



**THURSTON
CLIMATE
ADAPTATION
PLAN**

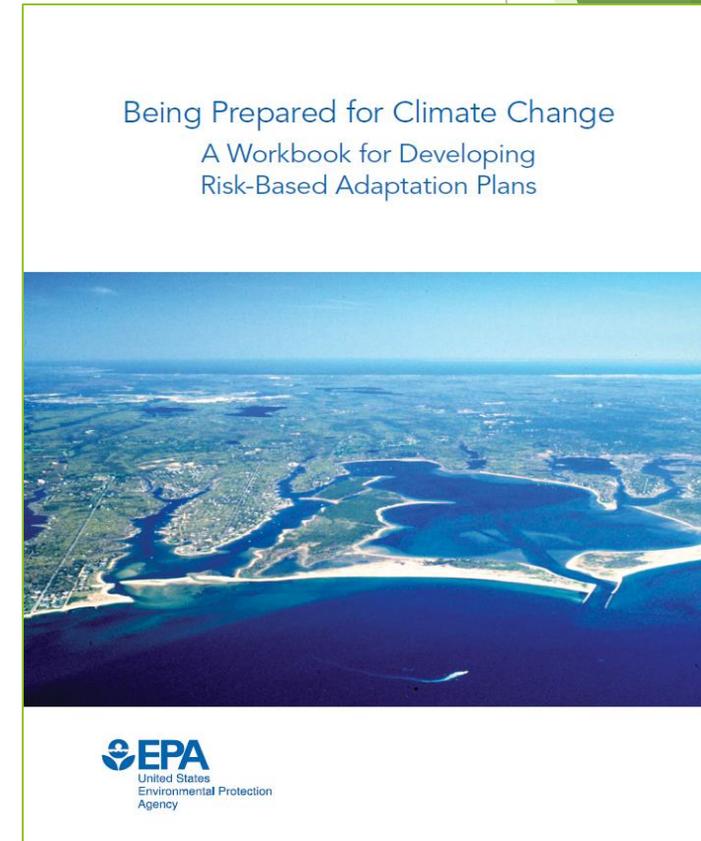
Presentation: Evaluating Strategies

Jan. 26, 2017



Risk Assessment Recap

- ▶ **Overview:** Use EPA tool for watershed-scale adaptation planning
- ▶ **Steps 1-2:** Define project area, gather stakeholders and establish goals [*July-September 2016*]
- ▶ **Step 3:** Identify how climate opportunities and risks affect goals [*October 2016*]
- ▶ **Step 4:** Assess risks (*probability, consequence, extent, time horizon*) [*November 2016*]
- ▶ **Step 5:** Compare risks (*put in probability/consequence table*) [*December 2016*]
- ▶ **Step 6:** Evaluate strategies (*e.g., take action or accept risk*) and potential actions and partners [*January 2017*]
- ▶ **Step 7:** Refine and prioritize adaptation strategies and actions [*February-May 2017*]





Identifying Risk

- ▶ **Method:** Identified risks & opportunities associated with climate stressors that affect our ability to achieve regional goals.

- ▶ **12** Sustainable Thurston priority goals

- ▶ **8** stressor categories identified by EPA and project team

Legend		Risk Identification Table											
		STRESSORS											
Added	Cut	Opportunity (+)	Low Risk (-)	Medium Risk (-)	High Risk (-)	Warmer Summer	Warmer Winter	Warmer Water	Increasing Drought	Intensifying Precipitation	Sea-Level Rise	Ocean Acidification	Population Change
						(+) Increases demand for compact, energy-efficient "green" buildings that conserve resources	(+) Increases number of walkers/bikers in winter		(-) Stresses sensitive urban landscaping, which could leave them vulnerable to extreme heat, pests or pathogens [Sec. 5.2, pg. 70]		(+) Increases frequency, depth and duration of inundation of low coastal areas, which could displace coastal residents [Sec. 4.1, pg. 54] (Cut ... Redundant with Goal 6 risk)		(+) Increases demand for compact, walkable neighborhoods [Sec. 6.5, pg. 89]
						(-) Causes urban heat islands, which could affect livability/health in heavily developed centers and corridors [Sec. 2.1, pg. 17]	(-) Increases range and survival of pests and diseases that kill vegetation (urban landscaping) [Sec. 5.1, pg. 68]		(-) Makes it harder to balance competing demands for water (water available to support new urban development) [Sec. 3.4, pg. 53]		(-) Increases frequency, depth and duration of inundation of low coastal areas (e.g., downtown Olympia), which could damage or disrupt use infrastructure and result in loss of cultural resources (e.g., homes, roads, etc.) [Sec. 4.1, pg. 54]		
						(-) Decreases climatic suitability of areas that currently support Garry oak and prairie habitat [Sec. 5.2, pgs. 70-71]	(-) Supports survival of invasive species (plants, insects) that could threaten native flora and fauna [Secs. 5.1 and 5.2, pgs. 67-71]	(-) Expands range for invasive aquatic species [Sec. 3.1, pg. 38]	(-) Raises the risk of wildfires, which could damage forests and other sensitive lands that provide habitat [Sec. 5.2, pg. 73]	(-) Increases frequency and intensity of heaviest 24-hour rain events and overall volume of winter streamflow, which could scour streambeds and degrade sensitive riparian areas [Sec. 3.1, pg. 32]	(+) Increases the rate of erosion of unprotected coastal bluffs, which contributes sand and gravel that allows for down-drift shores to become higher and move landward, thereby maintaining the beach profile [Sec. 4.1, pg. 63]		(-) Increases pressure to develop rural areas, which could reduce, fragment and degrade them [Sec. 6.5, pg. 89]



Analyzing Risk

- ▶ **Method:** Assessed each risk's:
 - ▶ Likelihood (*high, medium or low*)
 - ▶ Consequence (*high, medium or low*)
 - ▶ Spatial extent
 - ▶ Time horizon

- ▶ **Small-group exercise:**
 - ▶ Cut 9 risks but added 3 new ones
 - ▶ Made clarifying text edits
 - ▶ Changed “Increasing Storminess” stressor to “Intensifying Precipitation”

Risk Analysis Table

Goal 1: Create vibrant centers, corridors, and neighborhoods while accommodating growth.

High Consequence Risks

	Likelihood	Stressor	Spatial Extent	Horizon	Confidence
3 Increases frequency, depth and duration of inundation of low coastal areas (e.g., downtown Olympia), which could damage or disrupt use infrastructure and result in loss of cultural resources (e.g., homes, roads, etc.)	High	Sea-level Rise	Place	0-10 years	High

Medium Consequence Risks

	Likelihood	Stressor	Spatial Extent	Horizon	Confidence
6 Increases range and survival of pests and diseases that kill vegetation	High	Warmer Winter	Place	More than 30 years	High
1 Makes it harder to balance competing demands for water (water available to support new urban development)	Low	Increasing Drought	Place	0-10 years	Low

Low Consequence Risks

	Likelihood	Stressor	Spatial Extent	Horizon	Confidence
4 Causes urban heat islands, which could affect livability/health in heavily developed centers and corridors	Medium	Warmer Summer	Place	More than 30 years	Medium
5 Stresses sensitive urban landscaping, which could leave them vulnerable to extreme heat, pests or pathogens	Medium	Increasing Drought	Place	0-10 years	Medium

Evaluating Risk

- ▶ Put the net **126** risks into a Consequence/Likelihood Matrix
 - ▶ **53** risks fall in the upper-right third (**RED**)
 - ▶ These are of *most* consequence and likelihood
 - ▶ **41** risks fall in the middle third (**YELLOW**)
 - ▶ These are generally of *lesser* consequence or likelihood
 - ▶ **32** risks fall in the lower-left third (**GREEN**)
 - ▶ These are of *least* consequence and likelihood

Consequence/Likelihood Matrix				
Likelihood	High	38, 39, 40, 41, 42, 93, 98, 108, 109, 122, 123,	6, 11, 14, 20, 21, 29, 30, 31, 32, 43, 61, 63, 78, 79, 82, 90, 92, 137, 138,	3, 7, 8, 10, 12, 13, 22, 24, 25, 26, 27, 28, 52, 54, 55, 58, 59, 62, 75, 76, 81, 83, 101, 102, 103, 104, 114,
	Medium	4, 5, 45, 46, 47, 66, 68, 94, 95, 96, 97, 111, 112, 124, 125, 126,	9, 15, 16, 17, 18, 19, 23, 33, 35, 36, 37, 64, 69, 80, 84, 86, 88, 89, 91, 105, 106, 107, 121, 132, 133, 139	56, 57, 77, 85, 87, 115, 120,
	Low	51, 67, 71, 72, 74, 99, 110, 113, 118, 119, 129, 135, 136,	1, 50, 65,	60, 116, 117, 131,
#s correspond with Risk Analysis Table		Low	Medium	High
Consequence				

Selecting Strategies

- ▶ Project team selected a draft strategy for each risk and needs your input
 - ▶ **Take Action:** Lower the consequence and/or likelihood of the risk
 - ▶ Includes continuing effective actions, recommending new actions, or assisting responsible partners (transfer to state)
 - ▶ All red risks, as well as yellow risks with near-term impacts (0-10 years), are good candidates for this strategy
 - ▶ **Accept:** Run the risk - accept that consequences may occur and monitor
 - ▶ All green risks, as well as yellow risks that are decades off, are good candidates for this strategy





Next Steps

- ▶ **Today:** Review/Revise draft strategy for the 53 Red risks - those of highest consequence & likelihood.
- ▶ **February:** Continue evaluating strategies (*if necessary*) and actions (2/23 SAC meeting)
- ▶ **March:** Continue evaluating actions, leads and partners (3/23 SAC meeting)
- ▶ **April:** Elicit public input at forum (date TBD); revise and prioritize strategy/action packages (4/27 SAC meeting)
- ▶ **May:** Select 2-3 strategy/action packages for Benefit-Cost Analysis (Earth Economics will evaluate the benefits and costs of protecting or losing assets that provide ecosystem services)

Goal 1: Create vibrant centers, corridors, and neighborhoods while accommodating growth.

3 Increases frequency, depth and duration of inundation of low coastal areas (e.g., downtown Olympia), which could damage or disrupt use infrastructure and result in loss of cultural resources (e.g., homes, roads, etc.)

Stressor: Sea-level Rise Horizon: 0-10 years

Extent: Place Strategy: Take Action

6 Increases range and survival of pests and diseases that kill vegetation

Stressor: Warmer Winter Horizon: More than 30 years

Extent: Place Strategy: Accept

Goal 2: Preserve environmentally sensitive lands, farmlands, forest lands, prairies, and rural lands and develop compact urban areas.

7 Increases frequency and intensity of heaviest 24-hour rain events and overall volume of winter streamflow, which could degrade sensitive riparian areas

Stressor: Intensifying Precipitation Horizon: 0-10 years

Extent: Extensive Strategy: Take Action

8 Degrades critical habitat (lakes, rivers and streams) due to changes in water volume and temperature

Stressor: Increasing Drought Horizon: 0-10 years

Extent: Extensive Strategy: Take Action

10 Stresses sensitive plants and habitat, which could reduce long-term viability of preserved and restored areas

Stressor: Increasing Drought Horizon: 0-10 years

Extent: Extensive Strategy: Accept

11 Degrades critical habitat (rivers and streams) due to greater winter runoff

Stressor: Warmer Winter Horizon: 0-10 years

Extent: Place Strategy: Take Action

12 Increases frequency, depth and duration of inundation of low-lying coastal areas, which could turn marshes, estuaries and other upland areas into mudflats (dams limit sedimentation at Nisqually Delta)

Stressor: Sea-level Rise Horizon: 0-10 years

Extent: Place Strategy: Take Action

13 Stresses sensitive plants and habitat, which could leave them vulnerable to extreme heat, pests or pathogens

Stressor: Warmer Summer Horizon: 0-10 years

Extent: Extensive Strategy: Accept