# PRESPAWNING MORTALITY OF FALL CREEK WILLAMETTE CHINOOK SALMON:

# EVALUATION OF THE EFFECTS OF A NEW TRAP AT THE ADULT FISH COLLECTION FACILITY

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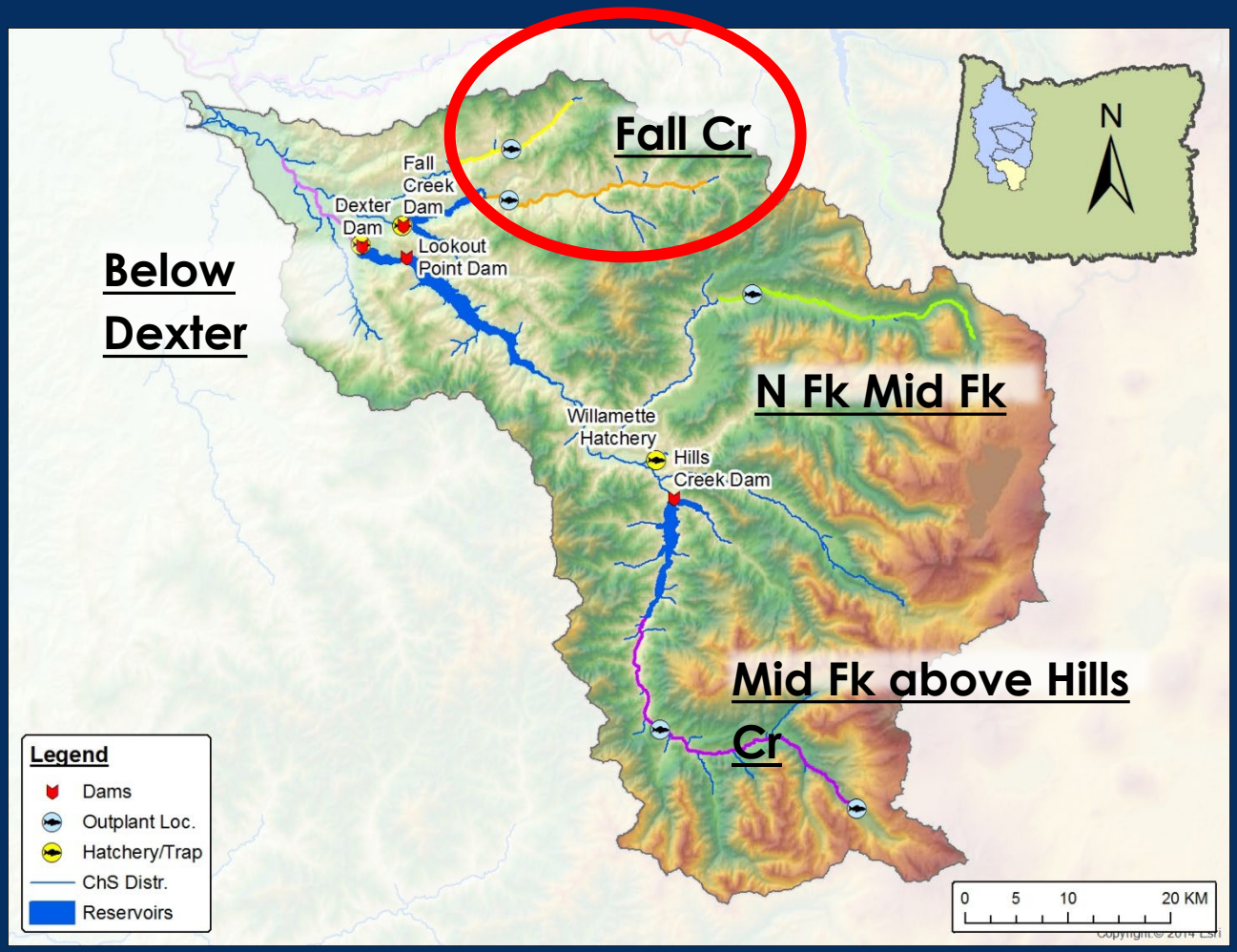
# Trap, Transport and Outplanting MF Willamette



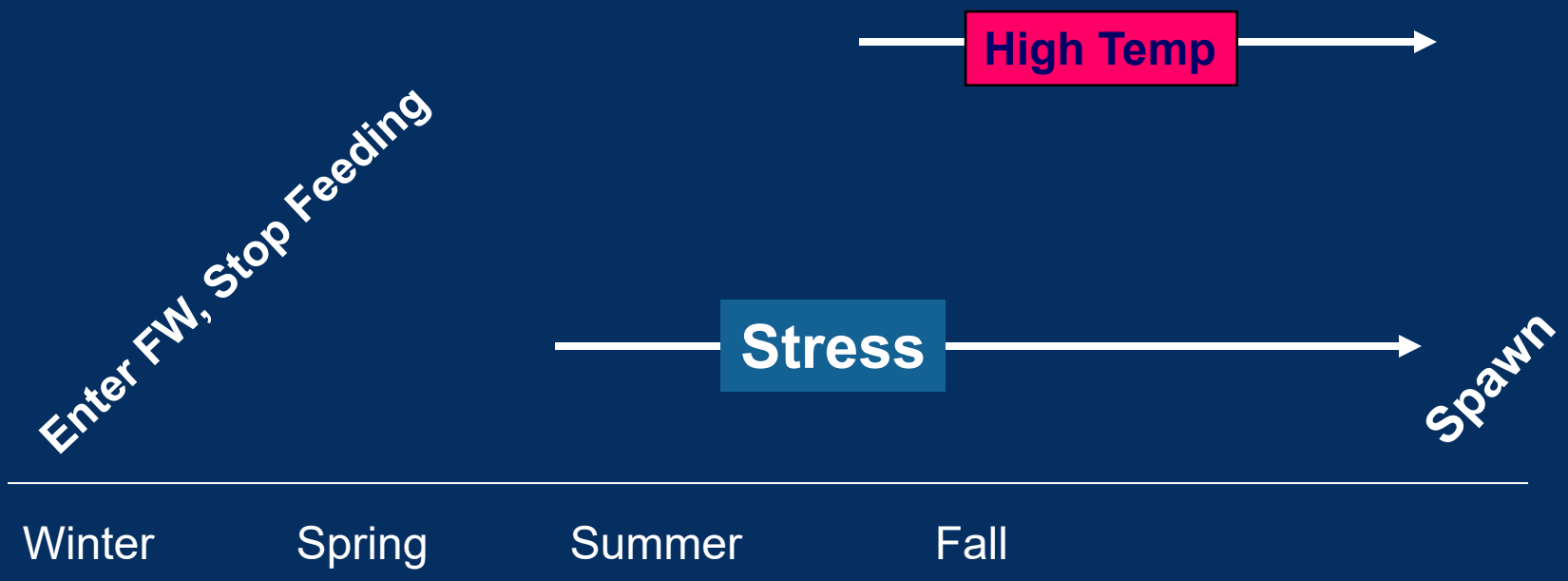

# Problem: Prespawning Mortality (PSM)

**Adult salmon that die after reaching their spawning grounds but prior to the successful release of gametes**

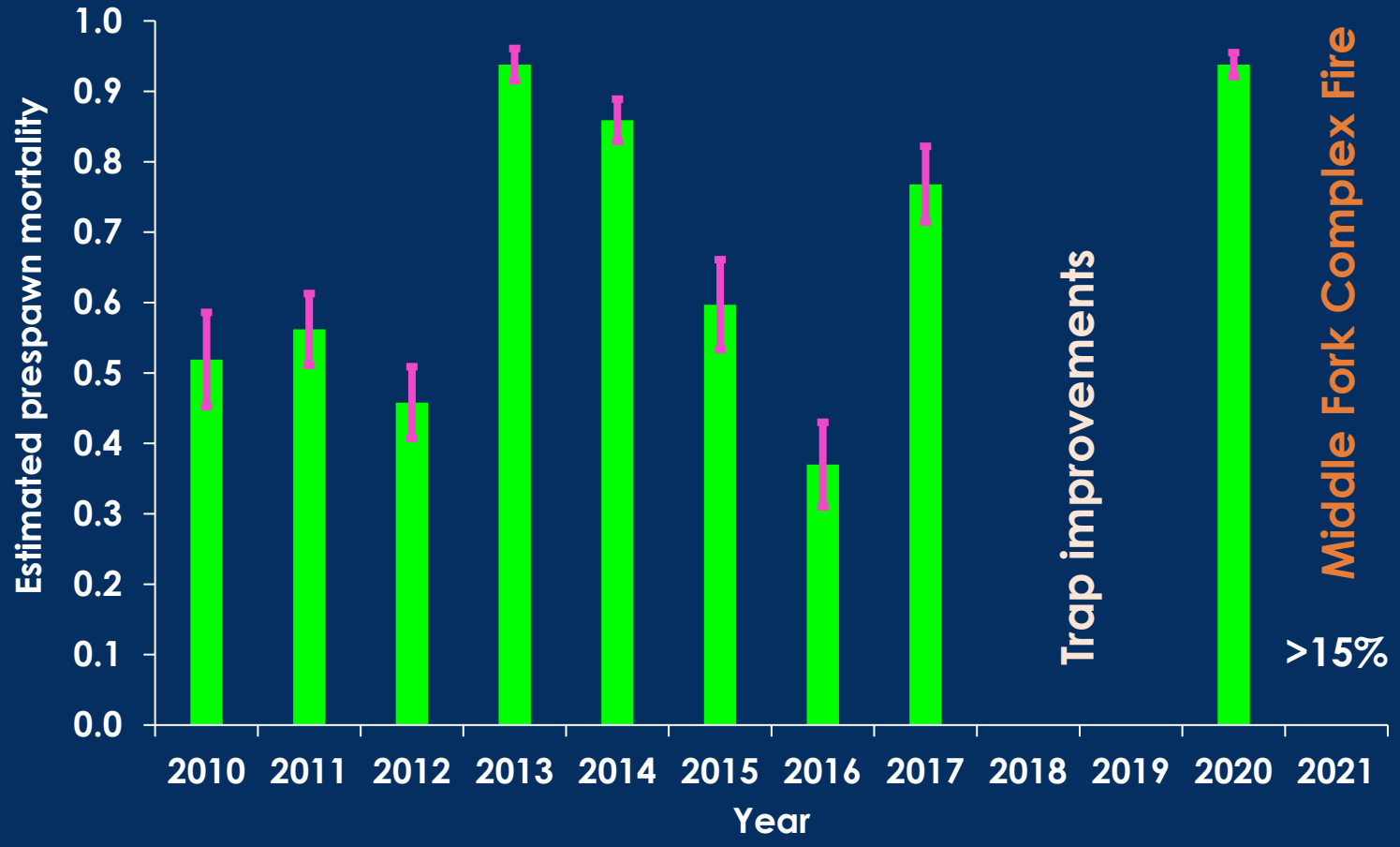
# Why do salmon die early?

## EFFECTS OF STRESS + CUSHING'S SYNDROME

**Cushing's + Stress = Immunsupp (+ Disease) = Death**



# Estimated Prespawning Mortality Fall Creek Pre-Improvement




Preliminary results subjected to revision

# PSM: POTENTIAL STRESSORS

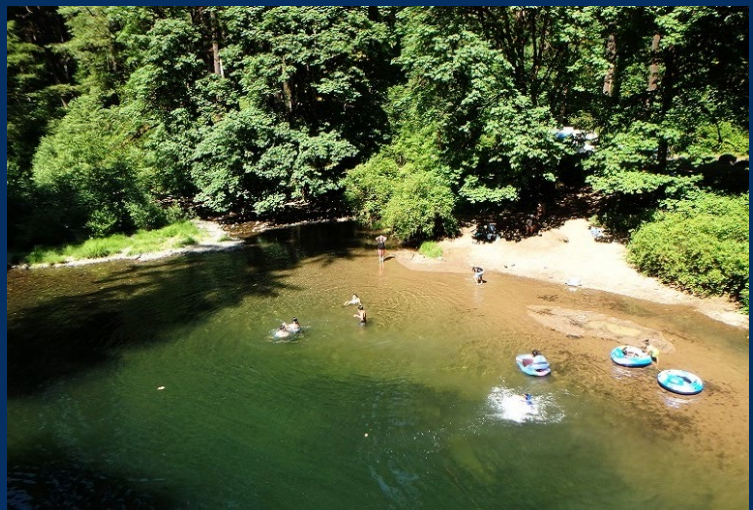
## Exploratory analysis, 2010- 2021 data

River Conditions (migration) ✓

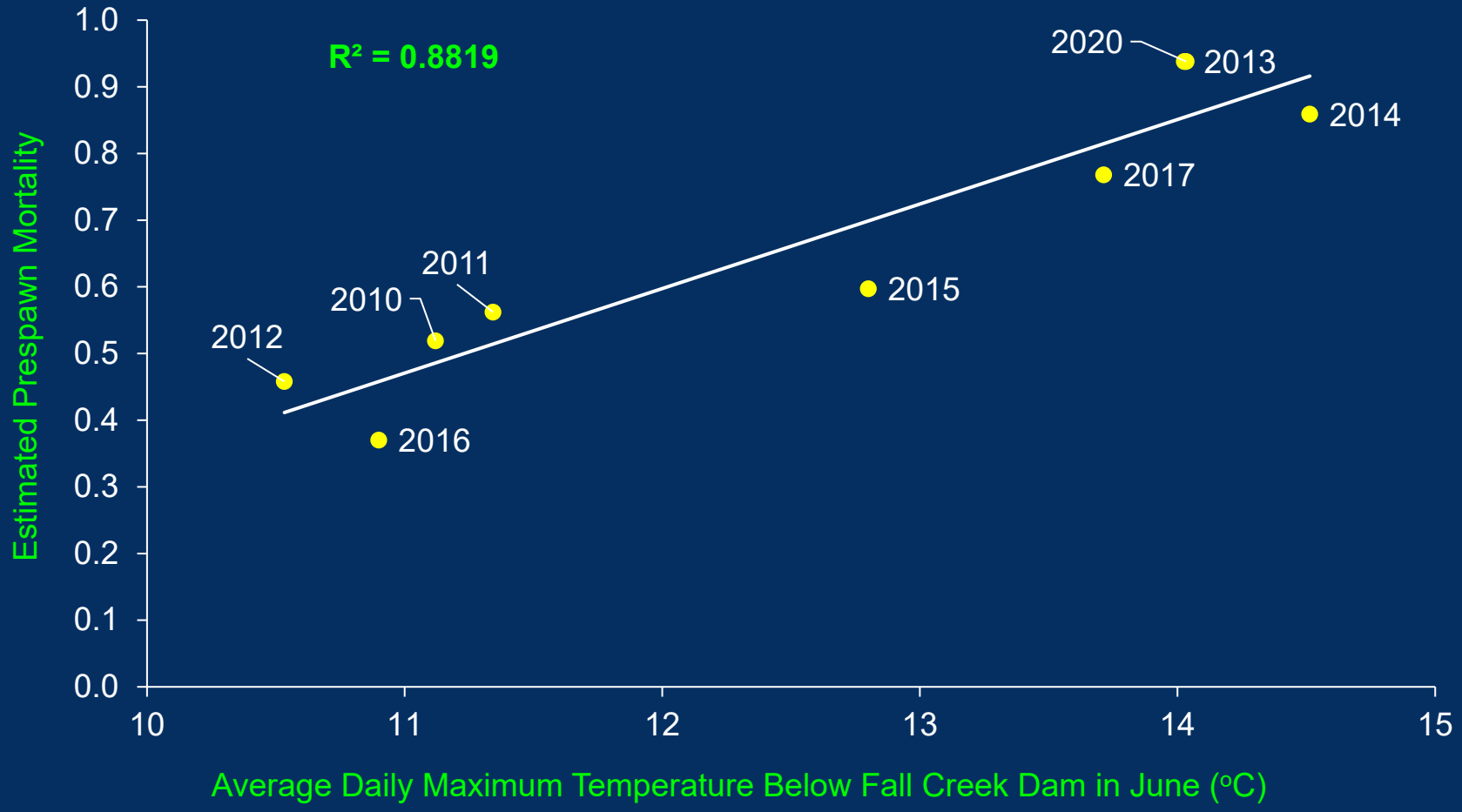
Pathogens ✓

Density Dependence

Human Disturbance ✓



# Example: Below dam temperature effects

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# Objectives

Develop decision model -- minimize PSM

Sensitivity analysis

Value of information (key unknowns)

Adaptive framework for PSM management

# Decision modeling

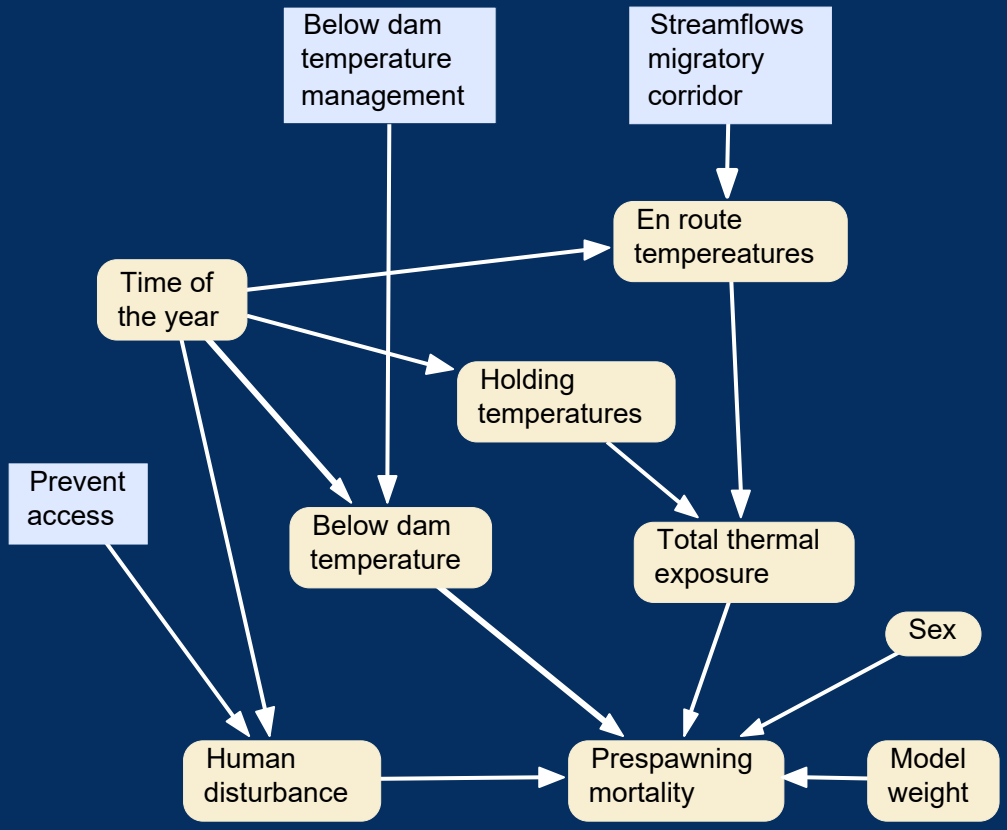
**3 submodels: hypotheses**

**Below dam temperature**
**Total thermal exposure**
**Human disturbance**

**2010-2020 PSM data**
**Published reports**

**Weight equally**

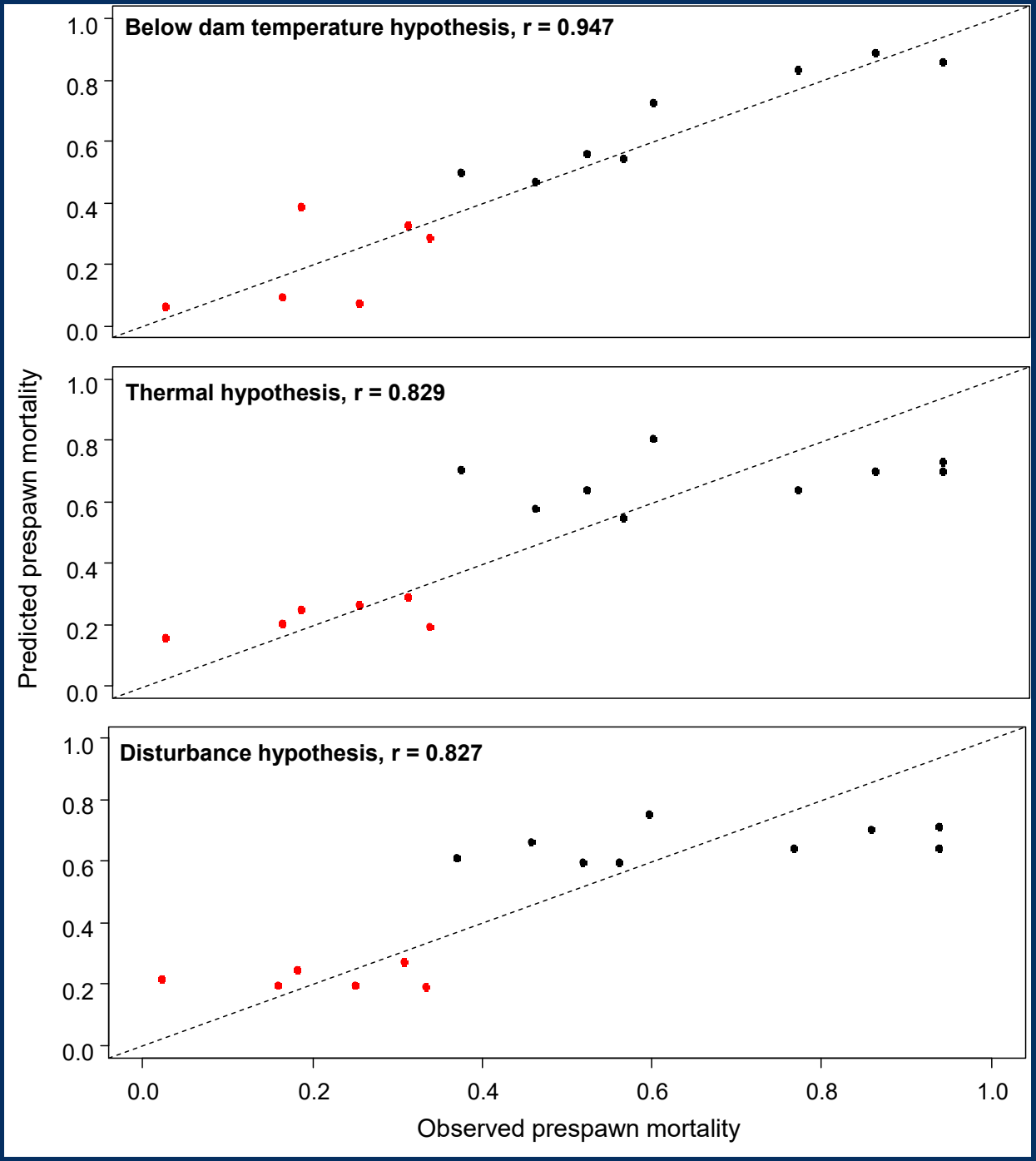
**3 monthly decision alternatives**
**Simulation 3000x**



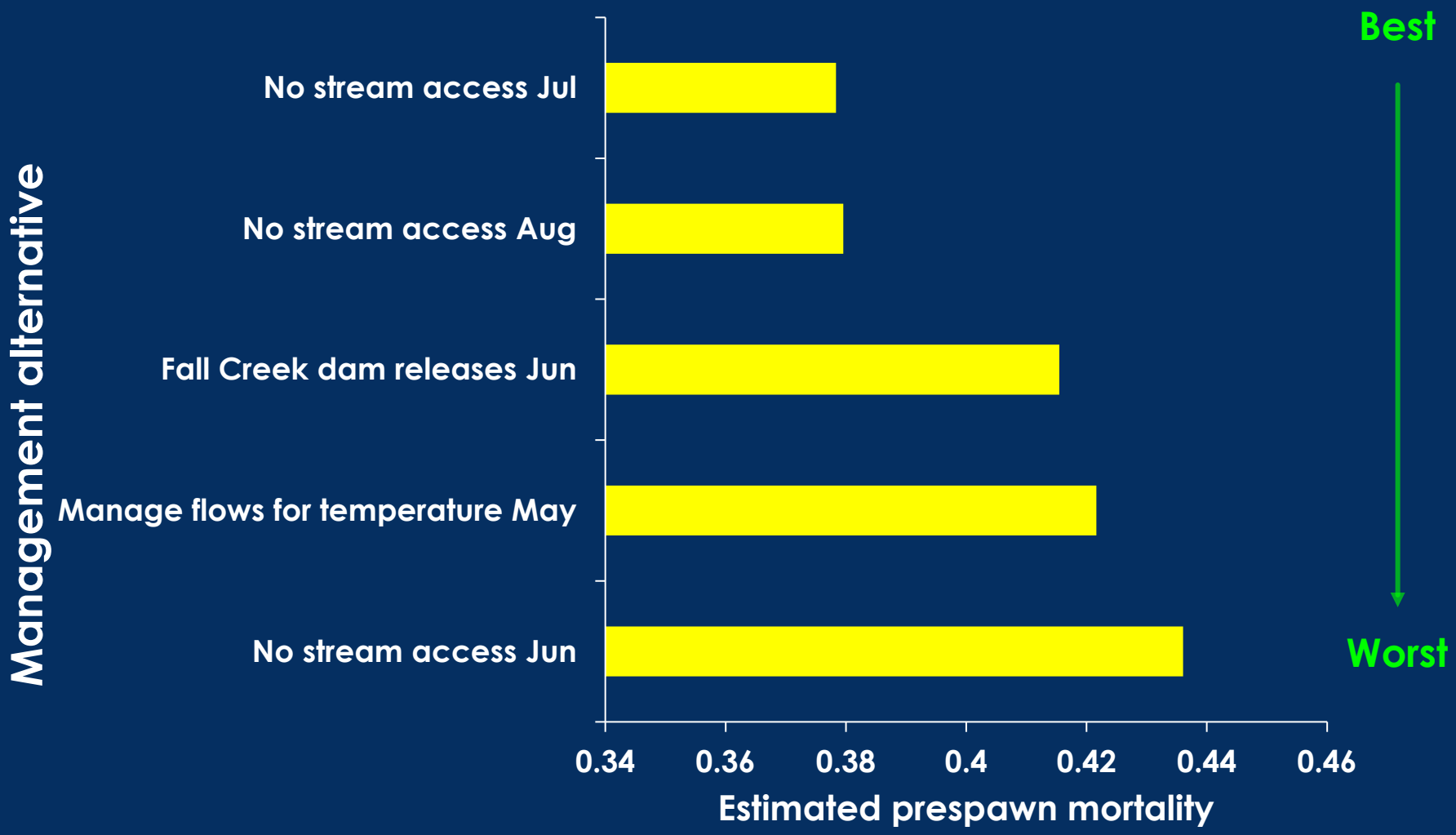
# Results: Model fitting

Male= red

Female = black

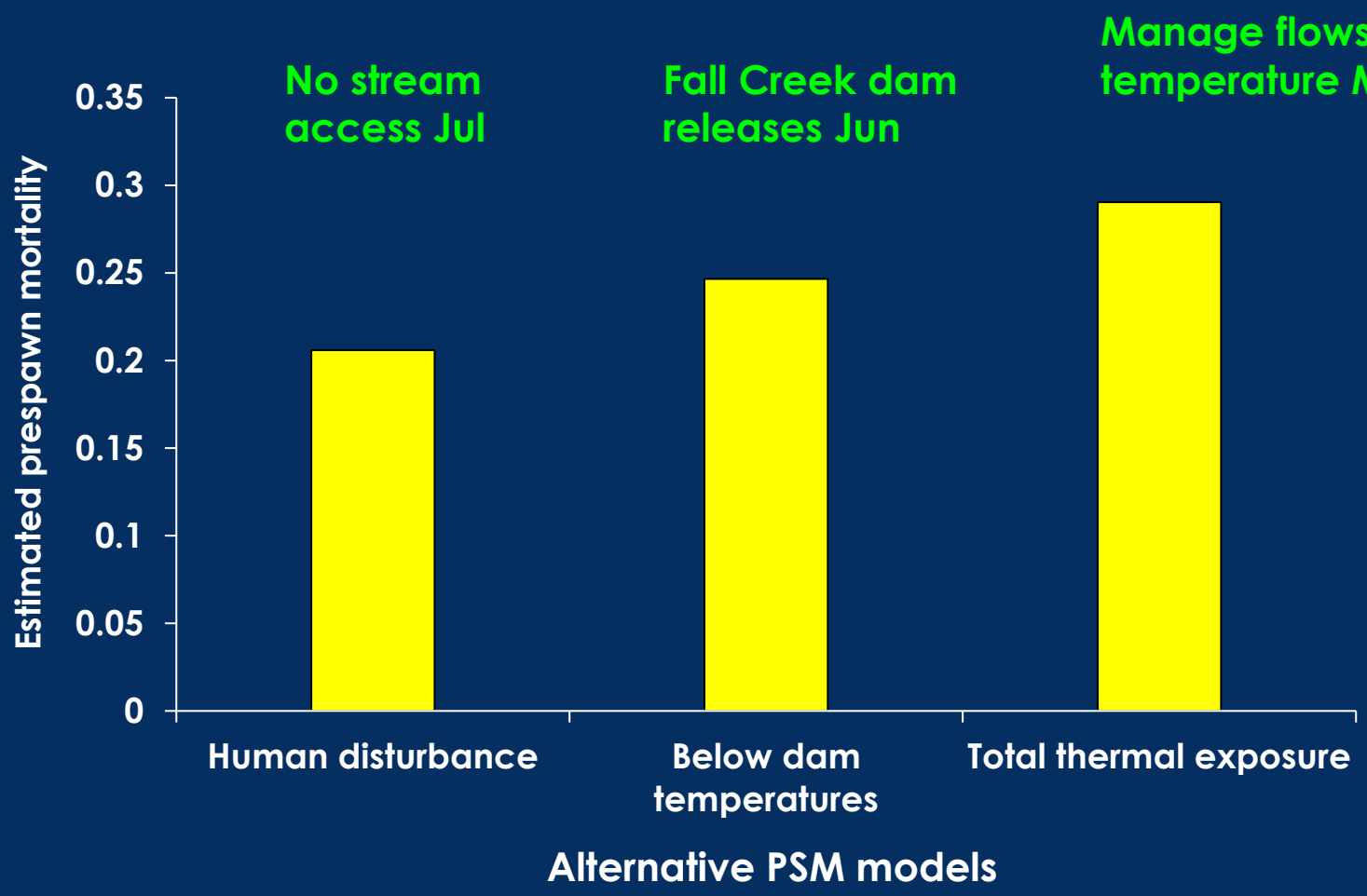


# Results: top five alternatives



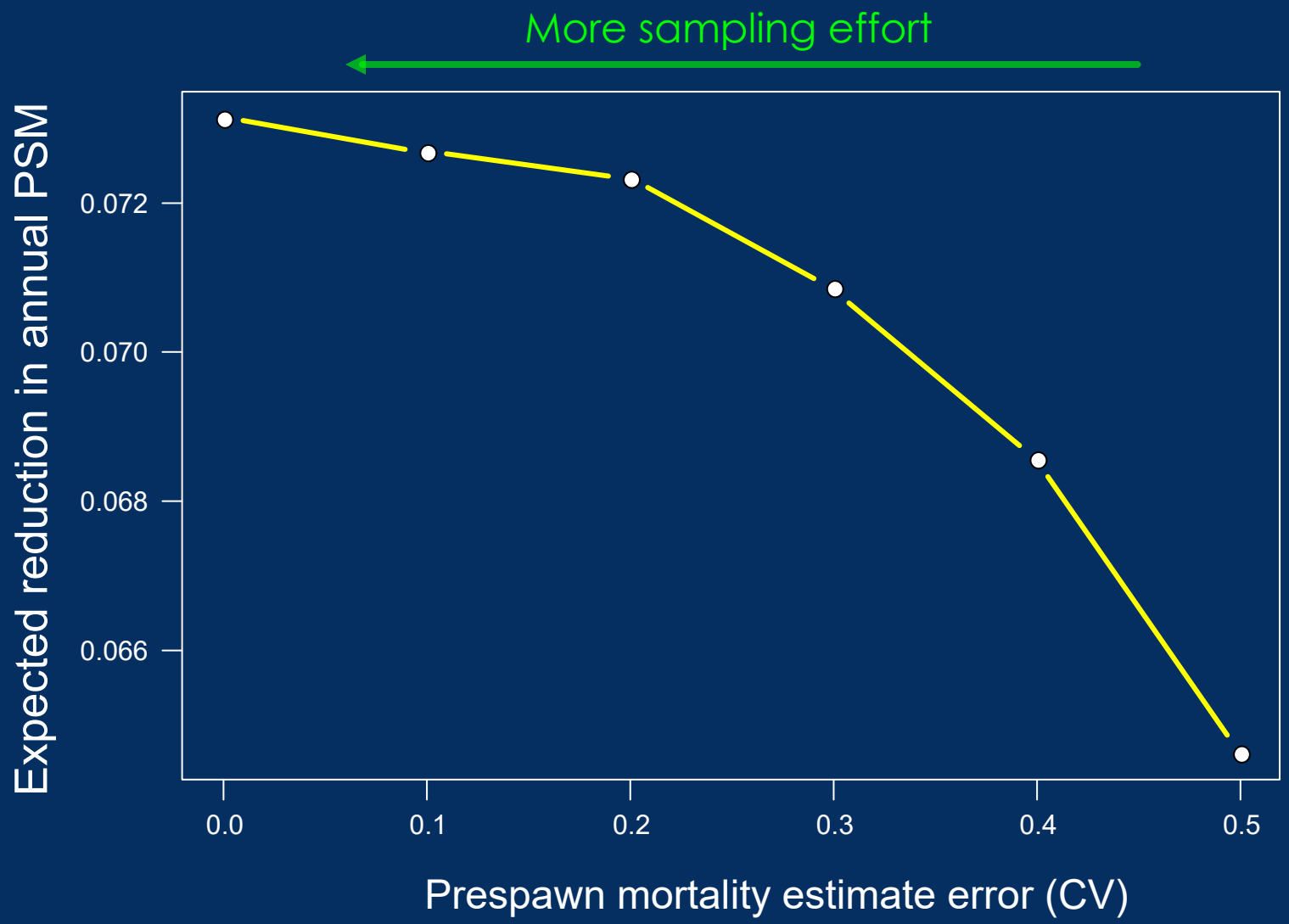
# Sensitivity analysis

## The best alterative differs among models (hypotheses)




Preliminary results subjected to revision

# Value of sample information

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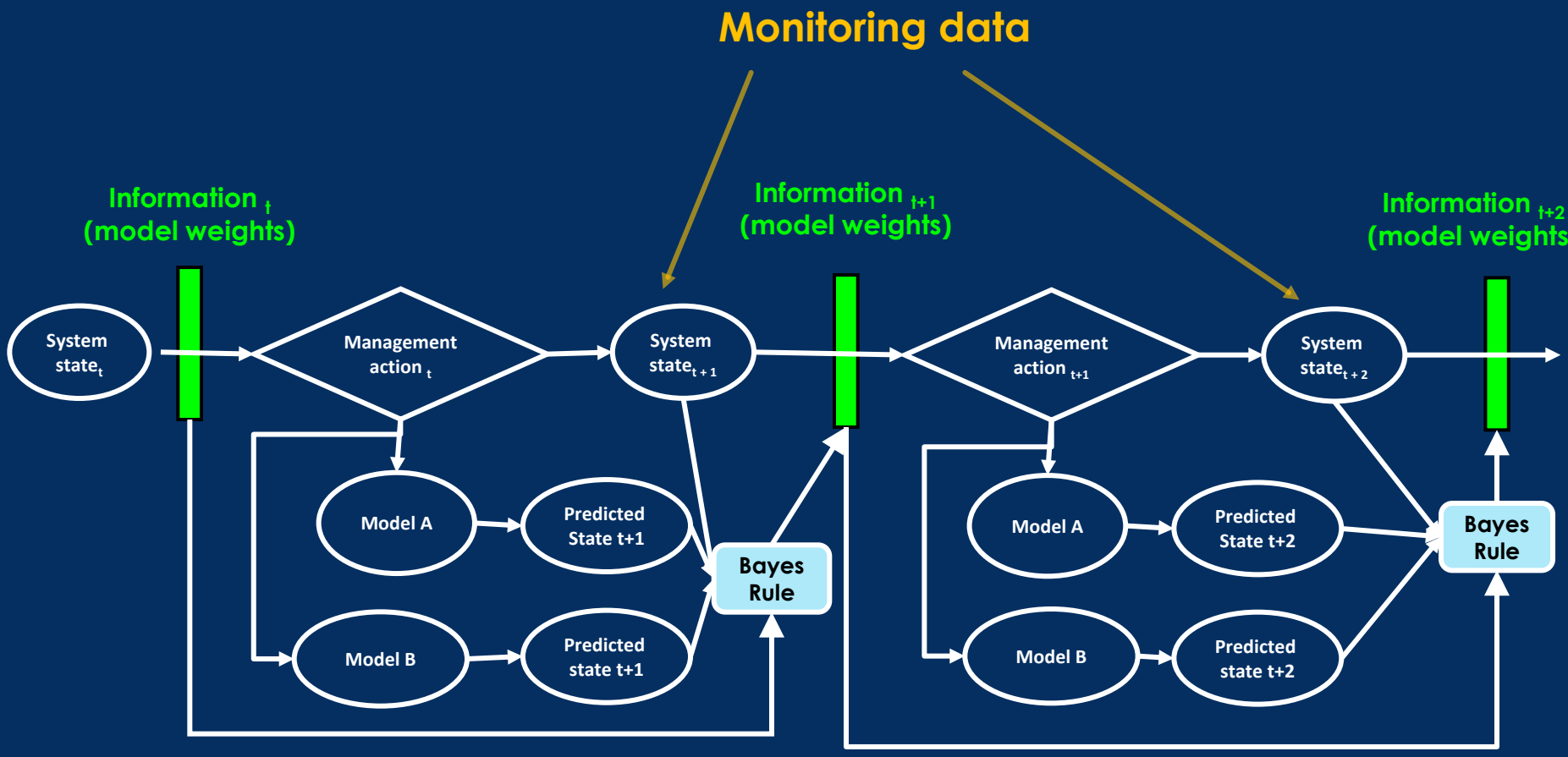
# Adaptive management updating




*How does this really work?*

# Updating illustration

Simulated management and monitoring

5 years, model weights updated annually

Optimal actions + no action

Simulated under alternative ‘true’ hypotheses

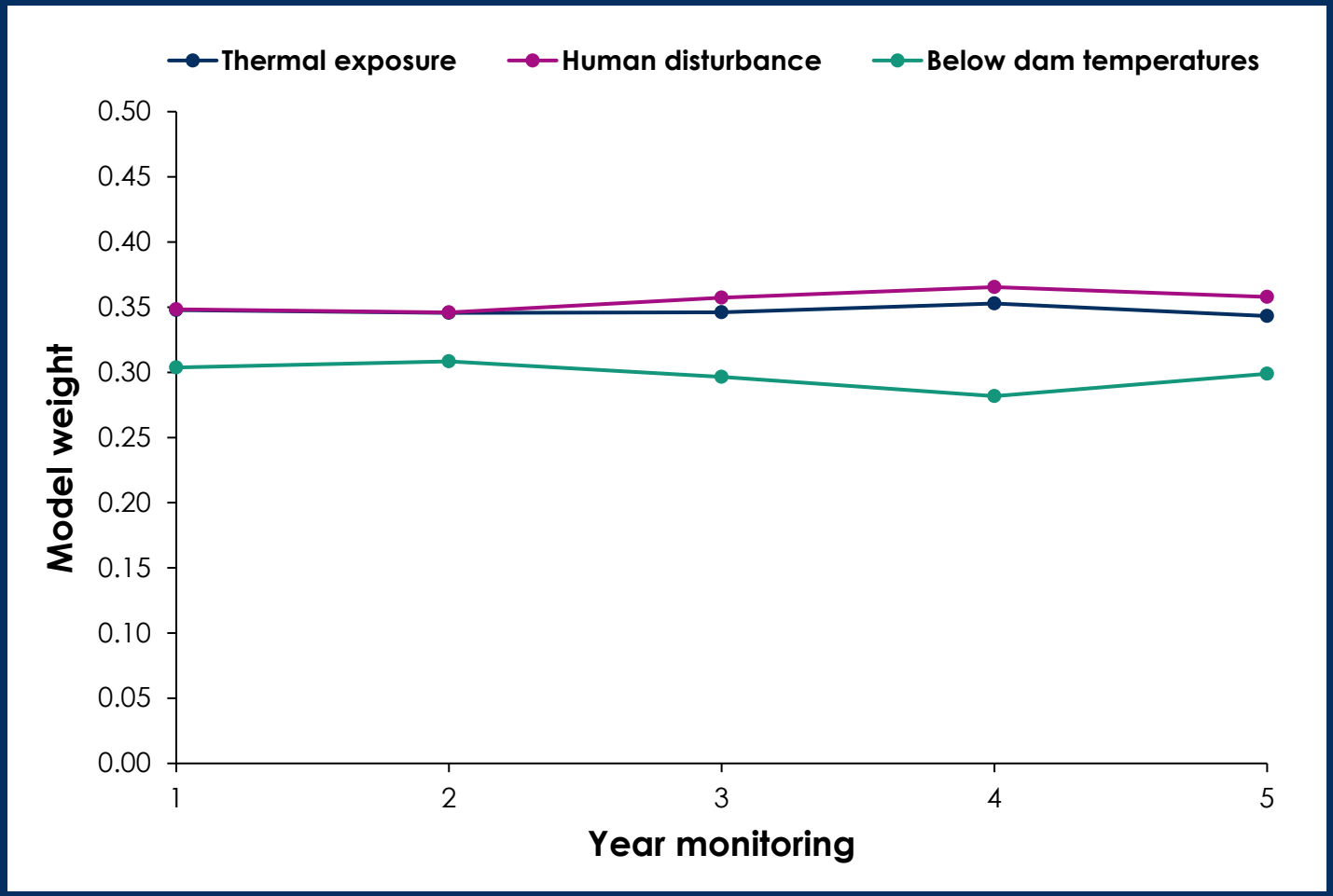
Effect of sampling error (sample effort)

Effect of model prediction error

3K iterations

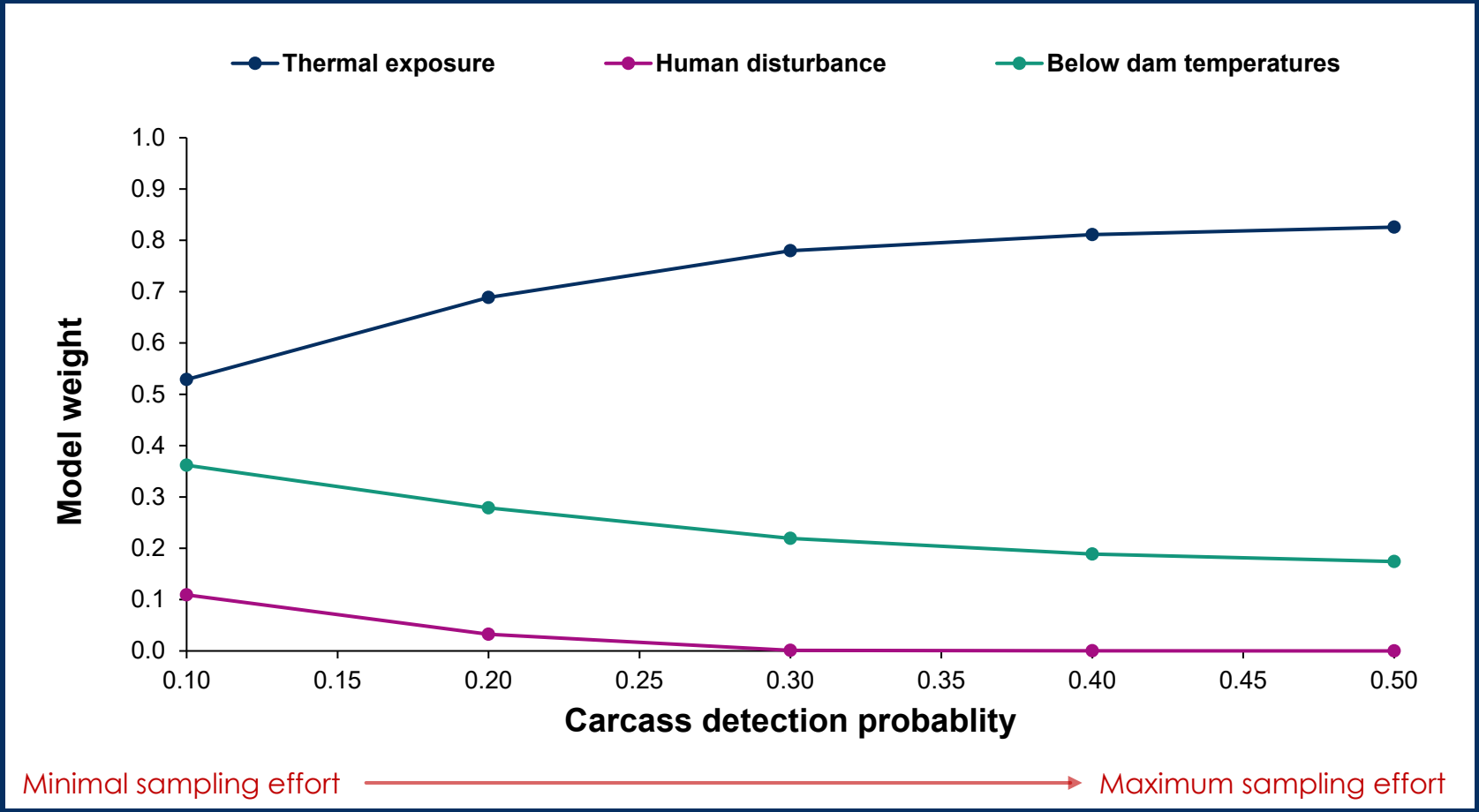
# No management = Slow / No learning

Management action = Do nothing
Carcass detection = 25%
Truth = Below dam temperature hypothesis



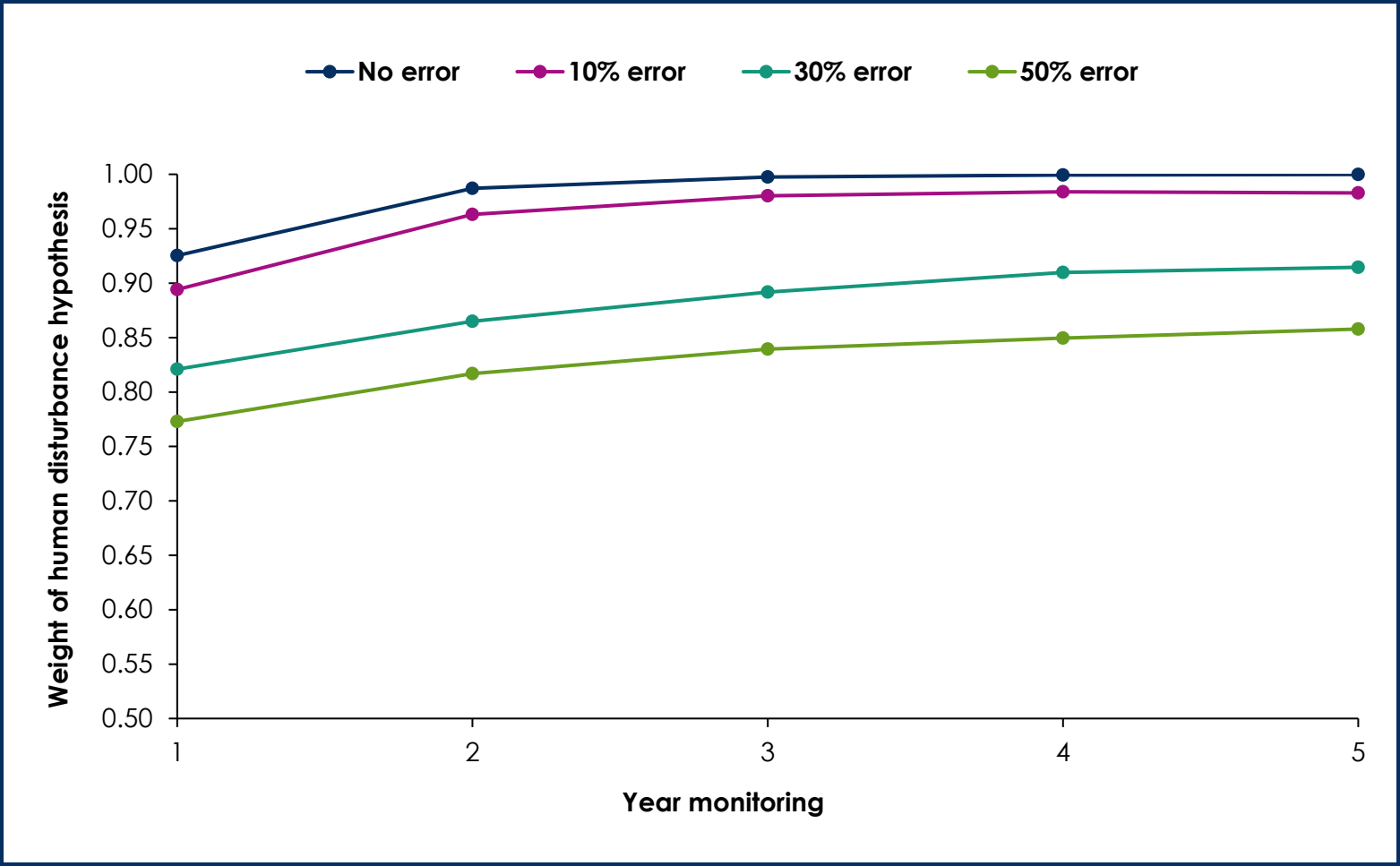
# Sample error affects rate of learning

Management action = Manage flows for temperature May
Truth = Thermal exposure hypothesis
Single year simulation



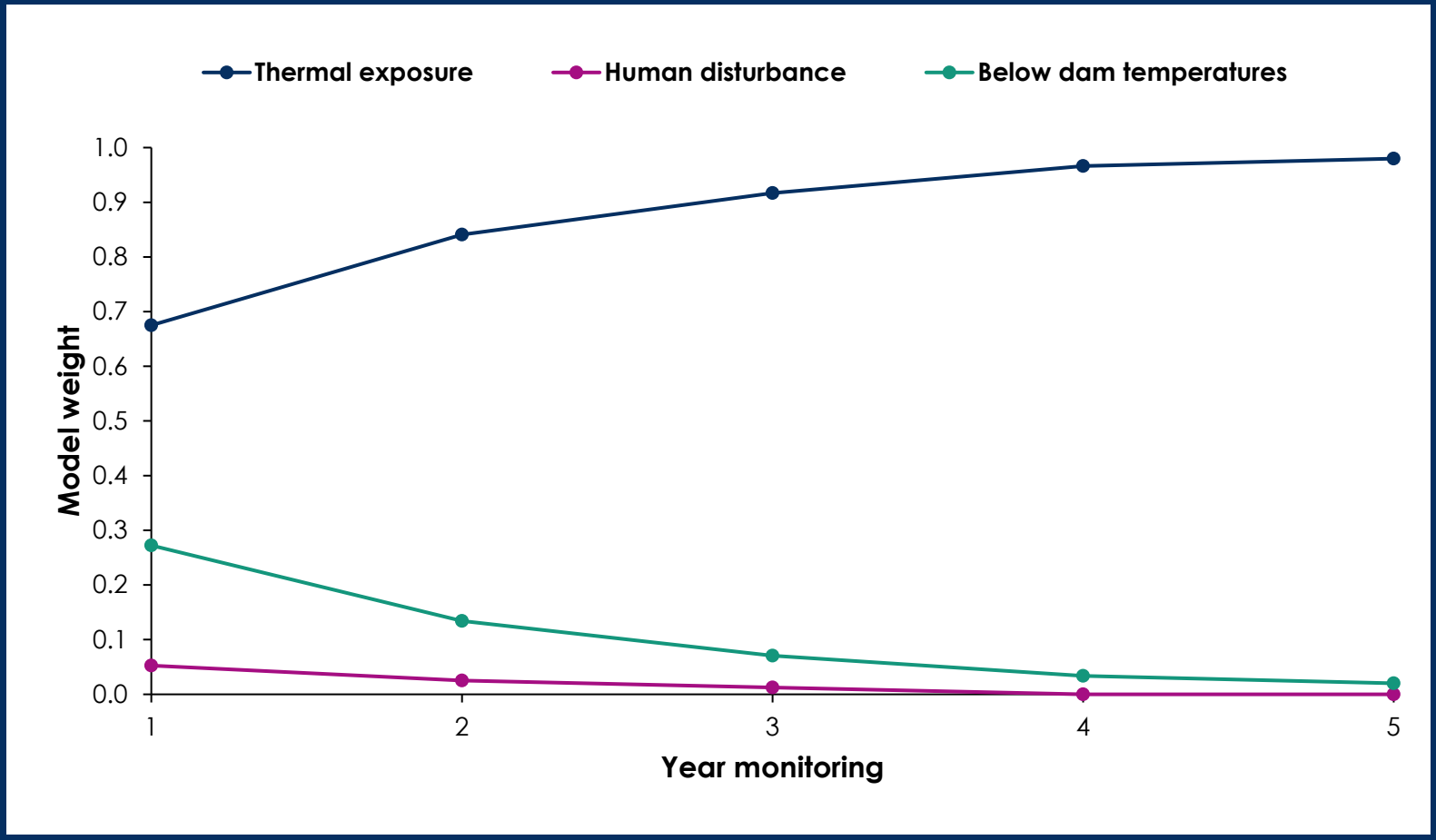
# Decision model error affects rate of learning

Management action = Stop stream access July
Carcass detection = 25%
Truth = Human disturbance hypothesis



# Learning occurs if 'wrong' decision made

Management action = Stop stream access July
Carcass detection = 25%
Truth = Thermal exposure hypothesis



# CONCLUSION

PSM: Many unknowns remain

Beyond trap and transport management?

Adaptive management
reducing PSM and uncertainty

Integrating modeling, monitoring, and management

Sampling and prediction errors

# ACKNOWLEDGEMENTS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