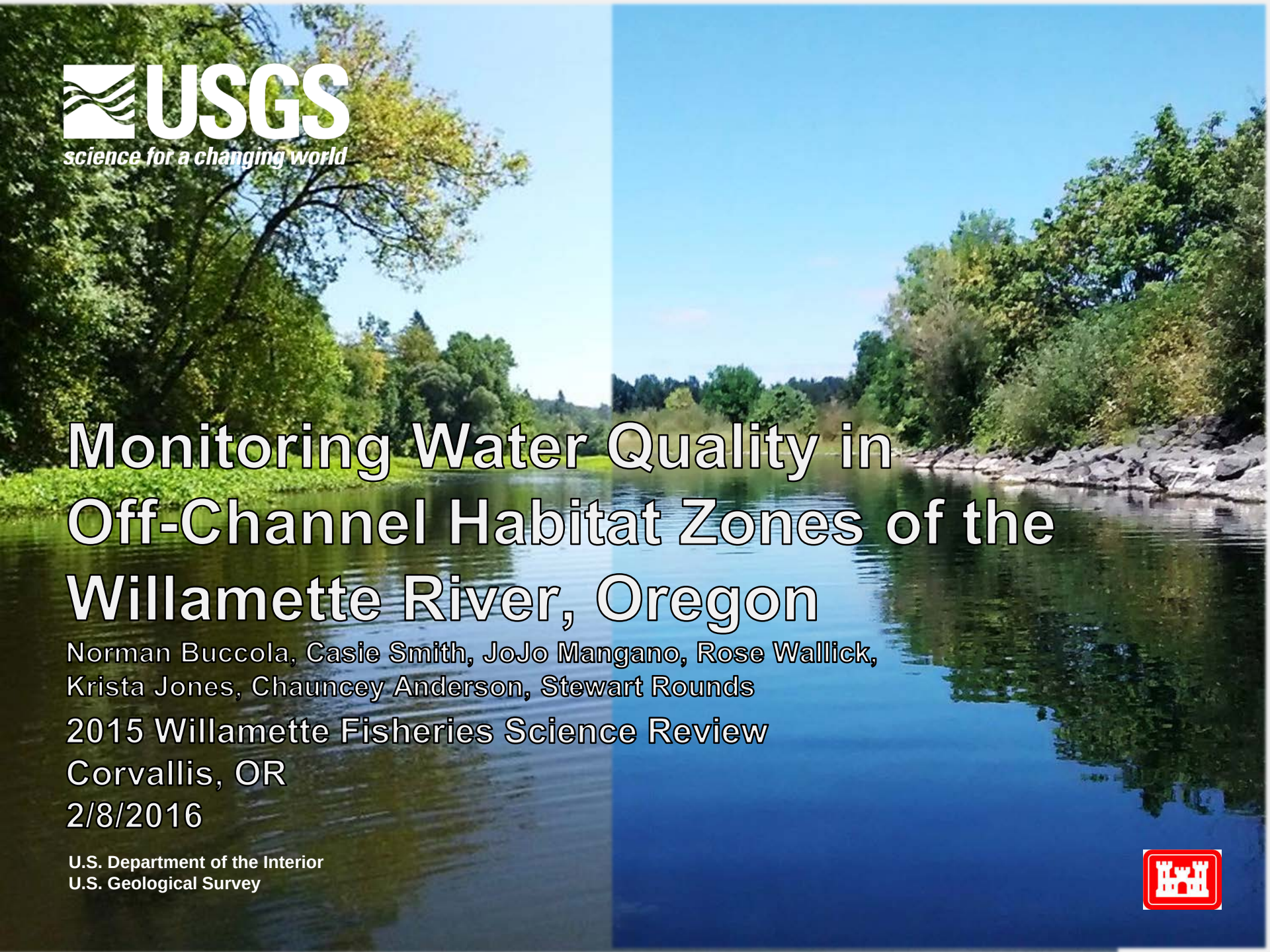


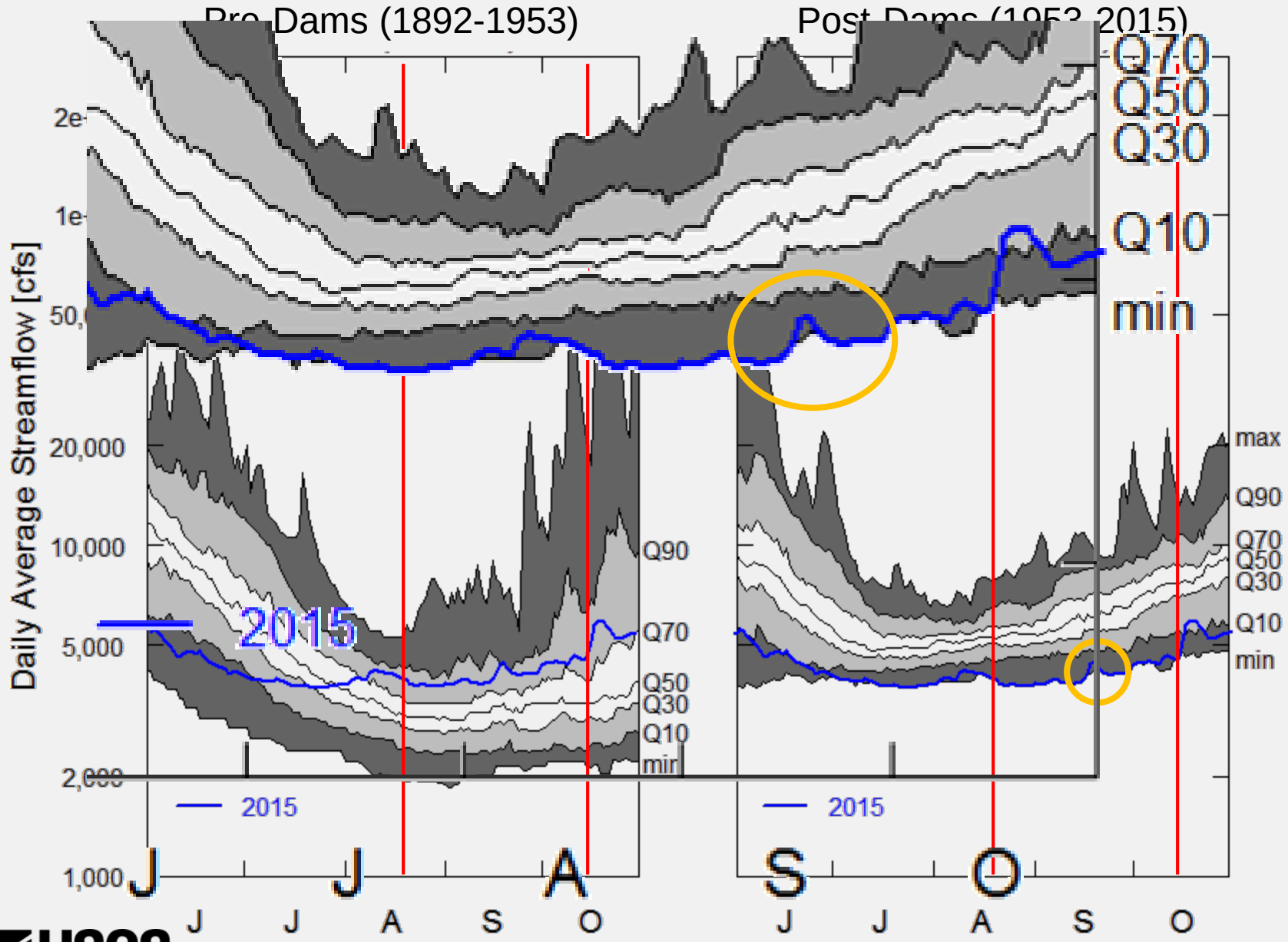
Monitoring Water Quality in Off-Channel Habitat Zones of the Willamette River, Oregon

Norman Buccola, Casie Smith, JoJo Mangano, Rose Wallick,
Krista Jones, Chauncey Anderson, Stewart Rounds

2015 Willamette Fisheries Science Review
Corvallis, OR
2/8/2016

U.S. Department of the Interior
U.S. Geological Survey

2015 Willamette R Streamflow at Albany

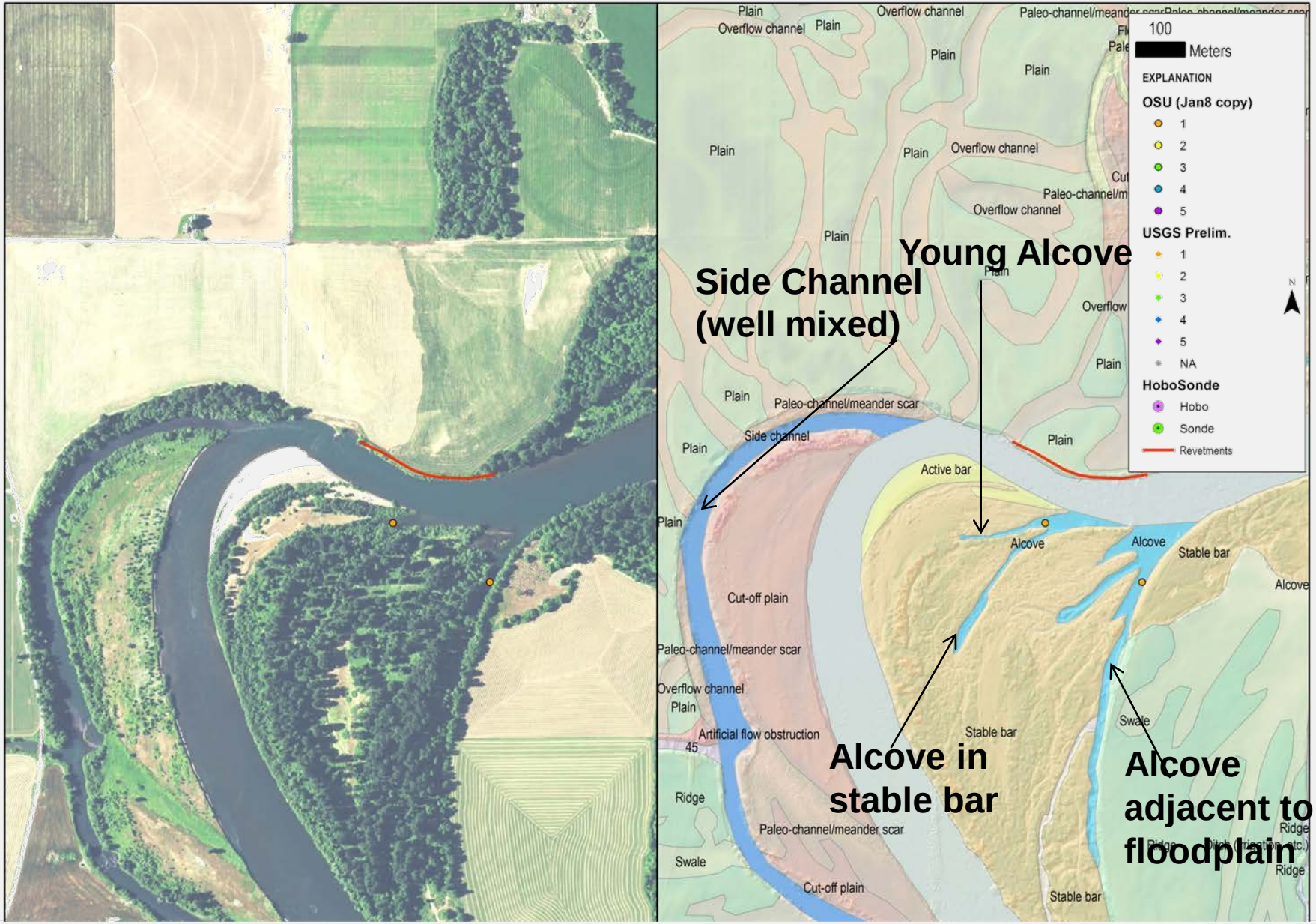


USGS

Data available on usgs.gov/nwis

Off-channel monitoring

Long Tom Confluence, Upper Willamette

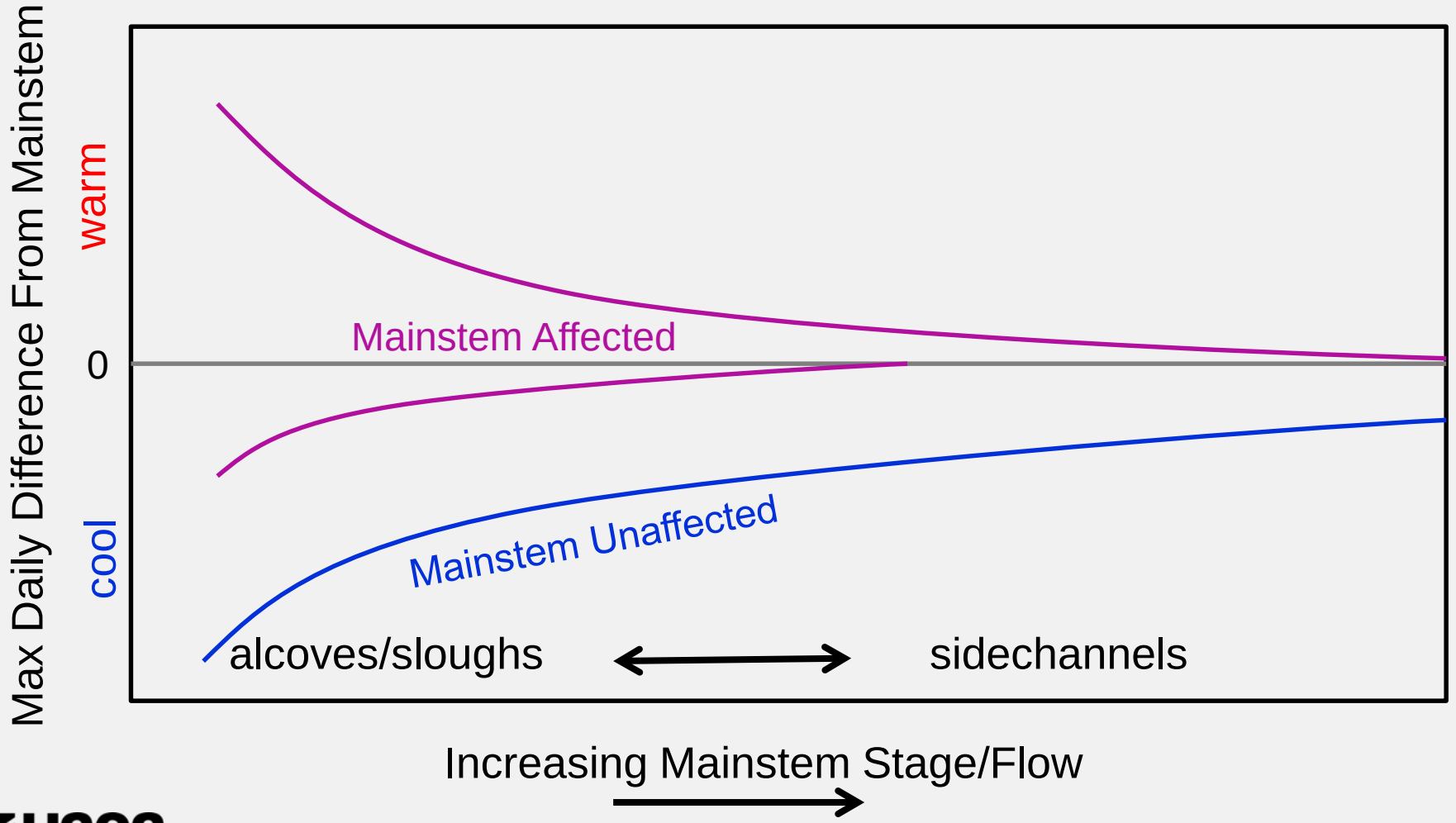


USGS

2014 Air Photos

Preliminary USGS mapping from 2008 lidar

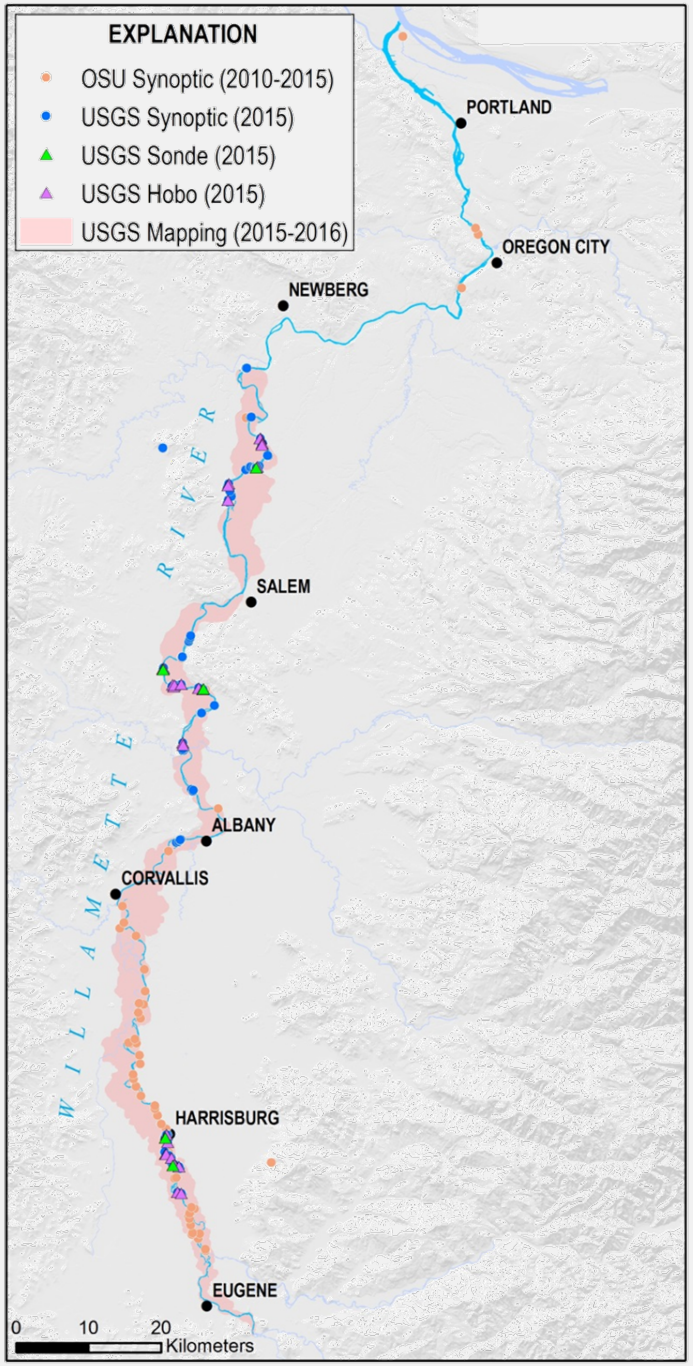
Motivating Question:
How does cold-water habitat change with mainstem flow?



USGS

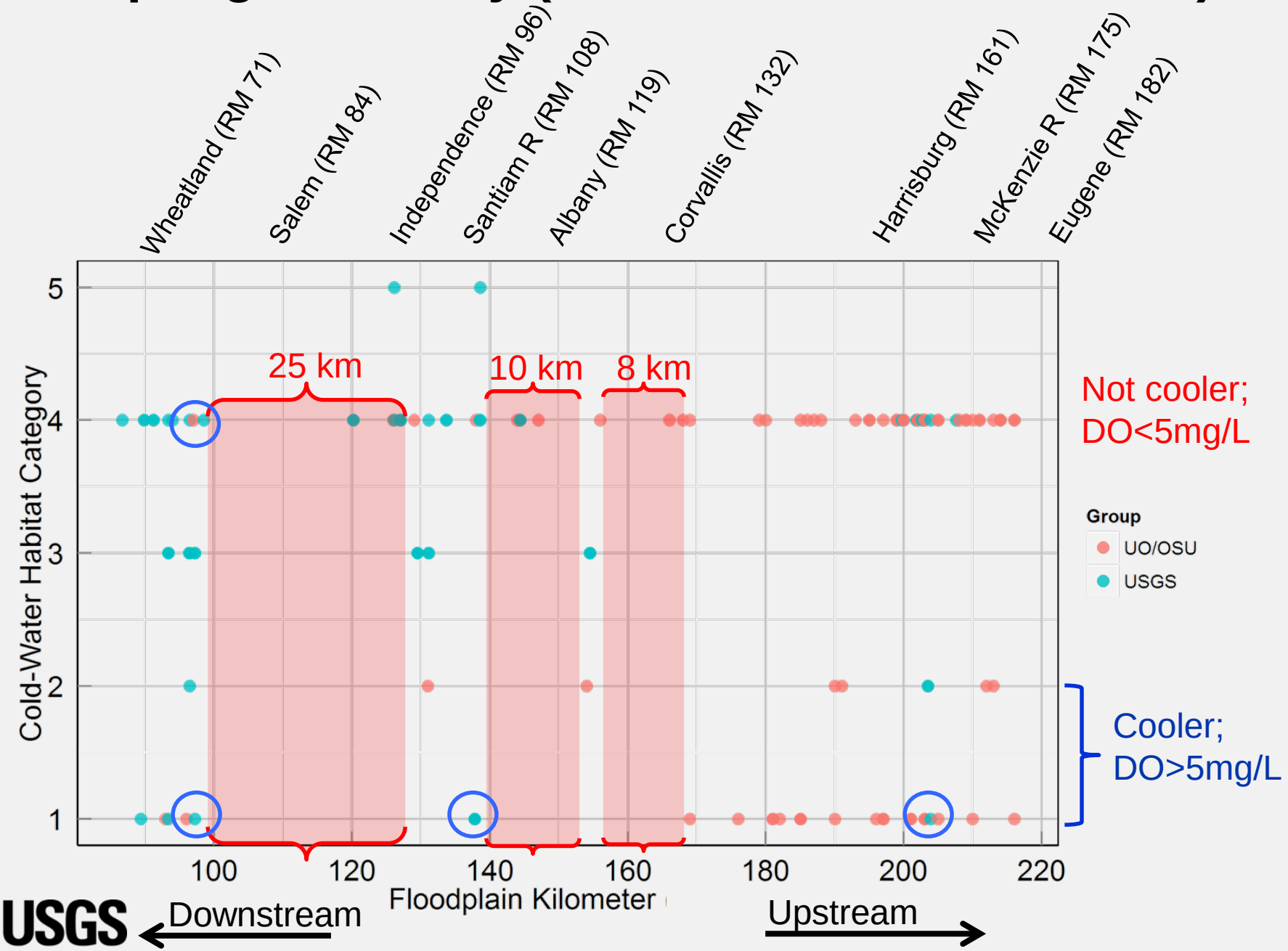
Project Goals

- Synoptic field studies
  - 70 locations - measuring depth, water quality, channel bed and vegetation assesment
- Continuous monitoring:
  - 27 Hobo temperature probes (mainstem and channel margins)
  - 5 Water quality data sondes (temperature, conductivity, DO, pH)



USGS

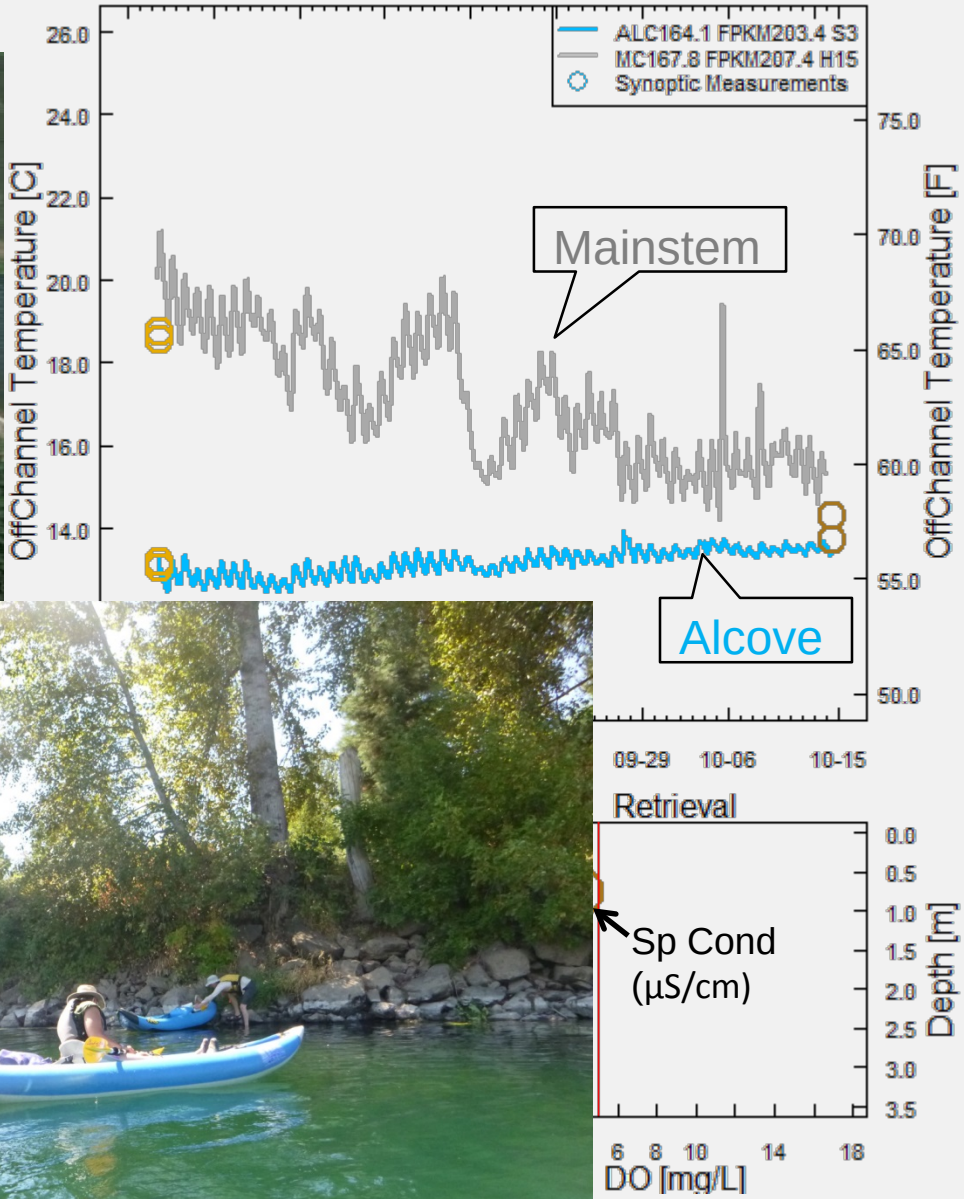
Sampling Summary (OSU, UO, USGS; 2011-15)



USGS

Mainstem Unaffected– Example 1 (long flowpath)

Blue Ruin (RM 164.1; FPKM 203.4)

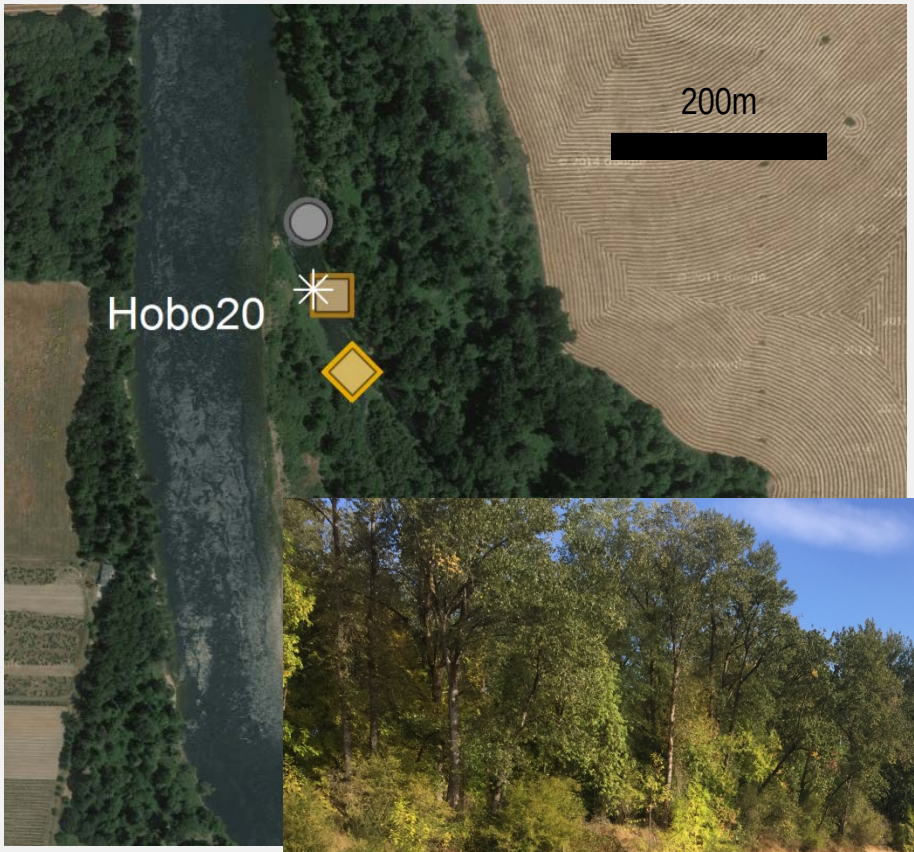


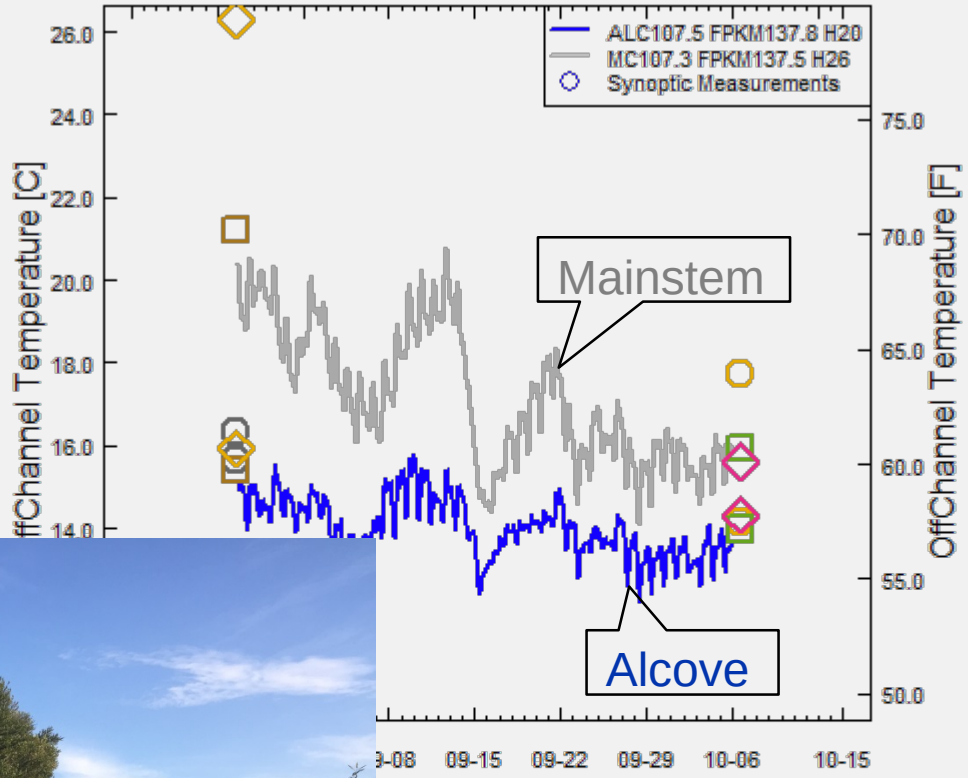
USGS

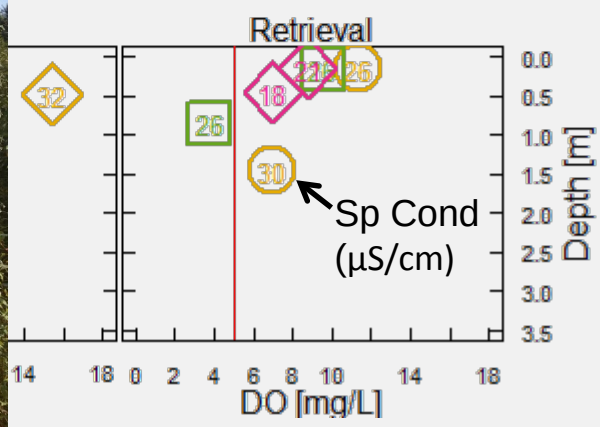
Provisional Data

Mainstem Unaffected – Example 2 (trib influence)

Santiam (RM 107.5; FPKM 137.8)





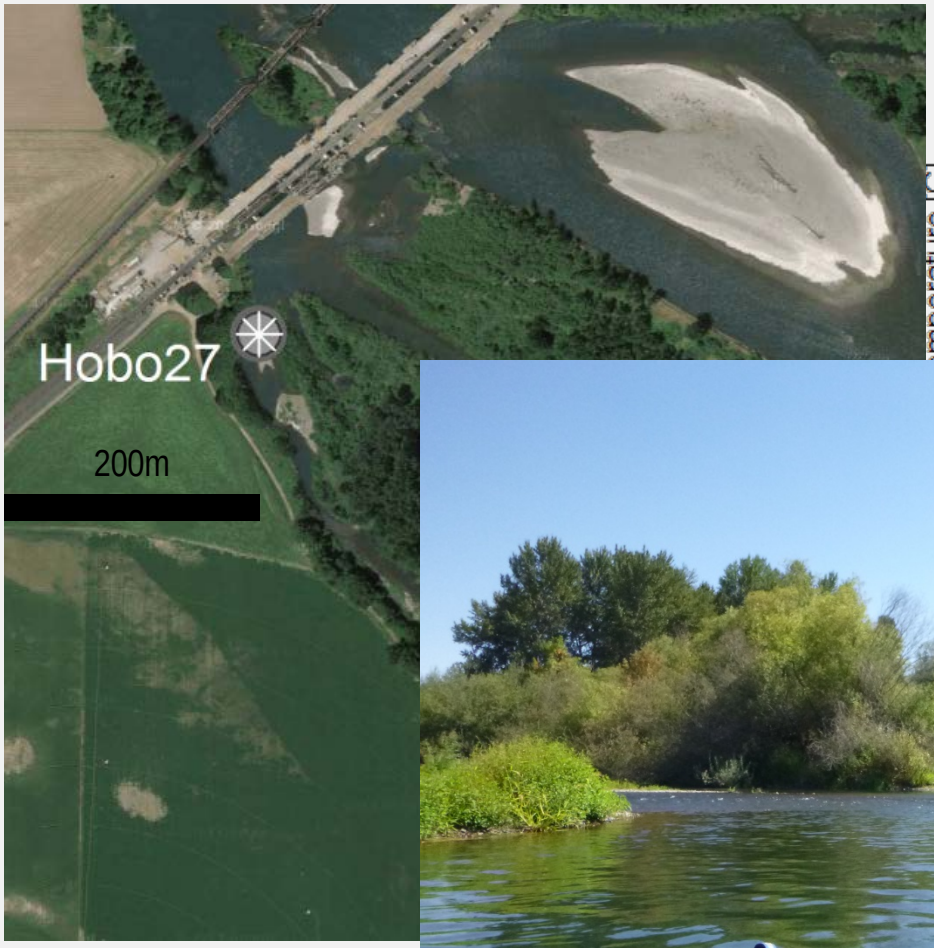


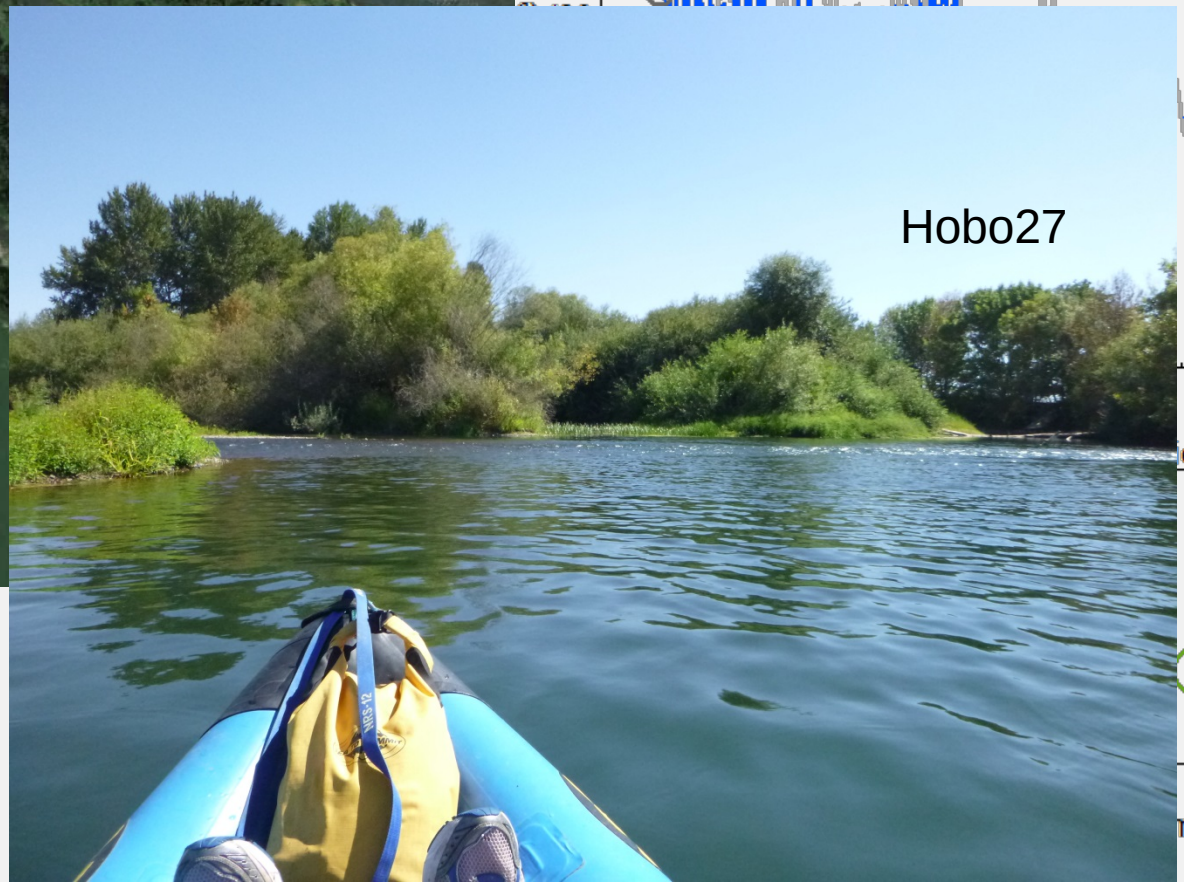
USGS

Provisional Data

Mainstem Affected – Example 1 (long flowpath)

(RM 162.8; FPKM 201.8)



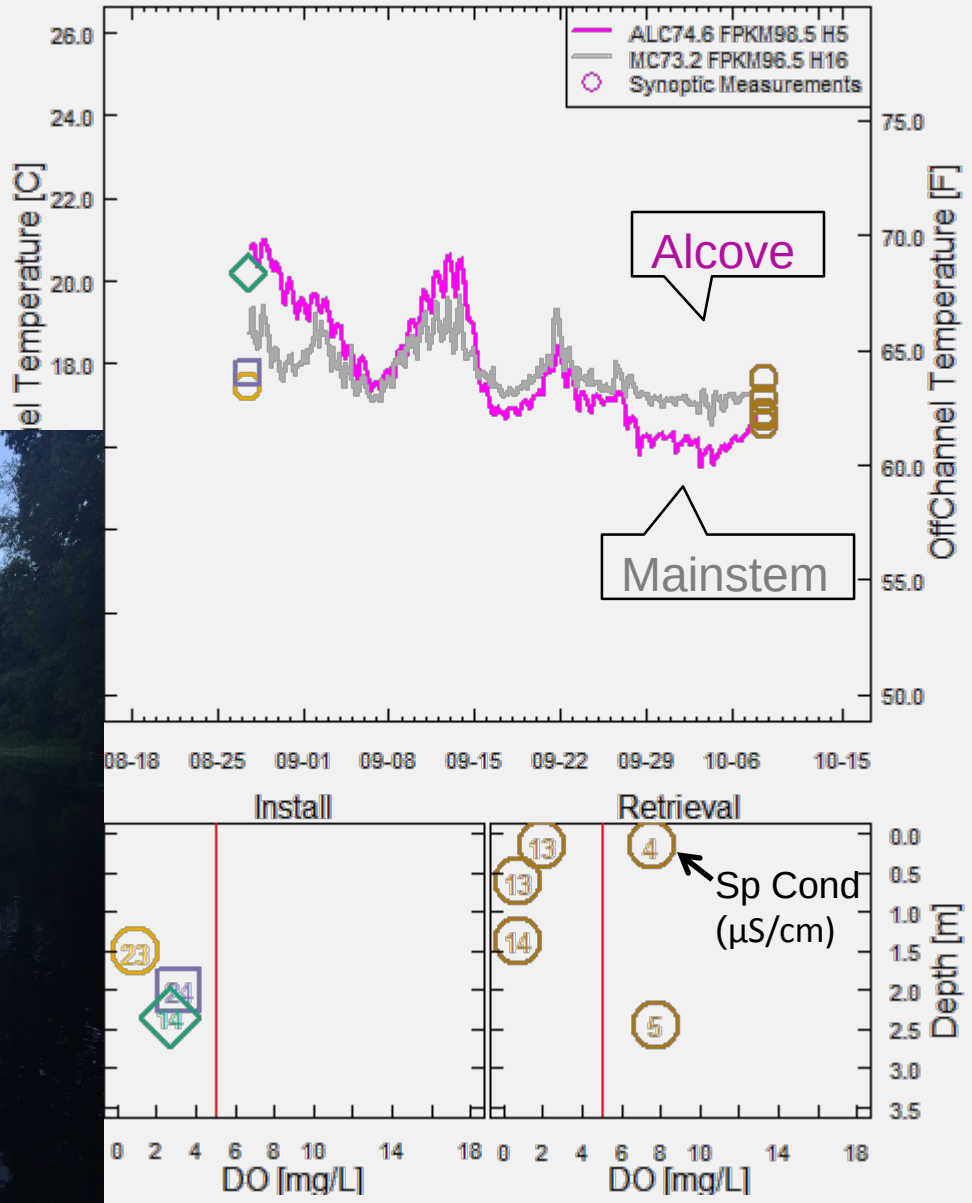


USGS

Provisional Data

Mainstem Affected – Example 2 (short flowpath)

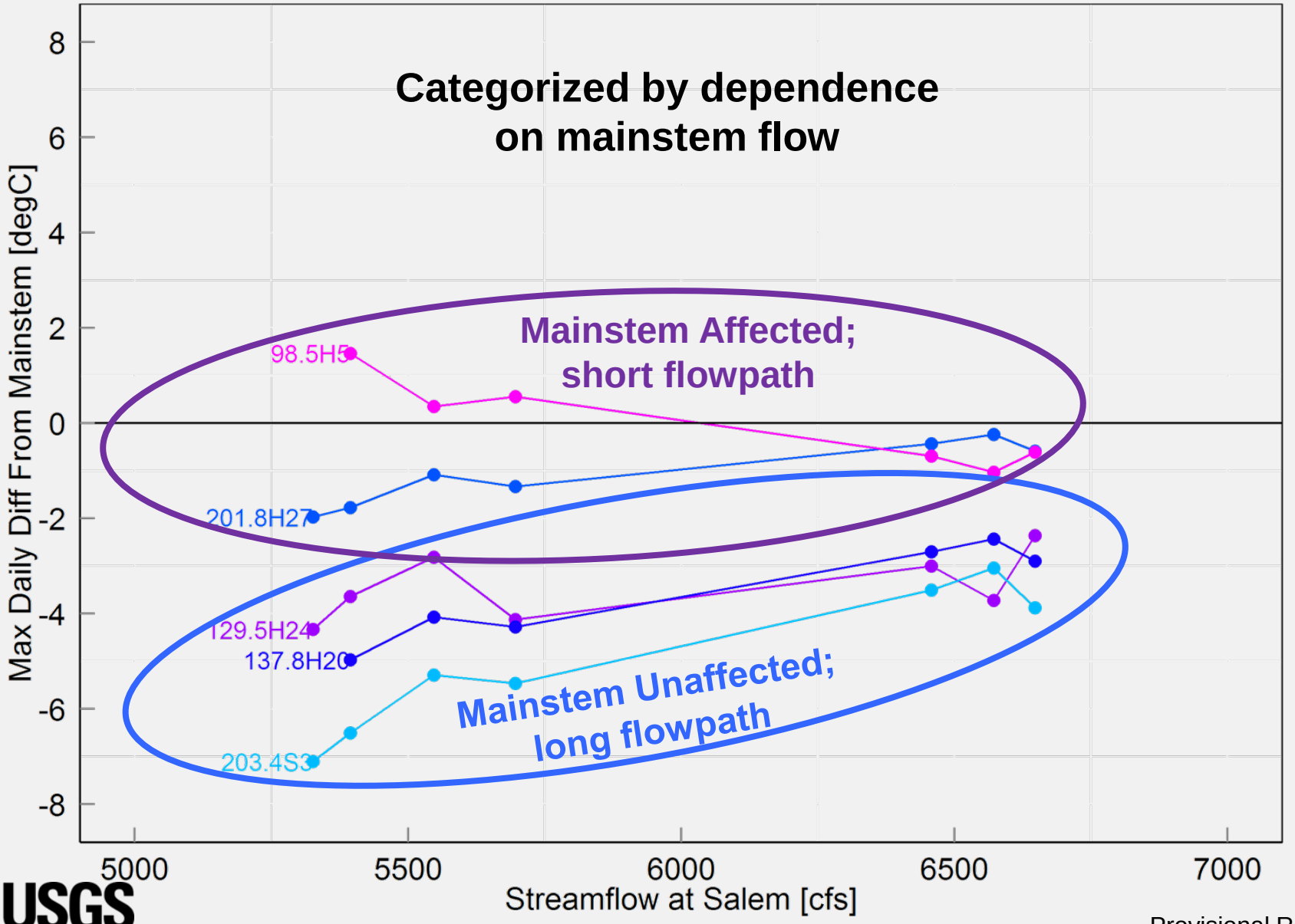
(RM 74.6; FPKM 98.5)



USGS

Provisional Data

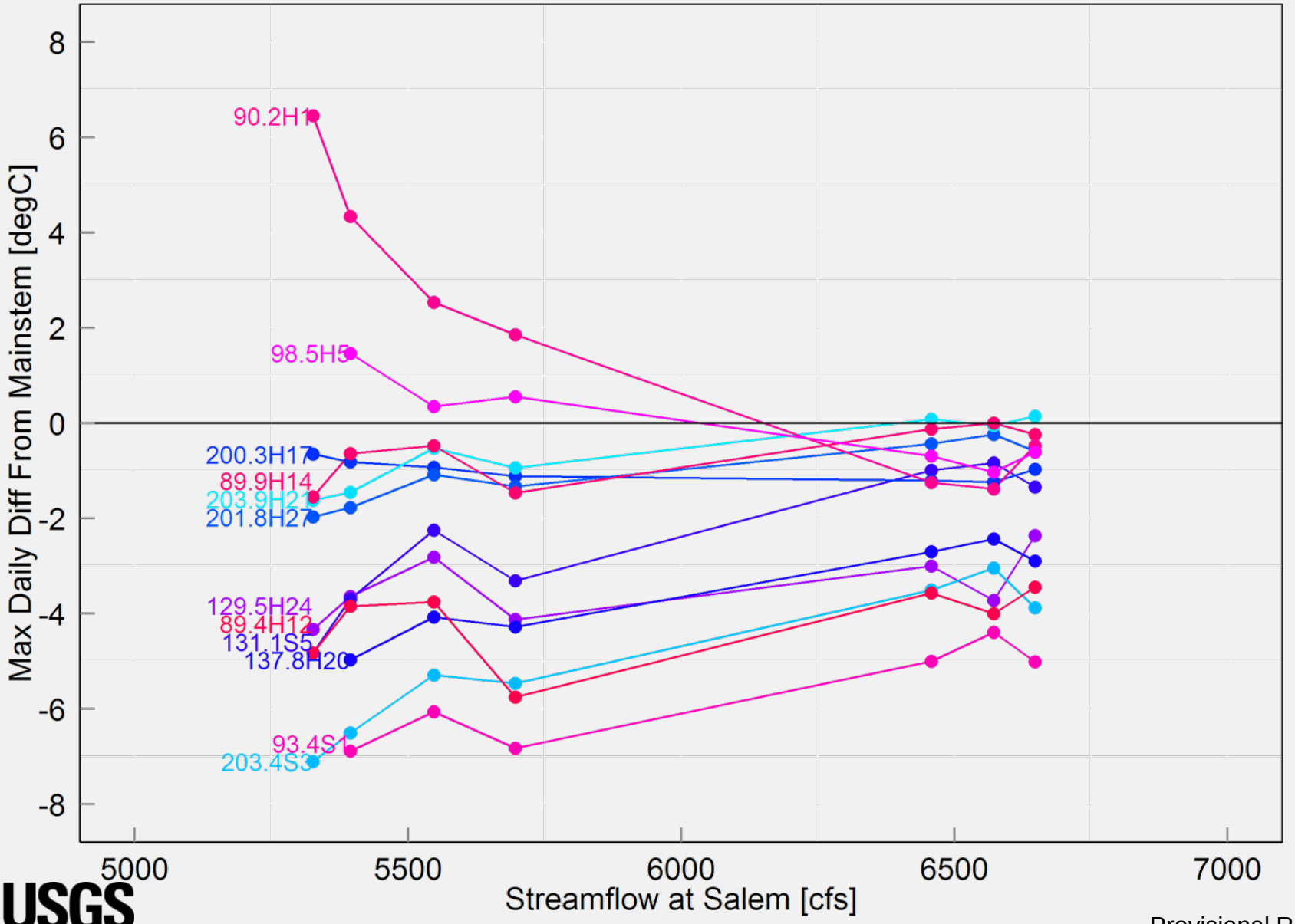
How does cold habitat relate to mainstem Willamette flowrate?



USGS

Provisional Results

How does cold habitat relate to mainstem Willamette flowrate?



USGS

Provisional Results

2015 Conclusions

Off-channel habitat can have a variety of thermal environments relative to mainstem

- **Upstream disconnection promotes cold water signal (hyporheic flow)**

Not all cold-water sites have adequate DO for salmonids

- **How does flowpath length, groundwater, bar age, siltation, vegetation help explain this?**

2016 Next Steps

- **Partner with fish monitoring studies (ODFW, OSU)**
- **How can geomorphic mapping and monitoring inform flow management *and* restoration planning?**

USGS

Acknowledgements

Casie Smith, JoJo Mangano, Rose Wallick, Krista Jones, Stewart Rounds, Chauncey Anderson, Dave Piatt, Heather Bervid, Tamara Wood

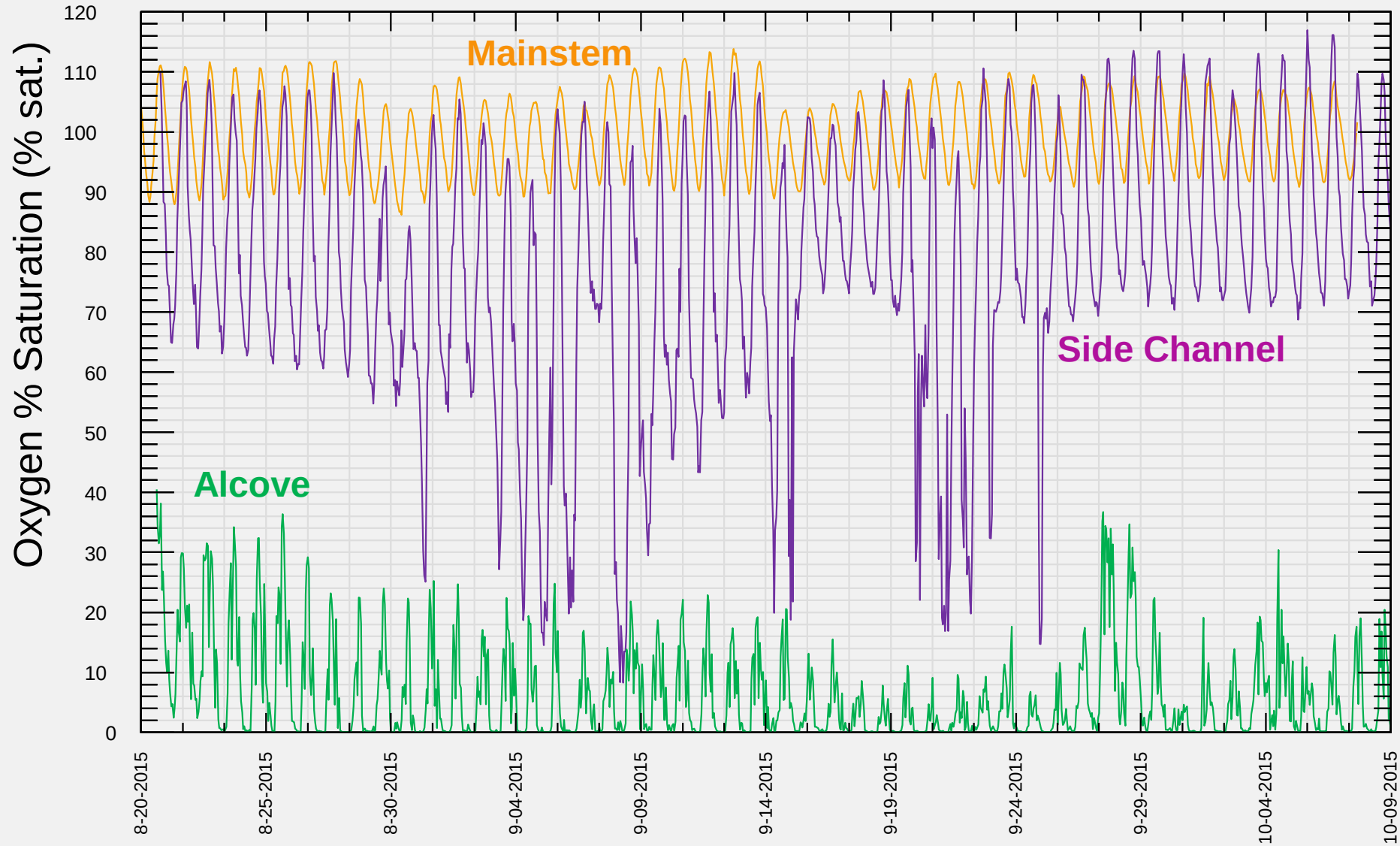
Greg Taylor, Dan Turner, Kathryn Tackley, Kristin Powers

Stan Gregory

Dave Hulse

Contact: Norman Buccola (nbuccola@usgs.gov; 503-251-3245)

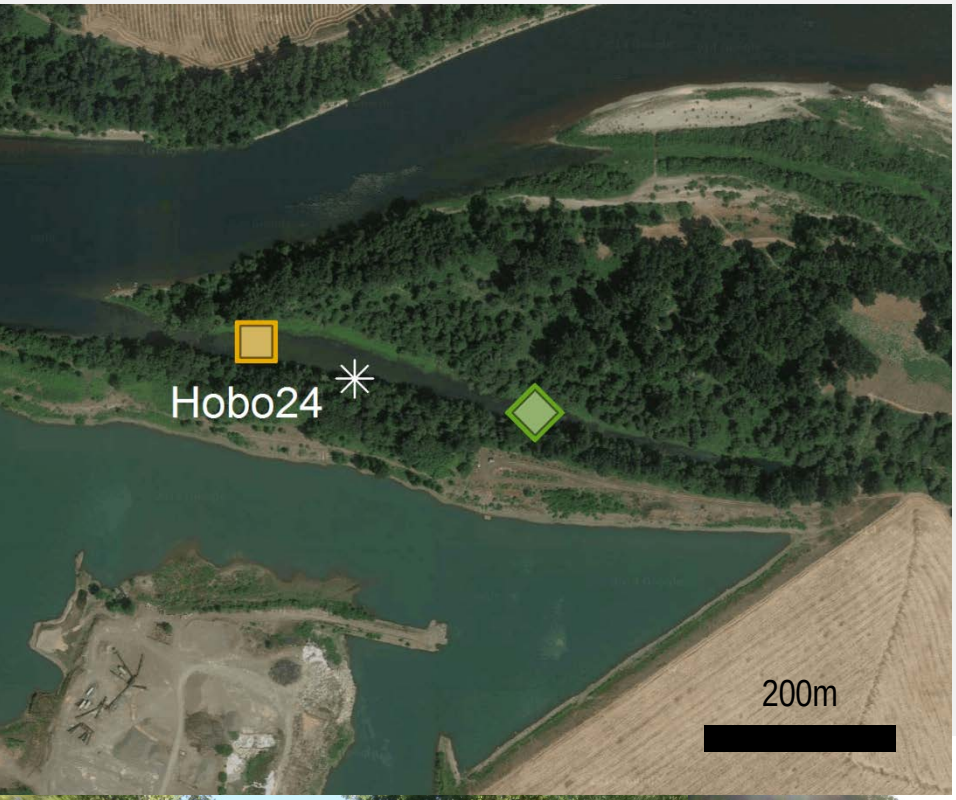
Dissolved Oxygen

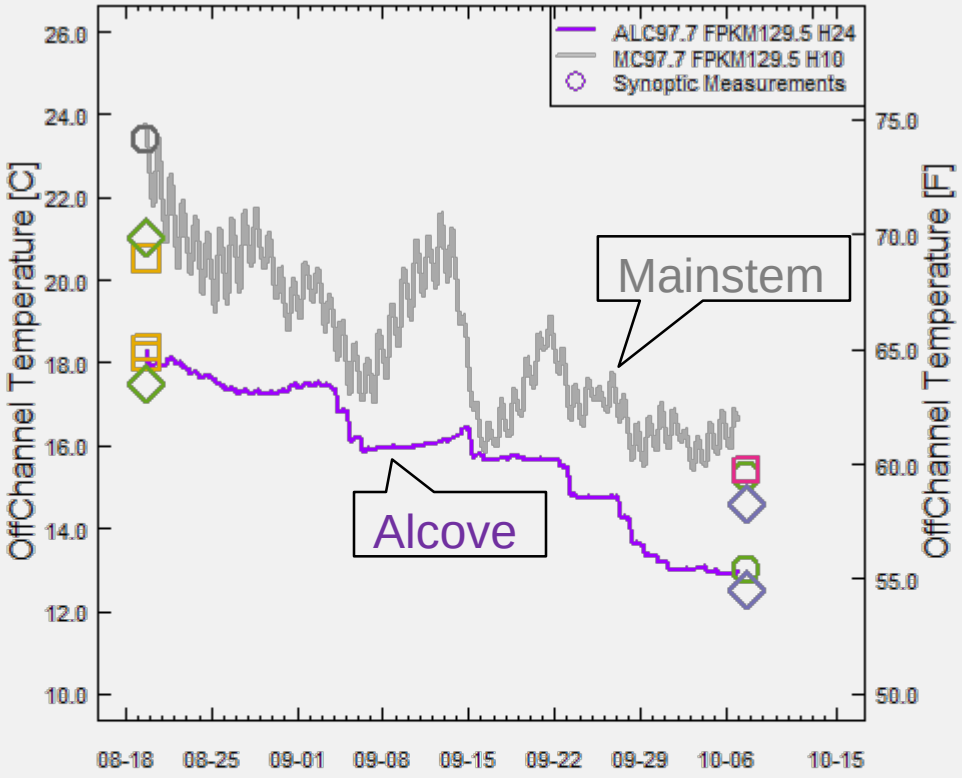


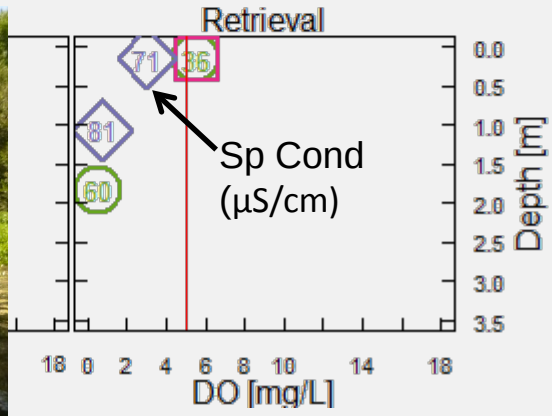
USGS

Mainstem Unaffected – Example 3 (long flowpath)

(RM 97.7; FPKM 129.5)







Provisional Data