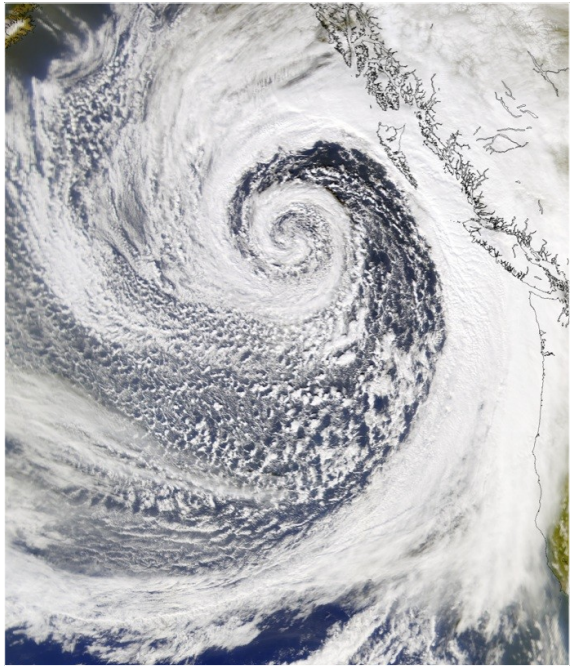
Putting Climate Projections to Use

Guillaume Mauger

Climate Change = More Floods, Bigger Floods

Sea Level Rise



Heavy Rains

Snowpack

Climate Impacts Everyone/Everything Differently

(Example from Pierce County)

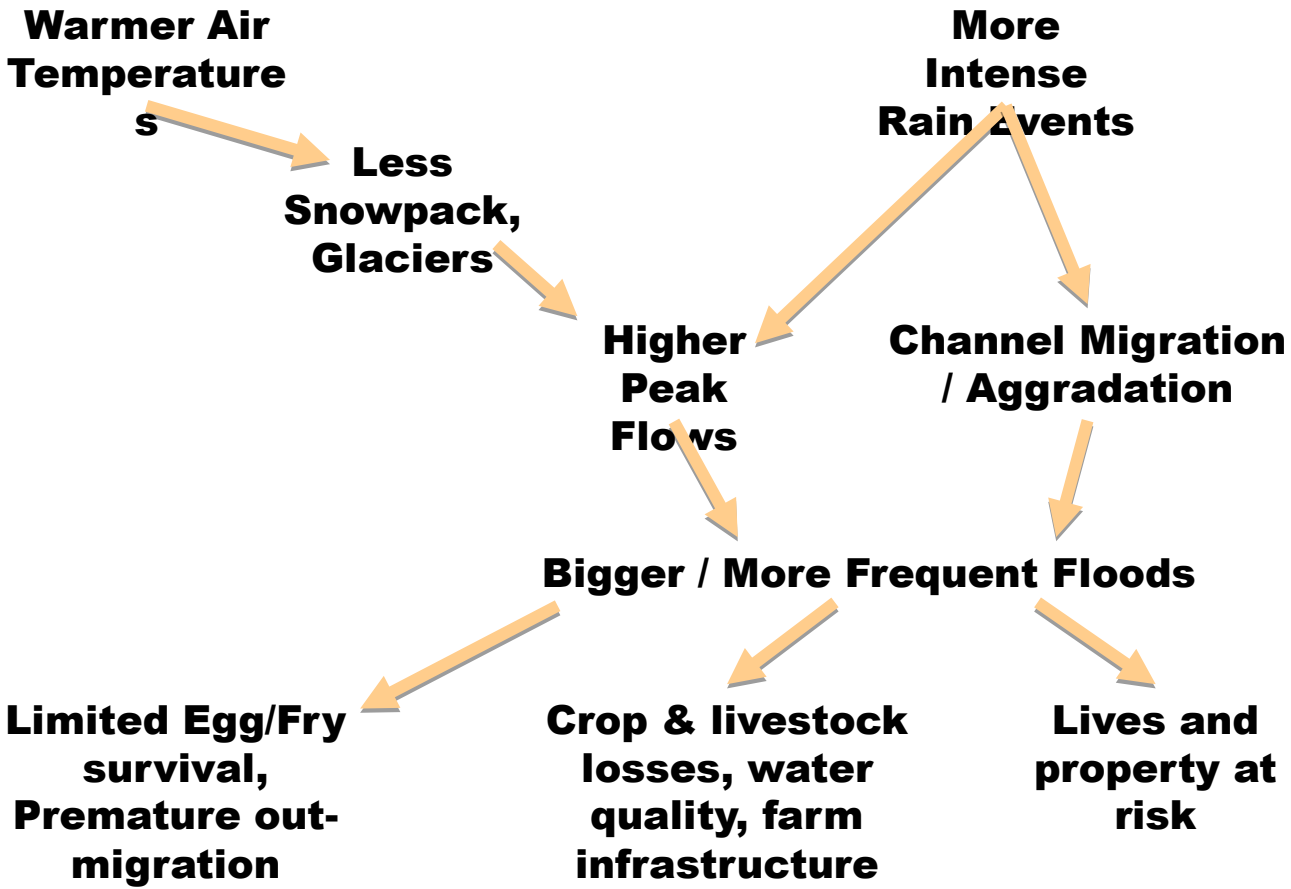
		Fish				Farm					Flood		
		Egg to Fry Survival	*Out-Migration*	*Rearing*	*Spawning*	*Crop Health/Growth*	*Water Supply*	*Flooding*	*Drainage*	*Channel Migration*	*Flooding*	*Stormwater*	*Channel Migration*
Growing Season	*Magnitude*					■	■						
	Duration					■			■				
	Min. Temp.					■							
Snowmelt	*Timing*		■										
Low Flow	*Magnitude*			■	■		■						
	Timing	■		■	■		■						
Water Temperature	*Maximum*	■		■	■								
	Timing			■	■								
Precipitation	*Maximum*								■		■	■	
	Timing						■		■				

Climate Impacts Everyone/Everything Differently

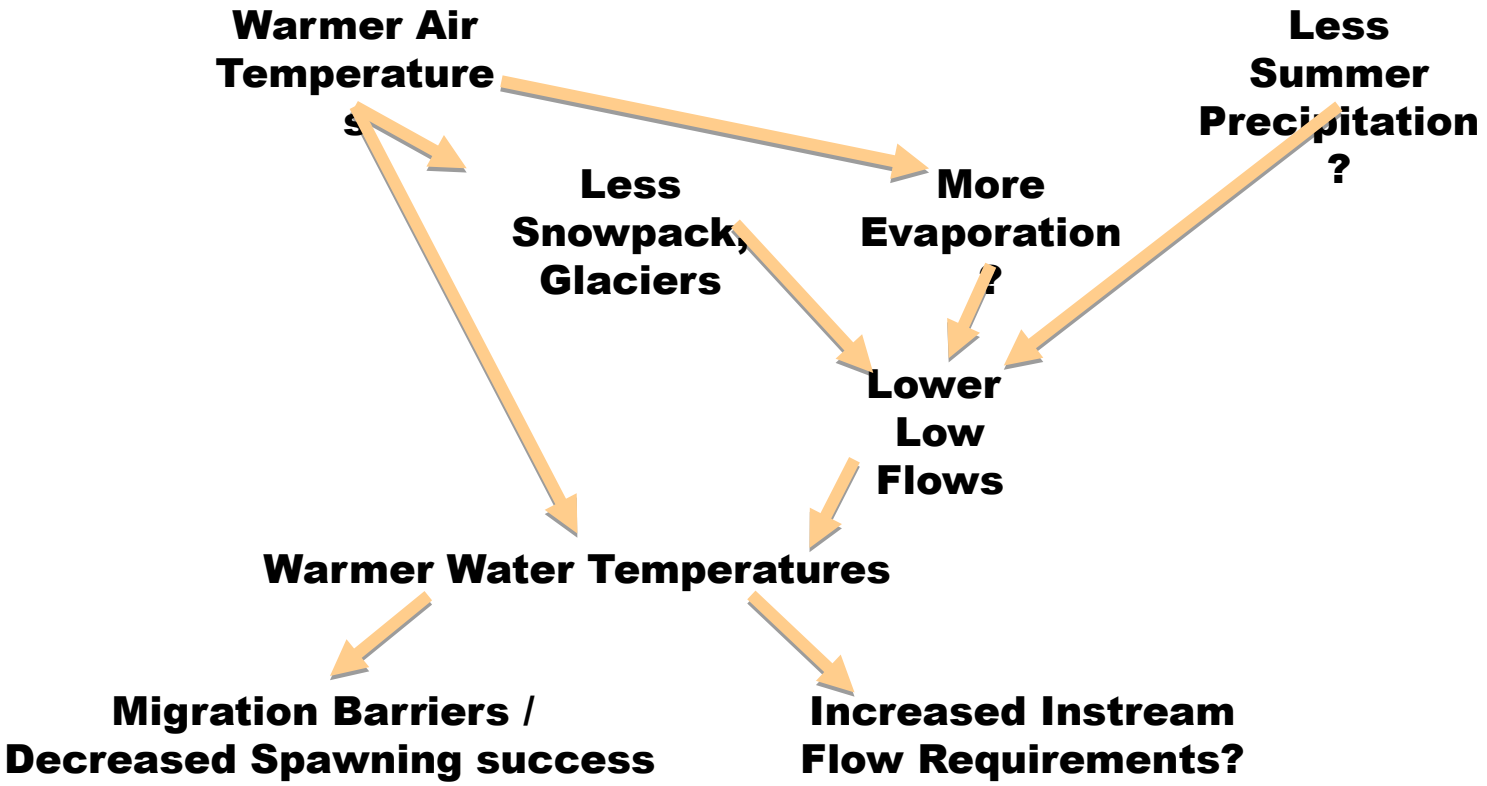
(Example from Pierce County)

		Fish				Farm					Flood		
		Egg to Fry Survival	Out-Migration	Rearing	Spawning	Crop Health/Growth	Water Supply	Flooding	Drainage	Channel Migration	Flooding	Stormwater	Channel Migration
Peak Flow	*Magnitude*	■		■				■	■	■	■		■
	Timing	■	■						■				
	Duration												
Sediment	*Transport*	■		■				■		■	■		■
	Grain Size				■					■			■
	Timing												
Sea Level	*Elevation*				■	■	■	■	■		■	■	
	Timing				■	■	■	■	■		■		
Groundwater	*Elevation*	■		■	■			■	■		■	■	
	Salinity				■								
	Timing	■		■	■	■	■	■	■		■	■	

athway from Climate Change to Impacts Can be Complex



athway from Climate Change to Impacts Can be Complex

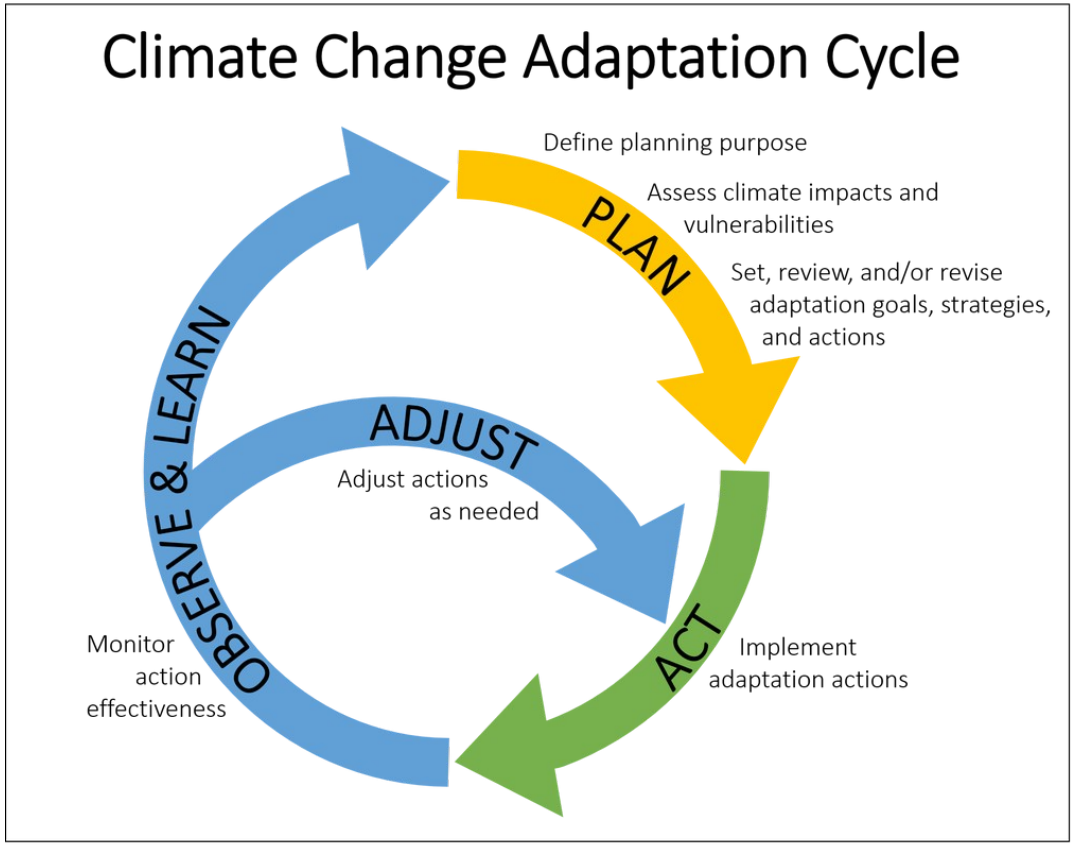


Planning for climate change is about risk management

Climate change is NOT the only stressor

… it only matters if it's bigger than other factors.

Planning for climate change is going to be iterative



So How Do I Assess Impacts?

Conservation Biology

Special Section

Choosing and Using Climate-Change Scenarios for Ecological-Impact Assessments and Conservation Decisions

AMY K. SNOVER,* ‡‡ NATHAN J. MANTUA,*† JEREMY S. LITTELL,*‡ MICHAEL A. ALEXANDER,§ MICHELLE M. MCCLURE,** AND JANET NYE††

*Climate Impacts Group, University of Washington, Box 355674, Seattle, WA 98195, U.S.A.
†National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center, 110 Shaffer Road, Santa Cruz, CA 95060, U.S.A.
‡Department of Interior Alaska Climate Science Center, U.S. Geological Survey, 4210 University Drive, Anchorage, AK 99508, U.S.A.
§NOAA, Earth System Research Laboratory, R/PSD1, 325 Broadway, Boulder, CO 80305-3328, U.S.A.
**National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Northwest Fisheries Science Center, 2725 Montlake Boulevard East, Seattle, WA 98112, U.S.A.
††School of Marine and Atmospheric Sciences, Stony Brook University, Stony Brook, NY 11794-5000, U.S.A.

Abstract: *Increased concern over climate change is demonstrated by the many efforts to assess climate effects and develop adaptation strategies. Scientists, resource managers, and decision makers are increasingly expected to use climate information, but they struggle with its uncertainty. With the current proliferation of climate simulations and downscaling methods, scientifically credible strategies for selecting a subset for analysis and decision making are needed. Drawing on a rich literature in climate science and impact assessment and on experience working with natural resource scientists and decision makers, we devised guidelines for choosing climate-change scenarios for ecological-impact assessment that recognize irreducible uncertainty in climate*

Snover et al., *Cons. Bio.*, 2013

Choosing & Using Scenarios

Information / Context	*Expertise*
1. Conceptual model: • Understanding of system • Sensitivity to climate	**Manager, Biologist, Engineer, etc.**
2. Climate science: • Climate effects on system • Able to simulate? • Spatial resolution • Time scales (variability v. trends)	**Climate scientist**
3. Decision context: • Robust v. most likely • Best vs. worst case • Time horizon	**Policymaker Risk Tolerance**

Snover et al., *Cons. Bio., 2013*

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So How Do I Assess Impacts?

1. Observations

We know a lot about the consequences of past events. We can often find out how much more likely these events will be by looking at off-the-shelf climate reports or datasets.

2. Modeling

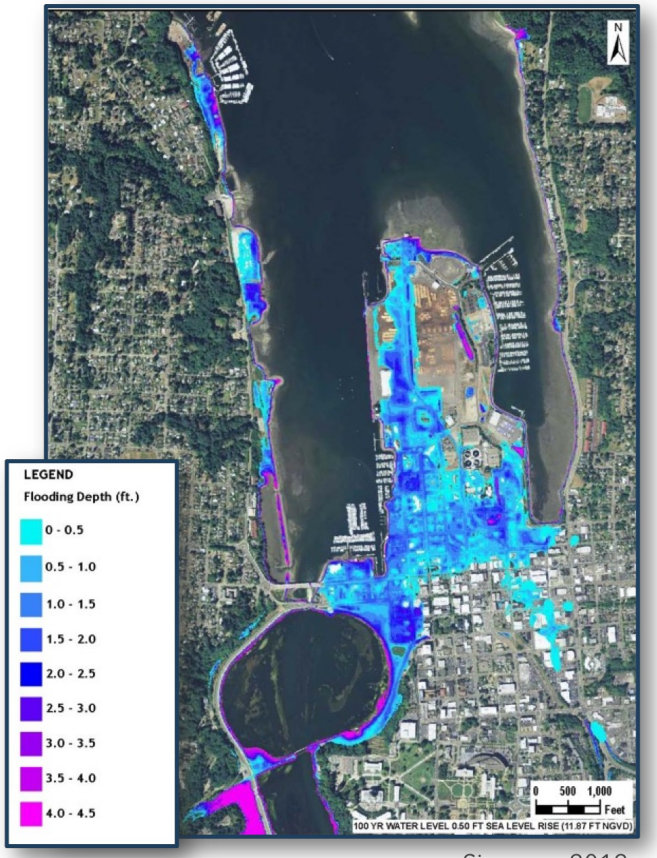
Some changes are beyond the realm of what we've seen in the past (e.g., loss of winter snowpack). Observations are also limited in where they are available; models offer 100% coverage.

Example: Using Observations

Coastal Flooding

With 24” of sea level rise in Olympia, ***the 100-year flood event would become an annual event***.

Snover et al., 2013, Mauger et al., 2015



Simpson 2012

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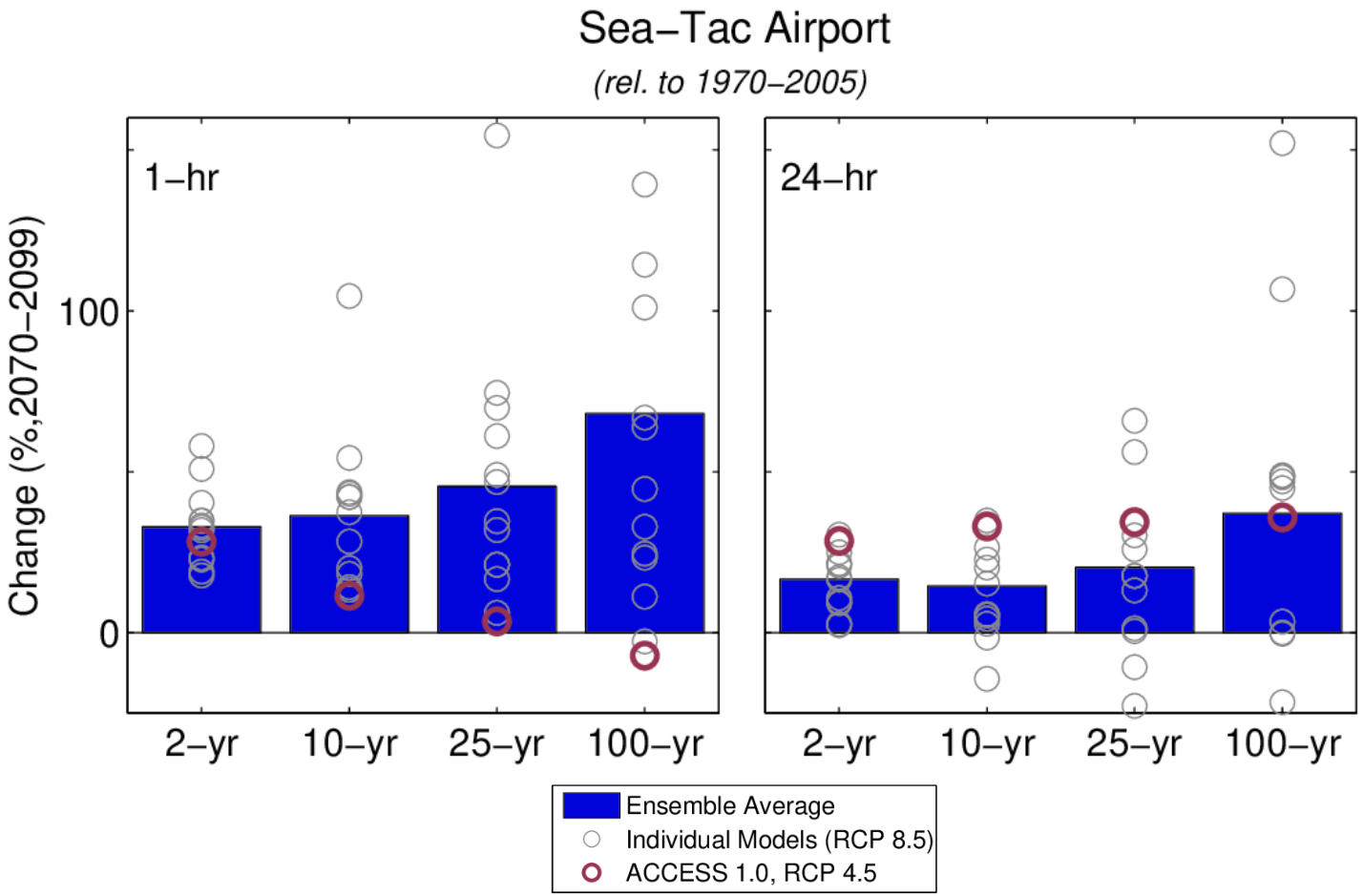
Example: Using Modeling

https://cig.uw.edu/our-work/applied-research/heavy-precip-and-stormwater/



Example: Using Modeling

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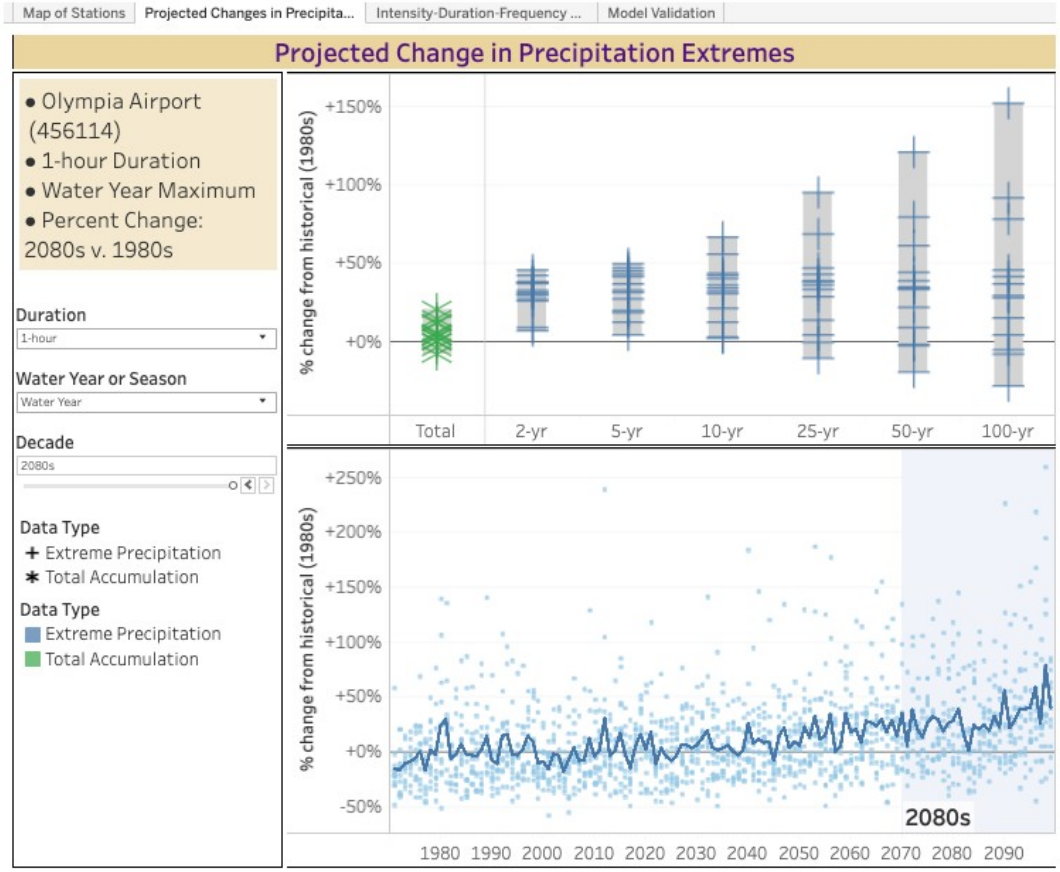
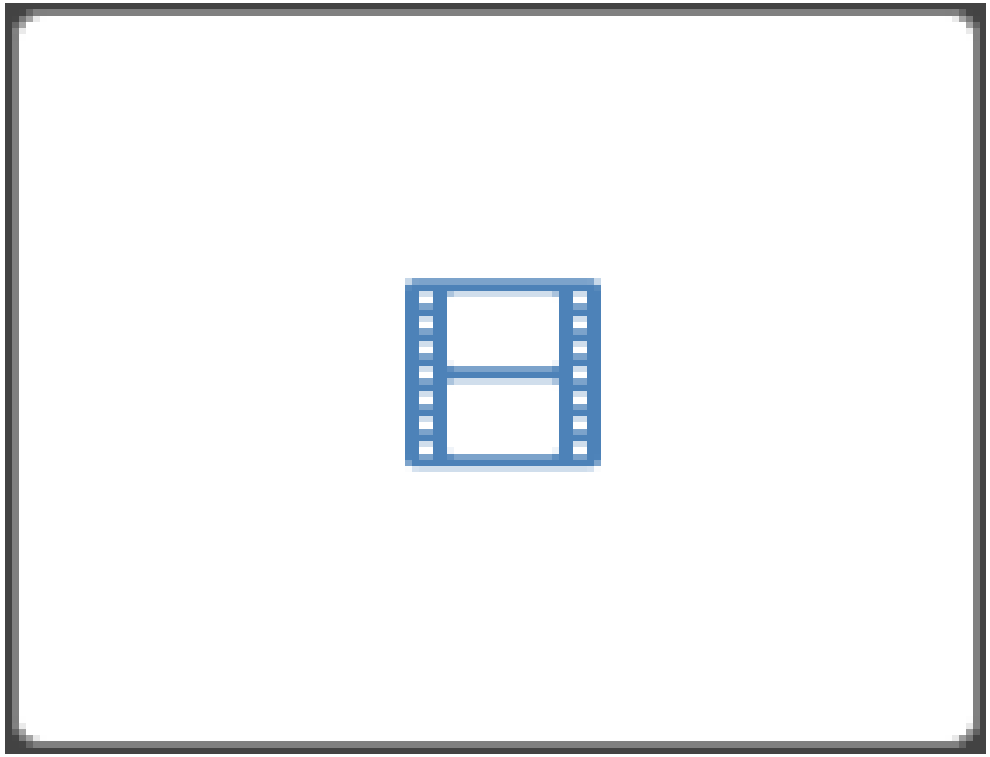


Example: Using Modeling



https://cig.uw.edu/our-work/decision-support/culvert-phase-2
/

Guillaume
Mauger
gmauger@uw.edu

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