# Should I Stay or Should I Go Now?

## Resident and migratory life history behaviors in Willamette Valley cutthroat trout *(Oncorhynchus clarkii)* in the Long Tom River Basin


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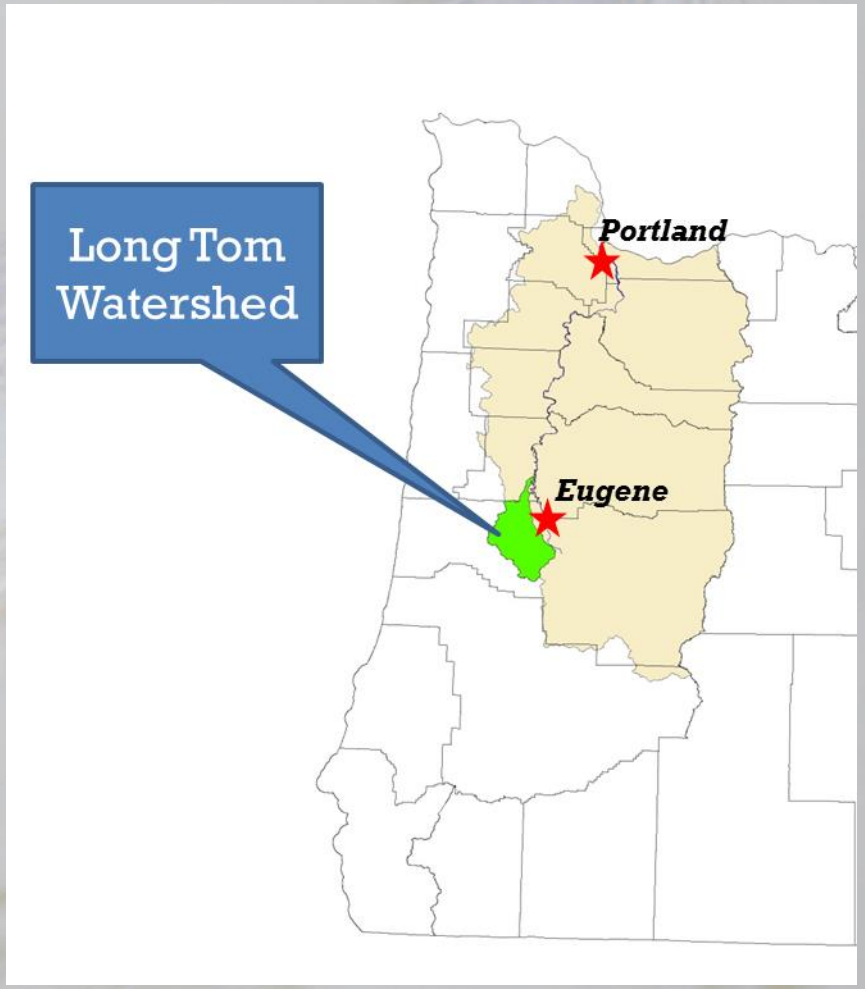
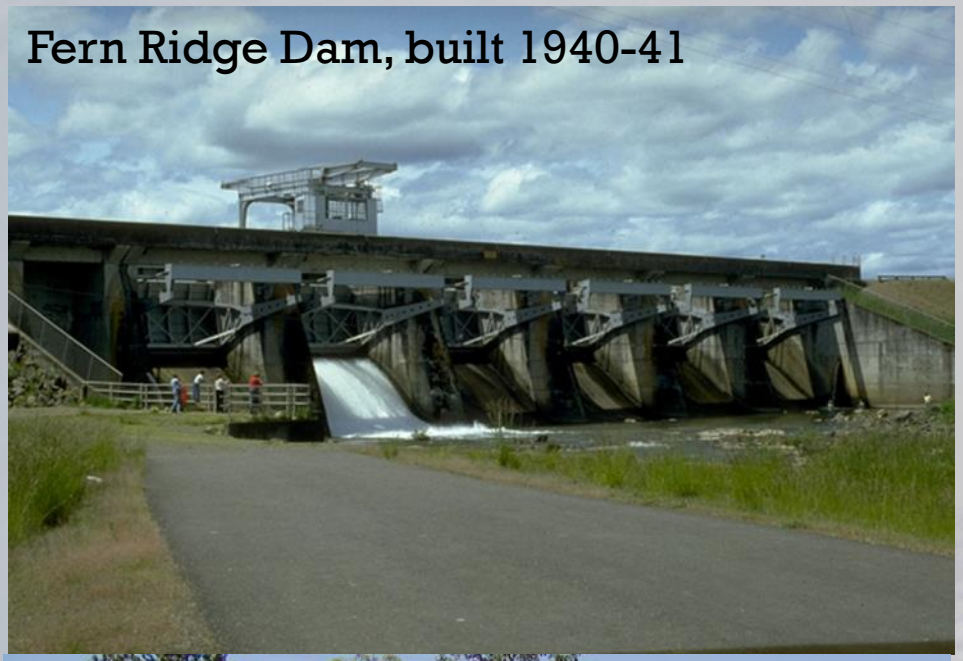
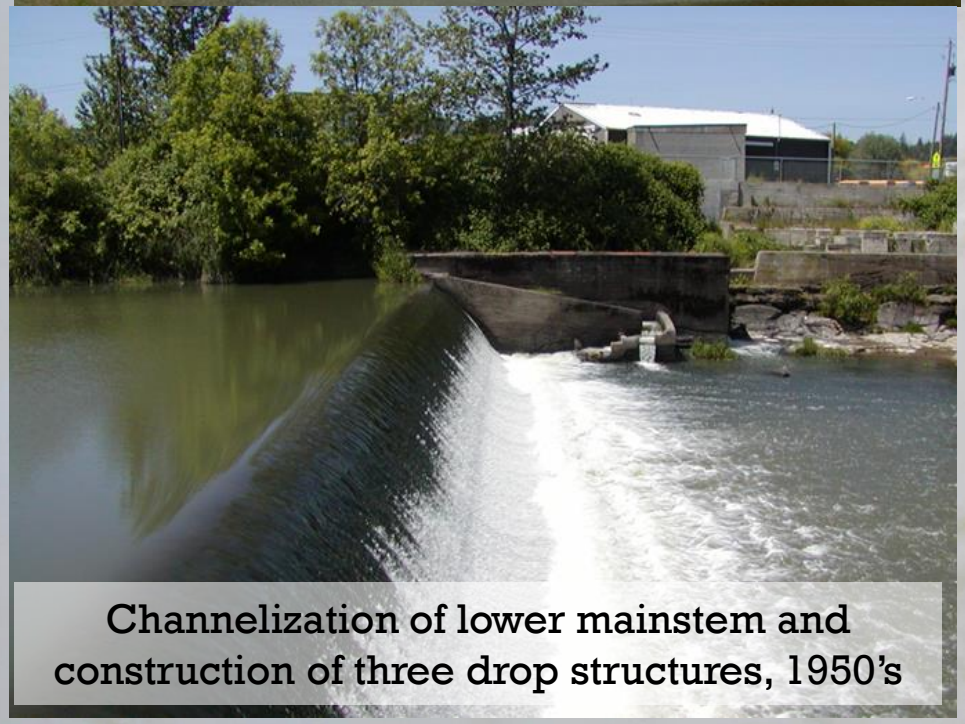
# What I'll cover today:

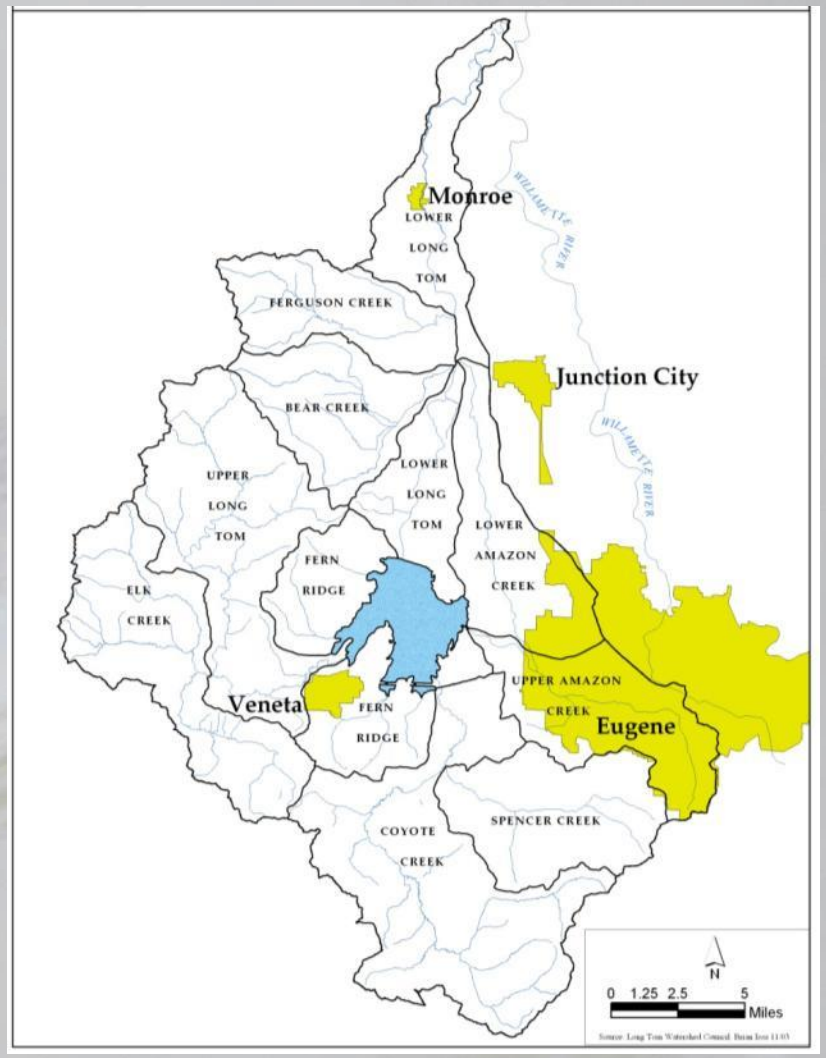
- **Overview of the Long Tom River Watershed and its Cutthroat Trout Populations**
- **Study Design and Introduction**
- **Preliminary Results**





Channelization of lower mainstem and construction of three drop structures, 1950's



**Two primary life history patterns of upper Willamette River cutthroat trout:**

***Type 1:*** Resident fish living in upstream tributary reaches;

***Type 2:*** Trout which are largely migratory; hatching and rearing in small to medium sized tributaries before migrating downstream to the Willamette or its largest tributaries – like the Long Tom River - to mature, then returning to the small tributaries to spawn.

## Questions we hope this study will answer:

- What parts of the stream network are cutthroat using at different times of the year?

- What are growth and age patterns?

**GOAL:** To help prioritize restoration projects and inform management of the population

# Cutthroat trout of the Long Tom Watershed

**“Despite unfavorable  summer water temperatures… these fish have adapted to survive in the system.”**
(*from Hutchinson’s Fish and Wildlife Resources of the upper Willamette basin and their water requirements, 1966*)

# Study Methodology

- Three primary fish collection methods:
  - Hoop or box traps
    - November - May;
  - Backpack E-fishing/seining;
  - Monroe Dam ladder trap;
- 23mm HDX PIT tags;
- PIT tag antenna detection stations installed;
- Recapture with hoop or box traps

The fish where anesthetized, measured, and a half duplex PIT tag is inserted in the abdominal cavity and a fin clip was taken.

Most all the data was collected by volunteers.

**Traps**

- SF Ferguson Creek
- Owens Creek
- Turnbow Creek
- Jones Creek
- Schafer Creek
- Rattlesnake Creek
- Monroe Dam
- Amazon Creek

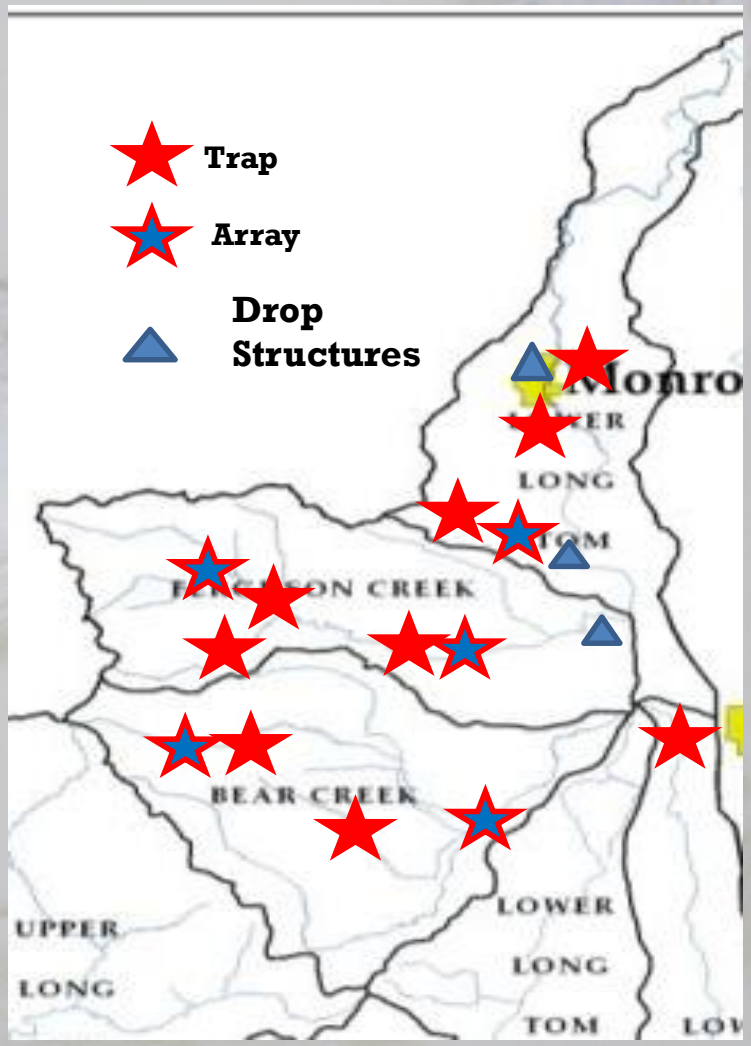
**E Fish/Seine**

- Ferguson Creek
- SF Ferguson Creek
- Rattlesnake Creek
- Owens Creek
- Eber Creek
- Monroe Dam

**Array Stations**

- Davidson Creek
- Ferguson Creek
- SF Ferguson Creek
- Bear Creek
- Owens Creek
- Rattlesnake Creek

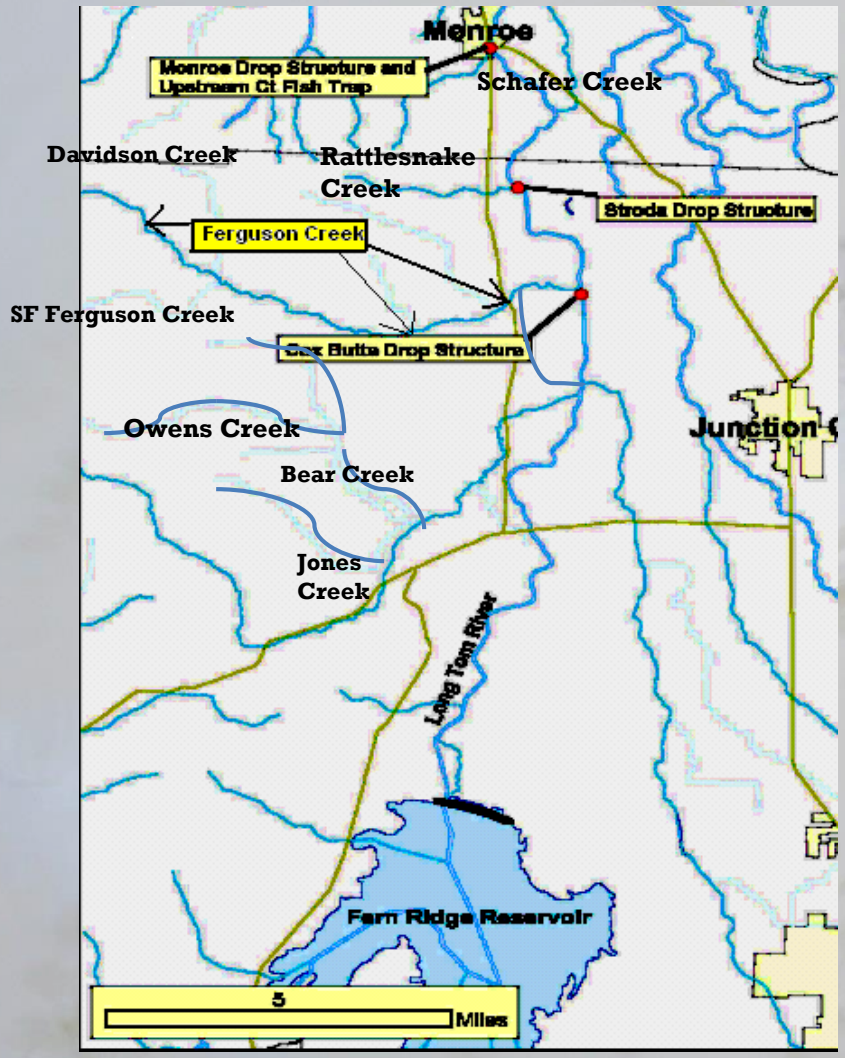
## Trap and Array Station Locations



# Preliminary Results

- **598** cutthroat >120mm where PIT tagged between 12/9/2010 and 5/21/2015 (>100 mm first year);
- Of these fish 100 have been recaptured at least one time – 16.7%;
- Many fish captured multiple times
  - One fish captured 12 times;
- 110 were detected at array stations -18.4%;
- 17 fish have been recaptured and detected at an array station.

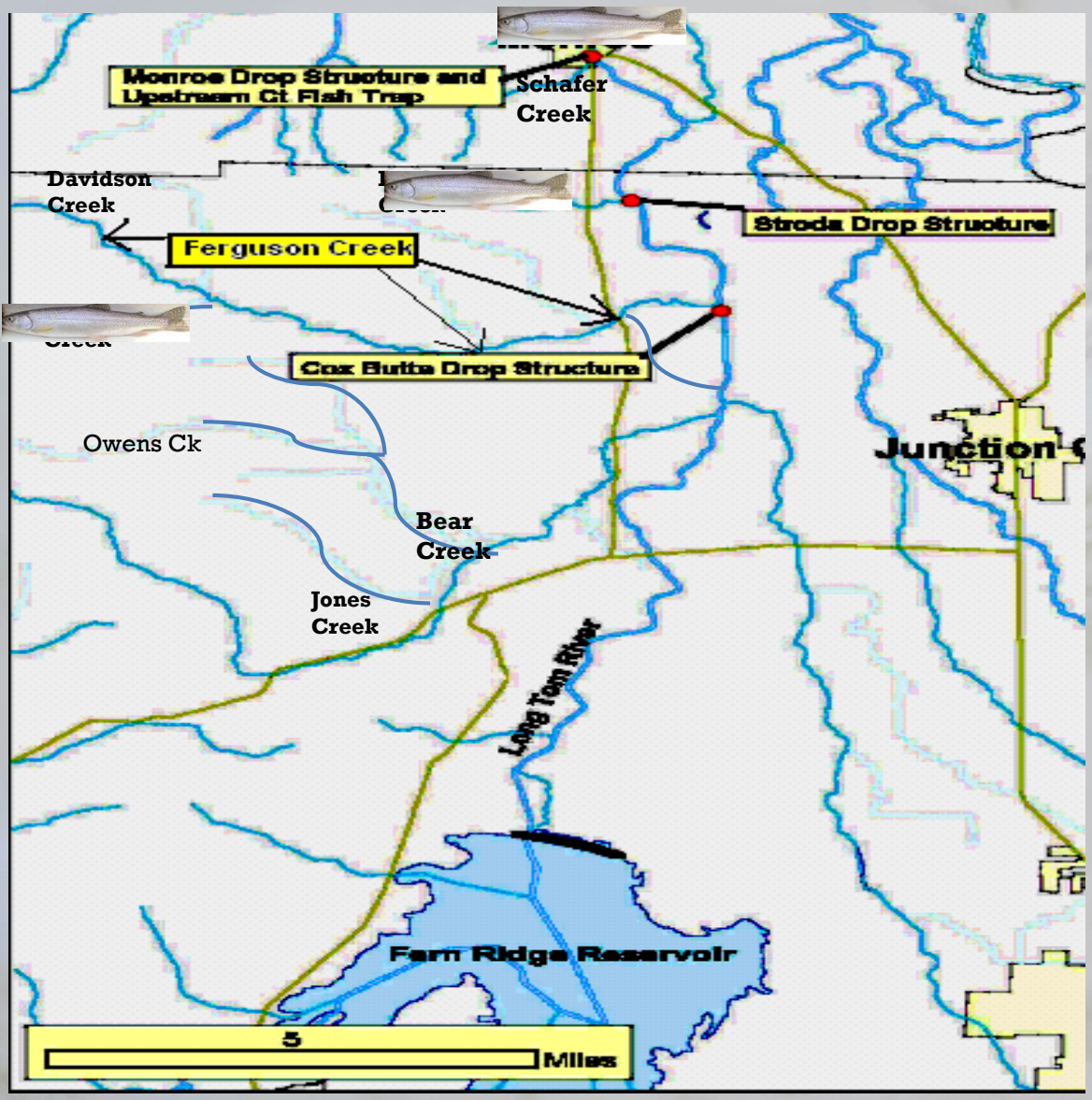
# Some Fish Moved; Some Fish Didn't




Schafer Creek to Ferguson Creek - 14 km
Rattlesnake Creek to Ferguson Creek – 11.4
Rattlesnake Creek to Davidson Creek – 17.4 km
SF Ferguson Creek to Davidson Creek – 4.3 km
Schafer Creek to Bear Creek – 20 km
Monroe Dam to Bear Creek
to Owens Creek – 27 km

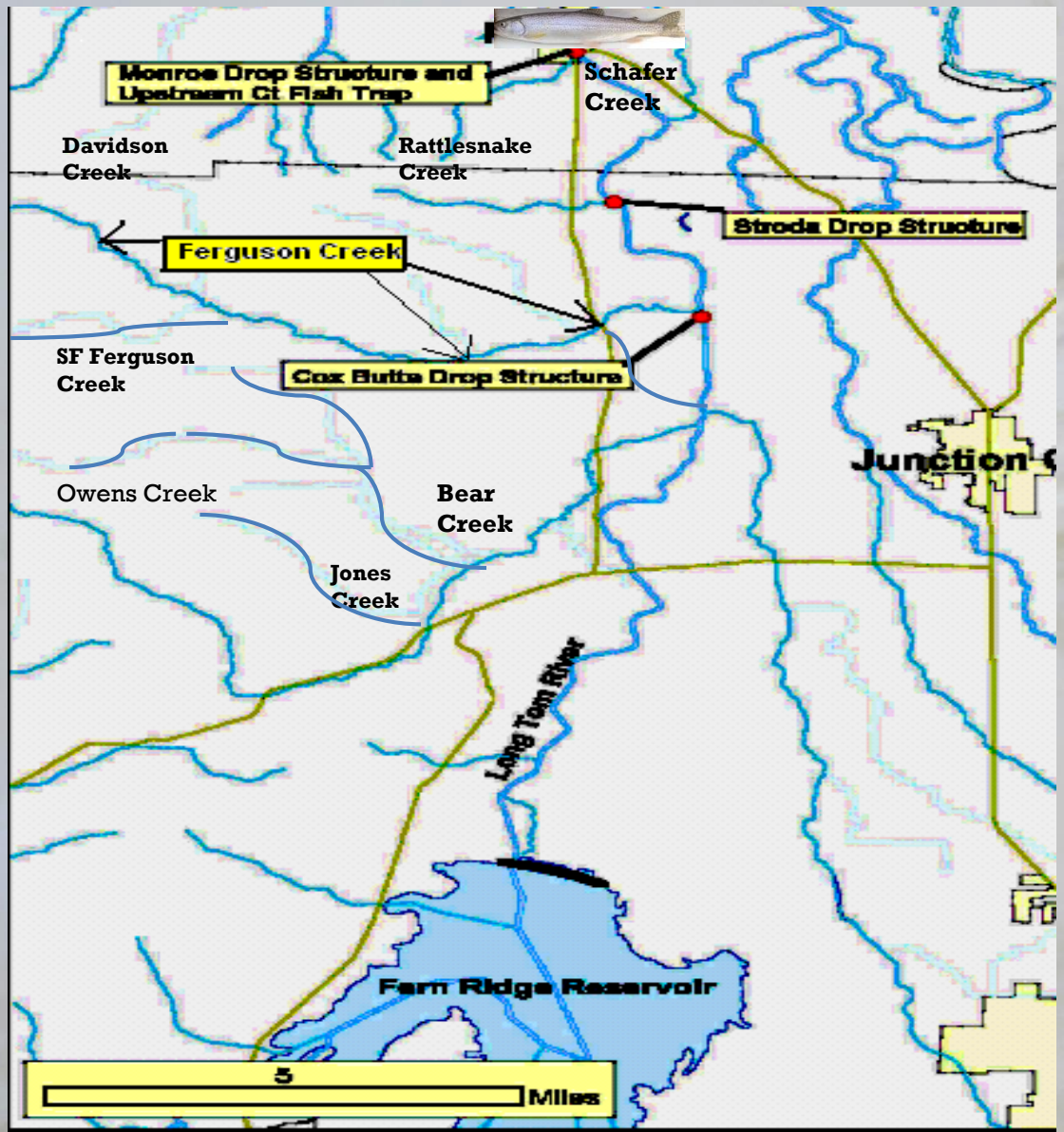
But….
Schafer/Rattlesnake Creeks to Ferguson – over or around Stroda Drop Structure
Scafer Creek or Monroe Dam to Bear over or around Stroda and Ferguson Drop Structures

# Fish That Moved…




- 12 fish moved from Schafer Ck to Ferguson Ck at Moffetts array station;
- 13 fish moved from Rattlesnake Creek to Moffetts array station;
- 3 fish moved from Rattlesnake Creek to Davidson Creek array station;
- One fish was tagged at SF Ferguson trap and detected at Moffetts array station on the same day (12/16/10).

# Fish That Moved Farther




176786086:

Tagged at Schafer Creek
3/11/13
Detected at Bear Creek
**7/2-10/2013**

177958775:

Tagged 10/4/13 at Monroe Dam;
Sighted at Bear Ck 11/20/13 &
12/2-4/13;
Sighted at Owens Ck
1/30/14
2/23/14 – 3/20/14

**Migrated 26.5 km**

# Fish That Didn't Move (Much)

- Of the 42 cutthroat trout tagged at the SF Ferguson trap that where recaptured or detected at an array station, all in the Ferguson Creek Basin;
  - 176785928 Captured at SF Ferguson trap 11/8/11, detected 5/12/13 at Ferguson Creek Array at Moffetts
  - 176785797 Captured at SF Ferguson trap 4/2/11, detected at Davidson Creek Array 1/18/12
- Fish also showed an affinity to Owens Creek at the trap and array station, and to Rattlesnake Creek;
  - 176786044 Captured at Rattlesnake Creek in 2012- 2013 and 2013-2014 trapping seasons;
- Fish often were recaptured or detected over several months at a particular location.

# Fish That Moved to Where They Were Not Supposed to Be…

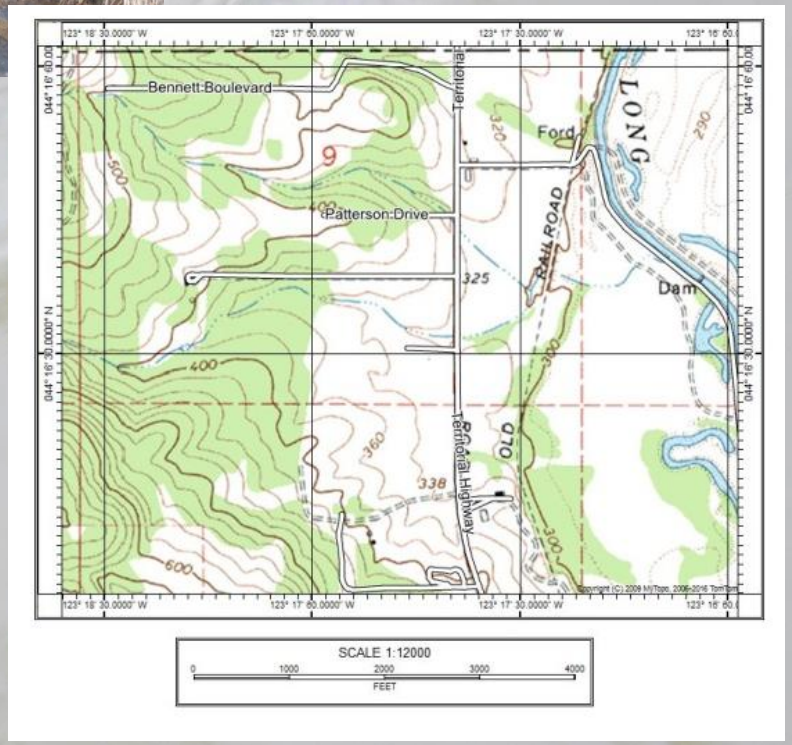
- 176785708
  - Tagged Ferguson Creek at Moffetts 1/21/11
  - Detected at Ferguson Creek Moffetts **8/18/11**
- 176786086
  - Tagged at Schafer Creek 3/11/13
  - Detected at Bear Creek **7/2-10/2013**
- 176786026
  - Tagged at Jones Creek 4/24/12
  - Detected at Bear Creek **9/30/2013** (1 ½ years later)

# Fish That Moved to Where They Were Not Supposed to Be…Rattlesnake Creek

360 mm

142 Cutthroat

- 128 >120 mm



# And what about those Rattlesnake Creek fish?

- We think the fish are migrating into the creek to spawn. Gravid females and males in spawning colors were routinely captured in the trap. Also a 45 mm cutthroat trout was captured in late April 2015 at the trap. A fish this small would be unlikely to traverse upstream from the Long Tom River, implying it was a 0+ fry produced in the creek that season.

- There were also several fish captured in the 95-110 mm range; these fish are perplexing. Rattlesnake Creek dries out most summers in the lower reaches. However there maybe pools in the upper reaches of the creek that maintain suitable for cutthroat trout. Whether these smaller fish were able to negotiate the creek upstream from the Long Tom River, or remained in Rattlesnake Creek throughout the year is unknown.

# And what about those Schafer Creek fish?

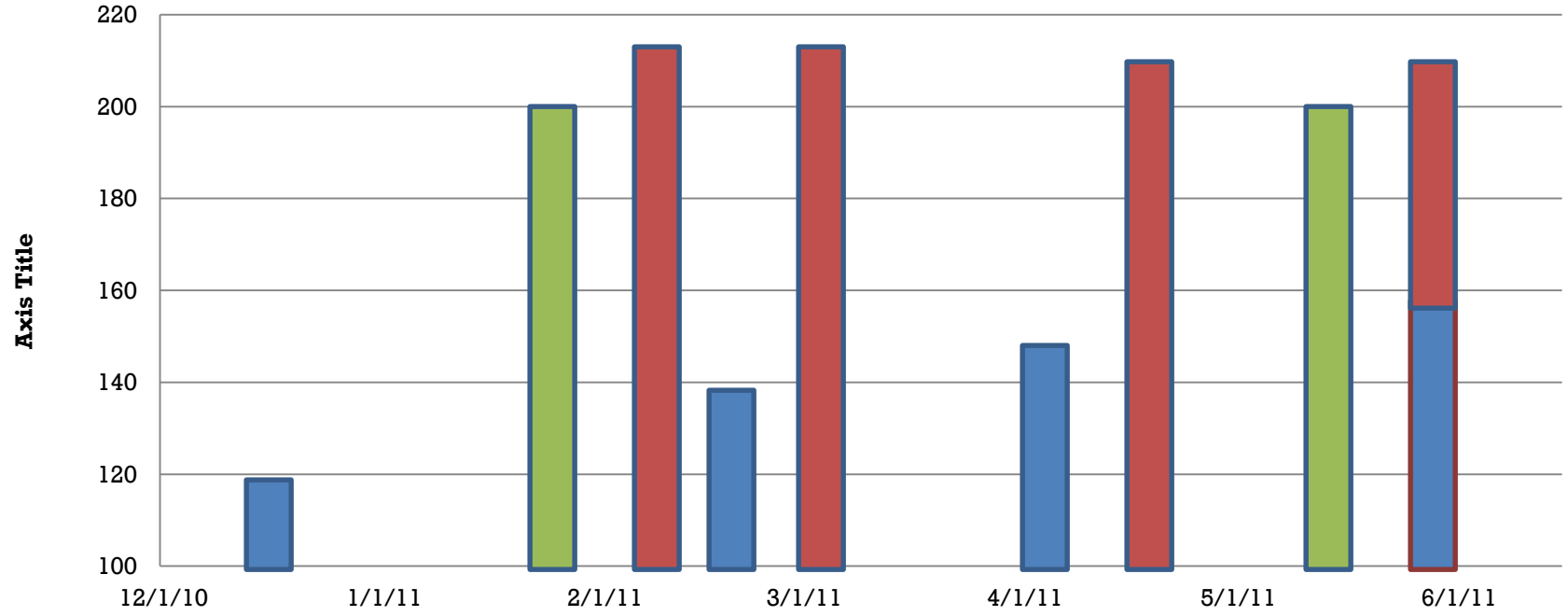
- We speculate the cutthroat trout are using Schafer Creek for rearing and refuge rather than spawning.
- Little, if any, spawning habitat is located upstream
- Fish recaptured in Schafer Creek showed significant growth:

  136 -195 mm in 3 months (2 in)

  148 – 202 mm in 3 months (2 in)

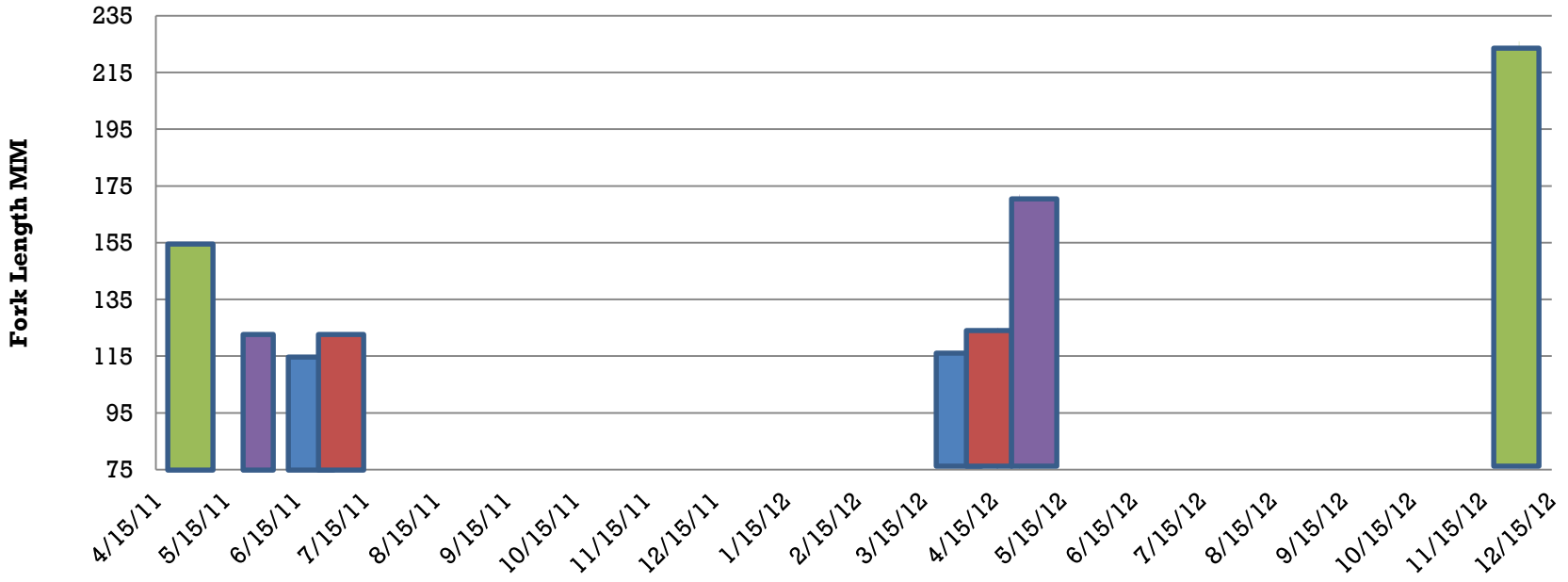
  143 – 156 mm in 3 weeks ( ½ in)

# Some Fish Grew; Some Fish Didn't




| | 12/1/10 | 12/16/10 | 1/26/11 | 2/10/11 | 2/19/11 | 3/4/11 | 4/5/11 | 4/19/11 | 5/14/11 | 5/28/11 | 6/15/11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 174478180 | | 117 | | | 138 | 139 | 148 | | | 155 | |
| 176785757 | | | | 210 | | 209 | | 208 | | 209 | |
| 176785714 | | | 197 | | | | | | 198 | | |

# Some Fish Grew; Some Fish Didn't




| | 4/23/11 | 5/28/11 | 7/5/11 | 4/17/12 | 4/26/12 | 12/1/12 | |
|---|---|---|---|---|---|---|---|
| 17678822 | | | 111 | 112 | | | |
| 17685823 | | | 122 | 125 | | | |
| 17685784 | 154 | | | | | 226 | |
| 176785809 | | 122 | | | 172 | | |

# But…When Fish Did Grow, They Grew at an Consistent Rate

| Fish | Date | Fk Lnth MM | Date | Fk Lnth MM | Growth MM | Weeks | MM/ Wks | Watershed |
|---|---|---|---|---|---|---|---|---|
| **176785737** | 11/10/11 | 170 | 5/22/12 | 208 | 38 | 26 | **1.5** | SF Ferguson Ck |
| **177958709** | 12/4/14 | 186 | 2/2/15 | 198 | 12 | 8 | **1.5** | SF Ferguson CK |
| **176786208** | 1/10/12 | 165 | 3/20/12 | 180 | 15 | 9 | **1.6** | Turnbow Ck |
| **176786056** | 12/26/12 | 152 | 3/11/13 | 173 | 21 | 11 | **1.9** | Schafer Ck |
| **176786012** | 3/20/12 | 158 | 5/15/12 | 168 | 10 | 7 | **1.4** | Owens Ck |

# Unless…

| Fish | Date | Fk Lnth MM | Date | Fk Lnth MM | Growth MM | Weeks | MM/ Wks | Watershed |
|---|---|---|---|---|---|---|---|---|
| **176785975** | 1/31/12 | 120 | 3/27/12 | 151 | 31 | 8 | **3.9** | Jones Ck (Bear Ck WS) |
| **177958721** | 2/5/15 | 183 | 2/26/15 | 195 | 12 | 3 | **4** | Schafer Ck |
| **176786047** | 12/7/12 | 118 | 12/31/12 | 130 | 12 | 3 | **4** | Rattlesnake Ck |

# And then there's 176785950…

- SF Ferguson Ck 2012

| Date | Fk Lnth MM | Growth MM | Weeks MM | MM / Wks | | Wks from 1/7 | MM / Wks |
|---|---|---|---|---|---|---|---|
| 1/7 | 130 | | | | | | |
| 2/11 | 145 | 15 | 3 | **3** | | | |
| 3/10 | 147 | 2 | 4 | **0.5** | | | |
| 4/12 | 158 | 11 | 4 | **2.75** | | | |
| 4/28 | 158 | 0 | 2 | **0** | | 13 | **2.15** |

# And 176785737…

- SF Ferguson Ck 2011 - 2012

| Date | Fk Lnth MM | Growth MM | Weeks MM | MM / Wks |
|---|---|---|---|---|
| 4/14/11 | 162 | | | |
| 5/17/11 | 164 | 2 | 4 | **0.5** |
| 11/10/11 | 170 | 6 | 24 | **0.25** |
| 11/19/11 | 172 | 2 | 1.5 | **1.3** |
| 1/14/12 | 178 | 6 | 8 | **0.75** |
| 3/13/12 | 198 | 20 | 8 | **2.5** |
| 3/27/12 | 198 | 0 | 2 | **0.0** |

| Date | Fk Lnth MM | Growth MM | Weeks MM | MM / Wks |
|---|---|---|---|---|
| 4/10/12 | 205 | 7 | 2 | **3.5** |
| 5/1/12 | 205 | 0 | 3 | **0.0** |
| 5/19/12 | 210 | 5 | 3 | **1.67** |

# Future Analysis

- Analyze in MARK for more recapture/resight information such as survival and population;
- Do a more detailed statistical analysis of growth data;
- Consider temperature and flow in relationship to movement and growth;
- Analyze fin clips for genetic information on family relationships and life history.

# Thank you!


*ODFW R&E Program*


*ODFW STEP Program*

*Meyer Memorial Trust*


*Oregon RFID*


*Willamette Valley Project Fisheries Program*

Dozens of LTWC Volunteers, Watershed Residents, and Technical Advisors!