# Salmon management priorities differ by scale:

- **International:  exploitation , oceanic environmental changes**
- **National:  freshwater quality , habitat and exploitation**
- **River: maximise access, habitat quality and smolt output**

**The role of scientists:
provide useful, and true,
knowledge**

# Likely Suspects Framework Approach

- Assist development of a conceptual Atlantic salmon life-cycle model
- Establish a shared data resource
- Enable hypothesis testing integrating datasets and mechanistic models
- Quantify mortality suspects based on assessment of available evidence

# Why bother?

- Assessment of the key management levers that relate to the most influential processes
- Examine possible interactions between freshwater and marine processes
- Allow review of efficiencies of certain actions and acknowledgement of relative gains
- Outputs will not be prescriptive, but provide a decision-support tool for management

(Friedman etal., 2019)
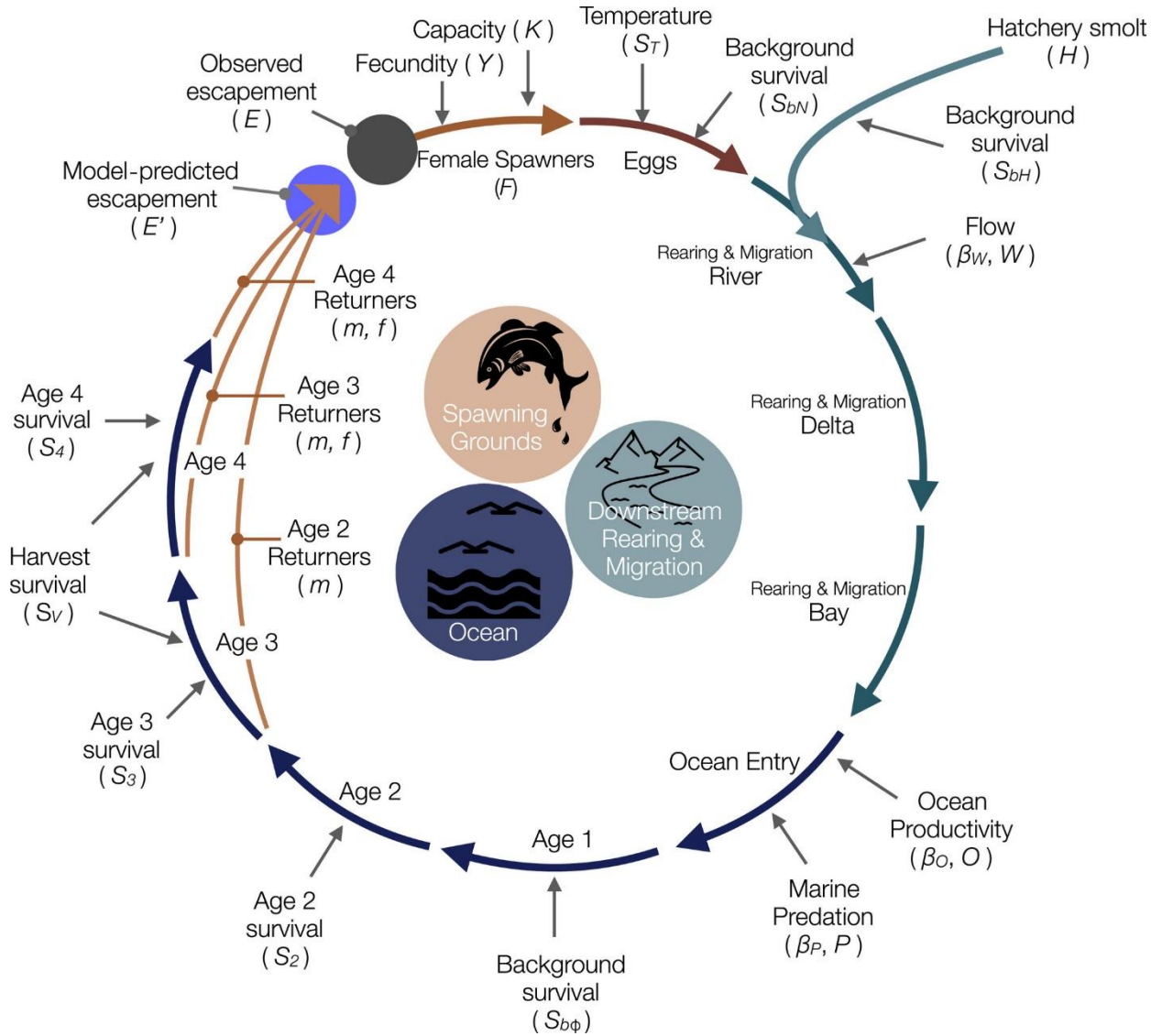
**Variables**

Year t total spawners
Year t female spawners
Average fecundity
Slope of mortality rate above critical temperature
Annual temperature dependent survival
Survival of age 2,3 and 4 yr salmon at sea
Annual ocean harvest survival index
Proportion of males returning at 2yr (from CWT)
Proportion of male and female returning 3yr (from CWT)

**Model Parameters**

Temperature threshold at representative river location
Background survival for fry
Coefficient for flow dependent survival
Coefficient for marine predation risk
Coefficient for ocean productivity and survival
Spawner capacity

**Environmental covariates**

River conditions during outmigration
Estuary conditions during outmigration
Ocean productivity (North Pacific Gyre Oscillation)
Annual index of marine predation

**Model-based predictions**

**Predicted number of male and female spawners in year t**

Population dynamics resulting from composite effects of processes in freshwater and marine environment



(Friedman etal., 2019)
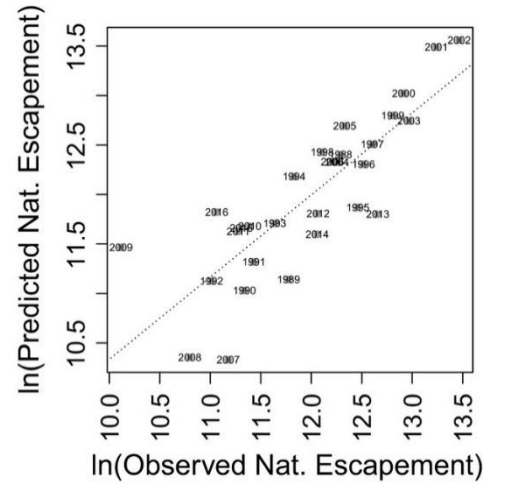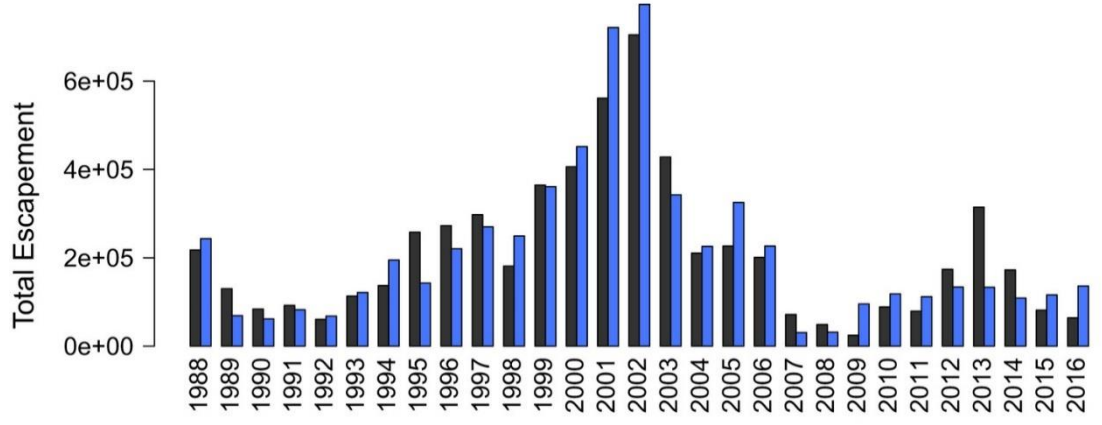
Model fit 68.3% of variation in historic escapement

Temperature during egg incubation, River flow during outmigration, Environmentally-mediated ocean predation

*Expectation management for costly activities relative to potential for survival controlled by processed in other areas*

*Justification and leverage to inform decisions and support less-popular (but necessary) actions*

The Likely Suspects Framework will only succeed if it gets the support of organisations and individuals

We need to ask the right questions and keep a focus on providing the information that managers need to make difficult decisions and do their jobs

colin@atlanticsalmontrust.org

# So what do you want / need ?

- Answering questions relating to marine mortality ?

- Forecasting of stock changes ?

- Expectations of success of actions?

- A reality check ?

- Why small smolts do badly?

- Predation management issues?

- Evidence for or against theories ?

colin@atlanticsalmontrust.org