

# *Community Salmon Investigation for Highline 2014 Findings*



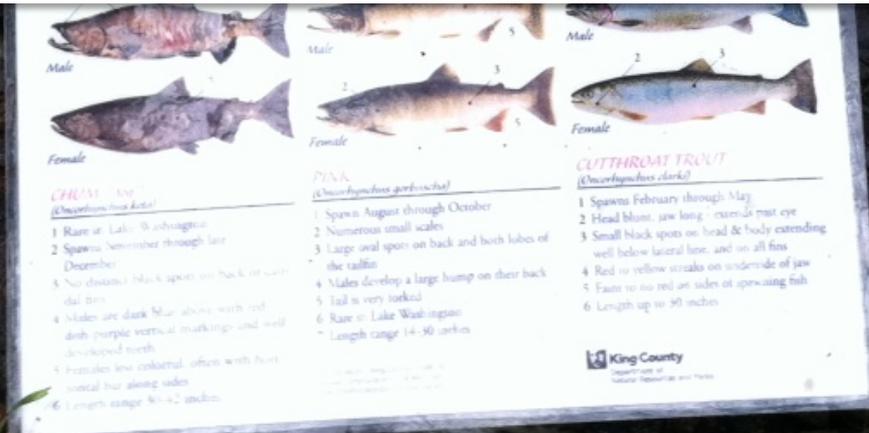
**Presented by Elissa Ostergaard  
Miller/Walker Creeks Basin Steward**

March 5 and 11, 2015

# Community Salmon Investigation for Highline - 2014 Results

1. Purpose of *Community Salmon Investigation: Highline*
2. How *CSI: Highline* works
  - Stream surveys
  - Necropsies
  - Survey locations
3. Results of October – January surveys
  - Summary data
  - Analysis
  - Weather and Wildlife
  - Thank you to volunteers
4. Plans for 2015
5. Factors affecting stream and salmon health
6. Your role!

# 1) Purpose of CSI



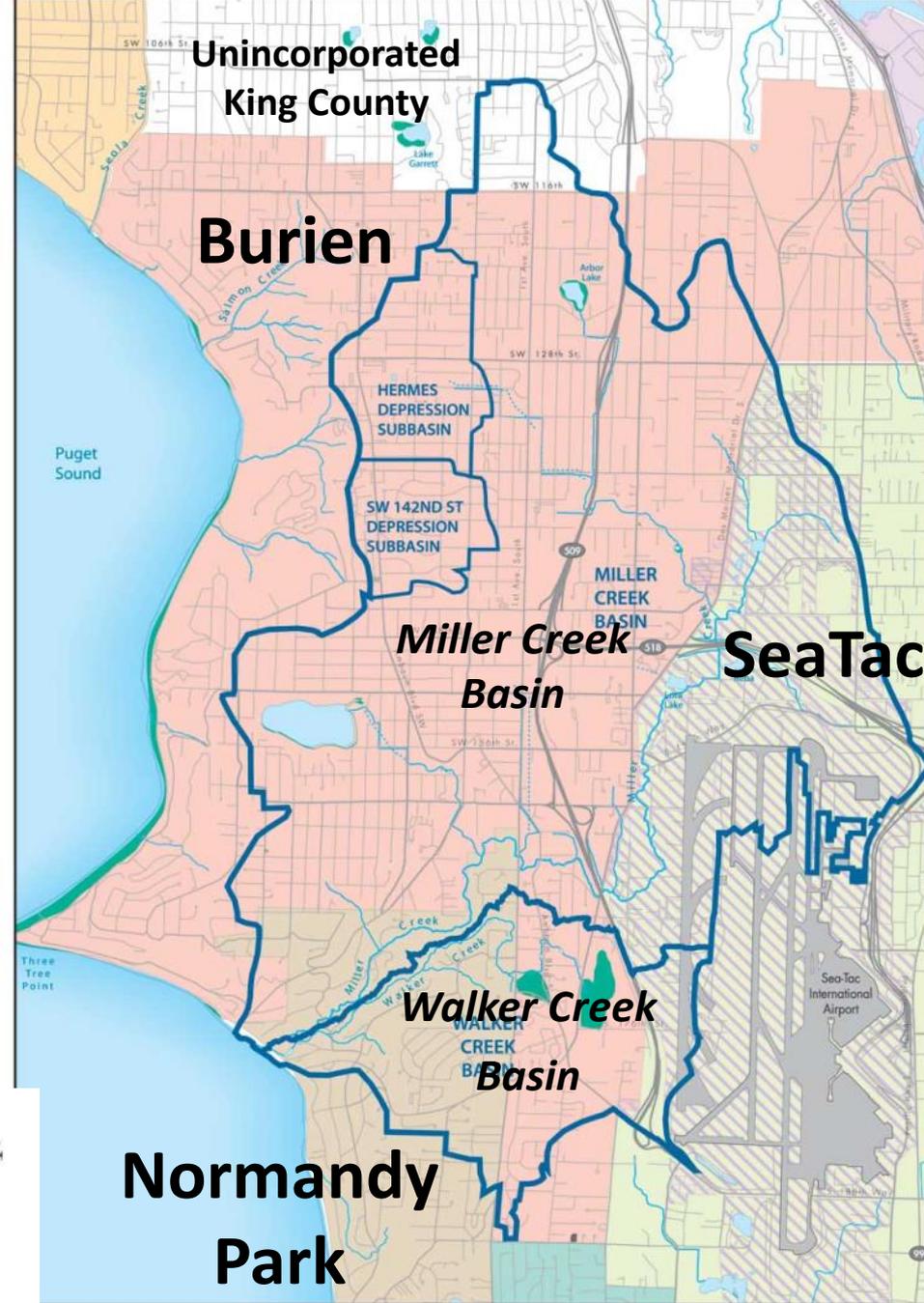
**Coho "jack"  
(immature male)**

**November 11, 2011**

**Photo courtesy of David Bobanick**

# Basin Boundaries for Miller and Walker Creeks

**Puget Sound  
Starts Here**



## Legend

- |               |                                     |                      |
|---------------|-------------------------------------|----------------------|
| Burien        | King County (unincorporated)        | Freeways & Arterials |
| Normandy Park | Port of Seattle Property            | Local Roads          |
| Seattle       | Basin Boundary                      | Railroads            |
| SeaTac        | Subbasin Boundary                   | Pipes                |
| Tukwila       | SAO Wetlands                        | Streams & Waterline  |
| Des Moines    | Other Significant Man-made Features |                      |



**Base Map Notes:**  
All updates registered by USGS PLS.  
Standard is USGS Mean High Water.

Compiled April, 1994, updated June 2010  
1000, 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031, 1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039, 1040, 1041, 1042, 1043, 1044, 1045, 1046, 1047, 1048, 1049, 1050, 1051, 1052, 1053, 1054, 1055, 1056, 1057, 1058, 1059, 1060, 1061, 1062, 1063, 1064, 1065, 1066, 1067, 1068, 1069, 1070, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1080, 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1089, 1090, 1091, 1092, 1093, 1094, 1095, 1096, 1097, 1098, 1099, 1100, 1101, 1102, 1103, 1104, 1105, 1106, 1107, 1108, 1109, 1110, 1111, 1112, 1113, 1114, 1115, 1116, 1117, 1118, 1119, 1120, 1121, 1122, 1123, 1124, 1125, 1126, 1127, 1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135, 1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143, 1144, 1145, 1146, 1147, 1148, 1149, 1150, 1151, 1152, 1153, 1154, 1155, 1156, 1157, 1158, 1159, 1160, 1161, 1162, 1163, 1164, 1165, 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# Draft 2006 Basin Plan

## Recommendation on Monitoring

An on-going basin monitoring program should be started that will allow for trend analysis of:

- Stream flow (volume)
- Water quality
- Habitat data



**Port of Seattle water  
quality sampling station  
at Walker wetlands**

October 16, 2007

# Watersheds, rivers and streams

## Central Puget Sound

You're in: Central Puget Sound Watershed » Miller and Walker Creeks Stewardship » Monitoring Information

- Central Puget Sound Watershed
- Vashon - Maury Island
- Miller and Walker Creeks Stewardship
  - Stewardship Tips
  - Volunteer Calendar
  - Stream Blog
  - Miller Creek Photo Tour
  - Walker Creek Photo Tour
  - Basin Plan
  - Clean Stormwater
  - Monitoring Information**
  - Salmon Monitoring Program - "CSI: Highline"
  - Contacts
  - Hydrologic Modeling
  - Nearshore environments
  - Puget Sound Shoreline Stewardship Guidebook
  - Related organizations
  - News archive
  - Site Map

### Monitoring Information: How Are Miller and Walker Creeks Doing?

This page provides information on:

- [Current and Past Monitoring](#)
- [Community Salmon Investigation for Highline](#)
- [Monitoring Sampling and Analysis Plan](#)
- [Final Monitoring Coordination Recommendations](#)
- [Background Information on Monitoring Coordination Workshops in 2008](#)

### Current and Past Monitoring

[General flow, water quality and other stream condition monitoring in 2012-2013](#) (Adobe PDF, 2MB)

### Water Quantity (Hydrology or Flow)

#### [Stream Gage Information](#)

There are five active gages and additional inactive gages that record flow in Miller and Walker Creeks. At the King County website, type in the number "42" to list all gages on Miller and Walker Creeks. This Web site will allow you to display information in graph form to illustrate the dramatic peaks of stormwater runoff.

#### [Hydrologic Modeling](#)

While not a source of current data from the stream, this page provides background on how land uses affect flow in the streams by influencing the volume of stormwater runoff.

### Water Quality

[2012 Miller Creek Water Quality analysis for Prespawn Mortality - King County](#) (Adobe PDF)

[Miller Creek Water Quality Information - Department of Ecology](#)

[Walker Creek Water Quality Information - Department of Ecology](#)

### Habitat Quality

[Miller and Walker Creeks Basin Plan - Appendix C: Habitat Characteristics and Identified Problems of Miller and Walker Creeks](#)

### Miller and Walker Basin Stewardship Sponsoring Jurisdictions

- City of Burien
- City of Normandy Park
- City of SeaTac
- King County
- Port of Seattle

### Miller-Walker Creek Questions

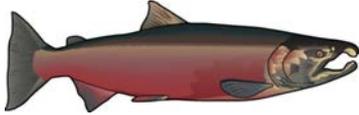
- Contact Elissa Ostergaard with questions about Miller and Walker Creeks, (206) 477-4792

### Lake Burien Questions

- Direct questions about Lake Burien, including toxic algae testing, to Sally Abella, (206) 477-4605

To offer a suggestion or report an error on the Water and Land Resources' Web site, please contact [Fred Bentler](#), webmaster.

# Why do *CSI: Highline*?



- Count adult salmon – indicators of the health of the ecosystem
- Document rate of coho “pre-spawn mortality” to see how pollution prevention helps
- Raise the awareness about the streams in the community

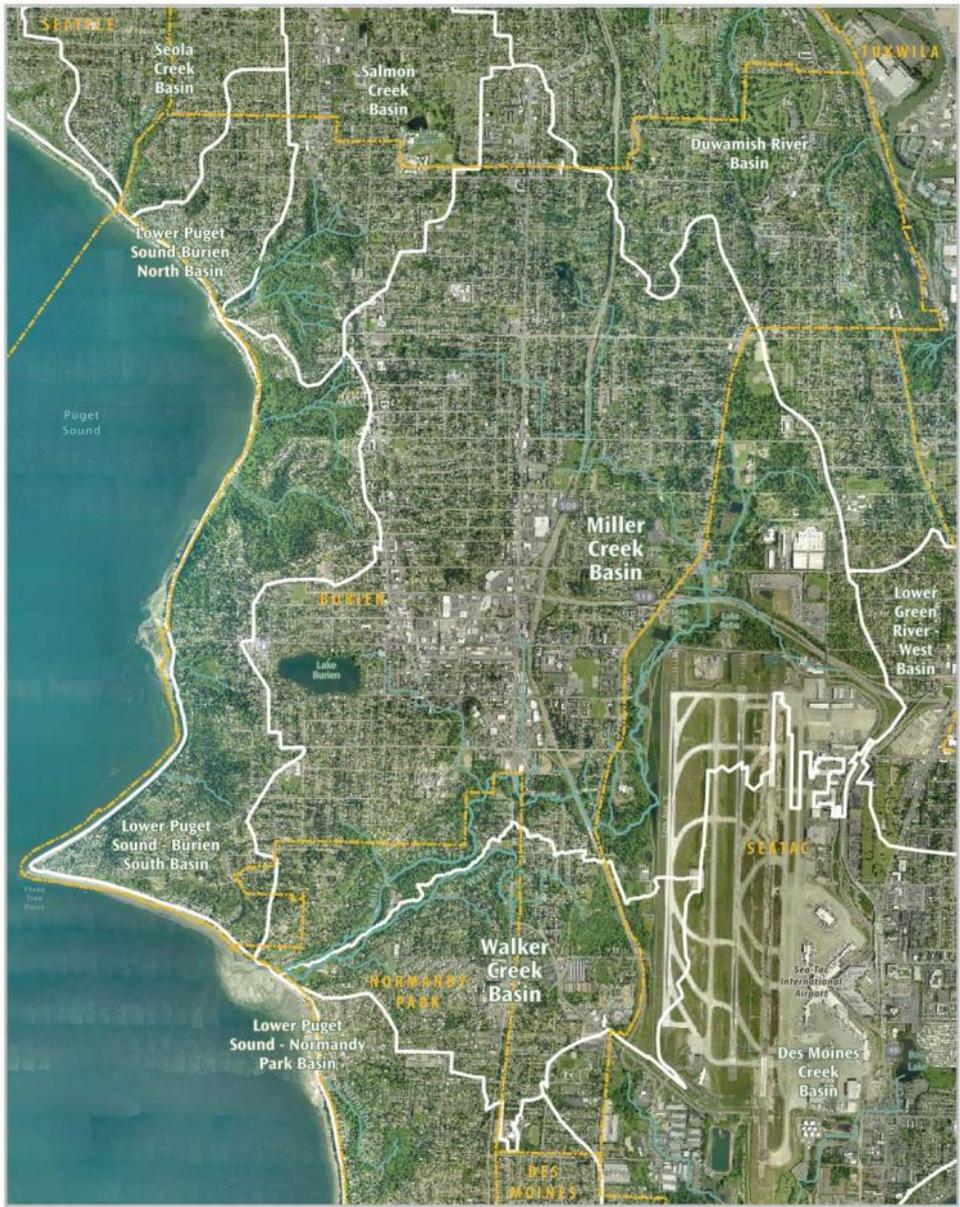
# Scientific Plan for Adult Monitoring

## Survey Plan for Adult Fish Counting and Coho Prespawn Mortality in Miller and Walker Creeks

### Community Salmon Investigation for Highline 2014

Version October 2, 2014

NOAA, Wild Fish Conservancy, the City of Seattle, King County and others have conducted a number of assessments concerning coho salmon in Seattle area creeks (Collier et al. 2003, Scholz et al. 2004, and McCarthy et al. 2008). Findings of these efforts indicate that while salmon were successfully returning to many urban streams, a high proportion of sexually mature female coho carcasses showed large numbers of retained eggs. Investigators documented highly erratic swimming behavior and prespawn mortality among both male and female coho. Affected fish from different urban streams displayed a common suite of symptoms, including surface swimming and gaping, fin splaying, spasming, disorientation, and loss of equilibrium. The coho usually died within a few minutes to a few hours after becoming overtly symptomatic. Visual inspections generally indicated that the affected coho spawners were in good condition, with the silver coloration typical of salmonids that have recently transitioned to freshwater from the ocean (McCarthy et al. 2008). This phenomenon has been termed coho prespawn mortality (PSM).



**Miller and Walker Creeks**  
**Basin Boundary Update 2010**

-  Basin Boundary
-  Incorporated Area Boundary

Map Document:  
 (D:\p1\projects\WLRD\10069\AS\MillerWalker2graphics.mxd)

**King County**  
 Department of Natural Resources and Parks  
 Water and Land Resources Division





# Stormwater is not treated



# Testing highway runoff on adult coho



Photo courtesy of Tiffany Royal, Northwest Indian Fisheries Commission

# 2) How CSI Works

A photograph of two people, a woman and a young man, standing in a shallow stream. They are both wearing bright orange safety vests over their regular clothing. The woman on the left is wearing a blue jacket and black pants, and the young man on the right is wearing a black hoodie and red shorts. They are holding long wooden sticks or poles. The stream is surrounded by dense green and yellow foliage, suggesting an autumn setting. The water is clear and flows over rocks.

**Half of “Team Saturday” Lisa and Alex brave the elements**

October, 2013

# CSI “Cast”

- 32 regular volunteers from Burien, Normandy Park, and Seattle (plus friends and family – 37 total)
- Seven daily teams – one team for each day of the week
- Teams had 2-6 people – some surveyed weekly, some every other week
- Backups filled in



**“Team Monday” - Joy, Roger and Michael**

# CSI Training

**Steve Damm from U.S. Fish &  
Wildlife Service teaches necropsies**

October 7, 2010



# CSI *Style*

**Polarized sunglasses for fish spotting**

**Back pack for supplies**

**“Team Thursday” Kay modeling survey attire on Miller Creek**  
Photo courtesy of Pam Silimperi

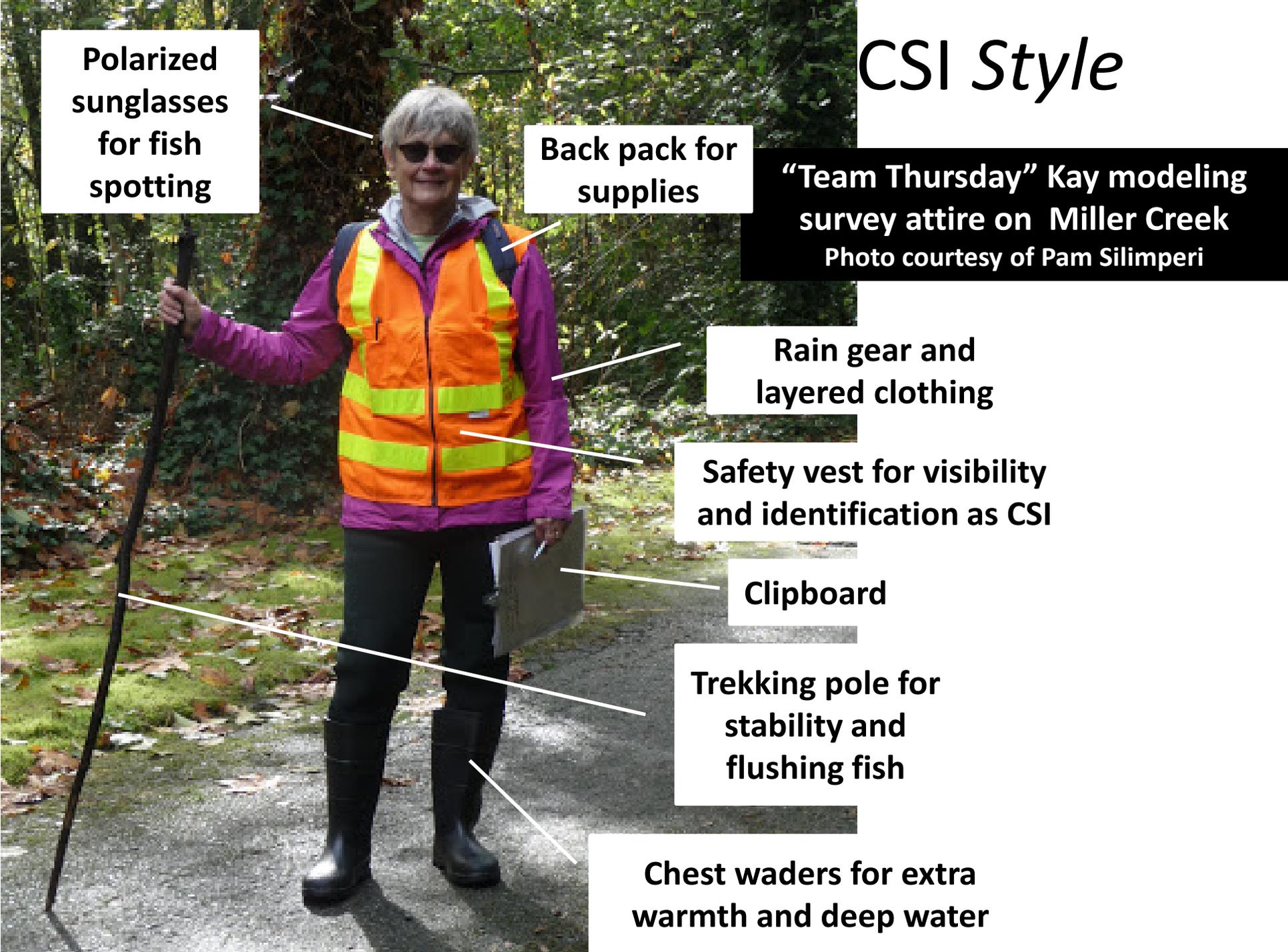
**Rain gear and layered clothing**

**Safety vest for visibility and identification as CSI**

**Clipboard**

**Trekking pole for stability and flushing fish**

**Chest waders for extra warmth and deep water**

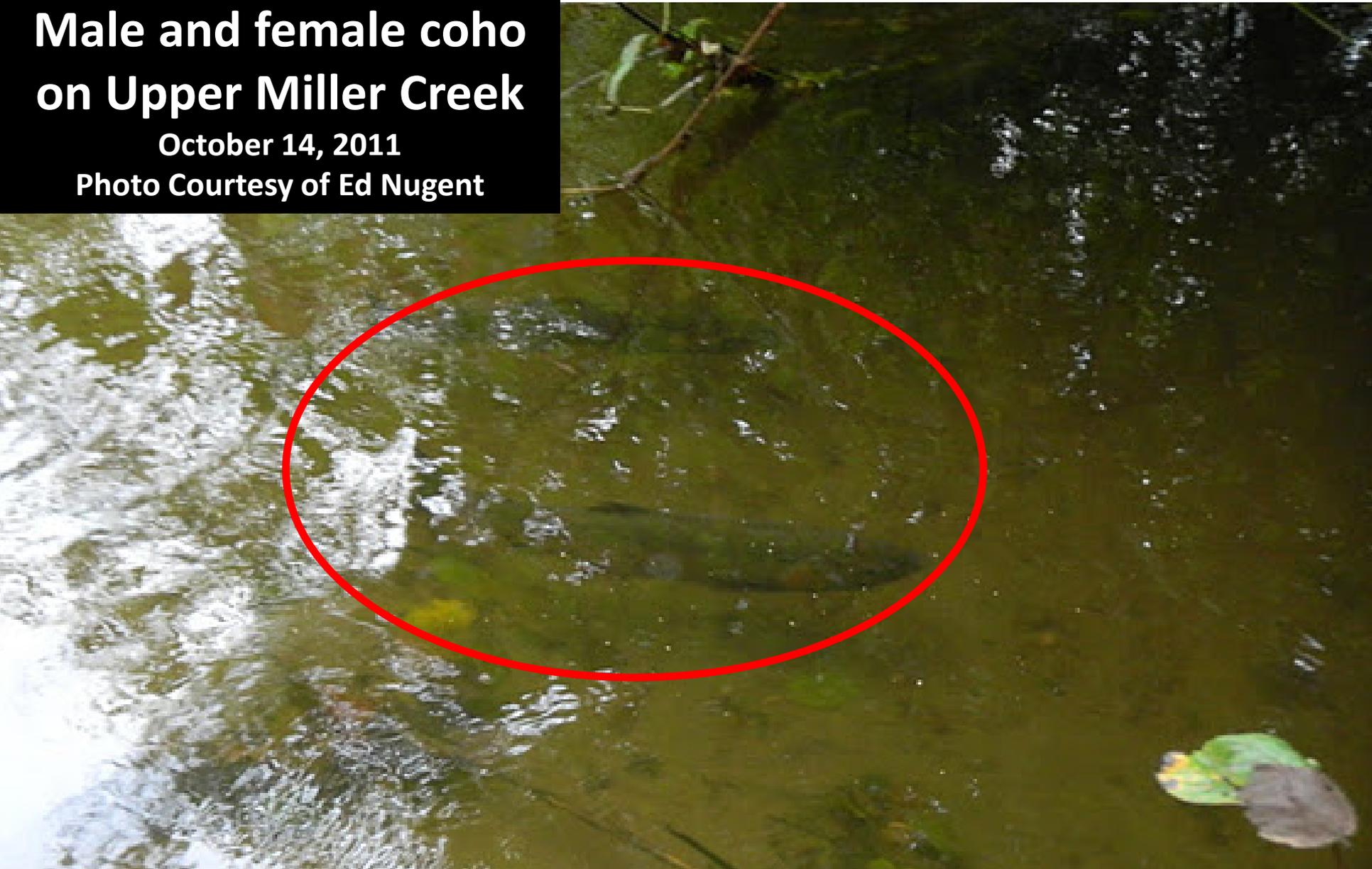


# CSI in Action

**Male and female coho  
on Upper Miller Creek**

**October 14, 2011**

**Photo Courtesy of Ed Nugent**



# CSI in Action

**“Team  
Wednesday” Lee  
measuring a  
salmon carcass**



# CSI in Action

**“Team Thursday” Pam cutting  
open the carcass to look for eggs**

Photo courtesy of Pam Silimperi/Kay Larsen



# CSI in Action

**Investigating egg retention –  
this female spawned!**

Photo by L. Moyer



# CSI in Action

**Investigating pre-spawn mortality – this is a male coho –  
note white milt sacs**



# CSI in Action

Each carcass was  
“marked” by cutting off  
the tail



# CSI in Action



**“Team Tuesday”  
Christine – snouts  
are collected from  
hatchery coho  
carcasses to check  
for tags**

# CSI in Action



**“Team Sunday”  
Drew, Jeremy and  
Nick - it takes  
teamwork**

Fall 2014

Photo courtesy of Robin Hoefer

# CSI in Action

**Chum building a redd**

November 7, 2010



# Property Owner Permission

## Graciously Provided by:

- Clint Adams
- Ann and Stephen Backstrom
- Linda and Thomas Beffa
- Brett Fish
- Glen and Karen Gabrielson
- Mark and Sherri Henry
- Chris Longridge
- Susan Klein
- Steve Dubois
- Normandy Park Community Club
- Normandy Park Swim Club
- Southwest Suburban Sewer District



# Survey Locations

- Four locations
  - Two on Miller Creek
    - Lower Miller – Longridge, The Cove, and Adams property
    - Upper Miller – Sewer District and Fish property
    - (Above 1<sup>st</sup> Ave S. not surveyed – not many fish and difficult access)
  - Two on Walker Creek
    - Upper Walker – Beffa, Backstrom, Gabrielson, Henry properties
    - Lower Walker – The Cove, Swim Club

# CSI Survey Locations Topographic Map of the Miller and Walker Creek Drainages

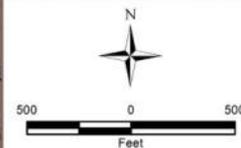
**Upper Miller  
Survey Location**

**Lower Miller  
Survey Location**

**Upper Walker  
Survey Location**

**Lower Walker  
Survey Location**

**First Ave South**



**GEOENGINEERS**

Reference: LIDAR DEM and Hillshade provided by the Puget Sound LIDAR Consortium  
Notes:  
1. The locations of all features shown are approximate.  
2. This drawing is for information purposes.

# Walker Creek Stream Restoration



**Removing invasive weeds  
and planting native trees  
and shrubs at Walker  
Preserve**

**January 10, 2015**

# Upper Miller Creek Survey Area - CSI: Highline

Not surveyed Oct. 27-Nov. 10



Miller Creek

• Park Here - Mon-Fri

SWSSD

Start

0 346ft

(C) 2008 King County

COMMENTS: Updated 10/1/2012

The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a survey product. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.



# CSI in Action

2010's "Team Tuesday" Christine & Kerry  
at Sewer Plant on Upper Miller Creek

November 9, 2010



"Test plot" native plant  
revegetation area

# CSI in Action

Lee and Jim planting willows at Sewer Plant  
on Upper Miller Creek

November 22, 2011



# CSI in Action



**2013 - Test Plot at Sewer Plant  
on Upper Miller Creek**

**October 13, 2013**

# CSI in Action



**2014 - Test Plot at Sewer Plant  
on Upper Miller Creek**

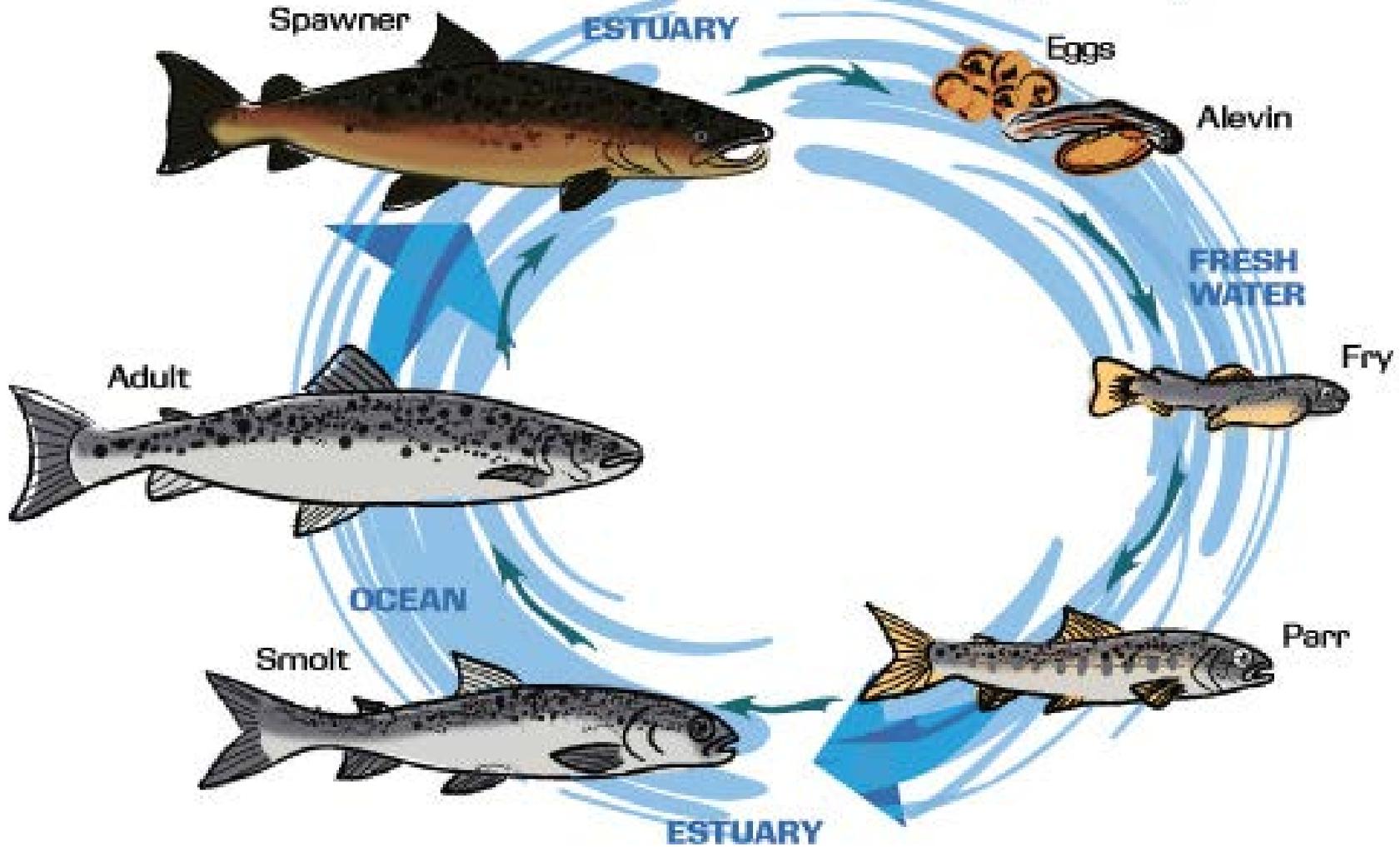
**October 16, 2014**

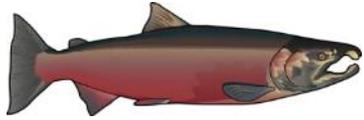
# 3) 2014 CSI Results



**Coho carcass**  
October 23, 2012

# Life Cycle of the Salmon





# Coho: 3-year Life History

- October-Nov 2011 Spawned
- Early 2012 Hatched
- Early 2012 – early 2013 Rearing in stream
- Early 2013 Migration to salt water
- Early 2013 – October 2014 Rearing in Puget Sound and Pacific Ocean
- October – December 2014 Migration upstream, spawning, death
- Early 2015 New fish hatch



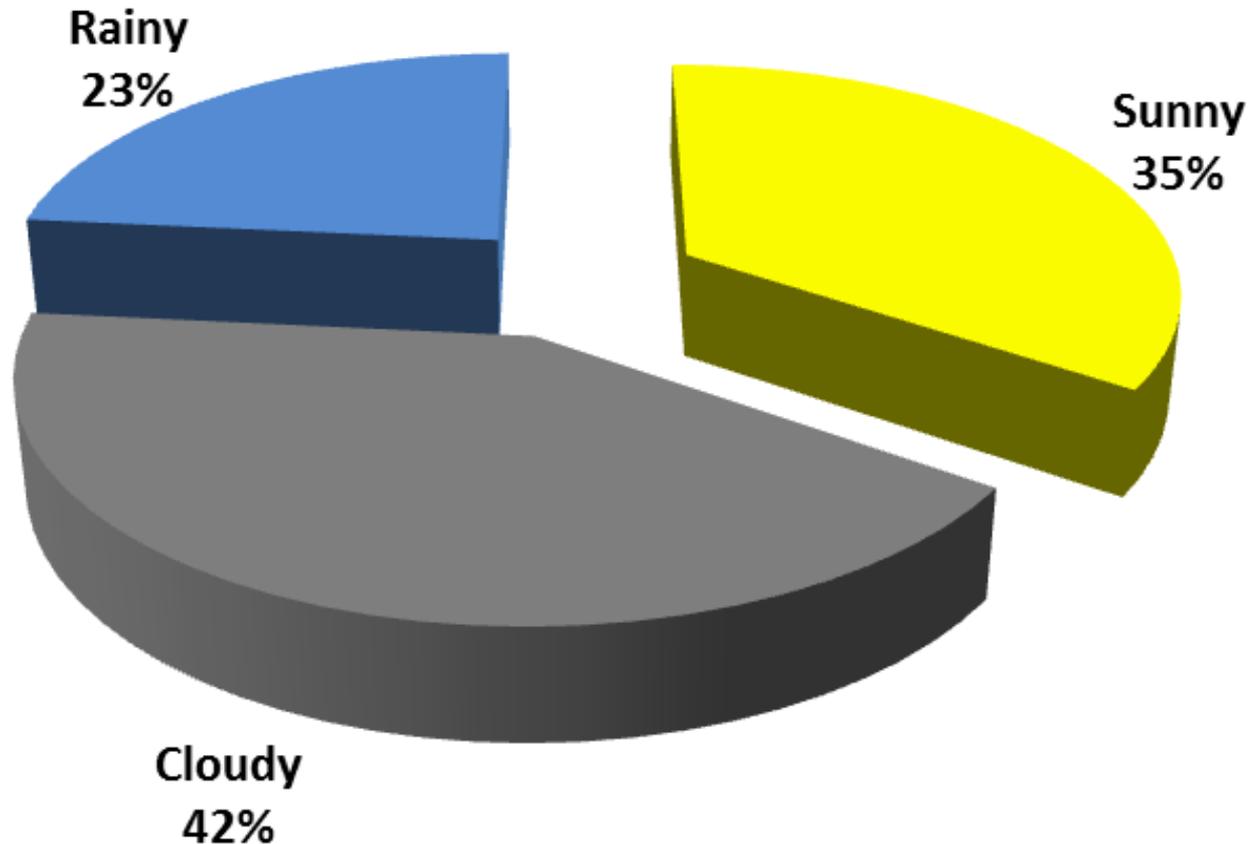
# Chum: 4-year Life History

- Nov. – December 2010      Spawned
- Early 2011      Hatched and migrated to salt water
- Early 2011 – Nov. 2014      Rearing in Puget Sound and Pacific Ocean
- Nov. – December 2014      Migration upstream, spawning, death
- Early 2015      Eggs hatch & migrate to Puget Sound

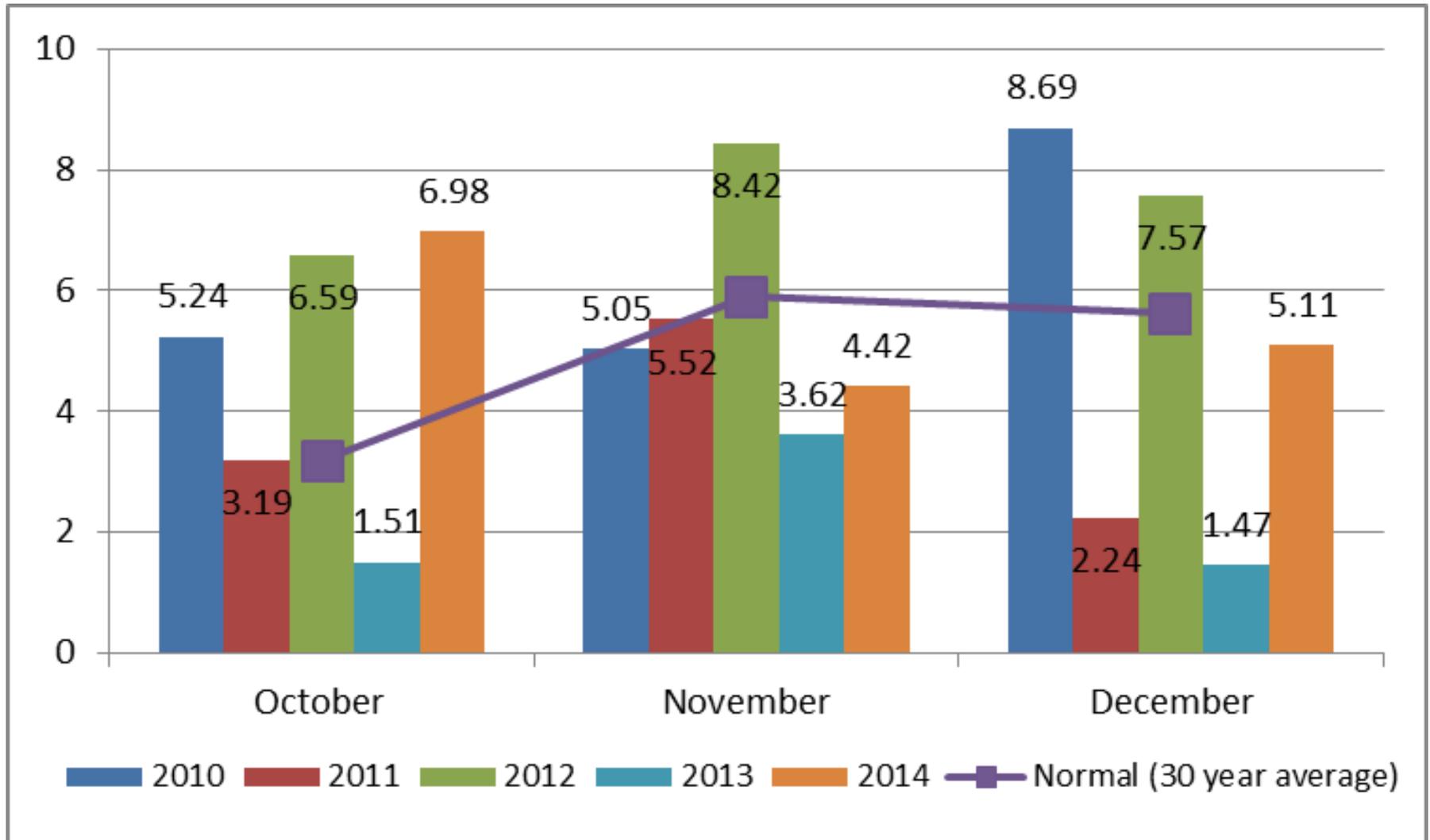


# CSI Weather

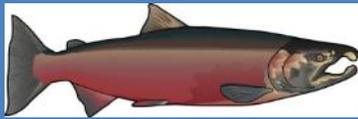
- Average survey time = 2 hours, 31 minutes
- Weather conditions (81 survey days):



# CSI Weather – Monthly Rainfall (inches)



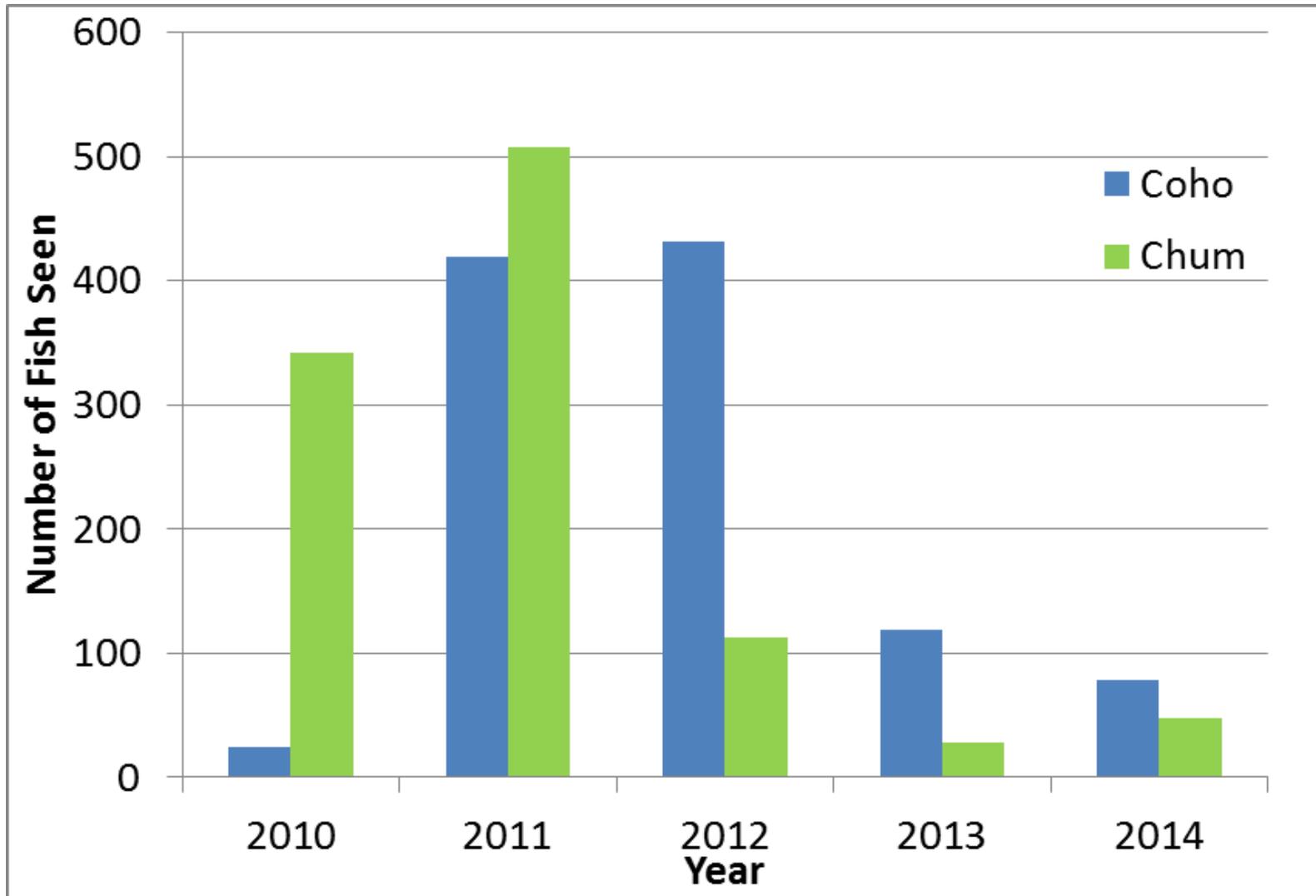
# Results: Live Fish Observations Summary

Species	Coho 	Chum 	Unidentified Adults
Miller Creek	52	40	14
Walker Creek	26	8	6
<b>Total</b>	<b>78</b>	<b>48</b>	<b>20</b>

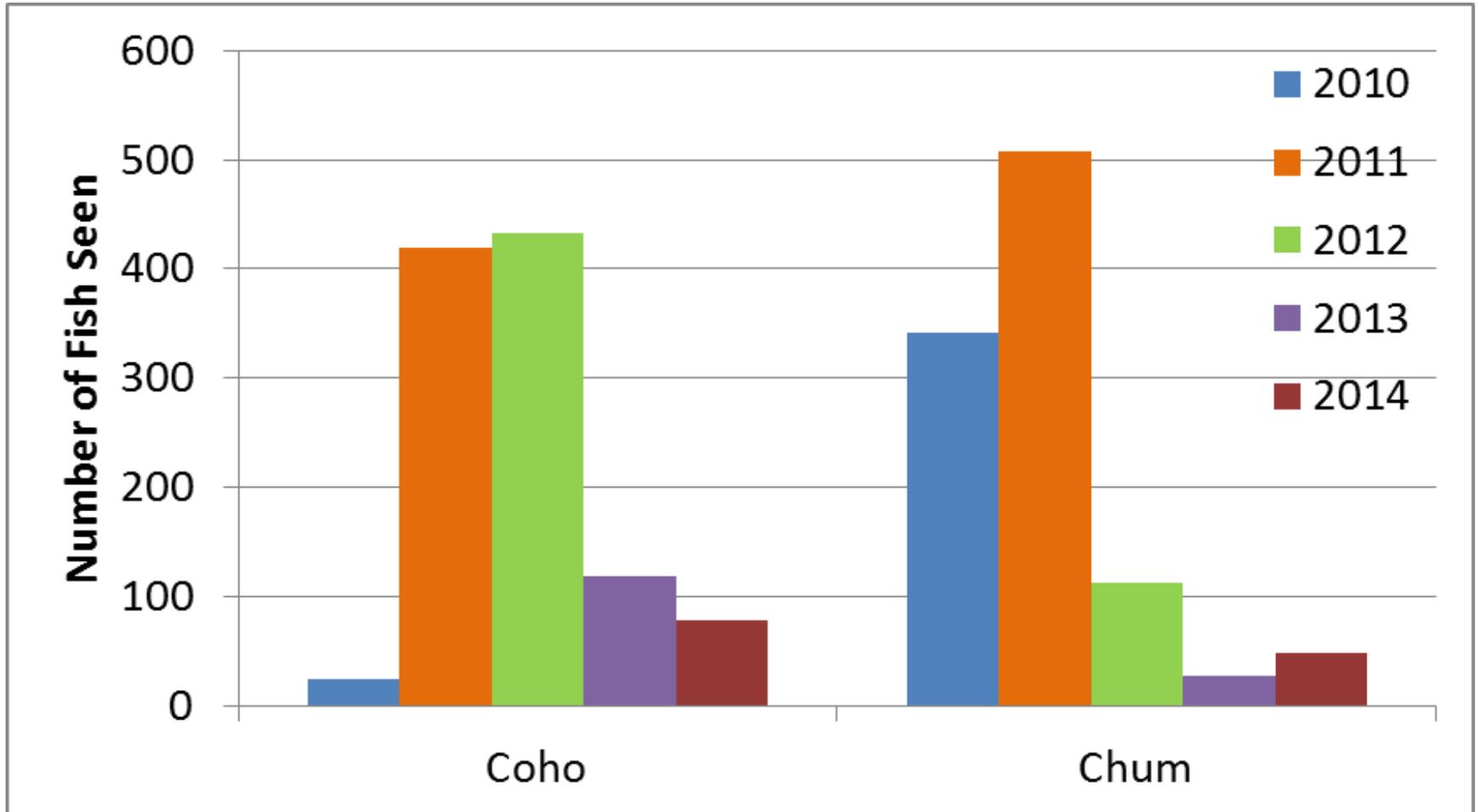
**GRAND TOTAL: 146 live fish seen**

Unidentified adults were 14% of total fish observed.

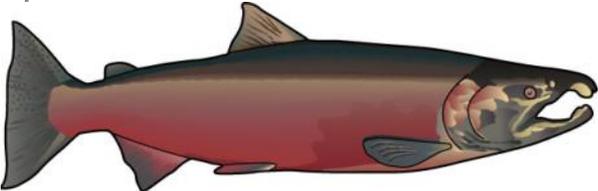
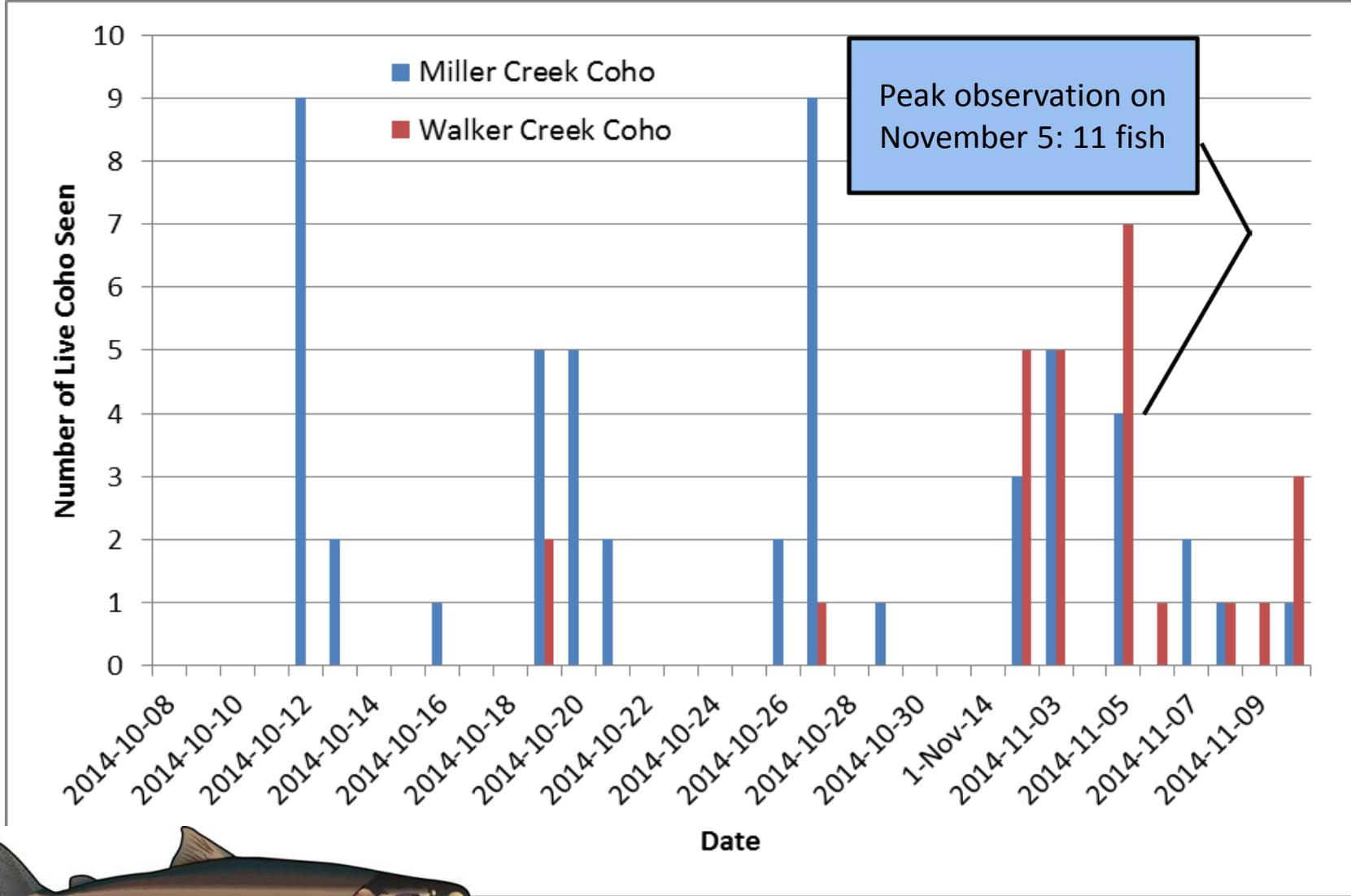
# Results: 2010-2014



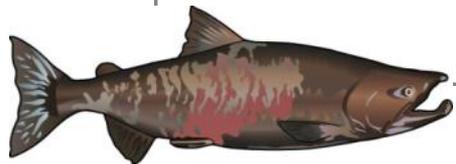
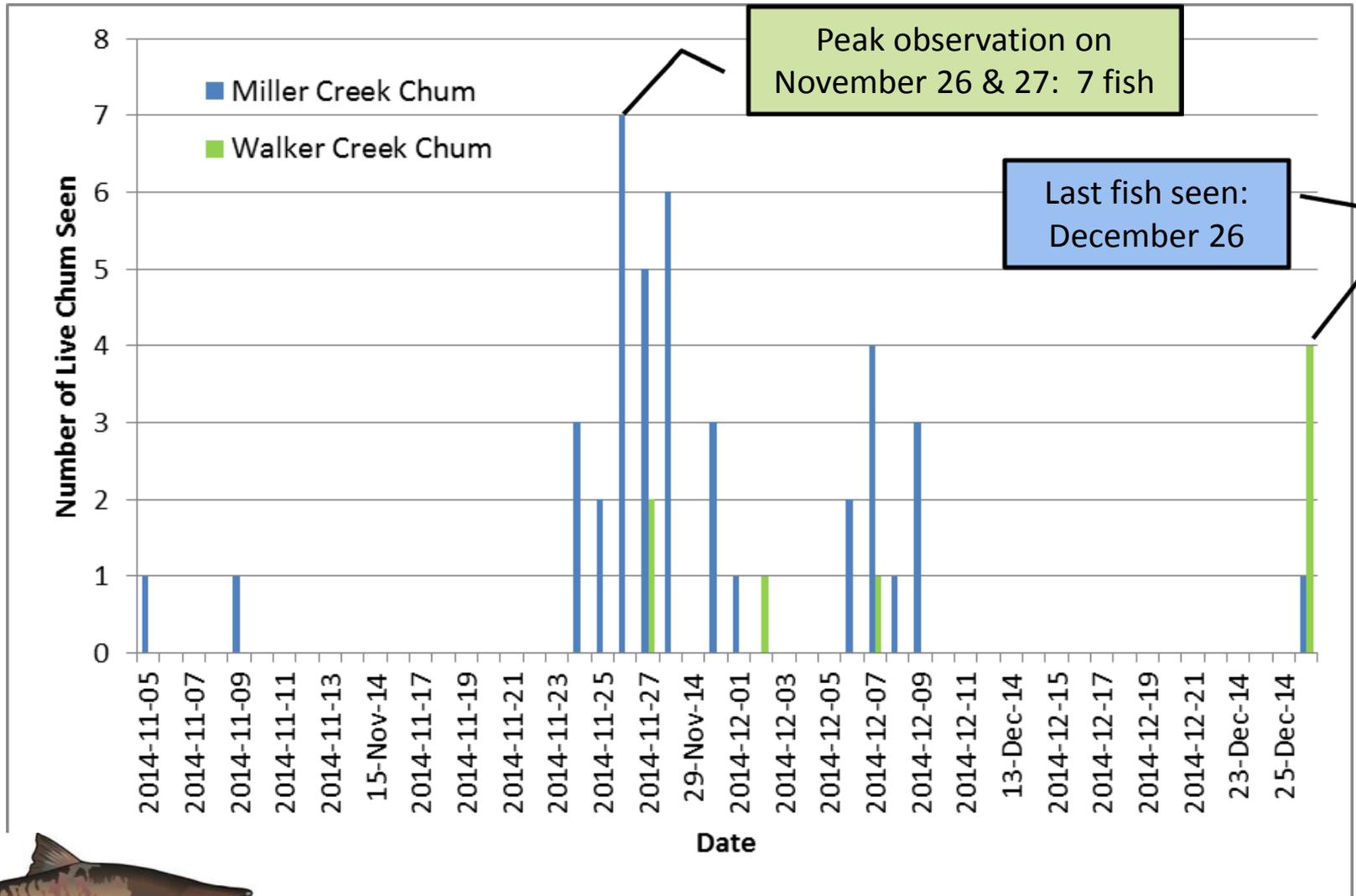
# Results: 2010-2014



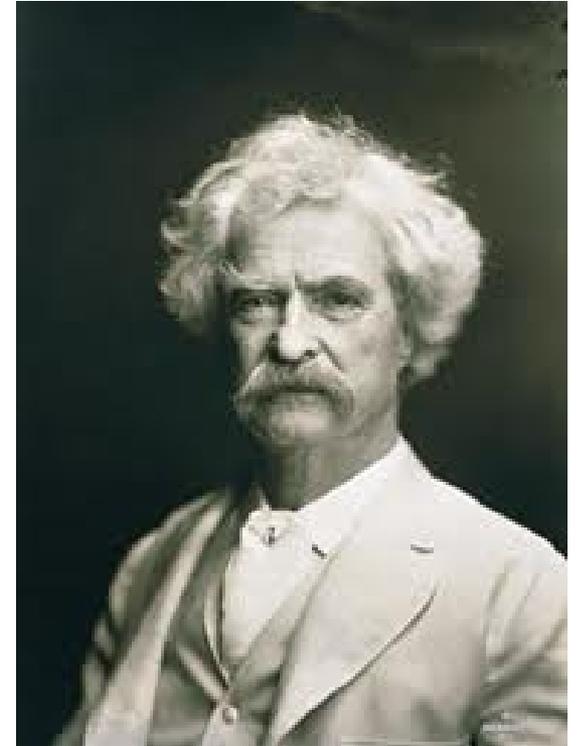
# Results: 78 Coho Seen



# Results: 48 Chum Observations

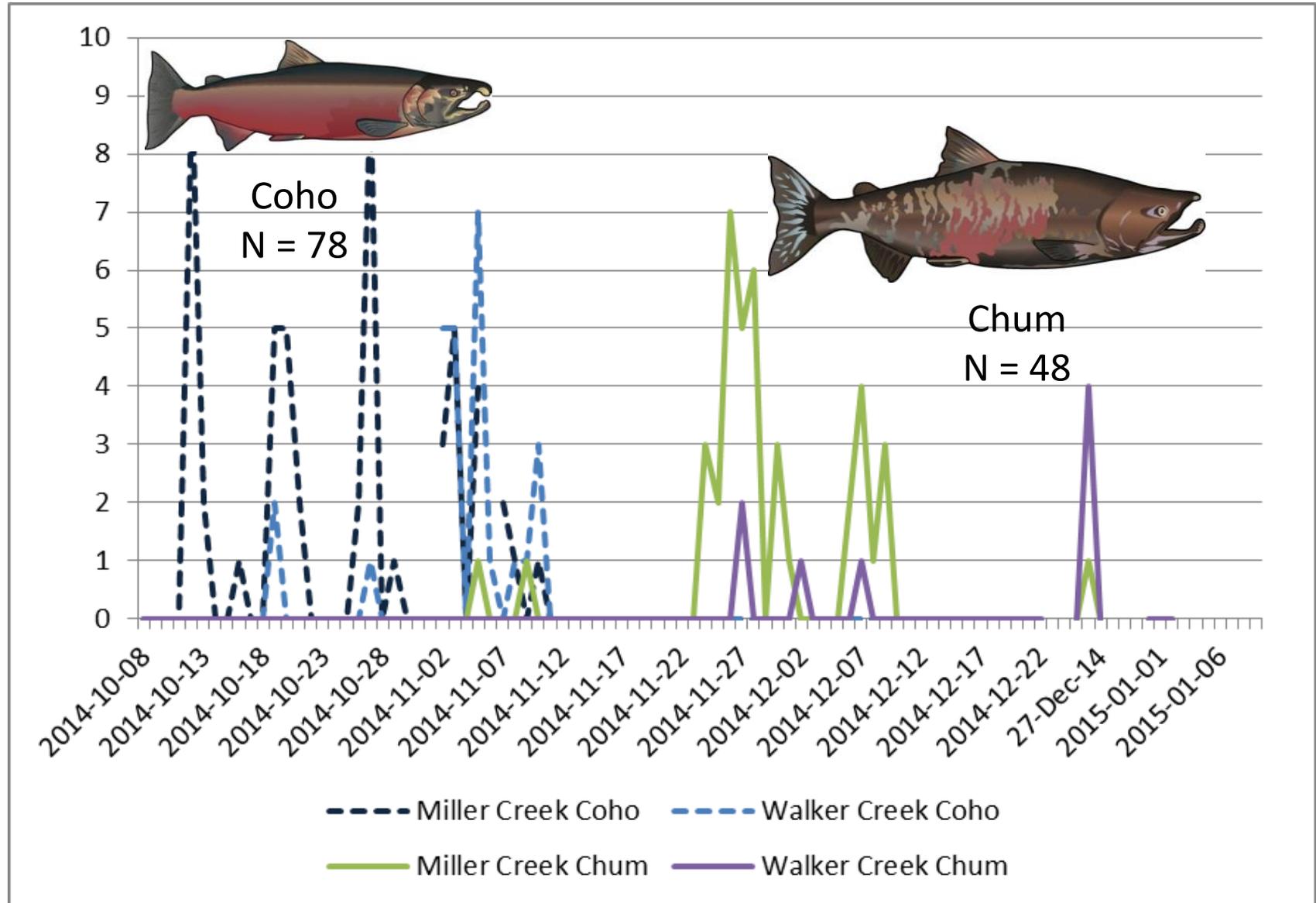


There is something  
fascinating  
about science.  
One gets such  
wholesale returns of  
conjecture out of  
such a trifling  
investment of fact.

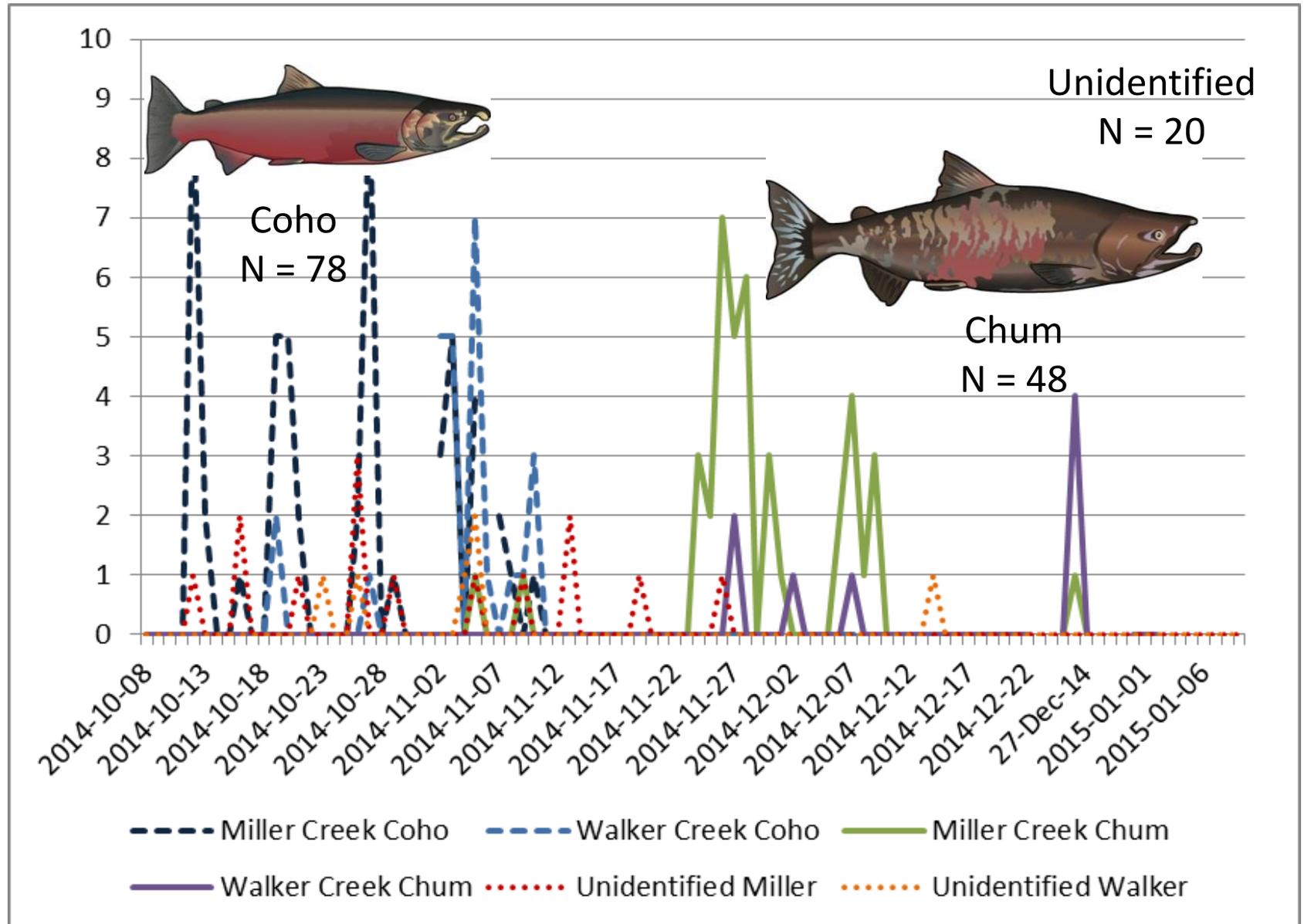


**Mark Twain**

# Species by Stream

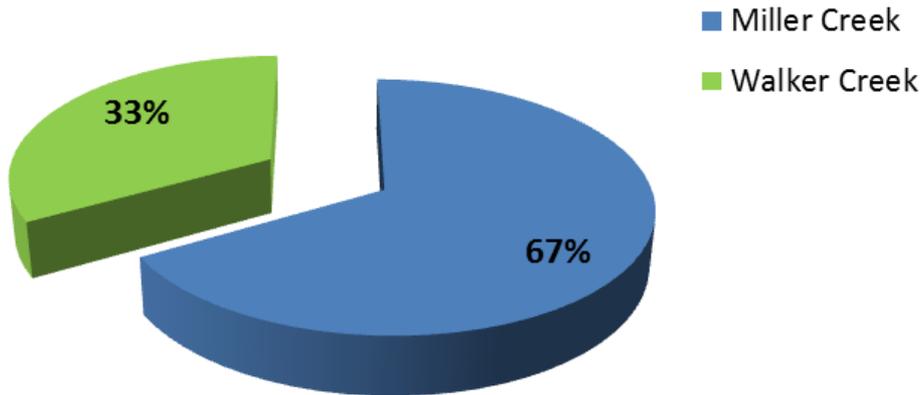


# Species by Stream

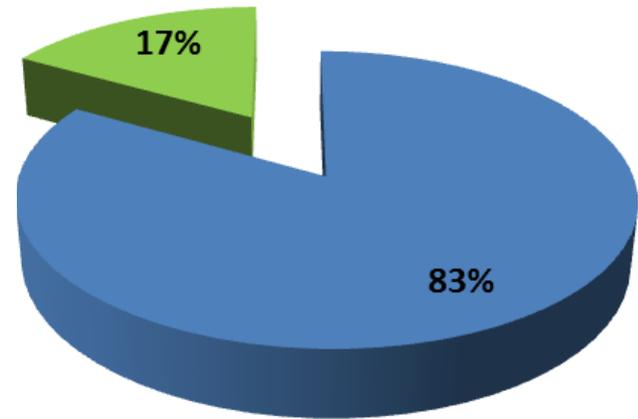


# Species by Stream

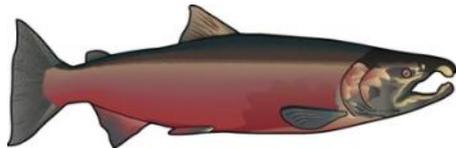
## Coho



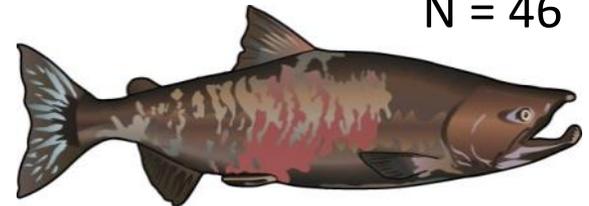
## Chum



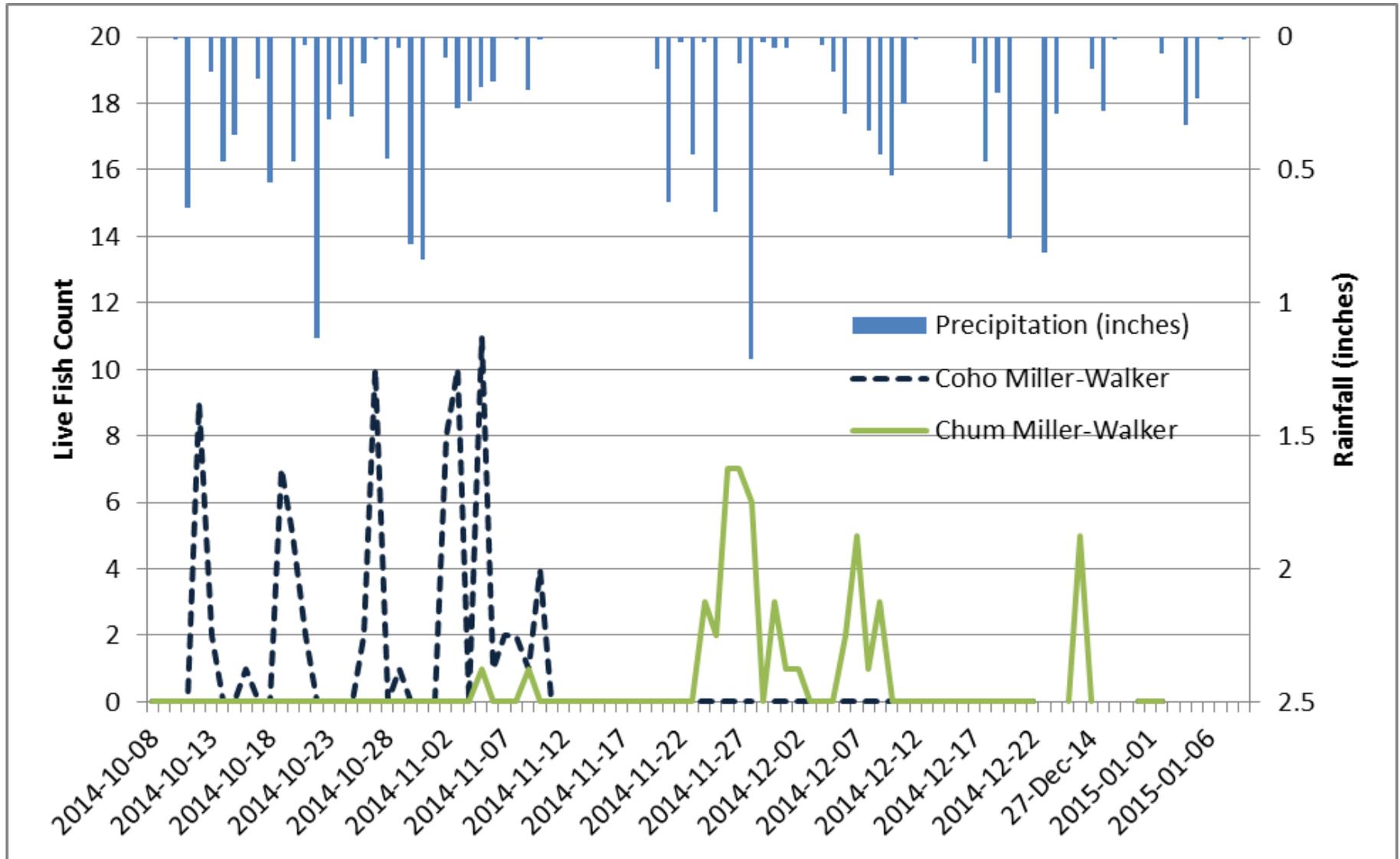
N = 78



N = 46



# Rainfall and live fish - 2014



# Estimated *Population*

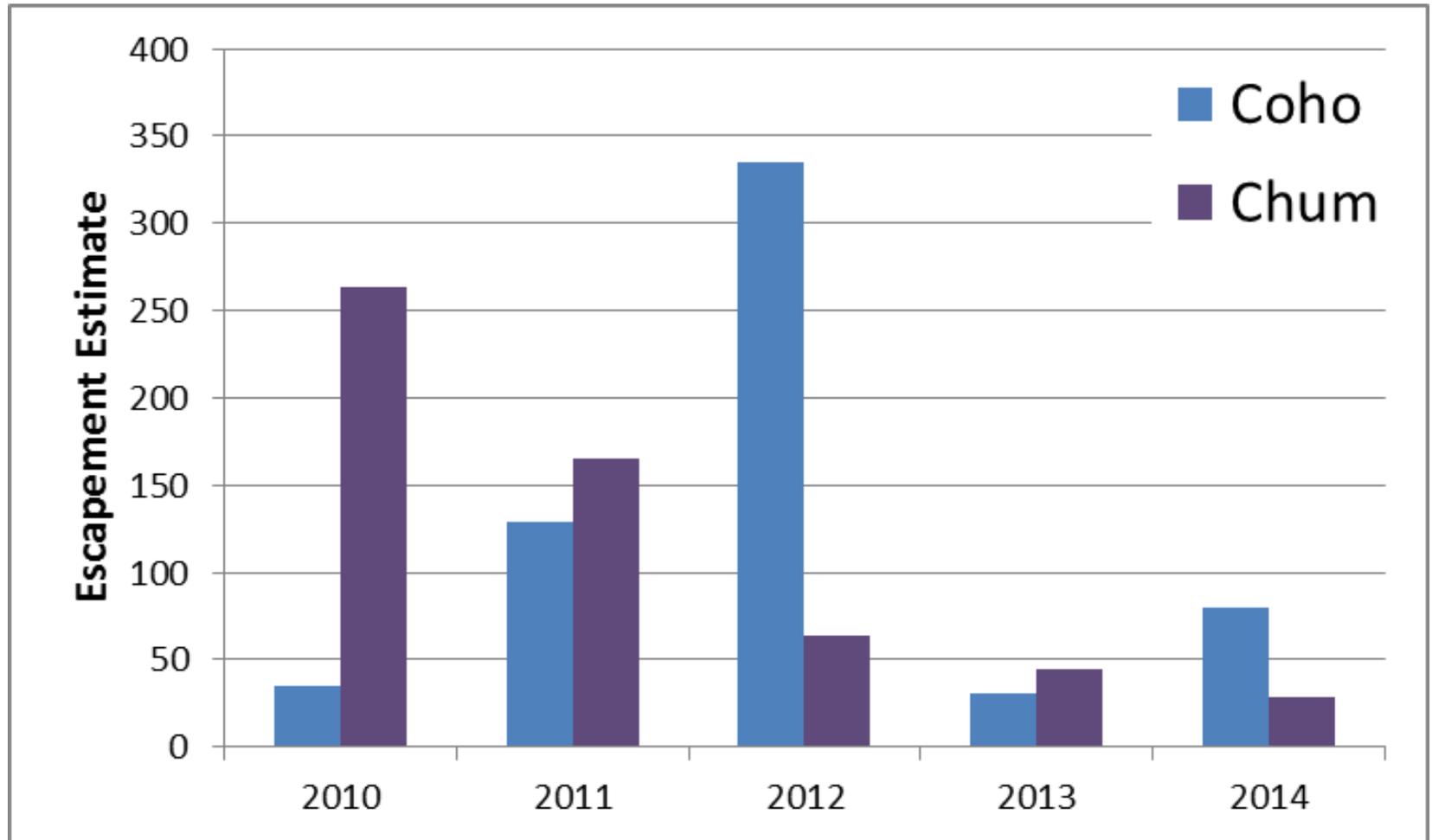
Species	Coho 	Chum 	Total
Miller Creek	56	24	80
Walker Creek	24	5	29
<b>Total</b>	<b>80</b>	<b>29</b>	<b>109</b>

Assumptions:

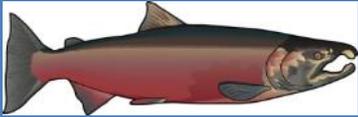
- Using the area under the curve (AUC) over the survey period corrects for probable double-counting of fish – salmon spend several days in the stream.

The estimated population is the “escapement estimate” – the actual number of fish that are likely to have spawned.

# Escapement Estimates

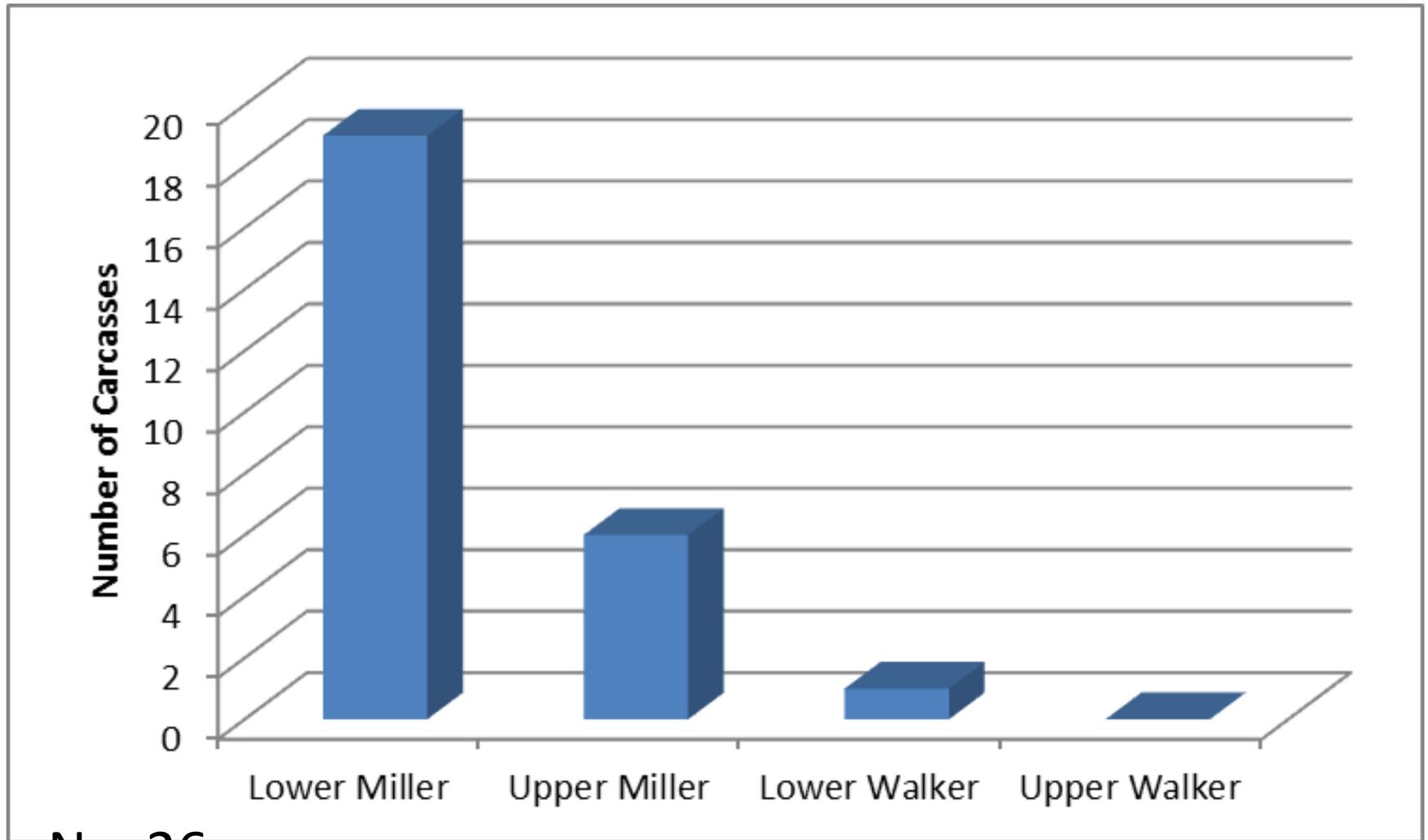


# Carcasses Summary

Species	Coho 	Chum 	Unidentified Adults
Miller Creek	56	23	3
Walker Creek	14	3	1
<b>Total</b>	<b>70</b>	<b>26</b>	<b>4</b>



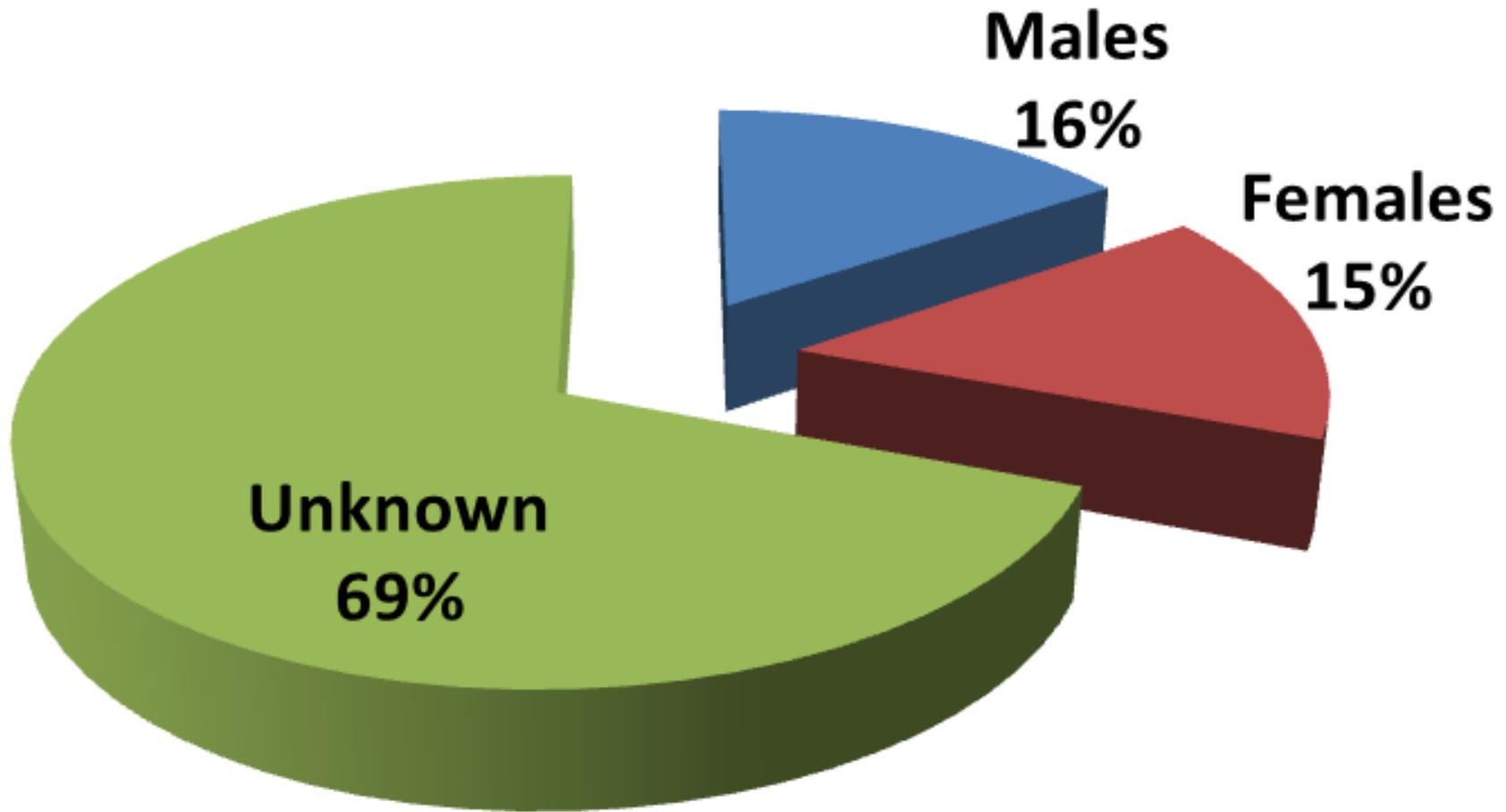
# Chum Carcasses: Location



N = 26



# Chum Carcasses: Sex



N = 26

# Predation by wildlife



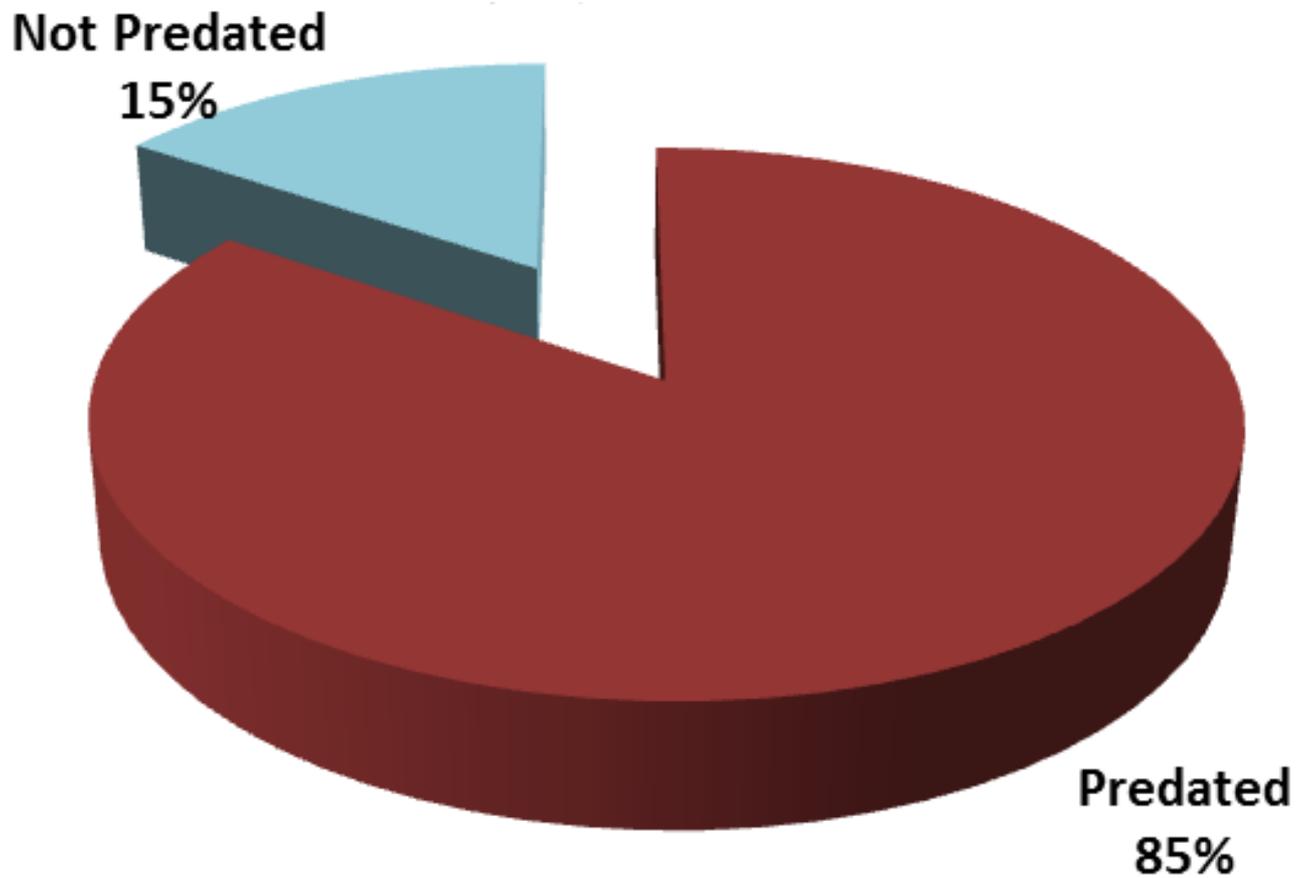
**Predated chum carcass**

Photo by Gary Wagner

November 7, 2014



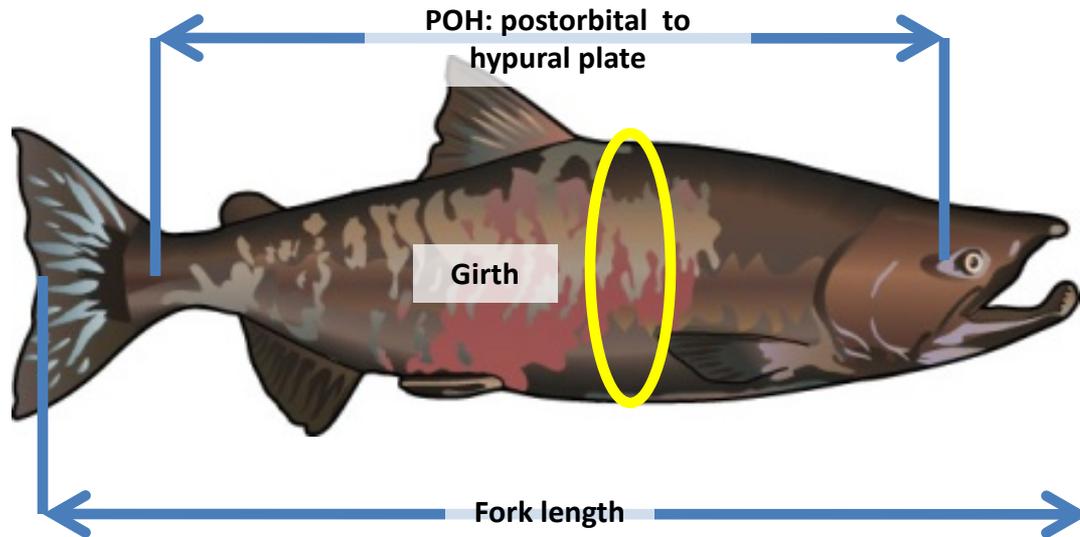
# Chum Carcasses: Predation



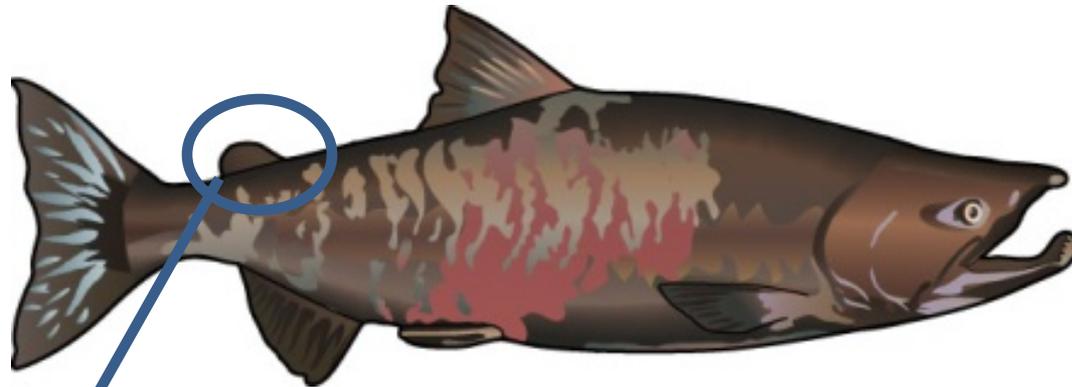
N = 26

# Chum Carcasses: Size

	Fork length (cm)	POH (cm)	Girth (cm)
Male average	70.0	48.0	32.5
Female average	70.3	54.9	33.8



# Chum: Hatchery Origin Unknown



**Adipose fin**

# Prespawn Mortality

**Coho experiencing  
“prespawn” mortality at  
Upper Miller survey location**

**October 23, 2009**



# Prespawn Mortality (PSM)



**Coho female, full of eggs**

**October 25, 2012**

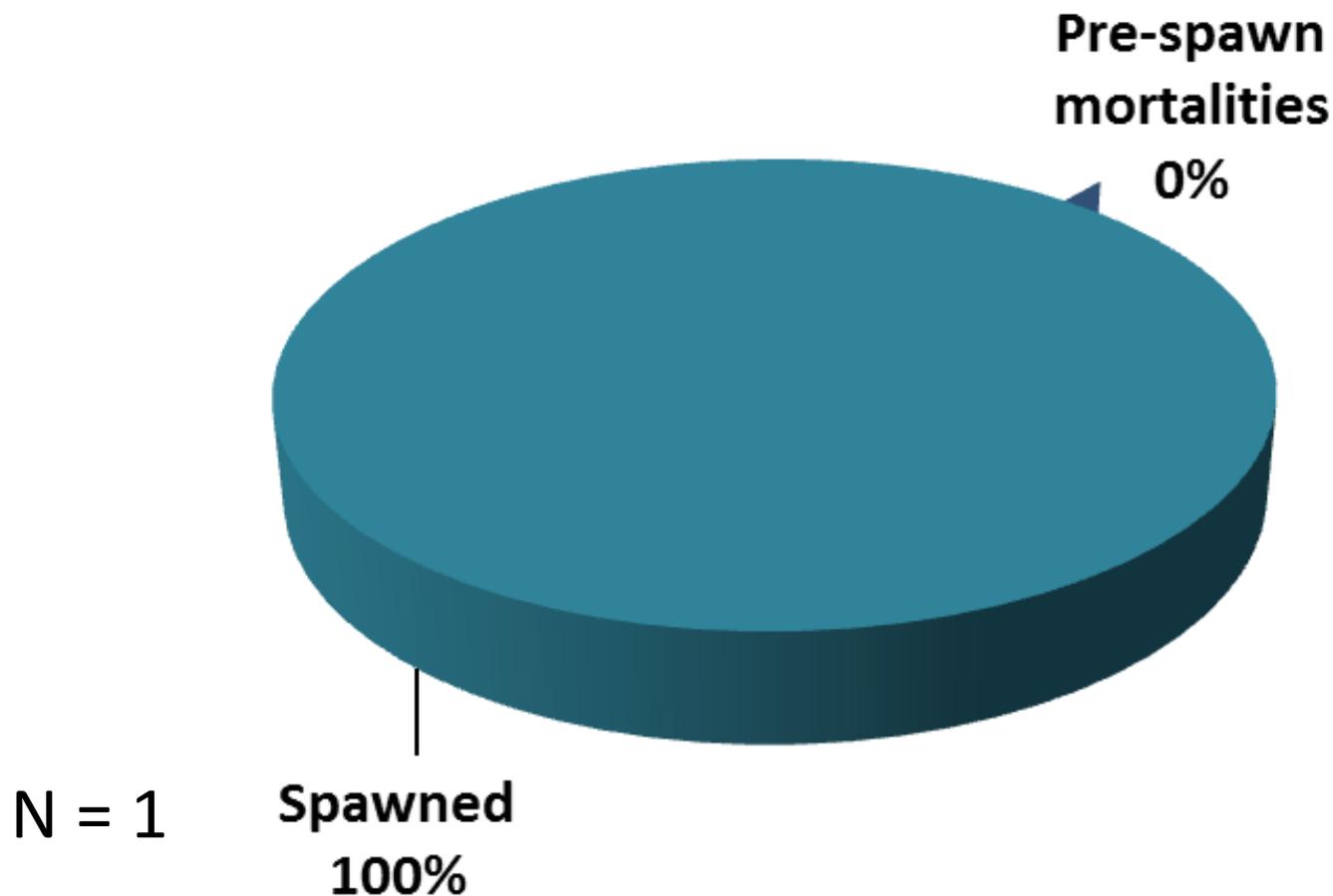
**Photo courtesy of Pam Silimperi**

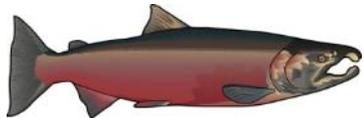


# Chum: Success in Spawning

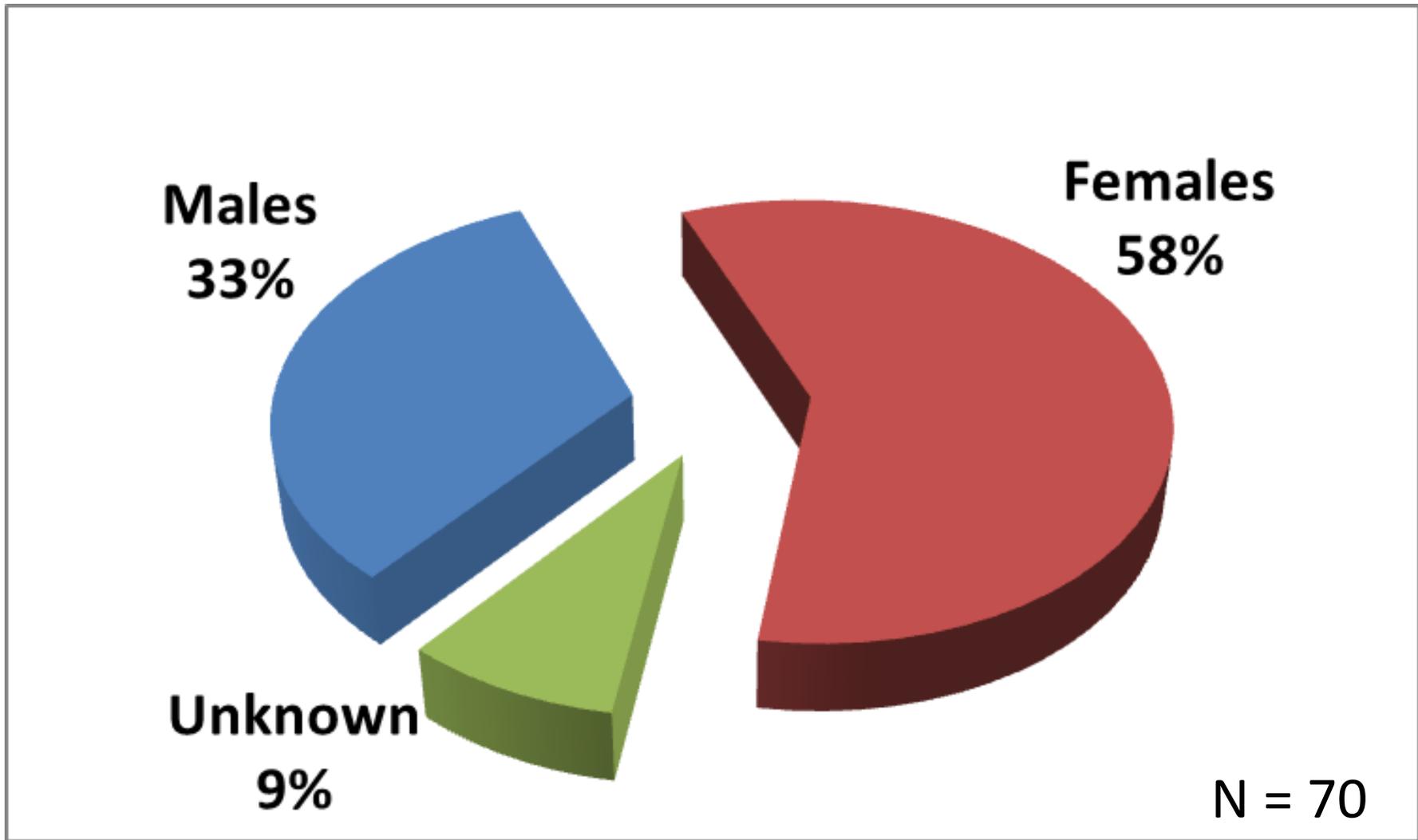
Miller and Walker Creeks – 0 of 1 female =

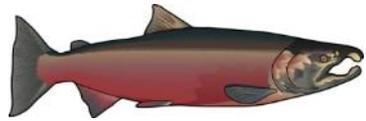
**0% Pre-spawn Mortality**



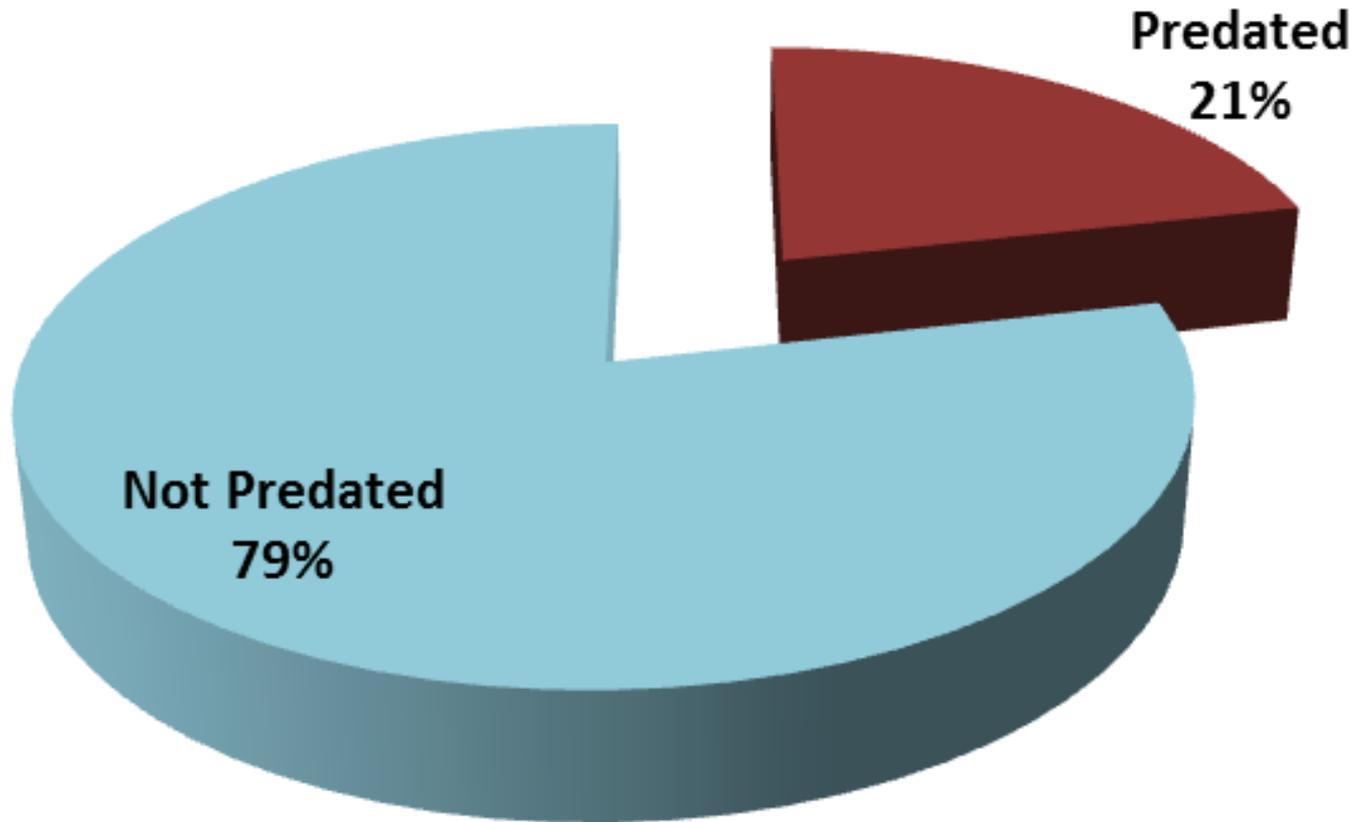


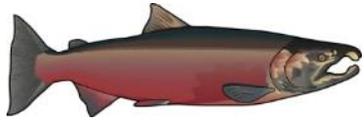
# Coho Carcasses: Sex



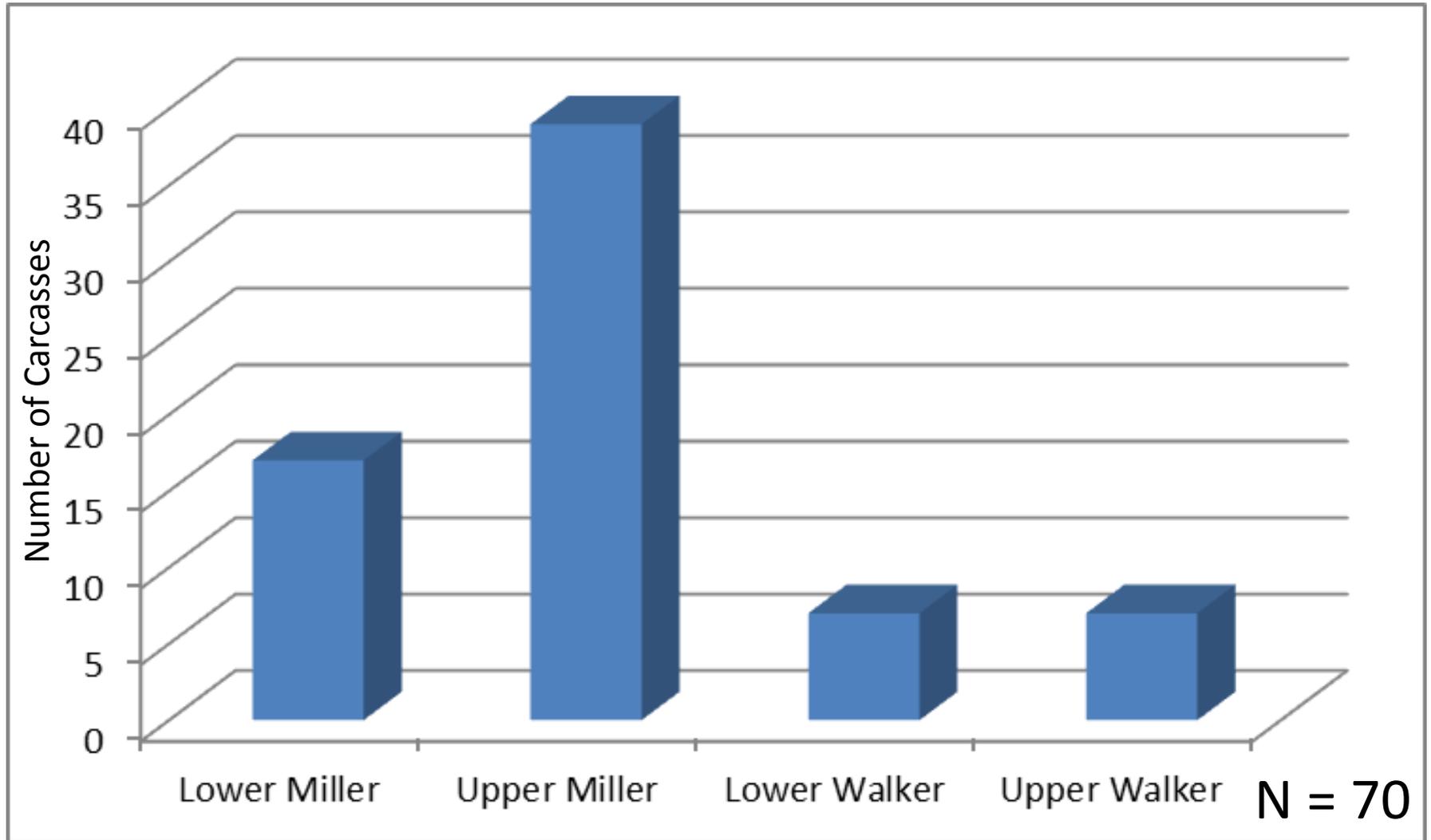


# Coho Carcasses: Predation



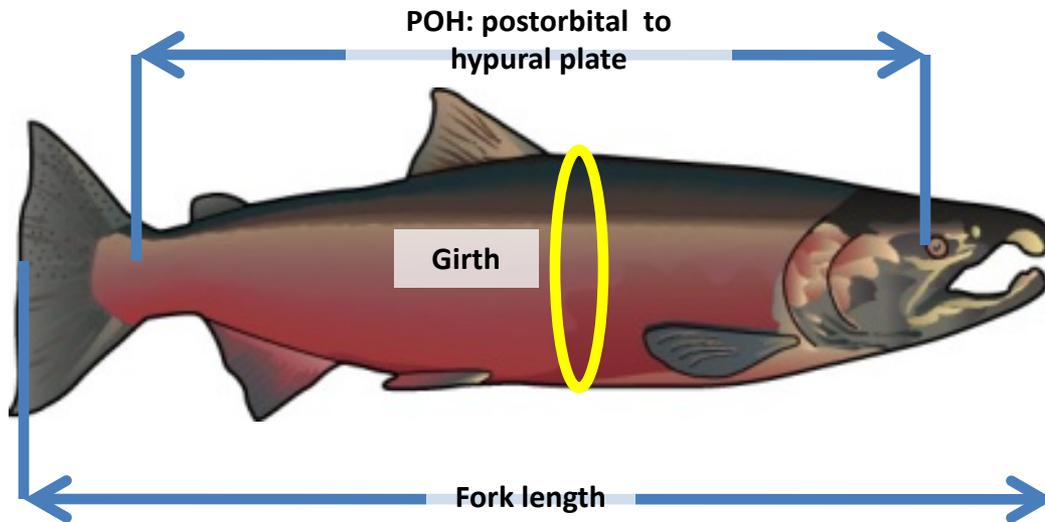


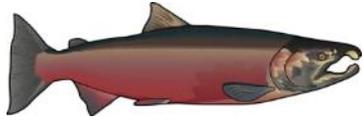
# Coho Carcasses: Location



# Coho Carcasses: Size

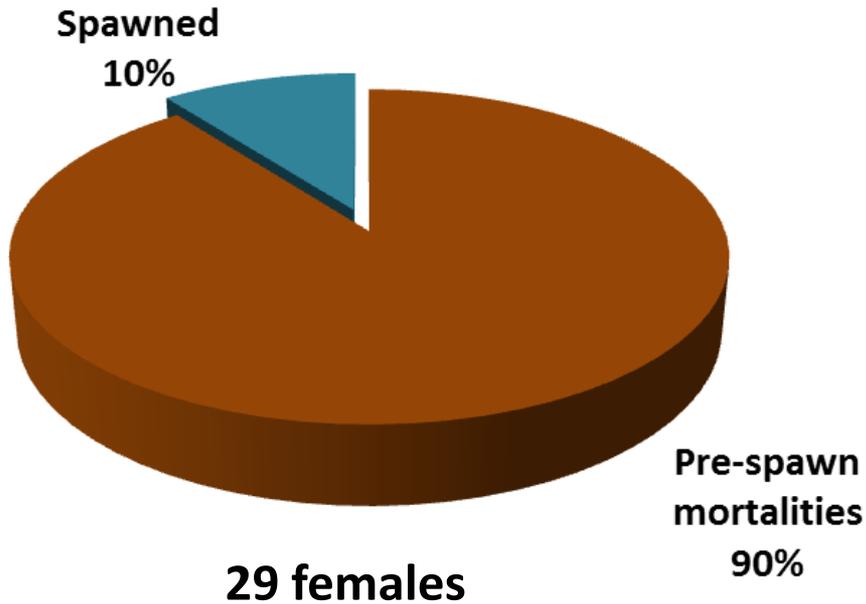
	Fork length (cm)	POH (cm)	Girth (cm)
Male average	55.5	42.5	27.6
Female average	58.3	46.2	28.8



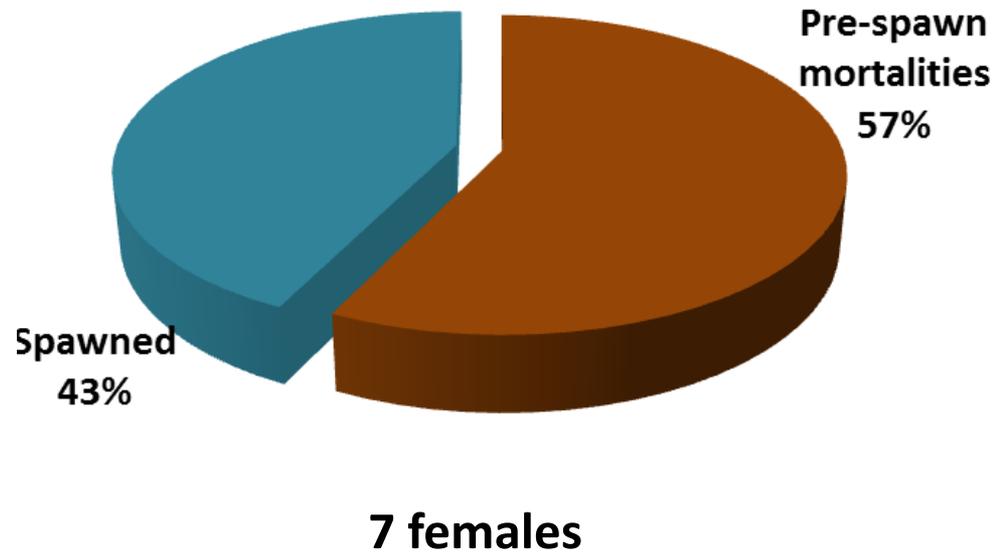


# Coho: Success in Spawning

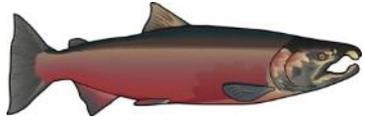
**Miller Creek**  
**90% PSM**



**Walker Creek**  
**57% PSM**



**Overall coho pre-spawn mortality:**



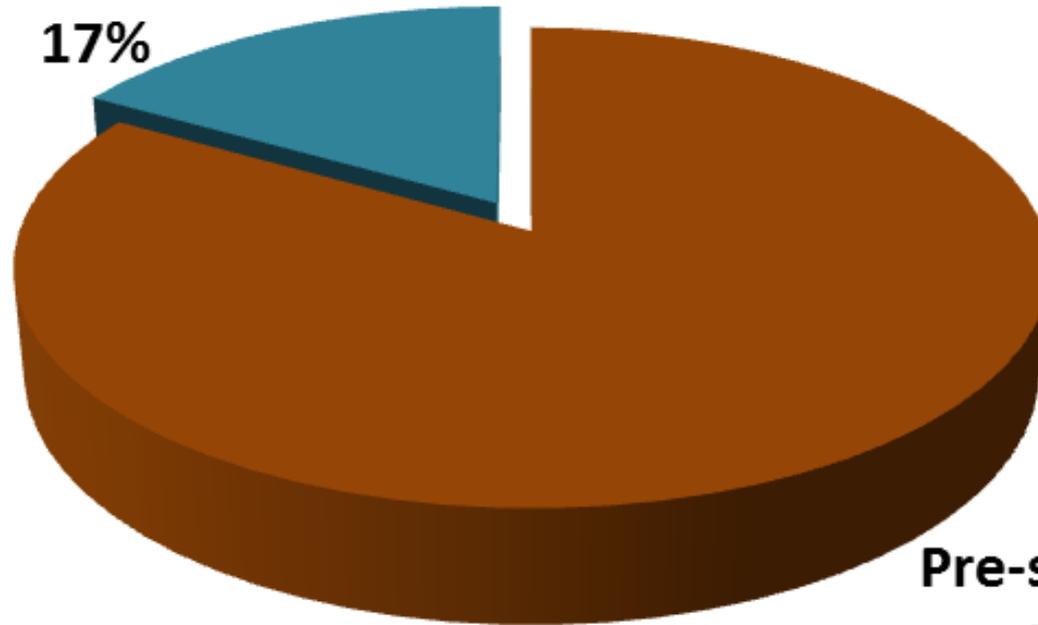
# Coho: Success in Spawning

Miller and Walker Creeks – 30/36 females =

**83% Pre-spawn Mortality**

Spawned

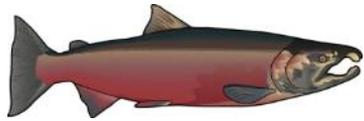
17%



Pre-spawn  
mortalities

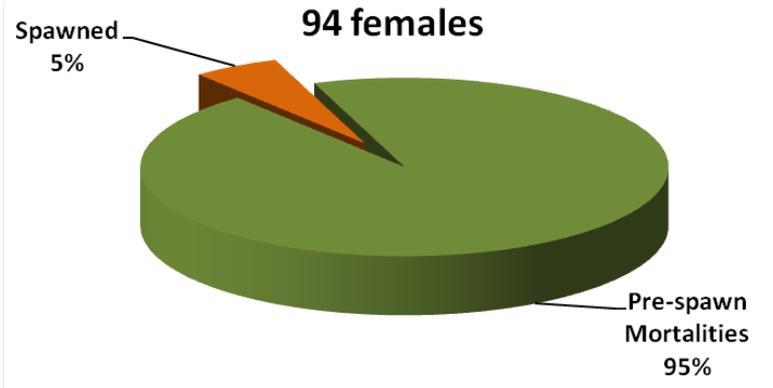
83%

N = 36

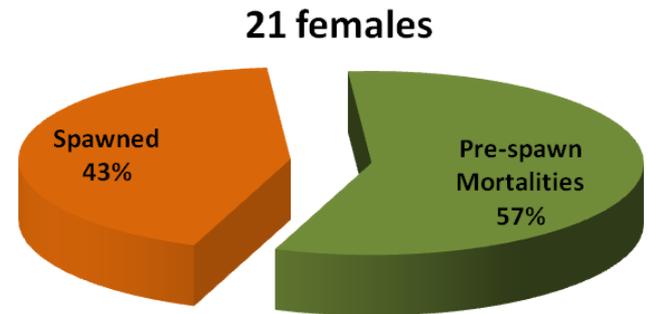


# Coho: Spawning Success in 2012: Miller/Walker and Nearby

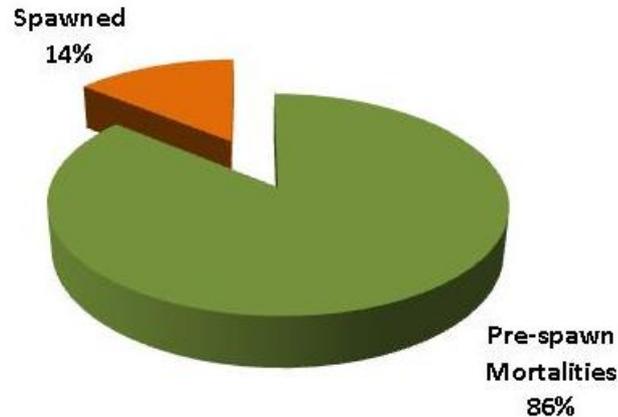
## Miller Creek- 95% PSM



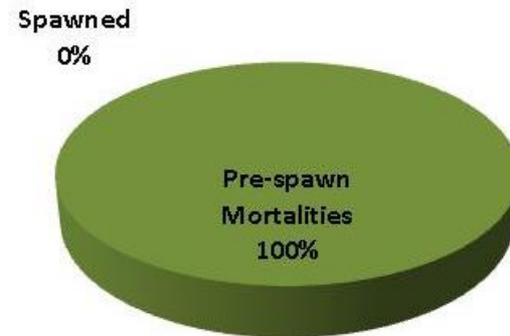
## Walker Creek – 57% PSM

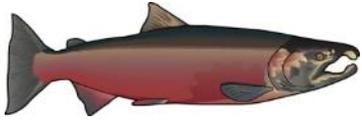


## Longfellow Creek – 86% PSM



## Des Moines – 100% PSM





# Coho: Hatchery Origin

15 fish were either  
"wild-origin" or TU  
outplanted fish

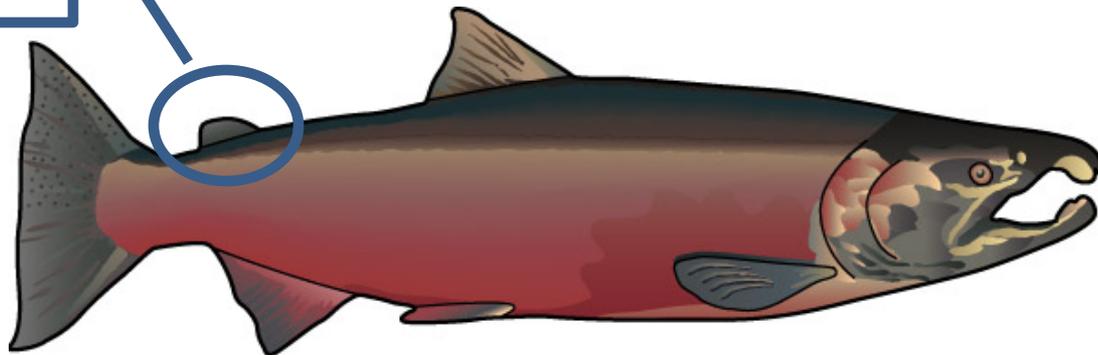
**Unmarked**  
**21%**

?  
**6%** 4 fish were too  
far gone to tell

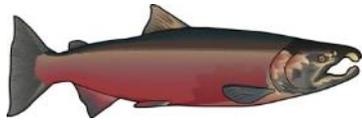
**Hatchery**  
**73%**

51 fish originated from  
hatcheries outside of the  
basin and "strayed" into  
the streams to spawn

**Adipose fin**

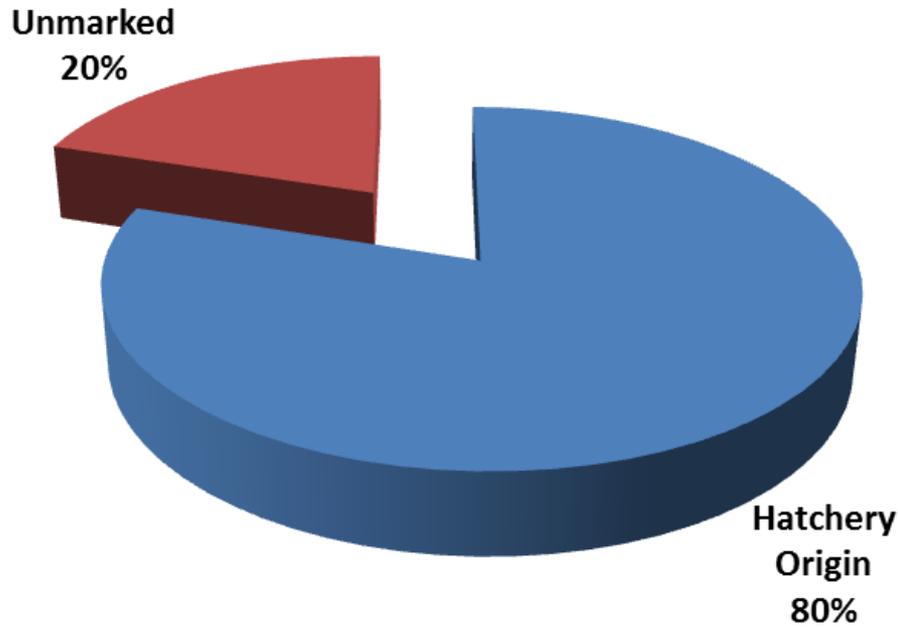


**N = 70**



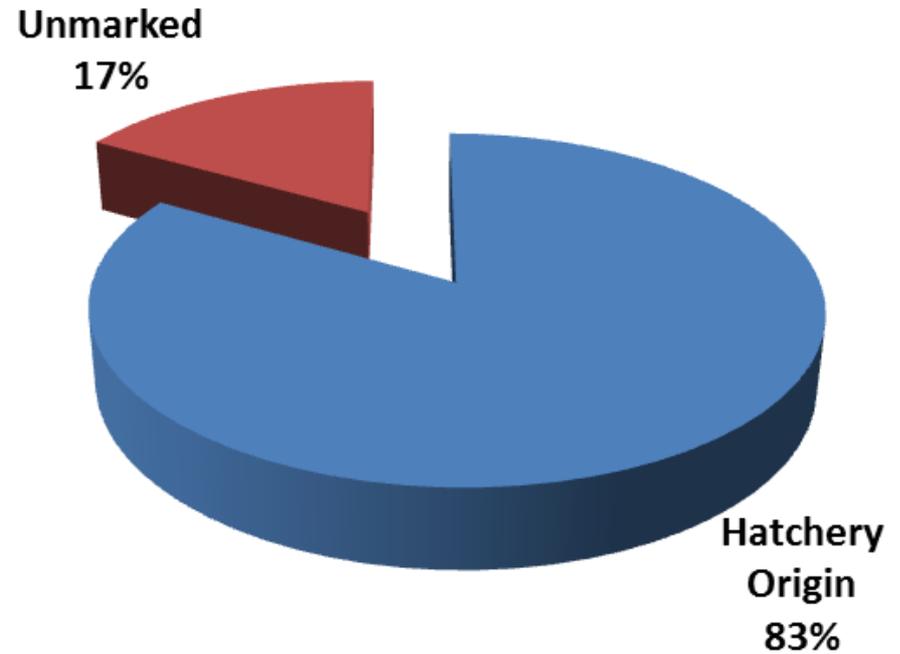
# Coho: Success in Spawning and Origin

**Pre-spawn Mortalities**



N = 30

**Spawned Fish**



N = 6

# Collecting Coho Heads for Coded Wire Tags

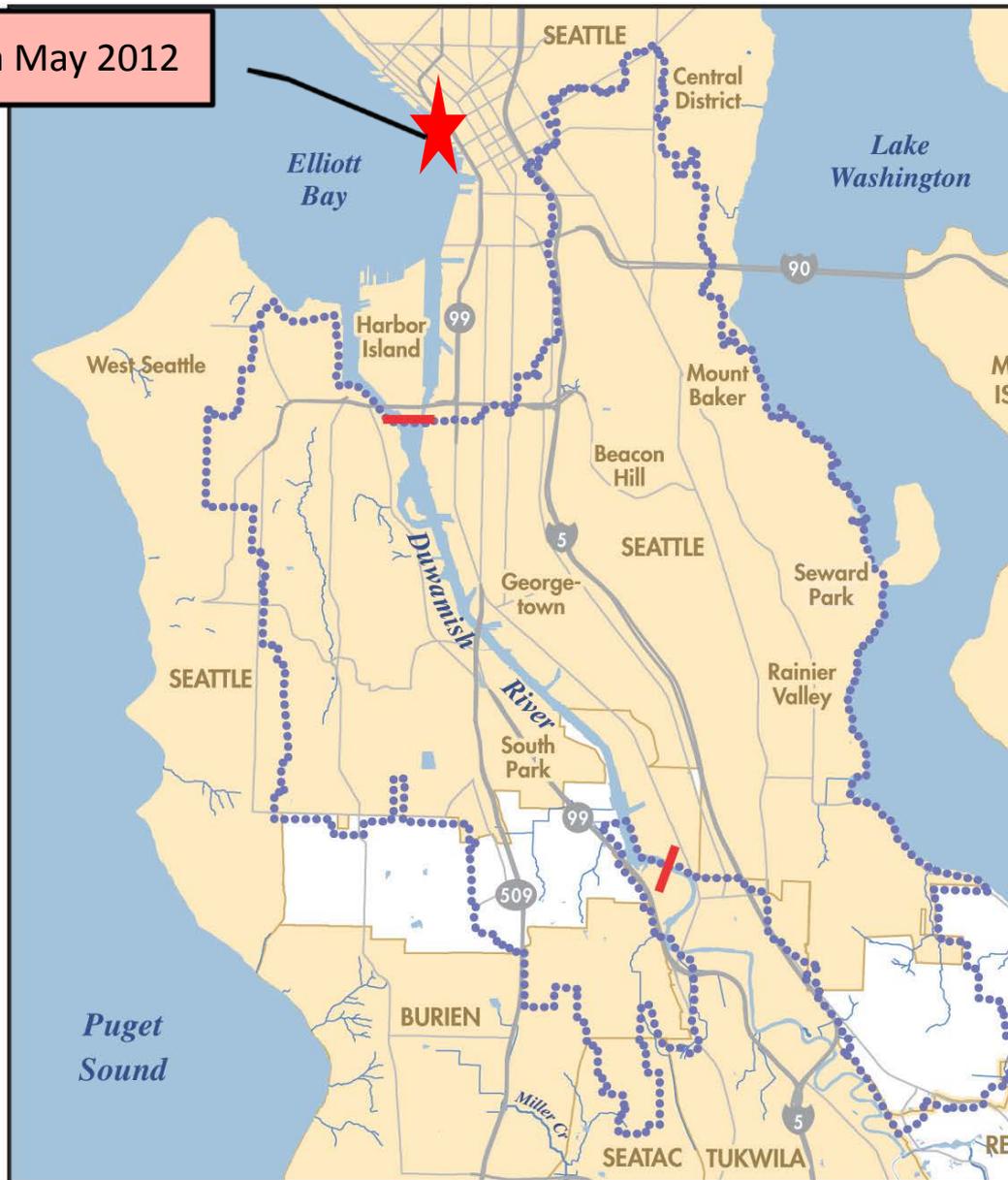


Image from Alaska Department of Fish and Game

# 2013 Coho with Coded Wire Tags: 3

Coho released here in May 2012

- Coho from Elliot Bay – Muckleshoot Indian Tribes Net Pen
- From Keta Creek Hatchery (Green River) in 2010
- Released in 2012 into Puget Sound
- 3 females: 2 spawned, 1 PSM
- 2014 – 3 tags/46 snouts – origin not yet known



# Wildlife

- Rabbits
- Raccoon
- Bald eagles
- Red-winged blackbirds
- Mallards
- American wigeons
- Belted kingfisher



**Coyote near Miller Creek**

December 23, 2012

Photo by Robin Hoefler

# Beautiful

Down trees and  
sun



# Pollution?

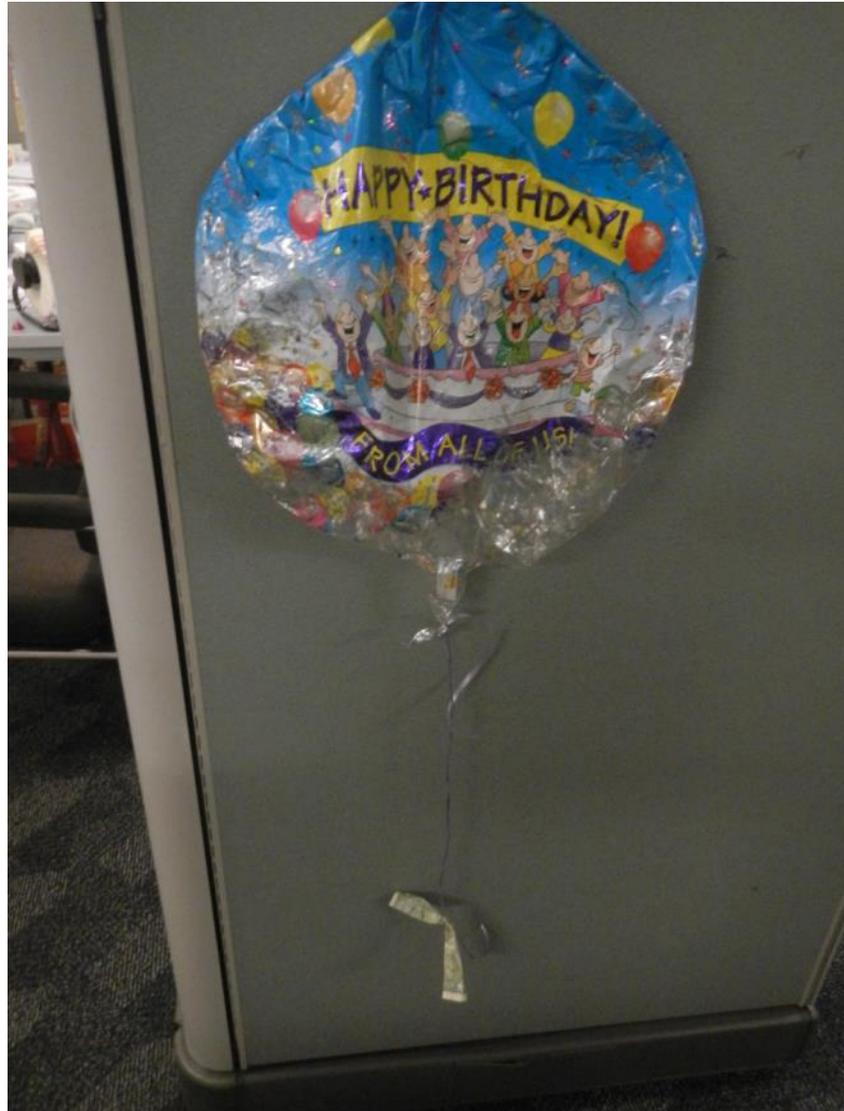


**Foam on Miller  
Creek**

**December 9, 2013**

**Photo by Joy Neubauer**

# Bonus



# Shared Funding for Stewardship

Thank you Miller-Walker basin partners, who support King County basin stewardship:



**King County**



# Thank You Volunteers!

**“Team Sunday”  
Drew and Nick cutting  
open carcasses on Miller  
Creek  
October 19, 2014**





# Thank You 2014 Volunteers!

- Joy and Roger Neubauer
- Michael and Carlyn Roedell
- Kristine Feldman
- Liesl Sallquist
- Christine Terry
- John Moziaka
- Lee Moyer
- Margy Wallace
- Steve Hanley
- Pam Silimperi
- Kay Larsen
- Scott Newcombe
- Brenda Sullivan
- Jim Burrows
- Gary Wagner
- Peter Naval
- Tracy Madole
- John McKindley
- Merry Ann Peterson
- Ed Nugent
- Ryan Rhodes
- Lisa Cowden
- Alex Ankuta
- Echo Allen
- Michael Lubrano
- Robin Hoefler
- Drew Hoefler
- Nick and Jeremy Hoefler
- Shelby Vander Molen
- Meghan Schuster
- Craig Knutson
- Dahli Strayer
- Nick Rhodes
- Tyler Feldman



# Amazing 2014 Volunteers

## Most Days Surveyed:

- Merry Ann Peterson (11)
- Ed Nugent (10)
- Joy Neubauer (10)
- Lee Moyer (10)
- Michael Roedell (9)
- Roger Neubauer (9)

## Most Hours Spent Surveying:

- Joy Neubauer (28)
- Kristine Feldman (25)
- Liesl Sallquist (25)
- Lee Moyer (24)

# 4) Plans for 2015 CSI

**Ethan documents a  
carcass**

**December 5, 2010  
Photo courtesy of  
David Bobanick**



# Plans for 2015 CSI Survey Season

- Continue the excellent work of the last 5 years by surveying again at four locations in Normandy Park
- Monitor through end of chum spawning season
- Maintain between 25 & 32 volunteers
- Training in early October, 2015
- Sign in with your email address to stay informed

# 5) Factors Driving Stream and Salmon Health



**St. Francis  
Elementary students  
mark storm drains by**

**Lake Burien**

**October 5, 2010**

**Photo courtesy of  
Michael Stein-Ross**

**Coho salmon fry in Miller  
Creek in Normandy Park**

June 30, 2008



# How Urban Lands Affect Streams

- Hydrology – stream flow
  - Faster, higher flowing water more often
  - Less and warmer water in summer
- Water quality
  - Warmer, low dissolved oxygen, altered pH, more turbid
  - More pollution - bacteria, metals, pesticides, oil, salt, etc.
- Physical habitat conditions
  - Substrate: hardened, more silt/sand, less gravel
  - Salmon nests in gravel are smothered
  - Streamside vegetation: native, invasive, absent
  - Reaches inaccessible to resident and anadromous fish



# Expanded Ambaum stormwater detention pond in Burien

December 3, 2007

With funding  
support from:



Washington State  
Department of Transportation

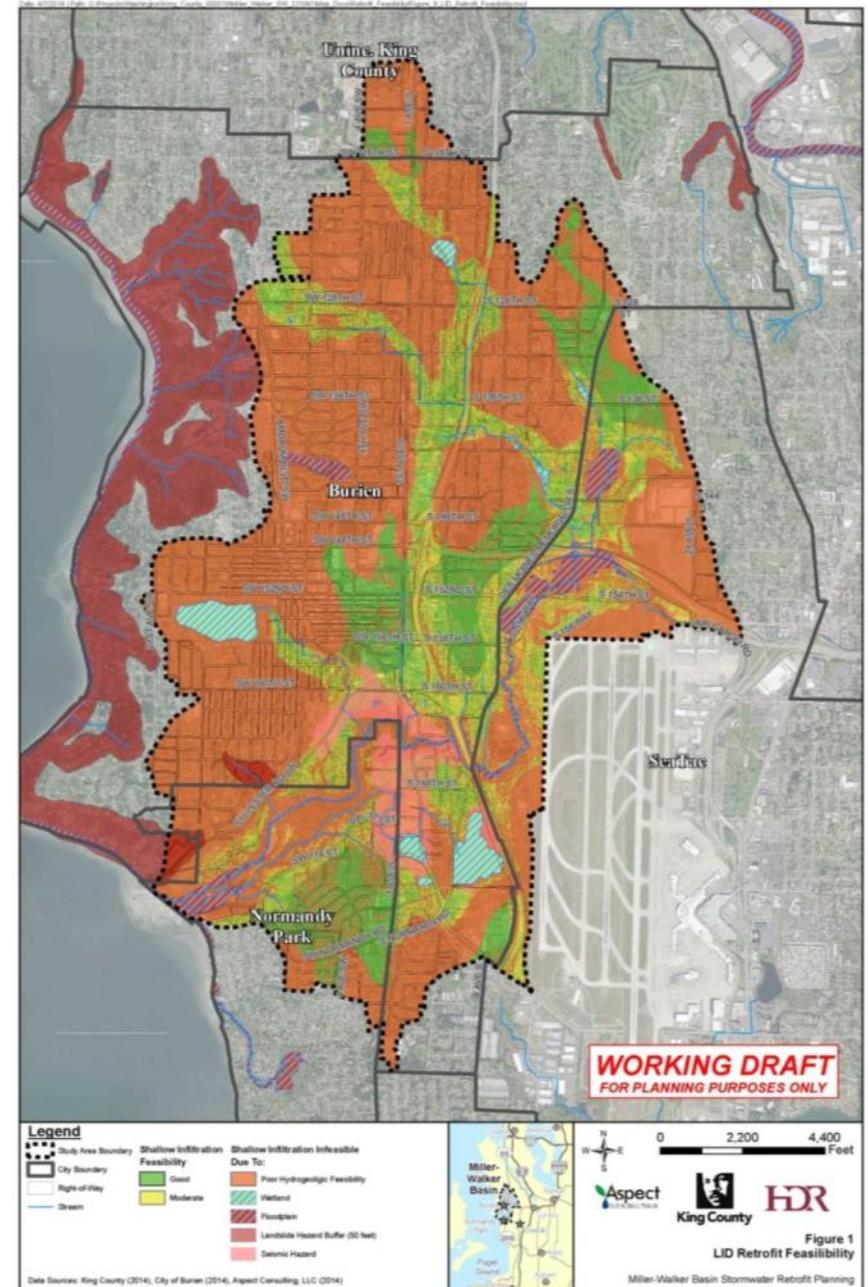
# Miller-Walker

## Stormwater Retrofit Analysis

- Goal: identify where stormwater management will make the biggest difference and be successful
- Grant funded by Dept. of Ecology and supported by Miller-Walker basin partners
- Hydrologic and soil, geology, steep slope analysis of Miller-Walker basin for good locations
- 80 sites selected and prioritized
- Top 4 selected for pre-design
  - Moshier Park and adjacent Moshier Community Art Center
  - 6<sup>th</sup> Ave SW from SW 146<sup>th</sup> St to SW 153<sup>rd</sup> St
  - King County District Court – 6<sup>th</sup> Ave & SW 149<sup>th</sup> St.

# Locations for infiltrating stormwater

- Infiltration potential
- Impervious surface
- Hydrology
- Slope
- Risk to surrounding environment
- Available area
- Utility, Transportation, Capital project coordination



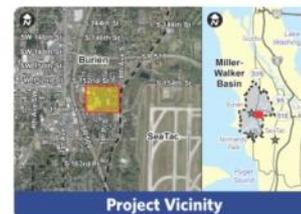
# Moshier: Top-ranked project

- Burien submitted grant proposal to Ecology in November 2014
- Made first cut
- Grant would provide \$447,000 for field and parking lot stormwater improvements

Proposed Concept



Typical BMP Concepts





# Watersheds, rivers and streams

Central Puget Sound

You're in: Central Puget Sound Watershed » Miller and Walker Creeks Stewardship » Clean Stormwater

- Central Puget Sound Watershed
- Vashon - Maury Island
- Miller and Walker Creeks Stewardship
  - Stewardship Tips
  - Volunteer Calendar
  - Stream Blog
  - Miller Creek Photo Tour
  - Walker Creek Photo Tour
  - Basin Plan
  - Clean Stormwater**
  - Monitoring Information
  - Salmon Monitoring Program - "CSI: Highline"
  - Contacts
  - Hydrologic Modeling
  - Nearshore environments
  - Puget Sound Shoreline Stewardship Guidebook
  - Related organizations
  - News archive
  - Site Map

## Miller and Walker Creeks Stormwater

### Miller and Walker Creeks Stormwater: Retrofit Planning for Improving Streams

When it rains in the Miller and Walker Creeks basin, streams flow high and fast, and the water is polluted. This is because much of the area was built with the idea of getting water into the creeks as quickly as possible. Now, we realize that this washes pollution (oil, gas, fertilizers, pesticides, metals used to waterproof wood, etc.) into the streams and causes high flows that damage habitat.

The Miller Walker Basin Partners (the cities of Burien, Normandy Park, and SeaTac; King County; and the Port of Seattle) conducted a stormwater retrofit analysis that identified potential strategies and projects to help reduce runoff into Miller and Walker Creeks.

### Maps and Reports

Reports, maps and other Miller-Walker stormwater retrofit products will be posted to this page as they become available.

- [Level I Stormwater Retrofit Site Evaluation Map](#) (Adobe PDF)
- [Level I Stormwater Retrofit Site Evaluation Criteria](#) (Adobe PDF)
- [Level I Stormwater Retrofit Site Evaluations - Matrix](#) (Adobe PDF)
- [Level II Stormwater Retrofit Site Evaluation Map](#) (Adobe PDF - 7 MB)
- [Level II Stormwater Retrofit Site Evaluation Matrix](#) (Adobe PDF)
- [Miller-Walker Infiltration Feasibility Assessment](#) (Large PDF file - 20 MB)
- [Public Comments and Answers, May 2014](#) (Adobe PDF)
- [Draft Pre-Design Report for King County Courthouse in Burien](#) - Project KC-47 (Adobe PDF)
- [Draft Pre-Design Report for 6th Ave SW in Burien](#) - Project B-20 (Adobe PDF)
- [Hydrologic Assessment of Stormwater Retrofit Need in the Miller-Walker Basin](#) (Adobe PDF)

### Miller and Walker Basin Stewardship Sponsoring Jurisdictions

- City of Burien
- City of Normandy Park
- City of SeaTac
- King County
- Port of Seattle

### Miller-Walker Creek Questions

- Contact Elissa Ostergaard with questions about Miller and Walker Creeks, (206) 477-4792

### Lake Burien Questions

- Direct questions about Lake Burien, including toxic algae testing, to Sally Abella, (206) 477-4605

To offer a suggestion or report an error on the Water and Land Resources' Web site, please contact **Fred Bentler**, webmaster.



# Restoration of Walker Creek at Walker Preserve

August 24, 2009



With funding  
support from:



# Stewards of the Cove at work since 2003



**Normandy Park  
Community Club**

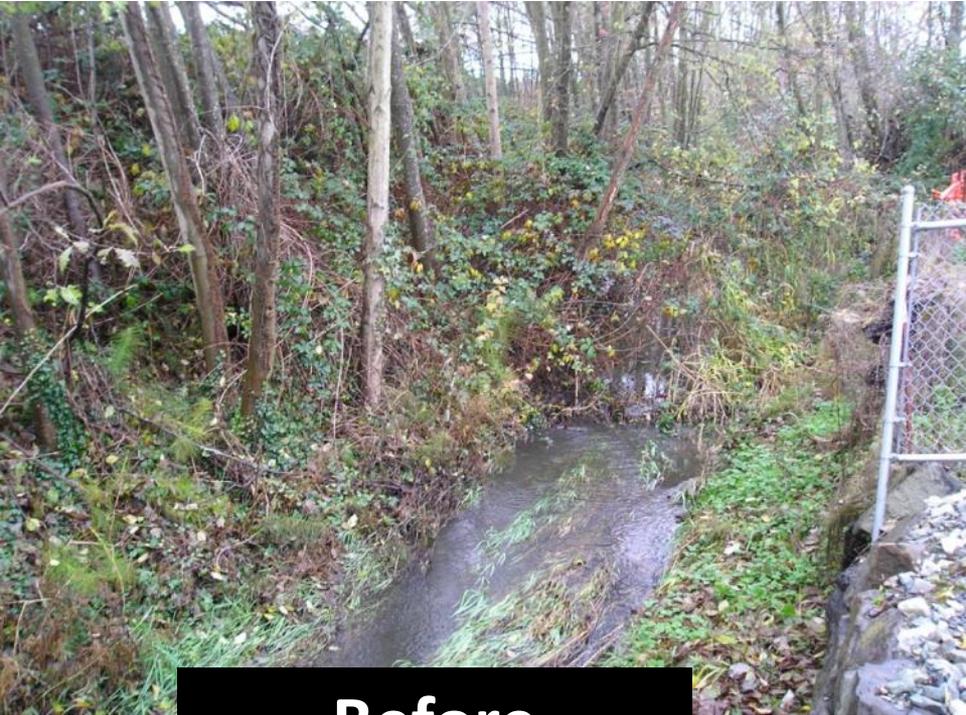


**Cove volunteers installing  
log in Miller Creek**

**August 9, 2008**

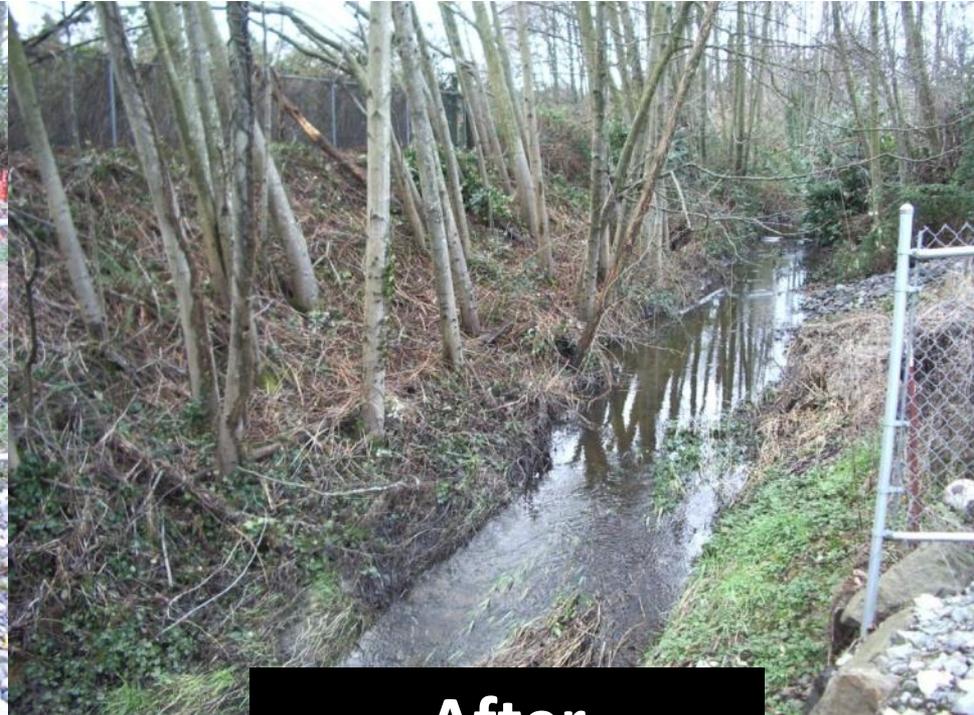
**Photo courtesy of Al Miller**

# Homeowner Stewardship



**Before**

**November 16, 2007**



**After**

**January 11, 2008**

Photo on right courtesy of Kevin Alexander



**Ivy in trees along Walker Creek in  
Normandy Park**

**August 25, 2011**



**February 7, 2015**



**January 10, 2015**



**October 18, 2014**



**Removing ivy  
along Walker  
Creek in  
Normandy Park  
March 22, 2008**

# 6) Your Role





# Things You Can Do

Clean up runoff:

Fix oil leaks in your car

- Check for leaks
- Contain leaks until you can get the car fixed



[www.fixcarleaks.org](http://www.fixcarleaks.org)

## Things You Can Do

Clean up runoff:

- Wash your car at a carwash (avoids wasting up to 80 gallons!) or on the lawn rather than in the street (keeps soap and oil out of the storm sewer and out of the creek)



# Things You Can Do

Clean up runoff: pick up after your pet



# Things You Can Do

Clean up runoff: build a rain garden



**Rain garden at  
Burien Town Square**

**January 25, 2011**

Photo courtesy of Ken Srilofung, City of Burien

Puget Sound   
Starts Here



# Things *You* Can Do

Volunteer to mark storm drains



**Lindsay/Andolina family  
marked storm drains in  
their Burien neighborhood**

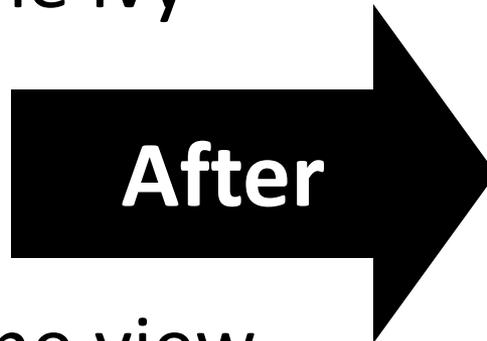
**August 25, 2010**



# Things *You* Can Do



Save your trees –  
remove the ivy



Trees ARE the view





# Things *You* Can Do



Leave down logs in the stream

**Not so great**

Leave down logs and branches for wildlife



# Things *You* Can Do: Volunteer

**Upcoming volunteer events:  
Ivy removal at Walker  
Preserve on March 22 and  
April 19, 2014  
Photo taken February 18, 2012**



# Things *You* Can Do: Volunteer

Volunteer for the  
Community  
Salmon  
Investigation  
for 2015!

**“Team Wednesday”**  
**Margy taking statistics**  
October 23, 2012  
Photo courtesy of Margy Wallace



Photo courtesy of Barb and Darrell Williams

# The End

**Miller-Walker Basin**  
Local partners  
working together  
for clean water  
and healthy  
streams

