



ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers

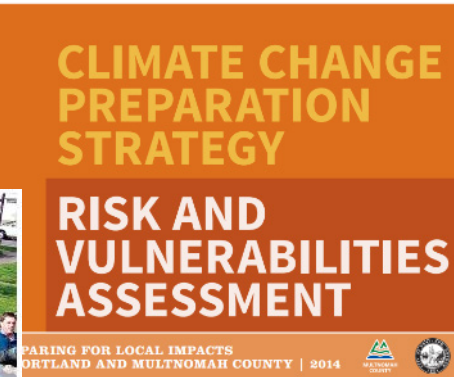
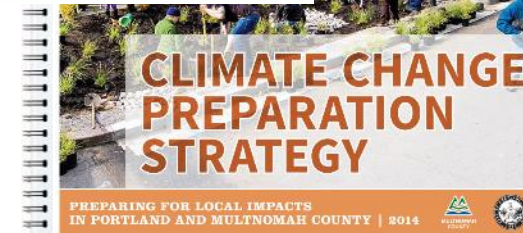
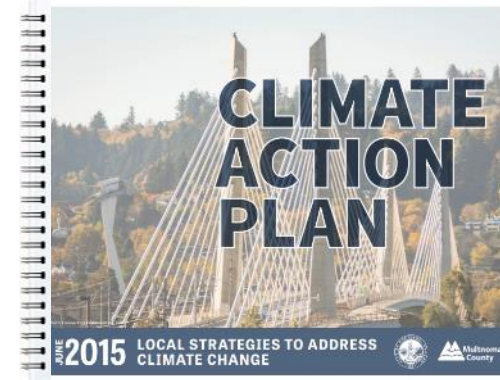


Climate Change Resiliency Planning For Water, Wastewater, and Stormwater in Portland, OR

Kavita Heyn, Portland Water Bureau

Nicholas McCullar P.E., Bureau of Environmental Services
AWWA Sustainable Water Management (3/27/2018)

City of Portland Climate Planning



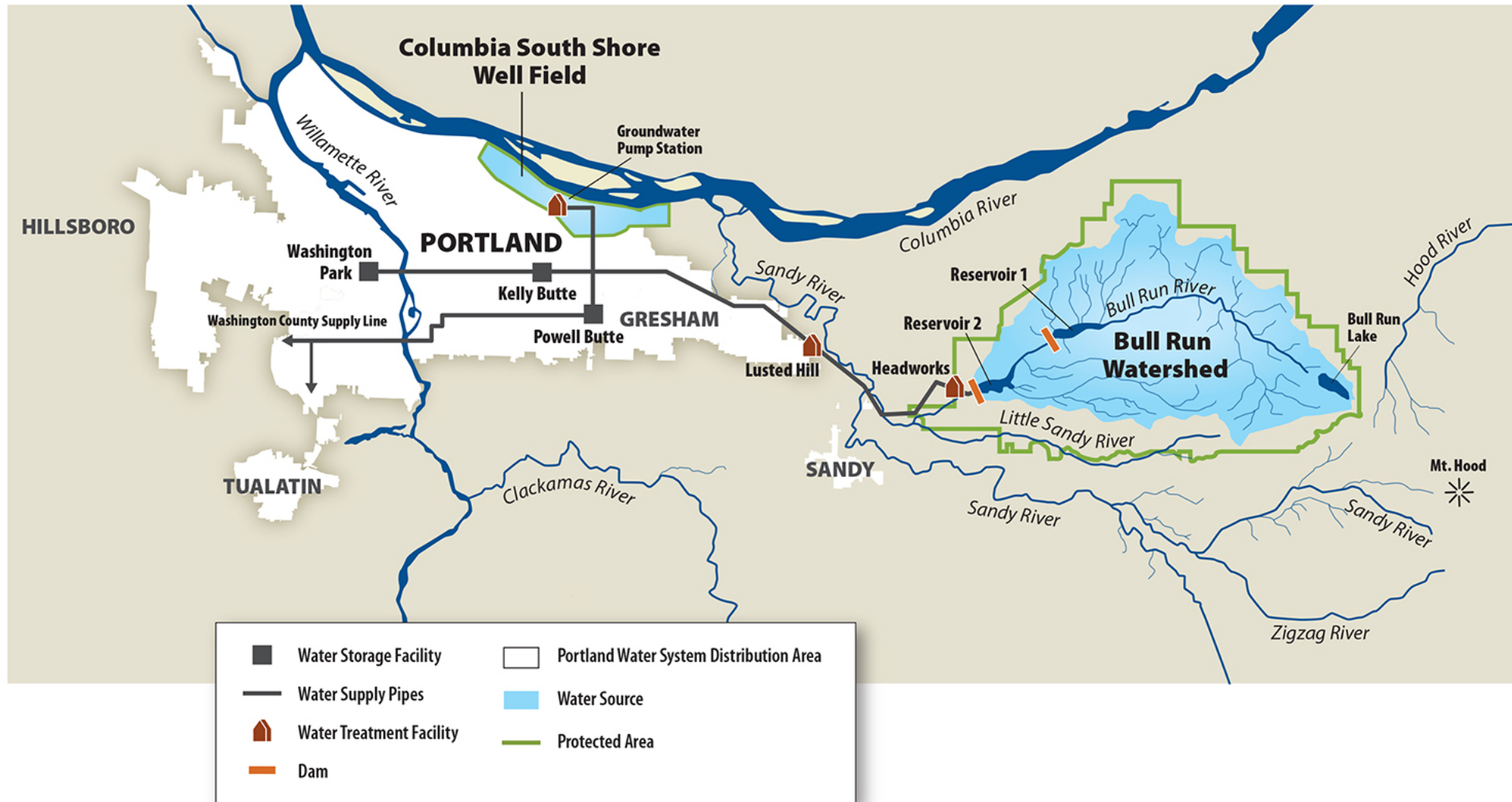
Portland's wastewater and stormwater system



<https://tunnelingonline.com/portland-east-side-cso-tunnel-achievement-award/#prettyPhoto/1/>



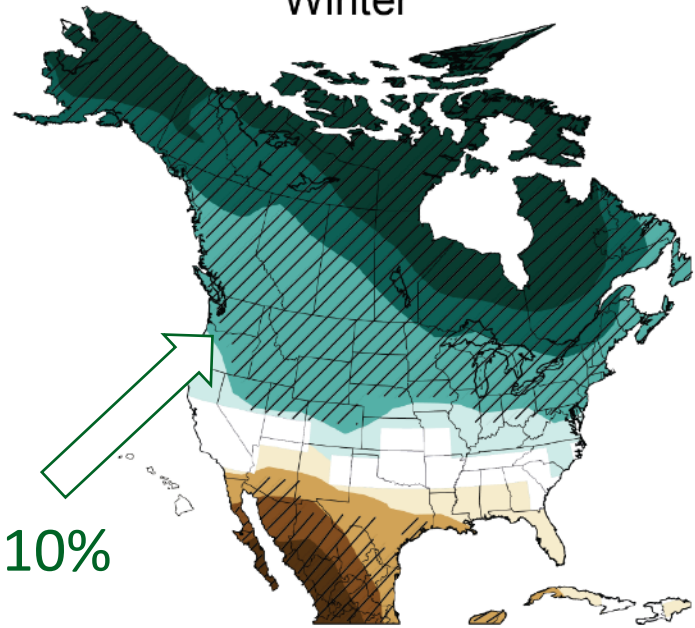
Portland's drinking water system



Key challenge is to plan for uncertainty

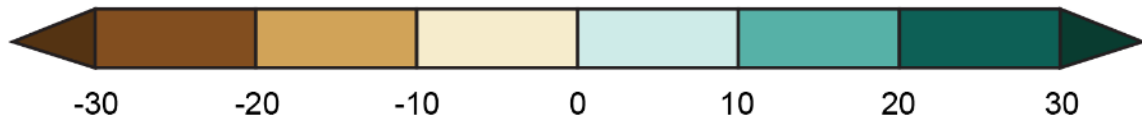
National Climate Assessment Higher Emissions – End of Century

Winter

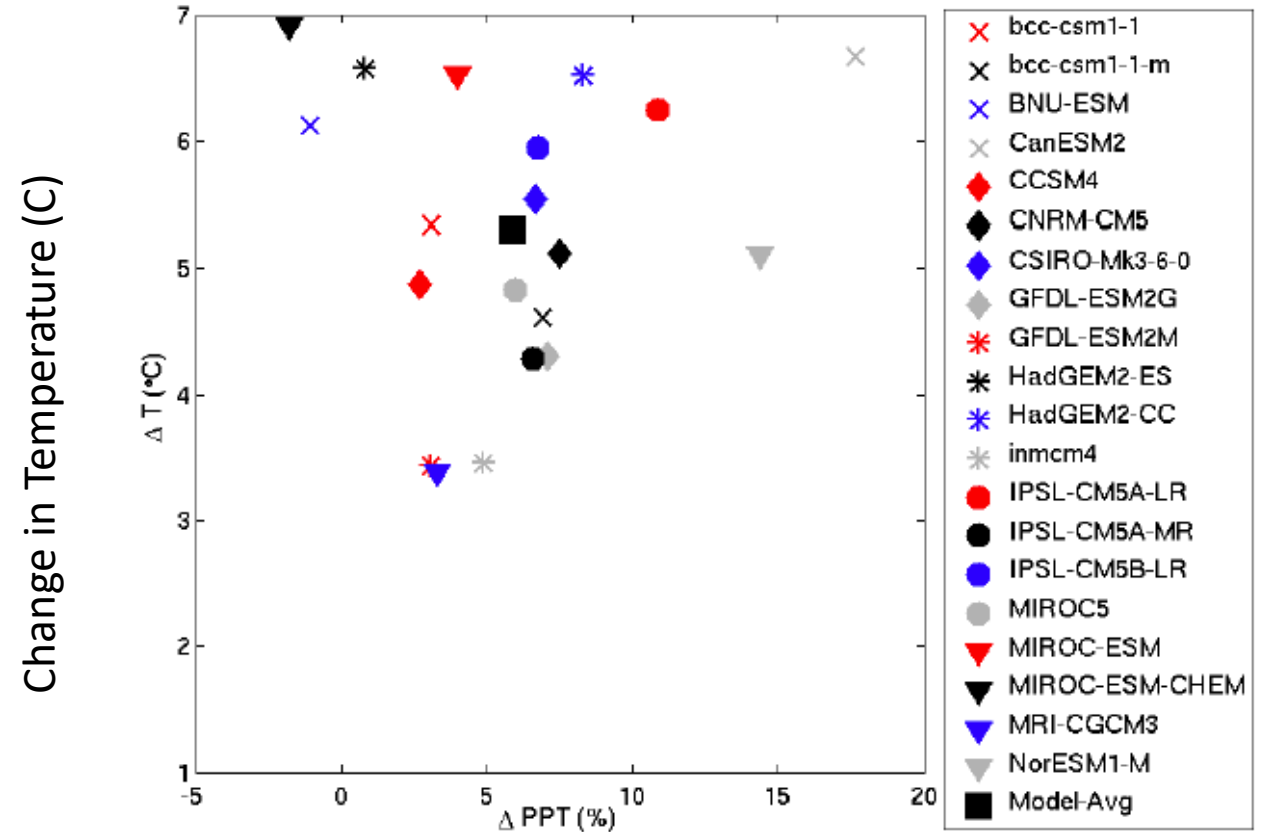


Rainfall +10%

Precipitation Change (%)



Δ Precipitation vs. Δ Temperature, 2071-2100, RCP85



Rupp et. al, 2013 "Evaluation of CMIP5 20th Century
Climate Simulations for the Pacific Northwest USA"



Lessons Learned

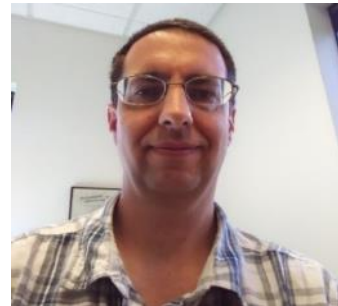
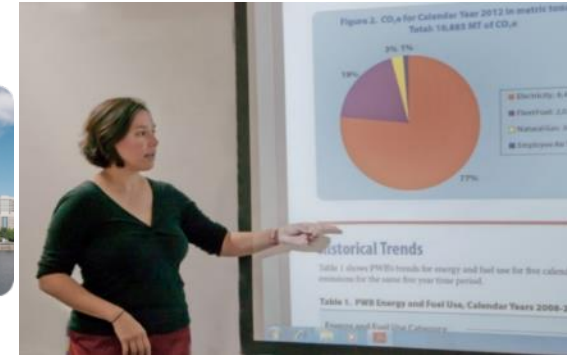
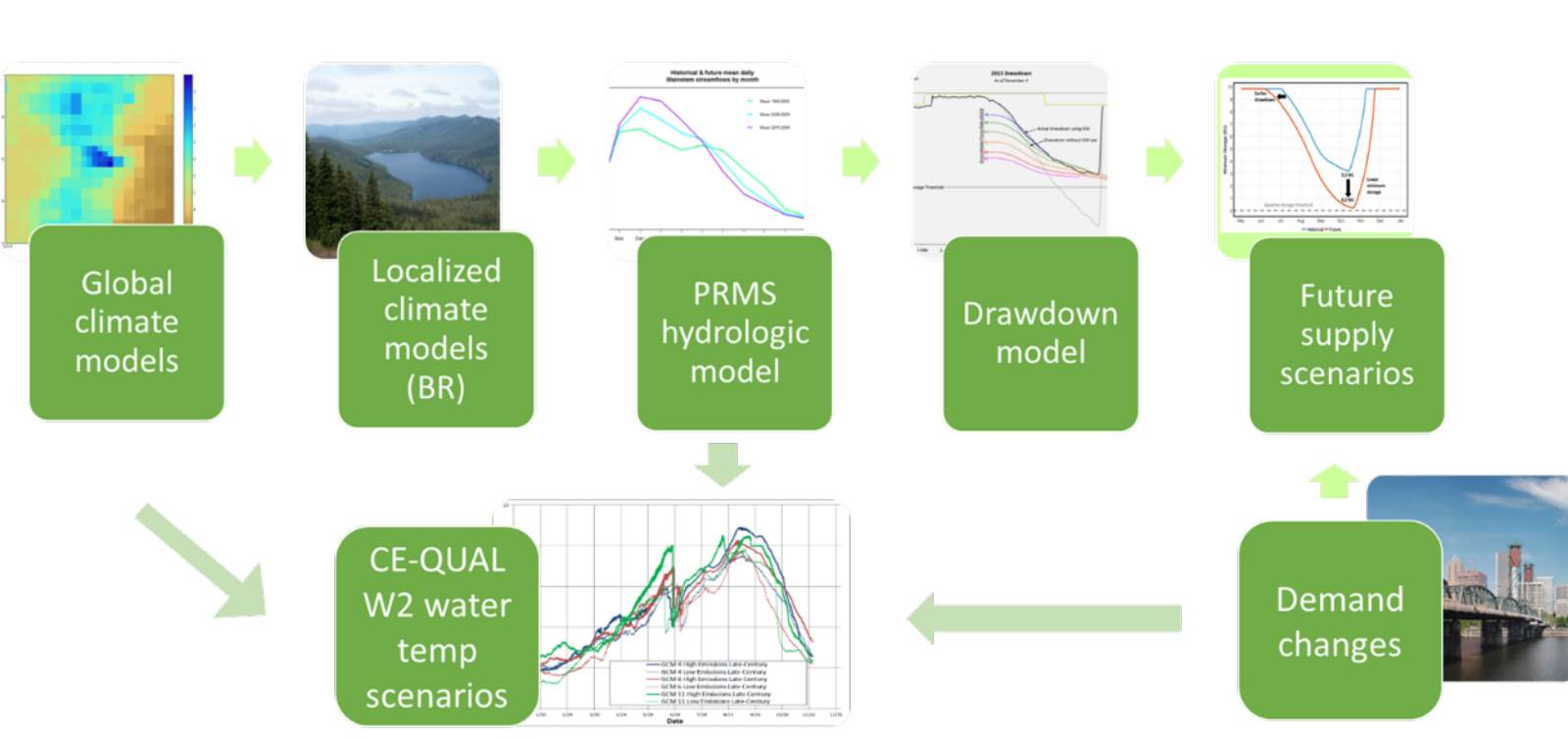
1. Build capacity
2. Know your system
3. Co-produce actionable science
4. Learn from others
5. Tell (science-based) stories



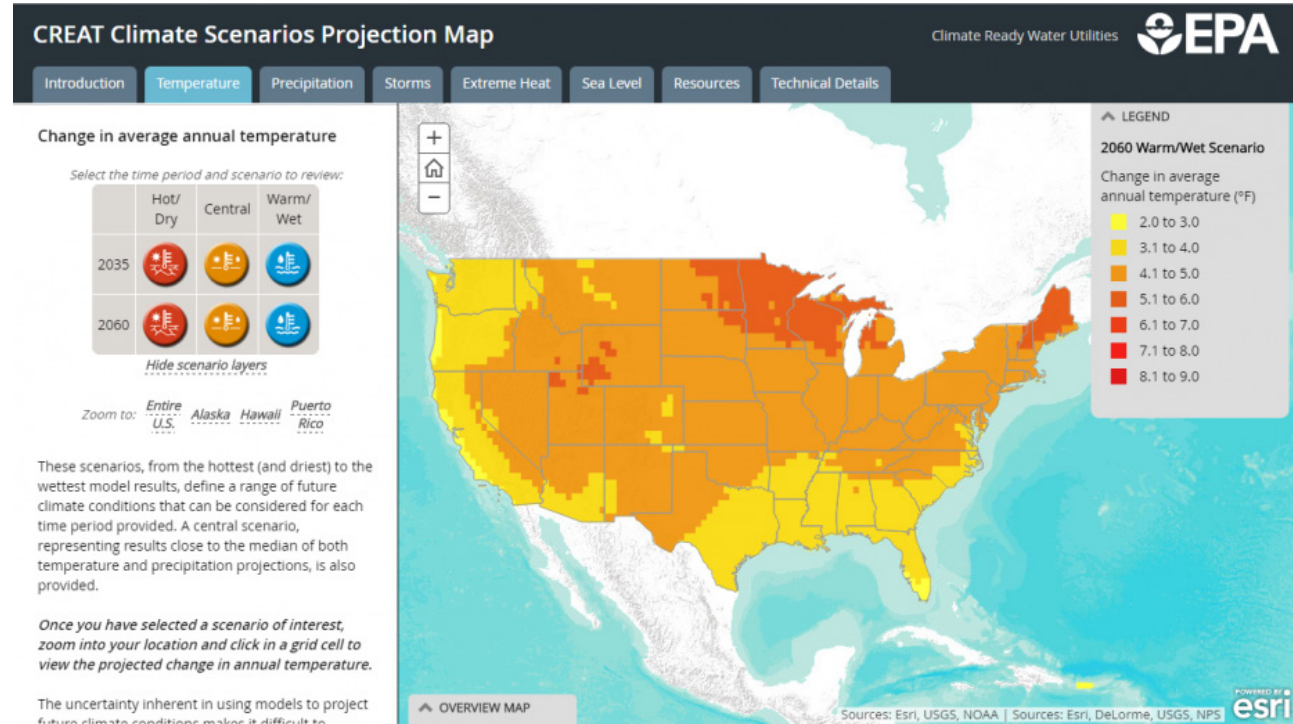
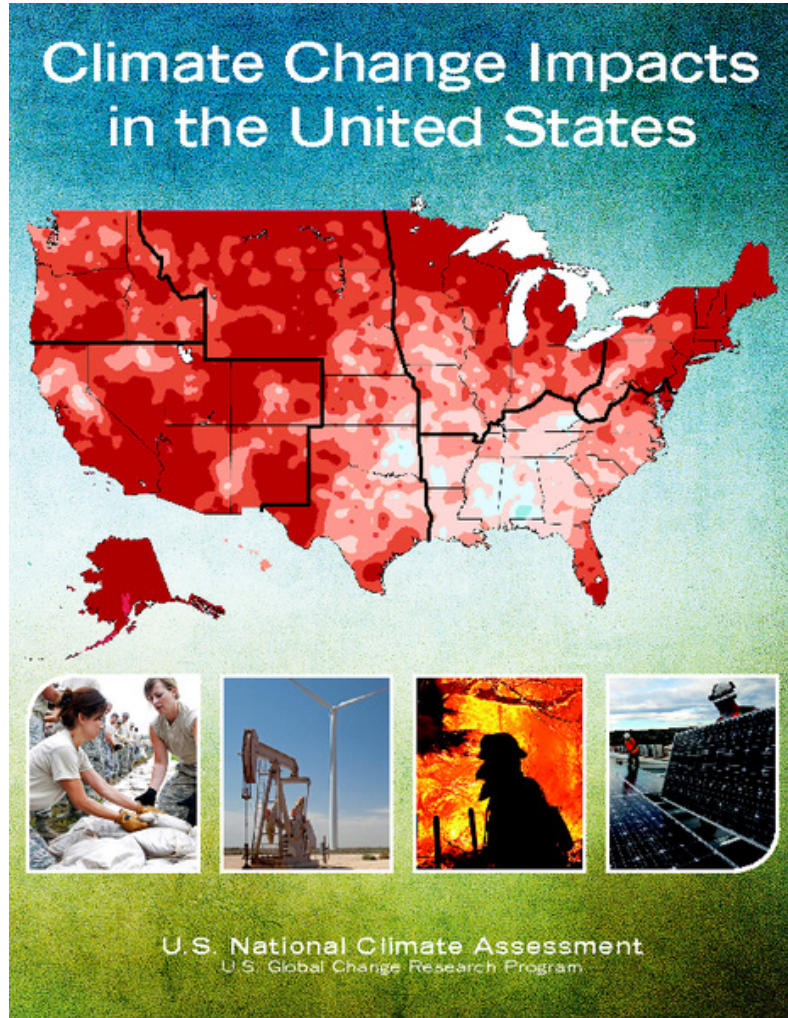
Lessons Learned: Water Supply



Lesson Learned 1: Build capacity



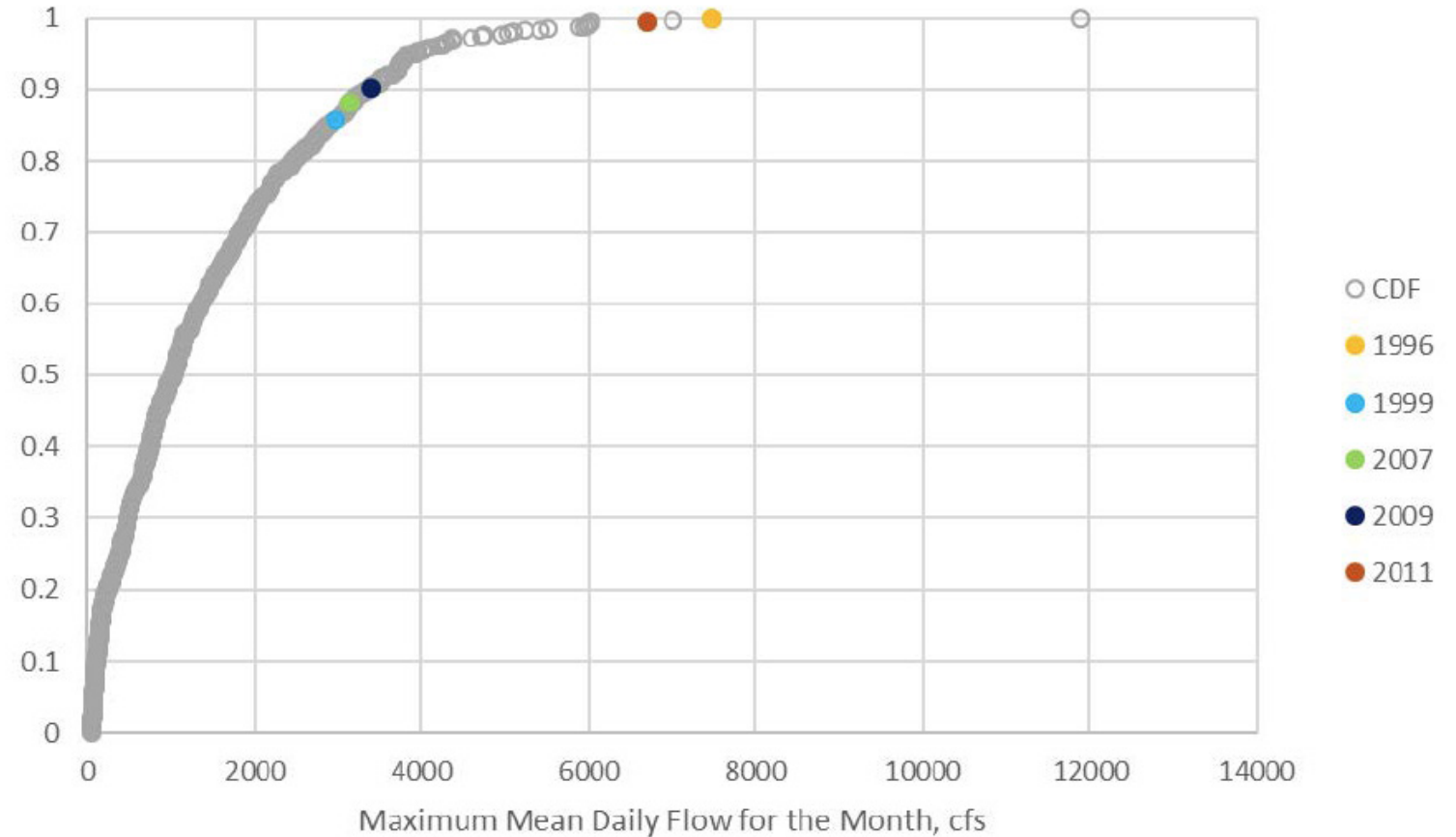
Lesson Learned 1: Build capacity



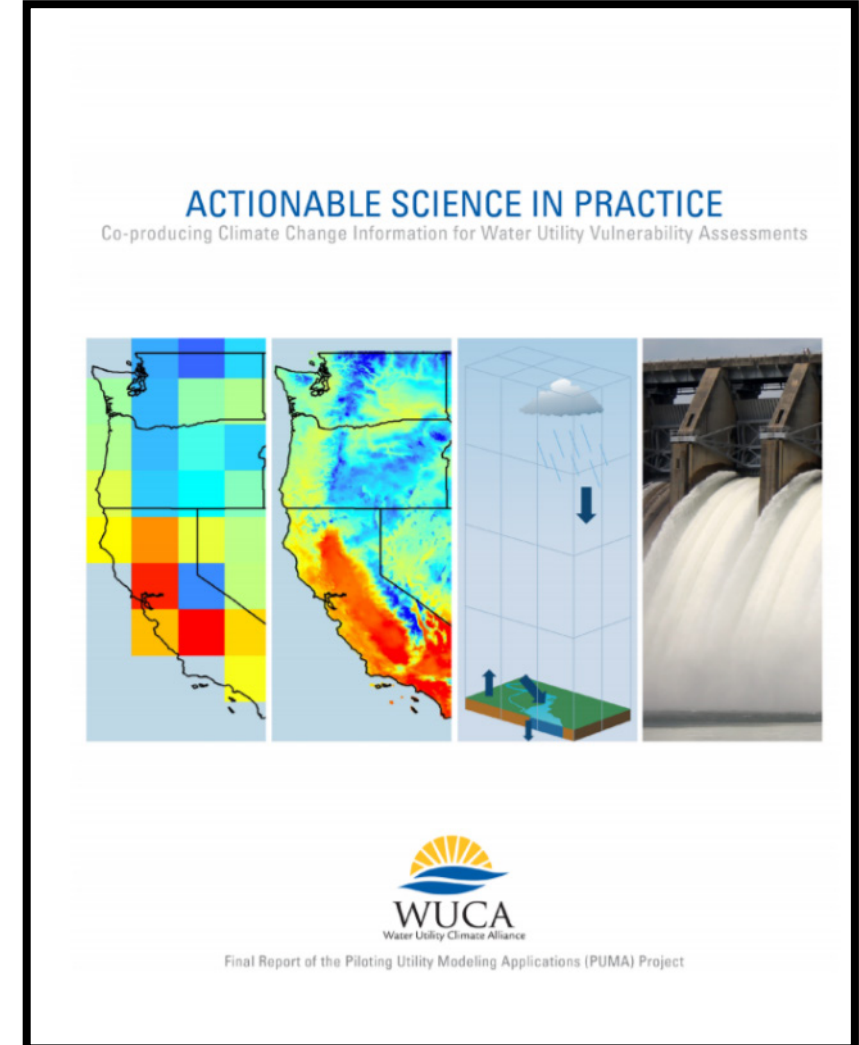
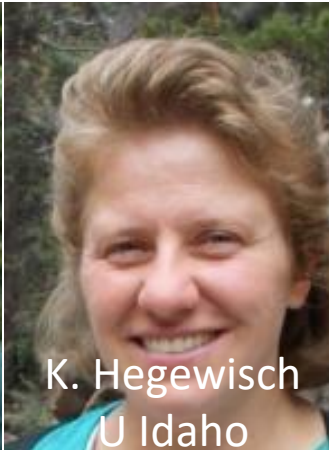
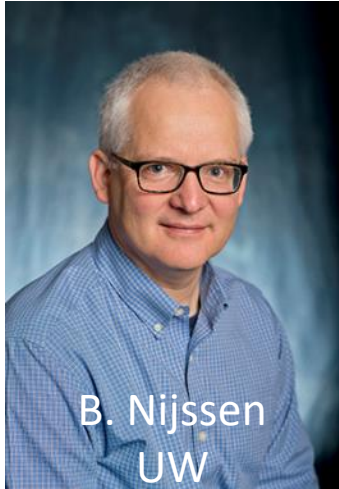
Lesson Learned 2: Know your system



Figure 1b. Maximum monthly mean daily flow on the Mainstem Bull Run as a distribution frequency.



Lesson Learned 3: Co-produce actionable science



Lesson Learned 4: Learn from others



City of Portland & Portland State University

Lesson Learned 5: Tell (science-based) stories



Oregon snowpack remains low despite February snow, report says

Updated Mar 7; Posted Mar 7



Julie Koeberle, a hydrologist with the U.S. Department of Agriculture's Natural Resources Conservation Service, and Dan Fries, hydrologic technician, measure the natural snowpack at a survey station at the Timberline Lodge on Dec. 29, 2015. (Tony Hernandez/File)

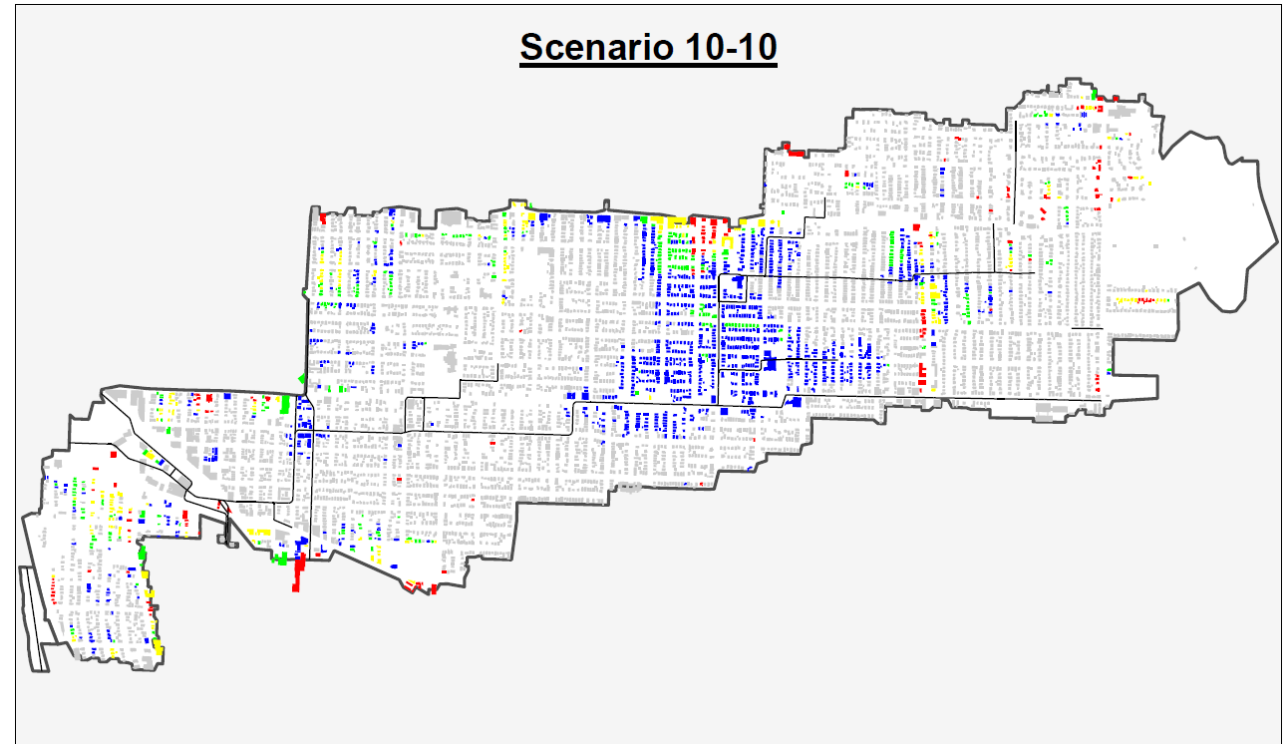
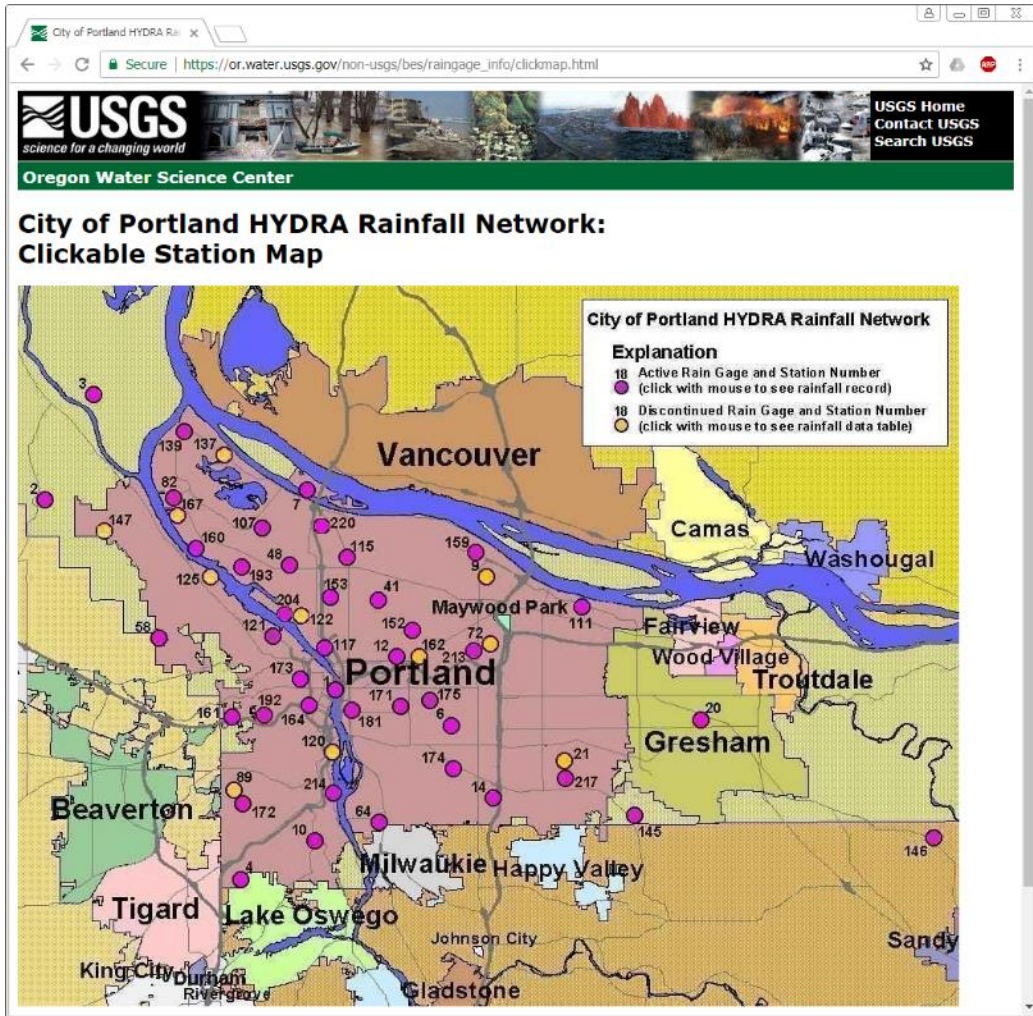
The Oregonian, March 7, 2015 (oregonlive.com)



Lessons Learned: Wastewater & Stormwater

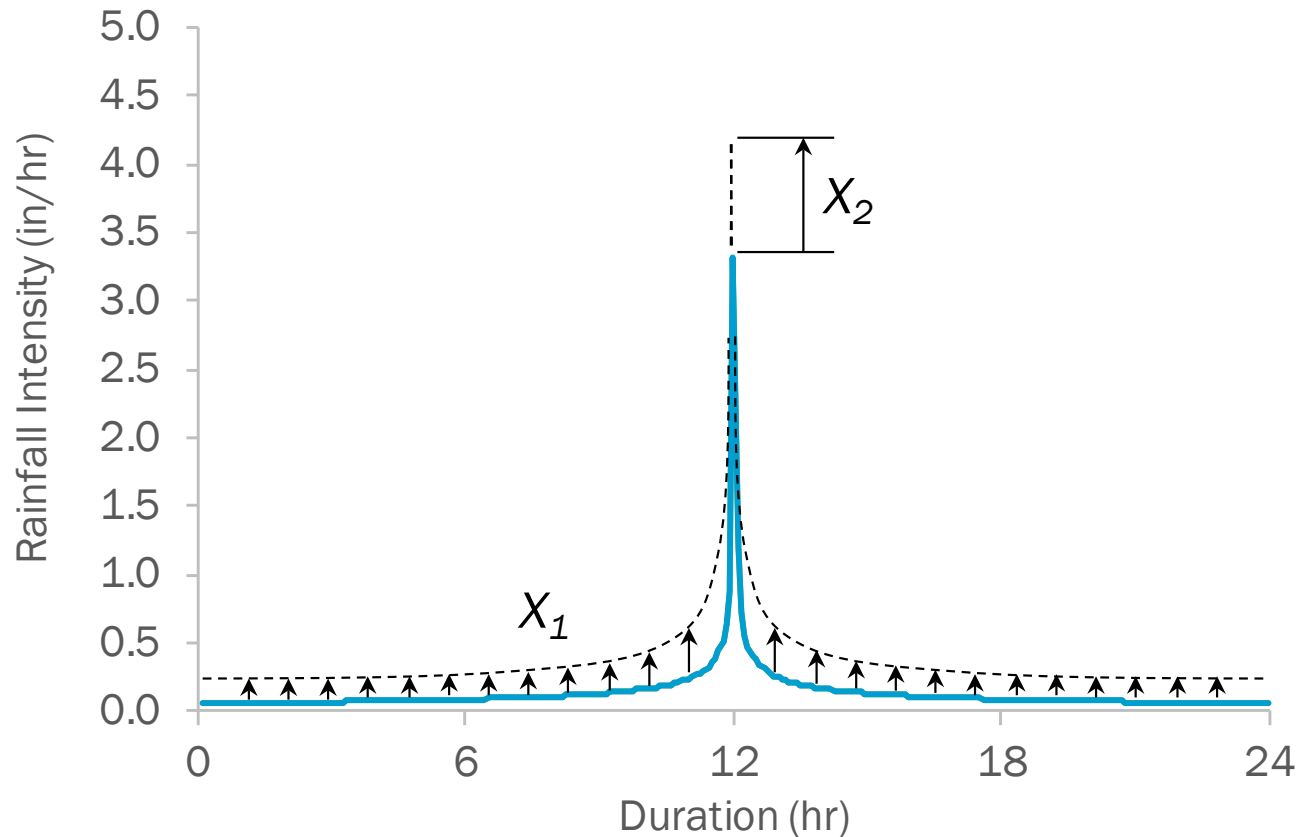


Lesson Learned 1: Build capacity



Lesson Learned 2: Know Your System

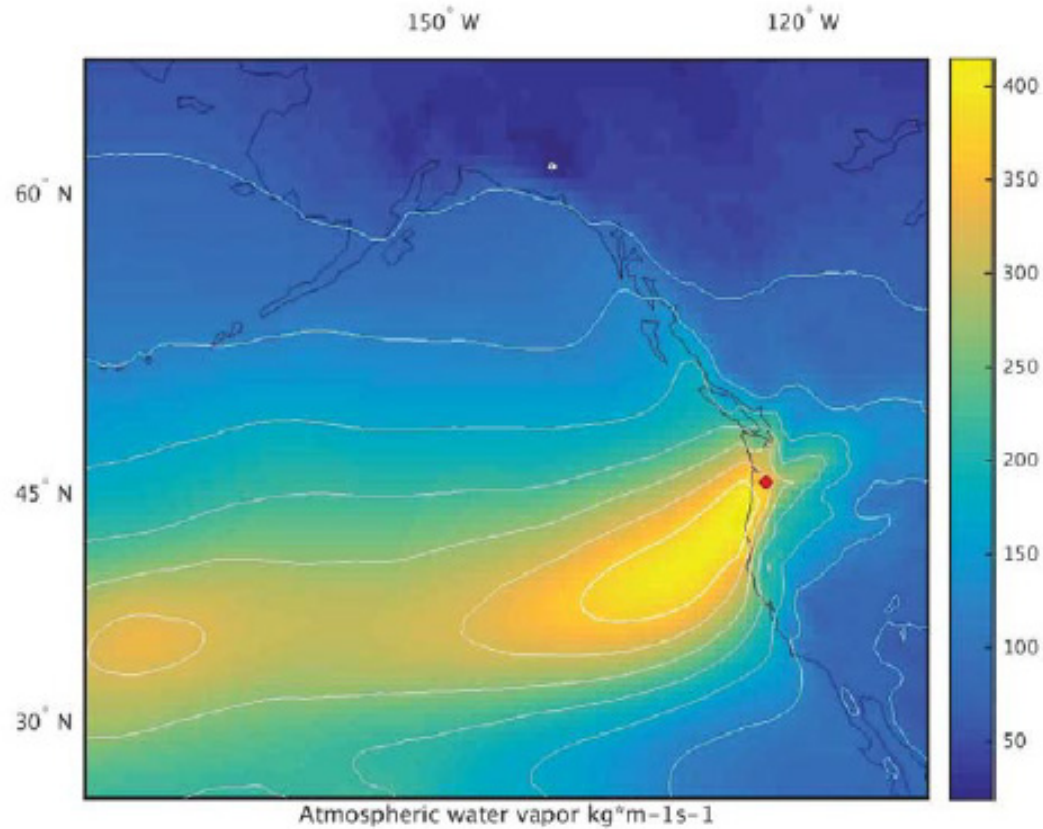
- Test out a range of intensities/volumes



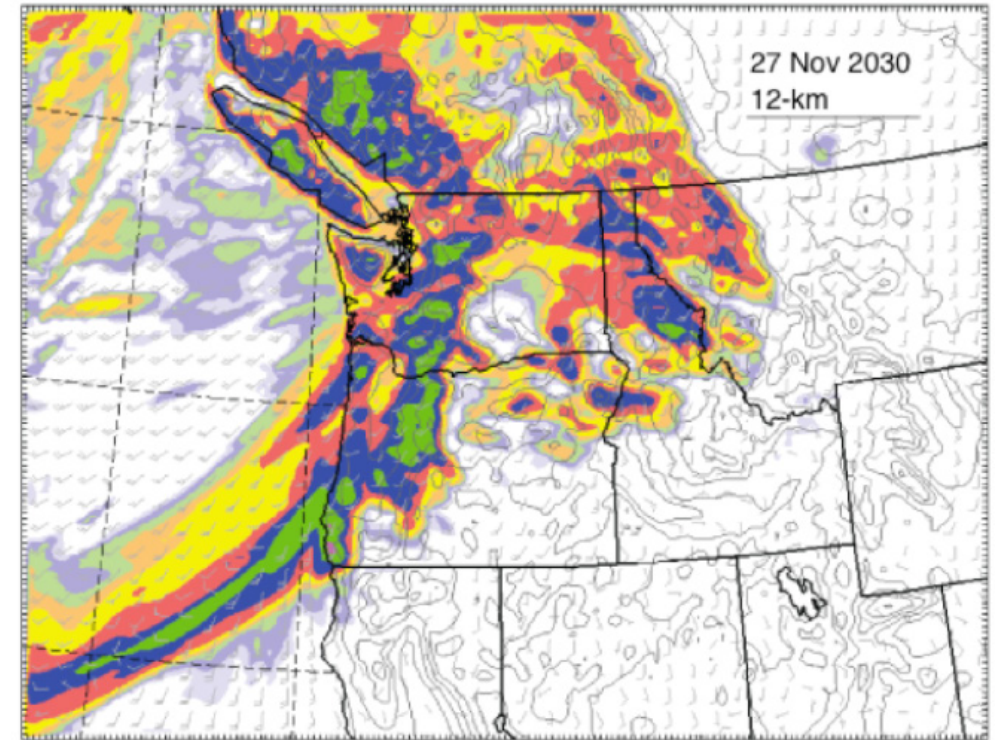
		Basement Backup Risk Increase					
Intensity Increases	50%	272%	292%	300%	325%	345%	362%
	40%	198%	216%	231%	246%	265%	286%
	30%	133%	151%	162%	175%	193%	198%
	20%	79%	91%	100%	116%	128%	137%
	10%	37%	43%	49%	59%	71%	90%
	0%	0%	0%	7%	14%	23%	34%
		0%	10%	20%	30%	40%	50%
Volume Increases							



Lessons Learned 3: Co-produce actionable science



Loikith, Aragon 2017



Eric Salathé



Institute for
Sustainable Solutions
PORTLAND STATE UNIVERSITY



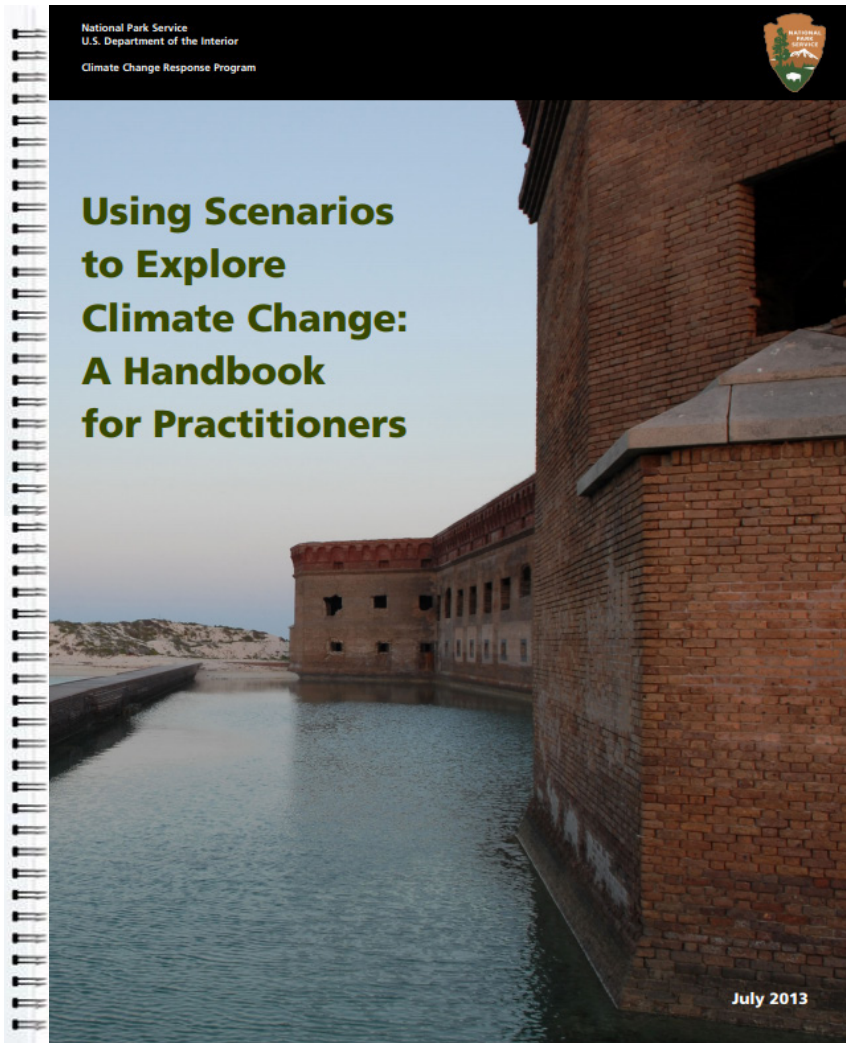
Lesson Learned 4: Learn from others



“Bizarro” by Dan Piraro <http://bizarro.com/2014/10/25/guru-saucy-dvd-crash/>



Lesson Learned 5: Tell (science-based) stories

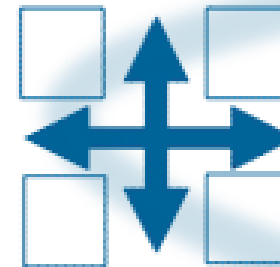


<https://www.nps.gov/subjects/climatechange/upload/CCScenariosHandbookJuly2013.pdf>

Identify
Driving
Forces



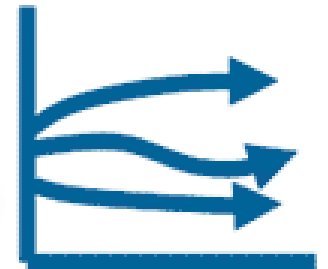
Develop
Plausible
Scenarios



Identify
Critical
Uncertainties



Discuss
Implications
& Paths



Thank you!

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2. Know your system
3. Co-produce actionable science
4. Learn from others
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