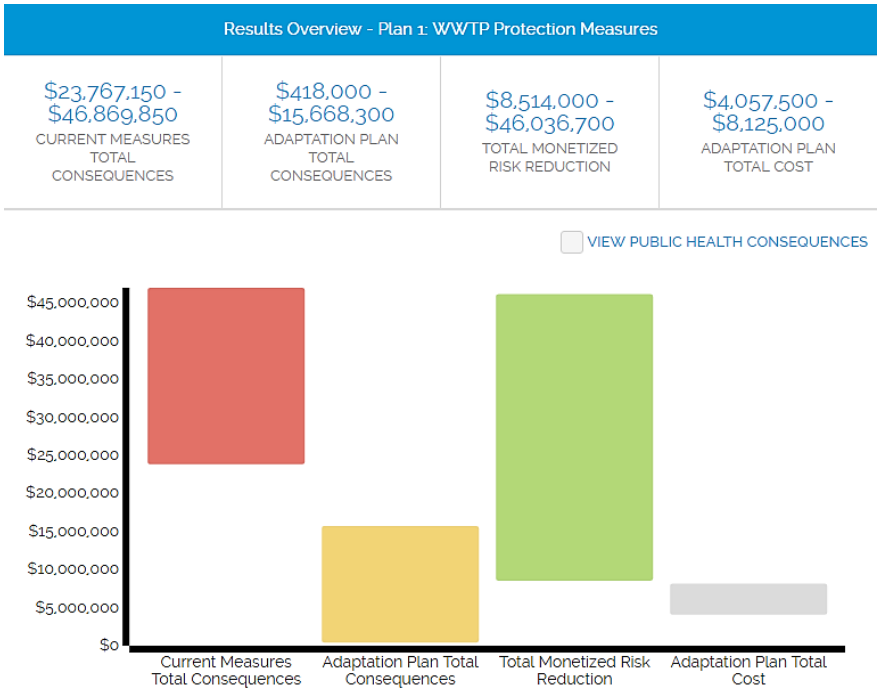
United States
Environmental Protection
Agency

EPA's CREAT: Decision Support Example

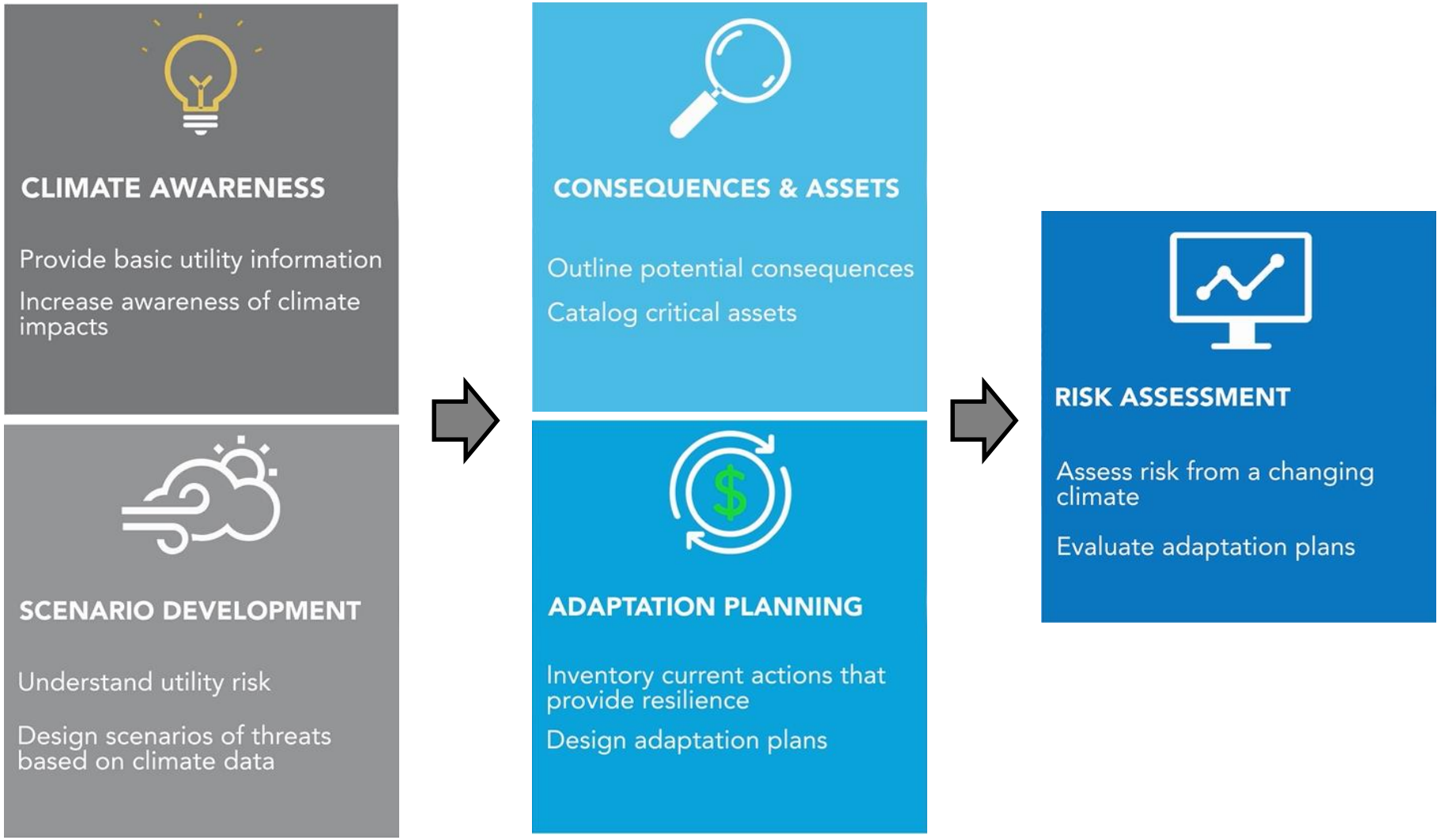
EPA's Creating Resilient Water Utilities (CRWU)

The CREAT Process

- **Web-based tool** for assessing risk of potential impacts
- **Module-based process** with clearly defined goals and reports
- Multiple scenarios provided to help **capture uncertainty**
- **Assessment of current resilience** will help inform adaptation planning
- Results help utilities compare **risk reduction** and **implementation costs**



Tool Resource - CREAT 3.0 Modules



Economic Consequences

LEVELS	Utility Business Impacts
VERY HIGH	Long-term or significant loss of expected revenue or operating income
	$1,590,000+
HIGH	Seasonal or episodic compromise of expected revenue or operating income
	$1,062,000 - $1,590,000
MEDIUM	Minor and short-term reductions in expected revenue
	$531,000 - $1,062,000
LOW	Minimal potential for loss of revenue or operating income
	$0 - $531,000

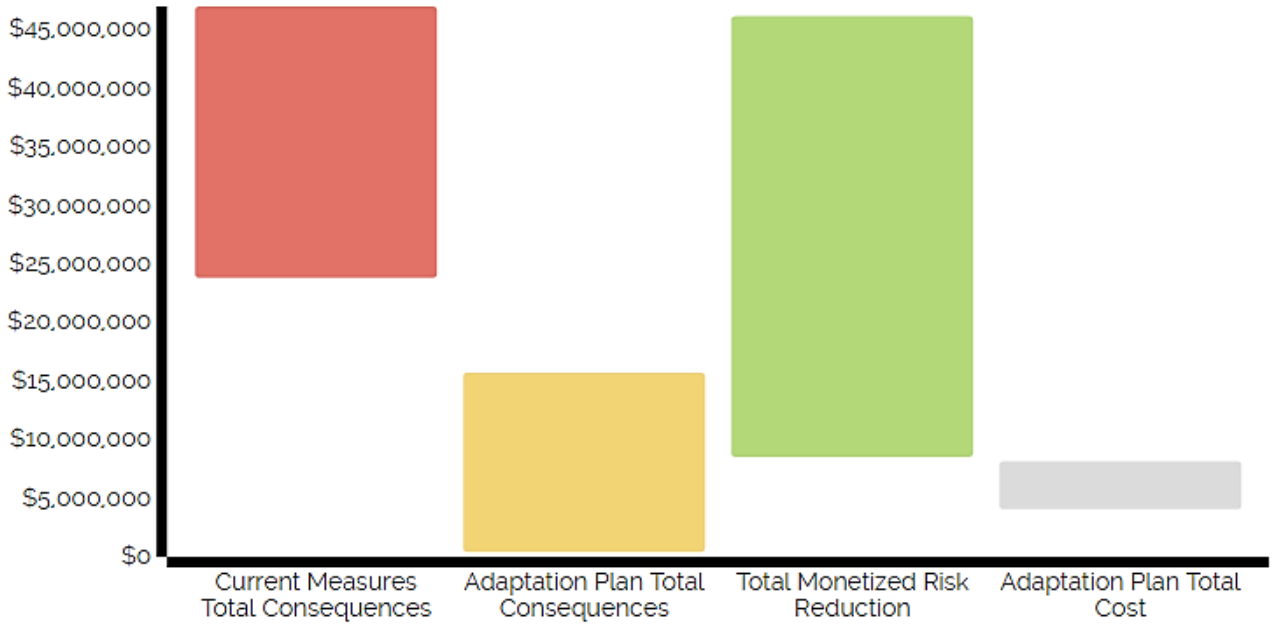
- Ranges of values are provided for each category based on utility information
- Basis for default values are published sector survey data
- Values can be modified, additional categories can be considered

CREAT Outputs: Risk Results

Results Overview - Plan 1: WWTP Protection Measures

$23,767,150 - $46,869,850	$418,000 - $15,668,300	$8,514,000 - $46,036,700	$4,057,500 - $8,125,000
CURRENT MEASURES TOTAL CONSEQUENCES	ADAPTATION PLAN TOTAL CONSEQUENCES	TOTAL MONETIZED RISK REDUCTION	ADAPTATION PLAN TOTAL COST

☐ VIEW PUBLIC HEALTH CONSEQUENCES



Consider Other Economic Factors/Impacts

Contribute your risk assessment results to the Adaptation Case Study and Information Exchange Map to share your lessons learned with others. The map provides an opportunity for utilities to learn about climate change adaptation planning efforts from their peers across the United States.

Add Custom Impact

PLAN REPORT	PLAN NAME	TOTAL COST	ENERGY IMPACTS	SOCIO-ECONOMIC IMPACTS	COMMUNITY PUBLIC HEALTH IMPACT	UTILITY BUSINESS IMPACTS	SOURCE/RECEIVING WATER IMPACTS
Download	Collection Priority	$25,000 - $100,000	Low	Neutral	Beneficial/Ene	Neutral	Beneficial/Enei
Download	System Protection	$275,000 - $1,100,000	Low	Medium	Beneficial/Ene	Beneficial/Ei	Beneficial/Enei

Note: CREAT generates a plan report you can view and download after you complete at least one critical asset/threat pair assessment for each adaptation plan. If you are viewing this report on a tablet, it will display best using the Microsoft Word App.

Back | Export Data | Complete Analysis File

Example Case Studies – Los Angeles Sanitation

- Based on past experience, LA Sanitation has already taken action to protect their assets from power outages and storm surge flooding.
- Their current focus is additional short-term measures for strengthening physical and operational resilience to future flooding, coupled with rising sea level and landslides.

TYPE	RESILIENCE STRATEGIES
Existing Measures	Fill backup generator fuel storage tank in anticipation of flooding
	Establish interconnections or other partnership opportunities, such as the Water/Wastewater Agency Response Network, to share resources with neighboring water utilities
	Perform an energy audit to identify energy-saving opportunities and implement recommendations to extend the life of backup power supply
Short-Term Measures	Store on-site documents in water-tight containers
	Conduct half-day tabletop exercises to practice implementing shutdown procedures, providing backup power, restoring normal operations, and performing post-event assessments
	Identify storage locations outside of flood zones for utility equipment to prevent damage from flood waters or debris
	Have an alternative access plan in case of blockages; consult with other entities to consider alternate transportation options during and immediately after an event
	Provide local emergency management agency and power company with facility locations to expedite electricity restoration during an outage
	Establish an agreement with fuel supplier and provide estimates of fuel needs (e.g., volume and frequency) in the event of a power outage and secure a list of alternative fuel suppliers
	Maintain communication with local emergency management agencies for priority in getting and transporting fuel supplies
Long-Term Measures	Install waterproof protection for building entry points
	Caulk or seal wall and floor penetrations
	Replace vulnerable electrical, instrumentation, control and mechanical components with submersible alternatives
	Construct a perimeter wall around the facility for flood protection
	Procure a portable generator and wire the facility accordingly. Ensure that "quick connect" capability is installed and ready, and that staff are trained
	Install unions in the conduit system to reduce the time required to repair damages

Example Case Studies – City of Anacortes (WA)

- City concerned with flooding at treatment plant and lower source water quality associated high sediment loads.
- Response: city built a new facility on the same site that incorporates flood-resistant and sediment-tolerant resilience measures.

TYPE	RESILIENCE STRATEGIES
Current Measures	Elevate critical assets and electrical equipment above the 100-year flood elevation level
	Utilize water-tight construction on the facility and waterproof membrane below 40-foot elevation
	Ensure minimal penetrations exist below 100-year flood elevation level
	Raise and strengthen ring dikes surrounding the plant
	Standby power generation system with the capacity to operate the plant for several days in the event of utility power interruption
	Maintain treatment effectiveness for sediment removal to deal with projected increase in sediment loads
Other Strategies	Quantify the projected increase in sediment load
	Perform additional modeling and analysis of saltwater intrusion potential
	Conduct additional research to model, evaluate, and respond to long-term challenges associated with projected increases in sediment loads

United States Environmental Protection Agency

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Visit us on the web and register for the CRWU newsletter at: www.epa.gov/crwu