Community Salmon Investigation for Highline "Season Finale"

Presented by Dennis Clark

Miller and Walker Creeks Basin Steward

January 26, 2011

Chum on
Miller Creek
November 17, 2010
Photo courtesy of
Barb and Darrell Williams
Chum on Miller Creek on November 27 - Part 1
footage by Barb and Darrell Williams

Community Salmon Investigation for Highline 2010 Results

1. Purpose of *Community Salmon Investigation: Highline*
2. How *CSI: Highline* works
   - Stream surveys
   - Necropsies
   - Survey locations
3. Results of October – December 2010 surveys
   - Summary data
   - Analysis
   - Weather and stream flow information

Volunteer Recognition

4. Plans for 2011
5. Factors affecting stream and salmon health
6. Your role!

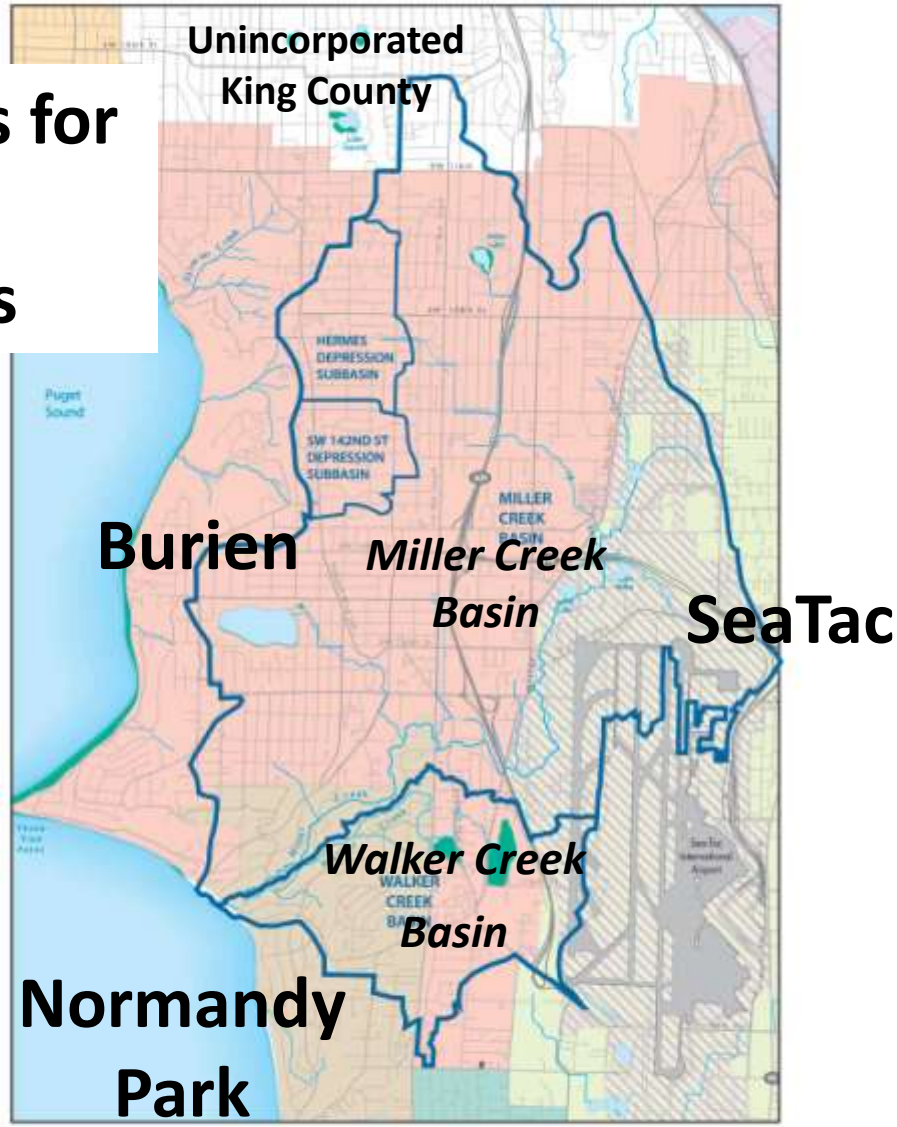
1) Purpose of CSI

Coho "jack" (immature male)

November 2, 2010

Photo courtesy of Christine Terry

Basin Boundaries for Miller and Walker Creeks



Draft 2006 Basin Plan Recommendation on Monitoring

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

- Flow (volume)
- Water quality
- Habitat data

Port of Seattle water quality sampling station at Walker wetlands

October 16, 2007

Basin Monitoring Coordination Workshops Fall 2008

Monitoring Workshop #1 at Burien Community Center

September 24, 2008

Basin Monitoring Coordination Workshops Fall 2008

Monitoring Workshop #3 at ERAC in Burien

December 4, 2008

Watersheds, rivers and streams

Central Puget Sound

Central Puget Sound Watershed
Vashon - Maury Island
Miller and Walker Creeks Stewardship Page
Stewardship Tips
Volunteer Calendar
Stream Blog - 2010
Miller Creek Photo Tour
Walker Creek Photo Tour
Basin Plan
Monitoring Information
Salmon Monitoring Program 2010 - "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:

- Final Monitoring Coordination Recommendations
- Background Information on Monitoring Coordination Workshops in 2008
- Current and Past Monitoring

Learn about the Community Salmon Investigation (CSI) of adult salmon returns in fall 2010.

Final Monitoring Coordination Recommendations

Three workshops occurred in fall 2008 where interested citizens and staff discussed coordination of monitoring of water flow, water quality, and habitat conditions on Miller and Walker Creeks. Basin Steward Dennis Clark drafted recommendations based on input from these workshops. These recommendations were posted for public review in June 2009 before being finalized. The final versions include:

- Recommendations including Table 2 and Appendices A and B (Adobe Acrobat)
- Table 1: Miller and Walker Creeks Recommended Monitoring Locations for

Activities and Purpose of *CSI: Highline*

Tasks	Why?	Use of Data
Count adult salmon	As "keystone species," salmon are indicators of the health of fresh and marine waters and surrounding lands	Baseline data that will allow us to determine status and trends when monitored over time (>10 years)
Identify whether coho are spawning before they die	"Pre-spawn mortality" is known to occur in Miller/Walker but extent has not been quantified	Baseline data that may allow us to determine effects of pollution prevention efforts in future
Raise the profile of the streams and their resources in the Highline community	Improving the health of these streams and Puget Sound requires residents to be aware of and act to protect the shared resources of the streams	To be determined – by all of us!

Scientific Plan for Adult Monitoring

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

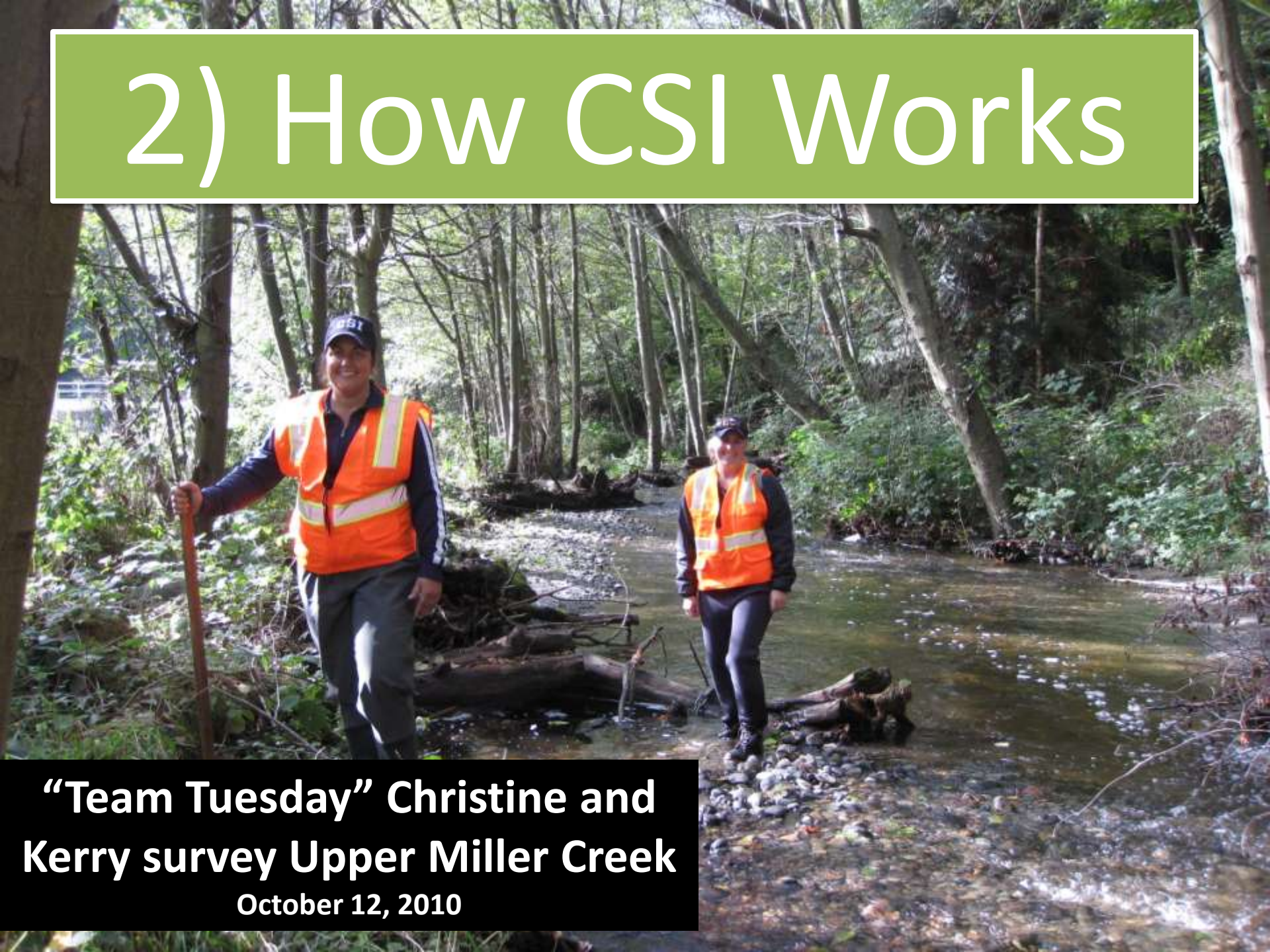
Community Salmon Investigation for Highline 2010

Version October 27, 2010

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).

In Miller and Walker Creeks, PSM has been documented and is probably a serious concern for

2) How CSI Works



"Team Tuesday" Christine and Kerry survey Upper Miller Creek

October 12, 2010

CSI "Cast"

- 20 volunteers from Burien and Normandy Park
- Seven daily teams – one team for each day of the week
- Backups to fill in

"Team Sunday" David and Ethan with male coho carcass on Miller Creek
October 17, 2010
Photo courtesy of David Bobanick

CSI Training

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

October 7, 2010

CSI *Style*

"Team Friday" Kim and Gordon model survey attire on Upper Walker
November 12, 2010
Warm hat
Back pack for supplies
Hip waders
Rain gear and layer clothing
Safety vest for visibility and identification as CSI
Trekking pole for stability and flushing fish

CSI in Action

"Team Wednesday" Joy looks for salmon on Miller Creek

October 12, 2010

CSI in Action

"Team Sunday" Bobanick family sights the first chum of the season

November 7, 2010

CSI in Action

CSI in Action

CSI in Action

Measuring the coho carcass

October 13, 2010

CSI in Action

CSI in Action

CSI in Action

CSI in Action

CSI in Action

CSI in Action

Select & Zoom

Daily Survey Sheet - Community Salmon Investigation for Highline

Date: 12 / 2 /2010

Team Members: Jon Jones Paul Cadd + Mike Cadd

Site: Miller and Walker Creeks

Dead Adult Fish Fish ID#	Fork Length (cm)	Fish Girth (cm)	POH (cm)	Ad Fin? (Y/N)	Sex (M/F)	% Egg Retention (dead females) 0-25	25-50	50-75	75-100	Spawning Condition PSM	POST	PRED	UNK	Species	Notes (including presence/absence of milt in males)
Example: 101510_ LwrMlr_PSM01	52	40	36	Y	F				X	X					Lower jaw missing
12210_UprMlr_ UnK01	N/A	N/A	N/A	U	Unk	N/A	N/A	N/A	N/A				X	Chum	Tail and skin only
12210_LwrMlr_ UnK02	N/A	N/A	N/A	Y	Unk	N/A	N/A	N/A	N/A				X	Chum	Tail and skin deteriorated
12210_LwrMlr_ Pred03	69.5cm	N/A	48	Y	M	N/A	N/A	N/A	N/A			X		Chum	Head belly skin and tail intact. No middle or gonads. Heavy Pred.

Ad = adipose fin POH = distance from back of eye to bend in tail. Location codes: LwrMlr = Lower Miller, LwrWkr = Lower Walker, UprWkr = Upper Walker, UprMlr = Upper Miller

Live Adult Fish

Location	Coho	Chum	Other Adult Fish (record here if not confident of species ID)	Notes Regarding Adult and Juvenile Fish, Wildlife, Stream Condition (flow volume, clarity, presence/absence of foam)
Lower Miller	0	0	0	Gauge reads 2-6" Very large head observed in water above Bridge #4
Lower Walker	0	~~8~~ 6	0	Clear - five IDd on swim club property and 2 large redds
Upper Walker	0	6	0	Some white foam otherwise clear All 6 fish within 15' upstream of crossing 2 possibly working + redd
Upper Miller	0	21	0	Lots of foam, white Water higher than prev. week + turnie Lots of sign ~~water~~ had been much higher

Suspected redds (list location and marking/flagging that *your* team placed): ① UprMlr 100' S. of bridge

② 10' to left bank of rebar ~~after~~ upstream of culvert ③ On swim club in bend after fence ④ Marked working redd - 20' downstream of #3

Start Time 1:30 pm End Time 4:10 pm Weather: X Sunny ___ Cloudy ___ Rainy

Temp ≈ 45°

Version 10.27.10

Property Owner Permission Graciously Provided by:

- Ann and Stephen Backstrom
- Linda and Thomas Beffa
- Brett Fish
- Glen and Karen Gabrielson
- Chris Longridge
- Normandy Park Community Club
- Normandy Park Swim Club
- Southwest Suburban Sewer District

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

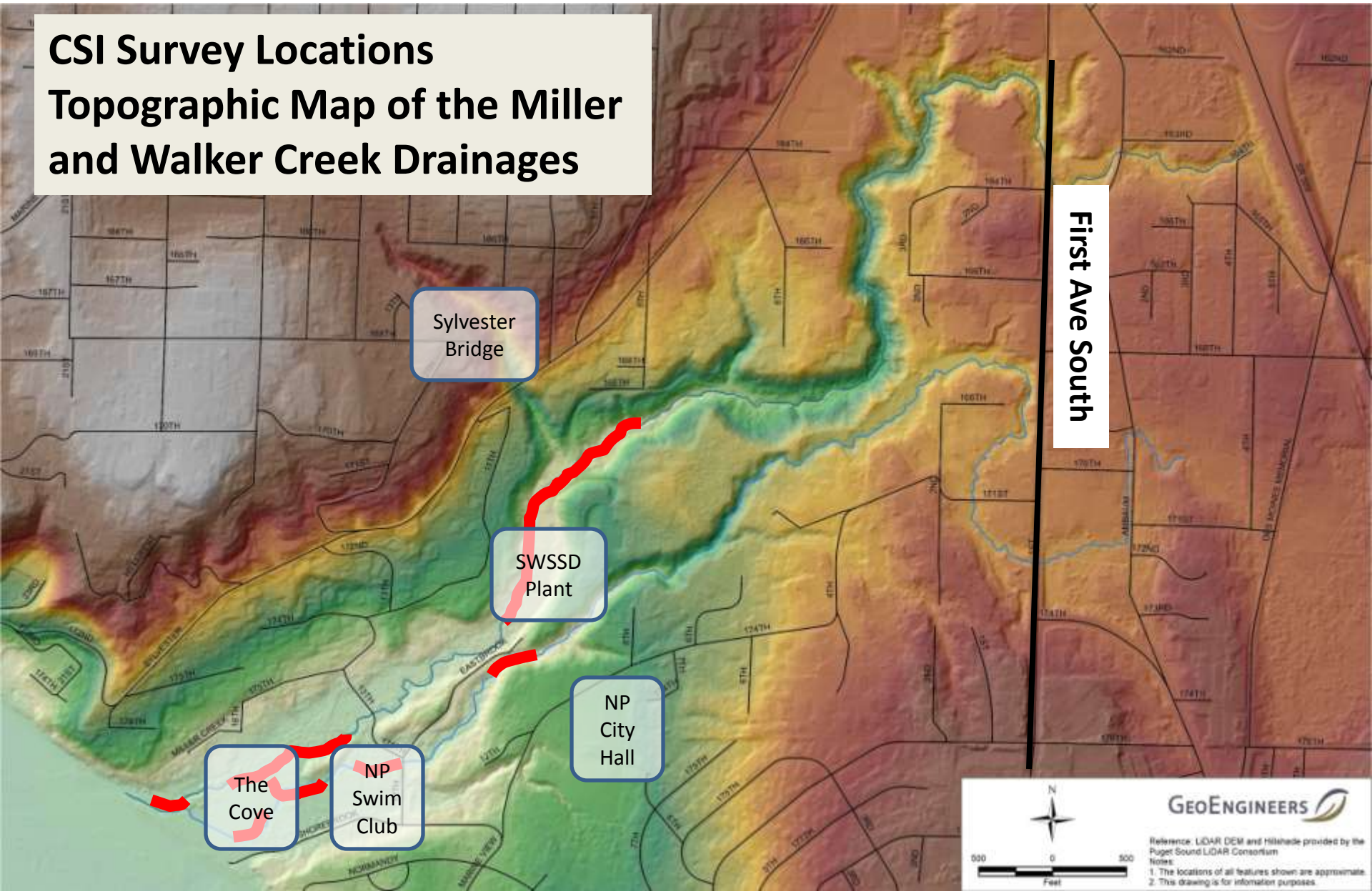


Image courtesy of GeoEngineers and Washington State Department of Transportation

Survey Locations

- Four locations
  - Two on Miller Creek
    - Upper Miller – Sewer District and Fish property
    - Lower Miller – The Cove and Longridge property
  - Two on Walker Creek
    - Upper Walker – Beffa, Backstrom, Gabrielson properties
    - Lower Walker – The Cove, Swim Club

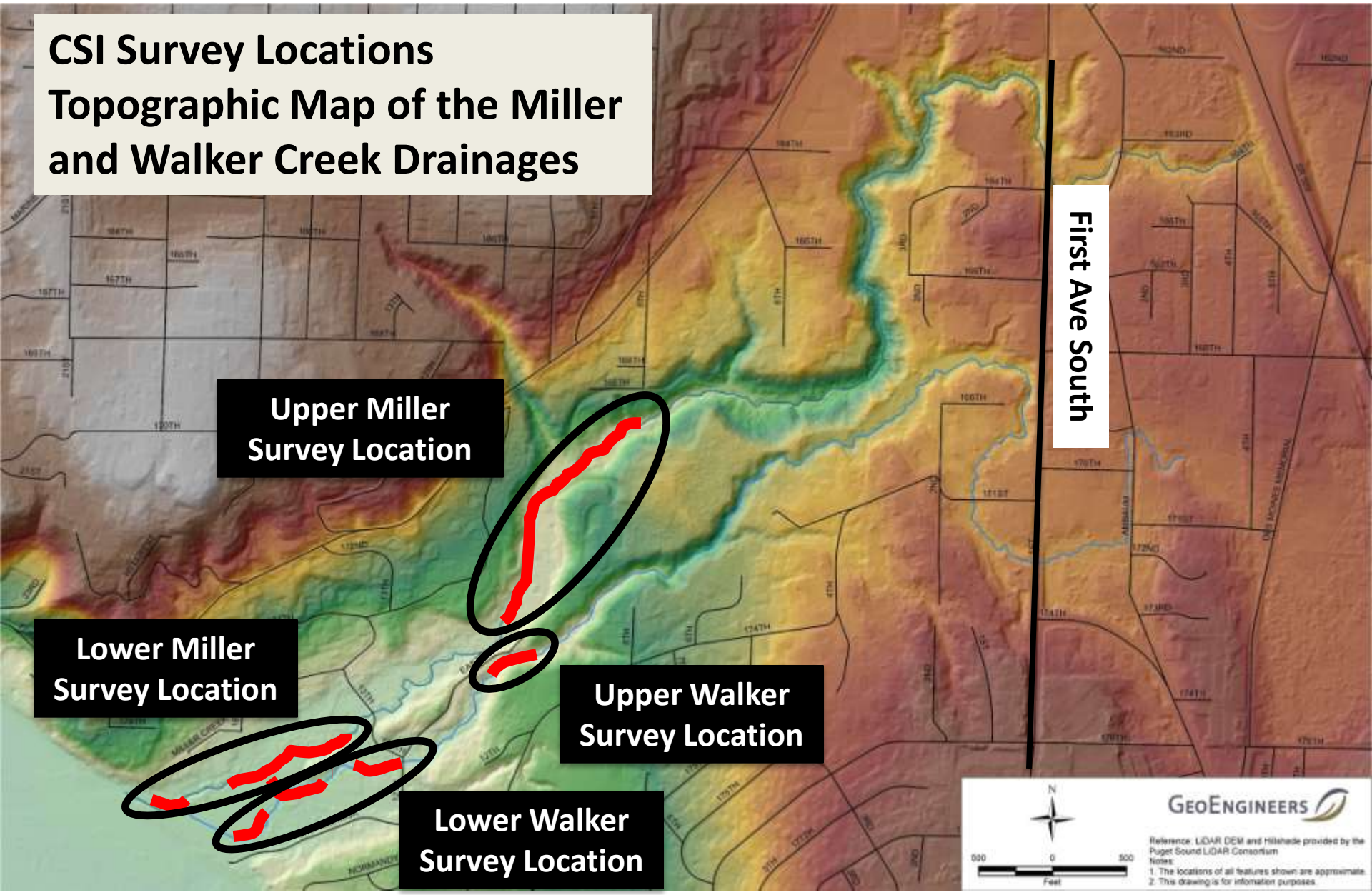


Image courtesy of GeoEngineers and Washington State Department of Transportation

Lower Miller Creek Survey Area - CSI 2010

COMMENTS: Updated version 10/22/10

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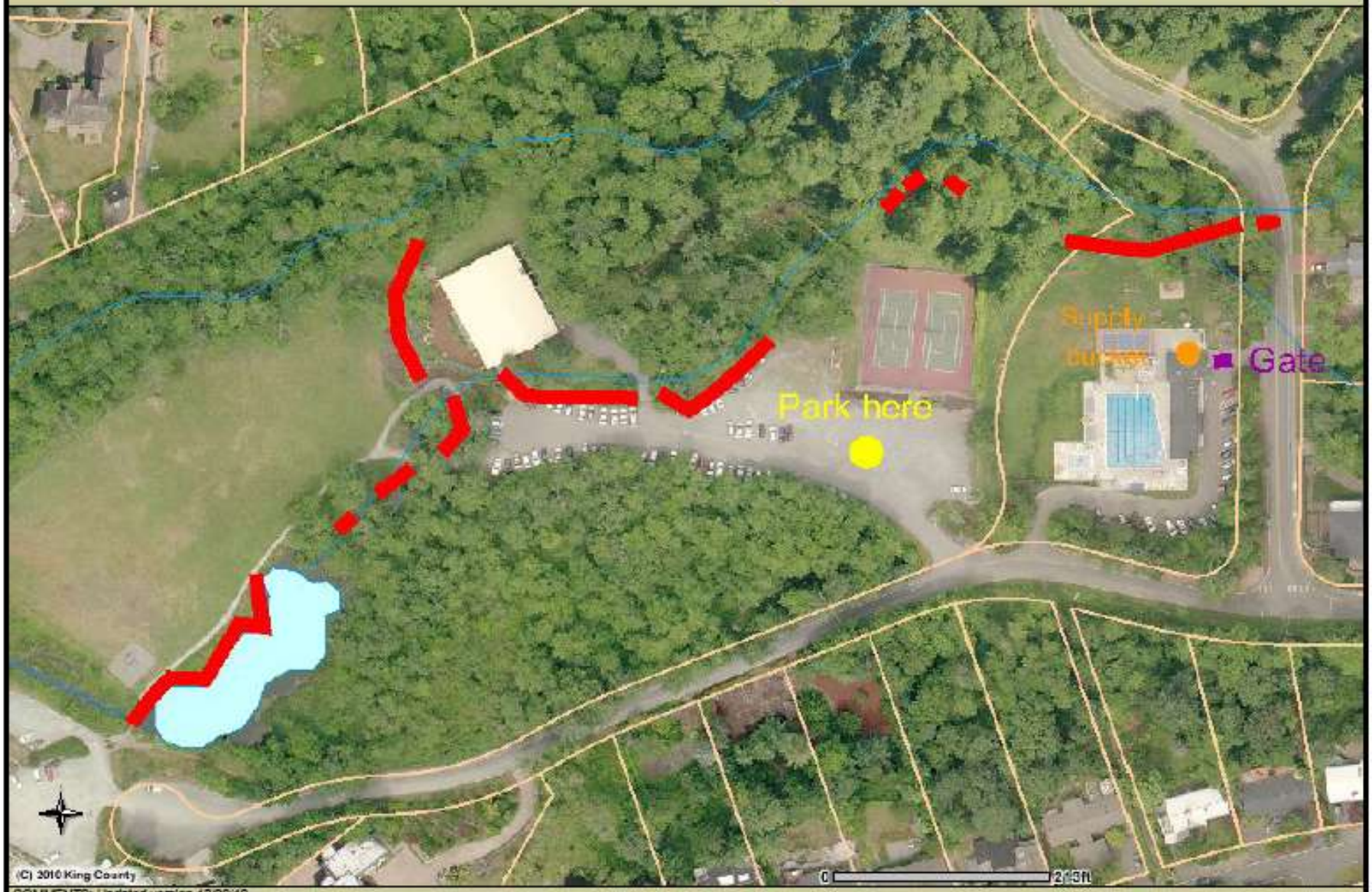
Date: 10/22/2010 Source: King County IMAP - Property Information (http://www.metrokc.gov/GIS/IMAP)

King County

Lower Walker Creek Survey Area - CSI 2010



COMMENTS: Updated version 10/22/10.

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Date: 10/22/2010 Source: King County IMAP - Property Information (http://www.metrokc.gov/GIS/IMAP)

Swim Club Stream Restoration

Planting native trees and shrubs on Walker Creek

October 25, 2009

Upper Walker Creek Survey Area - CSI 2010

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King County

Upper Miller Creek - SWSSD Survey Area: CSI 2010

COMMENTS: Avoid getting locked in; do not park on site after 4 p.m. weekdays.

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Date: 10/6/2010 Source: King County IMAP - Property Information (http://www.metrokc.gov/GIS/IMAP)

King County

Upper Miller Creek - Brett Survey Area: CSI 2010

COMMENTS: Parking shown for Saturday/Sunday teams only; do not block metal gate (okay to park in front of wooden gate).

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Date: 10/6/2010 Source: King County IMAP - Property Information (http://www.metrokc.gov/GIS/IMAP)

King County

CSI in Action

"Team Monday" Merry Ann and Ed look for salmon on Lower Miller Creek

November 8, 2010

CSI in Action

CSI in Action

"Team Monday" Merry Ann and Ed survey Lower Miller Creek

November 22, 2010

CSI in Action

"Team Tuesday" Christine and Kerry at Sewer Plant on Upper Miller Creek

November 9, 2010

CSI in Action

"Team Friday" Gordon in the "Stairmaster" on Upper Miller Creek

November 26, 2010

CSI in Action

Communing with chum on Lower Walker Creek

November 10, 2010

Photo courtesy of Jean Spohn

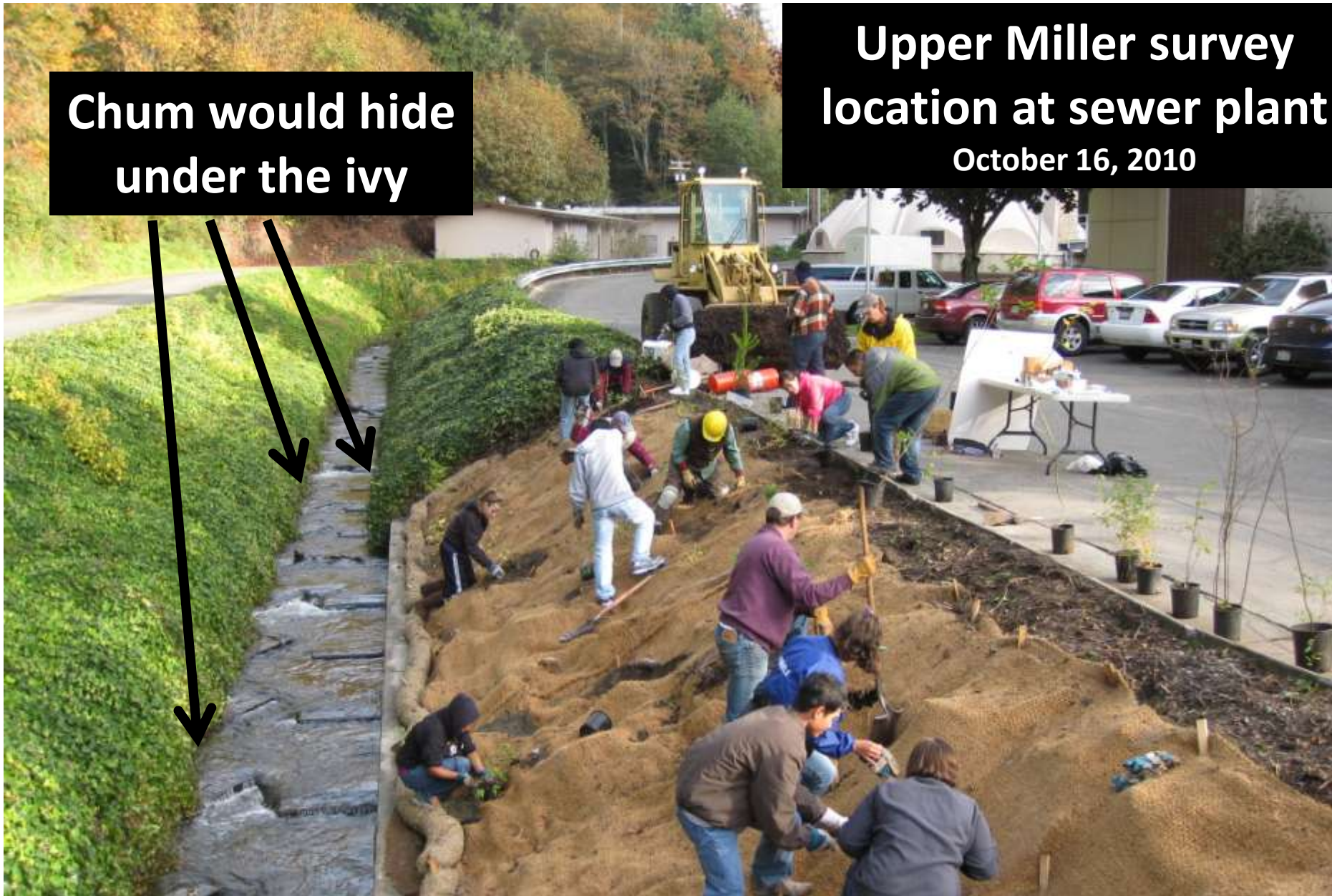
CSI in Action

Communing with chum on Lower Walker Creek

November 10, 2010

Photo courtesy of Jean Spohn

CSI in Action

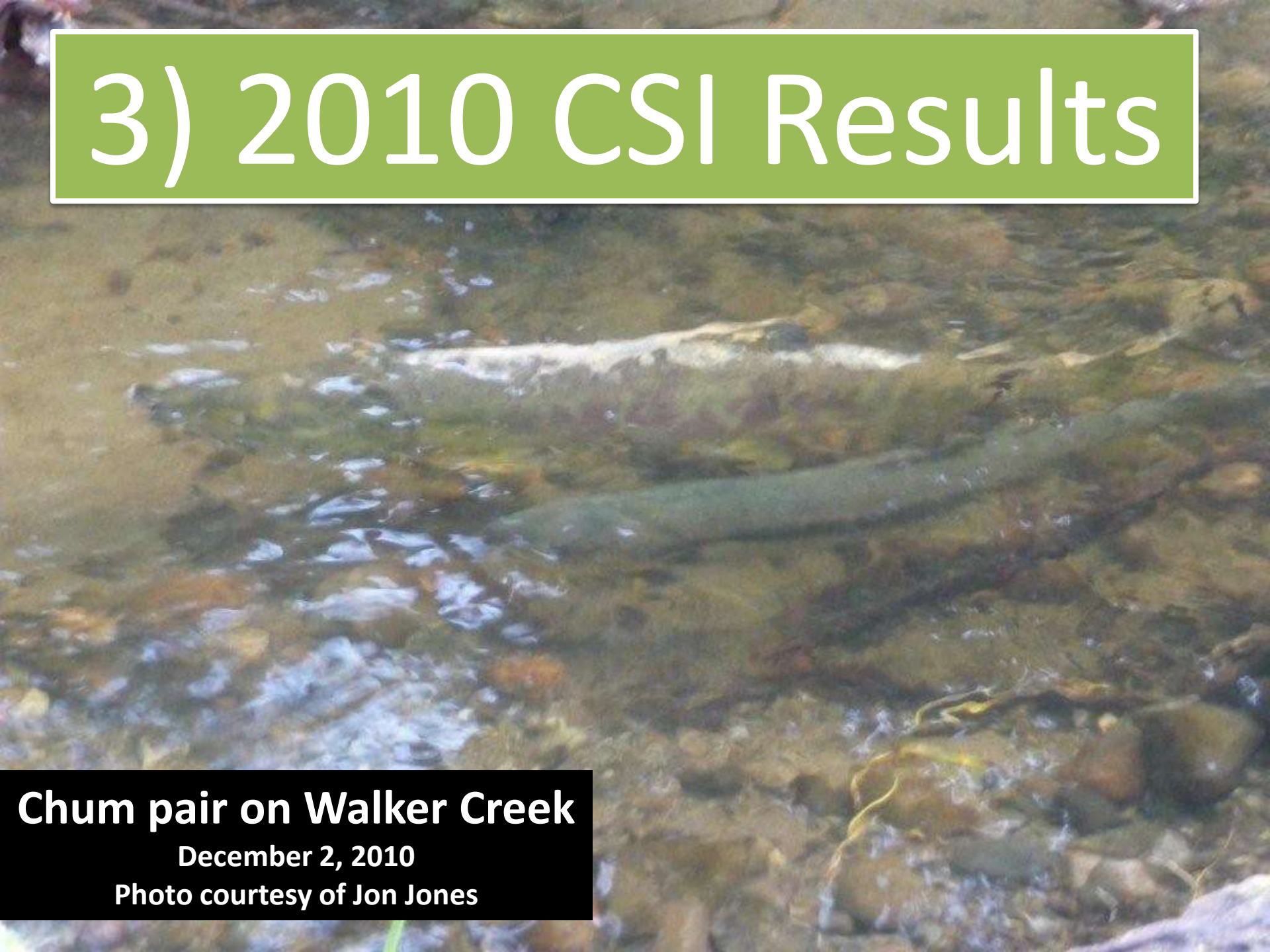


CSI “Getting it done”

“Team Saturday” Annette flags a badly decayed carcass in pouring rain

November 16, 2010

3) 2010 CSI Results



Chum pair on Walker Creek

December 2, 2010

Photo courtesy of Jon Jones

Chum on Miller Creek
November 17, 2010
Photo courtesy of Jean Spohn
Chum on Miller Creek on November 17
footage by Jean Spohn

Coho: Life History

• October 2007	Spawned
• Early 2008	Hatched
• Early 2008 – early 2009	Rearing in stream
• Early 2009	Migration to salt water
• Early 2009 – October 2010	Rearing in Puget Sound and Pacific Ocean
• October – November 2010	Migration upstream, spawning, death

Chum: Life History

- Nov. – December 2006 — Spawned
- Early 2007 — Hatched and migrated to salt water
- Early 2007 – Nov. 2010 — Rearing in Puget Sound and Pacific Ocean
- Nov. – December 2010 — Migration upstream, spawning, death

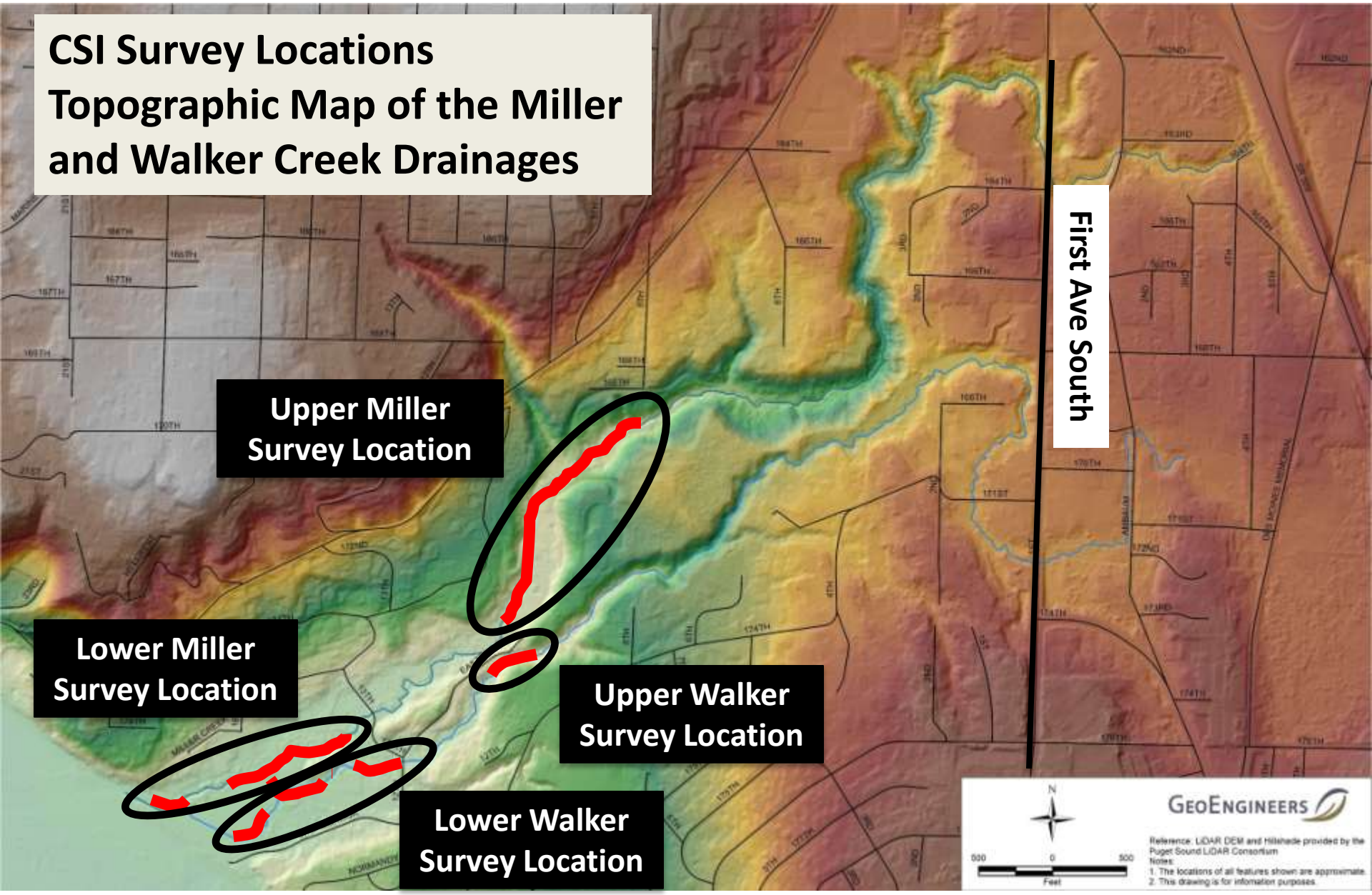
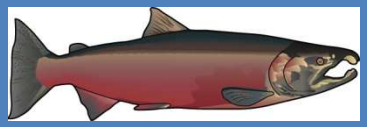


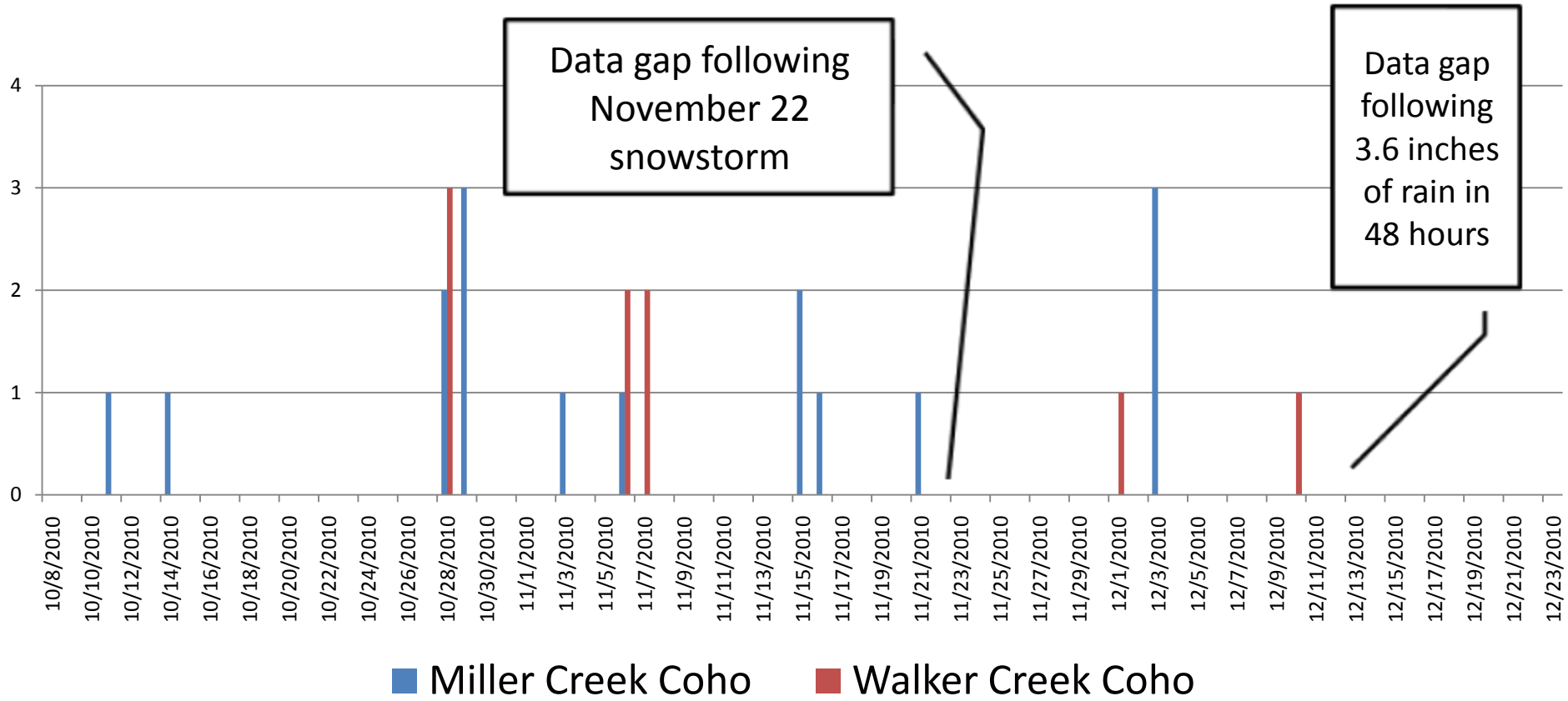
Image courtesy of GeoEngineers and Washington State Department of Transportation

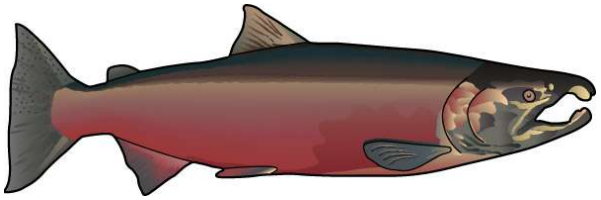
Results: Live Fish Observations Summary

Species	Coho 	Chum	Unidentified Adults
Miller Creek	16	252	52
Walker Creek	9	90	10
Total	**25**	**342**	**62**

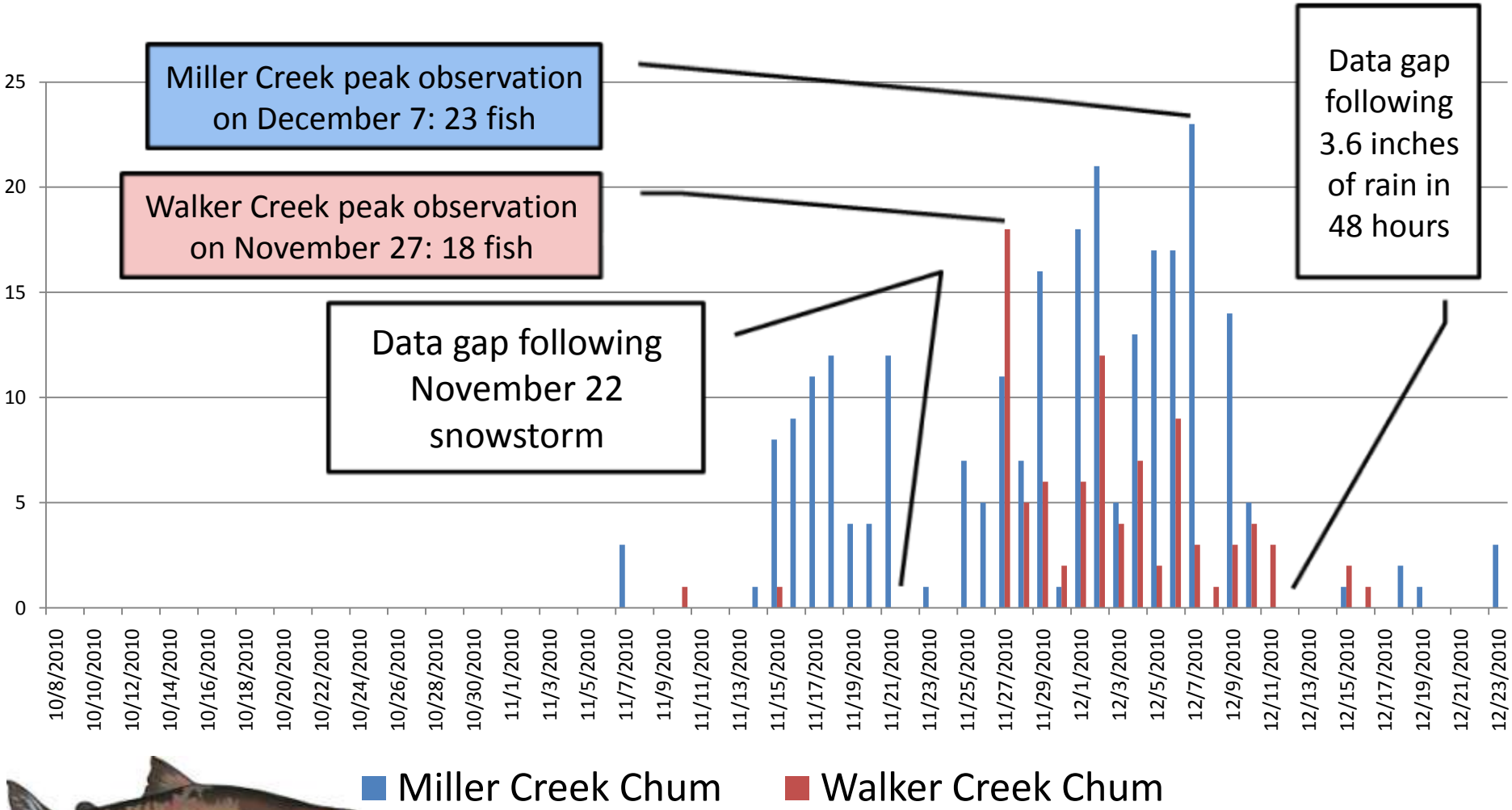
Unidentified adults are 14.4% of total fish observed.

Results: 25 Coho Observations

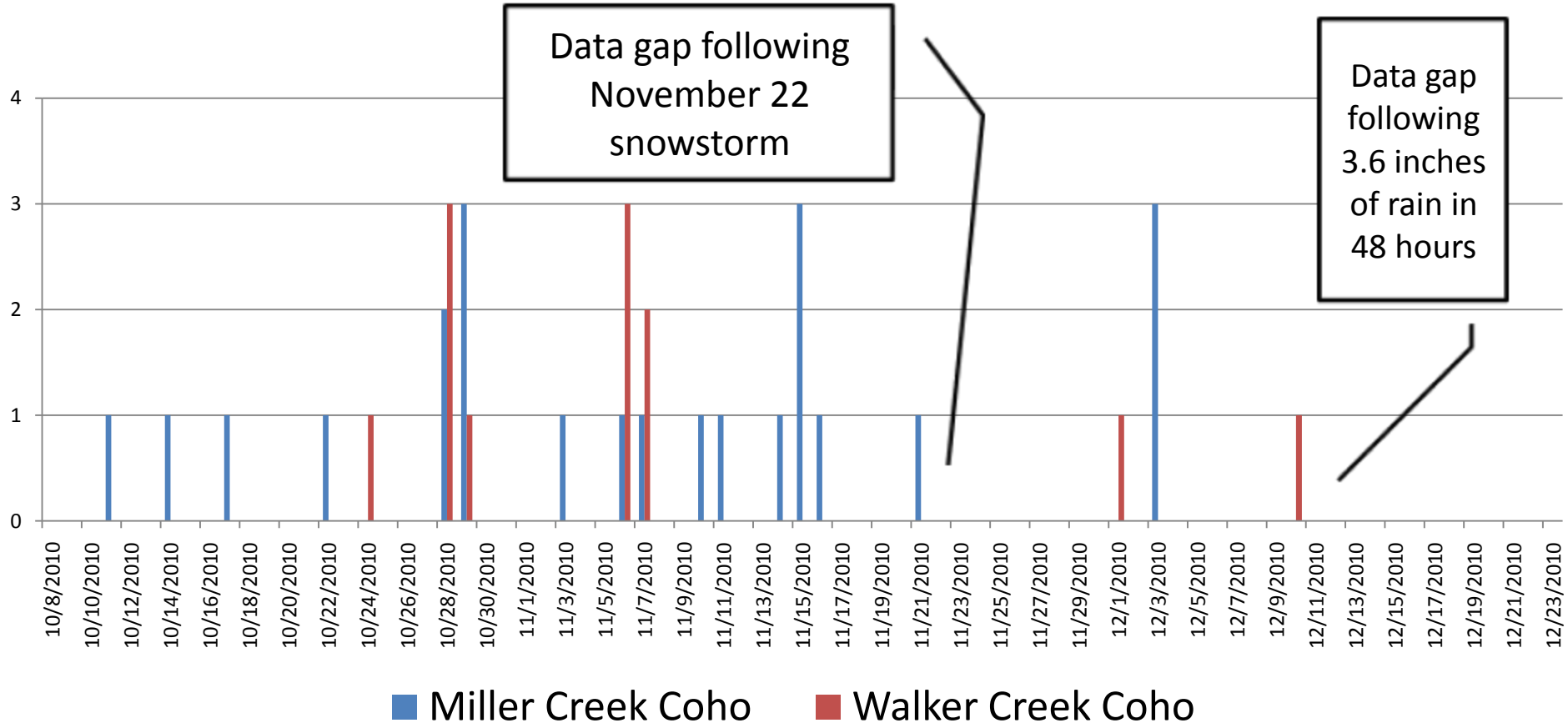


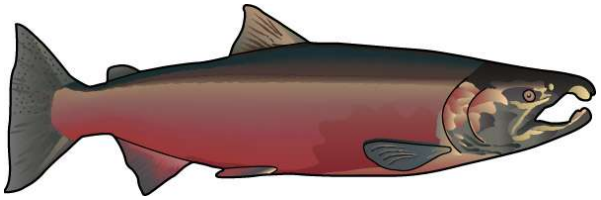


Results: 342 Chum Observations

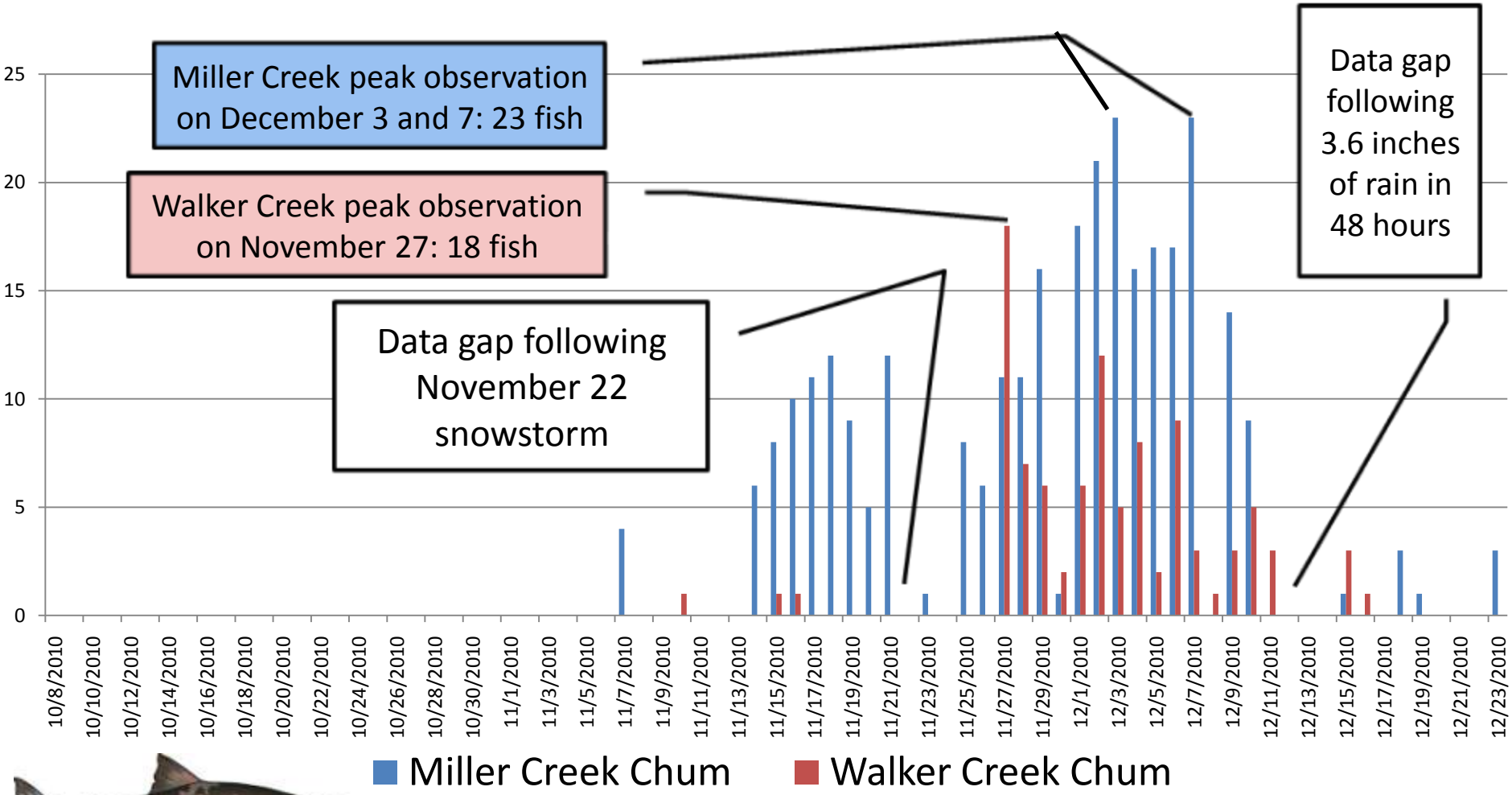


Results: 25 Coho Observations with 10 "Unknown" Fish Assumed to be Coho

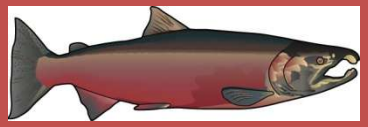




Results: 342 Chum Observations with 52 "Unknown" Fish Assumed to be Chum



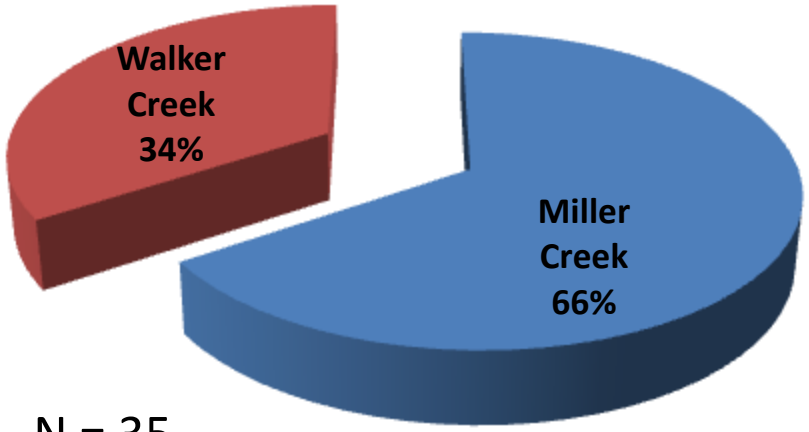
Observations Summary with Assumption About “Unidentified” Species

Species	Coho 	Chum	Total
Miller Creek	23	297	320
Walker Creek	12	97	109
Total	**35**	**394**	**429**

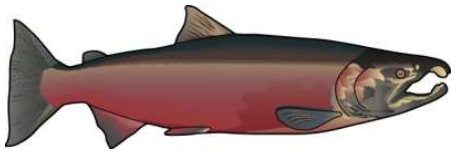
Assumption: Of the “unidentified” fish, 10 are coho and 52 are chum based on time of return.

Species by Stream

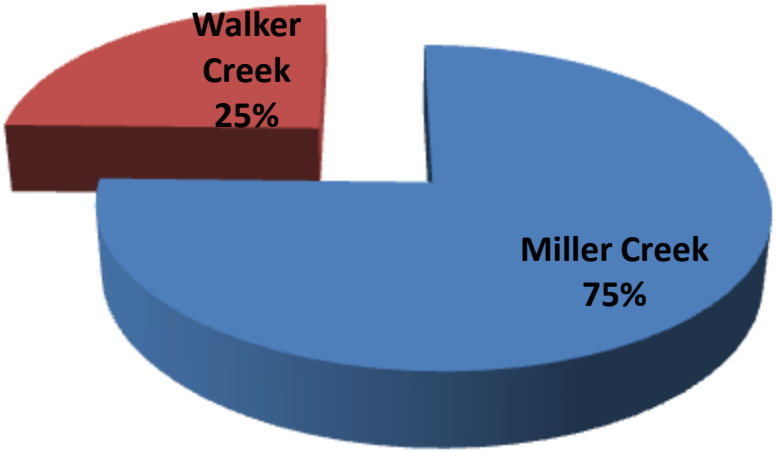
Coho by Stream



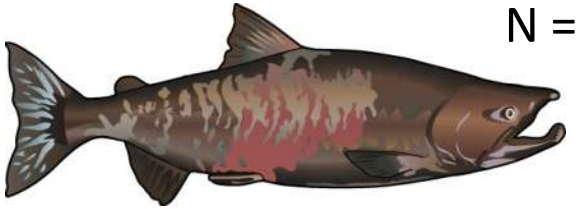
N = 35



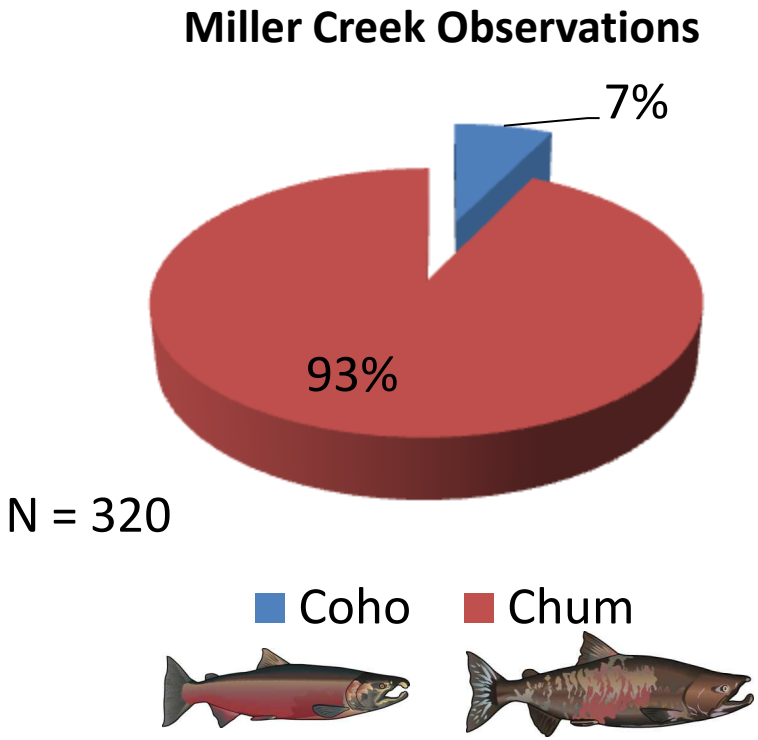
Chum by Stream

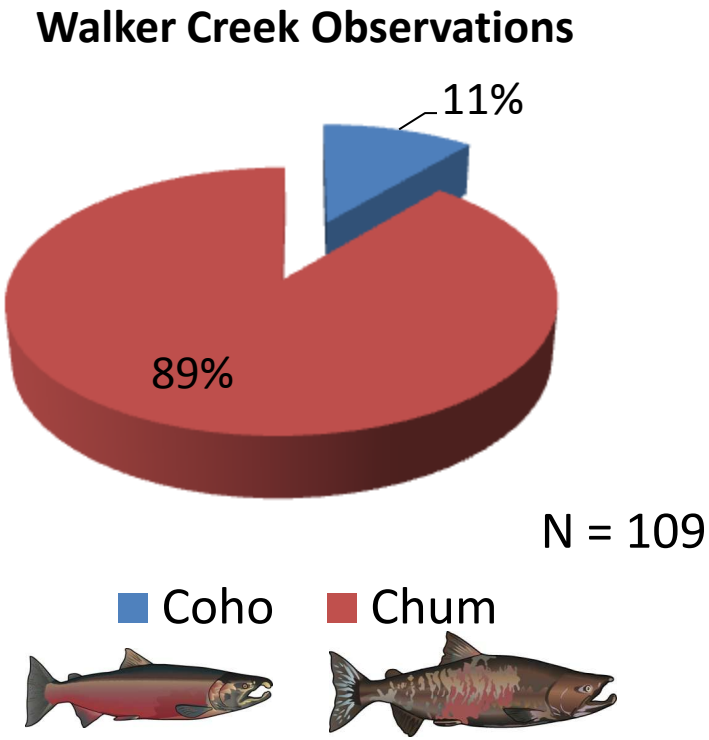


N = 394

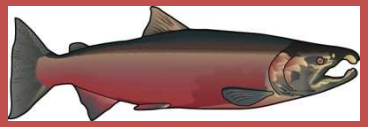


Use of Stream by Species





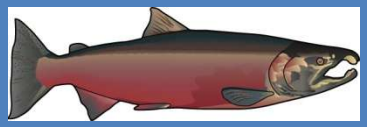
Estimated *Population*

Species	Coho 	Chum	Total
Miller Creek	23	199	222
Walker Creek	12	65	77
Total	**35**	**264**	**299**

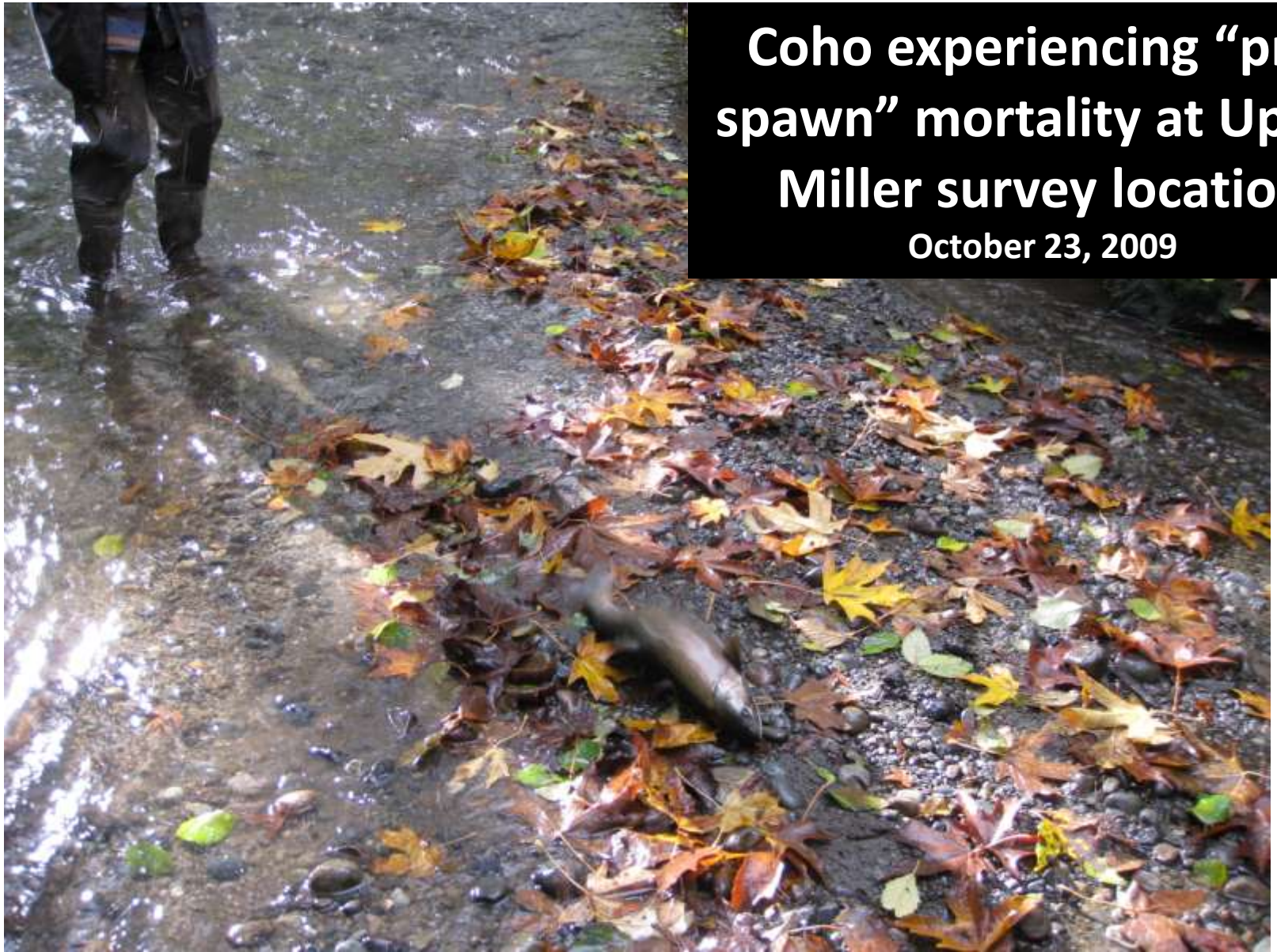
Assumptions:

- "Area under the curve" methodology applied to chum and 52 fish assumed to be chum. Methodology corrects for probable double-counting of fish that live for several days in the stream.
- Owing to distribution of coho returns and high level of pre-spawn mortality, risk of double-counting coho is low and "area under the curve" methodology is not applied.

Carcasses Summary

Species	Coho 	Chum	Unidentified Adults
Miller Creek	20	25	2
Walker Creek	1	13	1
Total	**21**	**38**	**3**

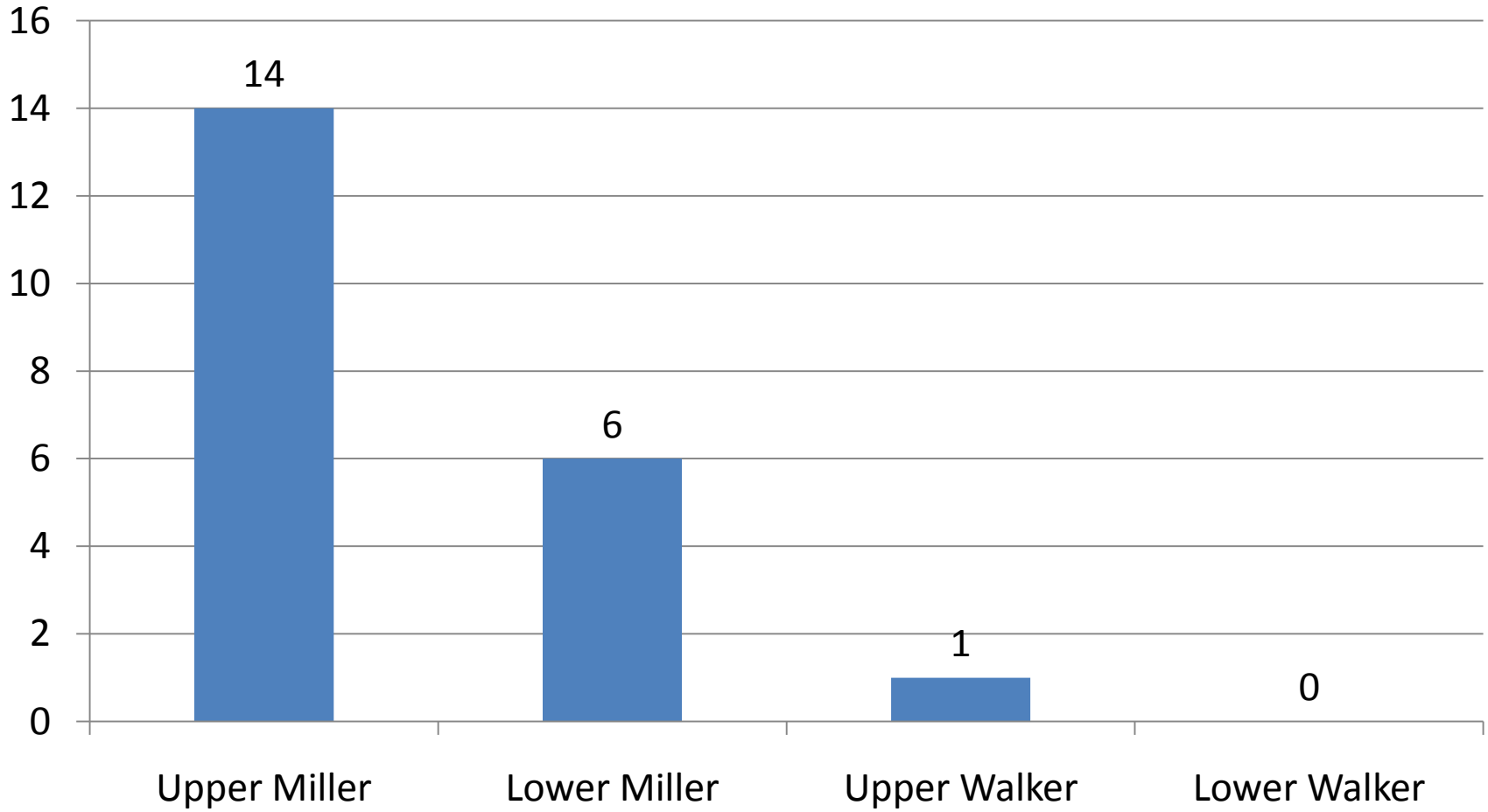
Pre-Spawn Mortality



Coho experiencing "pre-spawn" mortality at Upper Miller survey location

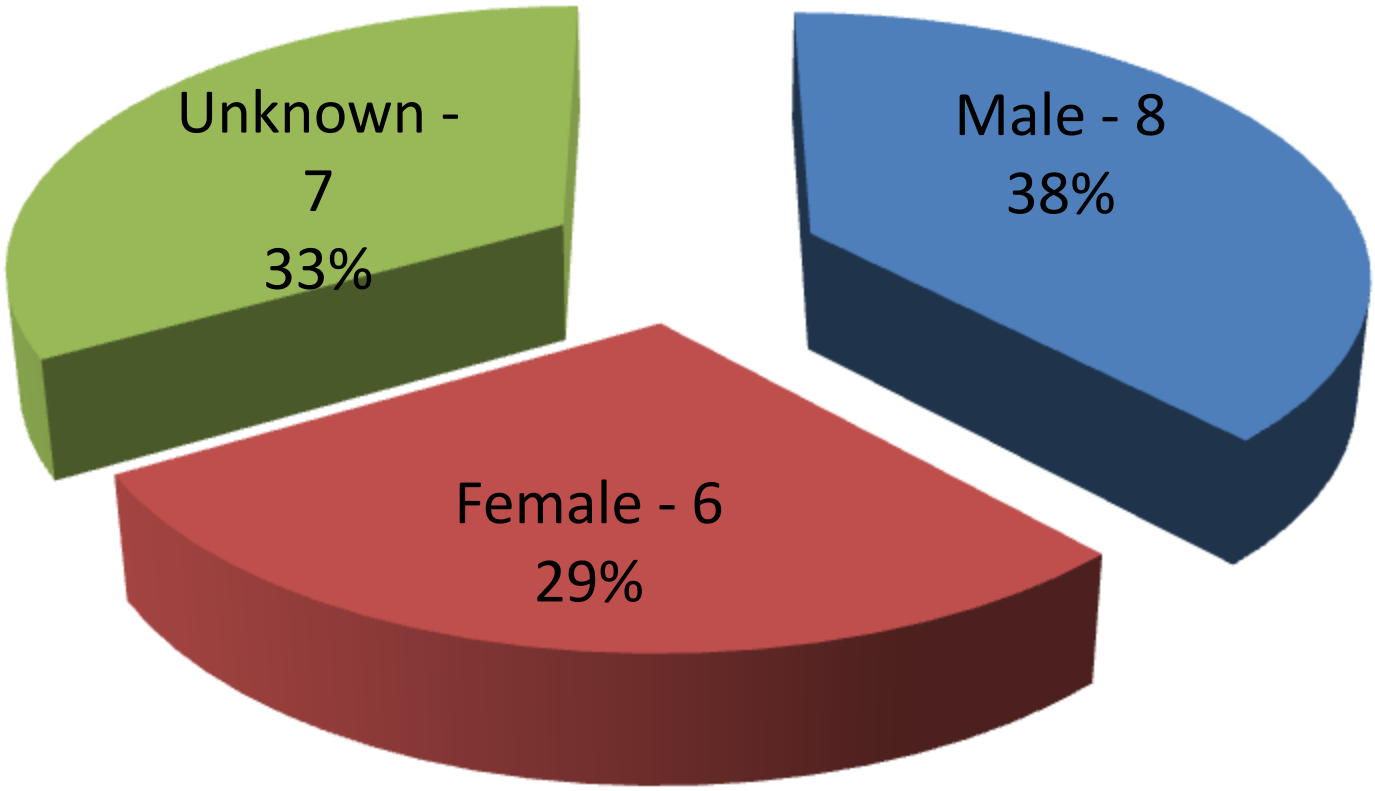
October 23, 2009

Coho Carcasses: Location



N = 21

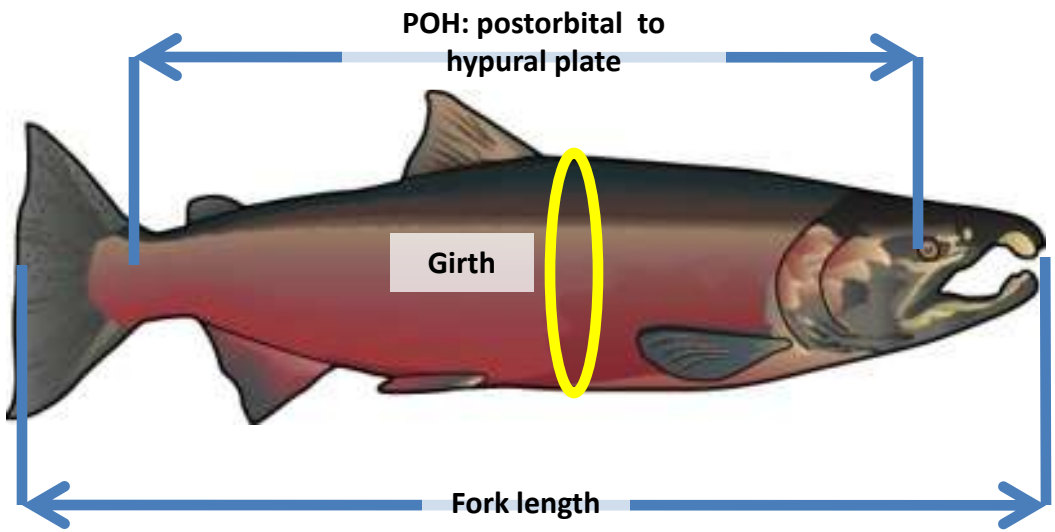
Coho Carcasses: Sex



N = 21

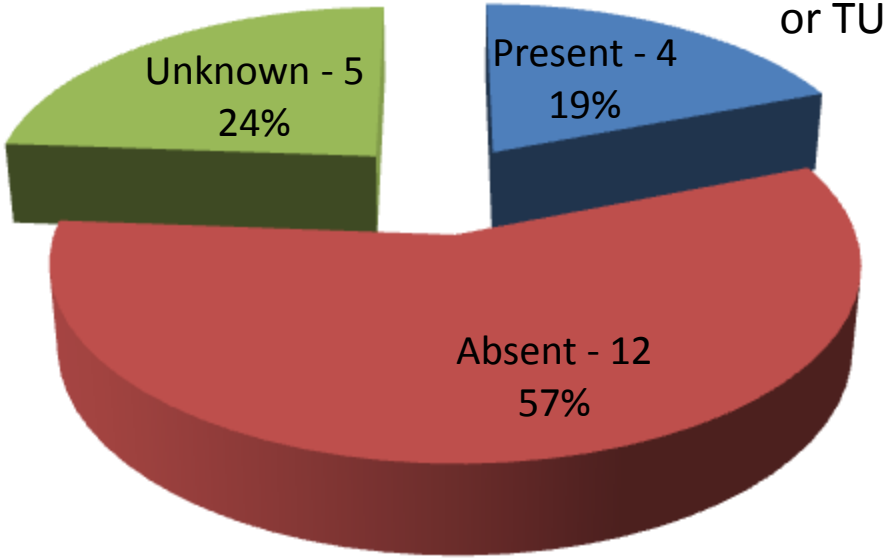
Coho Carcasses: Measurements

	Fork length (cm)	Girth (cm)	POH (cm)
Male average	59.7 (N = 8)	30.9 (N = 5)	38.8 (N = 6)
Female average	60.9 (N = 6)	30.7 (N = 6)	47.2 (N = 6)



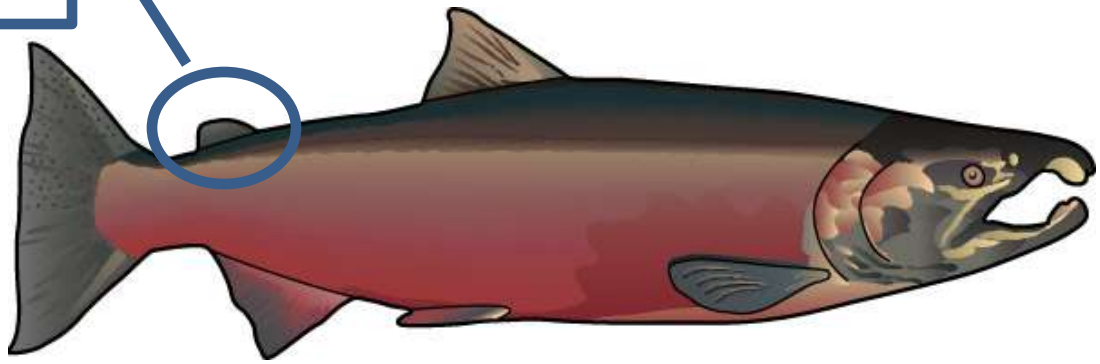
Coho: Hatchery Origin

4 fish were “wild-origin” or TU outplanted fish



12 fish originated from hatcheries outside of the basin and “strayed” into the streams to spawn

Adipose fin



N = 21

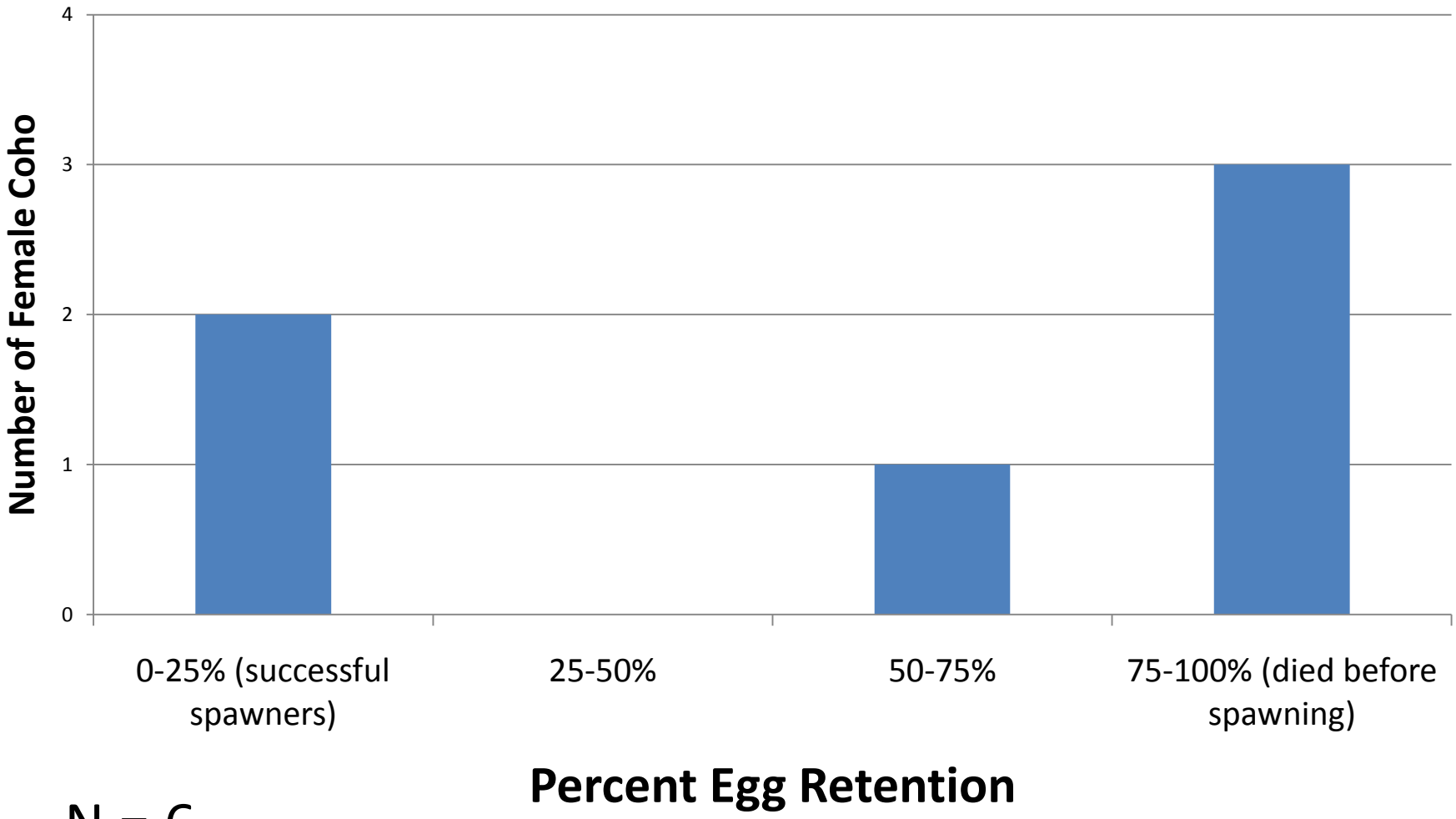
Collecting Coho Heads for Coded Wire Tag Analysis

“Don’t mind the severed heads in the freezer!”

Transferring the heads to U.S. Fish & Wildlife Service

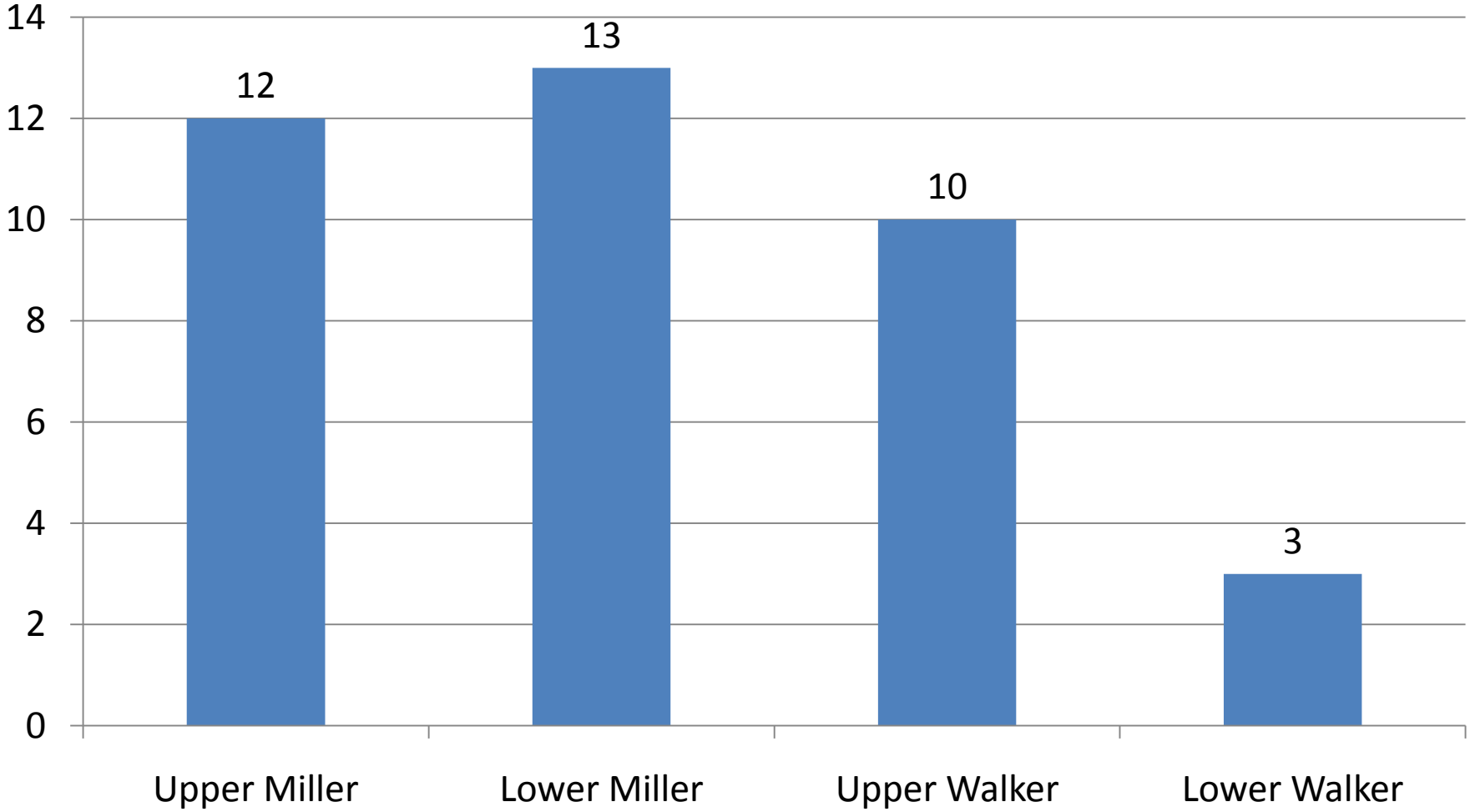
Image from Alaska Department of Fish and Game

Coho: Success in Spawning



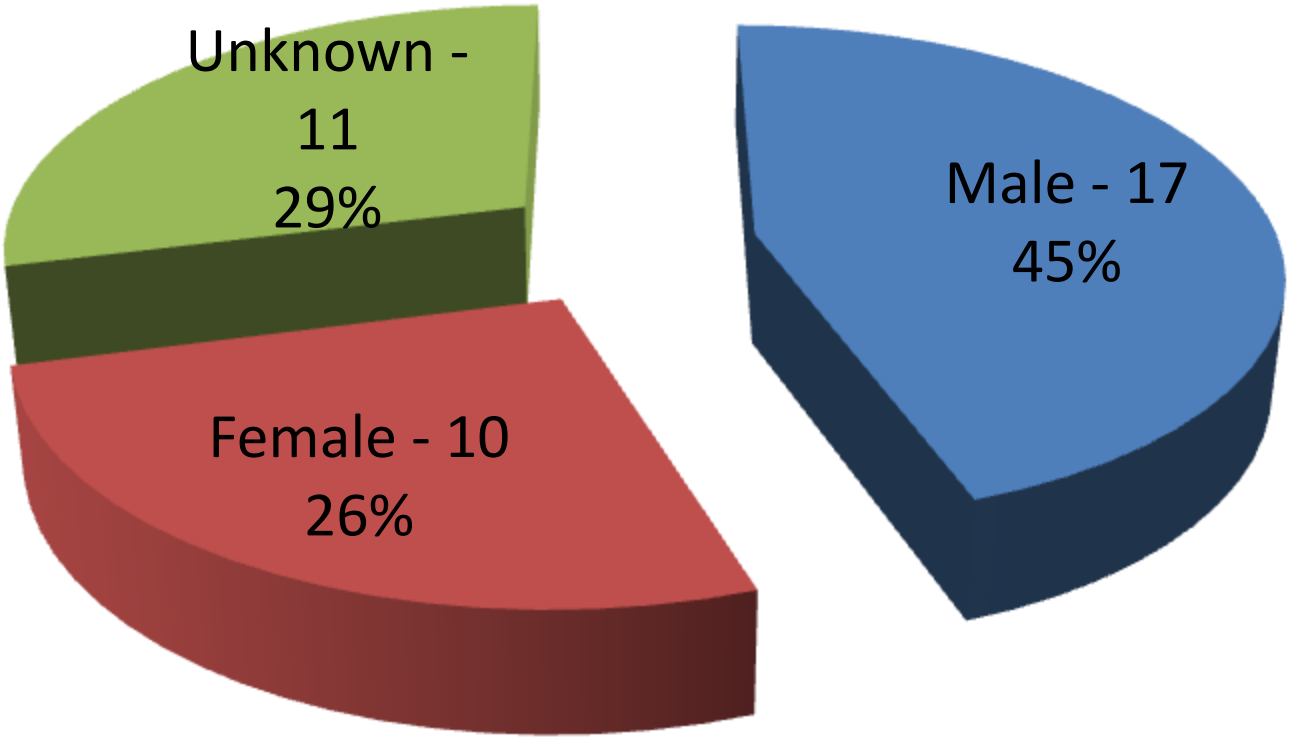
N = 6

Chum Carcasses: Location



N = 38

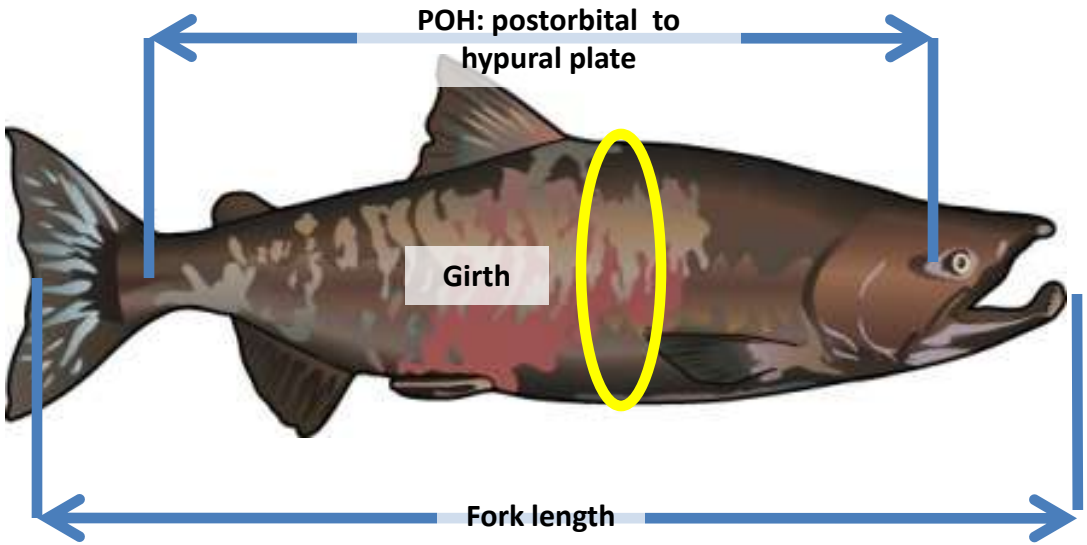
Chum Carcasses: Sex



N = 38

Chum Carcasses: Measurements

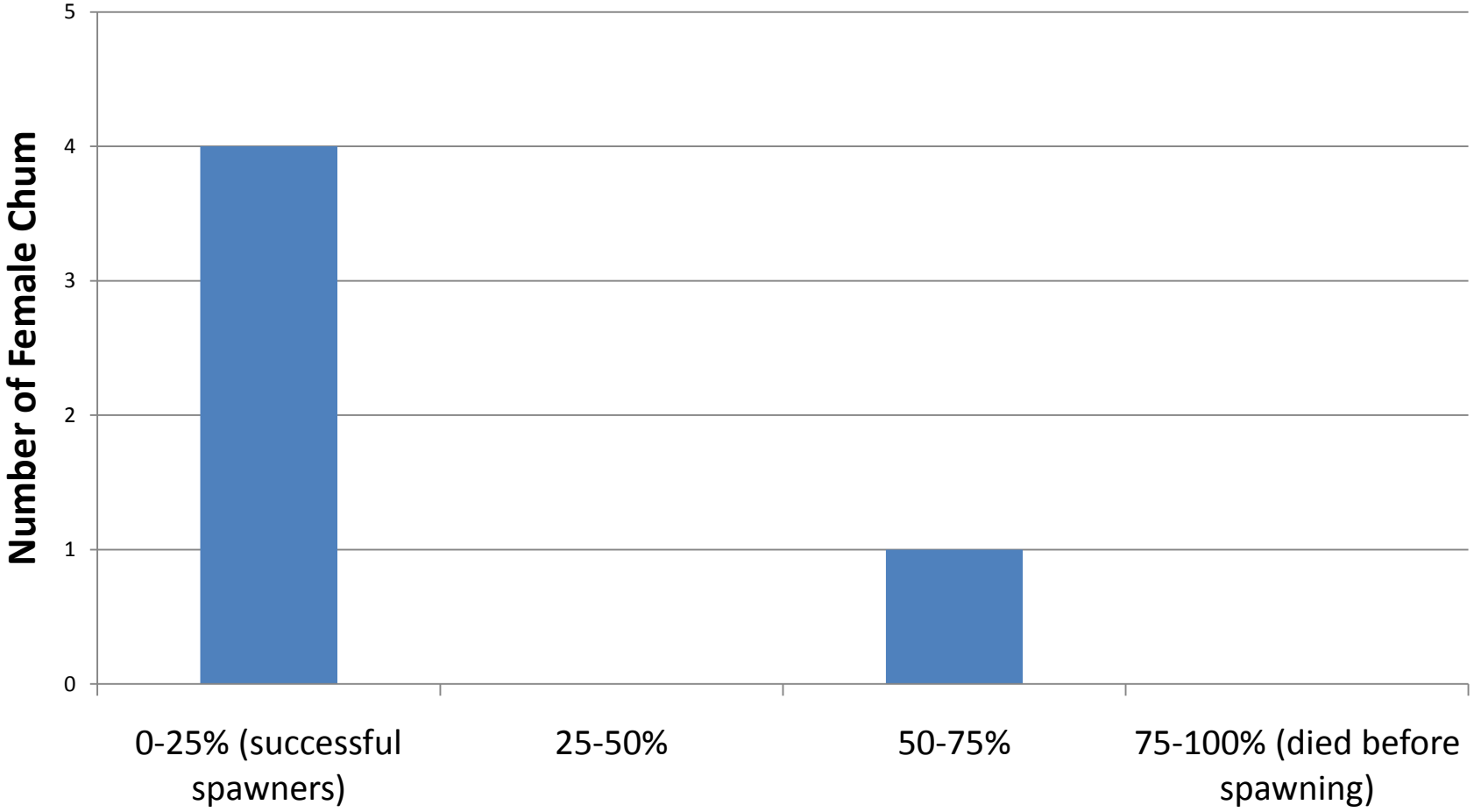
	Fork length (cm)	Girth (cm)	POH (cm)
Male average	66.0 (N = 15)	29.7 (N = 9)	47.7 (N = 12)
Female average	65.0 (N = 12)	26.3 (N = 4)	48.3 (N = 8)



Chum: Hatchery Origin Unknown

All have adipose fin

Chum: Success in Spawning



N = 5

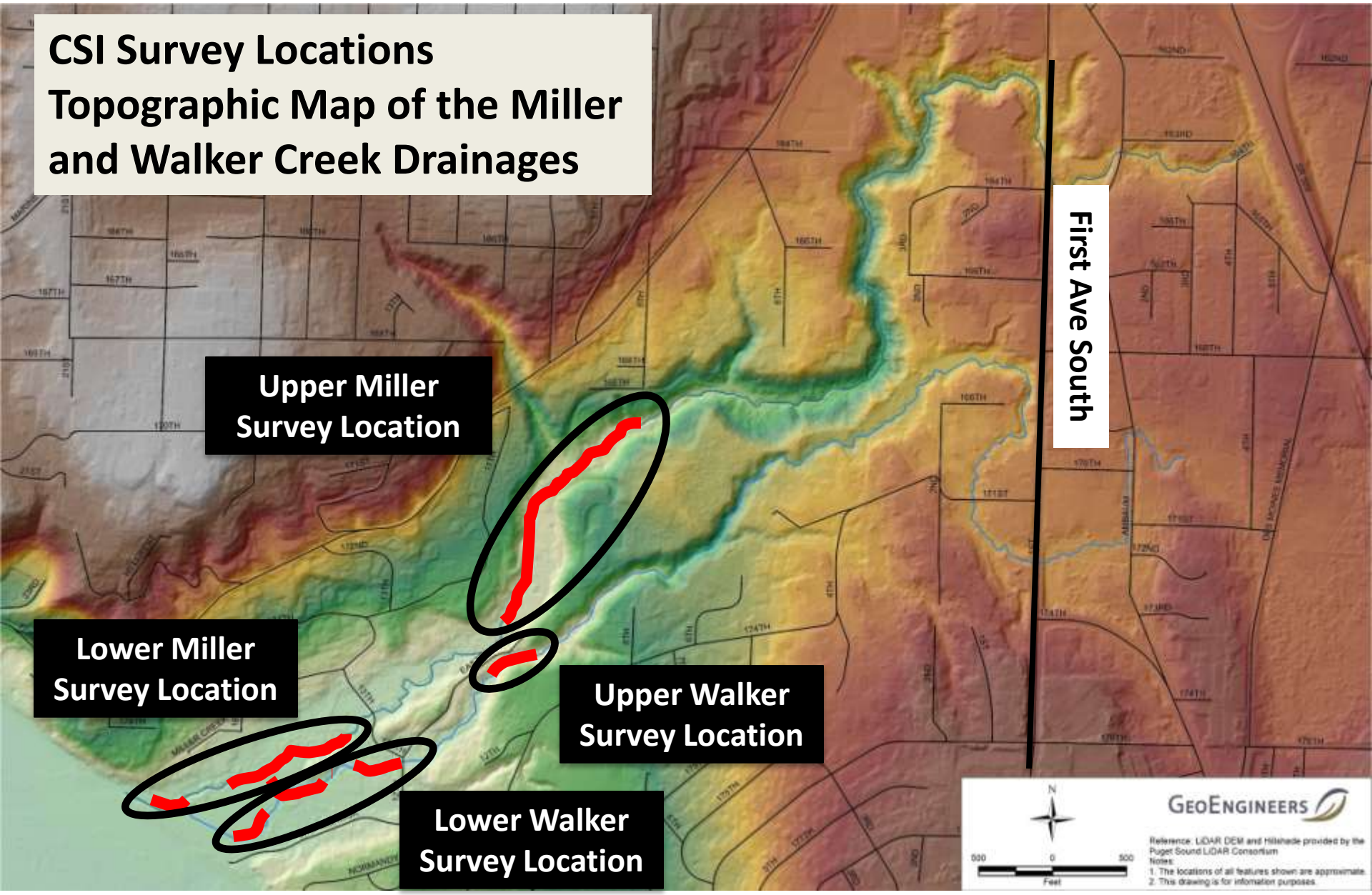


Image courtesy of GeoEngineers and Washington State Department of Transportation

The Mystery of the Missing Carcasses

- For every 1 living coho, we found 0.8 carcasses.
- For every 1 living chum, we found only 0.1 carcasses!
- For every 1 living chum seen on Walker Creek, 3 chum were seen on Miller Creek.
- But for every 1 chum carcass found on Walker Creek, only 2 chum carcasses were found on Miller Creek.
- 90% of living chum seen on Miller Creek were seen at Upper Miller Creek location but only 48% of chum carcasses on Miller Creek were found at Upper Miller Creek.

Conclusions:

1) Too few chum carcasses were found overall

2) Too few chum carcasses were found at Upper Miller Creek

Hypotheses

1. As the adult salmon migration season progresses, intensity of scavenging increases
2. Scavenging activity is disproportionately occurring in the Upper Miller Creek survey area

Evidence for Scavenging

Extensively predated chum carcass on Miller Creek

December 21, 2010

Evidence for Scavenging

Predation on staked carcass

December 18, 2010
Photo courtesy of Annette Anderson

Evidence for Scavenging

Bloody snow by the stream

November 25, 2010

Photo courtesy of Jon Jones

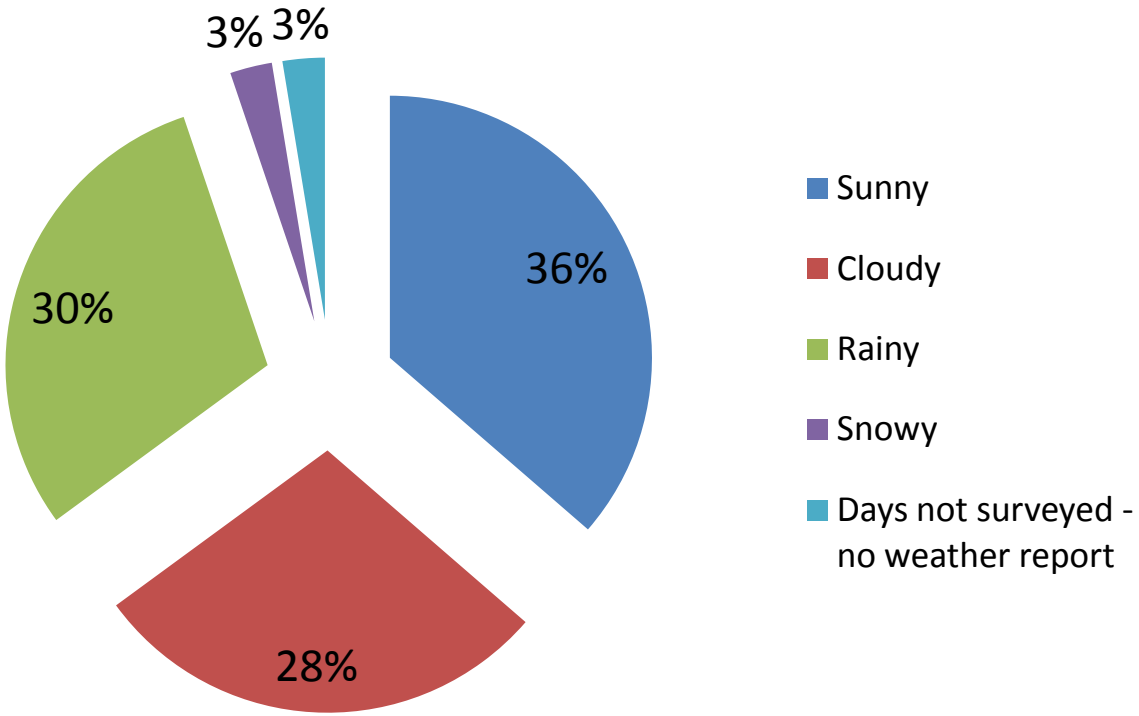
Evidence for Scavenging

Christine and Kerry interrupted three river otters eating this chum at Upper Miller

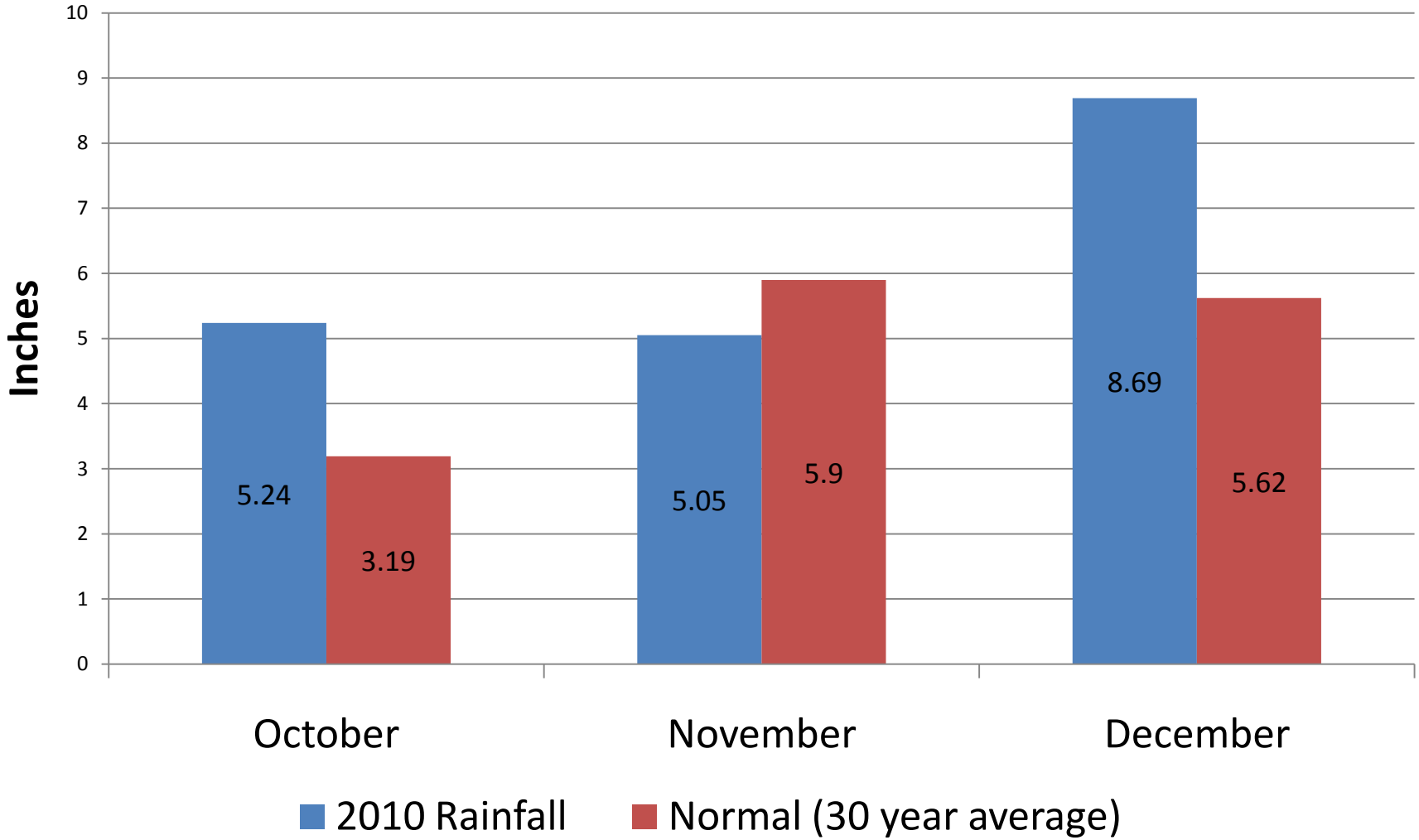
November 9, 2010

CSI Weather

- Average survey time = 2 hours, 48 minutes
- Weather conditions

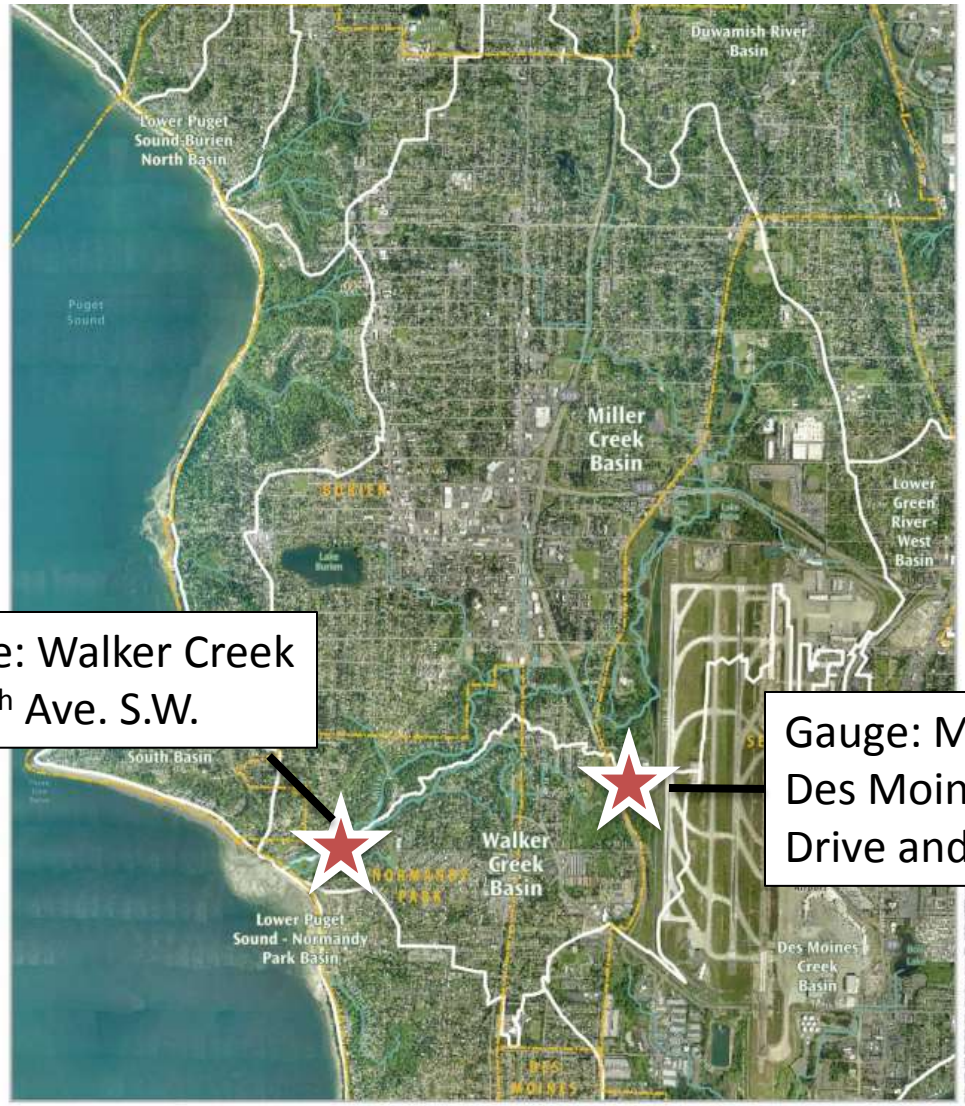


Precipitation During Survey Period



October – December precipitation was 29% above average

Stream Gauge Locations



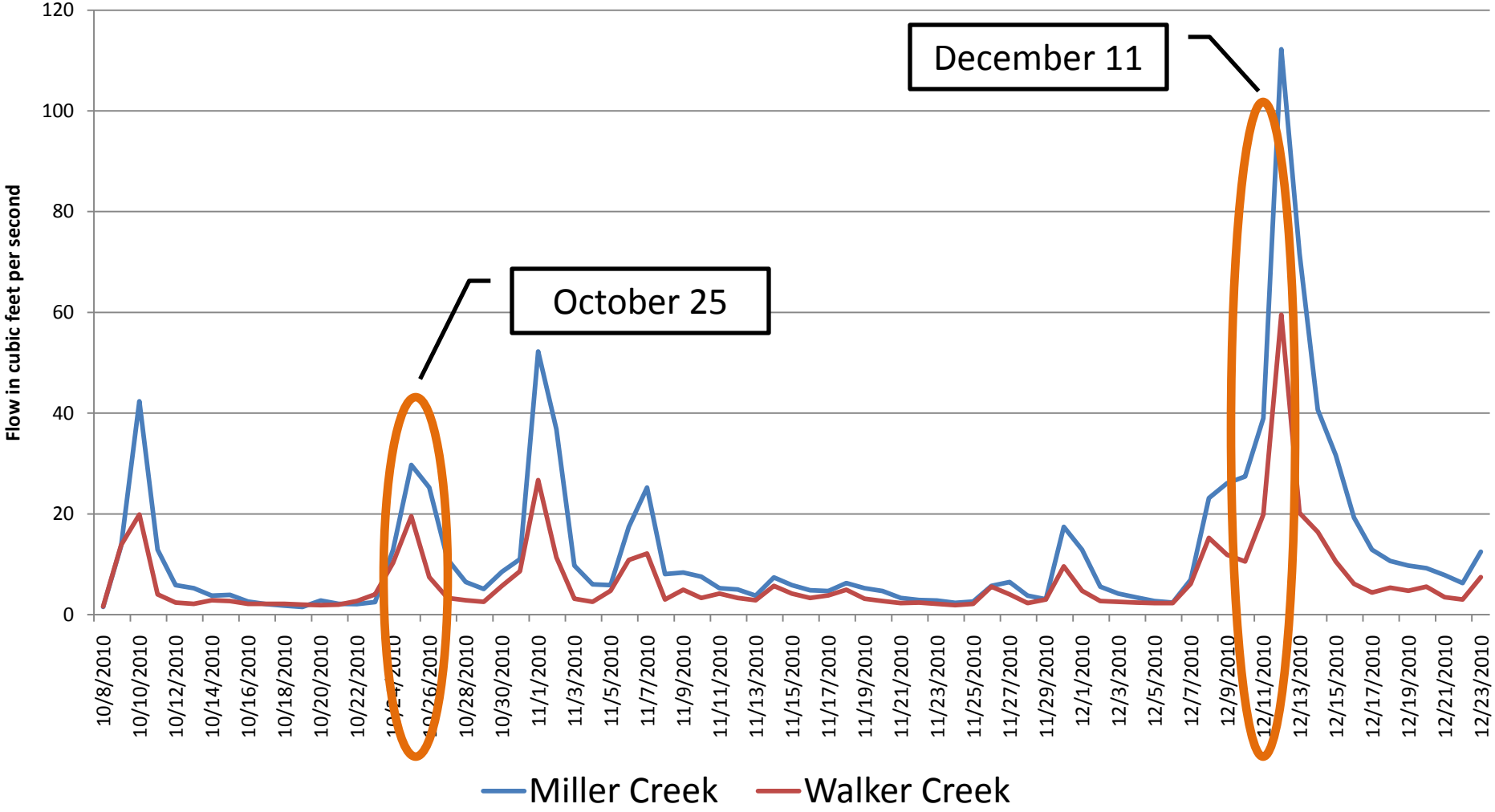
Miller and Walker Creeks

Gauge: Walker Creek at 13th Ave. S.W.

Gauge: Miller Creek at Des Moines Memorial Drive and SR509

Creek Flow – Daily Peaks

Miller Creek at Des Moines Memorial Drive/SR509
Walker Creek at 13th Ave. S.W.



Upper Miller Creek – October 25

Upper Miller Creek – December 11

Upper Miller Creek – December 21

Upper Miller Creek – October 25

Upper Miller Creek – December 11

"Team Saturday" Stefanie tries to stay dry

December 11, 2010

Photo courtesy of Annette Anderson

Upper Miller Creek – December 21

Upper Miller Creek – December 16

"Team Thursday" Paul observes new channel

December 16, 2010

Photo courtesy of Jon Jones

Lower Miller Creek – December 21

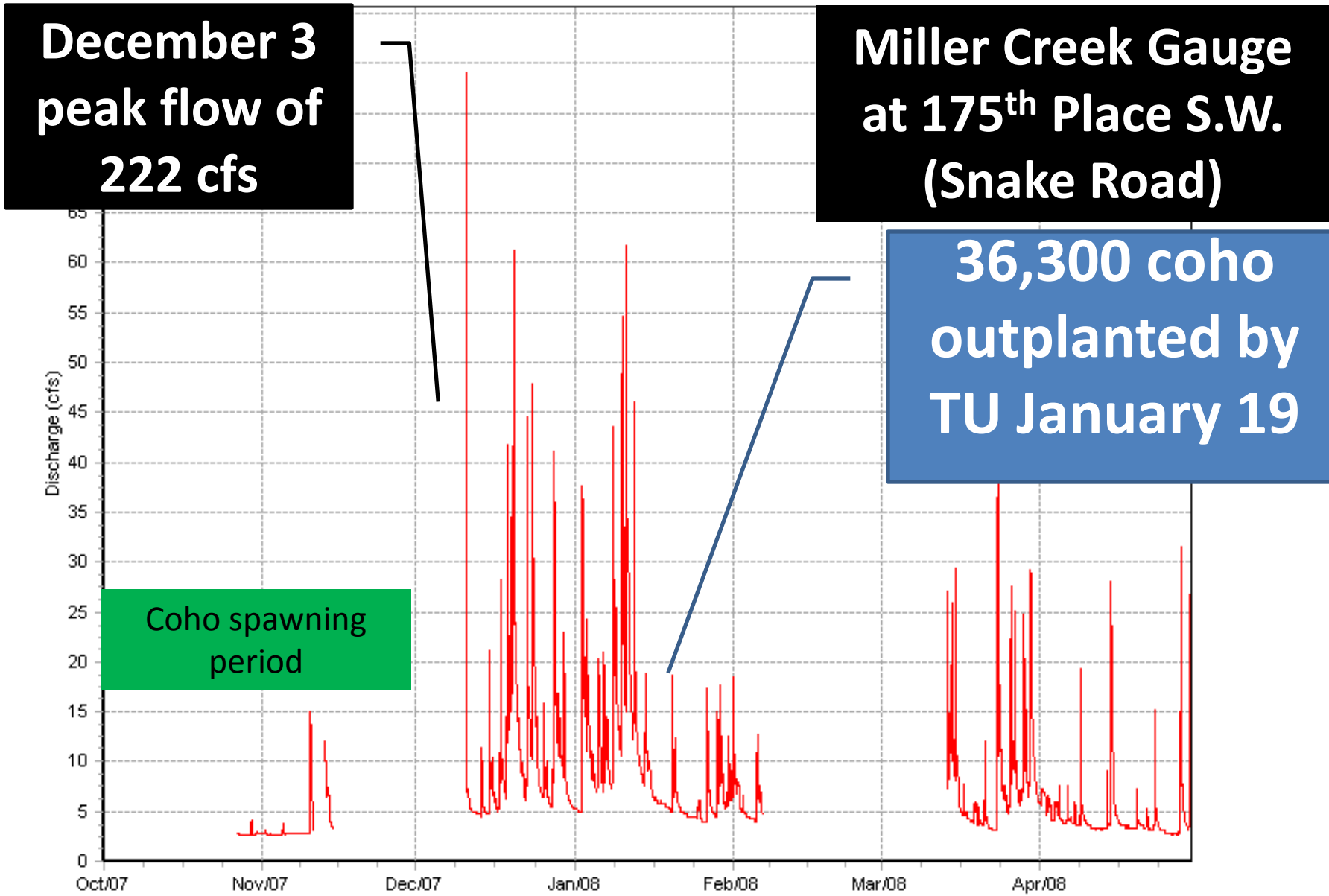
Lower Miller Creek – December 12

Lower Miller Creek – November 4

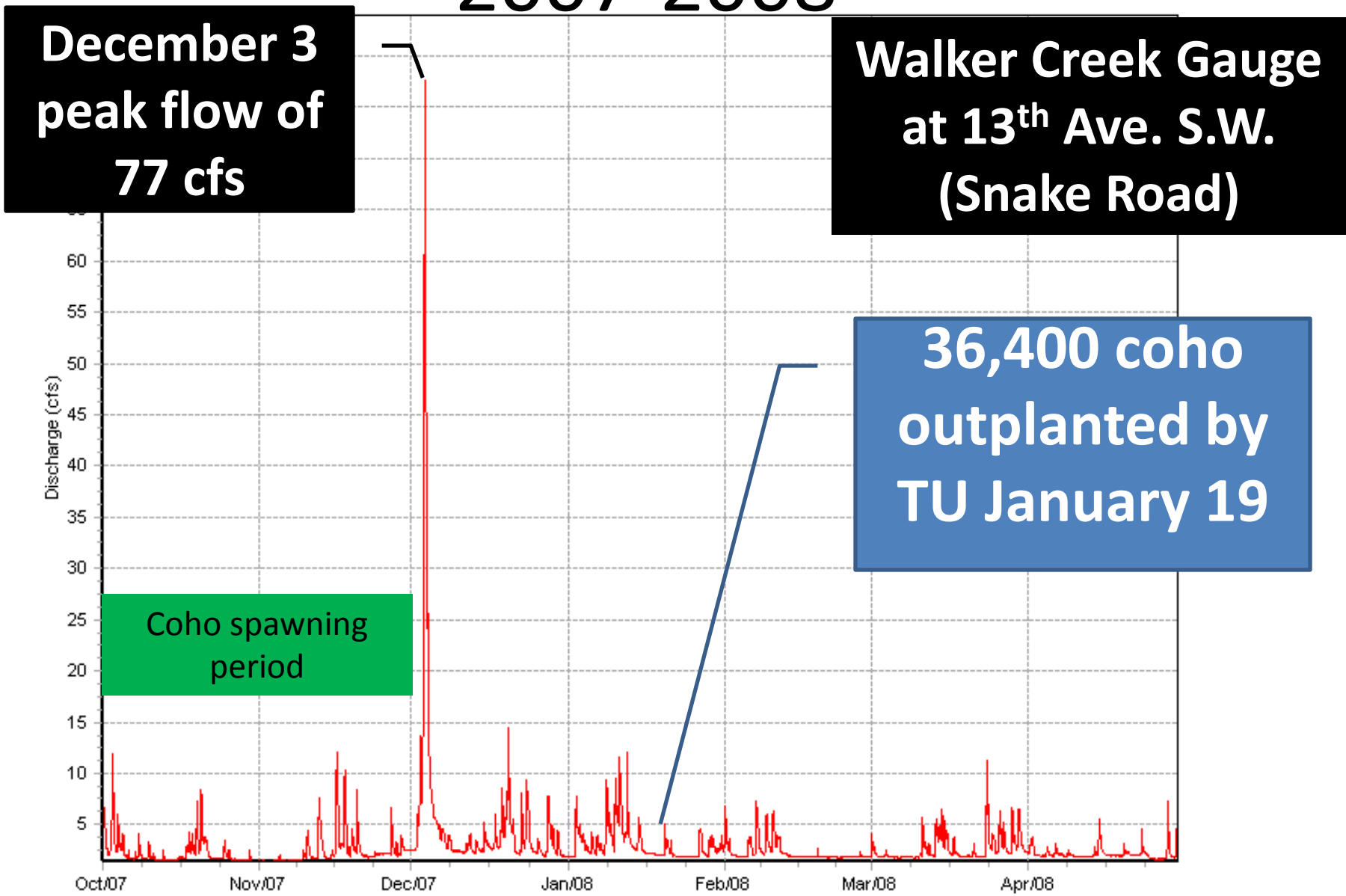
Lower Miller Creek – December 12

Photo courtesy of David Bobanick

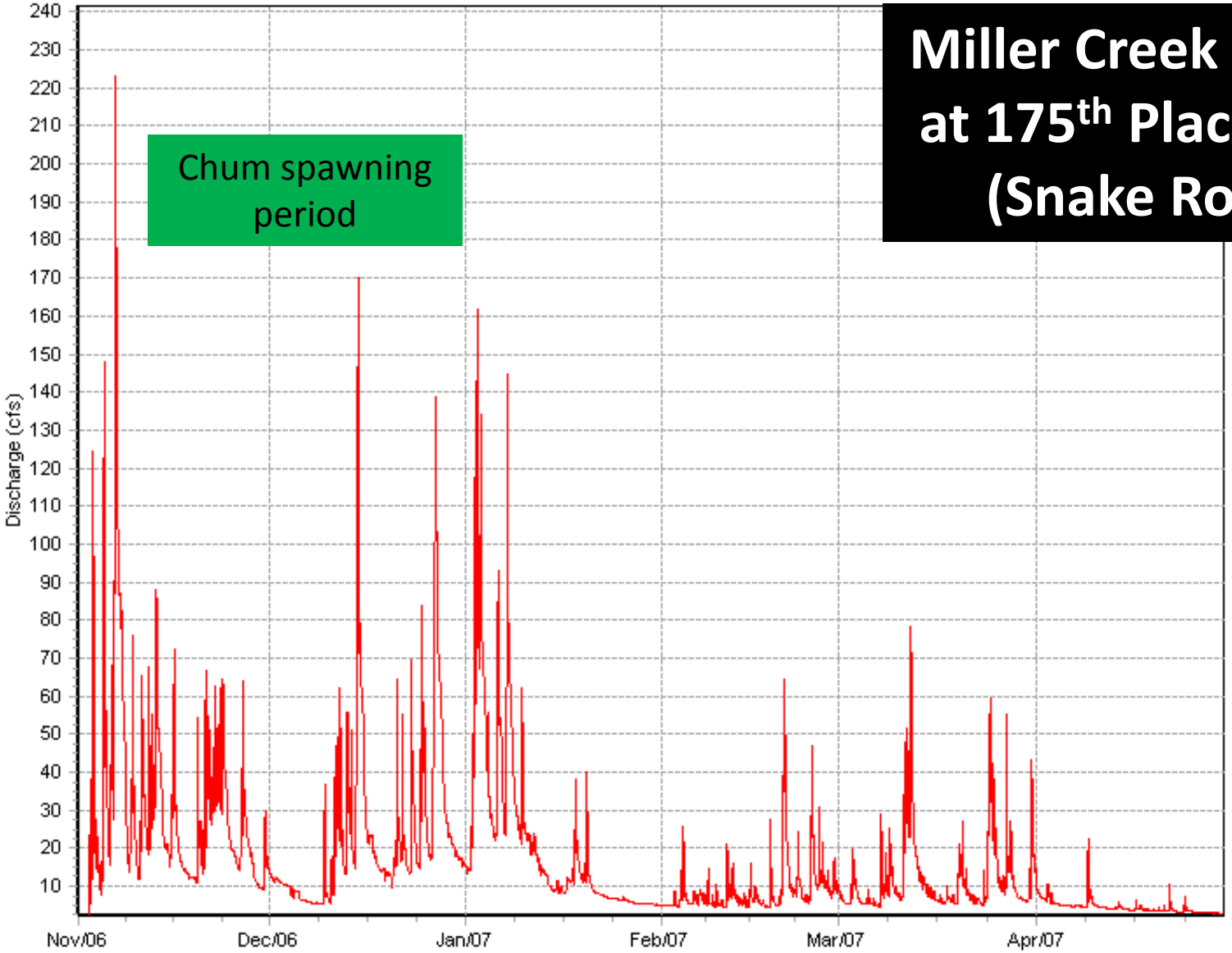
Hydrology During Coho Incubation 2007-2008



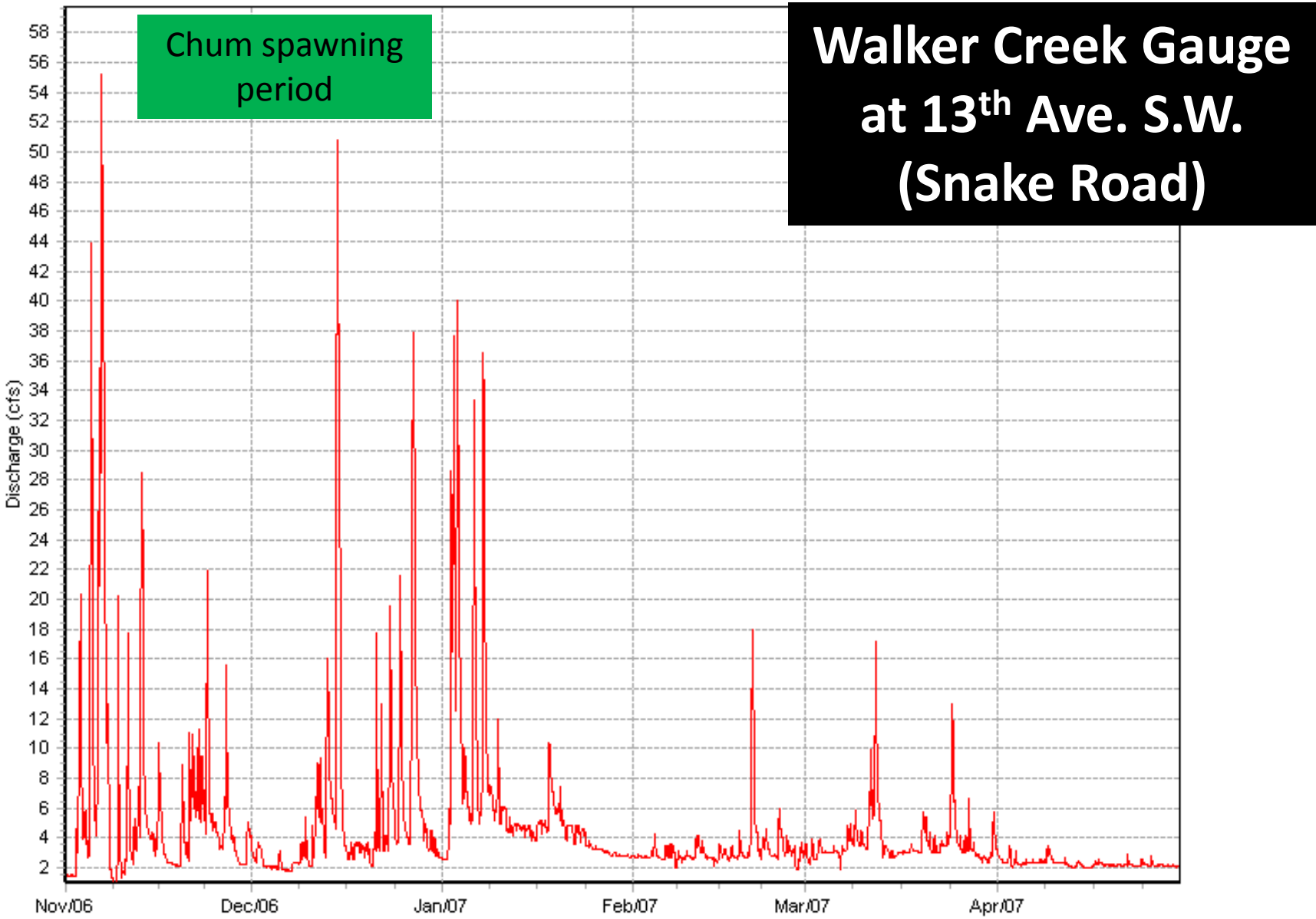
Hydrology During Coho Incubation 2007-2008



Hydrology During Chum Incubation 2006-2007



Hydrology During Chum Incubation 2006-2007



Wildlife

- Great blue heron
- Raccoon
- Coyote
- Bald eagle
- Red tailed hawks
- Pileated woodpeckers

Upper Miller at sewer plant
October 12, 2010

River otter

River otter

The Unexpected and Strange

- Number of CSI team members who got soaked = 5 (25%)
- Number of tennis balls = 10+
- Number of goldfish = 2

River otters in Fox Creek culvert just above Miller Creek confluence

November 26, 2010

Fox Creek culvert just above
Miller Creek confluence
November 26, 2010

Fish love . . . is it so wrong?

December 7, 2010

Photo courtesy of Christine Terry

Chum on Miller Creek
November 17, 2010
Photo courtesy of Barb and Darrell Williams
Chum on Miller Creek on November 27 – Part 2
footage by Barb and Darrell Williams

Volunteer Recognition

"Team Sunday"
David and Ethan conduct necropsy on female coho on Miller Creek
November 7, 2010

Awarded this 26th day of January 2011 to

YOUR NAME HERE

in appreciation for your dedicated scientific pursuit of salmon, living and dead, in Miller and Walker Creeks from October 8 to December 23, 2010 during the inaugural year of the Community Salmon Investigation for Highline. Your collection of data on adult salmon will help the community monitor its efforts to improve the health of the lands and waters of Highline as we seek to pass on a the legacy of a vibrant Puget Sound to future generations.

Dow Constantine, Executive
King County

Joan McGilton, Mayor
City of Burien

George Hadley, Mayor
City of Normandy Park

Shared Funding for Stewardship

King County basin stewardship is jointly funded by five governments:

BURIEN

CITY OF NORMANDY PARK WASHINGTON

CITY OF SEATAC EST. 1990

King County

Port of Seattle

4) Plans for 2011 CSI

"Team Sunday"
Ethan prepares flagging for a carcass
December 5, 2010
Photo courtesy of David Bobanick

Plans for 2011 CSI Survey Season

- Continue the excellent work of 2010 by surveying again at four initial locations in Normandy Park
- Add locations upstream in Burien and Normandy Park
- Monitor through end of December
- Increase volunteer pool from 20 to 30 persons (including Highline School District seniors for culminating projects)

5) Factors Driving Stream and Salmon Health

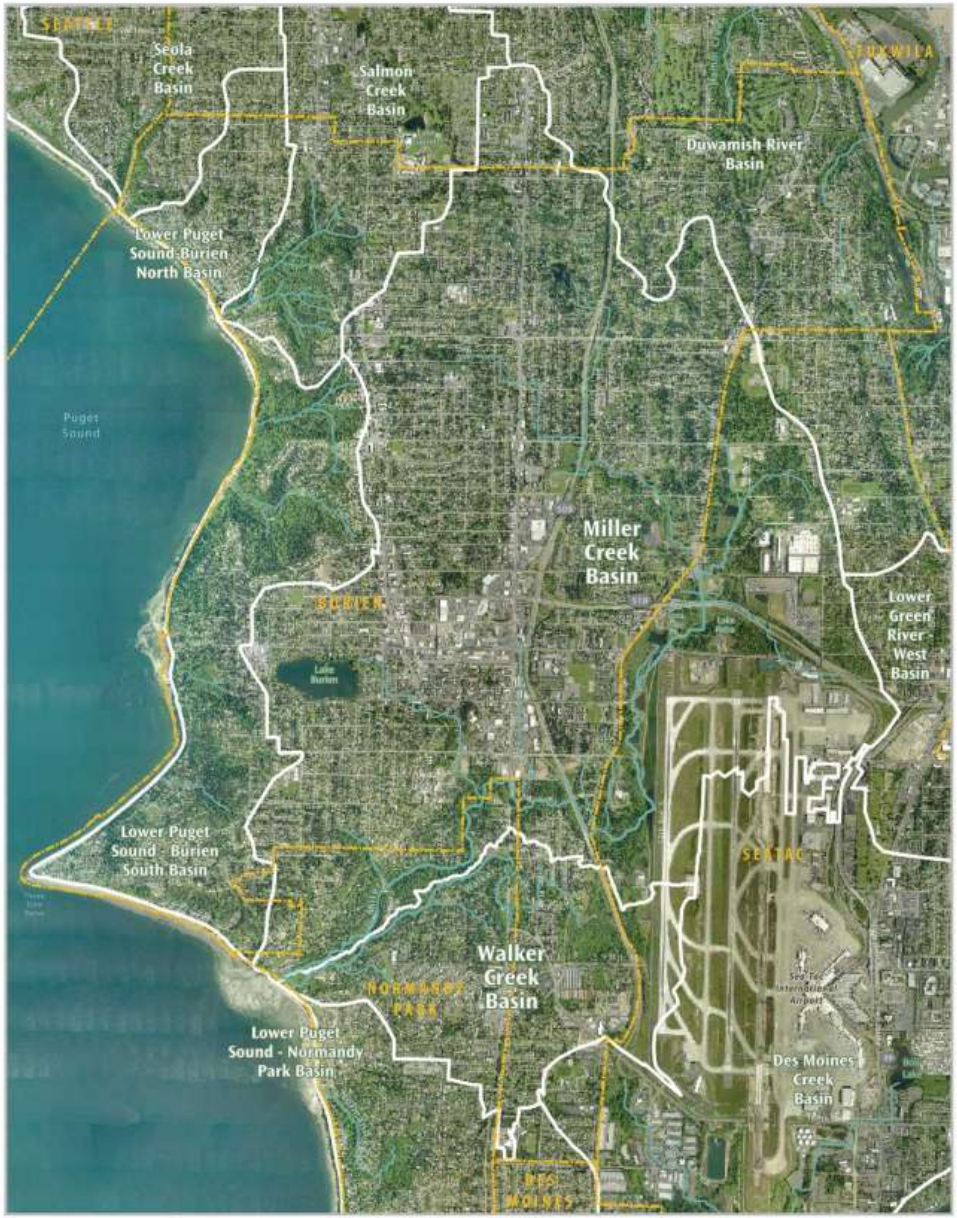
St. Francis Elementary students mark storm drains by Lake Burien

October 5, 2010

Photo courtesy of Michael Stein-Ross

Independent Chinook Populations

We are here



Miller and Walker Creeks

Basin Boundary Update 2010

Basin Boundary

Incorporated Area Boundary

Map Document:
(c:\Dwrp1\projects\WLRD\10069\MillerWalker2graphics.mxd)

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

N

0 1/4 1/2 1 Mile

06/04/10

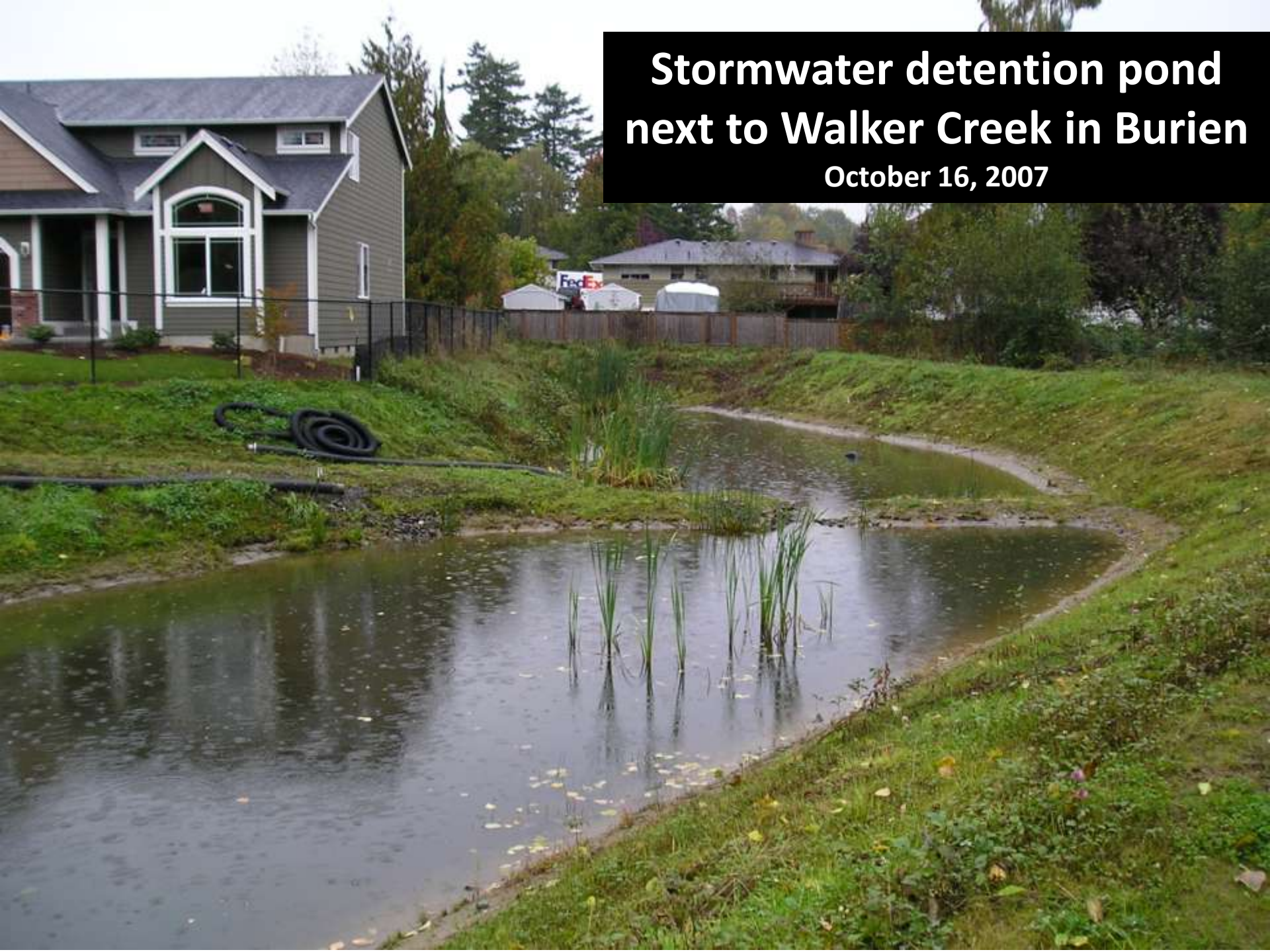
Factors Driving Stream and Salmon Health in Highline

- Increased impervious surfaces: roads, parking lots, roofs, cleared/compacted earth
- Decreased forest cover
- Pollution on land: pesticides, fertilizer, oil, metals (e.g., brake pad residue), car wash soap, pet waste, silt
- Fish passage barriers: culverts

Ways Streams Are Affected

- Hydrology – stream flow
  - Higher peak flows
  - Lower summer flows
- Water quality
  - Poor temperature, dissolved oxygen, pH, turbidity
  - Increased bacteria, metals, pesticides, oil, etc.
- Physical habitat conditions
  - Substrate: hardened, cobble, gravel, sand, silt
  - Streamside vegetation: native, invasive, absent
  - Reaches accessible to resident and anadromous fish

Coho salmon fry in Miller Creek in Normandy Park
June 30, 2008



Stormwater detention pond next to Walker Creek in Burien

October 16, 2007

Expanded Ambaum stormwater detention pond in Burien

December 3, 2007

With funding support from:

Port of Seattle

Washington State Department of Transportation

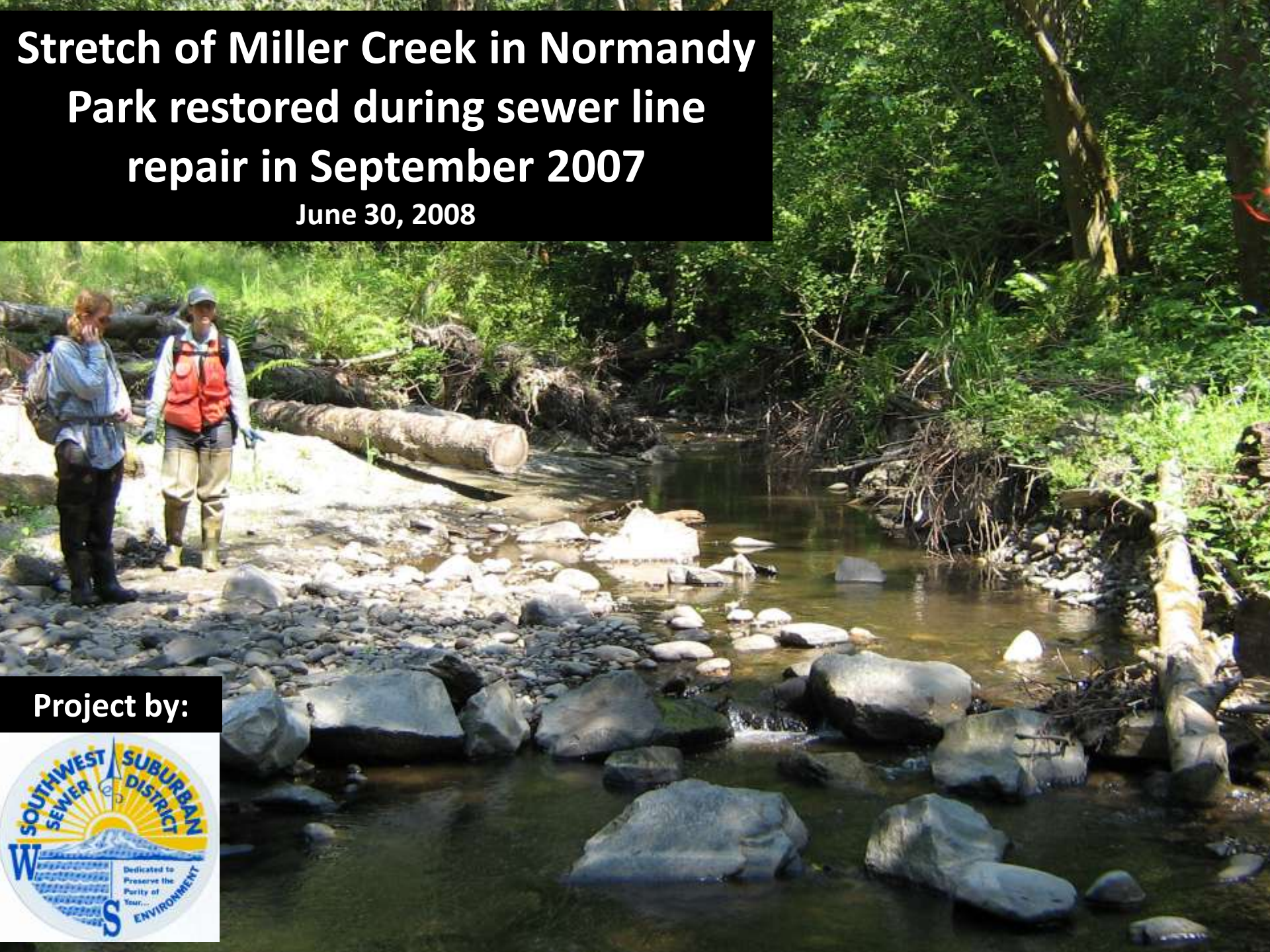
Restoration of Walker Creek at Walker Preserve

August 24, 2009

With funding support from: King Conservation District

Stretch of Miller Creek in Normandy Park restored during sewer line repair in September 2007

June 30, 2008



Project by:

SOUTHWEST SUBURBAN SEWER DISTRICT

Dedicated to Preserve the Purity of Your... ENVIRONMENT

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

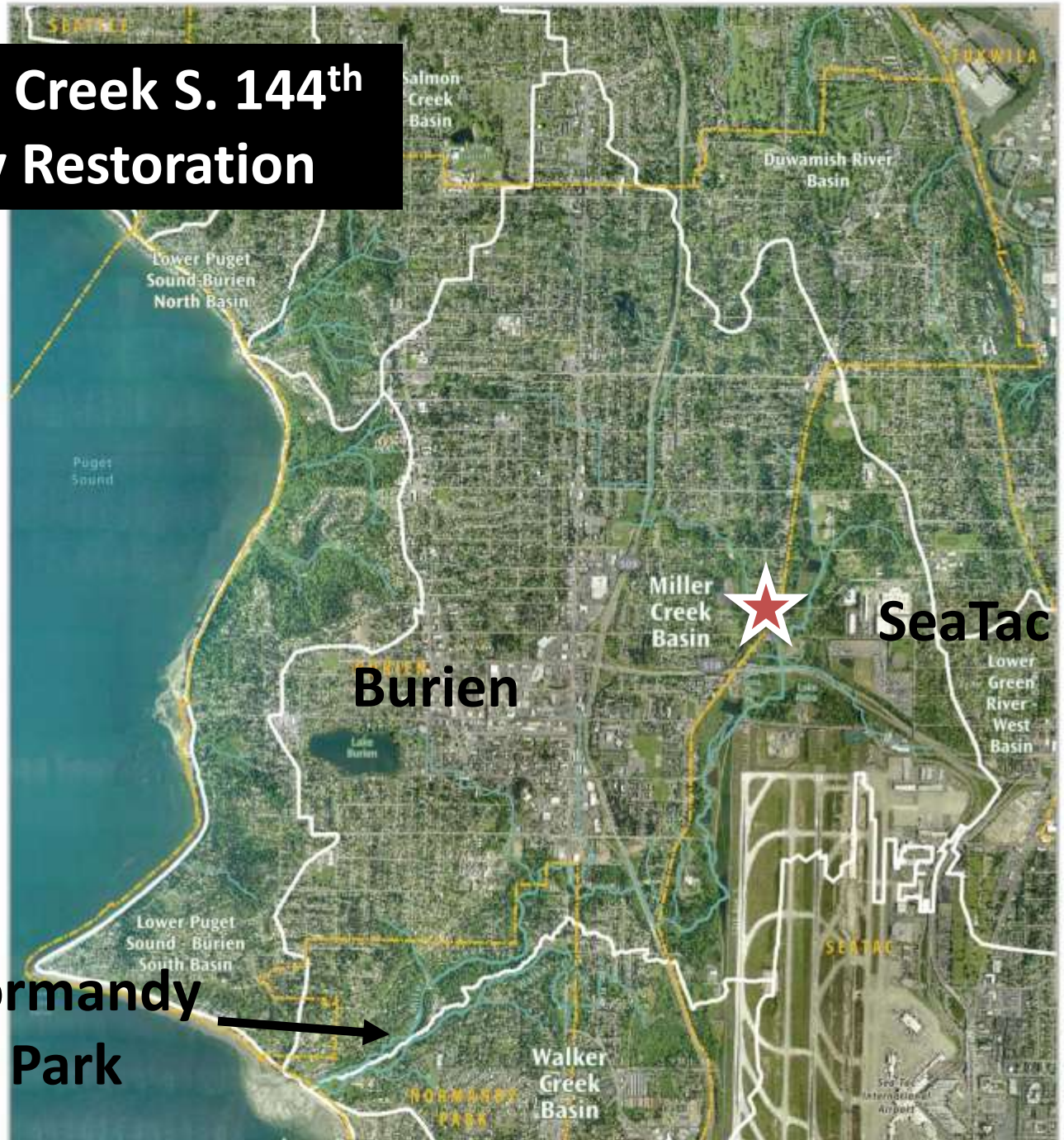
Homeowner Stewardship

Before
November 16, 2007

After
January 11, 2008

Photo on right courtesy of Kevin Alexander

Miller Creek S. 144th Way Restoration



"Before" restoration at S. 144th
Way on Miller Creek in Burien
October 11, 2007

"Before" restoration at S. 144th Way on Miller Creek in Burien
October 11, 2007
Invasive Himalayan blackberry;
no small native trees

Earth Corps crew begin to remove blackberry

October 22, 2007

Highline High School student volunteers planting

October 26, 2007

Community tree-planting

October 27, 2007

Community tree-planting
October 27, 2007

VCC members October 26, 2007

Washington Veterans Conservation Corps (VCC) partnered at Miller Creek restoration project

VCC members October 27, 2007

"After" restoration at S. 144th Way
on Miller Creek in Burien
October 26, 2007
Himalayan blackberry removed;
over 150 native trees planted

Restoration site at S. 144th Way on Miller Creek in Burien

January 7, 2008

Earth Day planting of donated plants
April 19, 2008

Earth Day mulching

April 19, 2008

Restoration site at S. 144th Way on
Miller Creek in Burien
September 4, 2008

Tree planting at S. 144th Way on
Miller Creek in Burien
October 17, 2009

Installing trunk protectors on three-year old trees at S. 144th Way on Miller Creek in Burien

July 7, 2010

Normandy Park Mayor Pro Tem Clarke Brant removes ivy along Walker Creek in Normandy Park

March 22, 2008

Knotweed control on Walker Creek in Burien

October 16, 2007

Control by

King County

Funded by

Port of Seattle

Storm drain marking in Burien with Waskowitz (HSD) program students

July 9, 2010

6) Your Role

THIS STREAM
IS IN YOUR CARE
MILLER
CREEK
WITHIN THE
GREATER
PUGET SOUND
WATERSHED

Things *You* Can Do

Conserve water:

- By turning off the water when brushing teeth, shaving
- Fixing leaks (#6 “use” of water by households)
- By installing low flow showerheads, sink aerators, and toilets

Puget Sound Starts Here

Things *You* Can Do

Clean up after your pet

Xena the Warrior Princess and Mr. Humphrey

Things *You* Can Do

Your car:

- 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 thus out of the creek)

Puget Sound Starts Here

Things *You* Can Do

Build a rain garden:

Rain garden at Burien Town Square

January 25, 2011

Photo courtesy of Ken Srilofung, City of Burien

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

Before

Save your trees – remove the ivy

After

Things *You* Can Do: Volunteer

"Test plot" revegetation on Miller Creek

October 16, 2010

Volunteer Autumn 2011

In partnership with:

Things *You* Can Do: Volunteer

Invasive plant removal at Arbor Lake in Burien

November 20, 2010

Volunteer

Saturday, February 5

9 a.m. – 11 a.m.

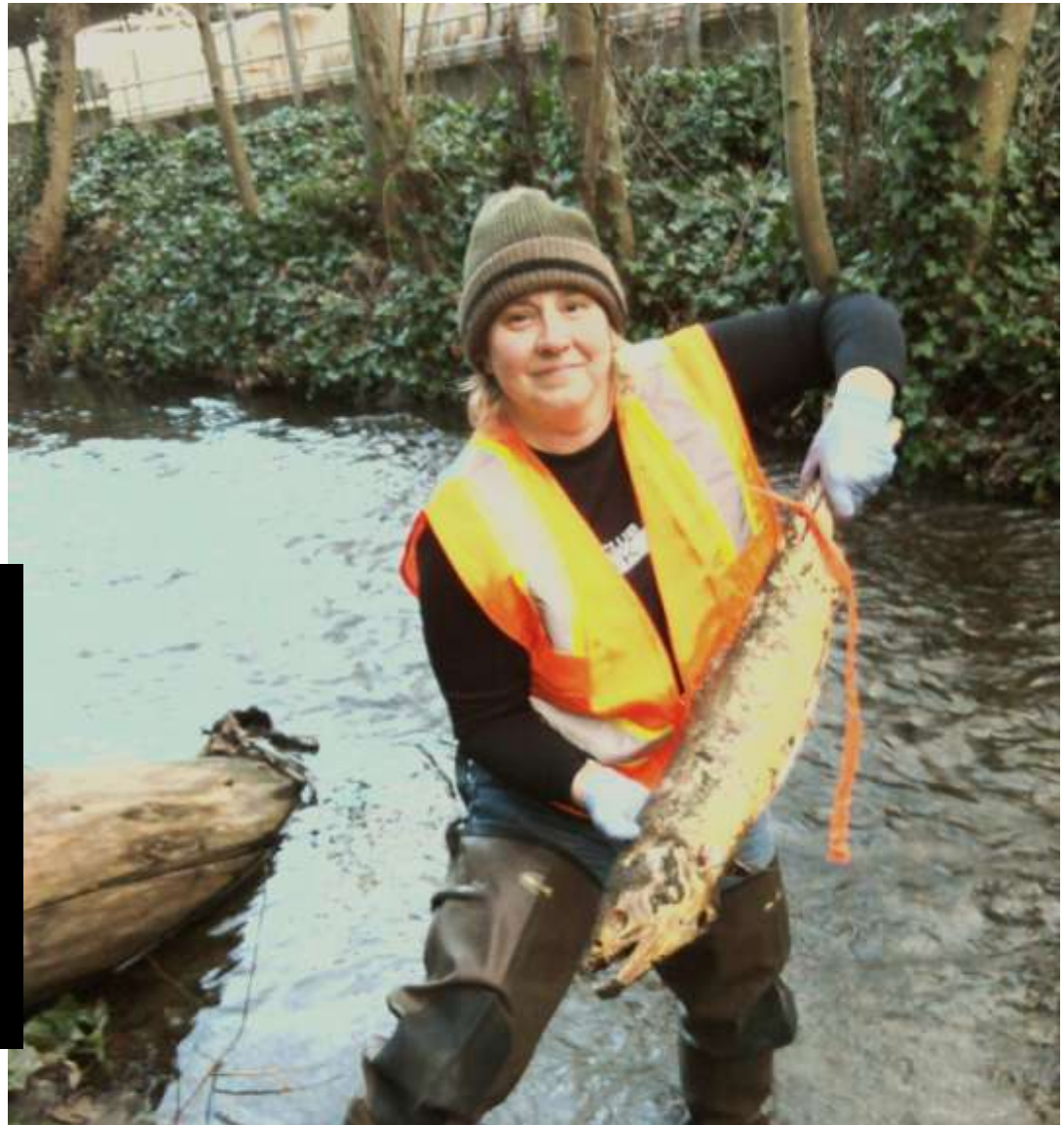
2nd Ave. S. and S. 124th St.

In partnership with Parks, Recreation and Cultural Services

BURIEN

Things *You* Can Do: Volunteer

Volunteer for the Community Salmon Investigation for 2011!



"Team Saturday" Annette prepares to stake a chum carcass on Upper Miller Creek
December 4, 2010
Photo courtesy of Stefanie Berg

Community Salmon Investigation for Highline 2010 Presentation

1. Purpose of *CSI: Highline*
2. How *CSI: Highline* works
3. Results of October – December 2010 surveys
4. Thanked volunteers and property owners
4. Plans for *CSI: Highline* 2011
5. Factors affecting stream and salmon health
6. Your role!

The End

Photo courtesy of Barb and Darrell Williams