



*Photo cred: Eiko Jones*



# Statewide Water Temperature Research and Monitoring

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# A strategy to inform management

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## Angling Regulations

Inform areas/times that may need additional protections



## Habitat Actions

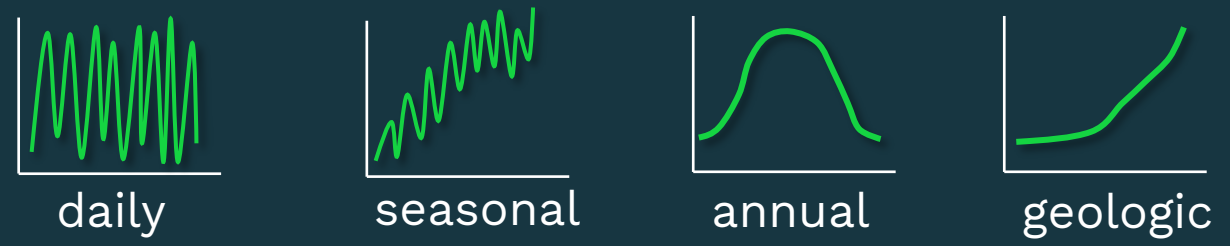
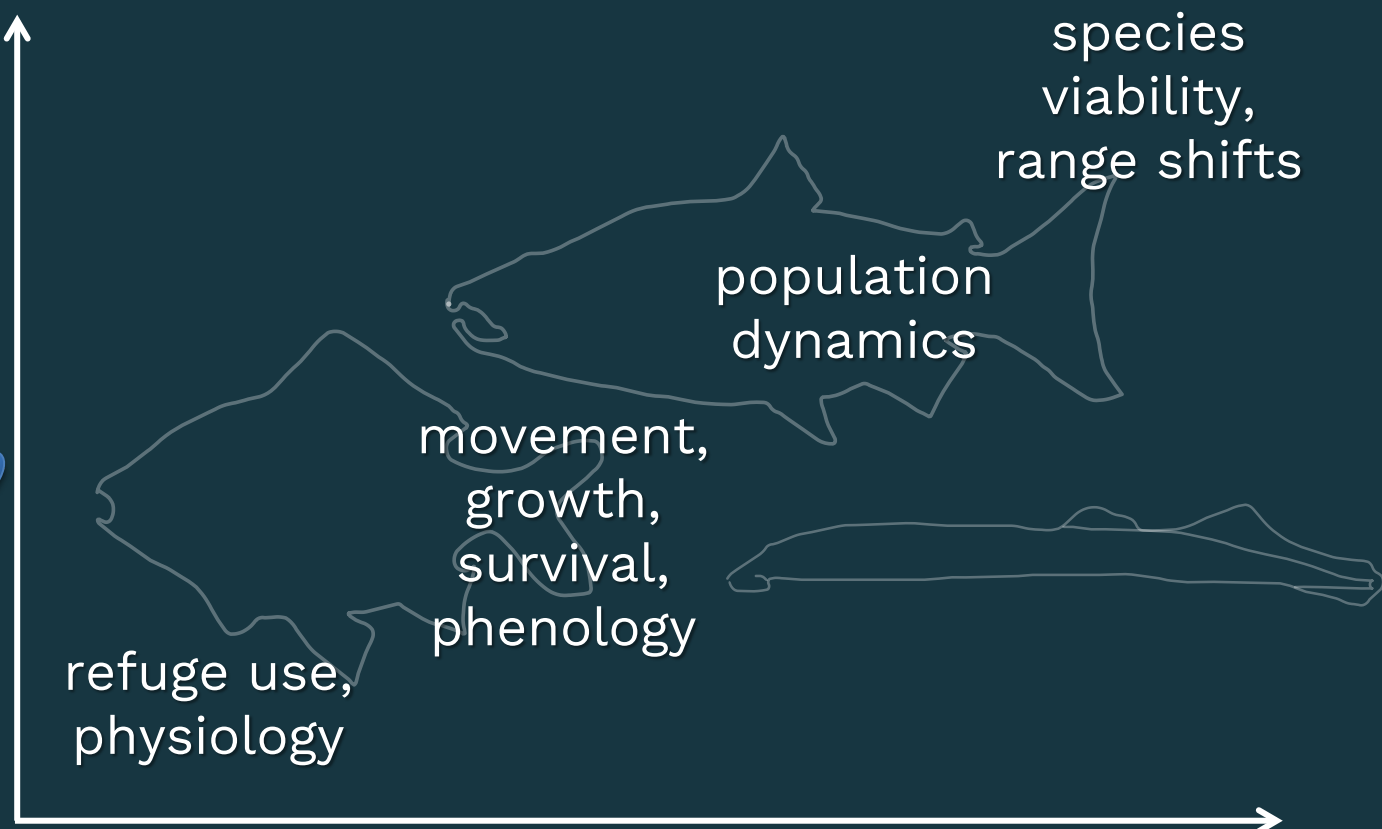
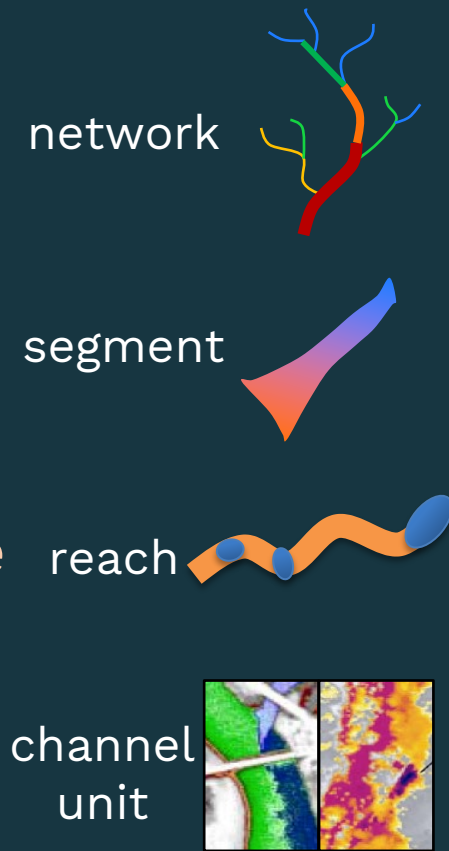
Informs permit/ grant reviews  
Identify priority habitats for protection  
Inform restoration actions



## Status and Projections

Input for species distribution models to understand current/future distribution

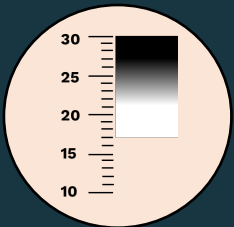
# Spatial scales of water temperature



# Temporal scales of water temperature

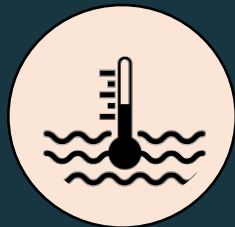
# Strategies

Measure species thermal tolerance



Use physiological trait data to identify thermal thresholds.

Monitor thermal-scape



Utilize a statewide network of loggers to understand thermal regimes.

Forecast future temperatures

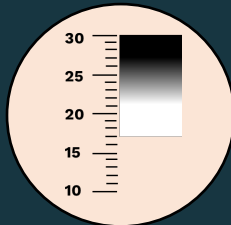


Link temperature and flow to improve our ability to forecast temperatures.

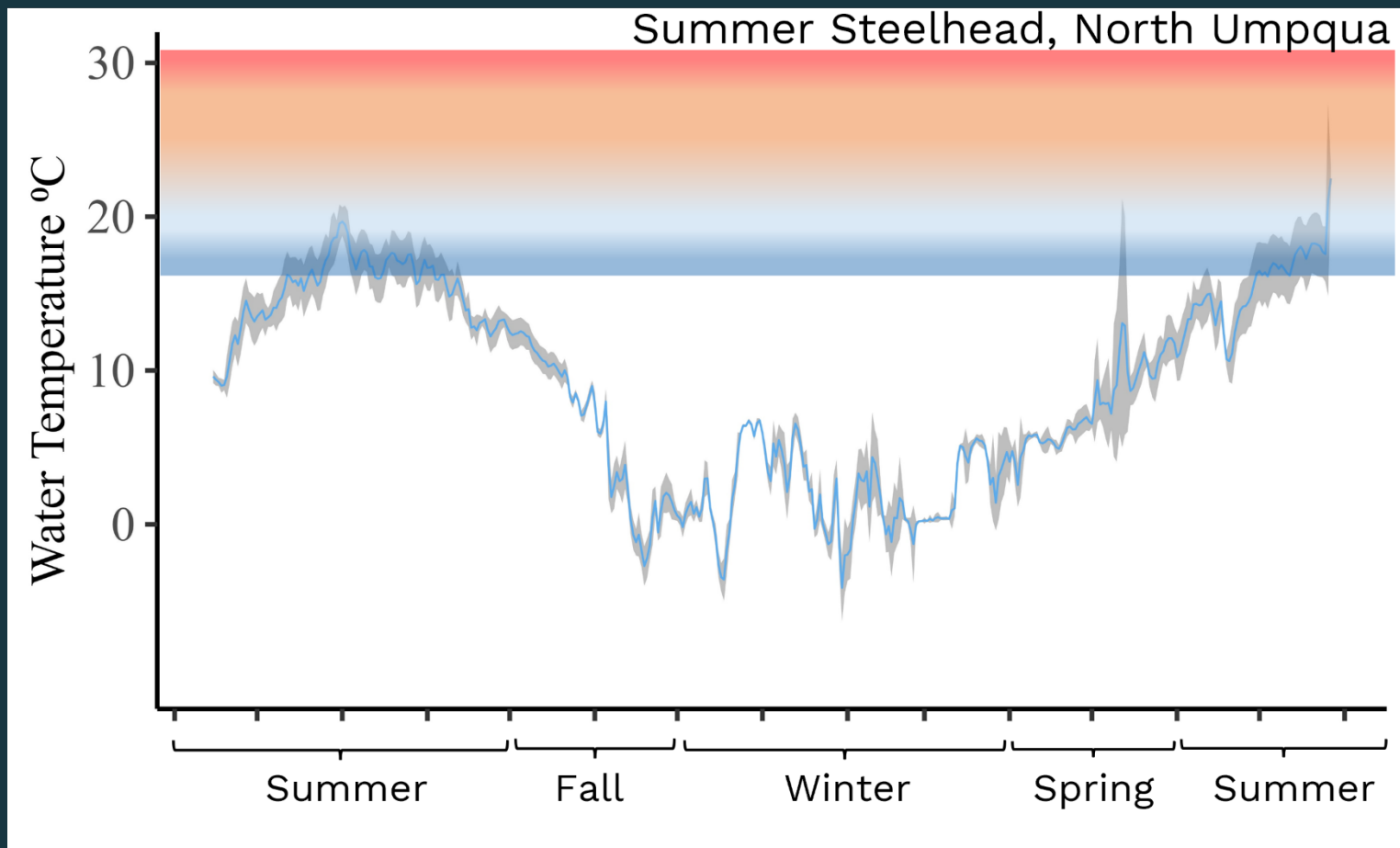
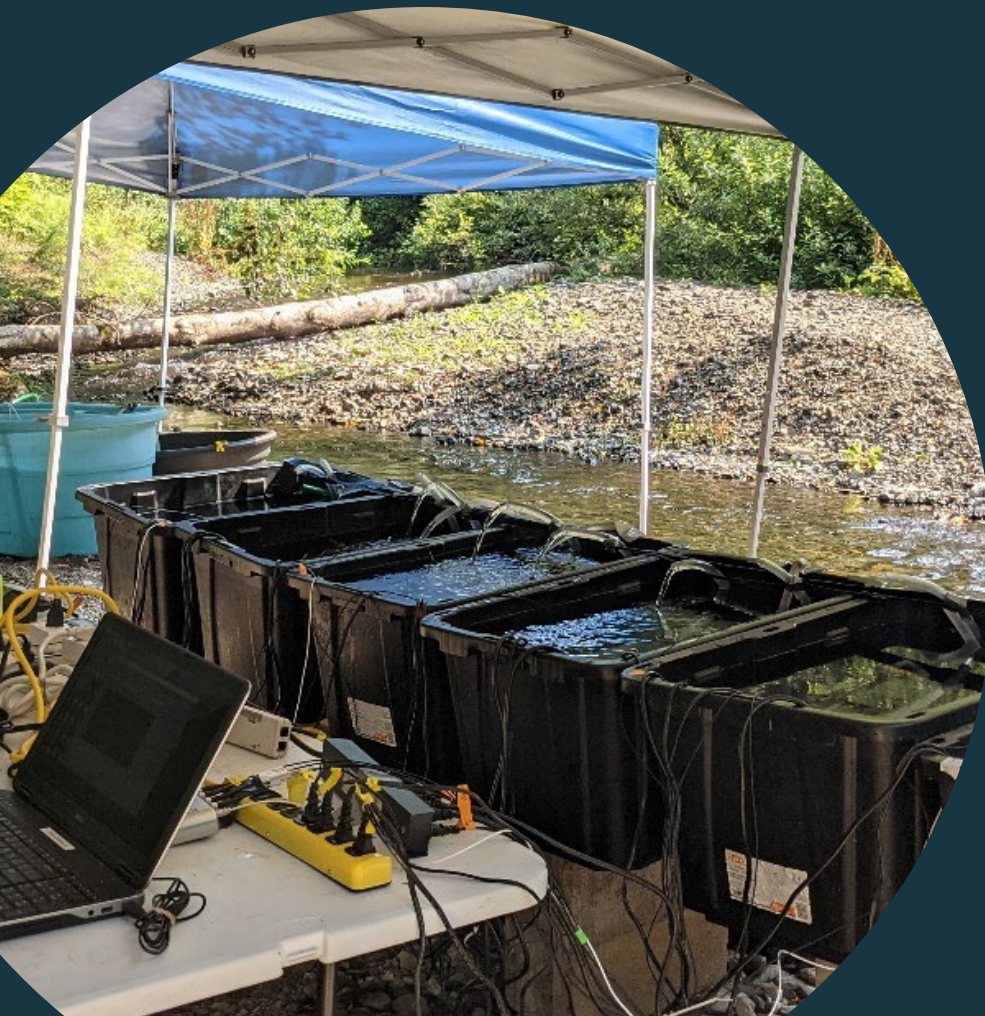
Develop models and decision frameworks



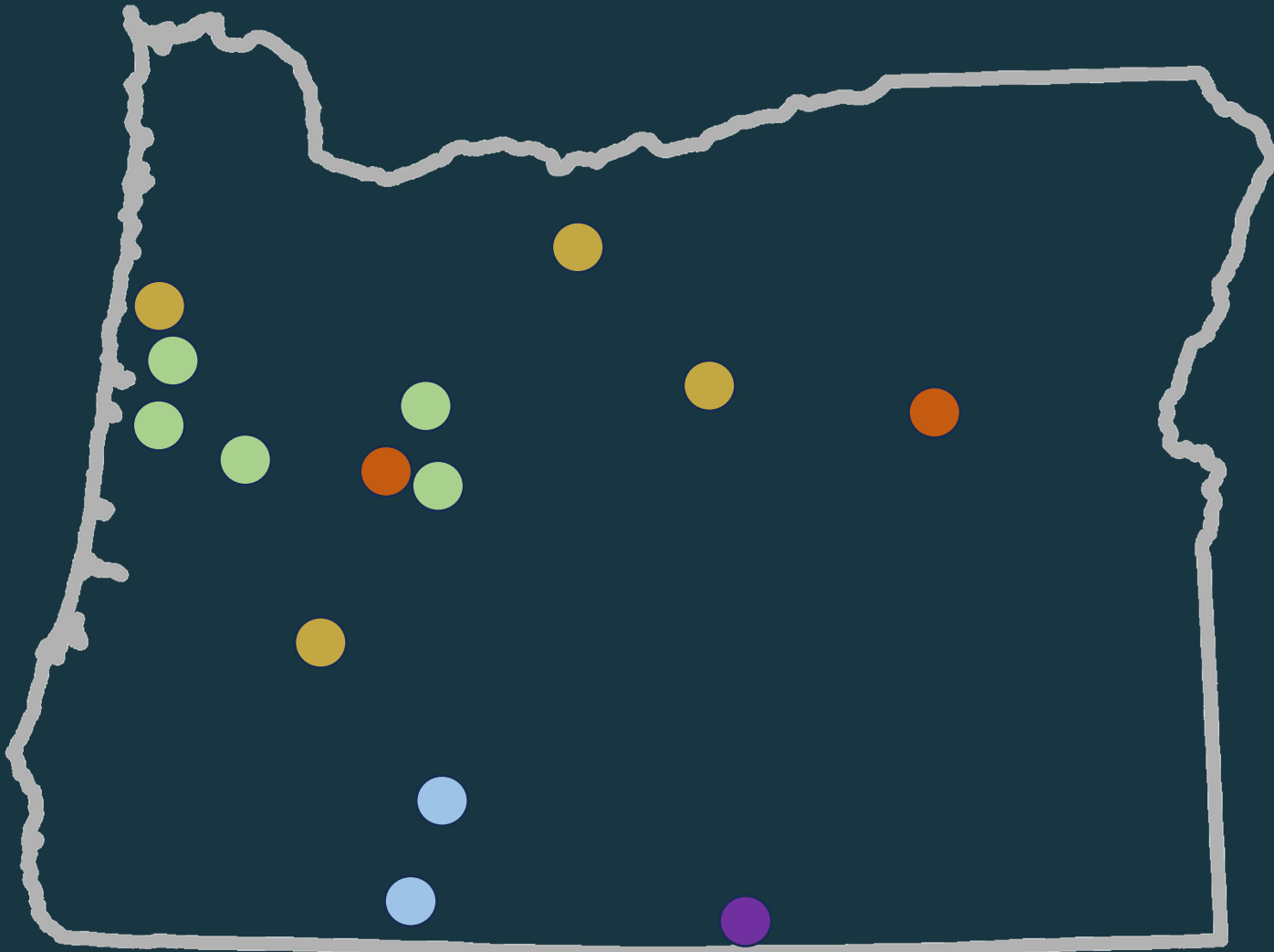
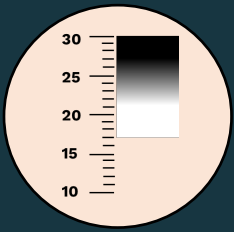
Integrate temperature and flow to improve models and decisions around fish and wildlife outcomes/needs.



# Measure thermal tolerance



# Initial focus is on most exposed and sensitive species



Total number of

**14**

Populations tested

● Summer Steelhead

● Spring Chinook

● Coastal Cutthroat

● Warner Sucker

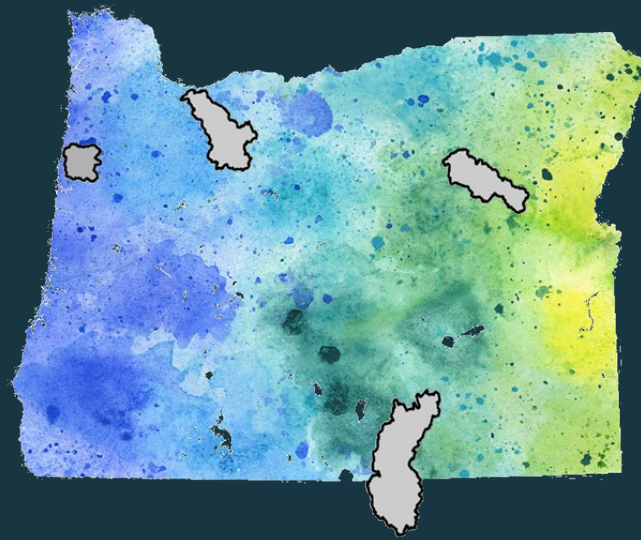
● Redband Trout



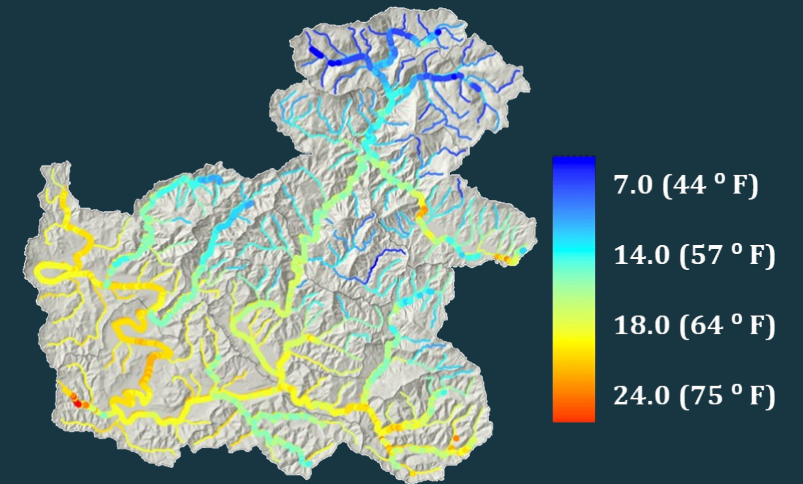
# Monitor thermal-scape



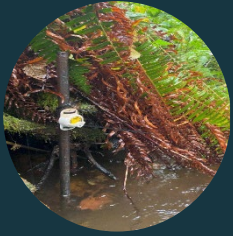
Network of real-time and standard temperature loggers to understand broad patterns/trends



Intensively monitor watersheds for temperature to understand fine scale patterns/trends



Identify most valuable assets: cold water sources, patches and thermal refuge



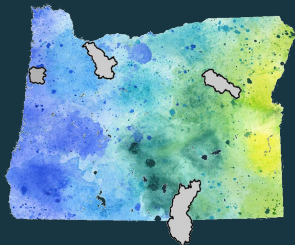
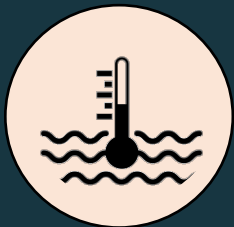
# Monitor thermal-scape

Ongoing deployment and maintenance of loggers and site-specific data statewide

Coordinated with partners to deploy loggers strategically

**Coming soon!** Improve data access and management (NRS-3 plus database)



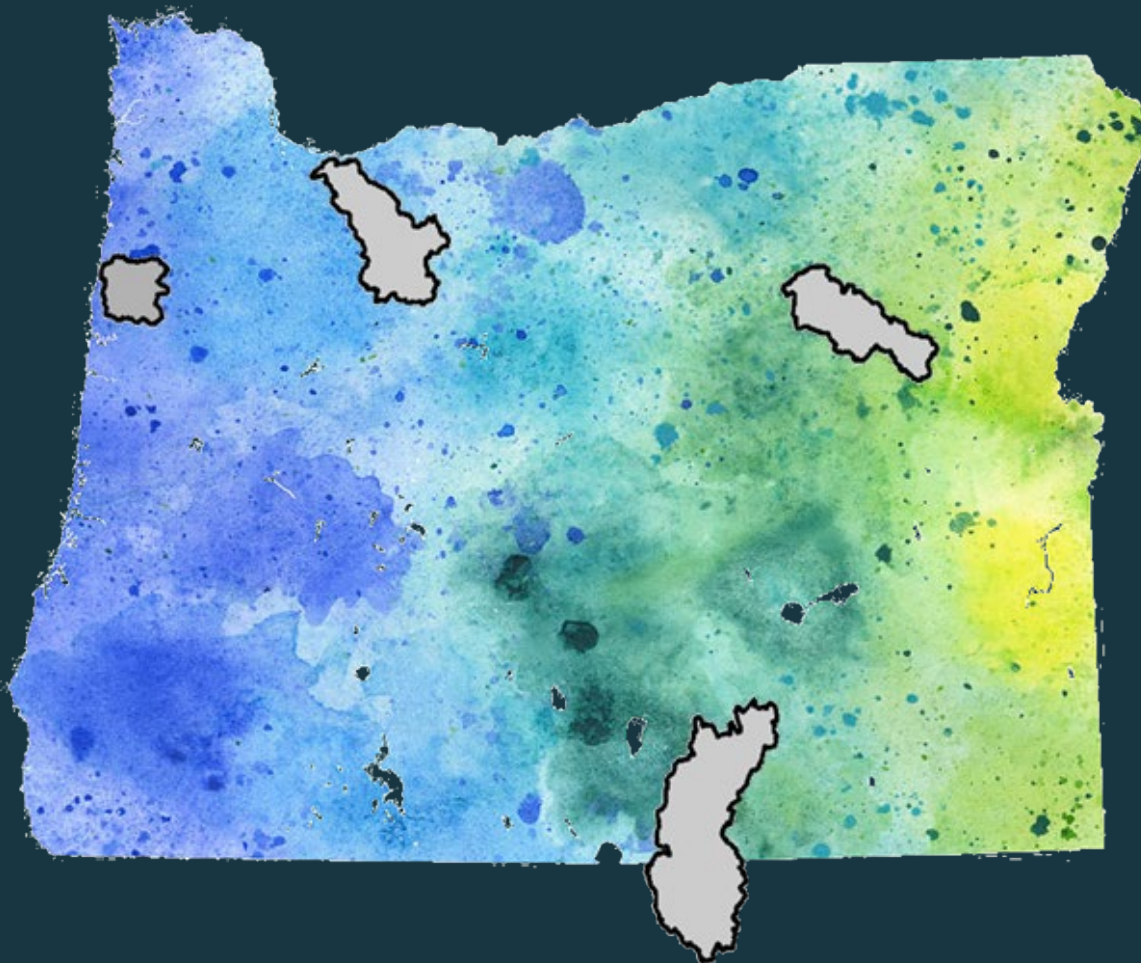


# Monitor thermal-scape

Focus on Siletz, Clackamas, Middle Fork John Day, and Warner Valley

Evaluate the strength of various temperature metrics

Examine patterns of distribution and survival of native species



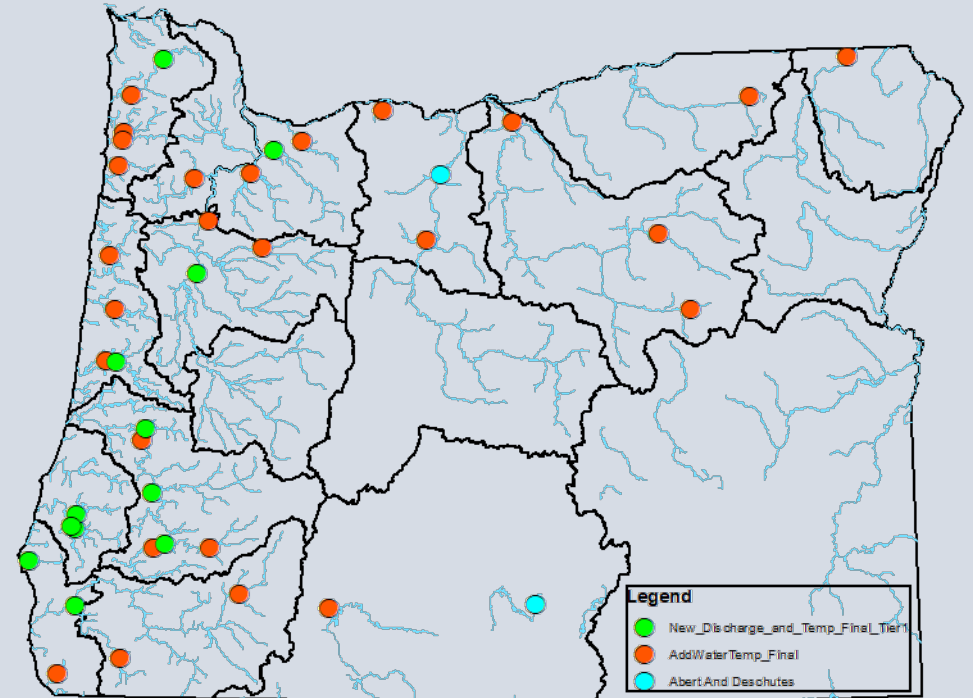


# Monitor thermal-scape (in real-time)

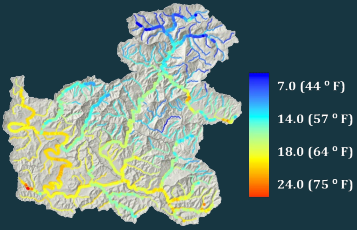
**44** New real-time temperature gages in 2022/23

- Uses
  - Track water temperature conditions in real-time
  - Facilitate water management agreements based on temperature conditions
  - Trend analyses
- Collaboration
  - OWRD, DEQ, Tribes, counties, SWCD's

*Proposed Drought Package USGS Gages*



- New Temperature Gage
- New Temperature/Discharge Gage



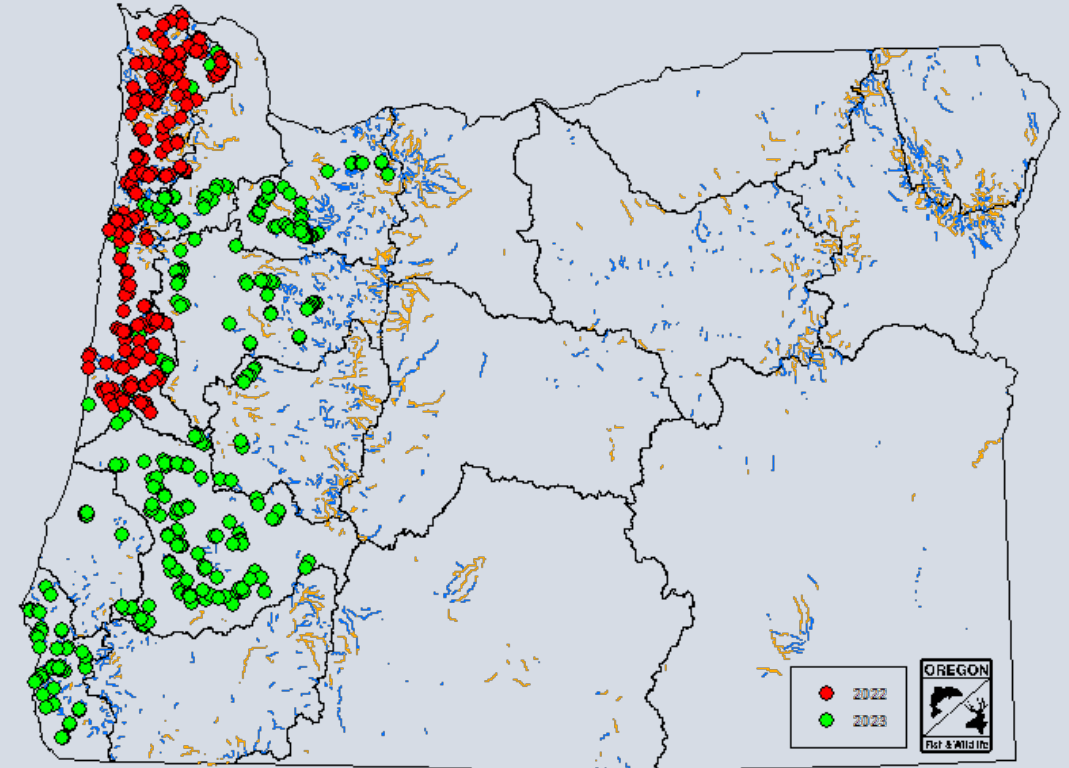
# Monitor thermal-scape

568

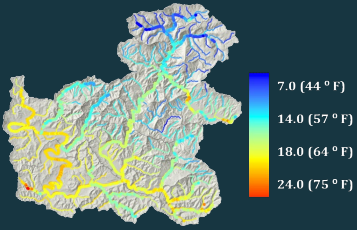
Loggers deployed in  
2022/23

- Focus on Umpqua, South/Mid/North Coast
- Collaboration
  - Federal, State, SWCD's, and Tribes

2022-23 Logger Deployments



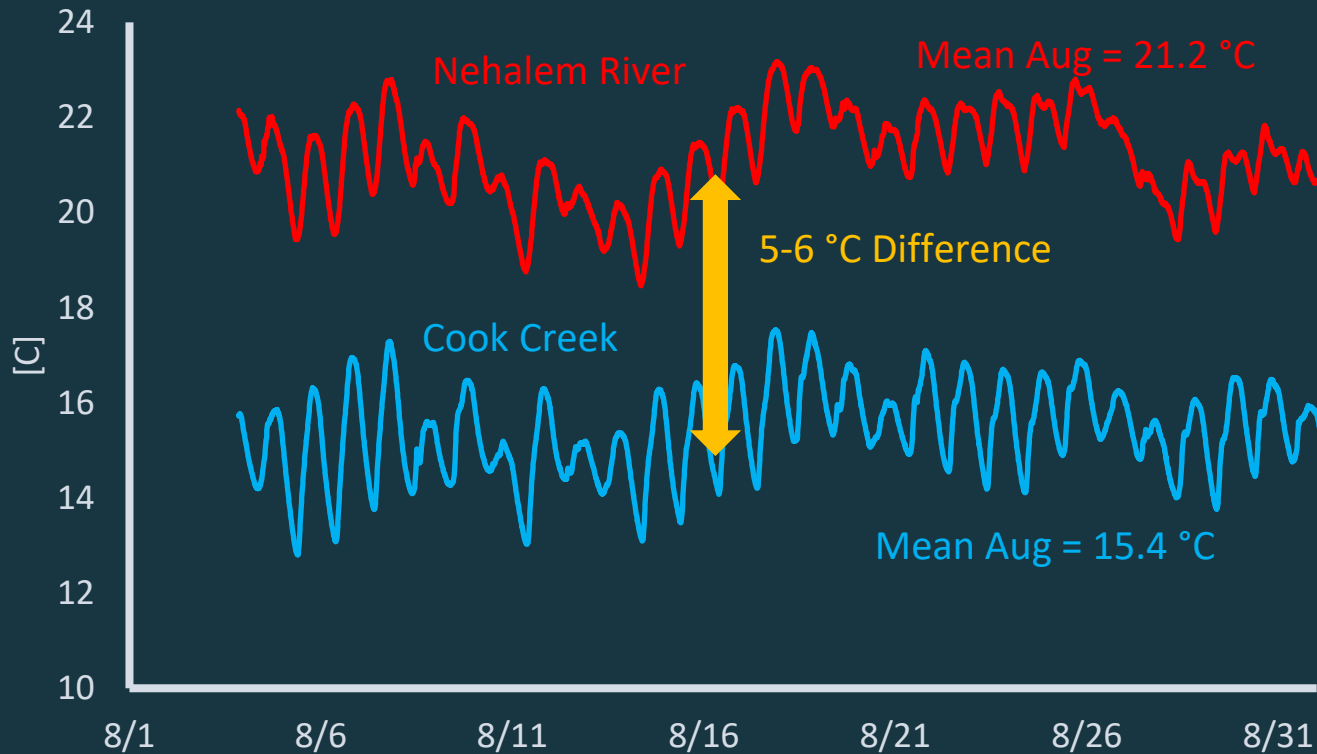
● 2022  
● 2023



# Monitor thermal-scape

Cook Creek is 5–6°C cooler than mainstem Nehalem throughout summer

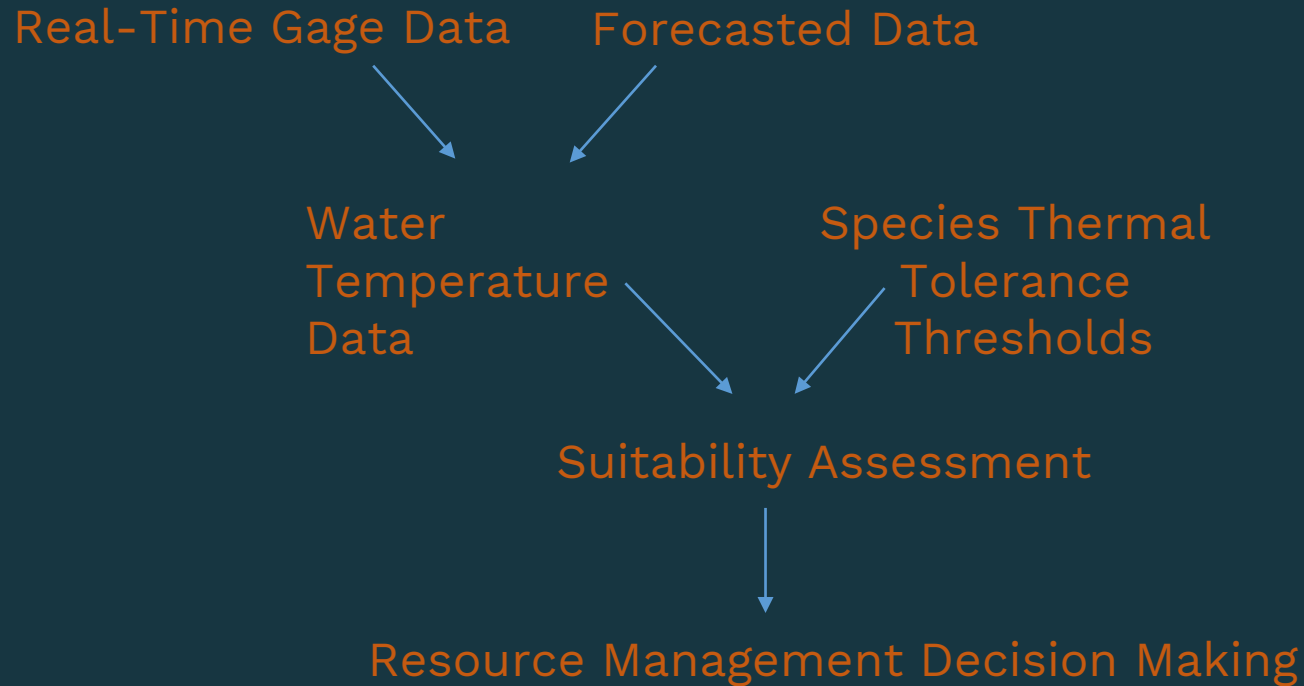
Matches predictions using NorWeST model





# Forecasting

## Automated Daily Water Temperature Prediction

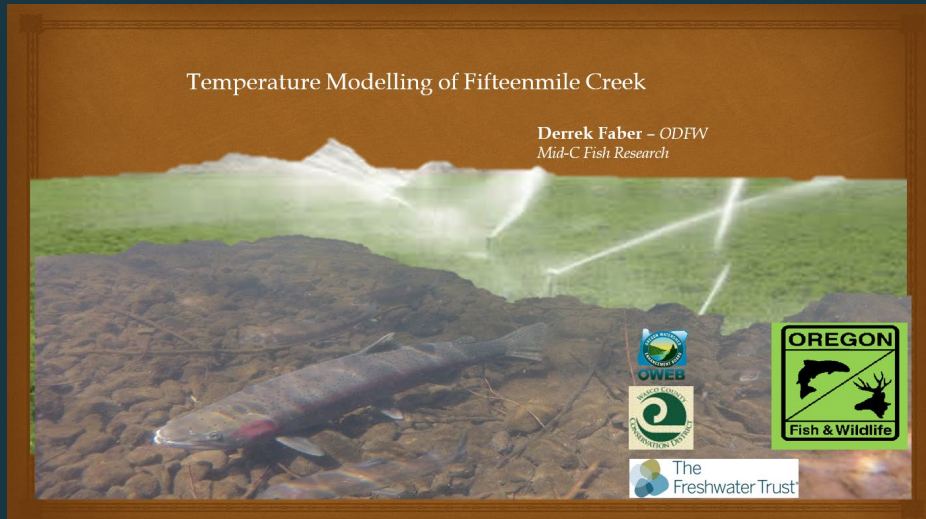


- Real-time water resources and fisheries management
- Statistical models
- 5-day forecast and alert system



# Forecasting

## Examples: Irrigation Water Management – Fifteenmile, MFJD



### ODFW discovers Chinook salmon die-off on John Day River

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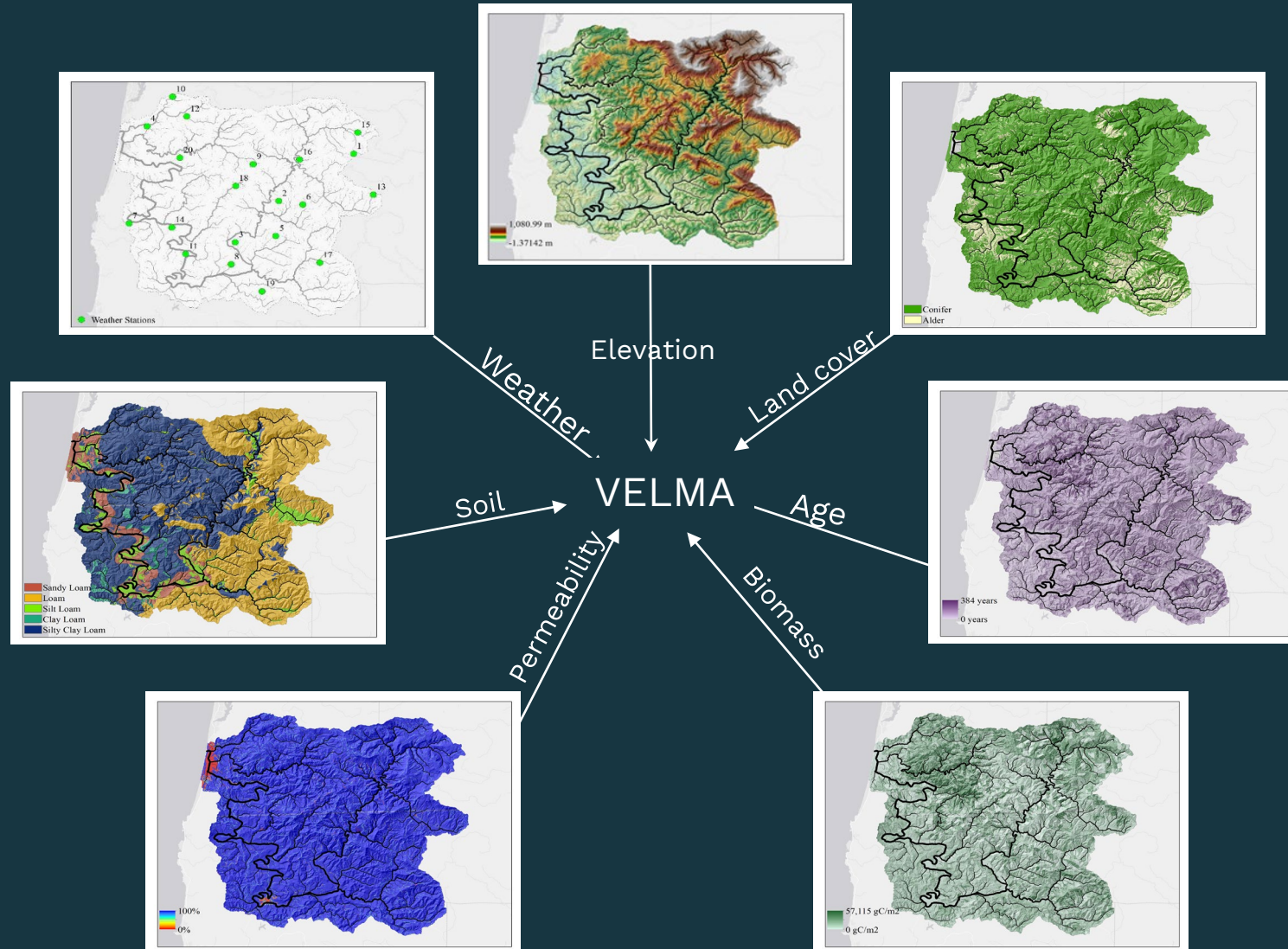
July 15, 2015

JOHN DAY, Ore. – An estimated 109 wild spring Chinook salmon in the upper section of the Mi  
According to Brent Smith, ODFW fish biologist in John Day, water temperatures in the mid-70s  
The spring Chinook die-off was first discovered by ODFW staff on July 7 near Windlass Creek.  
Similar salmon die-offs occurred in 2007 and 2013 with high temperatures being the main caus  
temperature.

Smith said he expects to see additional salmon mortalities for the rest of the summer until spaw



# Develop models and decision frameworks





# Take home

# Next steps

- Inform management decisions
- Support native species
- Work across divisions and programs
- Support with drought resilience funds

- Hire NRS-3
- Expand refugia mapping
- Continue thermal tolerance
- Continue to expand logger network



*Photo cred: Eiko Jones*



# Thank you!

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