

Community Salmon  
Investigations for  
Highline

**CSI: Highline**

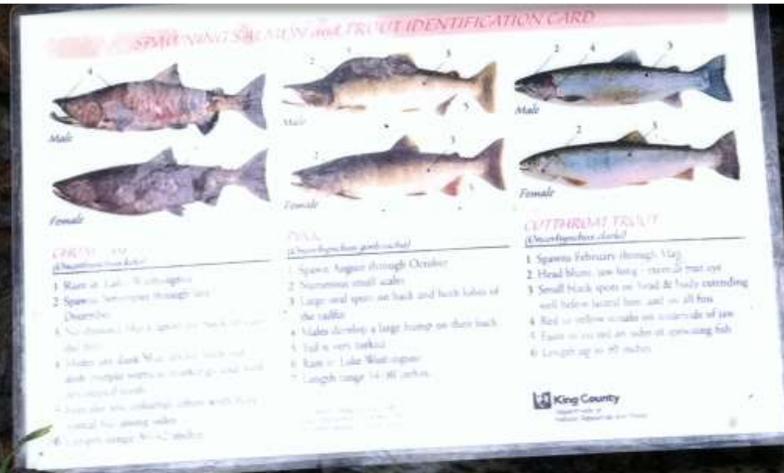
6<sup>th</sup> Annual Orientation & Training Workshop  
October 1, 2015

Elissa Ostergaard  
Miller-Walker Creek Steward, King County

# Agenda

- Why count & cut open salmon?
- How to survey
- Safety Requirements & Emergency Procedures
- Salmon & Redd identification – tips & practice
- Carcass necropsy for “pre-spawn mortality”
- Teams & scheduling, turn in waivers
- Submitting data – web form with new tricks
- Pick up survey kits & vests

# 1) Purpose of CSI



**Coho “jack”  
(immature male)**

November 11, 2011

Photo courtesy of David Bobanick

# Basin Boundaries for Miller and Walker Creeks



## Legend

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



Consulted April, 1994, updated June 2002  
[http://www.kingcounty.gov/natural\\_resources\\_and\\_parks/water\\_and\\_land\\_resources/division/](http://www.kingcounty.gov/natural_resources_and_parks/water_and_land_resources/division/)

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

# Basin Monitoring Coordination Workshops with Dennis Clark, Fall 2008



**Monitoring Workshop  
#3 in Burien  
December 4, 2008**

**Monitoring Workshop #1 at  
Burien Community Center  
September 24, 2008**



# Activities and Purpose of *CSI: Highline*

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

# Life Cycle of Pacific Salmon

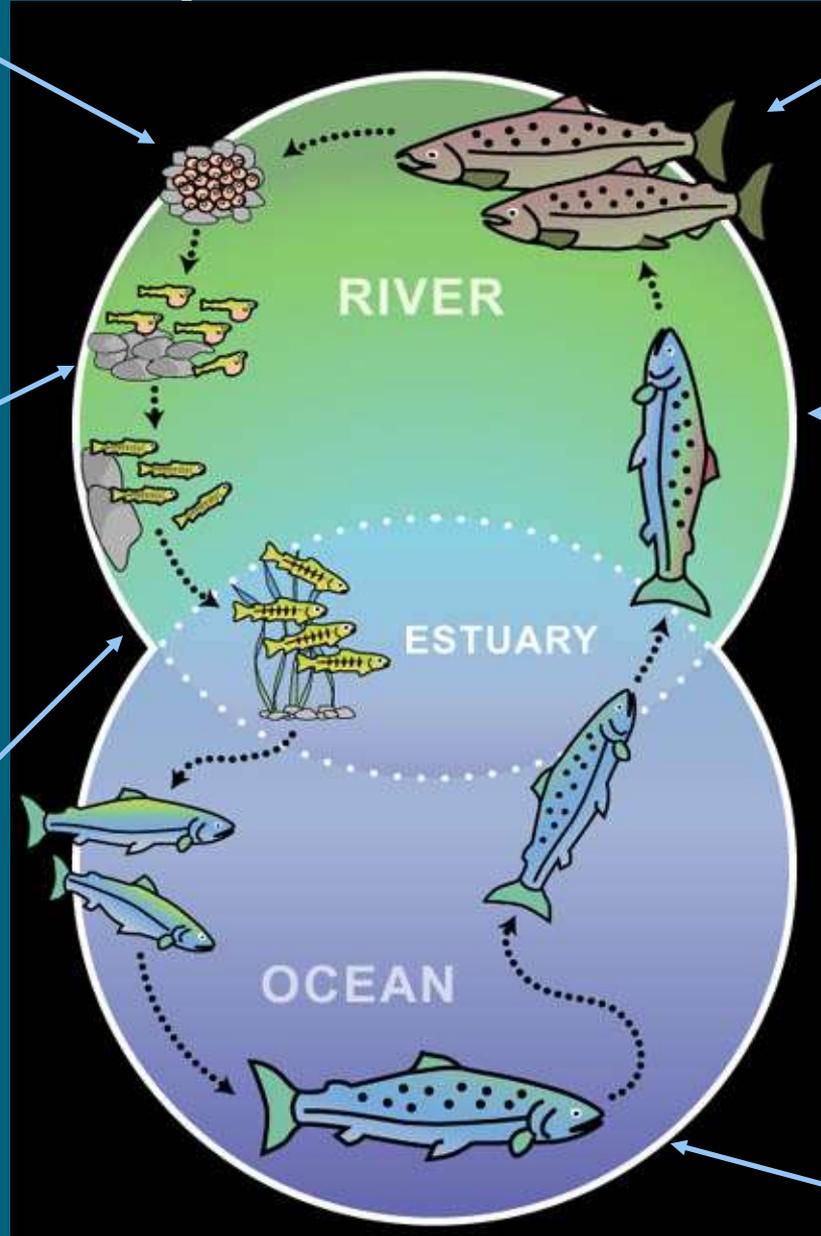
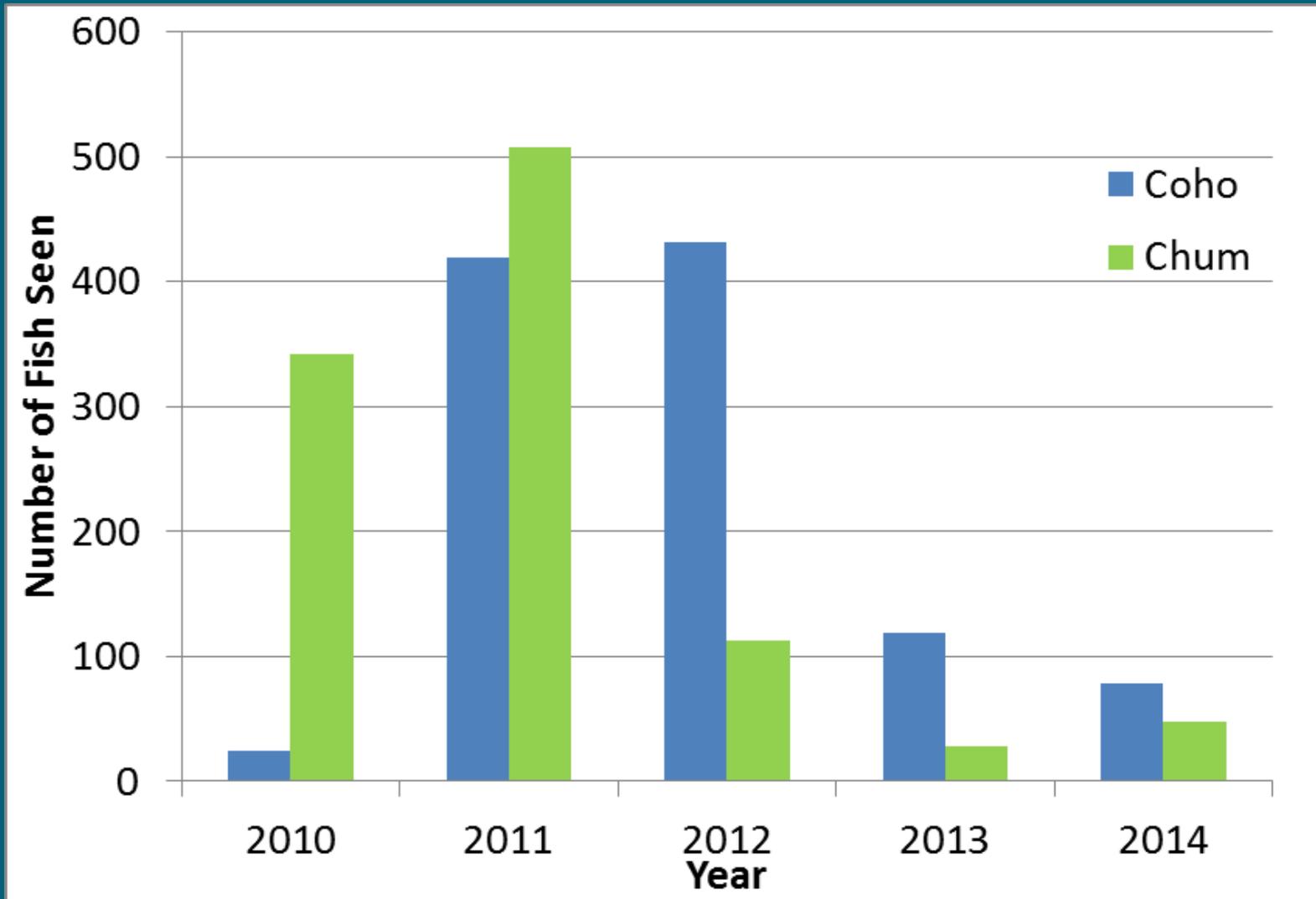


Photo by Hans Berge

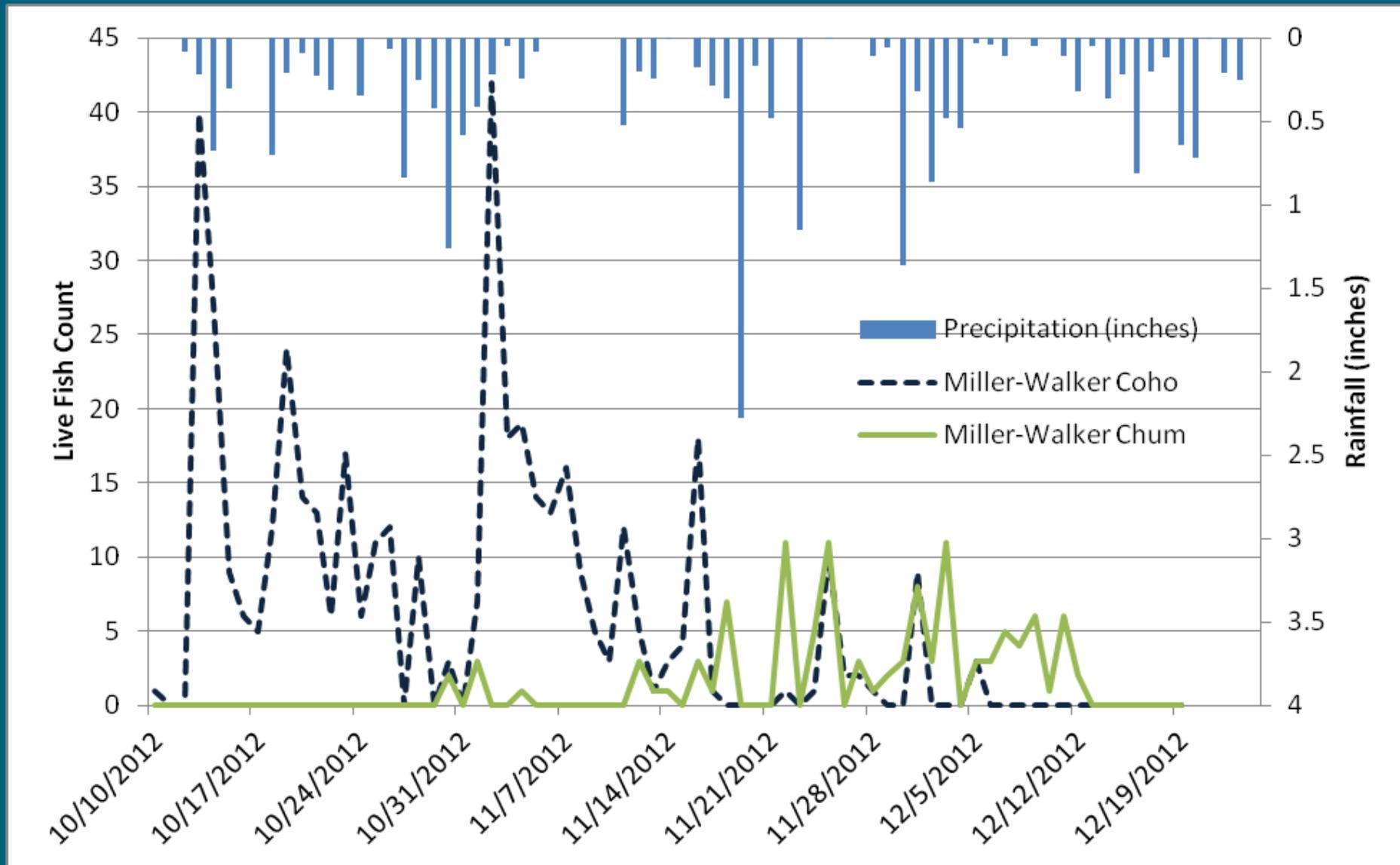


Photo by Al Solonsky

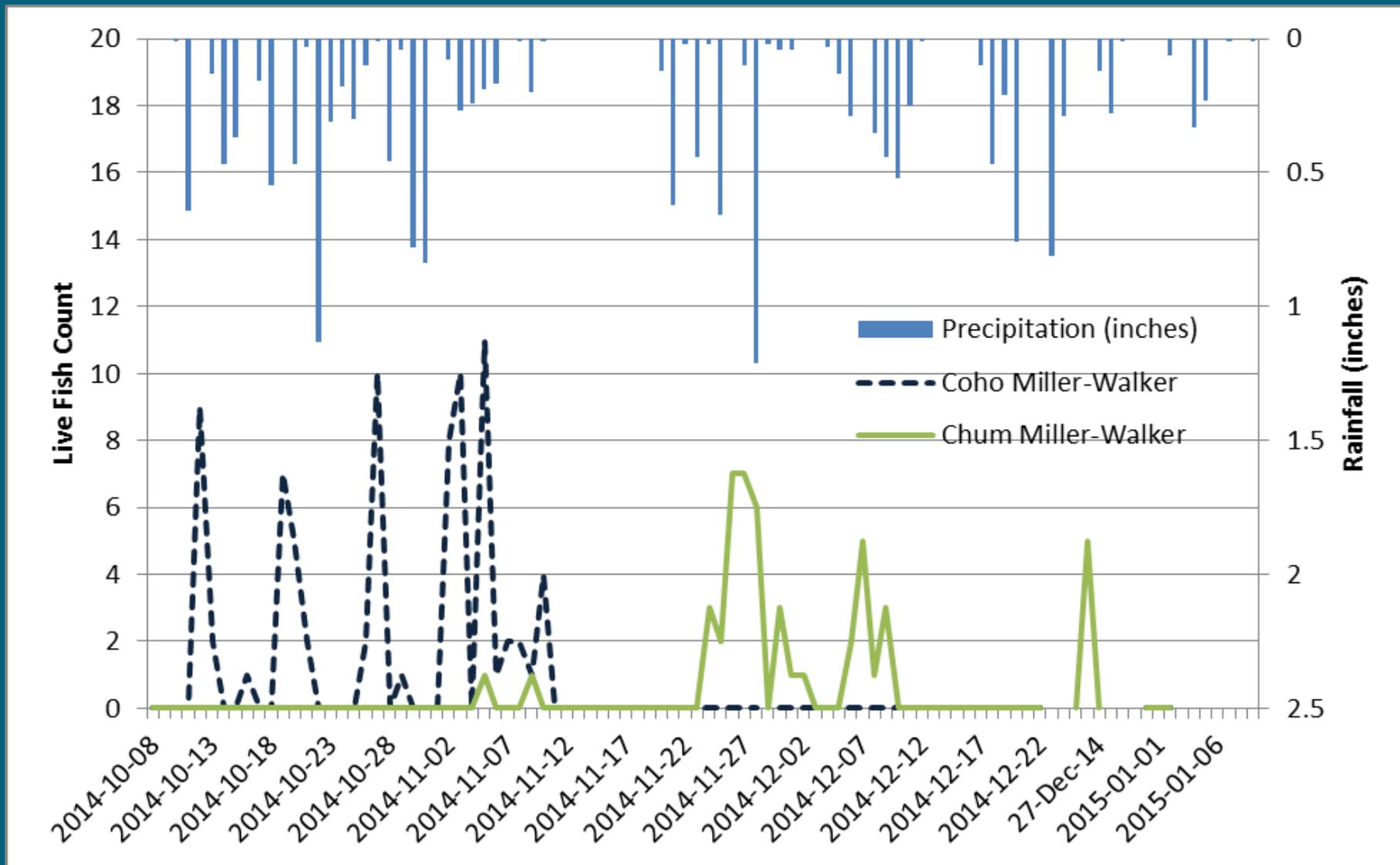
# Results: 2010-2014



# Rainfall and live fish - 2012



# Rainfall and live fish - 2014



# Stormwater is not treated



# Prespawn Mortality



**Coho experiencing  
“prespawn” mortality at  
Upper Miller survey  
location  
October 23, 2009**

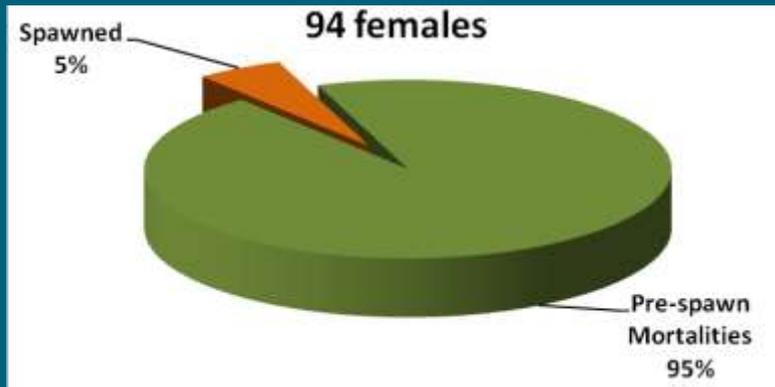


# If you see symptomatic fish

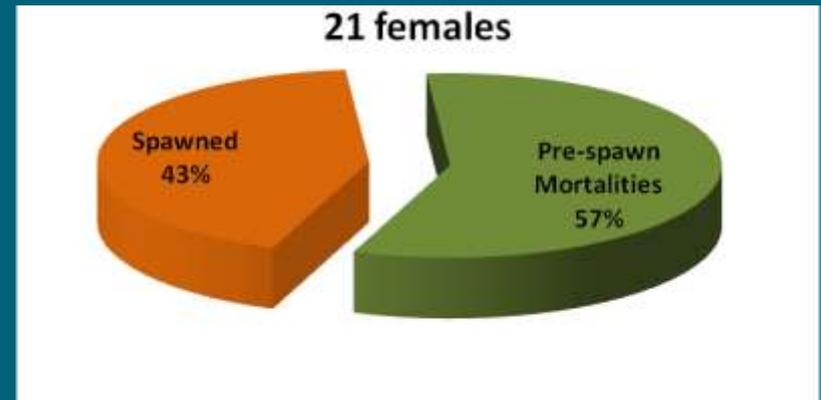
- Take video
- Post it to YouTube
- Write down date, time, exact location
- Send me the link – I'll share with NOAA
  
- Symptoms:
  - Swimming slowly, near the surface
  - Bumping into things
  - Gaping, fins splayed
  - On their side, barely moving, still fresh

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

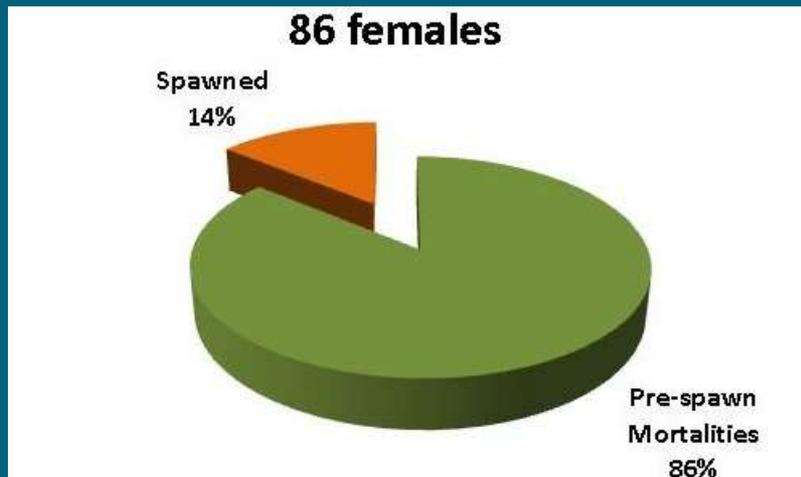
## Miller Creek- 95% PSM



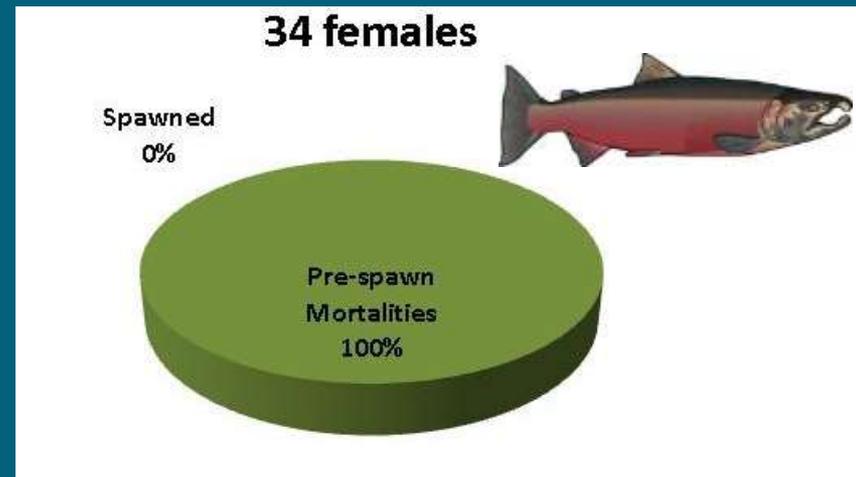
## Walker Creek – 57% PSM



## Longfellow Creek – 86% PSM



## Des Moines – 100% PSM

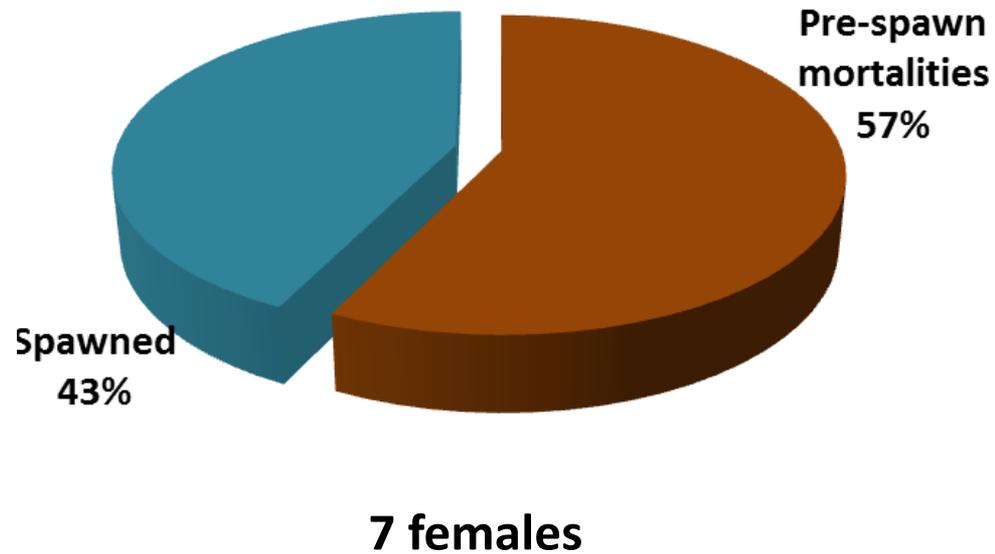
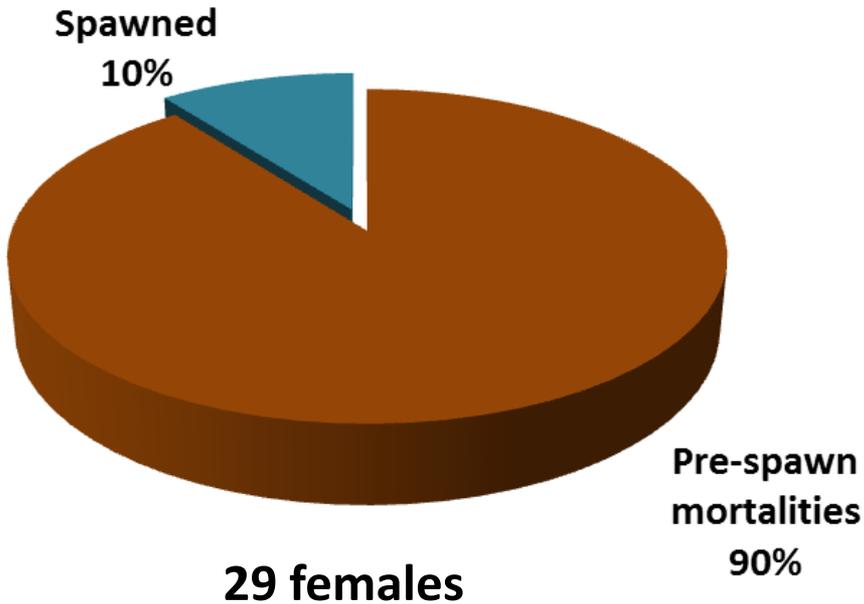


# Coho: 2014 Pre-Spawn Mortality

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

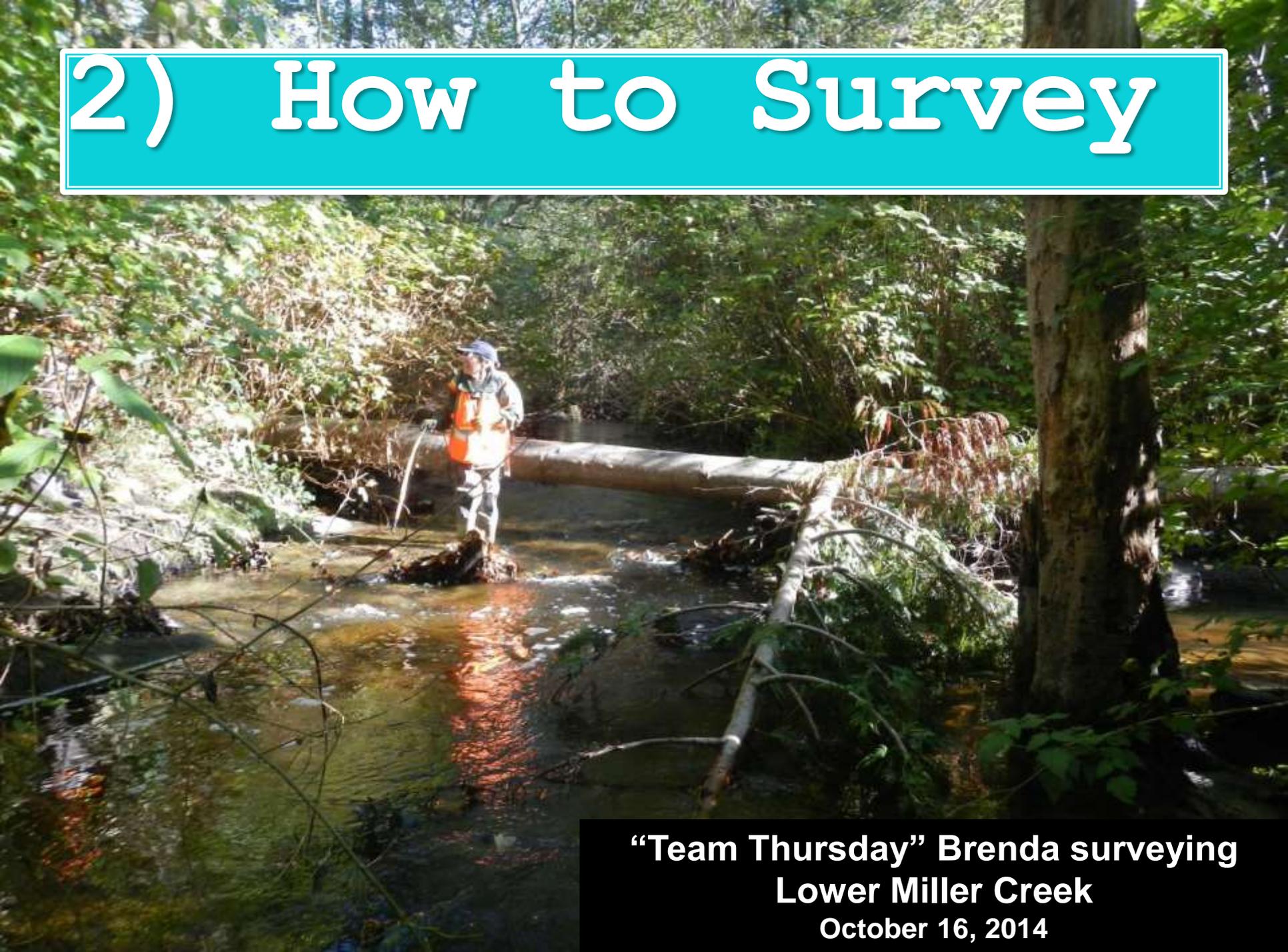


**Walker Creek**  
**57% PSM**



**Overall coho pre-spawn mortality: 83%**

## 2) How to Survey



**“Team Thursday” Brenda surveying  
Lower Miller Creek  
October 16, 2014**

# CSI: Highline – When

When do we start surveys?

Thursday, October 8

How often do we survey?

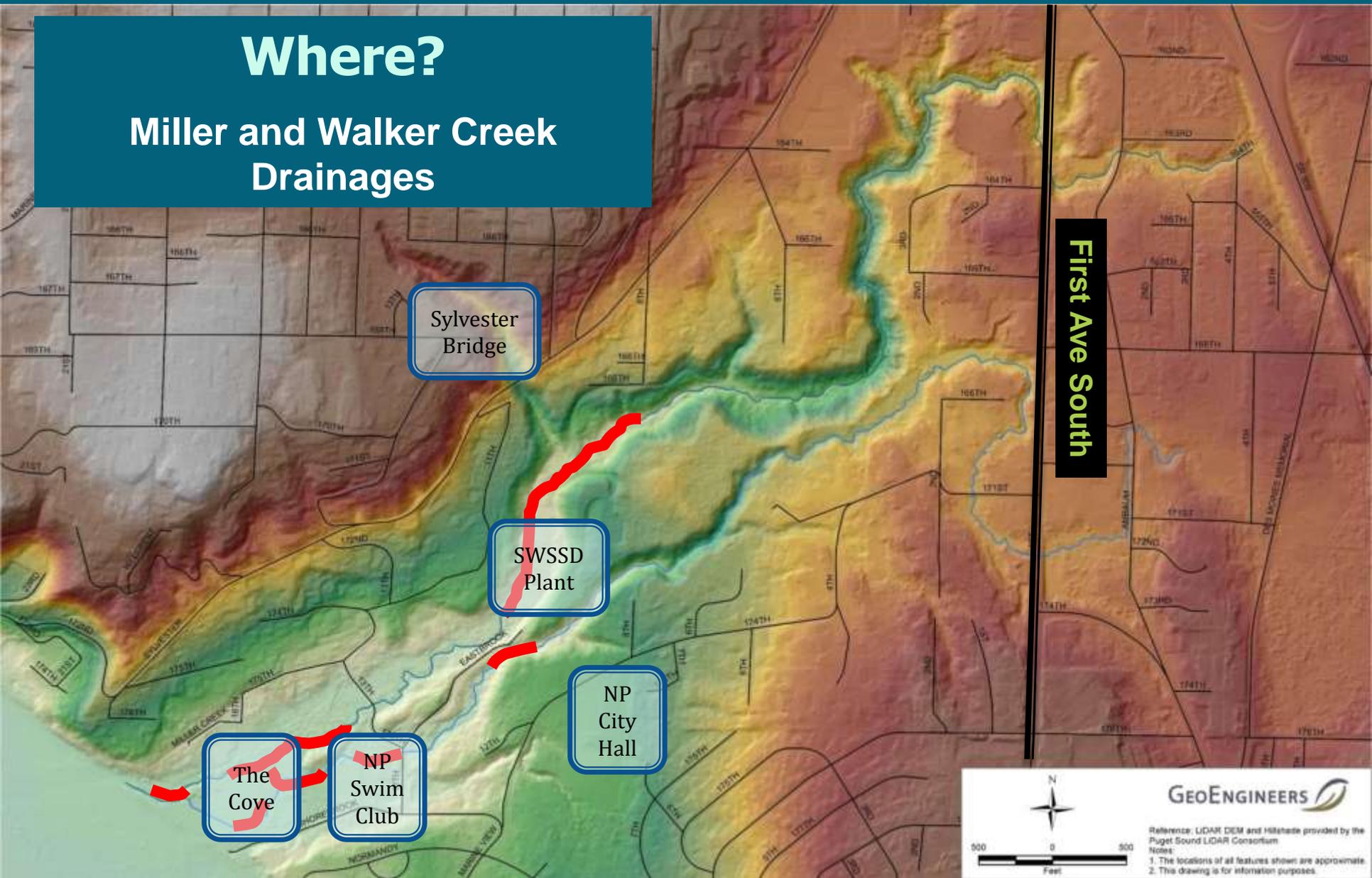
- A team will survey EVERY DAY (unless it is bad weather)
- Each team will survey once a week or every other week on the day they are scheduled

When do we stop surveys?

Sometime between Christmas and the end of January, when we haven't seen any live adult salmon for 10 days.

# Where?

## Miller and Walker Creek Drainages



# Survey Locations

- Four locations
  - Two on Miller Creek
    - Lower Miller – Private, The Cove, and Adams property (Call Adams' in advance)
    - 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

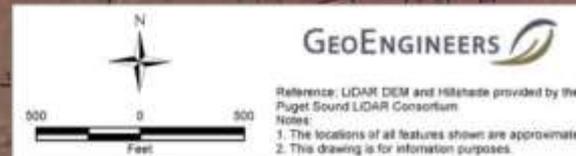
**Upper Miller  
Survey Location**

**Lower Miller  
Survey Location**

**Upper Walker  
Survey Location**

**Lower Walker  
Survey Location**

**First Ave South**



# Looking for live and dead fish



**“Team Tuesday”  
Kristine and Rony  
looking for salmon  
along Miller Creek**

# Recording Data

## Daily Survey Sheet - Community Salmon Investigation for Highline

Date: 11 / 19 <sup>2013</sup> / ~~2012~~

Team Members: Liesl Sallquist & Kristine Feldman  
 Site: Miller and Walker Creeks (north end)

Start Time 08:15 am End Time 12:00 pm Weather: Sunny  Cloudy  Rainy  Water Level at Cove Beach: ~ 5 cm

Dead Adult Fish Fish ID#	Species	Fork Length	Fish Girth	POH	Ad Fin?	Sex	% Egg Retention (dead females)		Spawning Condition			Predated?	Notes (general location, extent of any signs of predation, etc.)
		(cm)	(cm)	(cm)	(Y/N)	(M/F)	0-50	50-100	PSM	POST	UNK	(Y/N)	
<i>Example:</i> 10-15-12-01	coho	52	40	36	Y	F		X	X			Y	Bites out of back. Full of eggs.
Lower Walker 11-19-13-01	chum	82.5	44	63	Y	M					X	N	Gills still bright red. Beautiful fish!
Lower Miller 11-19-13-02	coho	54.5	23.5	43	N	M					X	N	Tail fin worn. Testes pink & deflated. Forgot to clip off snout.
Upper Miller 11-19-13-03	coho	60.0	31.5	47	Y	F		X	X			N	Gills pinkish, fins & skin in good shape. Found above water's edge.

Fork Length = distance from tip of snout to fork in tail. POH = distance from back of eye to bend in tail. Ad = adipose fin  
 PSM = Pre Spawn Mortality (not spawned), POST = Post spawning, UNK = unknown spawning condition (females) or male fish. Predated = evidence that another animal bit or ate the fish.

### Live Adult Fish

Location	Coho	Chum	Other Adult Fish (record here if not 100% sure of species ID)	Notes Regarding Adult and Juvenile Fish, Wildlife, Stream Condition (flow volume, clarity, presence/absence of foam)
Lower Miller	0	0	3	High flow volume, water clarity not very good. Browns tea-stained (tannins?) + some sediment.
Lower Walker	0	0	0	
Upper Walker	0	0	0	
Upper Miller	0	0	0	

Possible new redds (write general location and note marking/flagging that *your* team placed – hang flag above redd with date, species if known, and REDD): \_\_\_\_\_

# Dead fish = carcasses

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

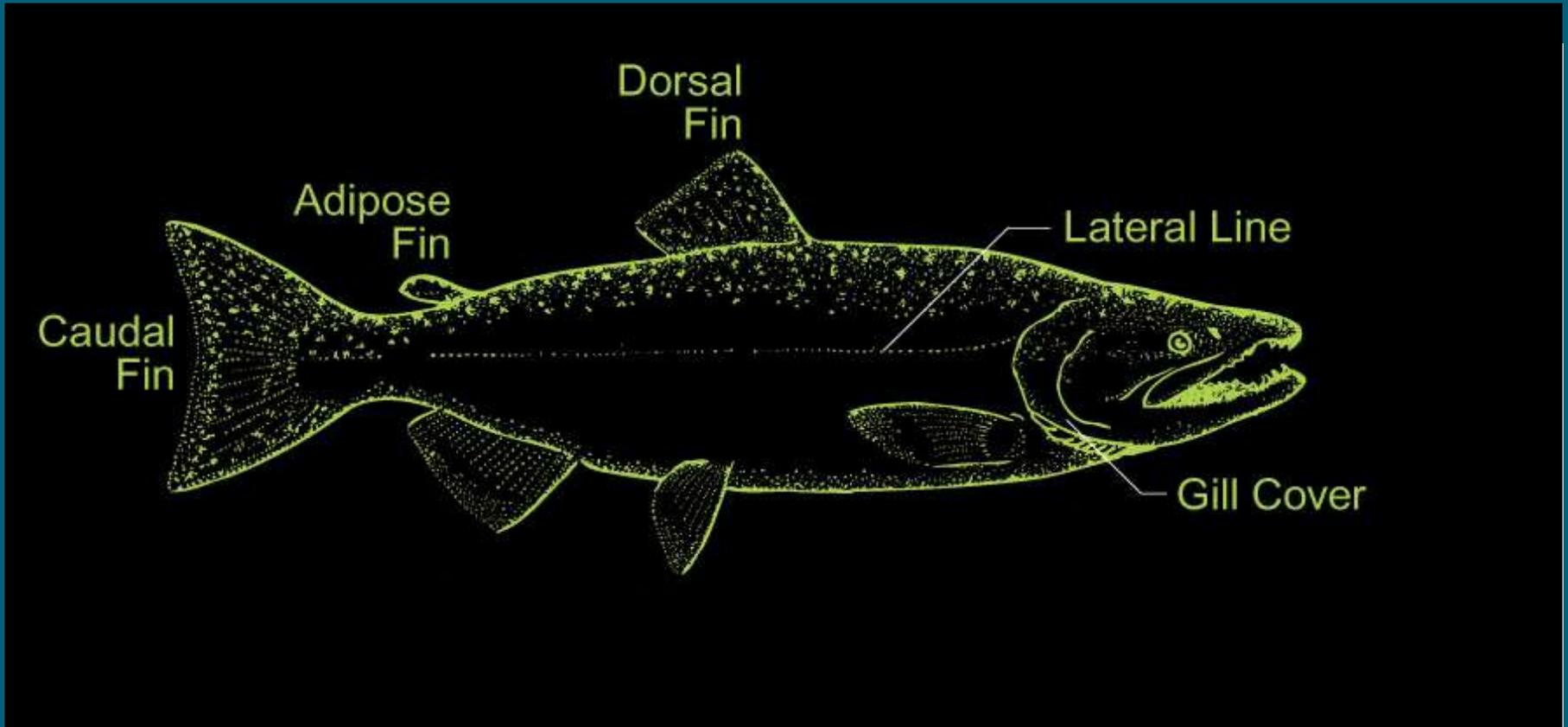


# Measure and Check for Adipose Fin

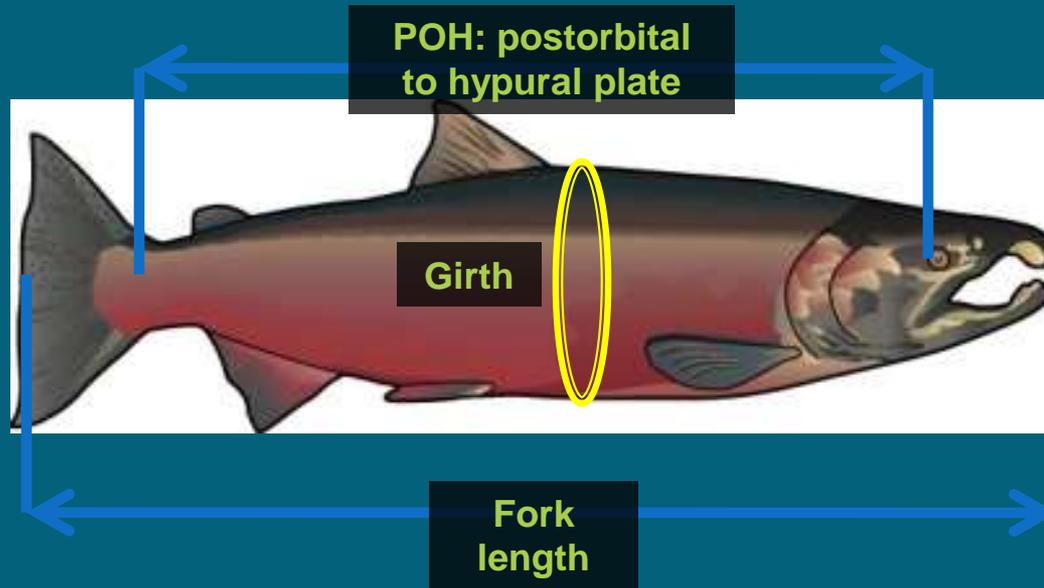


**“Team Monday”  
Joy, Roger &  
Michael – it takes  
teamwork  
October 15, 2012**

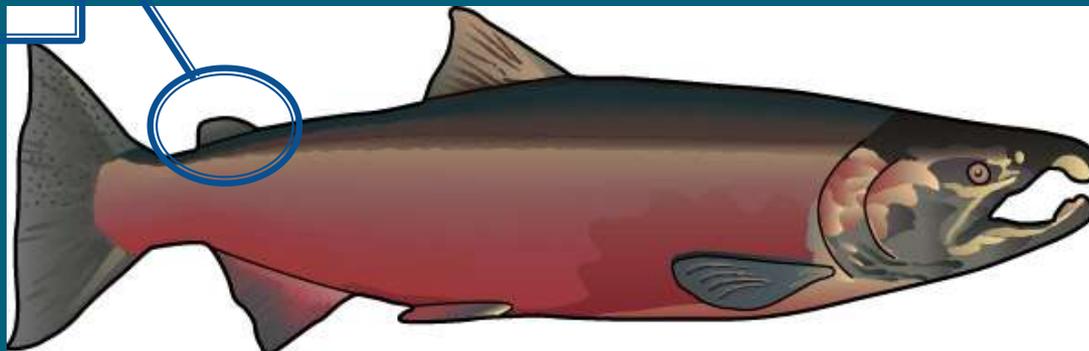
# Key Identification Features



# Measuring Carcasses & Hatchery Origin



Adipose  
fin



# Recording Data

## Daily Survey Sheet - Community Salmon Investigation (CSI) for Highline

Date: \_\_\_\_\_

Team Members: \_\_\_\_\_

Site: Miller and Walker Creeks (circle one or both)

Start Time \_\_\_\_\_ End Time \_\_\_\_\_ Weather: Sunny Cloudy Rainy Water Level at Cove Beach: \_\_\_\_\_

Live <u>Adult</u> Fish				
Location	Coho	Chum	Other <u>Adult</u> Fish (record here if not 100% sure of species ID)	Notes: Which reach surveyed, adult and juvenile fish, wildlife, flow volume, water clarity, presence/absence of foam
Lower Miller				
Lower Walker				
Upper Walker				
Upper Miller				

**Possible new redds** - HANG FLAG ABOVE REDD, with date, species and REDD written in perm. marker (note here general location, species, and flagging that YOUR team placed): \_\_\_\_\_

**Notes (for overall survey):** \_\_\_\_\_

Dead <u>Adult</u> Fish  Fish ID# and Location	Species	Fork Length	POH	Fish Girth	Ad Fin?	Sex	% Egg Retention (dead females)		Spawning Condition			Predated?	Snout Collected?	Notes  (general location, extent of any signs of predation, etc.) <b>For more dead fish, see Page 2</b>
							0-50	50-100	PSM	POST	UNK			
<i>Example: 101513_01 LwrMlr</i>	coho	52	40	36	Y	F		X	X			N	N	Example: Below bridge 2. Full of eggs.

**Ad** = adipose fin    **POH** = distance from back of eye to bend in tail.    Location codes: LwrMlr = Lower Miller, LwrWkr = Lower Walker, UpWkr = Upper Walker, UpMlr = Upper Miller  
**PSM** = Pre Spawn Mortality (not spawned), **POST** = Post spawning, **UNK** = unknown spawning condition.    **Predated** = evidence that another animal bit or ate the fish.

# Cut Open – Check for Eggs/Milt

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

**Photo courtesy of Pam Silimperi/Kay Larsen**



# Check for Pre-Spawn Mortality (PSM)

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

Photo by L. Moyer



# Females – Egg Retention



**Full of Eggs  
– Pre-spawn  
mortality**

October 24, 2011  
Photo by D. Bobanick

# Evidence of Predators



**Predated coho carcass and  
raccoon tracks**

**October 16, 2012**

# Collecting Coho Snouts for Coded Wire Tags – Bag, write ID #, note on form



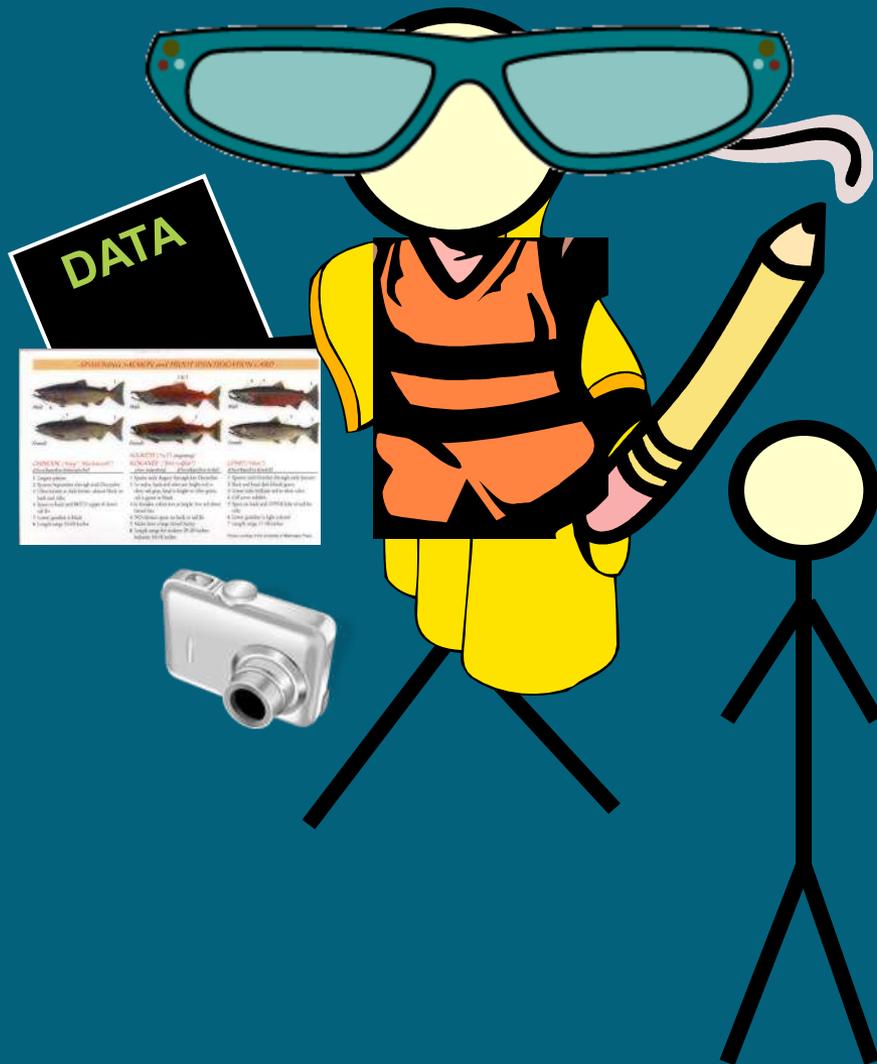
# Count and Mark All Dead Fish

Each carcass is “marked” by cutting off the tail so it is only counted once



# What You Should Bring

- Data sheets
- Car ID sheet for dash
- Lock combo & phone numbers
- Salmon ID materials
- Digital Camera /mobile
- Pencils NO pens, please!
- Polarized glasses
- Raingear & waders
- A Buddy! (for fun & safety)
- Orange vest (for safety)
- Walking stick



# Safety

- Surveying is not worth risking life or limb over.
- ALWAYS THINK! Using your brain is the best way to stay safe. If an activity seems “wrong,” your brain is telling you: “Don’t do it.”
- **ALWAYS survey with a partner.** If team members disagree about what to do, go with the more “conservative” course of action.
- **Do NOT survey when water is flowing fast and deep** – if you can’t see into the water, it is probably too fast/deep for you to survey safely (and you wouldn’t see fish anyway).
- Do NOT survey during windy conditions because of falling tree branches.

# Safety

- Be aware of and avoid hazards:
  - Slipping on mud, vegetation and wet rocks
  - Falls on slopes/streambanks
  - Unstable footing as logs or rocks roll
  - Poke in the eye from branches
  - Scrapes from branches
  - Stinging nettles, blackberries
  - Cuts from knife/gutting tool
  - Hypothermia from getting wet and cold
  - Bee stings – especially if allergic
- Stop surveying if anyone is hurt, wet or too cold

# Safety – Other Good Ideas

- Carry a cell phone in a Ziplock or watertight bag.
- Keep your keys & other valuables in a zipped/velcroed pocket so they don't fall out.
- Contact your sampling partner and make arrangements on the time and place you will meet.
- Each team should decide on a lead. The lead is responsible for making sure someone surveys on your day and bringing the survey kit unless other arrangements are made.
- Take a CPR and/or Wilderness First Aid course

# Emergency Procedures

- **In case of emergency, call 911**
- **Know how to get to the nearest Emergency Room:**

**Highline Medical Center**

16251 Sylvester Rd SW

Burien, WA 98166

(206) 431-5314

# Keeping invasives out

- Use dedicated boots and stick
- If boots have been in other creeks, disinfect:
  - 5 minutes in water over 140 degrees
  - Freeze overnight
  - Brush off all visible dirt
  - No felt soles
- See King County web page on New Zealand Mud Snails

# CSI *Style*

**Polarized sunglasses for fish spotting**

**Bag 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**

**Dat a forms and phone numbers**

**Trekking pole for stability and flushing fish**

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



# Recording data

## Daily Survey Sheet - Community Salmon Investigation for Highline

Below gauge

Team Members: Mayer Wallace

Date: 11/13/13

Site: Miller and Walker Creeks (circle one or both)

Start Time 9:35 End Time 12:40 Weather: Sunny Cloudy  Rainy Water Level at Cove Beach:

Dead <u>Adult</u> Fish  Fish ID# and Location	Species	Fork Length	Fish Girth	POH	Ad Fin?	Sex	% Egg Retention (dead females)		Spawning Condition			Predated?	Notes  (general location, extent of any signs of predation, etc.) For more dead fish, see Page 2
		(cm)	(cm)	(cm)	(Y/N)	(M/F)	0-50	50-100	PSM	POST	UNK	(Y/N)	
<i>Example: 101513_01 Lower Miller</i>	coho	52	40	36	Y	F		X	X			Y	Bites on back. Full of eggs.
LM_01	coho	56	26	46.5	N	F	∅			X		N	
LM_02	coho	60	30	46.5	N	F	100	X				N	
LM_03	coho	61	30.5	49.5	N	F	100	X				N	
LM_04	coho	58.5	26	48	N	F	∅			X		N	
LM_05	coho												Back half gone

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  
PSM = Pre Spawn Mortality (not spawned), POST = Post spawning, UNK = unknown spawning condition. Predated = evidence that another animal bit or ate the fish.

Live <u>Adult</u> Fish				Notes: Which reach surveyed, adult and juvenile fish, wildlife, flow volume, water clarity, presence/absence of foam
Location	Coho	Chum	Other <u>Adult</u> Fish (record here if not 100% sure of species ID)	
Lower Miller				
Lower Walker				
Upper Walker				
Upper Miller				

Possible new redds - HANG FLAG ABOVE REDD, with date, species and REDD written in perm. marker (note here general location, species, and flagging that YOUR team placed): \_\_\_\_\_

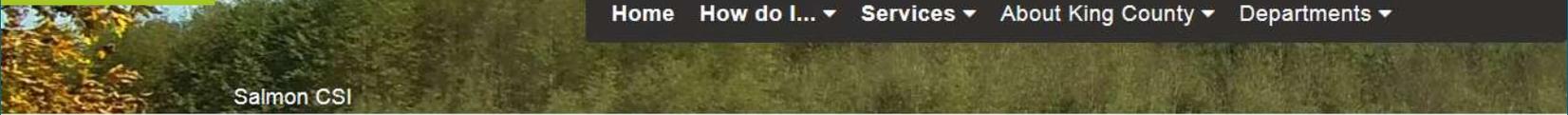


# Entering Data

- Enter data into web form within **3 days** of survey:

<https://green2.kingcounty.gov/SalmonCSI>

- Pick a username and password if you don't have one already
- Save paper data sheets and turn them in at the end of the season with frozen coho snouts



Salmon CSI

You're in: Salmon CSI

Salmon CSI

Login Status

You are not logged in!

For questions about the Salmon CSI Monitoring Program, please contact **Elissa Ostergaard**, Stewardship Coordinator.

# Sign in to continue to Salmon CSI



Login

Password

[Need help?](#)

**Sign In**

Updated: Dec. 18, 2014

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# Salmon CSI

You're in: Salmon CSI

Salmon CSI

Welcome:  
**Elissa Ostergaard**

[Log Off](#)

For questions about the Salmon CSI Monitoring Program, please contact **Elissa Ostergaard**, Stewardship Coordinator.

## Daily Survey Sheet - Community Salmon Investigation for Highline

### Instructions for Use

Please fill out all sections of the form below using the following key:

- POH** Distance from back of eye to bend in tail
- % Egg Retention** For dead females only
- PSM** Pre Spawn Mortality (not spawned)
- POST** Post spawning
- Predated** Evidence that another animal bit or ate the fish
- \*** Required field

Questions? Contact Elissa Ostergaard (206-477-4792)

**Date:** 10/01/2015

**Team Members:** Select Elissa Ostergaard, Robin Hoefer

**Start Time:** 05:00 PM

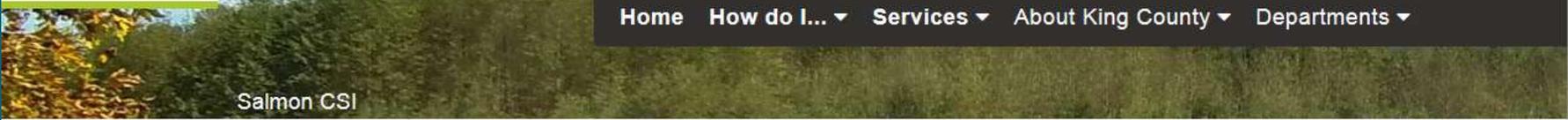
**End Time:** 07:00 PM

**Guest Members:** Beth Ostergaard

**Site:**  Miller Creek  Walker Creek

**Weather:** Sunny **Water Level at Cove Beach:**

**Notes (for overall survey):** Training and orientation tonight!



### Salmon CSI

You're in: Salmon CSI

Salmon CSI

Search Surveys

Account Info

Welcome:  
**Elissa Test**  
Volunteer

Log Off

For questions about the Salmon CSI Monitoring Program, please contact **Elissa Ostergaard**, Stewardship Coordinator.

## Your Account Information

### Instructions for Use

If you wish to edit your information please fill out all sections of the form below using the following key:

\* Required field

Questions? Contact Elissa Ostergaard (206-477-4792)

### Account

**First Name:** \*

**Last Name:** \*

Email

Click on the "Add Email" button to add an entry.

Add Email

Phone

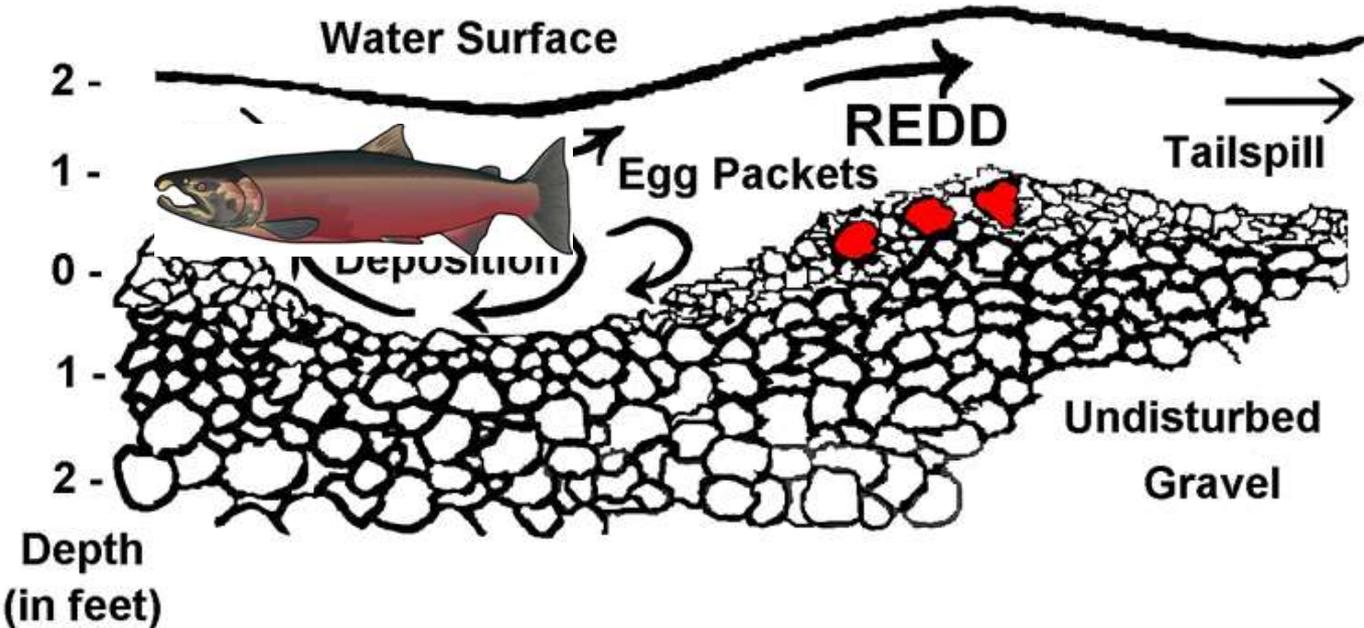
# Redds – egg nests in gravel

**Chum building a  
redd**

**November 7, 2010**



# Redd









# Actually, they don't all look alike

## Salmon Identification Training Slideshow

### CSI: Highline

Slideshow adapted from Salmon  
Watcher program; developed by  
Jennifer Vanderhoof, King County  
Water and Land Resources Division



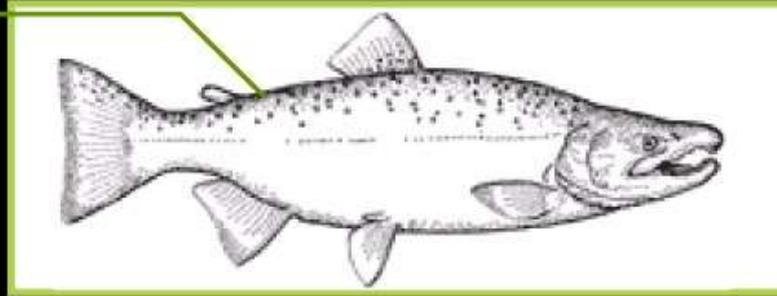
# Questions to Ask When Identifying Salmon

1. Size
2. Spots
3. Color
4. Other behavioral characteristics

# Coho

("Silvers")

Round  
black spots



Often very skittish

Spots on back and  
UPPER lobe of  
tail fin only



Female

Back and head  
dark blue-green

Lower sides  
red-purple



Male

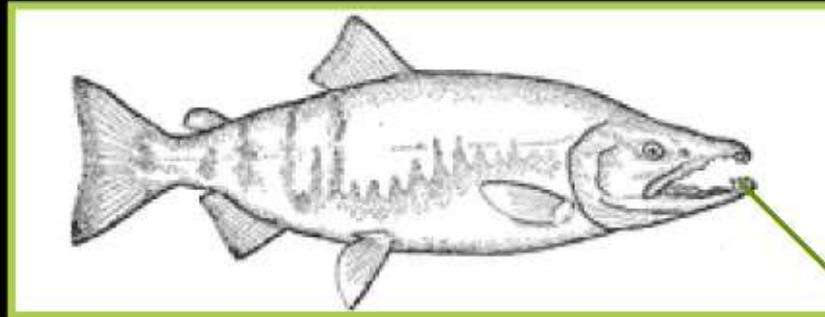
← 17 to 38 inches in length →

# Coho



# Chum

("Dog", "Keta")



Well developed teeth

No distinct black spots



Female

Dark blue above with reddish-purple vertical markings



Male

30-42 inches in length

# Chum

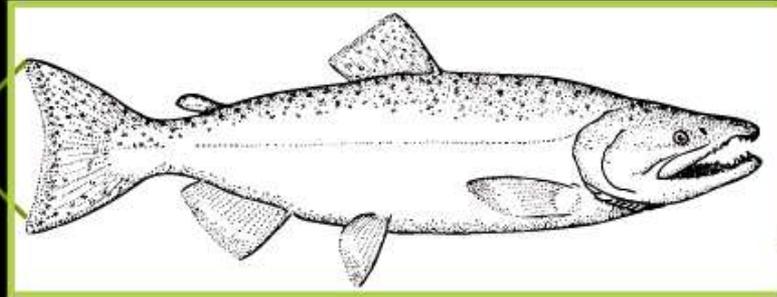


Photo courtesy of Nitinat River Hatchery, BC, Canada

# Chinook

("King," "Tyee," "Blackmouth")

Spots on BOTH  
upper and lower  
lobe of tail



Female



Olive brown  
to dark brown

Male



← 2 feet to 5 feet in length →

Photo by Carla Milesi



## Chinook



Photo by Geoff Clayton

# Pink, or Humpback

Numerous small scales



Dark band along lateral line

Only spawn in odd years (2011, 2013, etc.)

Large oval spots on back and both lobes of the tailfin



Males develop a large hump on their back (hence the nick name "Humpback" or "Humpy")

*Pink salmon spawn in central and south Puget Sound drainages ONLY in ODD numbered years*

# Pink Salmon



Photo E.R. Keeley

Look at boot for scale



Photo by Kirk Anderson

# Cutthroat Trout

Mouth extends  
beyond rear  
orbit of eye

Black spots  
throughout body  
in most sea-run fish

## Adult Sea-run Coastal Cutthroat Trout



Photo by Scott Craig USFWS

You will likely only see  
*juvenile* cutthroat trout.  
Coastal streams may see  
sea-run coastal cutthroat  
late in the season.

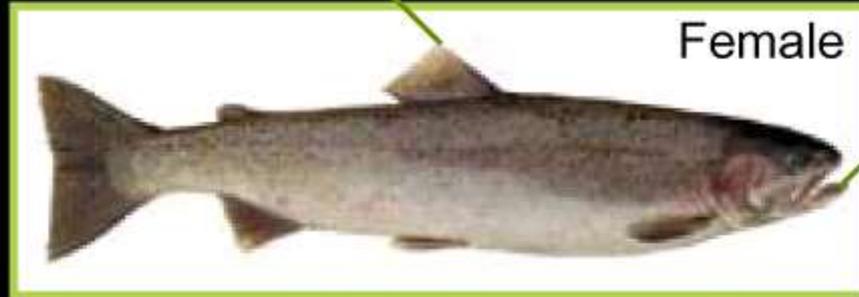
Length = 6-8"



Photo by Rodney Hsu

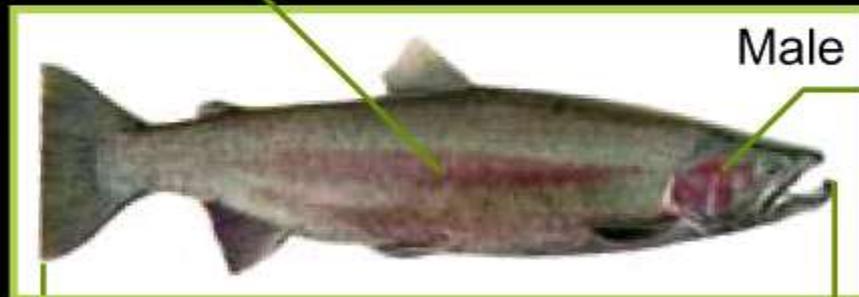
# Steelhead Trout: *Spawn in Winter* *VERY RARELY SEEN*

Distinct small spots on dorsal fin



Head blunt, jaw does not extend past the eye

Often has reddish stripe along sides

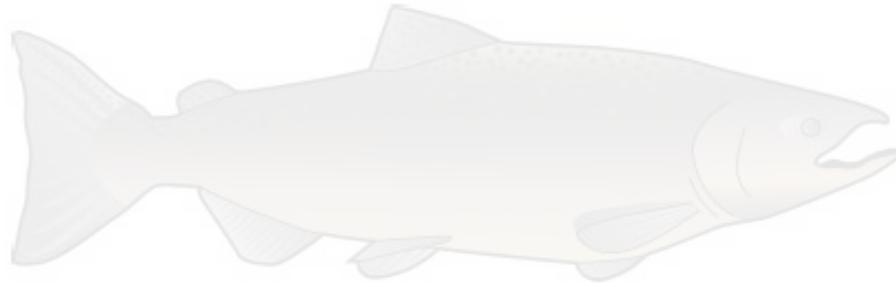


Gill cover reddish

← Up to 45 inches in length →

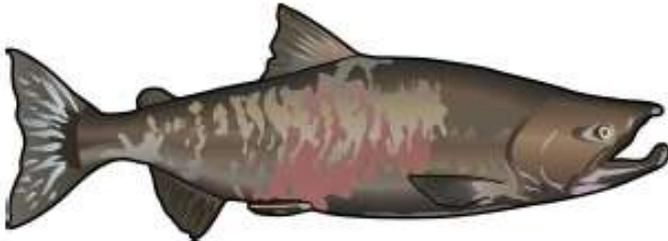
# Size

Chinook



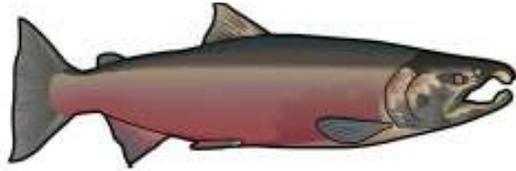
24-60"

Chum



30-42"

Coho



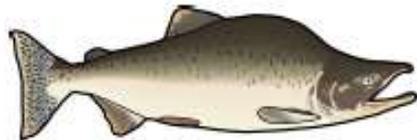
17-38"

Sockeye



20-28"

Pink



16-30"

Kokanee



8-22"

Cutthroat



up to 30"

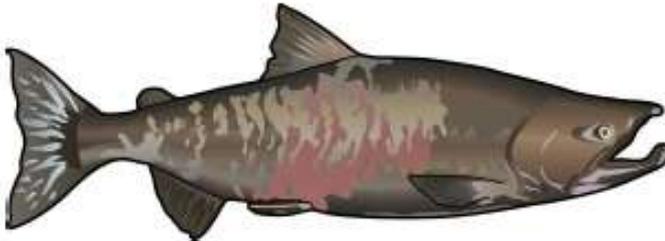
# Spots

Chinook



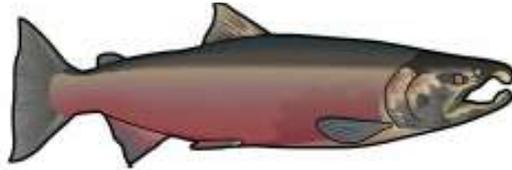
Large, splotchy, on top and bottom of tail fin

Chum



No defined spots

Coho



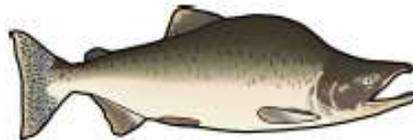
Small and distinct, only on top half of tail

Sockeye



No defined spots

Pink



Large, oval

Kokanee



May have small spots

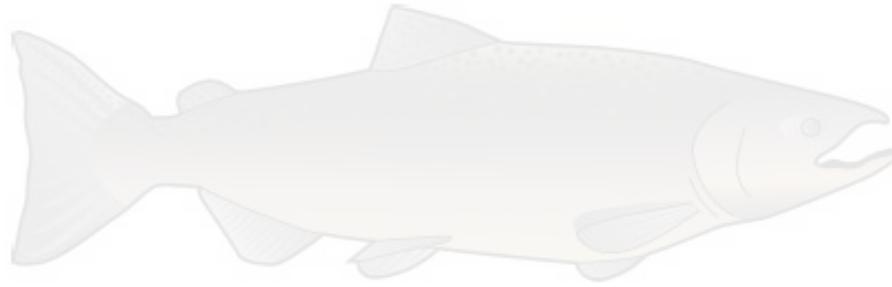
Cutthroat



Numerous small spots, top & bottom

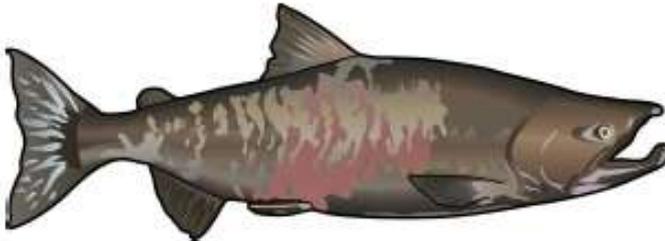
# Color

Chinook



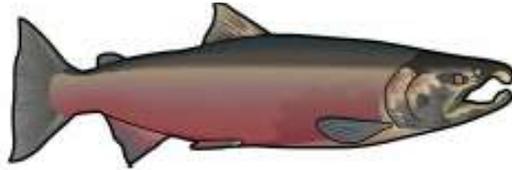
Wide color range from red to green to brown

Chum



Red/purple flame like markings

Coho



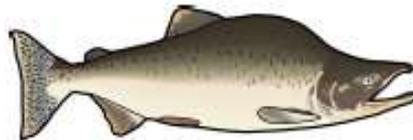
Red on belly and gill covers, green back

Sockeye



Red body, green head and tail

Pink



Green back, white belly

Kokanee



Varies red to brown

Cutthroat



silvery

# 3) Review





Photo by Greg Brown, National Park Service



Photo by King County Staff



Photo by Chris Carrel, Friends of Hylebos Wetlands





# Male and female coho on Upper Miller Creek

October 14, 2011

Photo Courtesy of Ed Nugent



A photograph showing a person in a high-visibility orange safety vest and a yellow hard hat, kneeling in a field. The person is wearing a grey long-sleeved shirt and dark pants. They are focused on a task on the ground, possibly examining a plant or soil. In the background, other workers in similar safety gear are visible, and the ground is covered with green leaves and some white plastic mulch. The overall scene suggests an agricultural or field research setting.

CSI :

Necropsy practice

# Important Tips!

- View after a rain, as soon as the water clears
- Use polarized glasses and a walking stick
- Be there before it gets too dark
- Wear dark clothes (except your safety vest) and move slowly – sudden movements or loud talking might frighten fish
- Walk lightly – on banks when possible

# More Important Tips

- Call Elissa if you have any questions -  
(206) 477-4792 or cell (206) 707-6549
- Stay on the properties who have allowed access at all times (unless you are the property owner).
- Call the Adams' from the Cove on Lower Miller: (206) 588-1776

# Good CSI Skills

- Enter data and turn in datasheets **within 3 days** of your survey, even when you didn't see fish. We want your data! No matter what!
- Turn in a datasheet with all dates and survey times, including those when you didn't see fish.
- Mark the fish ID # and reach location on data sheets and on plastic bags with snouts.
- Always put in a fish species name. If there is a live or dead fish count, there should be a species.
- Always putting surveyors names on datasheet. Take credit!



<http://www.kingcounty.gov/environment/animalsAndPlants/beavers.aspx>



# Teams and Scheduling

- Monday – Joy & Roger, Michael & Carlyn
- Tuesday – Kristine & Liesl
- Tuesday – John & Demetrius
- Wednesday – Lee & Margy
- Thursday – Pam & Kay
- Thursday – Brenda & Dahli
- Friday – Merry Ann & Ed
- Friday – Barb? Another?

# Teams and Scheduling

- Saturday – Craig & Donita
- Saturday – Angie? Ryan?
- Sunday – Robin, Drew & Nick
- Sunday – Shelby & Meghan
  
- Who doesn't have a survey day?
- Holidays: Weds 11/11, Thurs 11/26, Fri 12/25
- **Access** during weekends and holidays

# Teams and Scheduling

- Backup volunteers
  - Steve Hanley
  - Dahli Strayer
  - Others?
- Anyone know they need a backup on a particular day?

# Equipment and Waivers

- Please fill out and turn in the liability waiver. One for EVERY surveyor.
- Teams with day assignments: pick up ONE survey kit
- Backups: borrow a kit or use the one in the orange bucket
- Everyone – get a survey vest
- Optional: knife, snips, grippy gloves
- Return your equipment clean at the end of the season



**Thank you for your contribution!  
We couldn't do it without you.**