

# Population Size

Objective: Unbiased Estimates of Run Size and Spawning Abundance of Hatchery-origin and Wild-origin Pink and Chum Salmon in PWS for 2013 - 2015

## Population Size

Derivation:

A) Run Size (H) = Catch (H) + Spawning Abundance (H)

B) Run Size (W) = Catch (W) + Spawning Abundance (W)

C) Run Size (H) = Run Size  $\times$  Fraction comprised of hatchery salmon ( $\equiv p$ )

D) Run Size (W) = Run Size  $\times$  (1 - p)

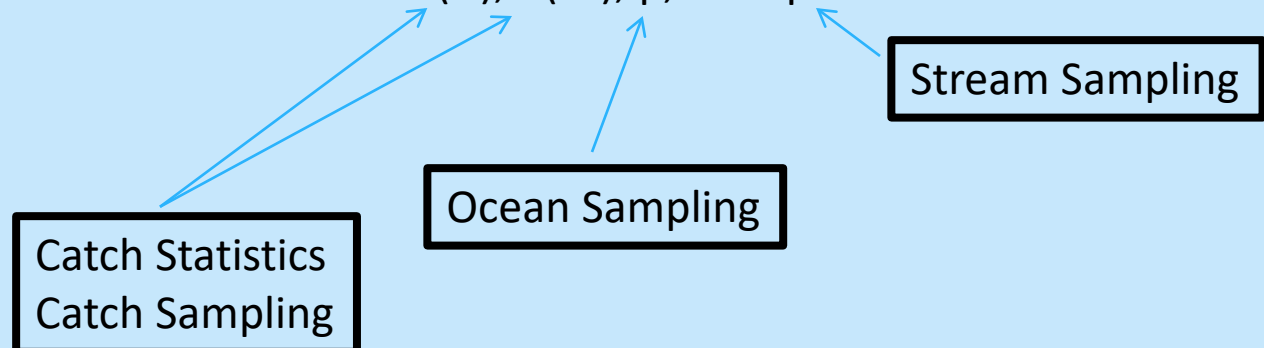
E) Spawning Abundance (H) = Spawning Abundance  $\times$  Fraction hatchery salmon ( $\equiv q$ )

F) Spawning Abundance (W) = Spawning Abundance  $\times$  (1 - q)

G) Run Size  $\times$  p = Catch (H) + Spawning Abundance  $\times$  q

H) Run Size  $\times$  (1 - p) = Catch (W) + Spawning Abundance  $\times$  (1 - q)

Spawning Abundance = Function of C(H), C(W), p, and q



# Preliminary Run Size Estimates – PWS Pink Salmon 2015

## Key Inputs for 2015

	<b>p</b>	<b>q</b>	<b>C<sub>w</sub></b>	<b>C<sub>H</sub></b>
Estimate →	0.549	0.09557634	25,558,145	64,542,809

## Thousands of Pink Salmon

<b>Year</b>	<b>Wild spawners</b>	<b>Hatchery spawners</b>	<b>Total spawners</b>	<b>Wild run</b>	<b>Hatchery run</b>	<b>Total run</b>
2013	15,698	701	16,399	33,096	69,888	102,985
2014	5,130	741	5,872	6,960	42,757	49,718
2015	30,074	3,178	33,252	55,632	67,720	123,353

# Preliminary Run Size Estimates – PWS Chum Salmon 2015

## Key Inputs for 2015

	<b>p</b>	<b>q</b>	<b>C<sub>w</sub></b>	<b>C<sub>H</sub></b>
Estimate →	0.688	0.0308956	221,512	2,455,950

## Thousands of Chum Salmon

<b>Year</b>	<b>Wild spawners</b>	<b>Hatchery spawners</b>	<b>Total spawners</b>	<b>Wild run</b>	<b>Hatchery run</b>	<b>Total run</b>
2013	894	50	944	1,141	3,007	4,148
2014	925	49	975	1,175	1,228	2,404
2015	905	28	934	1,126	2,484	3,611

# Key Metrics from Run Estimation

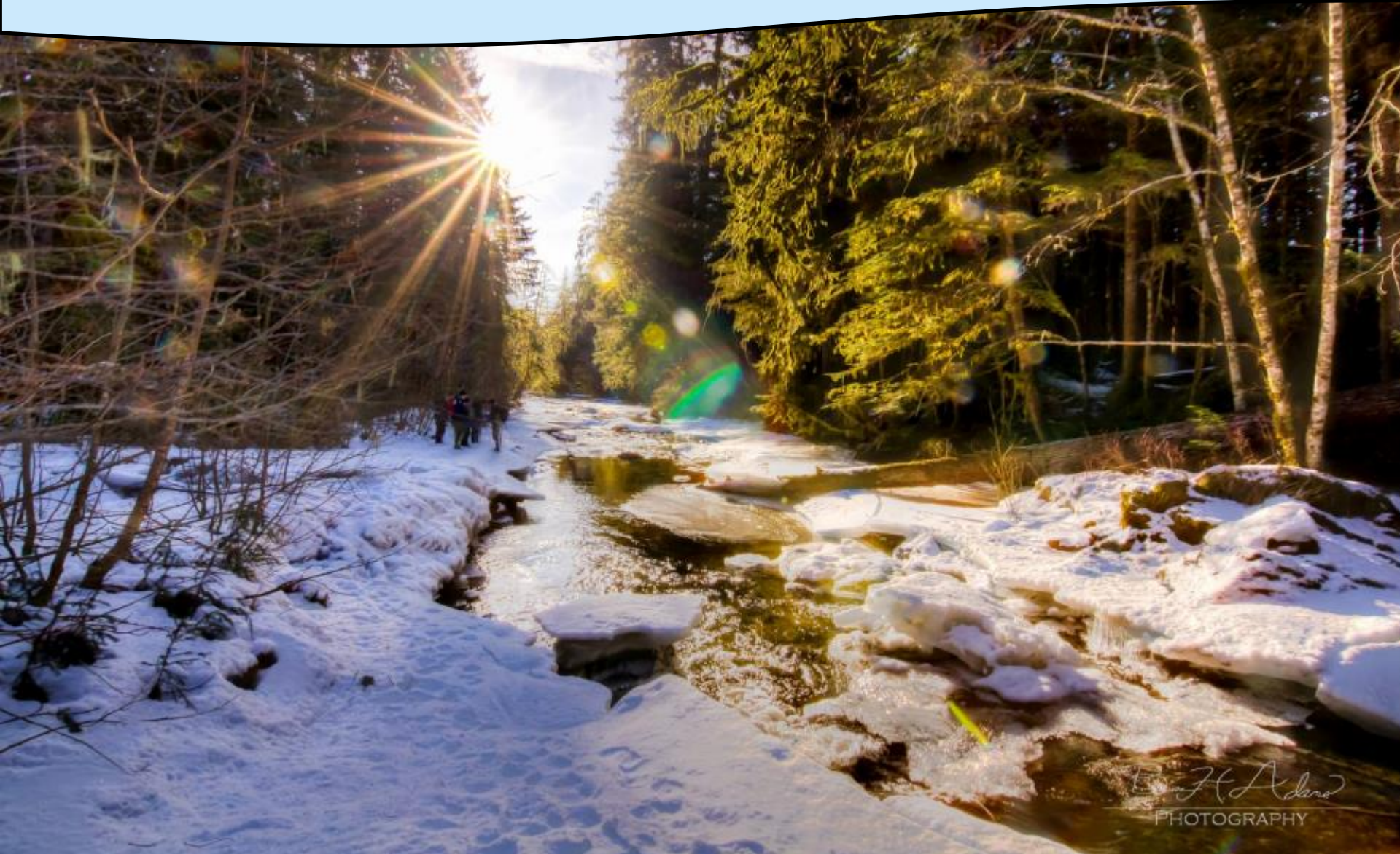
Harvest rate on natural-origin Pink and Chum Salmon:

Species	2013	2014	2015
Pink	52.6%	26.3%	40.2%
Chum	21.6%	21.3%	21.1%

Hatchery stray rate of Pink and Chum Salmon:

Species	2013	2014	2015
Pink	1.0%	1.7%	5.2%
Chum	1.6%	4.0%	1.1%

# Alevin Sampling





# Redd Sampling Technique



T.Kline/PWSSC Alevin sampling



T.Kline/PWSSC Alevin sampling







# Stockdale Creek Positive Pink Alevin Samples by Section

2014

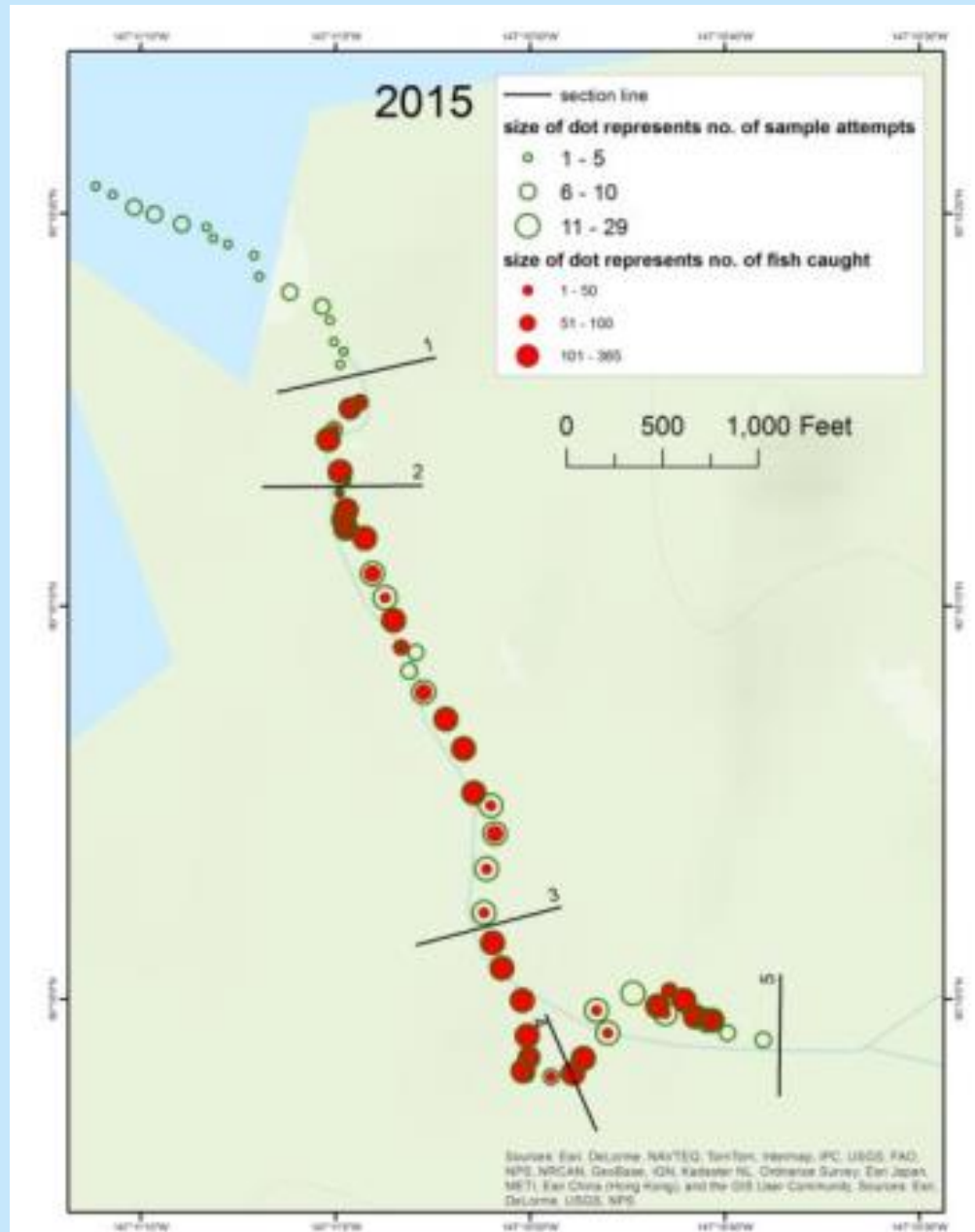
Section #	# of sample attempts	positive samples	% positive samples
1	98	11	11.2%
2	200	141	70.5%
3	142	67	47.2%
4	80	31	38.8%

**Legend**

- Section 1 - Lower intertidal
- Section 2 - High tide
- Section 3 - Under ice
- Section 4 - Upper reach
- Ice extent



# Stockdale Creek - 2015



# 2015 Stockdale Cr Pink Alevin

Section #	# of sample attempts	Avg pump time	positive samples	% positive samples	# Pink caught	# Pink collected	# Chum caught
1	73	47.9	0	0.0%	0	0	0
2	47	58	22	46.8%	388	228	0
3	265	57.5	111	41.9%	2425	1281	0
4	130	51.3	47	37.7%	893	657	0
5	205	49.7	70	34.1%	1332	853	0
<b>Total</b>	<b>720</b>	<b>52.88</b>	<b>250</b>	<b>34.71%</b>	<b>5038</b>	<b>3019</b>	<b>0</b>



# 2014 Fish Creek

— section line

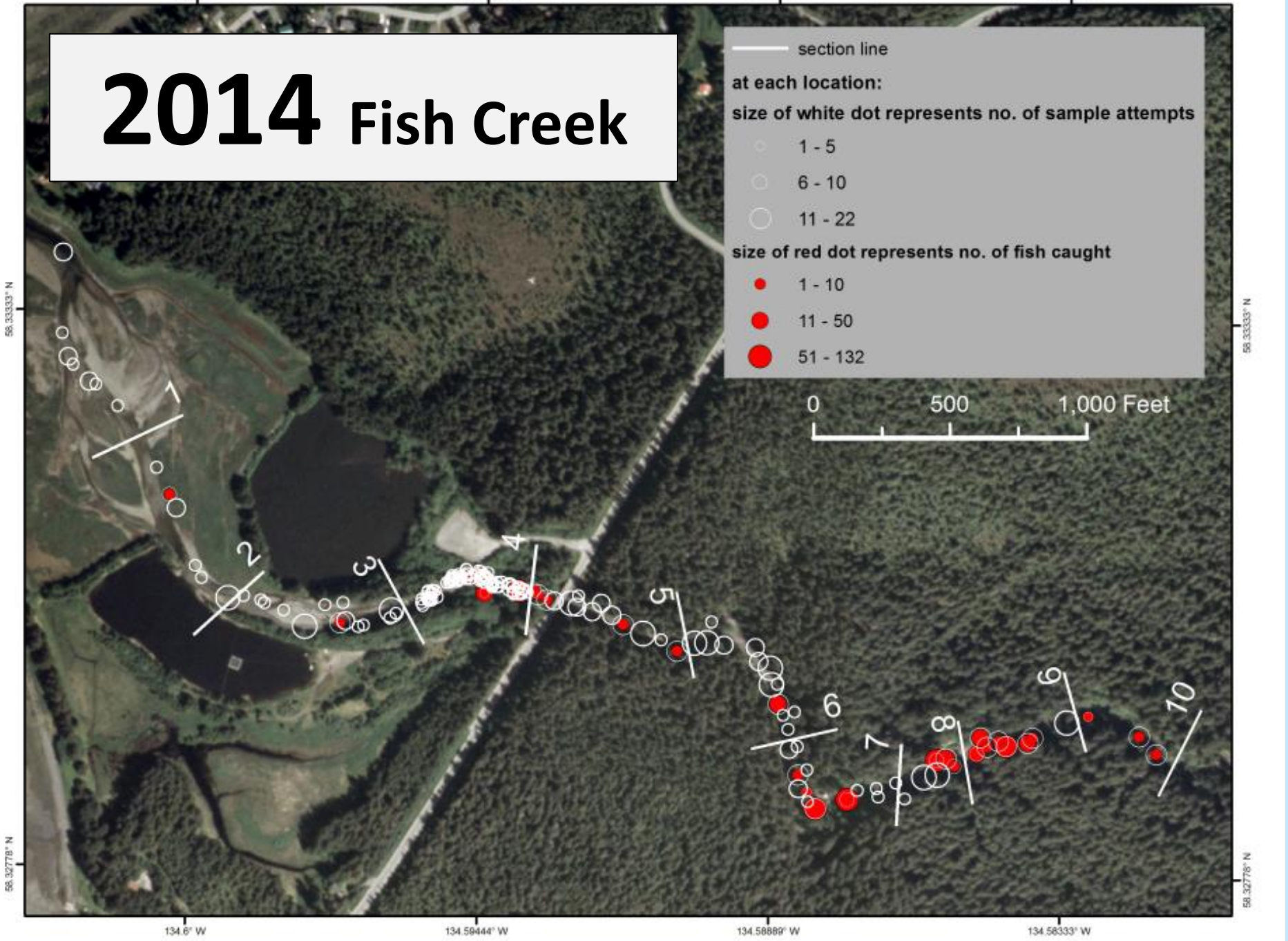
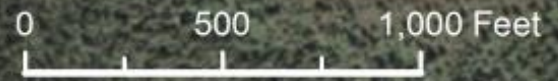
at each location:

size of white dot represents no. of sample attempts

- 1 - 5
- 6 - 10
- 11 - 22

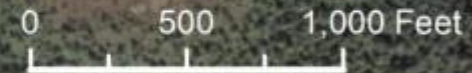
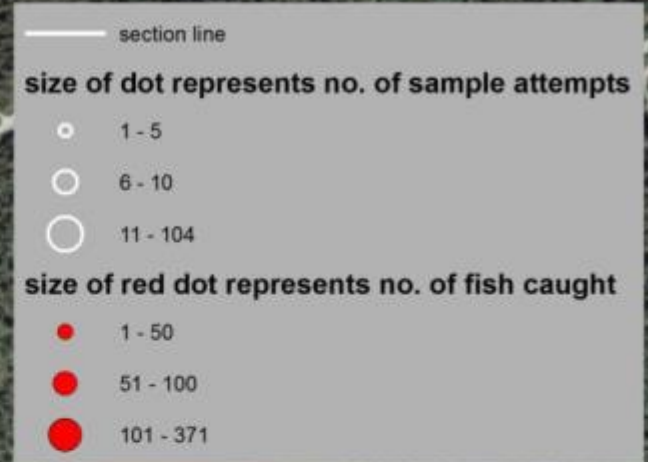
size of red dot represents no. of fish caught

- 1 - 10
- 11 - 50
- 51 - 132





# 2015 Fish Creek



56.33333° N

56.33333° N

56.32778° N

56.32778° N

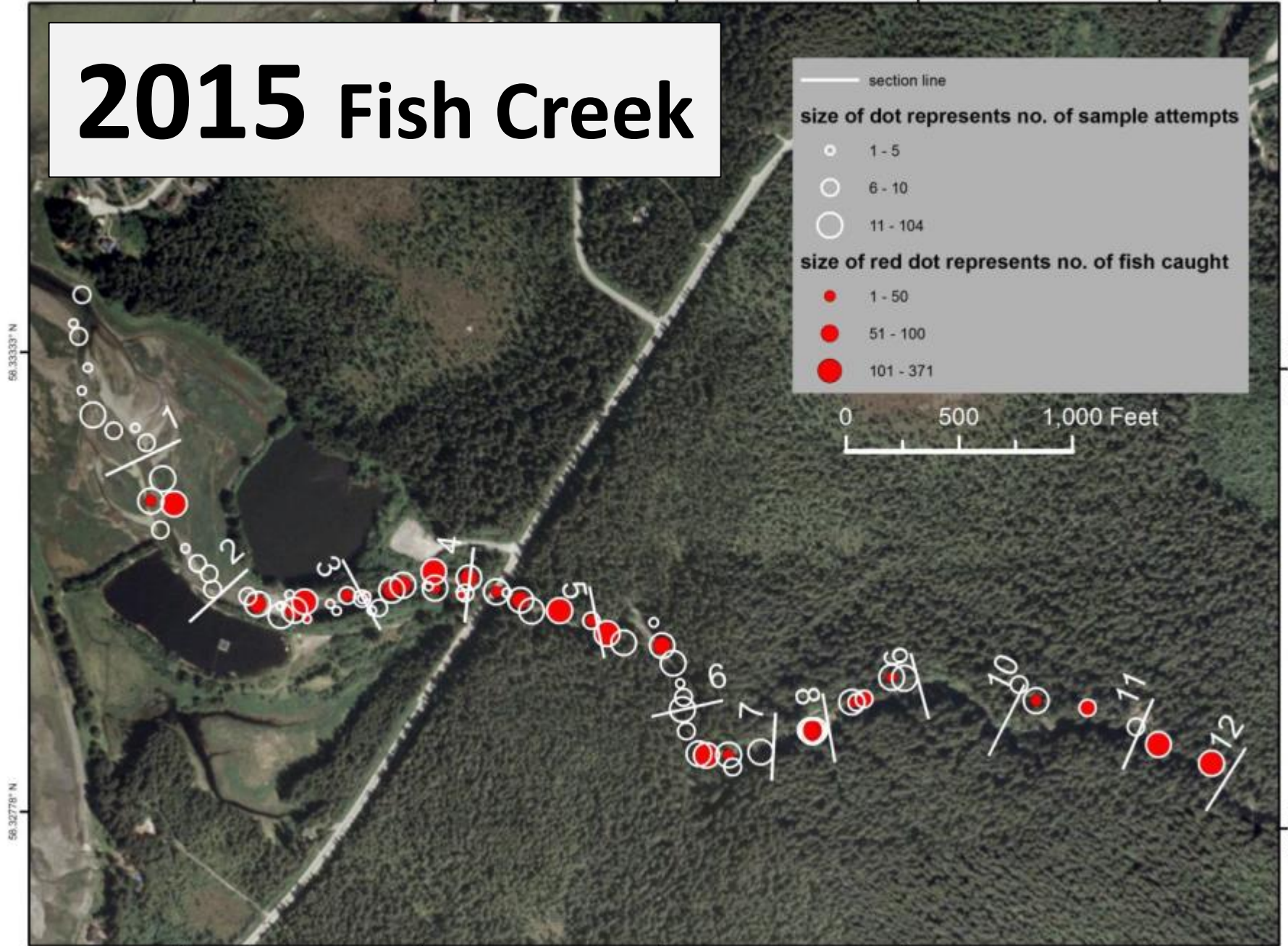
134.6° W

134.59444° W

134.58889° W

134.58333° W

134.57778° W



# 2015 Fish Cr Chum Alevin

**975 sample attempts (digs)**

**160 positive samples**

Section #	# of sample attempts	Avg pump time	positive samples	% positive samples	# chum caught	# chum collected	#pink caught
1	35	32.7	0	0.0%	0	0	0
2	92	39.8	2	5.0%	122	37	318
3	105	54.4	16	29.4%	296	182	15
4	85	65.5	20	30.5%	559	331	170
5	95	69.8	17	24.4%	304	201	0
6	123	60.2	30	49.8%	481	379	26
7	93	60.1	15	25.0%	224	144	0
8	88	61.3	25	40.8%	511	223	5
9	109	52.3	11	21.0%	236	136	0
10	7	47.6	0	0.0%	0	0	0
11	29	45.1	2	4.4%	53	27	1
12	114	55.2	22	39.9%	457	325	56
<b>Total</b>	<b>975</b>	<b>53.7</b>	<b>160</b>	<b>16.4%</b>	<b>3243</b>	<b>1985</b>	<b>591</b>



# Fish and Stockdale Creeks 2015

- Sampled February 24 –28 & March 11-16
  - Sampled longer stretch of stream
  - Good spatial coverage
- Alevins prevalent throughout
  - Exceptions:
    - Tide flat
    - Large substrate





