

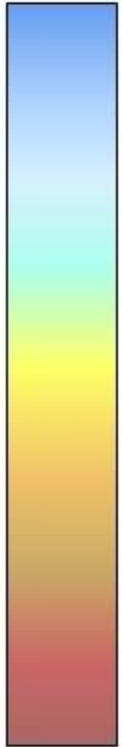


Our Climate and  
Ocean are  
Changing

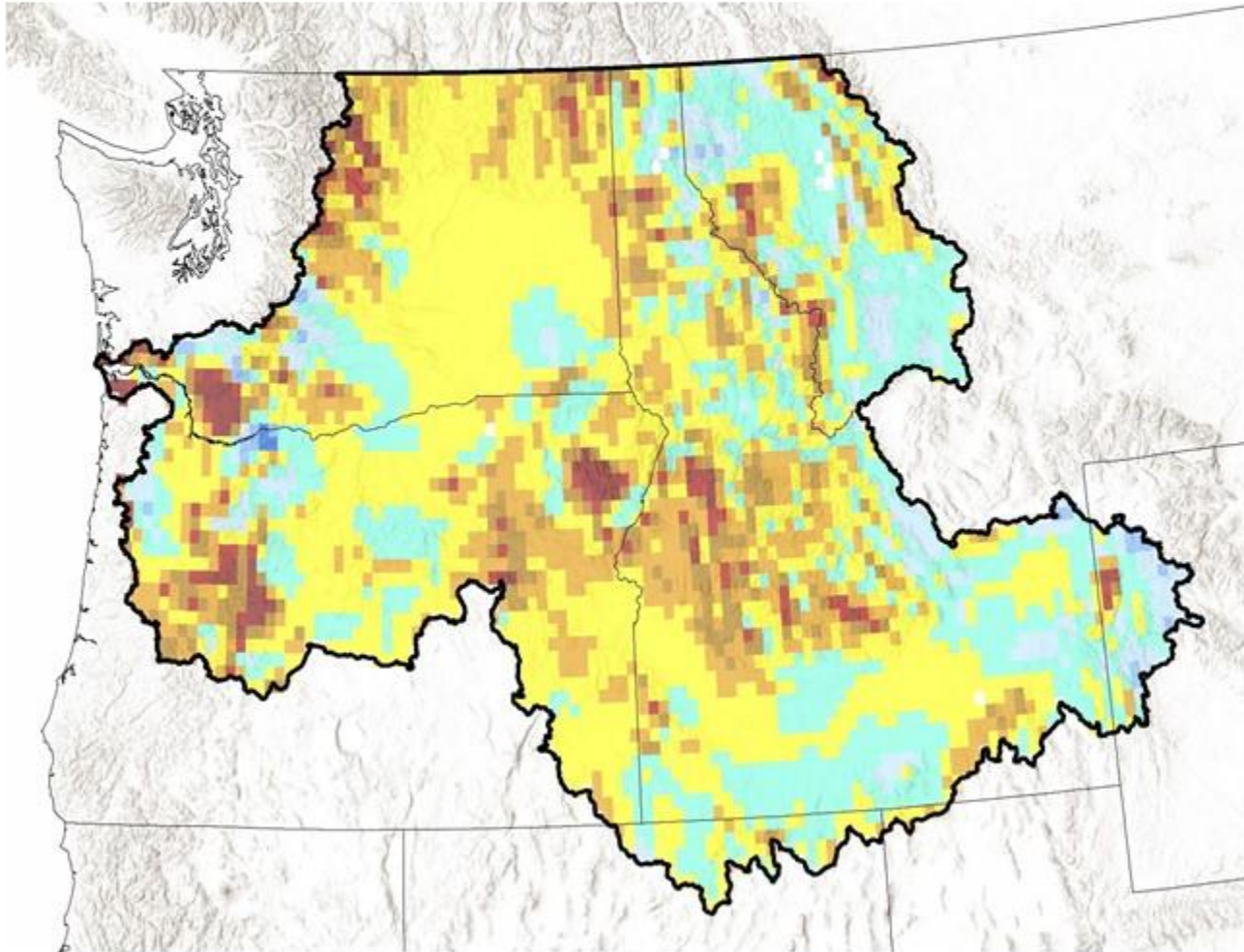


# SINCE 1980

More

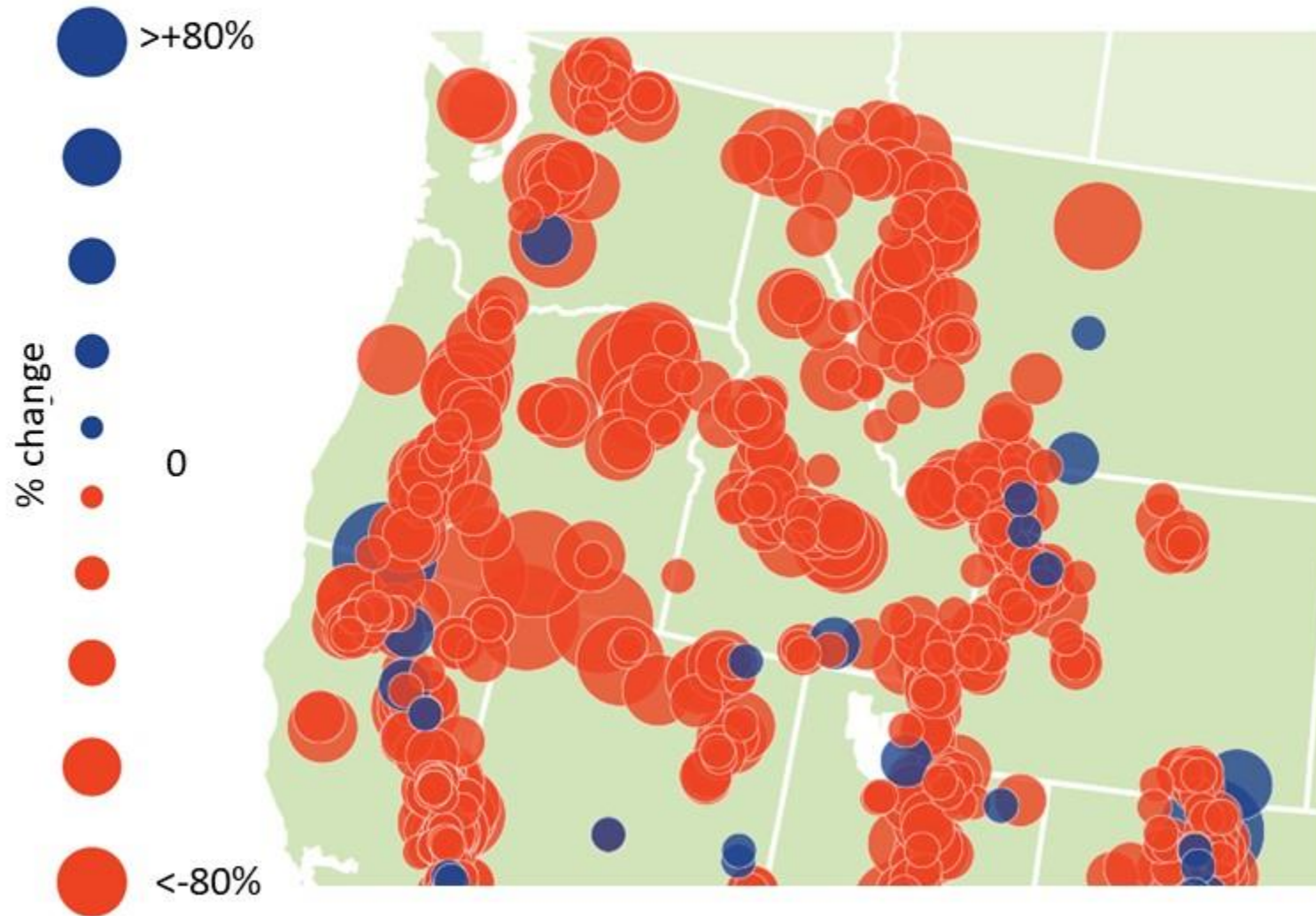


Less



Annual  
Precipitation  
patterns have  
changed

# SINCE 1955



Snowpack  
patterns have  
changed





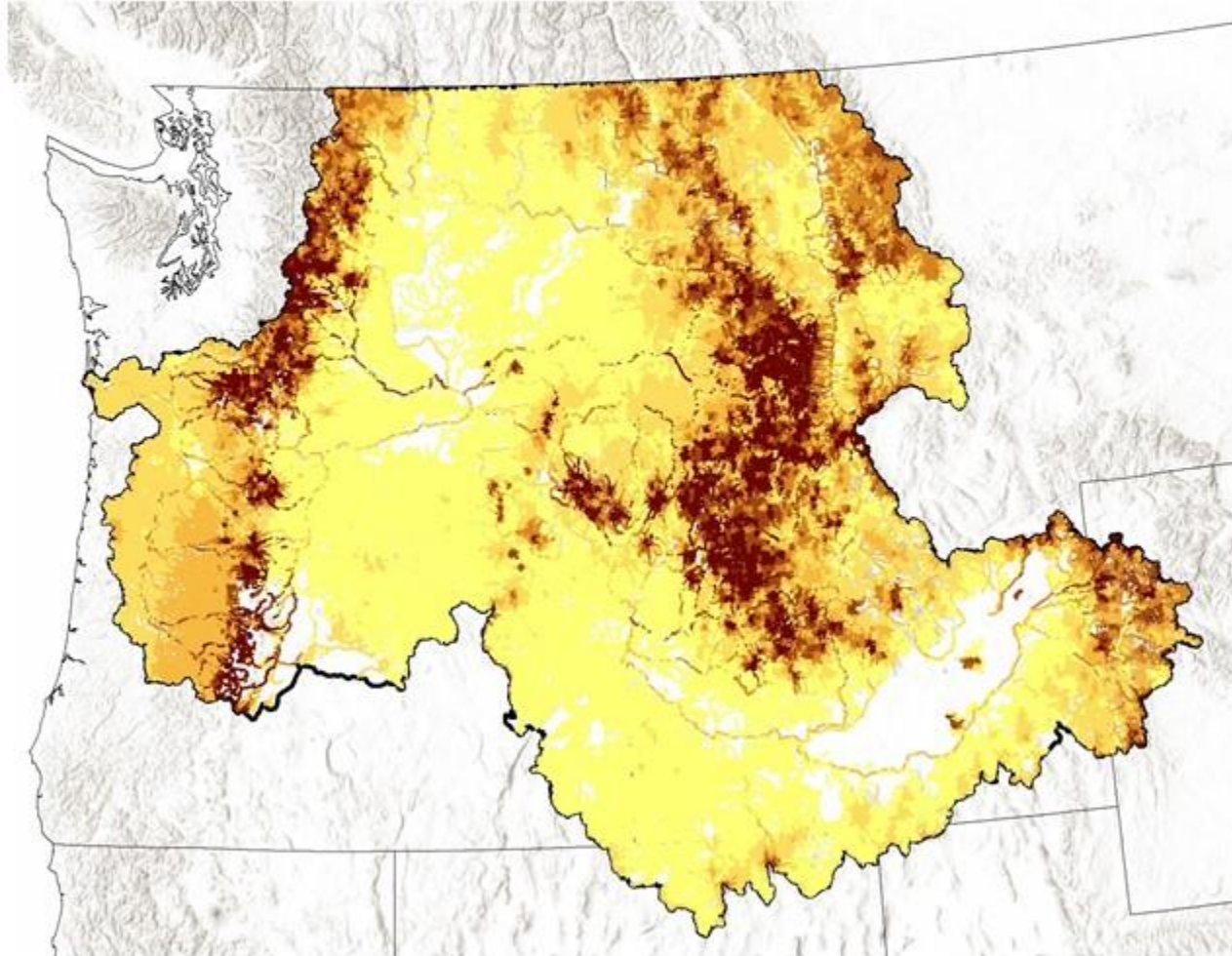
LESS  
SNOW

MORE  
RAIN

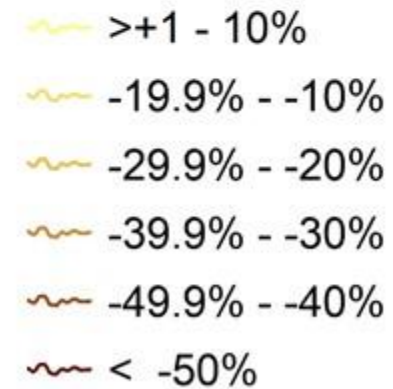




# BY 2040



Decreased summer  
flows in Mountain  
Areas







MORE  
DROUGHT

~60-80% likelihood of *mega-drought in West*  
by end of century







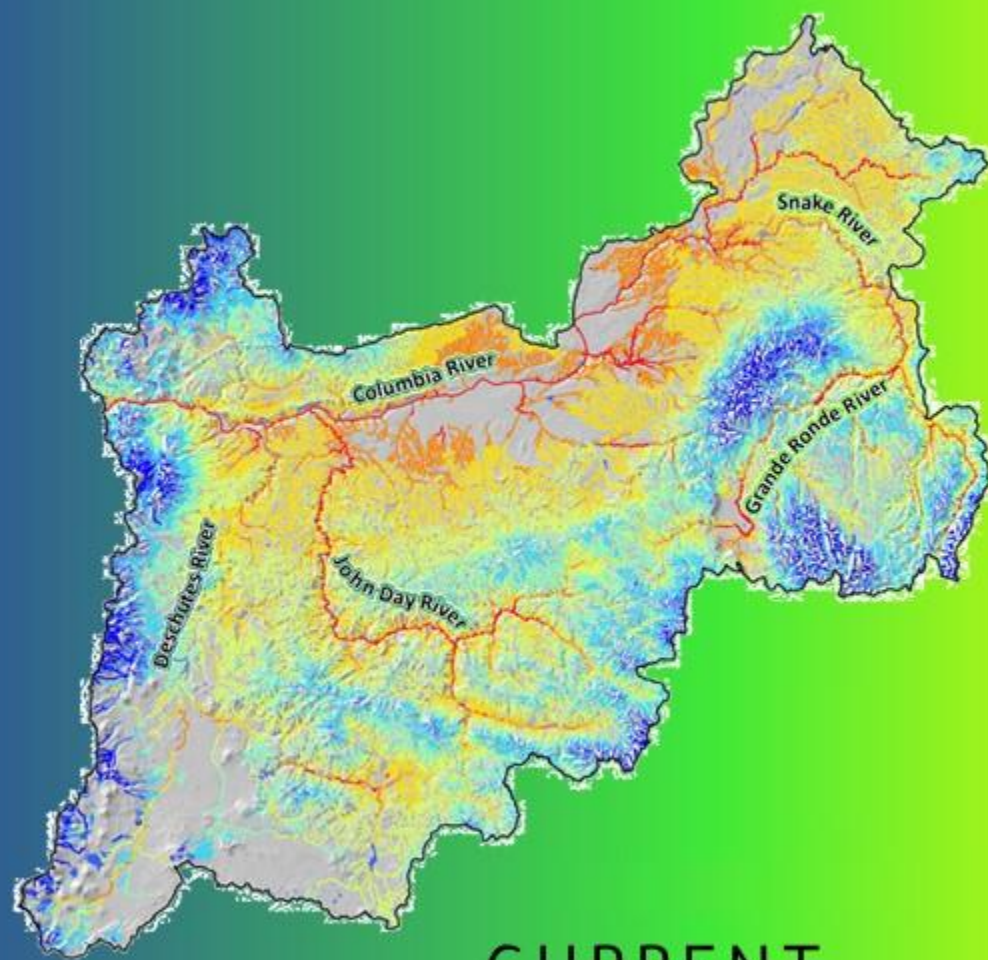
2005

Blue colored streams are likely to have water year round

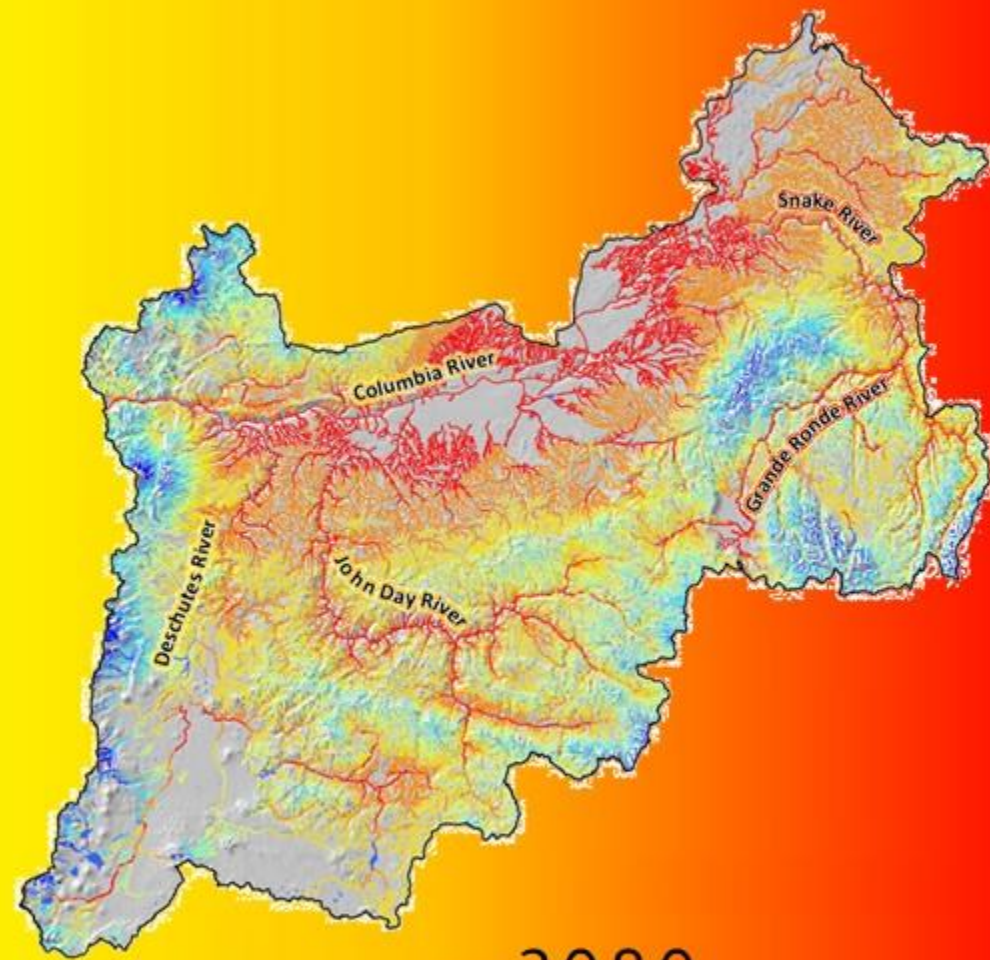
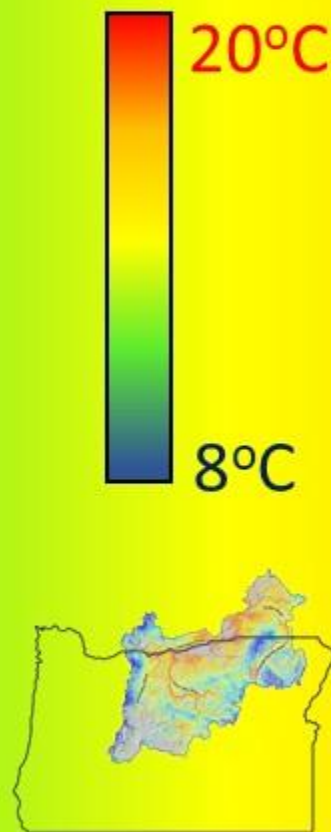
Red colored streams will likely run dry during summer



# WARMER RIVERS



CURRENT

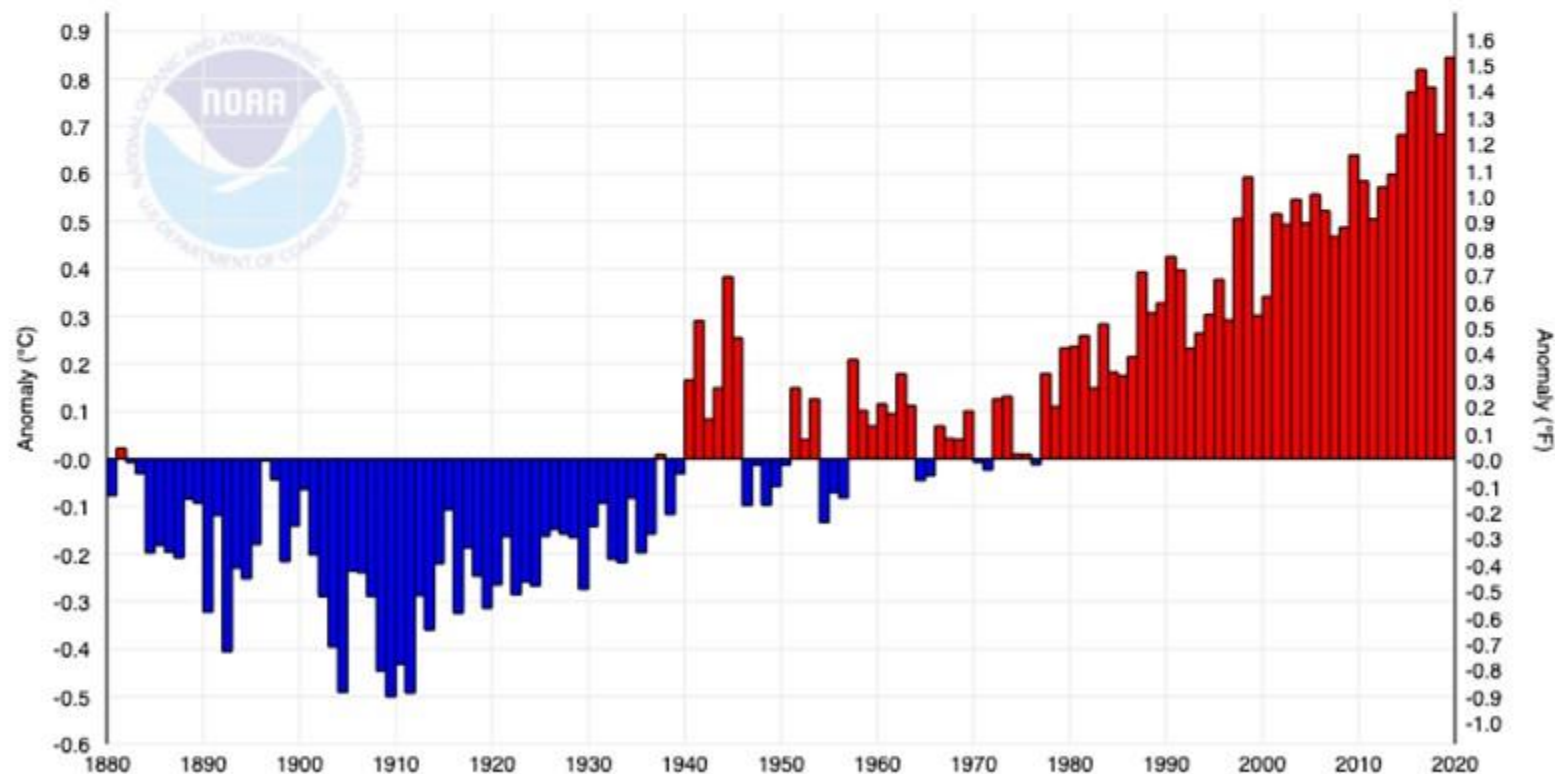


2080



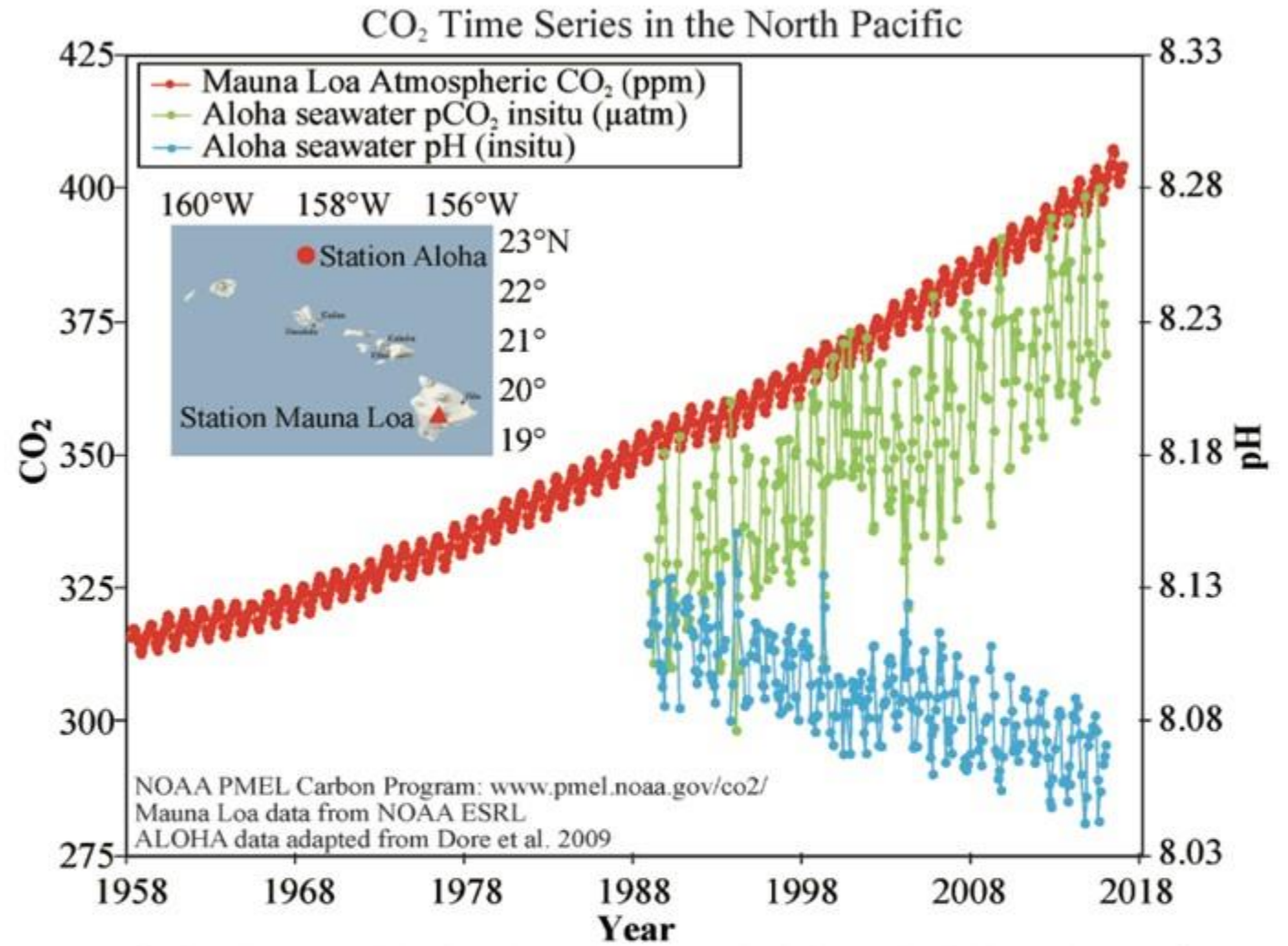
# WARMER OCEAN

Global Ocean Temperature Anomalies, July





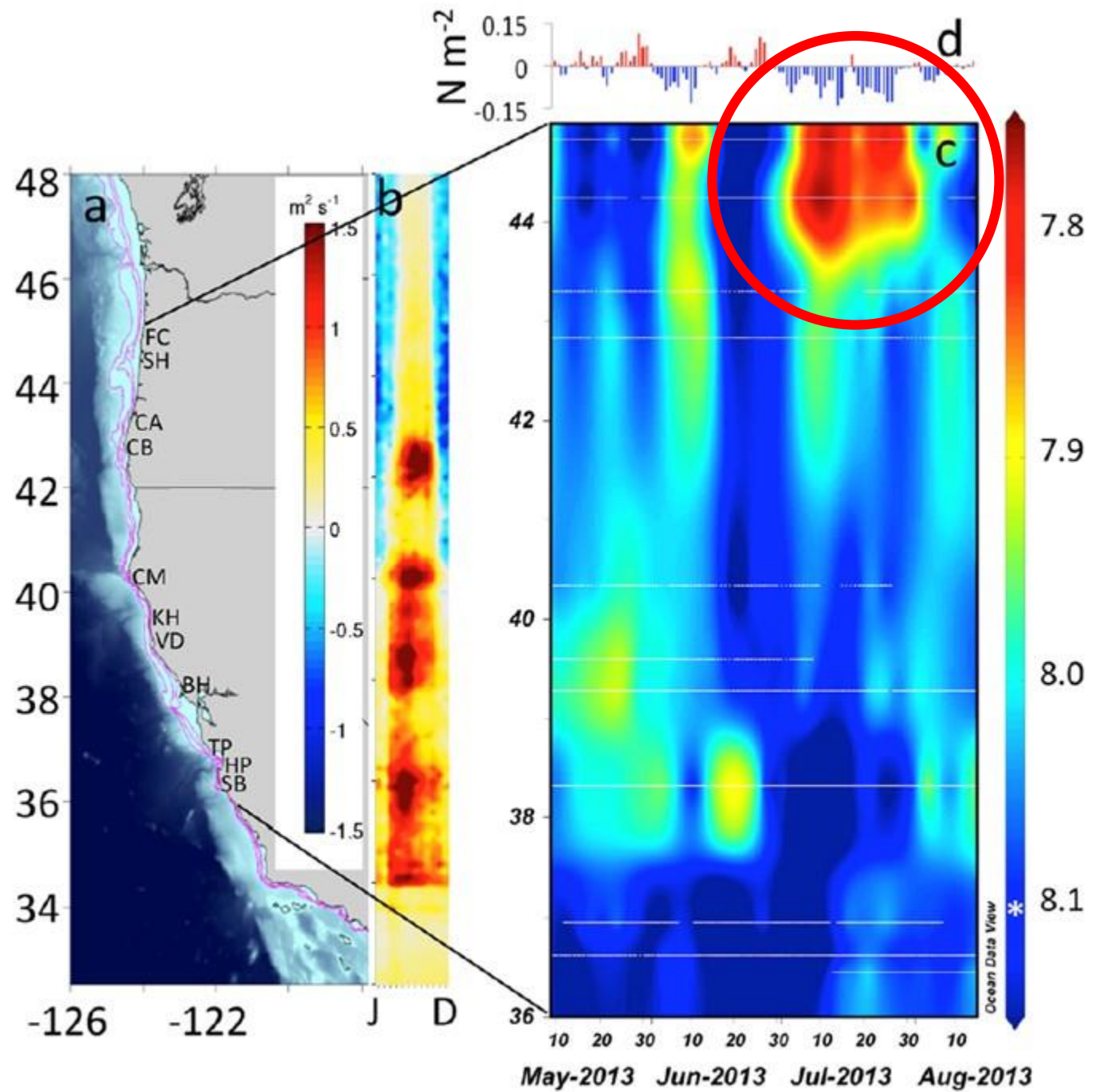
# OCEAN ACIDIFICATION



Data: Mauna Loa ([ftp://aftp.cmdl.noaa.gov/products/trends/co2/co2\\_mm\\_mlo.txt](ftp://aftp.cmdl.noaa.gov/products/trends/co2/co2_mm_mlo.txt)) ALOHA ([http://hahana.soest.hawaii.edu/hot/products/HOT\\_surface\\_CO2.txt](http://hahana.soest.hawaii.edu/hot/products/HOT_surface_CO2.txt))  
Ref: J.E. Dore et al, 2009. Physical and biogeochemical modulation of ocean acidification in the central North Pacific. *Proc Natl Acad Sci USA* **106**:12235-12240.



# OREGON ON THE FRONTLINE





# BROAD IMPACTS



## FISH & WILDLIFE

Fires, warming streams, drought, algal blooms, ocean acidification will collectively push our species closer to the edge

## INFRASTRUCTURE

More frequent and intense fires and flooding as well as sea level rise pose risks to buildings, docks, etc.

## JOBS

Tens of thousands of jobs in the recreation, tourism, fishing/hunting, and sectors rely on Oregon's natural resources

**THE BOTTOM LINE:** Climate and ocean change impacts will cost the State **billions of dollars** in lost opportunity and rebuilding after impacts occur and threatens existence of many species we care about



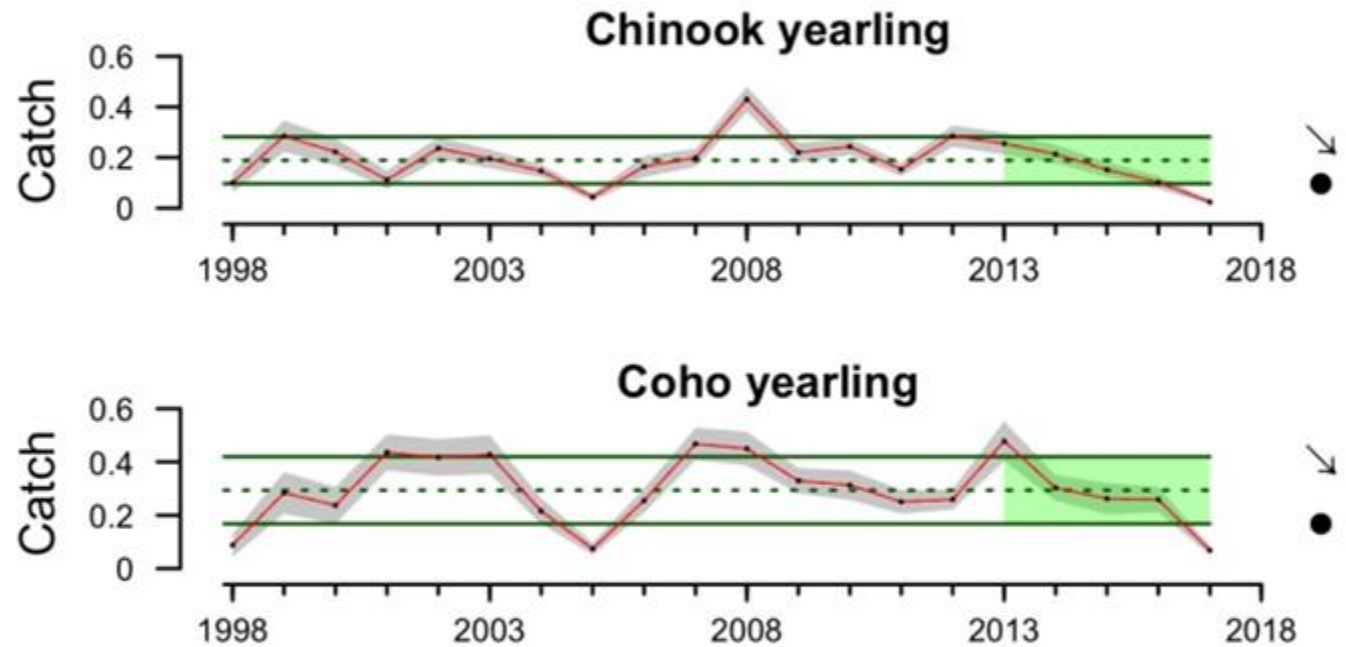
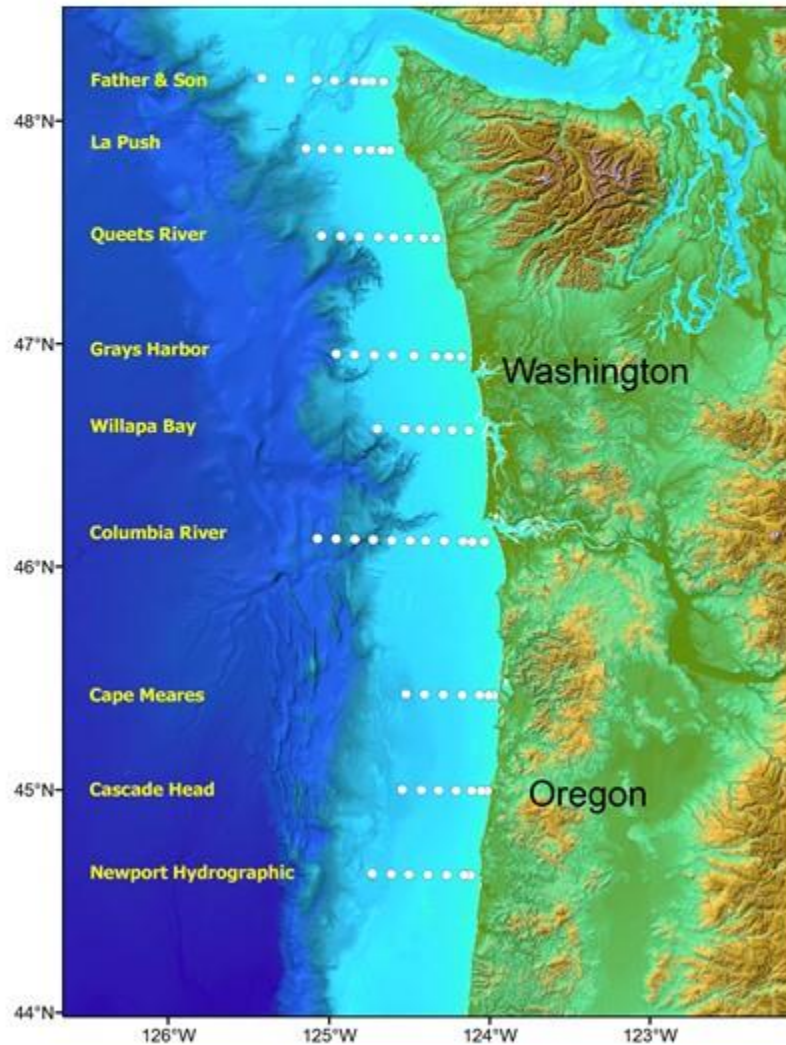
A photograph of a dead salmon lying on its side on a riverbank. The bank is covered with numerous smooth, grey, rounded river stones of various sizes. Some small green plants are growing between the rocks. In the background, a calm river flows, reflecting the sunlight. The far bank is lined with lush green trees and foliage. The overall scene is brightly lit, suggesting a sunny day.

**MORE COMMON**

**ACUTE MORTALITY**



# GROCERY SHORTAGES



# LOWER SURVIVAL



# TIPPING POINTS



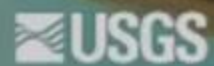


# SPECIES ON THE MOVE





# MORE DISEASE

The USGS logo, featuring a stylized mountain and water icon to the left of the text "USGS".

USGS

# ODFW ACTIONS

The background of the slide is an underwater photograph. On the left side, there is a vertical section of a coral reef, showing various types of coral in shades of brown, orange, and yellow. The rest of the image is filled with a school of fish swimming in clear, blue water. The fish are of various species and sizes, mostly appearing as dark silhouettes against the lighter blue background. The overall scene is vibrant and represents a healthy marine ecosystem.

- Research & Monitoring
- Fisheries Management
- Conservation Planning
- Habitat Prioritization
- Infrastructure Resiliency
- Interagency Coordination
- Strategic plan-focal team



# CLIMATE AND OCEAN CHANGE POLICY



PHOTO: PAUL VECSEI





# VISION

Through **science and proactive leadership** to address a changing climate and ocean, ODFW and Oregon:

- a) Understand the impacts
- b) Determine the most appropriate actions;
- c) Work collectively to enhance preparedness
- d) Strive toward carbon-neutral operations.

As a result, Oregonians have **healthy natural areas that provide clean air and drinking water, food, abundant fish and wildlife, support a thriving economy**, and are the first line of defense against fires, droughts, floods, and sea level rise associated with a changing climate and ocean.



# FIVE PILLARS

A photograph of two salmon swimming in a shallow, rocky stream. The water is clear, and the fish are in motion, creating some splashing. The background shows more rocks and the continuation of the stream.

STATEWIDE COORDINATION  
SCIENCE

RESOURCE MANAGEMENT

OPERATIONS

COMMUNICATION &  
EDUCATION



Good habitat is the *foundation of healthy*  
fish and wildlife populations

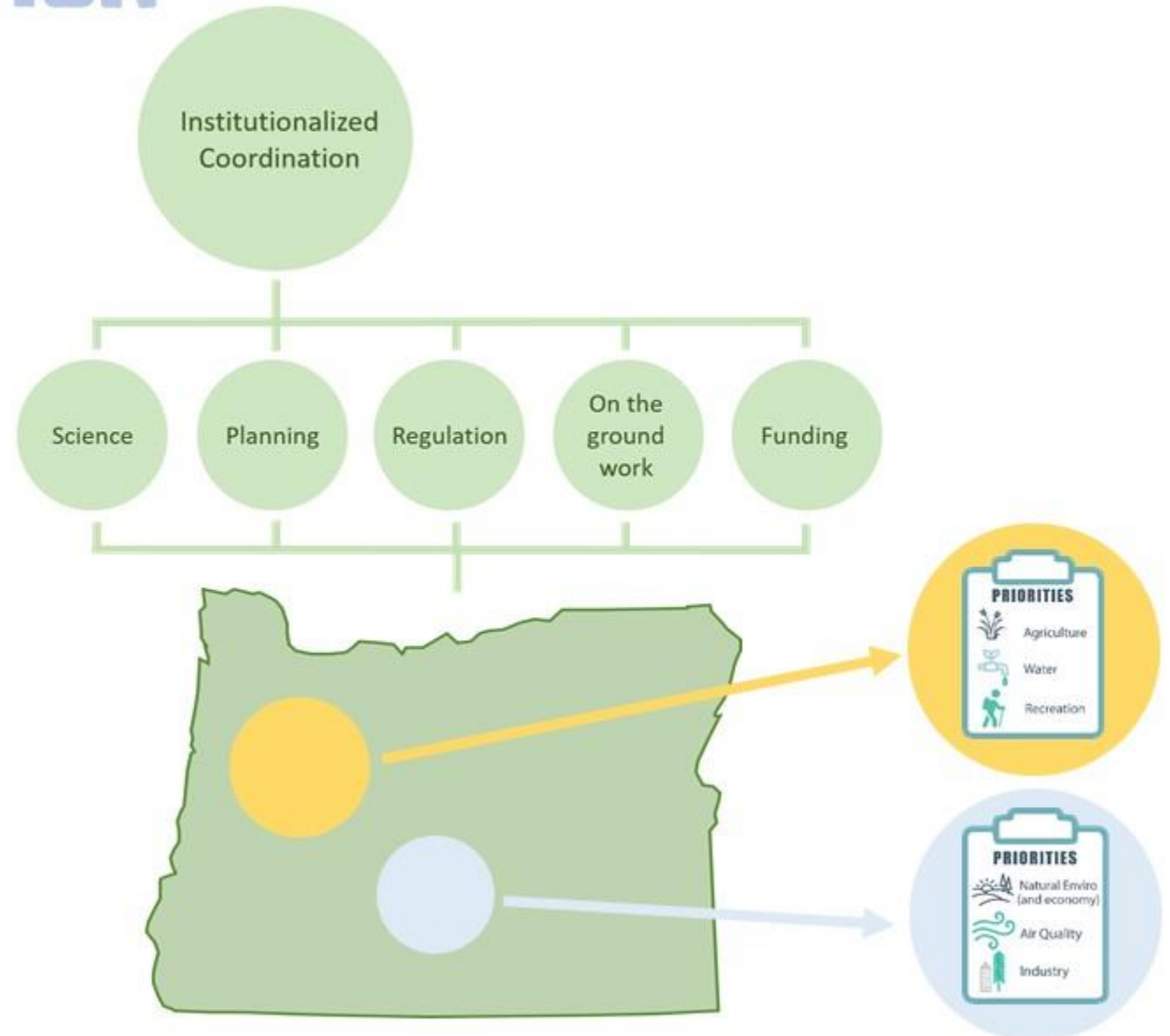


PHOTO: PAUL VECSEI



# STATEWIDE COORDINATION

- Coordinated inventories and vulnerability assessment
- Efficient research and monitoring
- Determine clear priorities within and across geographical areas
- Implement priorities





# COLUMBIA RIVER

PASSAGE AND HABITAT

Oregon has a long history of investing in the recovery of these fish

Mainstem survival via spill

Tributary Habitat Restoration



# FISHERIES

A scenic landscape photograph showing a person in a blue jacket and hat fly fishing in a river. The river flows through a valley with steep, eroded, tan-colored hills in the background. The sky is overcast with grey clouds. The foreground shows the turbulent water of the river.

Protect and enhance Oregon's fish and wildlife and their habitats for *use and enjoyment by present and future generations.*



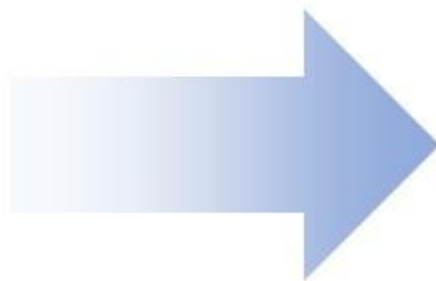


- Production is mitigation for impacts of dams
- Incidental impact on wild fish is constrained by ESA
  - 2% on Spring Chinook & Summer Steelhead
- ODFW manages in partnership with Tribal/Fed/State



# RESPOND ADAPTIVELY

- Take into account physical conditions (flow/temps) that might impose additional mortality on wild fish
- Range of tools
  - Rolling retention closures
  - Outright closures
  - Angling sanctuaries



WITHOUT UN-  
NECESSARILY TAKING  
AWAY OPPORTUNITY



# HIGH TEMPERATURE LOW FLOWS LOW POPULATION SIZE



## Emergency fishing closures kick in Saturday

BY MARK FREEMAN MAIL TRIBUNE | July 16, 2015



[Click for Maps and Directions](#)

## State officials close Columbia River to all salmon fishing

by KATU.com Staff | Thursday, September 13th 2018



A spring chinook salmon (Brian Davies/The Register-Guard via AP, File)



An underwater photograph of two rainbow trout swimming in clear, blue-green water. The fish are positioned horizontally, with the one in the foreground slightly above and ahead of the other. They have silvery scales with dark spots and a prominent reddish-pink stripe along their sides. Below them, several large, smooth, brownish rocks are visible on the riverbed. The text 'UP COMING:' is overlaid in the top left corner in a bold, orange, sans-serif font.

**UP COMING:**

- Thermal Angling Sanctuaries
- Climate policy
  - i. Statewide Framework for Responsive Fishery Management