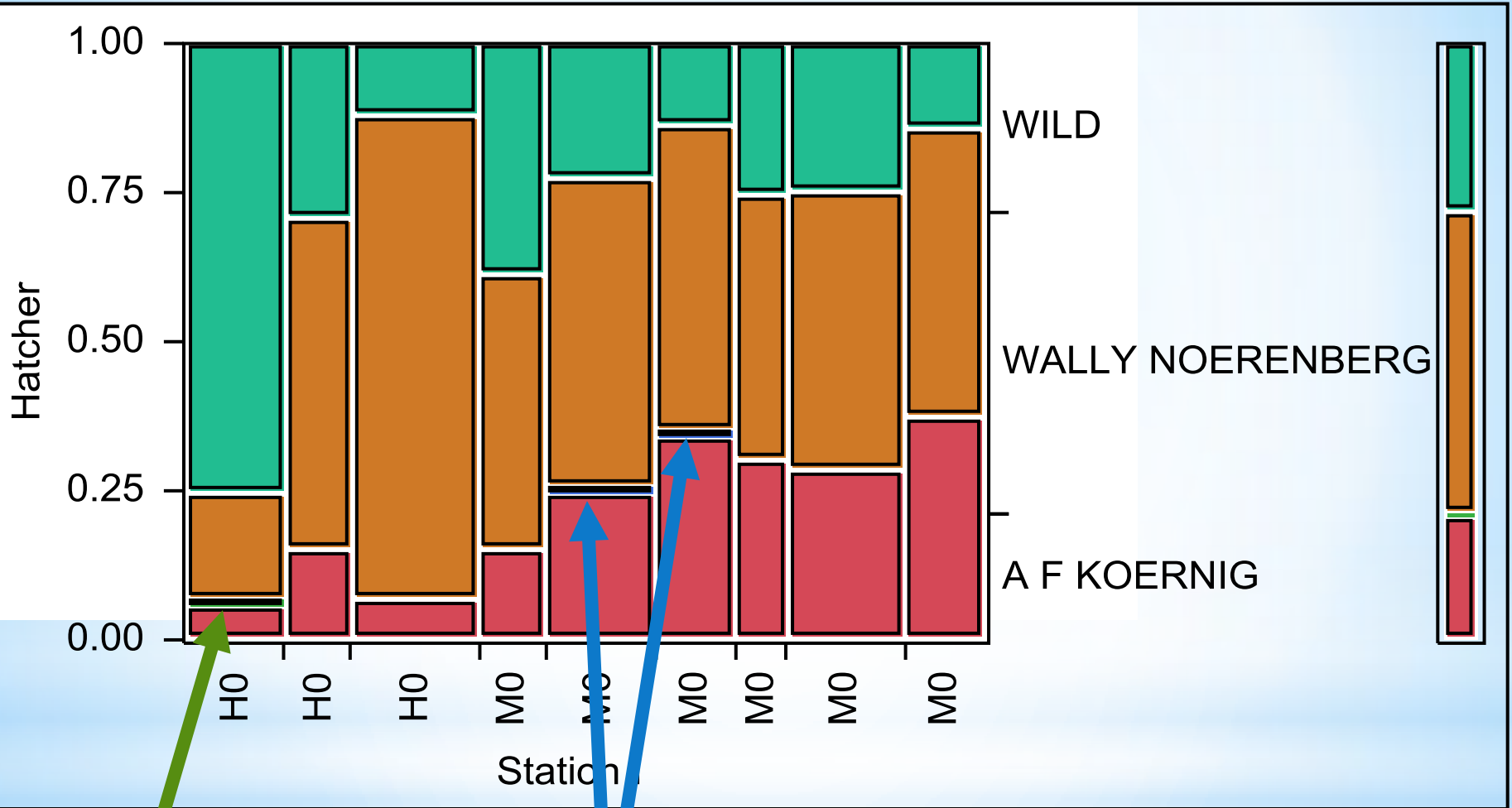
2013 Pink Salmon Hatchery Wild Proportions



2013 Chum Salmon Hatchery Wild Proportions



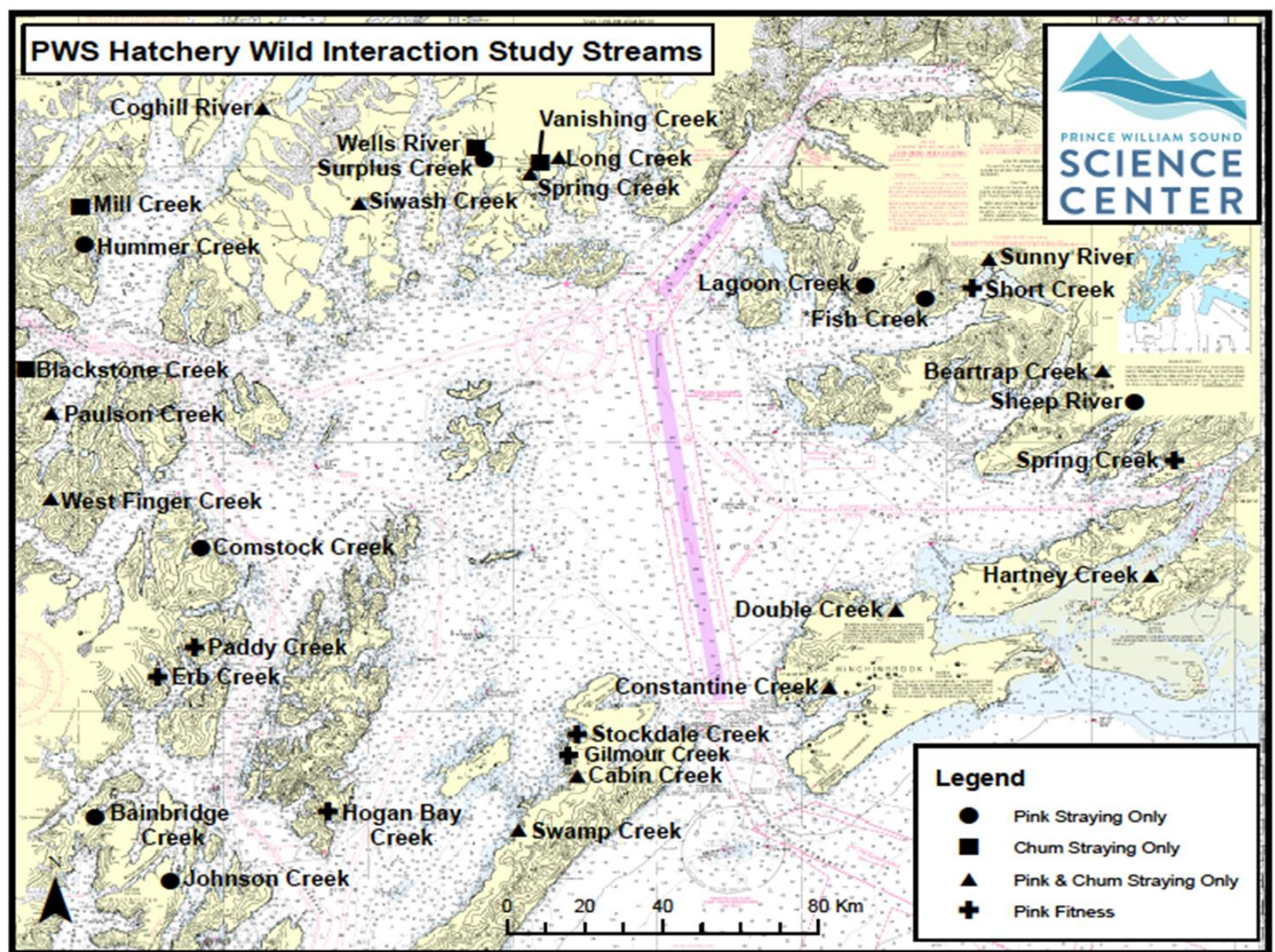
2013 Chum Salmon Hatchery Wild Proportions



Hidden Falls
Hatchery

Macaulay
Hatchery

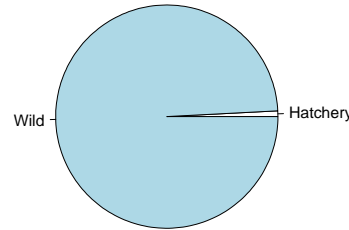
H-W Proportions in Streams



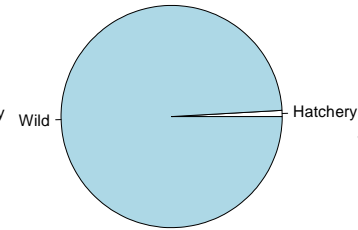
Pink Salmon Streams 2013

Hartney Creek

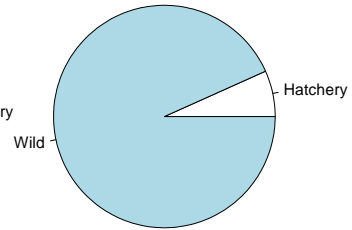
8/3/13



8/14/13

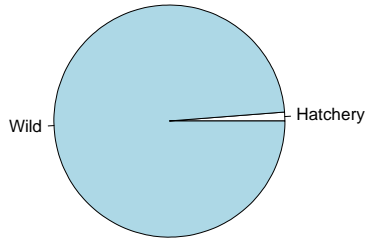


9/9/13

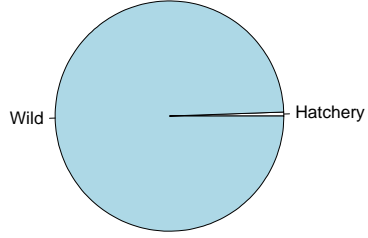


Spring Creek (pedigree)

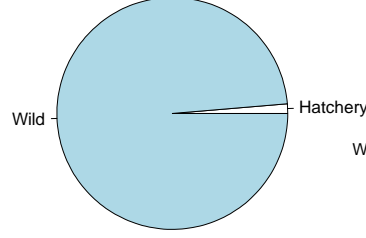
7/27/13



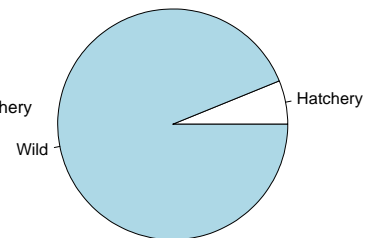
7/31/13



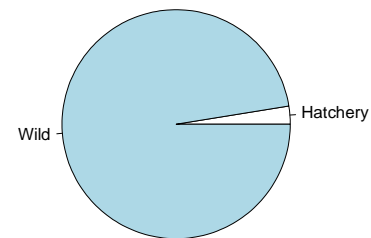
8/4/13



8/11/13



8/28/13



Pink Salmon

Pink Salmon

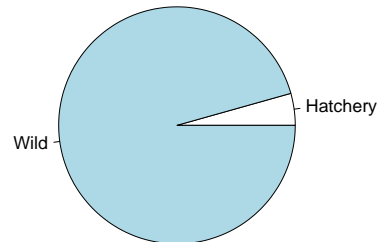
8/22/13

Pink Salmon

Pink Salmon

Pink Salmon

Beartrap Creek

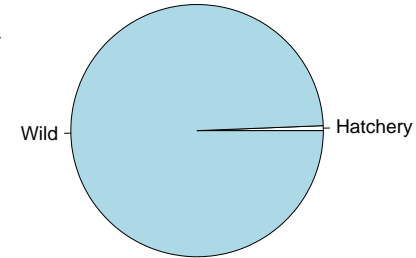


Pink Salmon

Pink Salmon Streams 2013

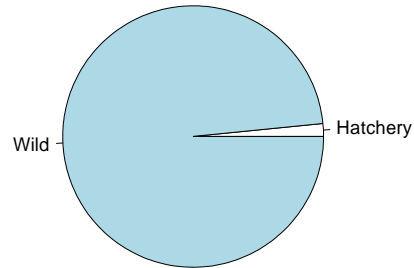
Sunny River

8/6/13

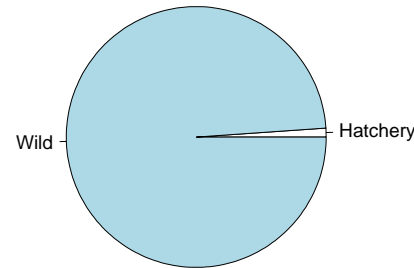


Short Creek

8/6/13

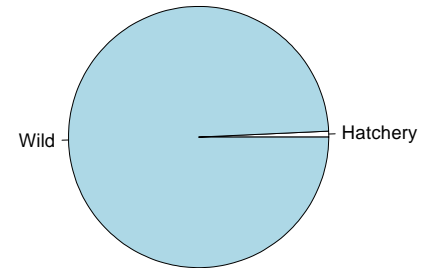


8/23/13



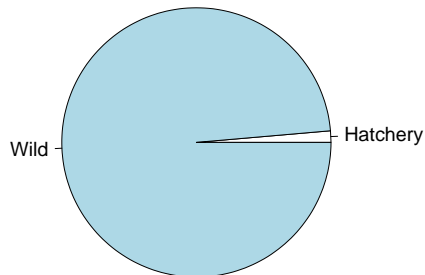
Pink Salmon

9/15/13



Fish Creek

7/19/13



Pink Salmon

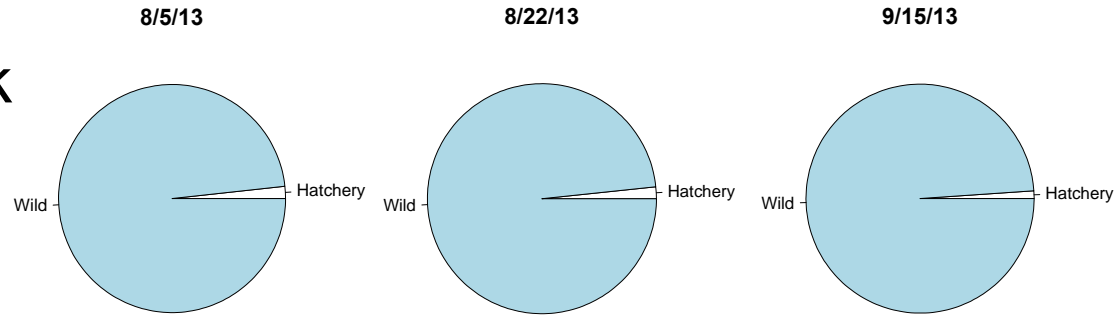
Pink Salmon

Pink Salmon

Pink Salmon

Pink Salmon Streams 2013

Lagoon Creek

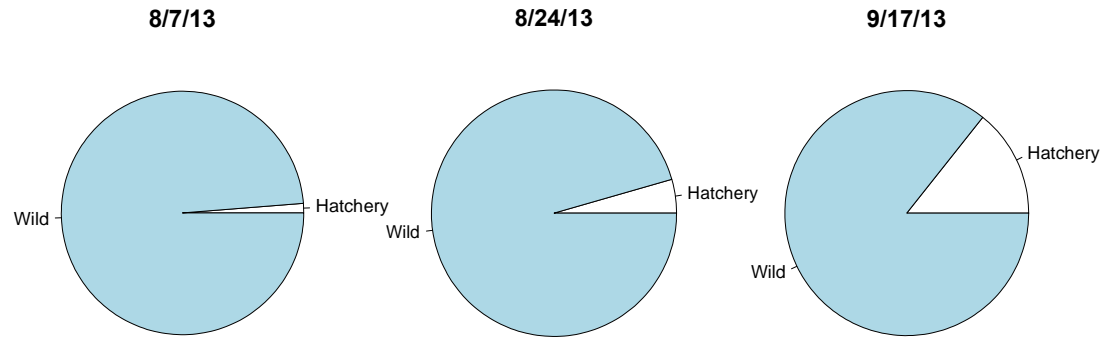


Pink Salmon

Pink Salmon

Pink Salmon

Long Creek

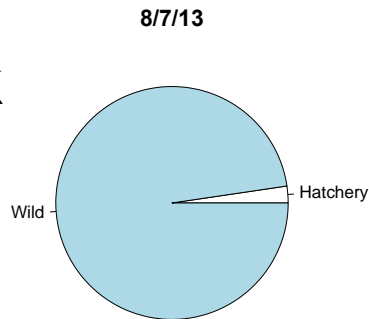


Pink Salmon

Pink Salmon

Pink Salmon

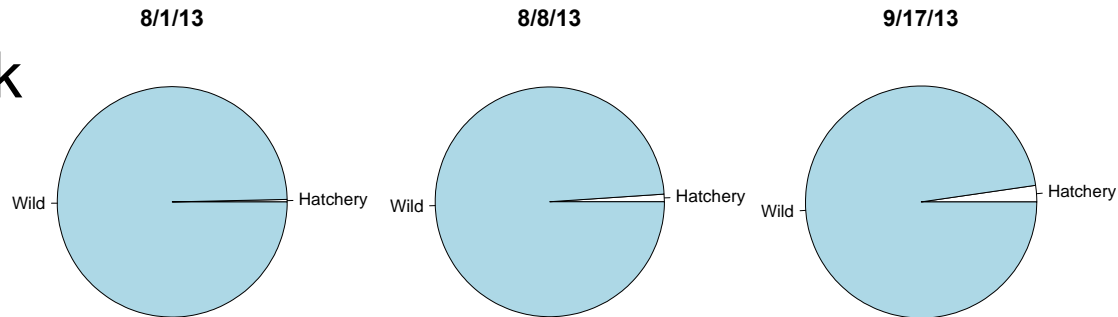
Spring Creek



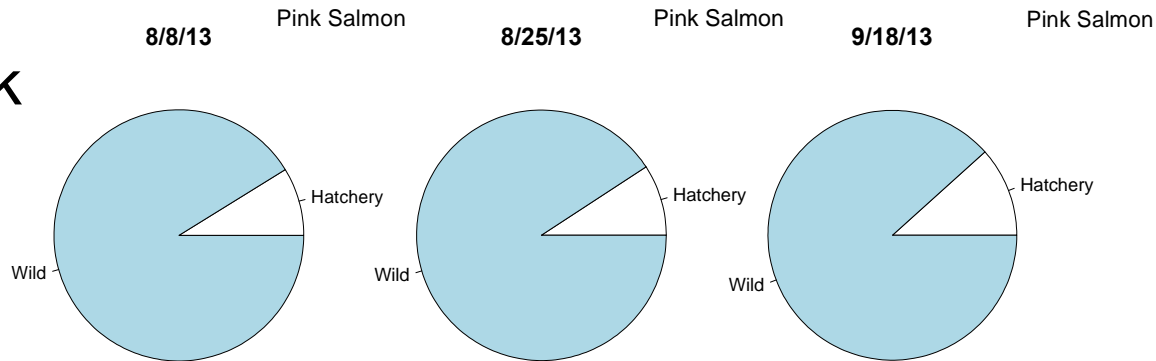
Pink Salmon

Pink Salmon Streams 2013

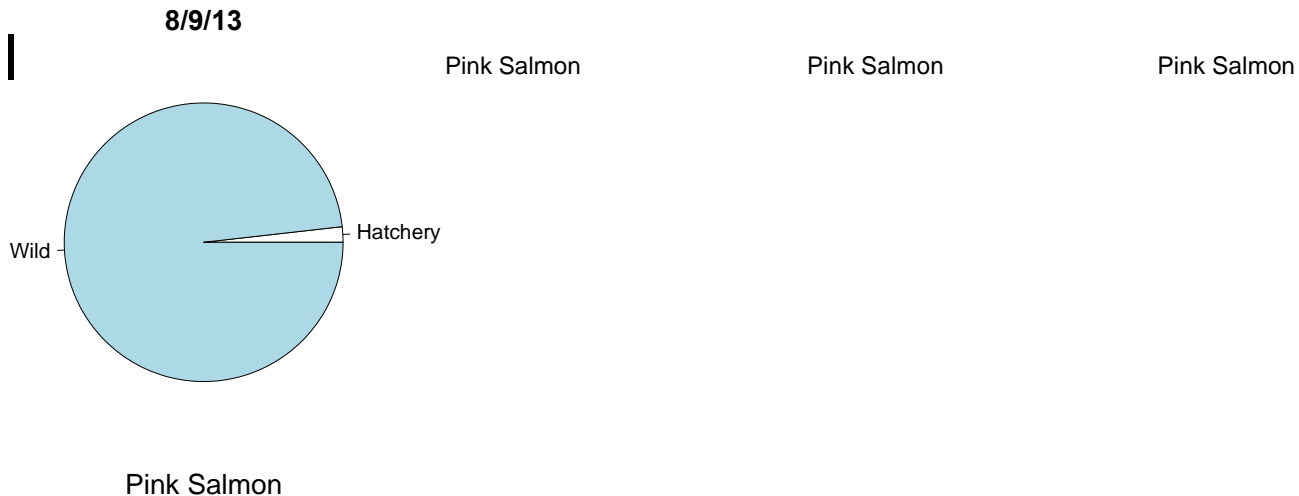
Surplus Creek



Siwash Creek

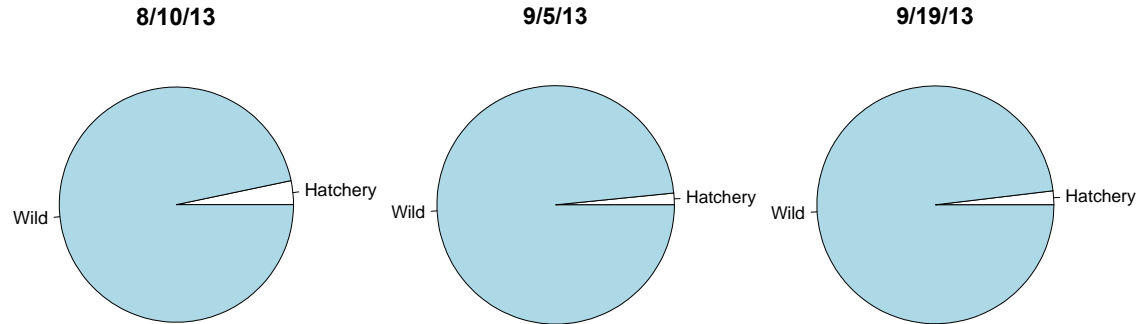


Coghill River



Pink Salmon Streams 2013

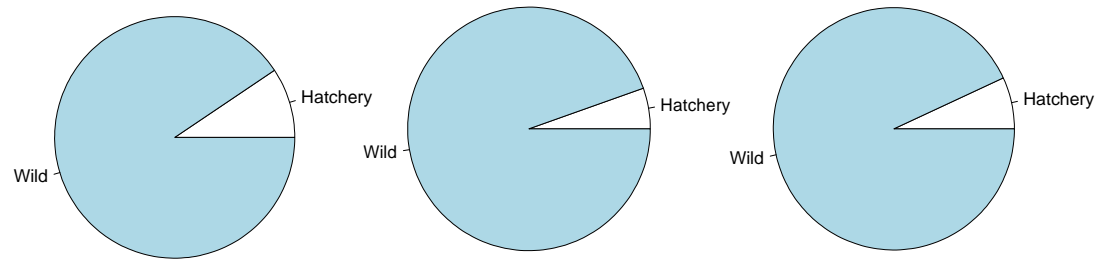
Hummer Creek



8/14/13 9/4/13 9/21/13

Pink Salmon Pink Salmon Pink Salmon

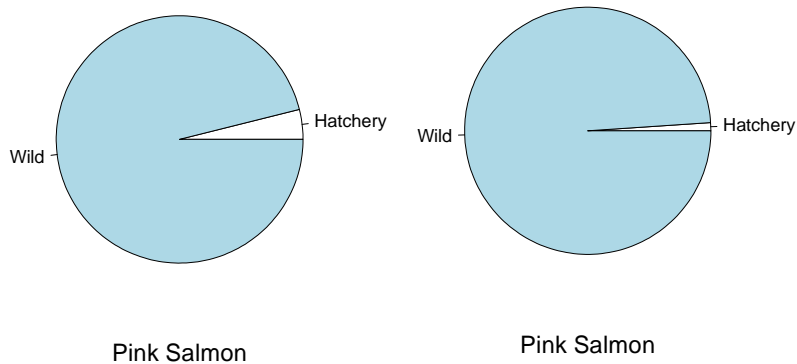
Paulson Creek



8/15/13 9/4/13

Pink Salmon Pink Salmon

West Finger Creek

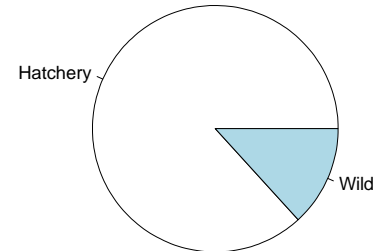
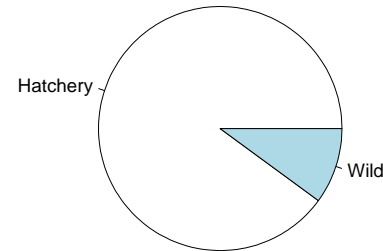


Pink Salmon Streams 2013

Comstock Creek

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Paddy Creek

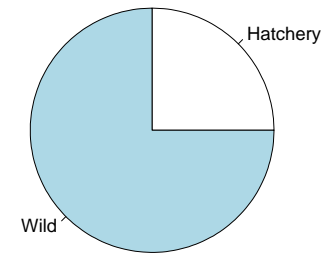
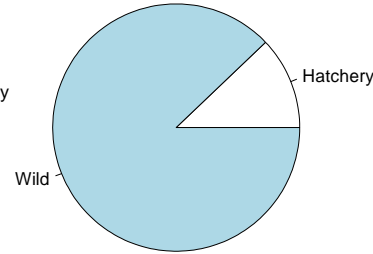
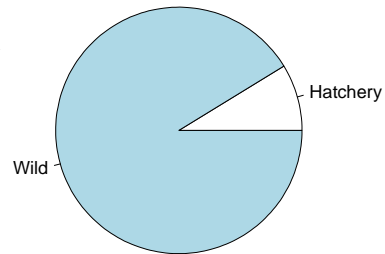
9/3/13

9/6/13

Pink Salmon

9/8/13

Pink Salmon



Erb Creek

8/16/13

Pink Salmon

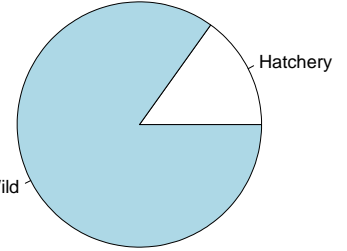
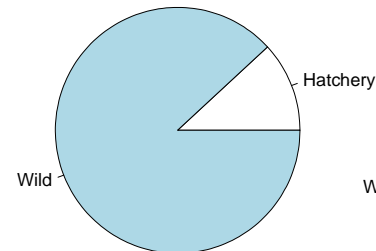
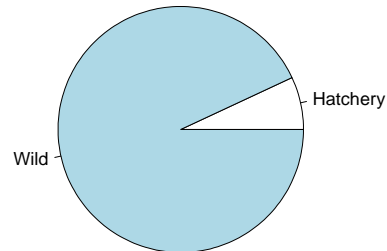
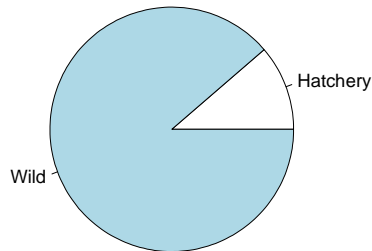
9/2/13

Pink Salmon

9/6/13

Pink Salmon

9/7/13



Pink Salmon

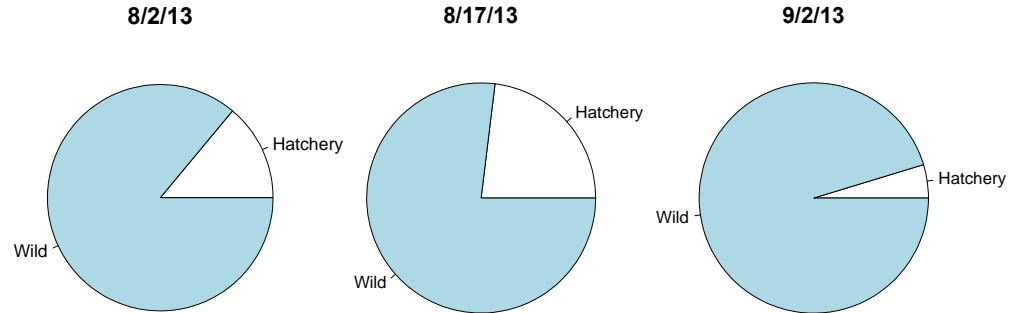
Pink Salmon

Pink Salmon

Pink Salmon

Pink Salmon Streams 2013

Bainbridge Creek

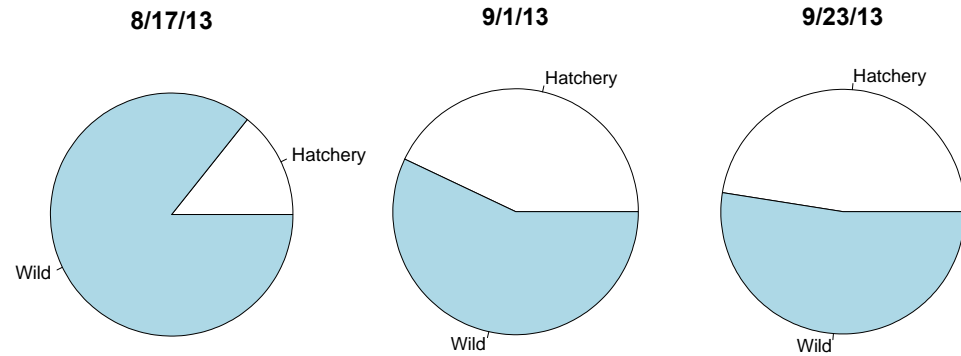


Pink Salmon

Pink Salmon

Pink Salmon

Johnson Creek

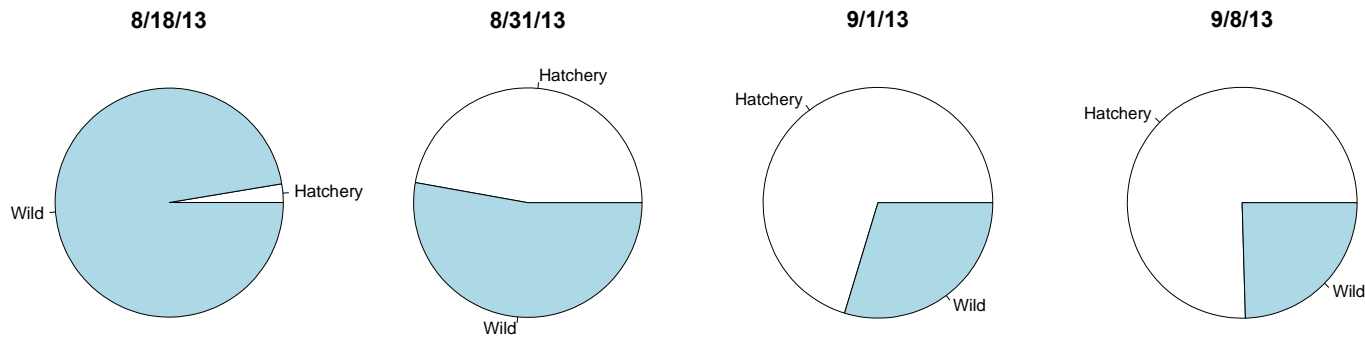


Pink Salmon

Pink Salmon

Pink Salmon

Hogan Bay



Pink Salmon

Pink Salmon

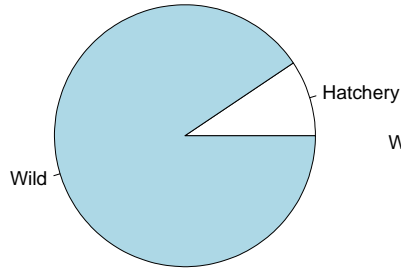
Pink Salmon

Pink Salmon

Pink Salmon Streams 2013

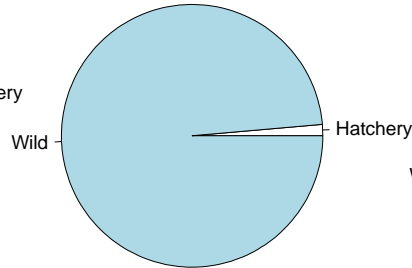
Swamp Creek

8/4/13



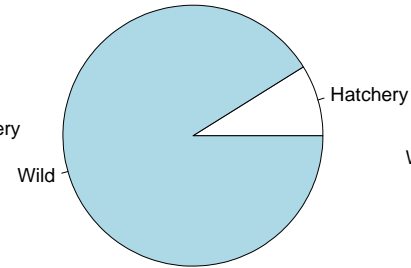
Pink Salmon

8/18/13



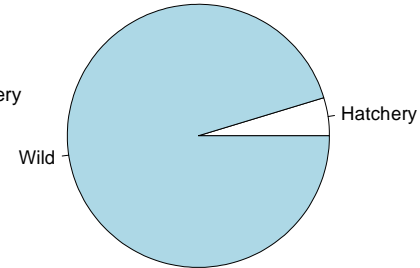
Pink Salmon

8/31/13



Pink Salmon

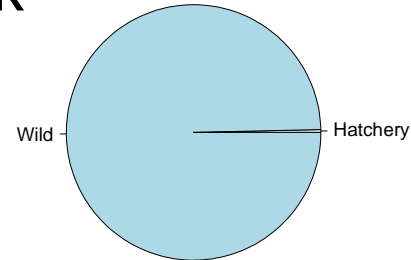
9/24/13



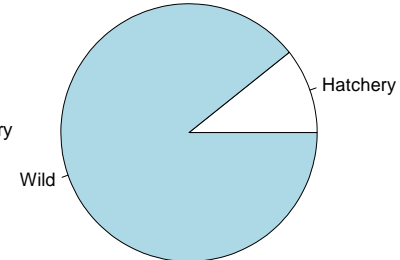
Pink Salmon

Cabin Creek

8/19/13



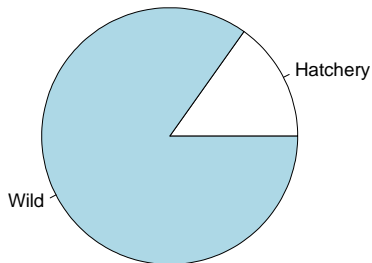
8/31/13



Pink Salmon

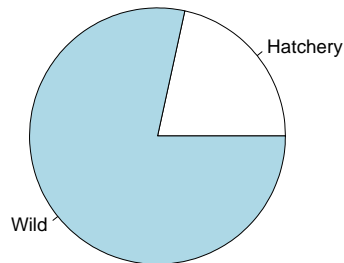
Stockdale Creek

8/30/13



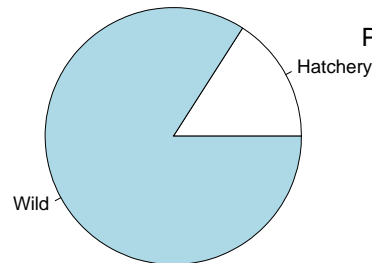
Pink Salmon

9/9/13



Pink Salmon

9/10/13

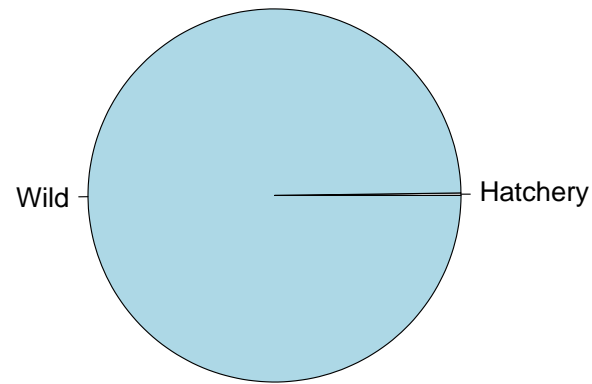


Pink Salmon

Pink Salmon Streams 2013

Double Creek

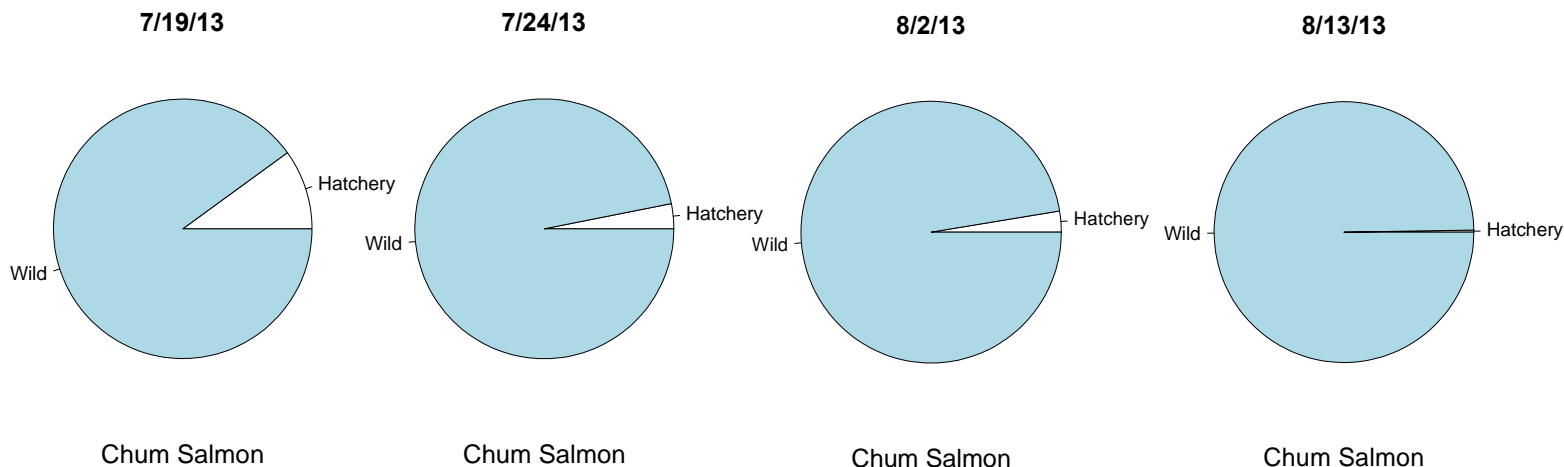
8/6/13



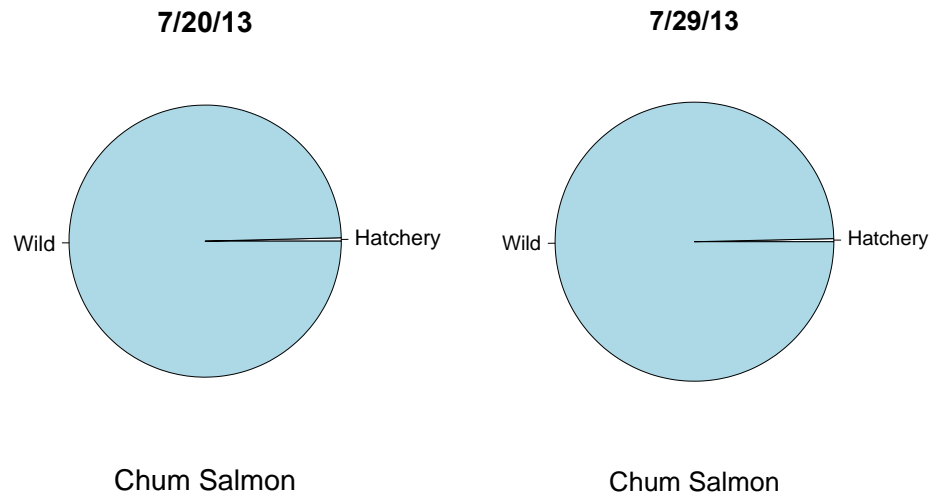
Pink Salmon

Chum Salmon Streams 2013

Hartney Creek



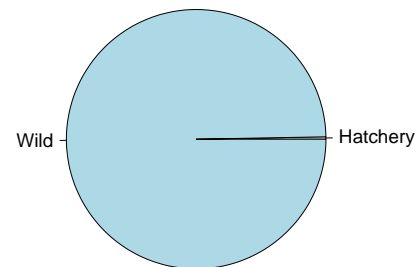
Beartrap Creek



Chum Salmon Streams 2013

Sunny River

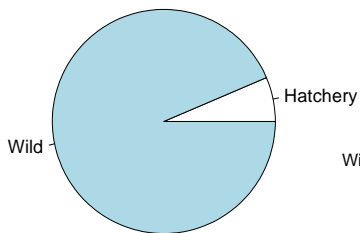
9/16/13



Chum Salmon

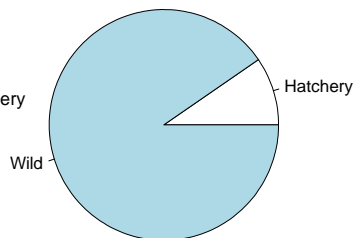
Long Creek

7/22/13



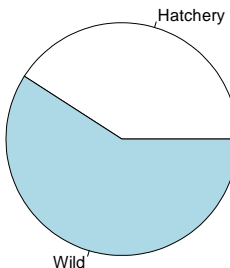
Chum Salmon

7/31/13



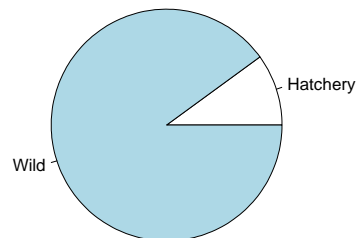
Chum Salmon

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Chum Salmon

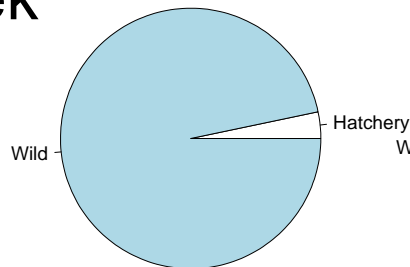
8/24/13



Chum Salmon

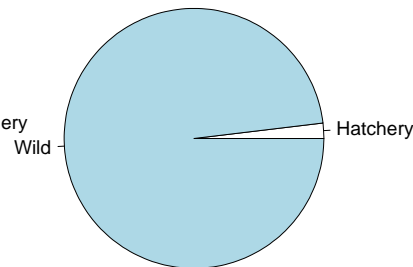
Spring Creek

7/31/13



Chum Salmon

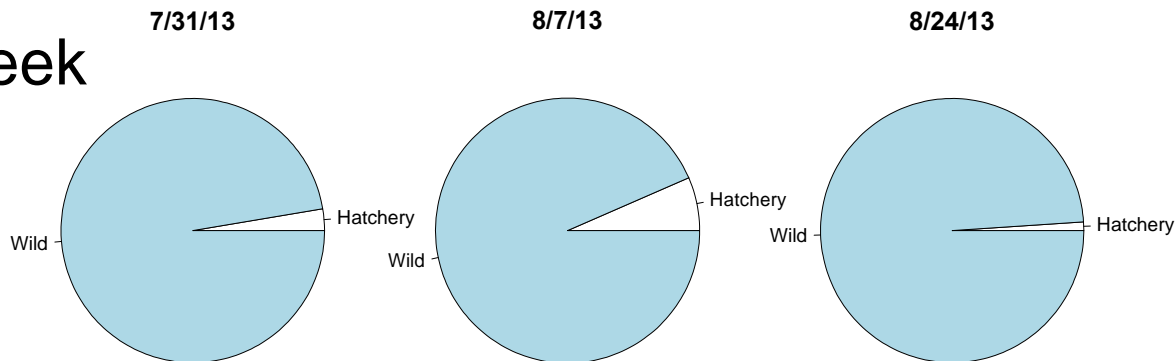
8/7/13



Chum Salmon

Chum Salmon Streams 2013

Vanishing Creek

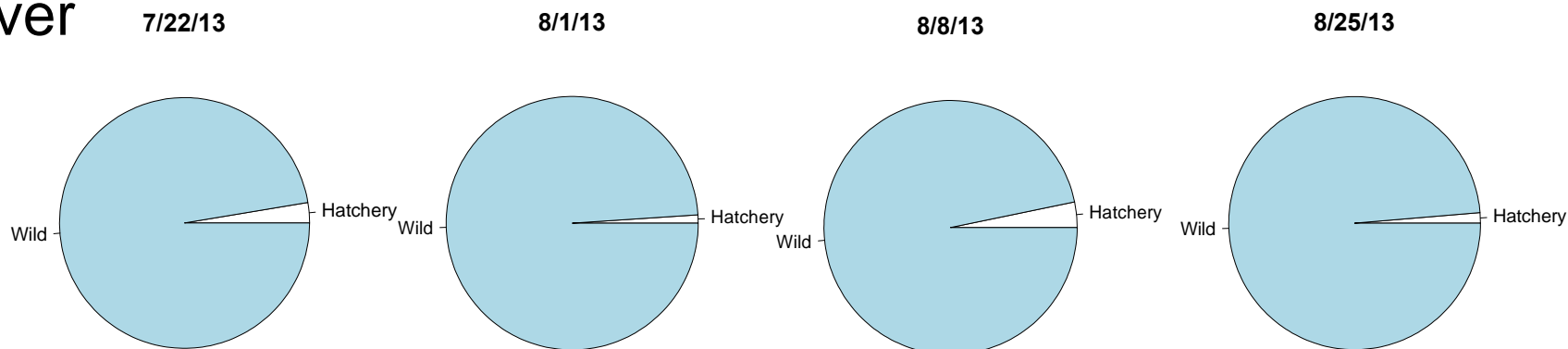


Chum Salmon

Chum Salmon

Chum Salmon

Wells River



Chum Salmon

Chum Salmon

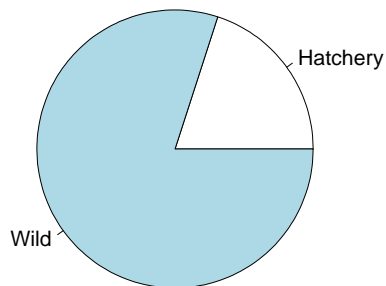
Chum Salmon

Chum Salmon

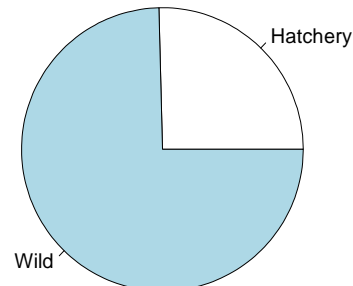
Chum Salmon Streams 2013

Siwash Creek

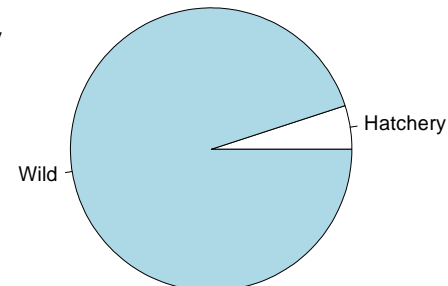
7/23/13



8/8/13



8/25/13



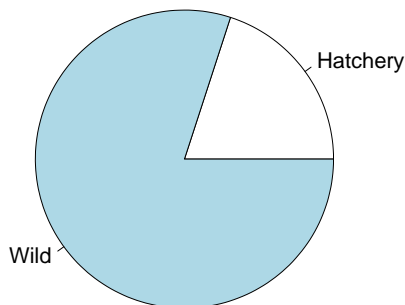
Chum Salmon

Chum Salmon

Chum Salmon

Coghill River

9/5/13



Chum Salmon

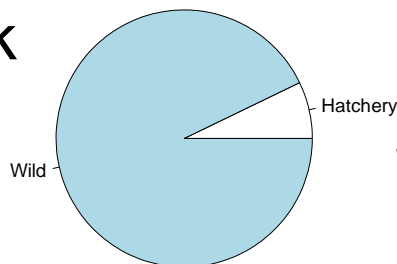
7/24/13

8/10/13

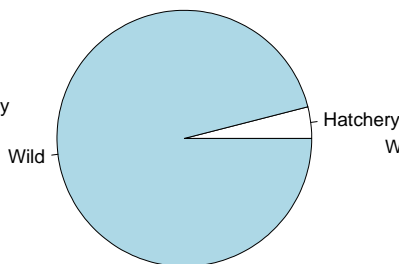
9/5/13

9/19/13

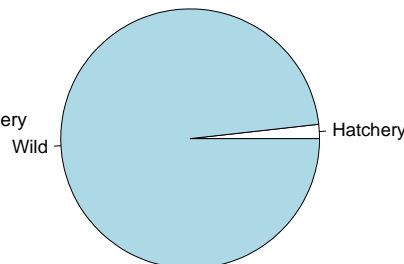
Mill Creek



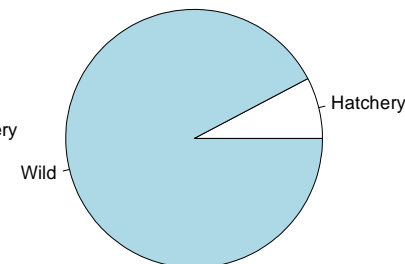
Chum Salmon



Chum Salmon



Chum Salmon

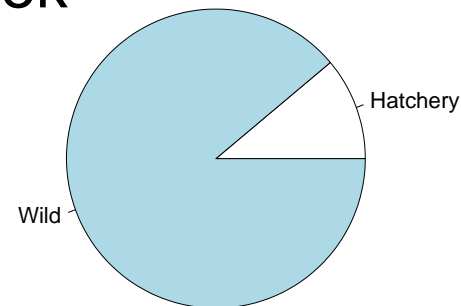


Chum Salmon

Chum Salmon Streams 2013

Tebenkof Creek

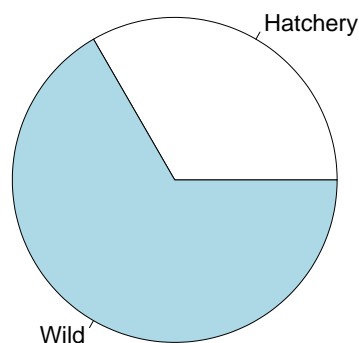
9/4/13



Chum Salmon

Paulson Creek

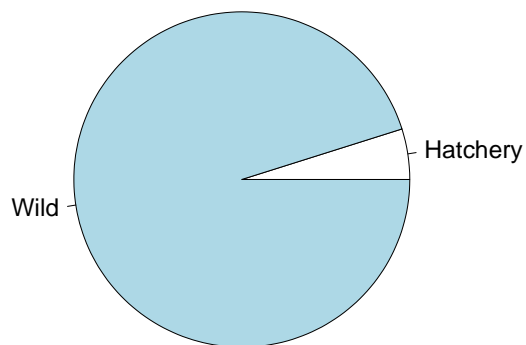
9/4/13



Chum Salmon

West Finger Creek

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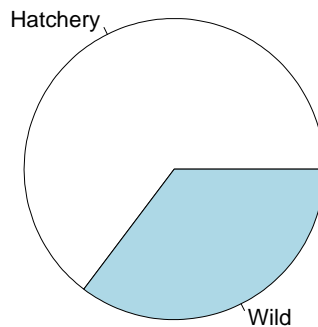


Chum Salmon

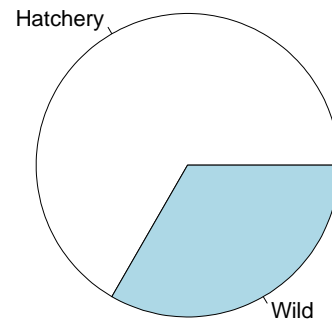
Chum Salmon Streams 2013

Swamp Creek

8/4/13



8/18/13

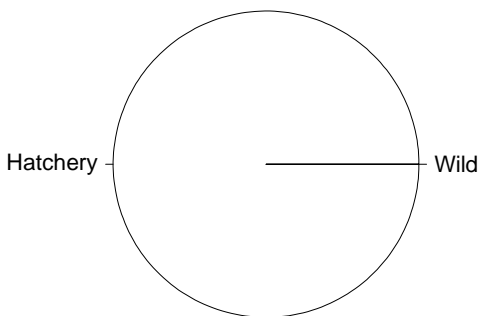


Cabin Creek

Chum Salmon

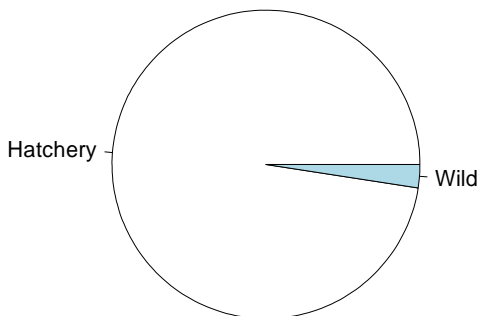
Chum Salmon

8/4/13



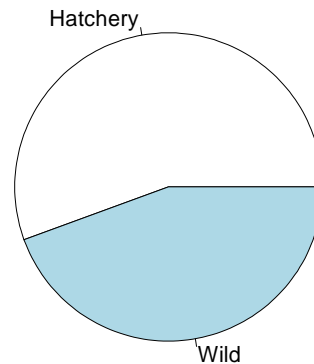
Chum Salmon

8/19/13



Chum Salmon

8/31/13



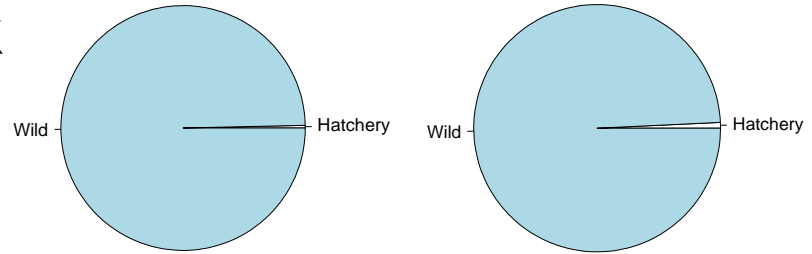
Chum Salmon

Chum Salmon Streams 2013

Constantine Creek

8/4/13

8/29/13



Chum Salmon

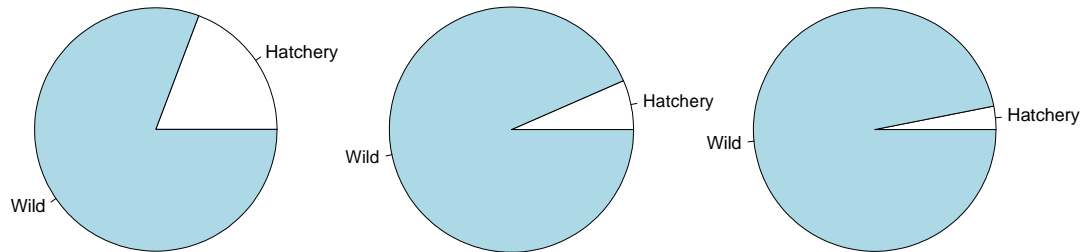
Chum Salmon

Double Creek

7/29/13

8/6/13

8/12/13



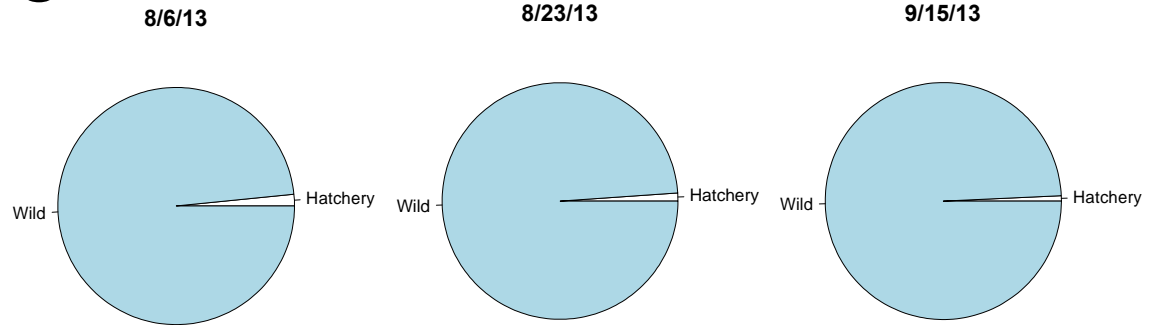
Chum Salmon

Chum Salmon

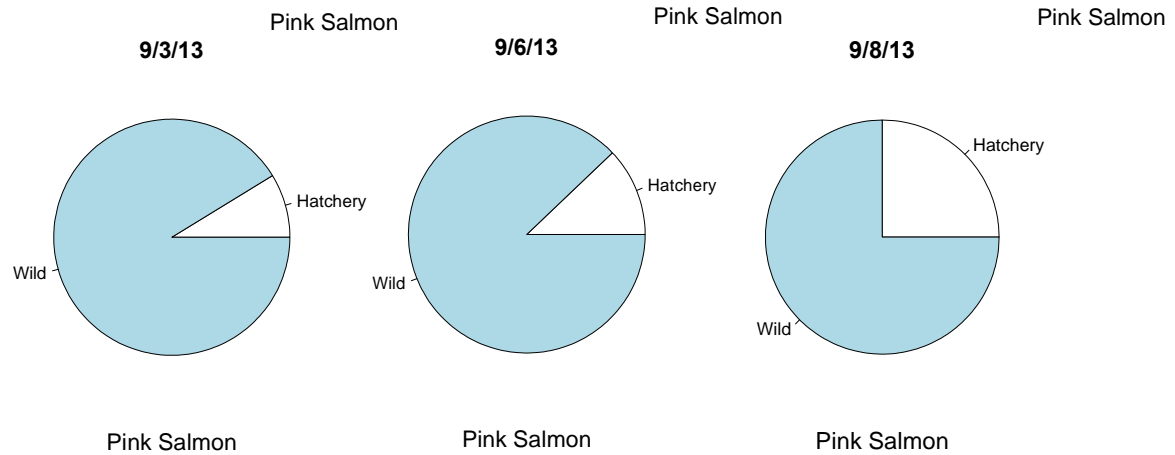
Chum Salmon

Pedigree Streams 2013

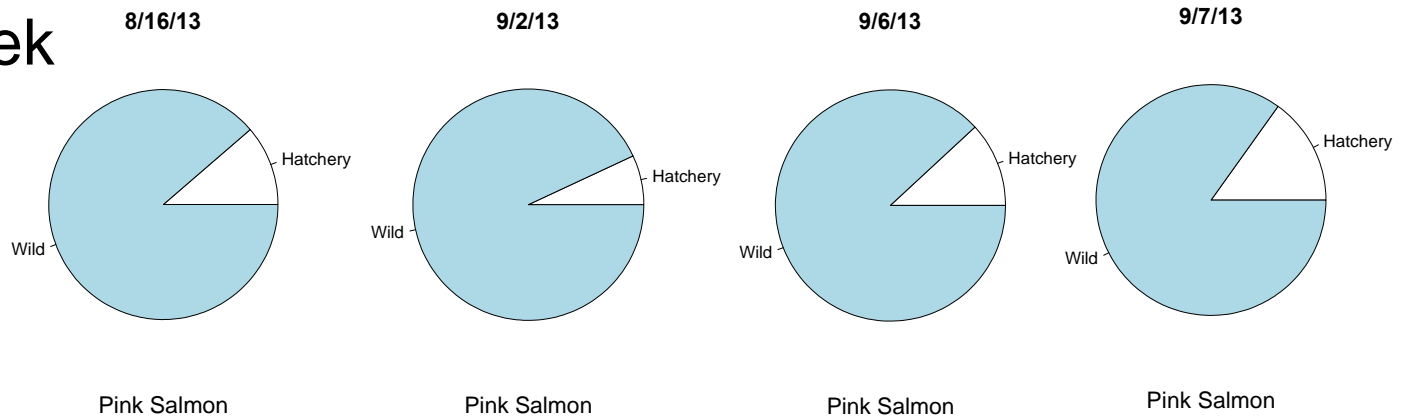
Short Creek



Paddy Creek

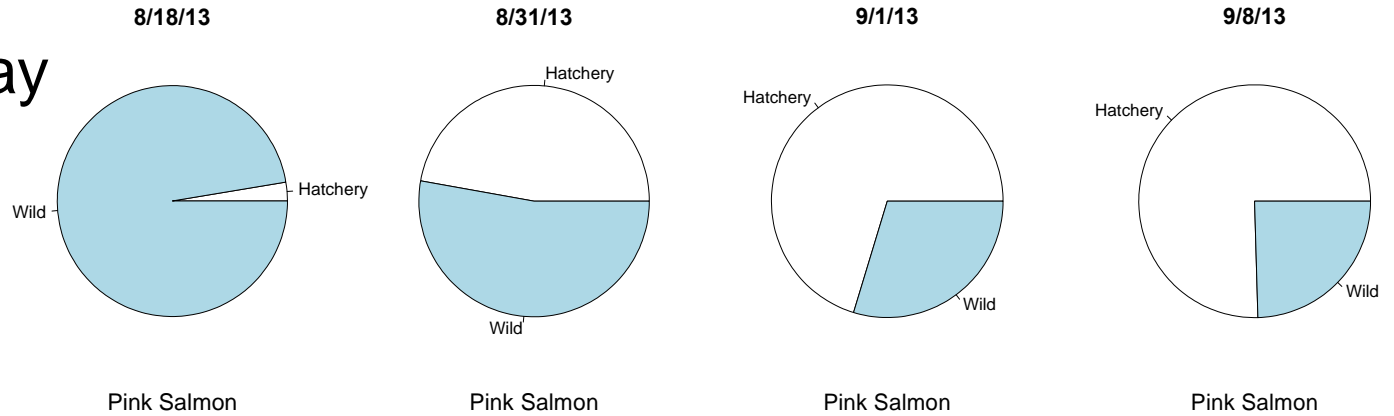


Erb Creek

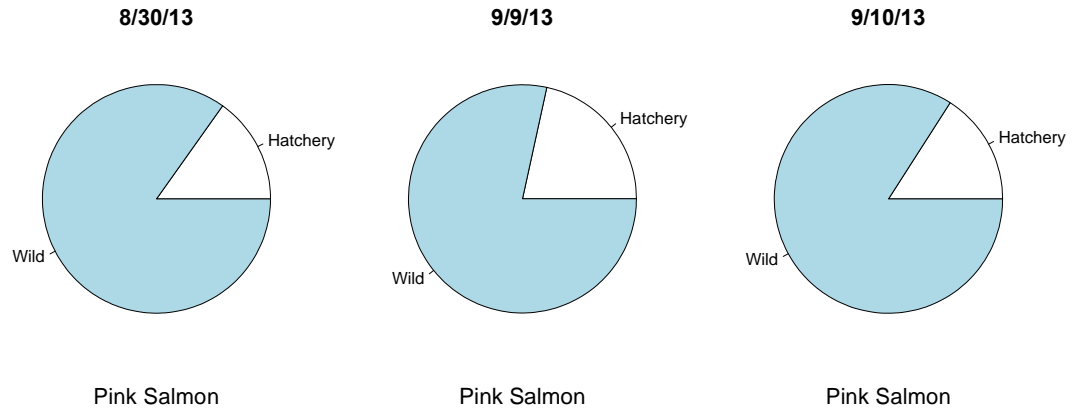


Pedigree Streams 2013

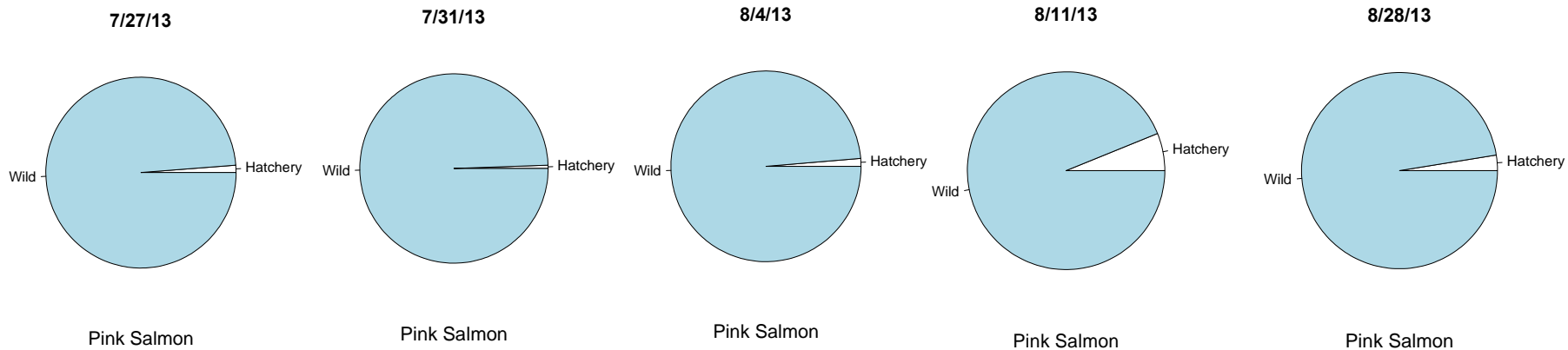
Hogan Bay



Stockdale Creek



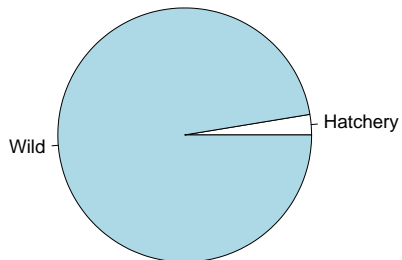
Spring Creek



Fishing District 101 SEAK 2013

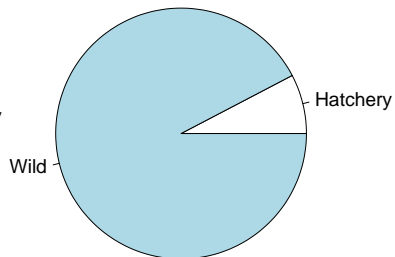
Hidden Inlet

8/7/13



Chum Salmon

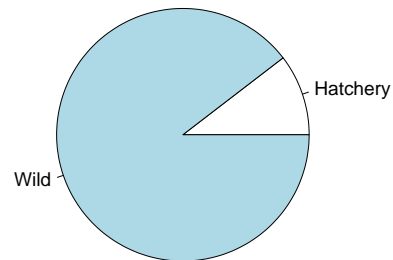
8/14/13



Chum Salmon

Marten River

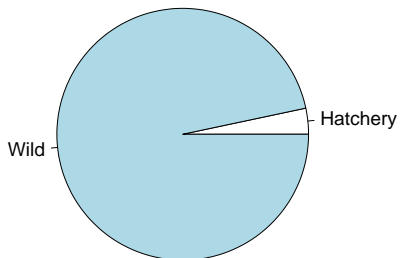
8/15/13



Chum Salmon

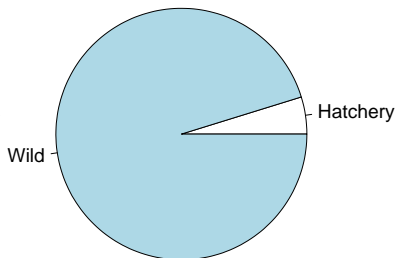
Carroll Creek

8/4/13



Chum Salmon

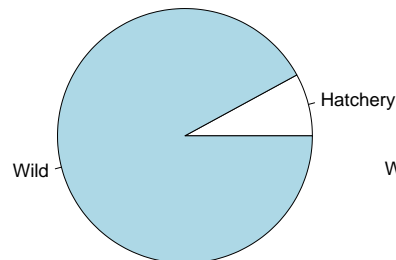
8/10/13



Chum Salmon

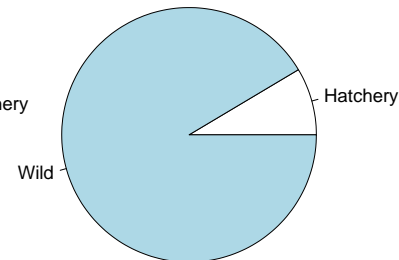
King Creek

8/5/13



Chum Salmon

8/12/13

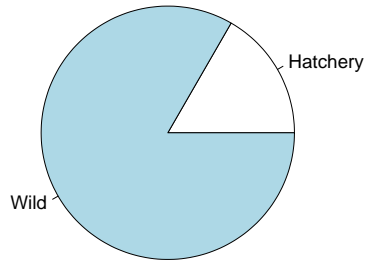


Chum Salmon

Fishing District 107-109 SEAK 2013

Harding River

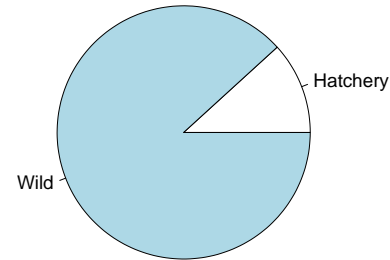
8/2/13



Chum Salmon

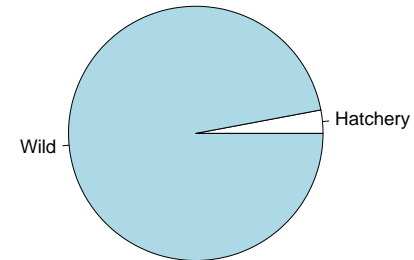
North Arm Creek

7/30/13



Chum Salmon

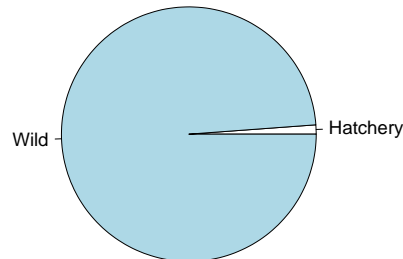
8/17/13



Chum Salmon

Saginaw Bay S Head

8/22/13



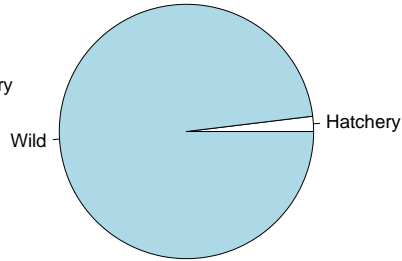
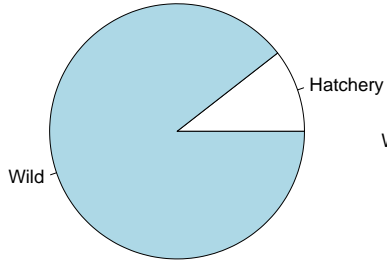
Chum Salmon

Fishing District 110 SEAK 2013

Johnston Creek

7/31/13

8/4/13



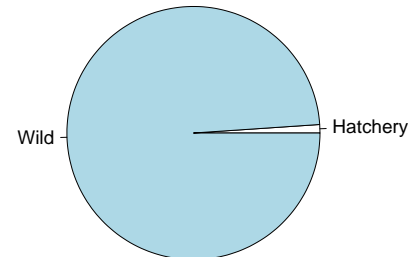
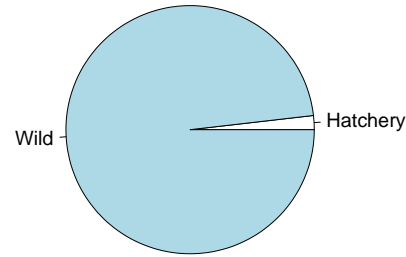
Chum Salmon

Chum Salmon

Chuck River

7/24/13

7/28/13



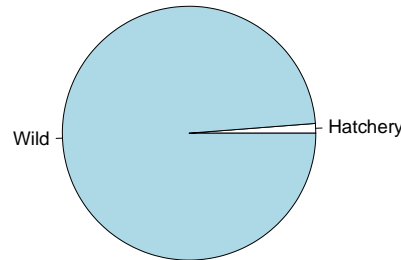
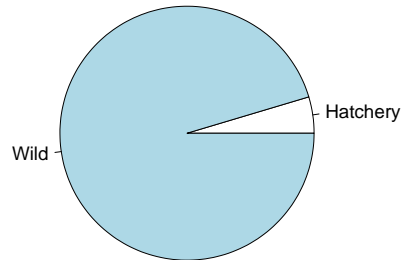
Chum Salmon

Chum Salmon

Glen Creek

8/1/13

8/6/13



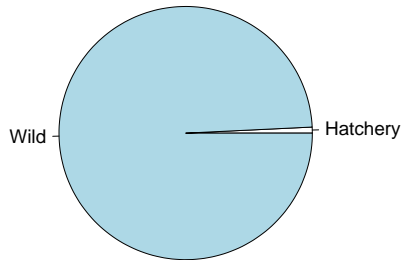
Chum Salmon

Chum Salmon

Fishing District 111 SEAK 2013

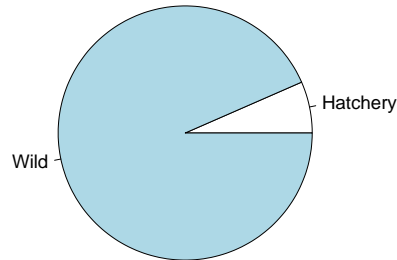
Swan Cove Creek

7/26/13



Chum Salmon

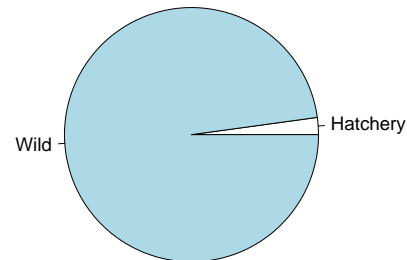
8/2/13



Chum Salmon

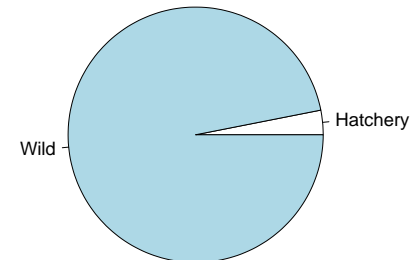
King Salmon River

7/25/13



Chum Salmon

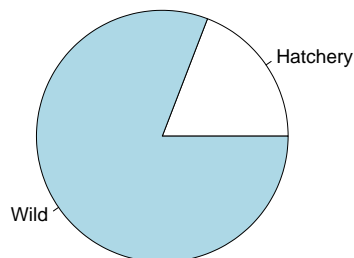
8/3/13



Chum Salmon

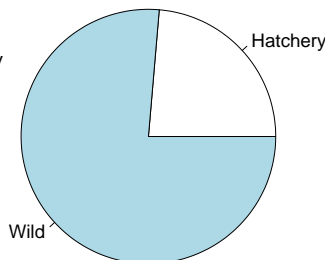
Prospect Creek

7/28/13



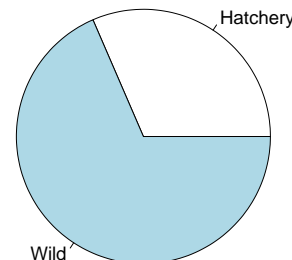
Chum Salmon

8/4/13



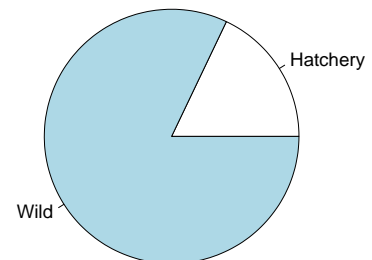
Chum Salmon

8/5/13



Chum Salmon

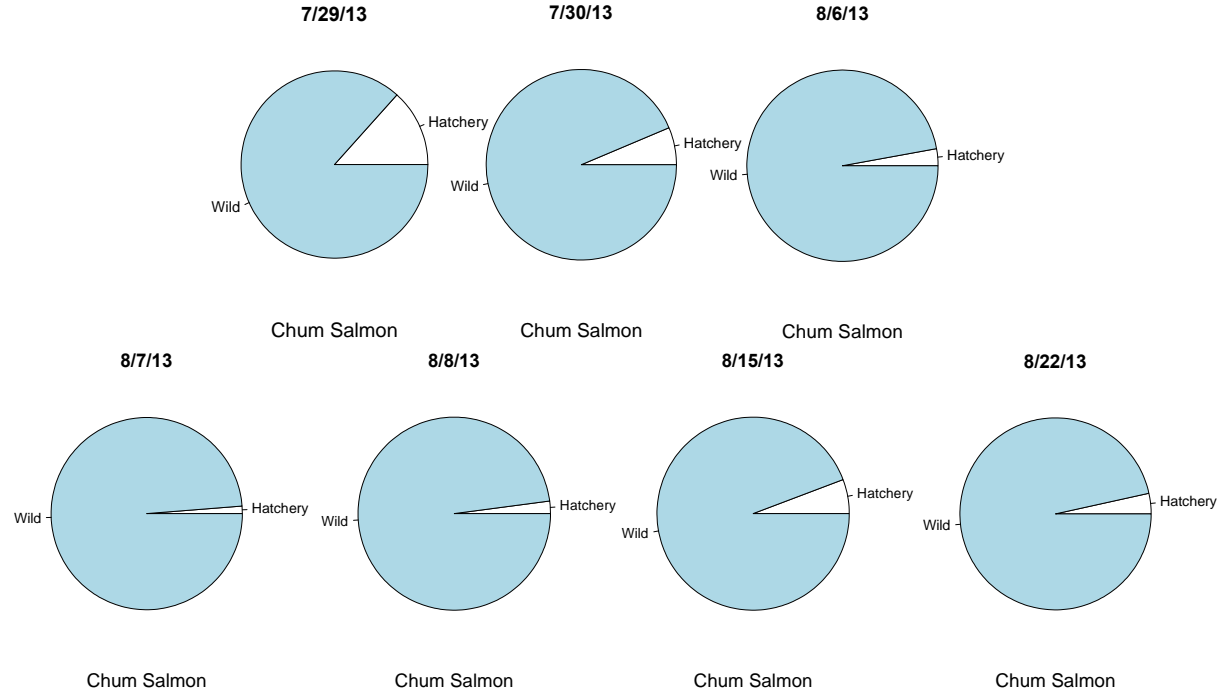
8/20/13



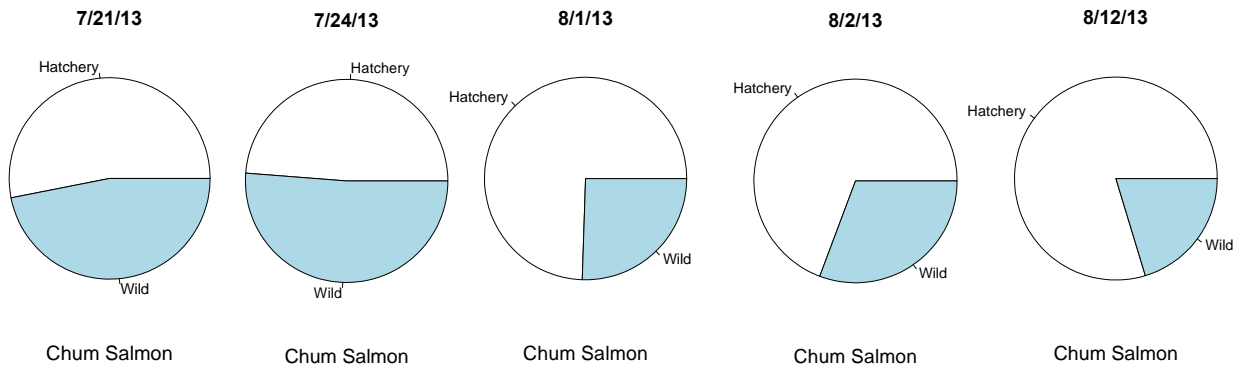
Chum Salmon

Fishing District 111 SEAK 2013

Admiralty Creek



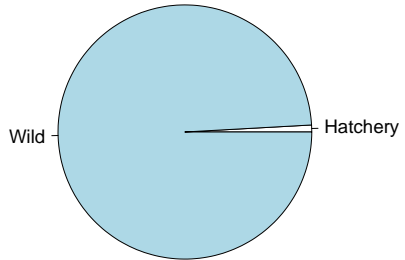
Fish Creek



Fishing District 112 SEAK 2013

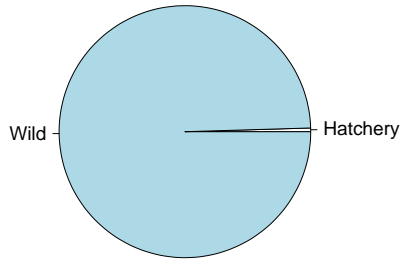
Ralph's Creek

7/20/13



Chum Salmon

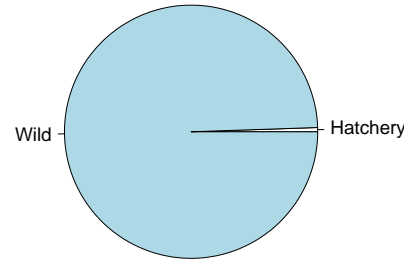
7/25/13



Chum Salmon

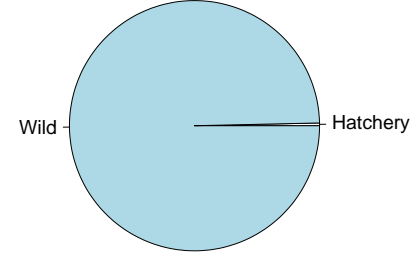
Seal Bay Head Creek

7/27/13



Chum Salmon

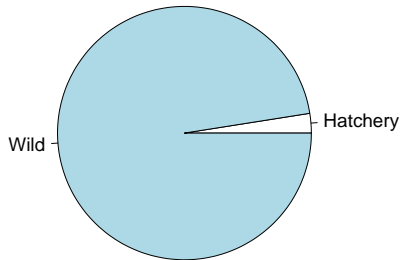
8/3/13



Chum Salmon

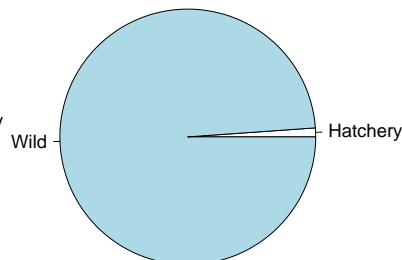
Freshwater Creek

8/6/13



Chum Salmon

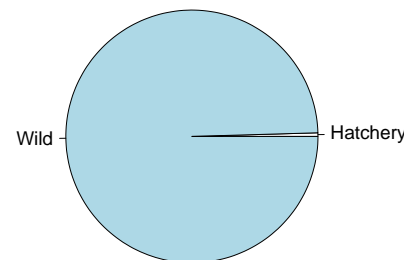
8/15/13



Chum Salmon

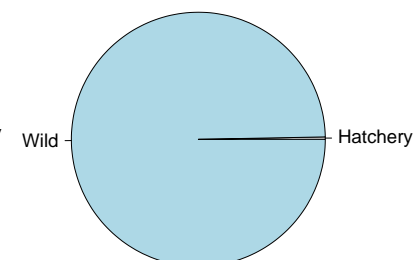
Chaik Bay

7/28/13



Chum Salmon

8/21/13

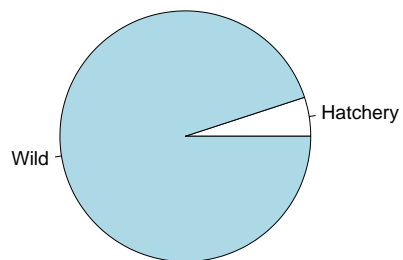


Chum Salmon

Fishing District 112 SEAK 2013

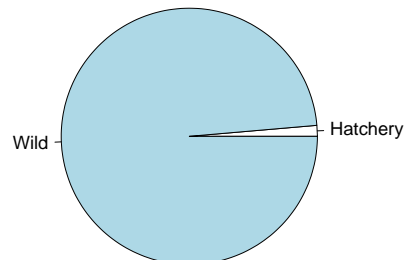
Whitewater Creek

8/7/13



Chum Salmon

8/19/13

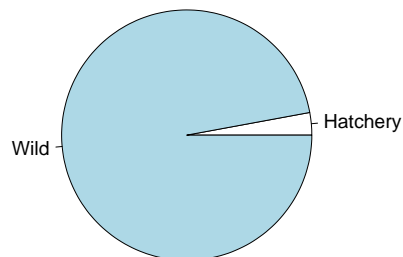


Chum Salmon

Fishing District 113 SEAK 2013

W Crawfish NE Arm Head

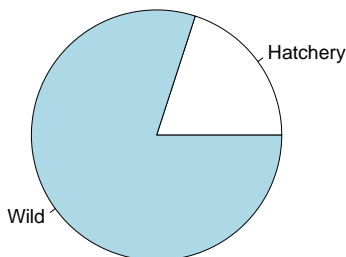
8/13/13



Chum Salmon

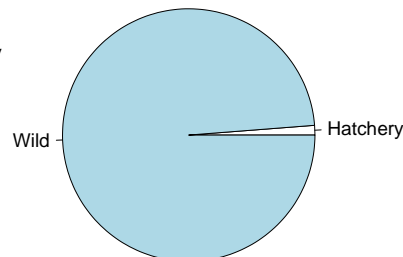
Rodman Creek

7/20/13



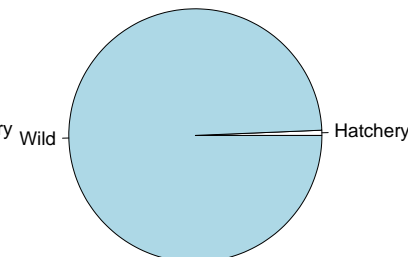
Chum Salmon

7/27/13



Chum Salmon

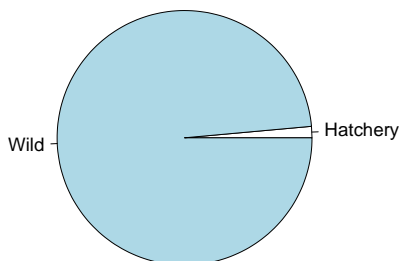
8/9/13



Chum Salmon

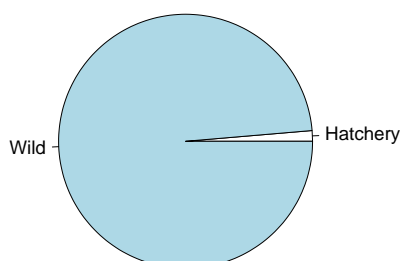
Ushk Bay W End

8/10/13



Chum Salmon

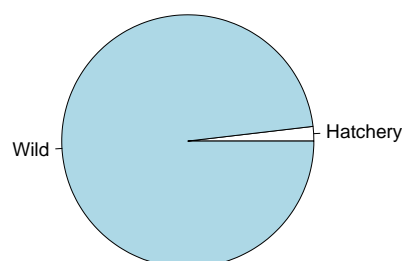
8/11/13



Chum Salmon

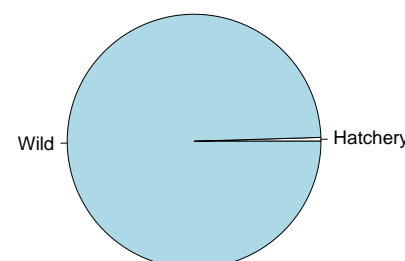
Sister Lake SE Head

8/15/13



Chum Salmon

8/25/13

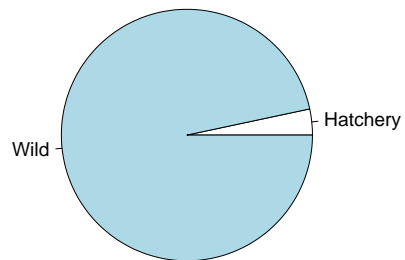


Chum Salmon

Fishing District 113 SEAK 2013

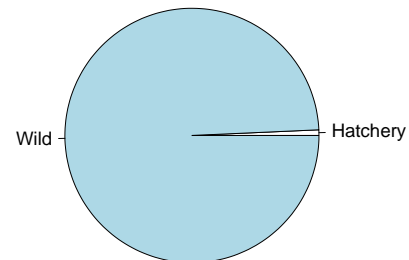
Ford Arm Creek

8/14/13



Chum Salmon

8/24/13

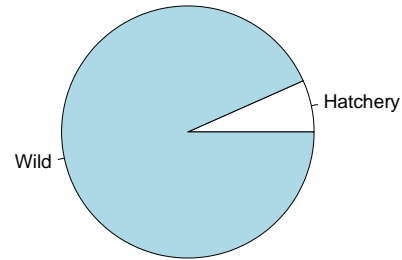


Chum Salmon

Fishing District 114-115 SEAK 2013

Game Creek

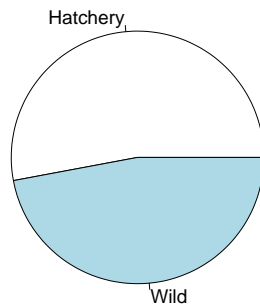
7/29/13



Chum Salmon

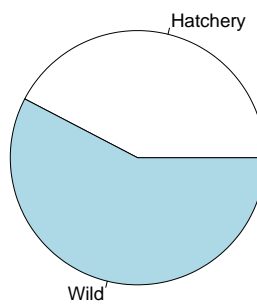
Sawmill Creek

7/23/13



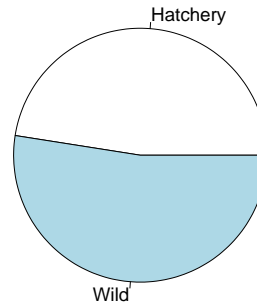
Chum Salmon

8/9/13



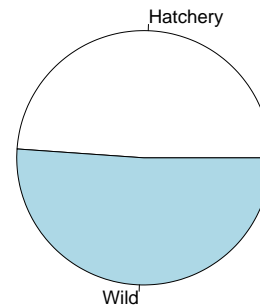
Chum Salmon

8/10/13



Chum Salmon

8/14/13



Chum Salmon

Future Directions – PWS Ocean Sampling

- Continue Ocean Sampling in 2015
 - Third year will help for interannual variation
 - Total estimates of run size
 - Parallels stream work

Future Directions – PWS & SEAK Stream Sampling

- Several SEAK streams had so few chum present that there may never be enough samples to contribute to the experimental analysis.
 - Glen Creek - SEAK
 - Greens Creek - SEAK
 - Saginaw Bay - SEAK
 - Swan Cove Creek – SEAK
- A few PWS streams had few pinks or chum
 - Spring Creek (fitness) 2014
 - Blackstone Creek 2013 and 2014

Future Directions – Pedigree Sampling

- For fitness streams, clarify which spawn-outs and carcasses should be sampled and which should not
 - If carcasses are very rotten should they be sampled or not?
 - Should dead, partially spawned Chum/Pink Salmon be sampled?
 - On live, partially spawned fish, we have been using the criteria of “sample if nearly all gametes have been expelled”
 - What about adults that have been preyed upon either prior to spawning, partially spawned, or post spawning?

Future Directions – Large Stream/River Sampling

- Access options will clearly be more expensive so budget issues will need to be considered as well.

- PWS Streams:
 - Sheep River
 - Beartrap Creek
 - Wells River
 - Sunny River
 - Coghill River (lake)
 - Constantine Creek
 - Double Creek
 - Bainbridge Creek (lake)
 - Gilmour Creek (lake)
- SEAK streams:
 - Marten River
 - Harding River
 - Chuck River
 - Kadashan River
 - King Salmon River
 - Greens Creek
 - Game Creek

Future Directions – Sample Collection

- Improve the process for collecting, storing, and separating the fitness stream DNA tissues and otolith samples
 - 48-DWPs are difficult to seal -- Ethanol occasionally leaked or evaporated out of plates after they were fully sealed and tightly wrapped in plastic
 - A lab technician must remove the otoliths from the 48-DWP and transfer to an otolith tray for shipping to the respective ADF&G processing lab
 - This creates another source of potential error, which may be largely undetectable.

Future Directions – Sample Collection

- Improve the trays in which samples are stored on otolith-only streams
 - The 96-well plates, while efficient, require extreme care to avoid tipping and spilling when in the field
 - Unlike 48 DWPs, the 96 well plates require crewmembers to remove the lid altogether when sampling
 - If possible, a larger, sturdier tray would be much preferable for streamside otolith collecting
 - Alternatively, a larger, rigid plate to contain the tray, much like that used to support the 48 DWPs, would better suit this field work

Future Directions – Sample Collection

- Improve labels for otolith and 48-DWP trays
- Problems with tray labels smearing and disintegrating, especially in rainy weather and rough field conditions
 - Labels for each type of tray 48 dwp and 96-well each have their unique challenges
 - If trays were “permanently” labeled with more rugged and weatherproof labeling, they could be better tracked via barcoding.

