

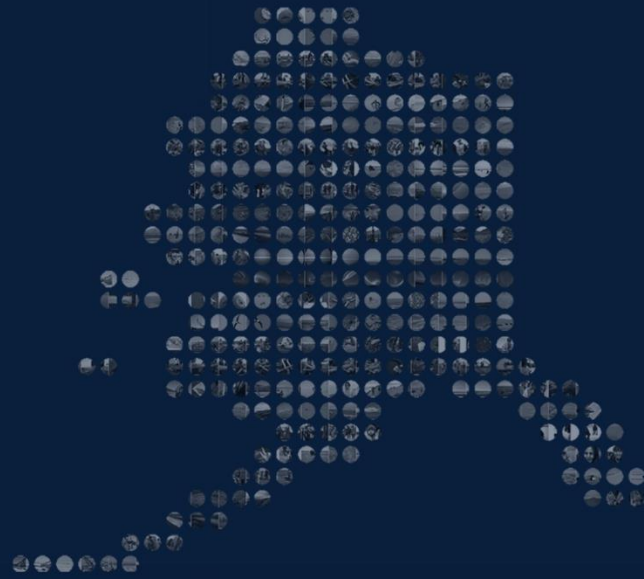
# Southeast Alaska Freshwater Temperature Monitoring

November 29, 2018

J Ryan Bellmore, Rebecca Bellmore, Jeff Falke,  
Chris Sergeant, and Davin Holen



**SOUTHEAST ALASKA  
WATERSHED COALITION**  
CONNECT - INFORM - PARTICIPATE



[What's Changing?](#) / [How Can We Adapt?](#)

A Resource for Alaska  
Communities



# SOUTHEAST ALASKA CLIMATE ADAPTATION SUMMIT



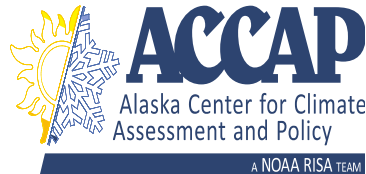
Raymond Paddock  
Environmental  
Program



Davin Holen  
Coastal Community Resilience Specialist



Chris Whitehead  
Sitka Tribe of  
Alaska



Southeast Alaska Environmental Conference - 2016

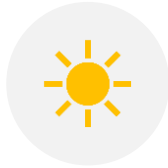
# Southeast Alaska Regional Issues



WARMING AIR  
TEMPERATURES



SNOWFALL  
VARIATION



WARMING OCEAN  
TEMPERATURES



OCEAN  
ACIDIFICATION



TOXINS



FOREST COVER

# SOUTHEAST ALASKA CLIMATE ADAPTATION SUMMIT: SOUTHEAST ENVIRONMENTAL CONFERENCE

## Goals:

1. Review current status of 5 resources identified as culturally important. Also include human health.
2. Initiate monitoring and mitigation strategies.

- Salmon
- Shellfish
- Berries
- Yellow cedar
- Cultural sites
- Human health

# WATER MONITORING IN SOUTHEAST ALASKA STREAMS: MODELING SALMON LIFE CYCLES IN A CHANGING CLIMATE

## WHAT'S THE PROBLEM?

- Warmer temperatures, more rain, and less snow in the future are expected to lead to warmer water, lower summer flows, and more severe winter floods.
- These changes have the potential to affect salmon at all freshwater stages—emigration and spawning adults, eggs, and juveniles.
- It's unclear how the combination of these effects will affect salmon populations in individual streams, and across the region as a whole.

## WHAT'S THE PLAN?

- Use community-based stream temperature and flow data to assess salmon populations under future conditions.

## HOW CAN YOU PARTICIPATE?

- Provide suggestions for streams and rivers to include in the study.
- Share previously collected data from your stream.
- Collect new data from your stream with project support (equipment, personnel to help with installation, and data management).
- Participate in a workshop to learn about project results, and how to assess salmon populations in your watershed.

## WHAT ARE THE BENEFITS?

- Existing and/or new data collection in your streams can be supported by the project with equipment, training, and data management.
- Learn about projects for salmon productivity in your critical streams and rivers, and in the region as a whole.



(L-R) Derek Poinsette, Rebecca Bellmore, Johnnie Gamble, Daniel Klanott. Photo by Jessica Forster.

## CONTACTS

Jeff Falke  
Project Lead  
jfalke4@alaska.edu

Chris Sergeant  
Graduate Student  
csergeant@alaska.edu

J. Ryan Bellmore  
Life Cycle Modeling Lead  
jbellmore@fw.fed.us

Rebecca Bellmore  
Field Data Lead  
Rebecca@sawcak.org

Davin Holen  
Outreach Lead  
dholen@alaska.edu

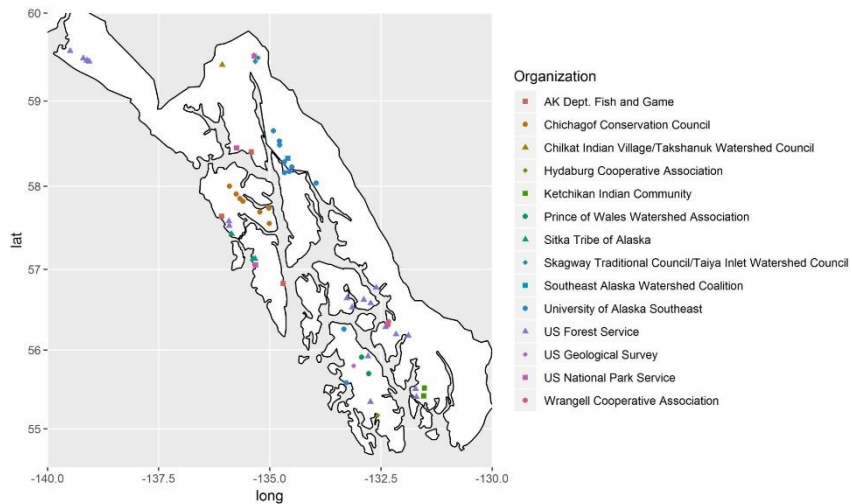


# Network Goals

- Community participation
- Collect high quality data
- Preserve and share data
- Long-term data collection



<http://www.alaskawatershedcoalition.org/southeast-alaska-stream-temperature-monitoring-network/>



## Organization

- AK Dept. Fish and Game
- Chichagof Conservation Council
- ▲ Chilkat Indian Village/Takshanuk Watershed Council
- ◆ Hydaburg Cooperative Association
- Ketchikan Indian Community
- Prince of Wales Watershed Association
- ▲ Sitka Tribe of Alaska
- ◆ Skagway Traditional Council/Taiya Inlet Watershed Council
- Southeast Alaska Watershed Coalition
- University of Alaska Southeast
- ▲ US Forest Service
- ◆ US Geological Survey
- US National Park Service
- Wrangell Cooperative Association

# Temperature Monitoring Locations



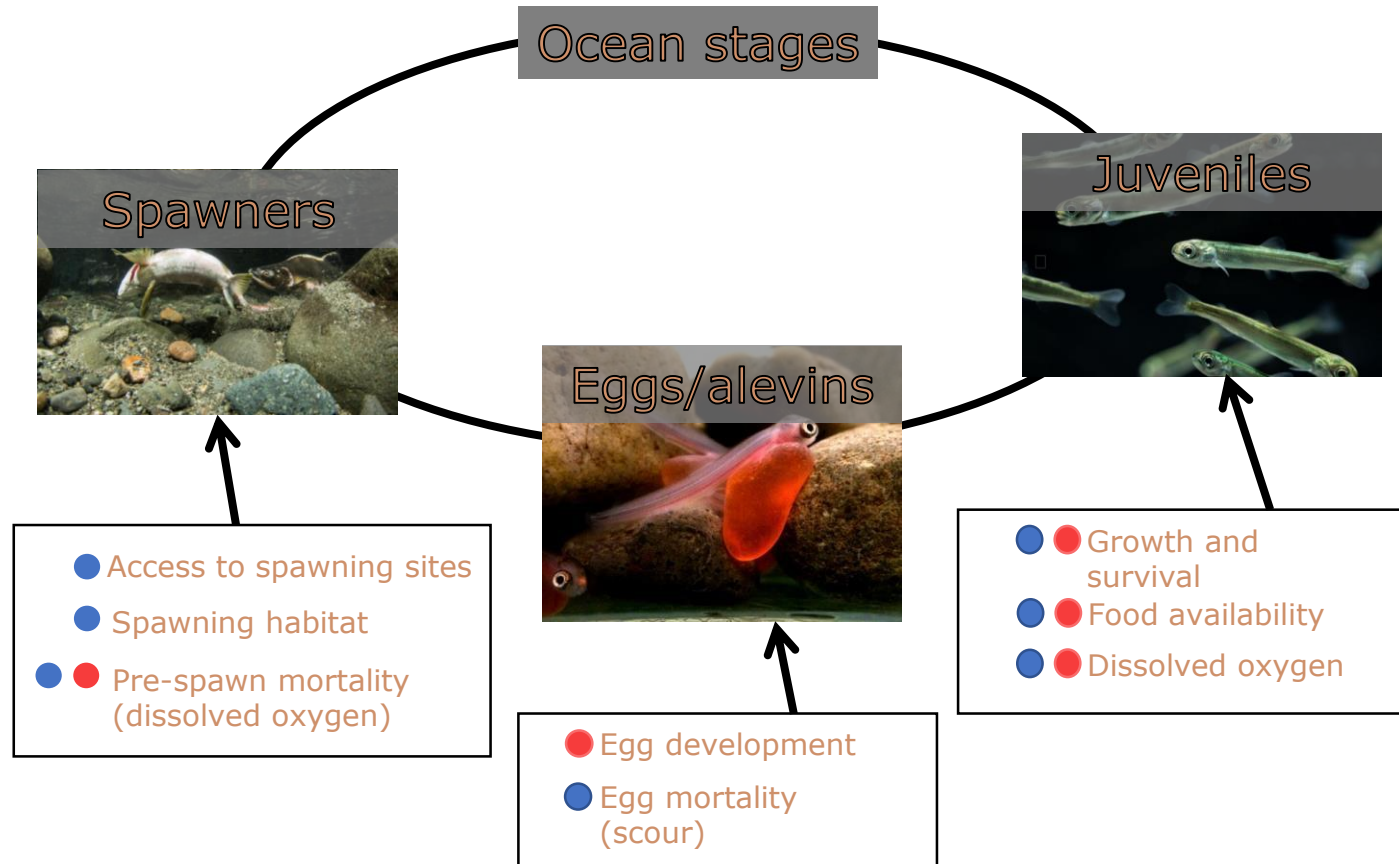
# Salmon resilience to climate change



- Stream temperatures and flows affect growth and survival in freshwater
- Use community-collected data to understand how salmon may respond to changes
- Involve communities in model development and use

# Life Cycle Modeling

**Critical Question:**  
How will changes  
in stream flow  
and temperature  
effect salmon?



modified from Chris Sergeant

# Life Cycle Modeling

## Critical Question:

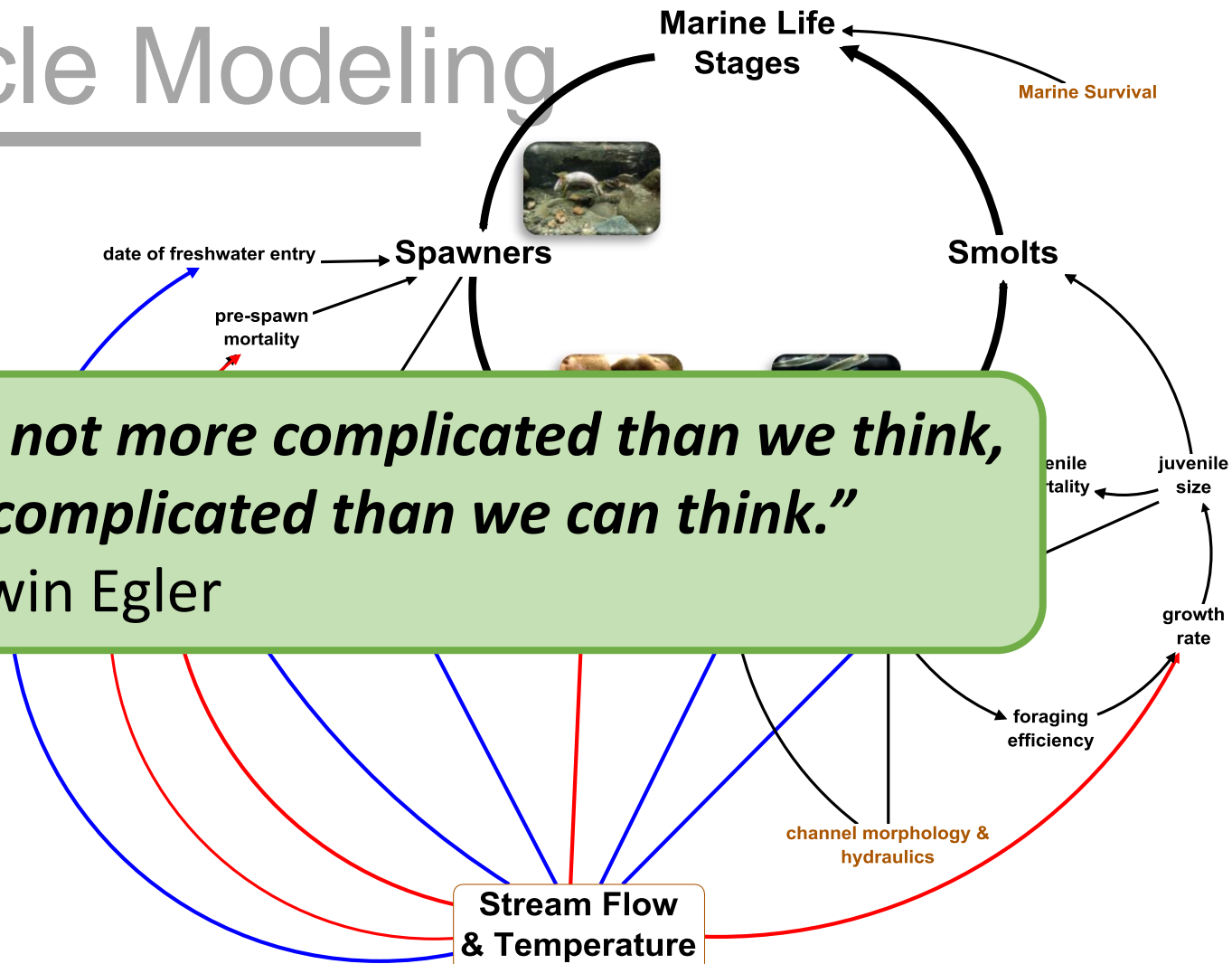
How will changes  
in stream flow

and temperature  
affect salmon

***“Nature is not more complicated than we think,  
it is more complicated than we can think.”***

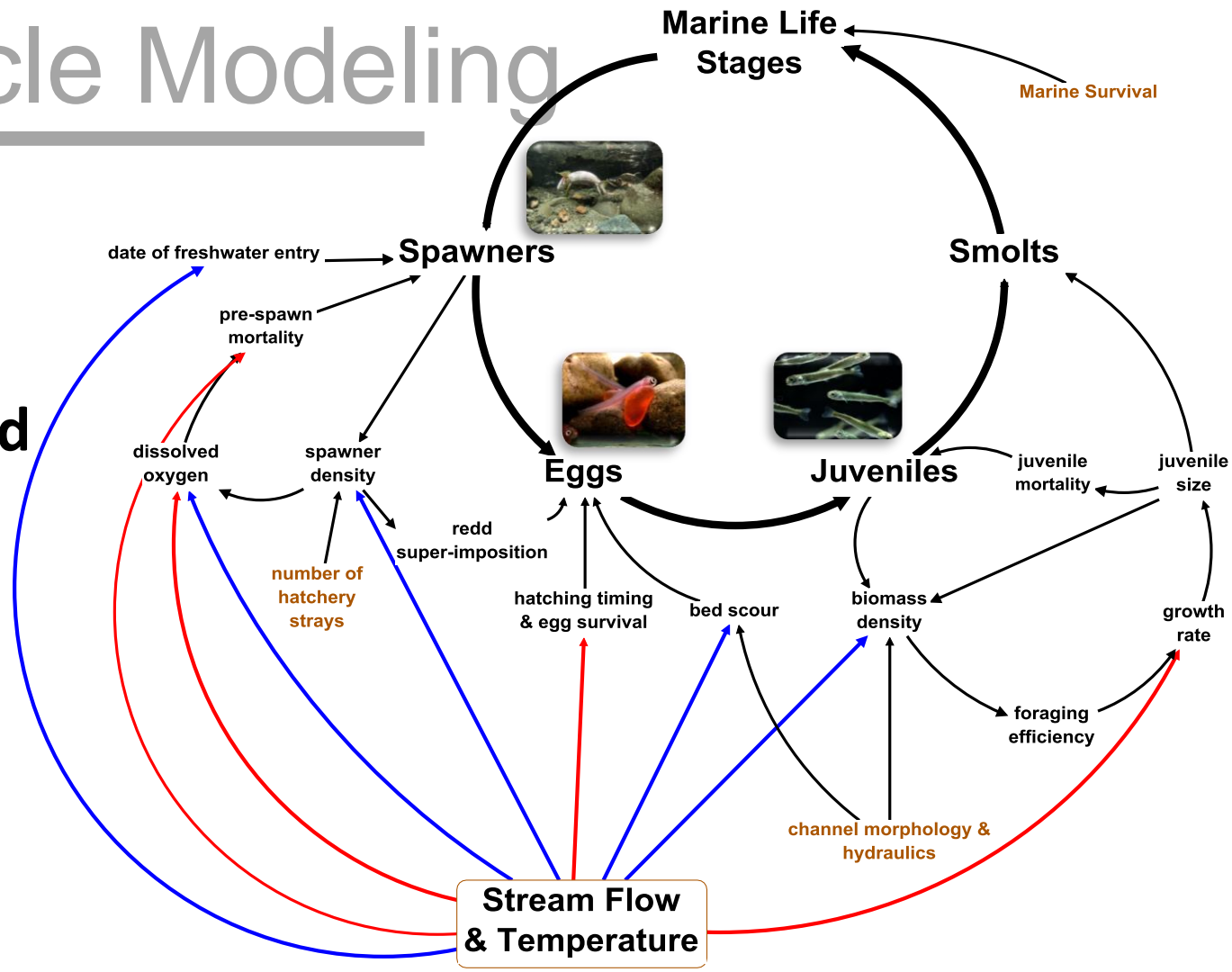
~Frank Edwin Egler

*It's complex*



# Life Cycle Modeling

Need a modeling framework that integrates all of these linkages and feedbacks.



# Life Cycle Modeling

---

## **The problem with mathematical models. . .**

- Require a great deal of expertise to use
- Potential model users are not included in development

## **A different approach. . .**

- Create user-friendly models that are ***accessible***, and can be used by (and developed in collaboration with) community members to explore how salmon populations may respond to future conditions.

# Southeast Alaska Salmon Simulator

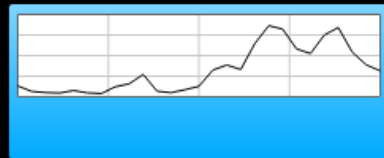
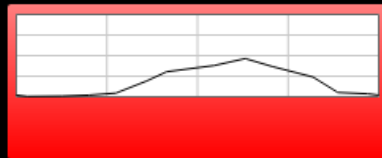
Use this model to explore how changes in stream flow and water temperature influence the number of returning adult salmon.

Click on the "thermal regime" and "flow regime" graphs to trace your own pattern of flow and temperature, or upload field data from your stream.

Run Model

Clear Graph

Upload Flow & Temperature Data



Restore Original Flow & Thermal Regimes