



# Can altered floodplains provide quality salmon habitat?

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# Multnomah Channel Marsh (MCM)



120 ha floodplain marsh

Water control structures (WCS)



# Fall 2014 restoration actions

- Culvert replacement
- Breaches in riparian berms of north and south ponds – hydrologic reconnection at 10.7 ft



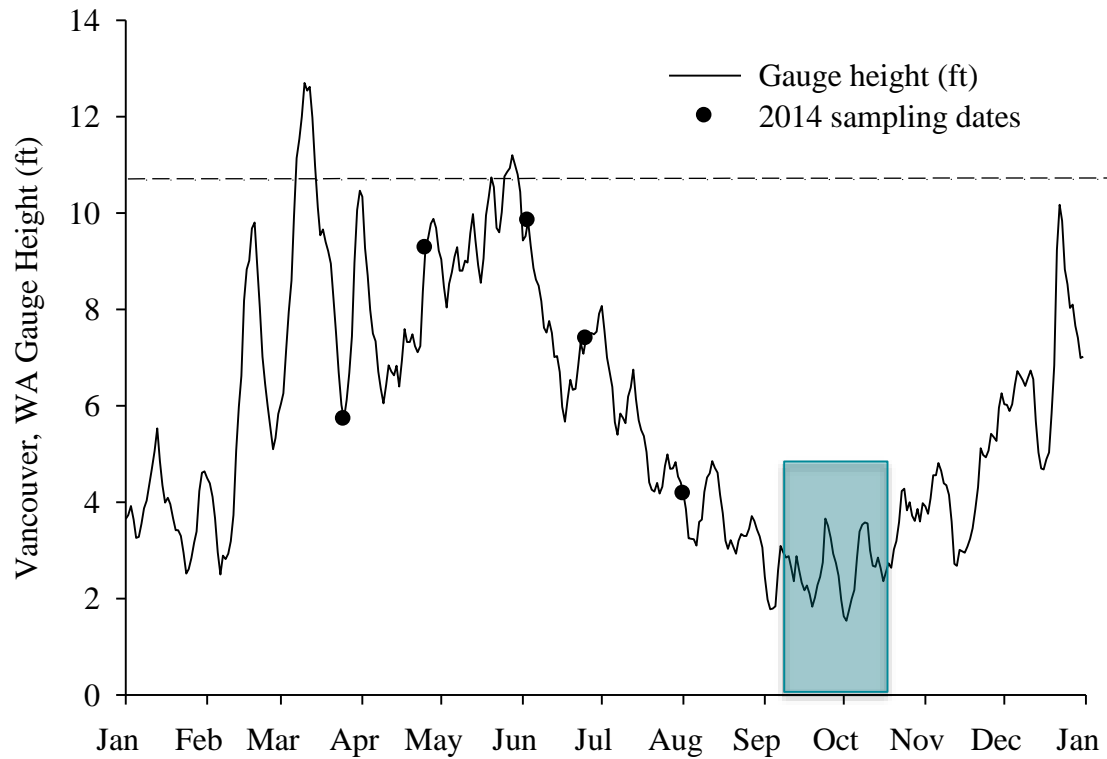
- Would salmon access the floodplain via the breaches?
- Would the floodplain provide good habitat?
- Could salmon return to the river?

# Approach

- Pond water quality (temp, DO, depth)
- Abundance and composition of fish assemblages in ponds, Multnomah Channel (MC), and main stem Columbia River (CR)
- WCS passage by salmonids
- Salmon growth and diet within two veg types
- Pond prey resources
- Breach sampling



# 2014 Hydrologic Profile

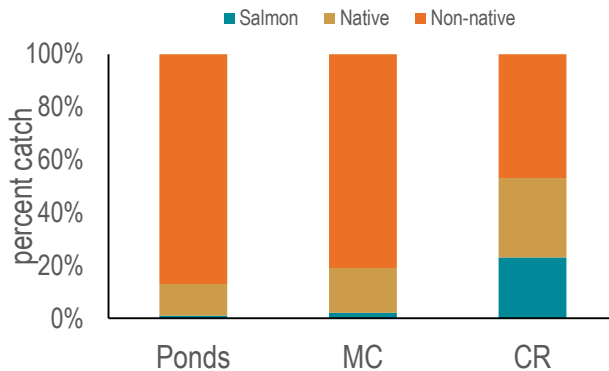


# 2014

- Water quality
  - Temp



- Fish assemblage



- Salmon growth & diet

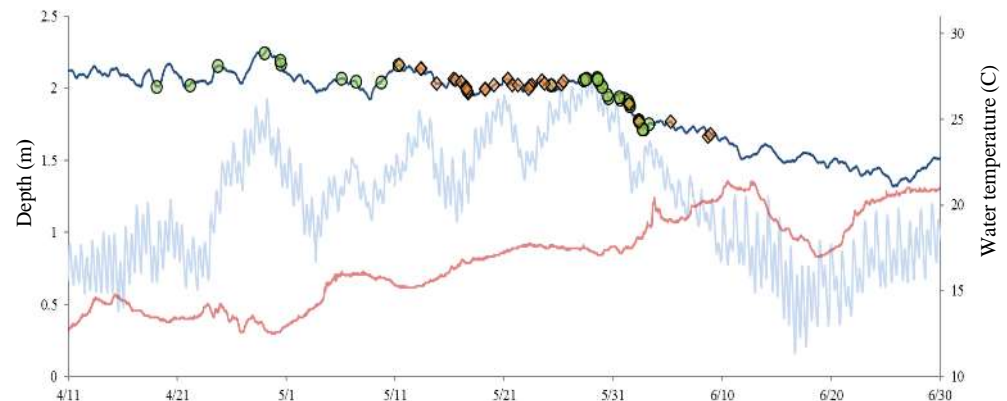
- No data collected

- Prey resources

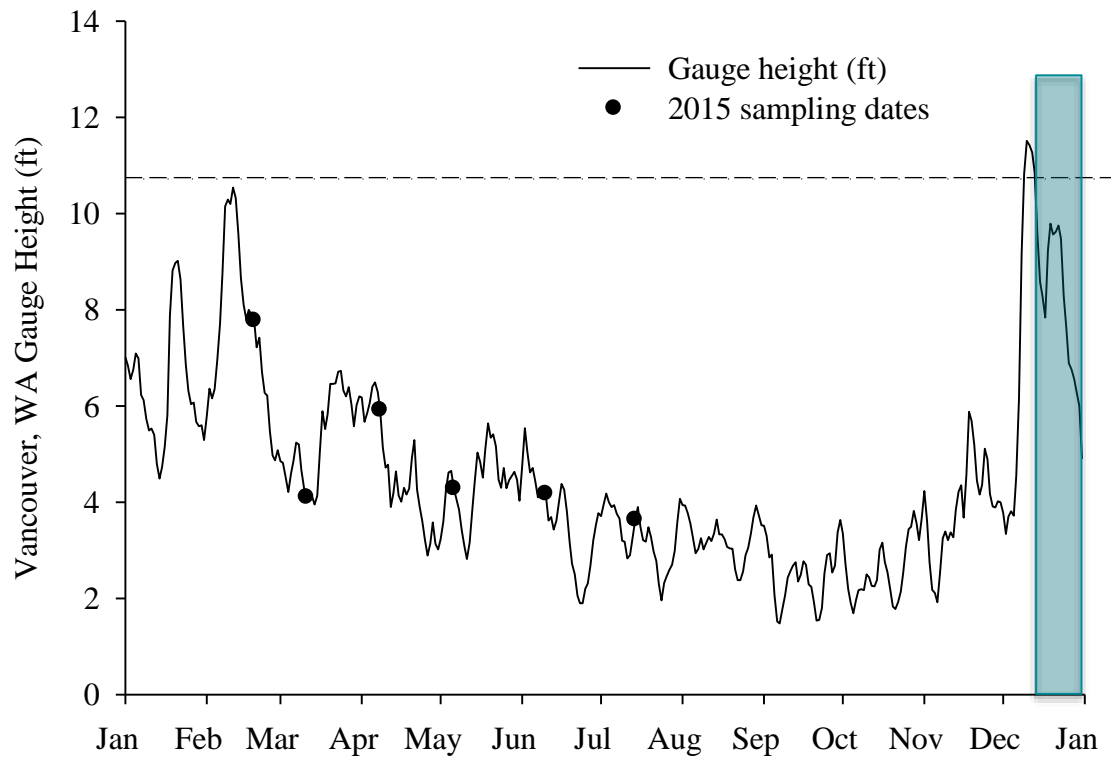
- No data collected

- WCS passage – south pond

- 16 PIT-tagged fish (mostly Willamette hatchery Chinook) approached MCM, but did not navigate past WCS
- 23% of 148 juvenile Chinook passed the south WCS



# 2015 Hydrologic Profile

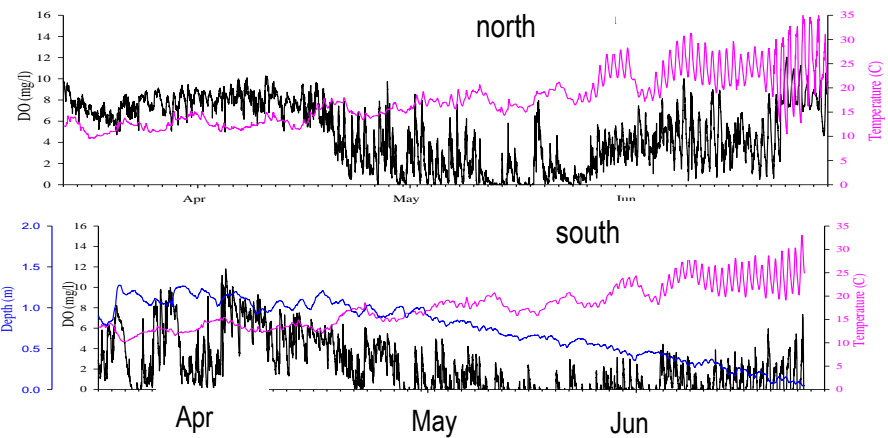
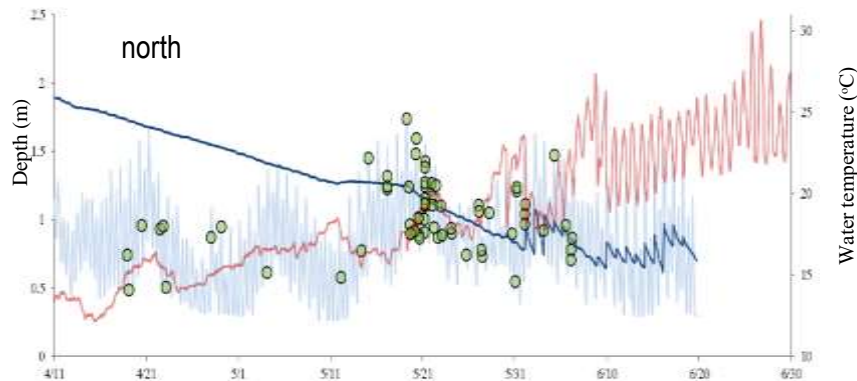
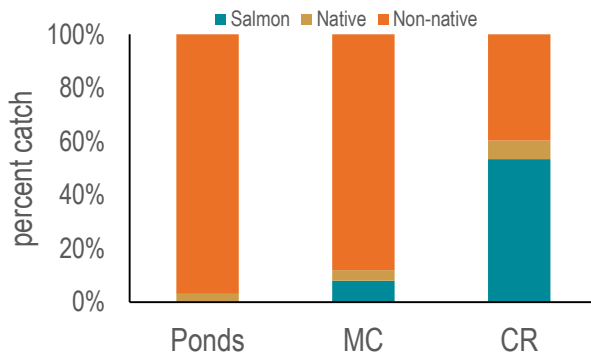


# 2015

- Water quality

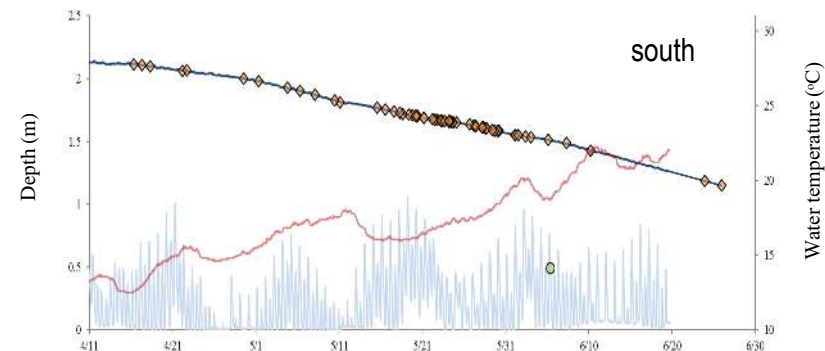
- Temp, DO, depth-south

- Fish assemblage



- WCS passage

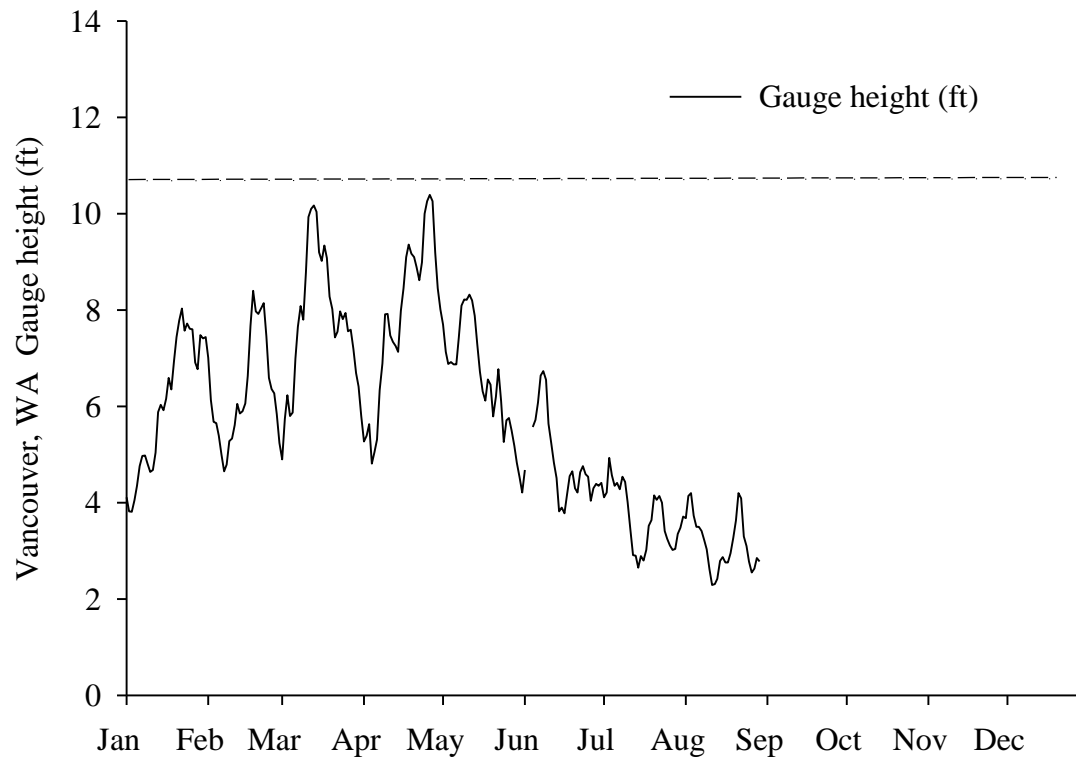
- 12 PIT-tagged fish (mostly Willamette hatchery Chinook) approached MCM, but did not navigate past WCS
- 43% of 175 Chinook passed the north WCS
- 1 of 191 Chinook passed the south WCS



# 2015 cont'd.

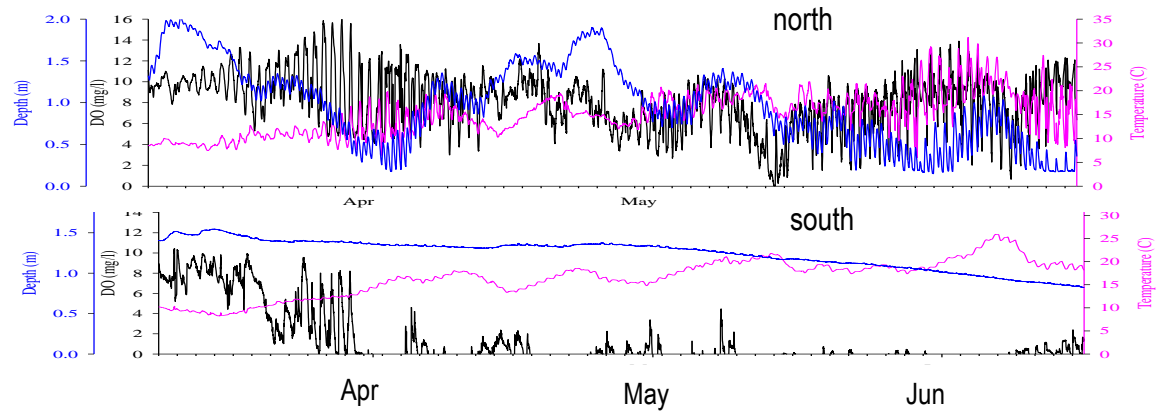
- Salmon growth and diet
  - Chinook grew more in native veg than in reed canarygrass (RCG)
  - No difference in stomach fullness
  - Salmon in RCG consumed more Copepods/Cladocerans and less Chironomids
  - Data limited to one replicate due to poor water quality
- Prey resources
  - Seasonal variation but similar densities and assemblages in both veg types
  - Chironomids and other Dipterans were most abundant

# 2016 Hydrologic Profile

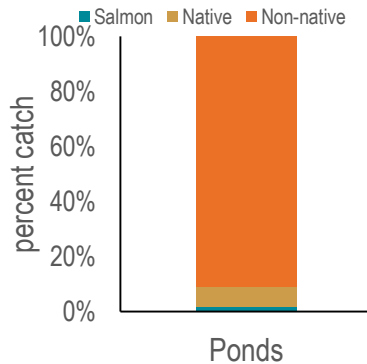


# 2016

- Water quality
  - Temp, DO, depth

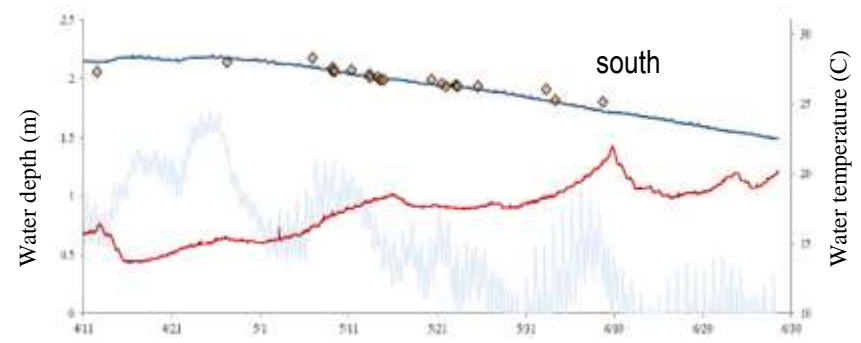
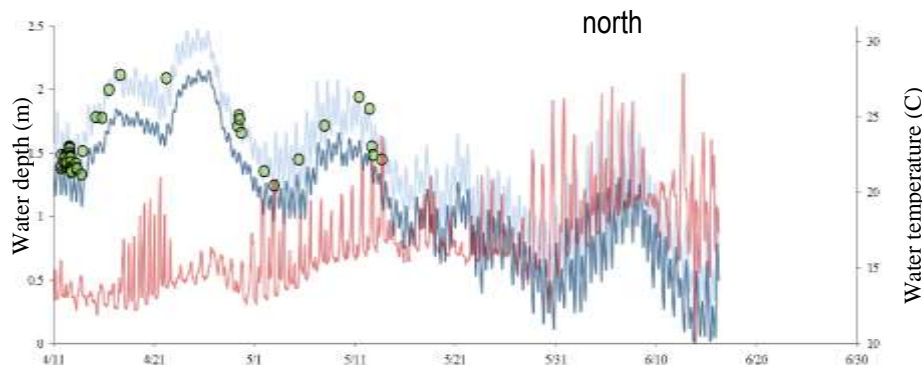


- Fish assemblage



- WCS passage

- 2 PIT-tagged fish (hatchery Chinook, north pikeminnow) approached MCM, but did not navigate past WCS
- 57% of 115 Chinook passed the north WCS
- 0 of 100 Chinook passed the south WCS



# 2016 cont'd.

- Salmon growth and diet
  - Chinook grew more in native veg than in RCG
  - No difference in stomach fullness
  - Salmon in RCG consumed more Chironomids and less Copepods/Cladocerans
  - Data limited to one replicate due to poor water quality
- Prey resources
  - Seasonal variation but similar densities and assemblages in both veg types
  - Chironomids and other Dipterans were most abundant

# Conclusions

- Winter and early spring rearing opportunities
- Water quality suffers from lack of connectivity with MC
- Non-native species, including predatory bass, are plentiful-better adapted to poor water quality
- WCSs impede passage of salmon, especially surface passage design
- Salmon grow in both native and non-native veg types
- Growth higher in native veg, though mechanism unclear

- Would salmon access the floodplain via breaches?
  - We don't know.
- Would the floodplain provide good habitat?
  - Not in low flow years.
- Could salmon return to the river?
  - Yes and no. There are issues with passage.



# Recommendations to improve habitat for salmon

- Remove water control structures
- Deepen and broaden breaches
- Alternative management of WCSs
  - Open both WCSs year round
  - Open south WCS year round and close north WCS seasonally
  - Conditional opening of WCSs



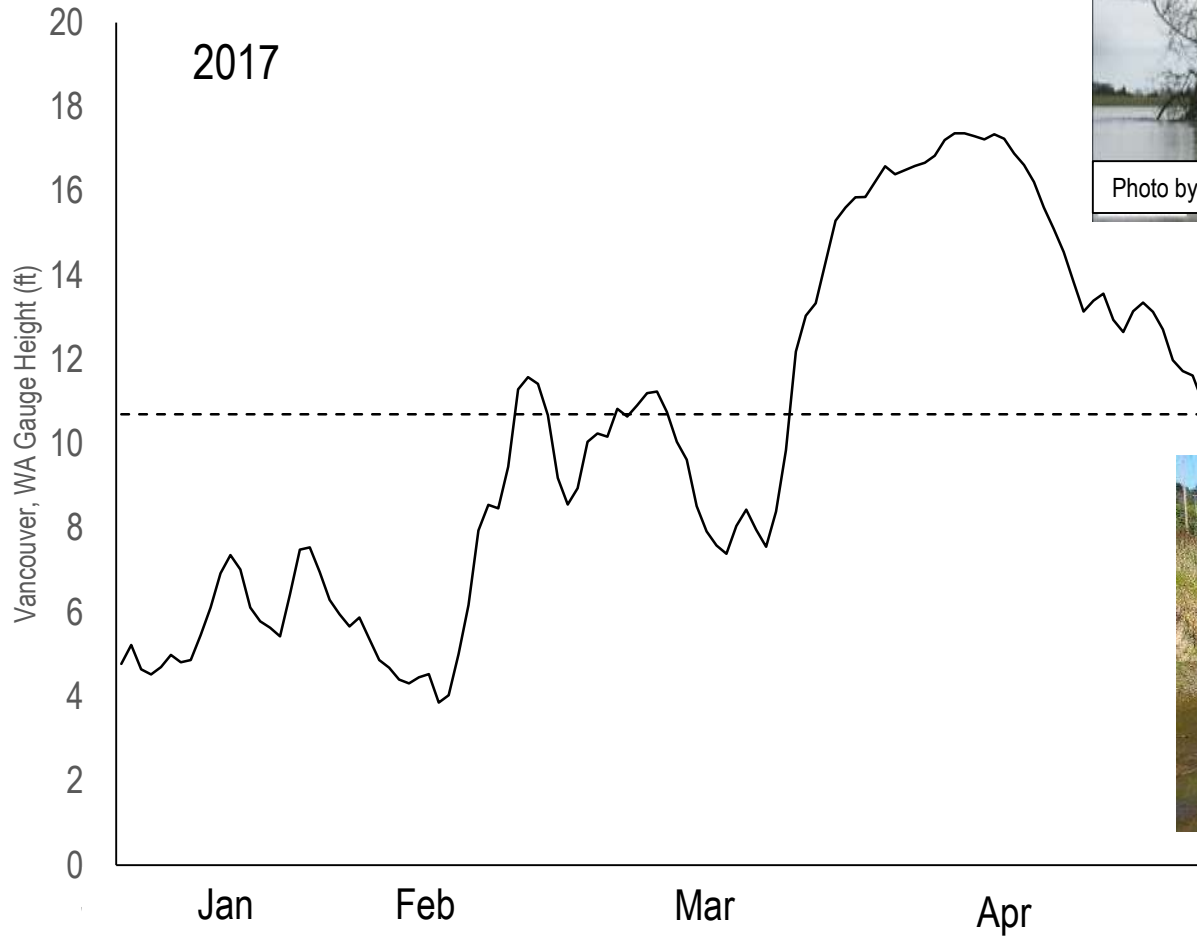
# Adaptive Management Actions

2017: Actively monitoring water level and adjusting flash boards to maintain surface flow

2018: Modify the south WCS fishway



# If only we had one more year...



# Thank you

- Curt Zonick, Rick Scrivens, Justin Cooley, Nathaniel Marquiss, Justin Takkunen, & Ariel Whitacre – Metro
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- Oregon Watershed Enhancement Board

