



# Crisfield Climate Risk & Adaptation Assessment

with U.S. EPA's Creating Resilient Water Utilities initiative

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# Creating Resilient Water Utilities (CRWU)

- Voluntary initiative in the U.S. EPA Office of Water, Water Infrastructure and Cyber Resilience Division
- Provides utilities with the practical tools, training, and technical assistance needed to increase resilience to climate change
- Promotes a clear understanding of climate science data and potential long-term adaptation options
- Collaborates with utilities and partners to increase our reach and improve our tools

From Left to Right: Griggs Reservoir on Scioto River in OH; Water Replenishment District in Southern CA; Water Sanitation Area in Cincinnati, OH; Water Treatment Plant in San Diego, CA



# CRWU Tools & Resources

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## Climate Data & Maps

- [Climate Scenarios](#) projections
- [Storm Surge](#) data
- [Streamflow](#) projections
- [Snowpack](#) projections
- [Wildfire Trends](#) data
- [Adaptation Case Studies](#) Map
- [Environmental Justice in Utility Climate Adaptation](#) StoryMap

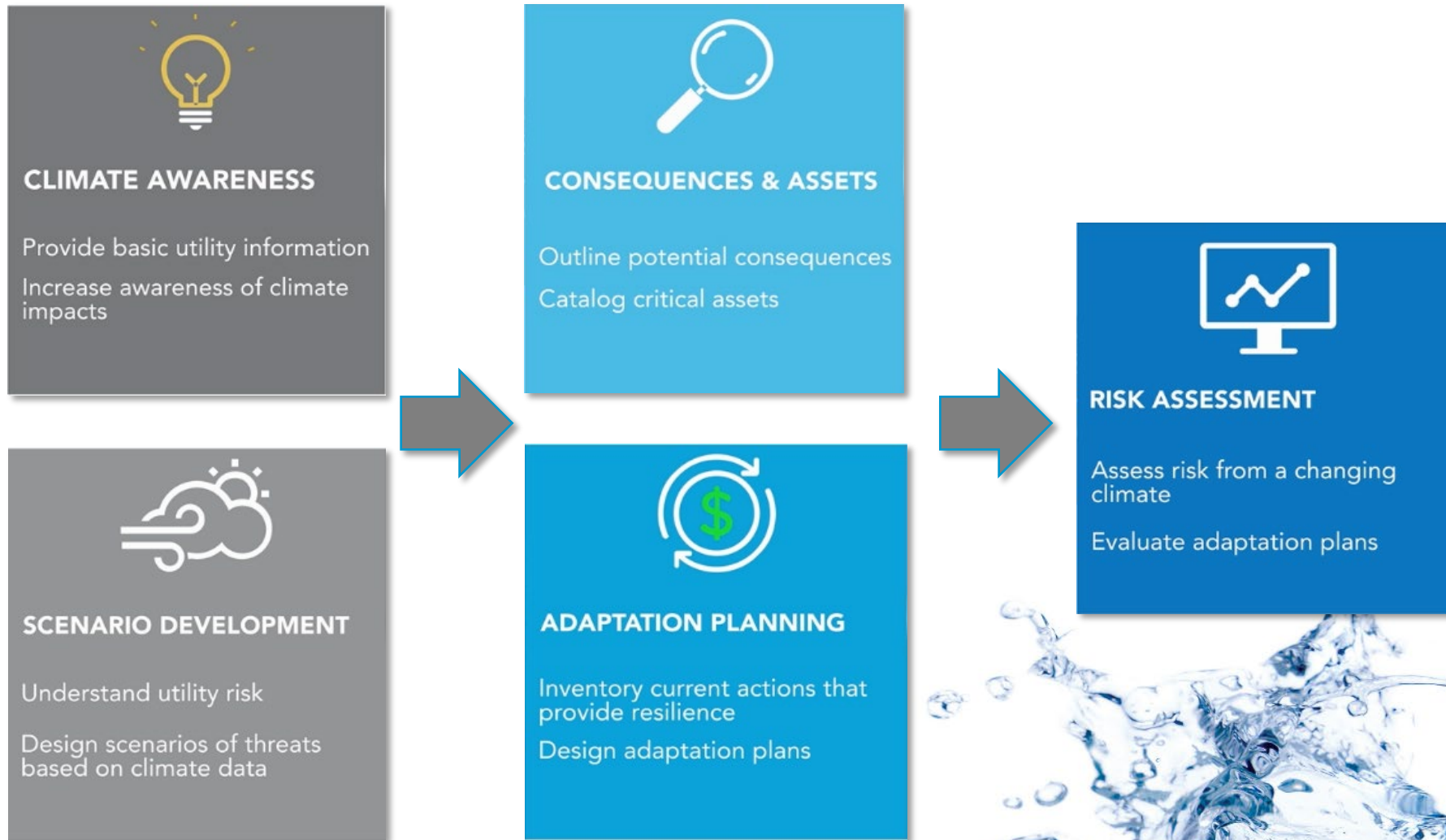
## [Resilient Strategies Guide](#) (RSG)

- Introduction to adaptation and funding options
- Suited for smaller utilities starting to address climate change

## [Climate Resilience Evaluation & Awareness Tool](#) (CREAT)

- Comprehensive climate change risk assessment tool for any water utility
- Provides climate data for scenario planning and helps utilities compare costs and benefits of adaptations

# CREAT Framework



# Technical Assistance with Crisfield

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- Climate risk assessment using CREAT, including virtual discussions & site visits
- Prioritized climate challenges, reviewed adaptation options, and evaluated potential benefits
- Scope of assessment narrowed so city could replicate experience for additional adaptation planning in future



# Crisfield Flood Concerns

## Climate concerns:

- Flooding, sea level rise, and stormwater drainage issues in the city's ditch system
- Focus on South Somerset Ave & Woodson School Rd

## Impacts:

- Clogged ditches, standing water, slow drainage after floods
- People stranded by flooded roads, home and business flooding, schools closed, delayed medical treatment

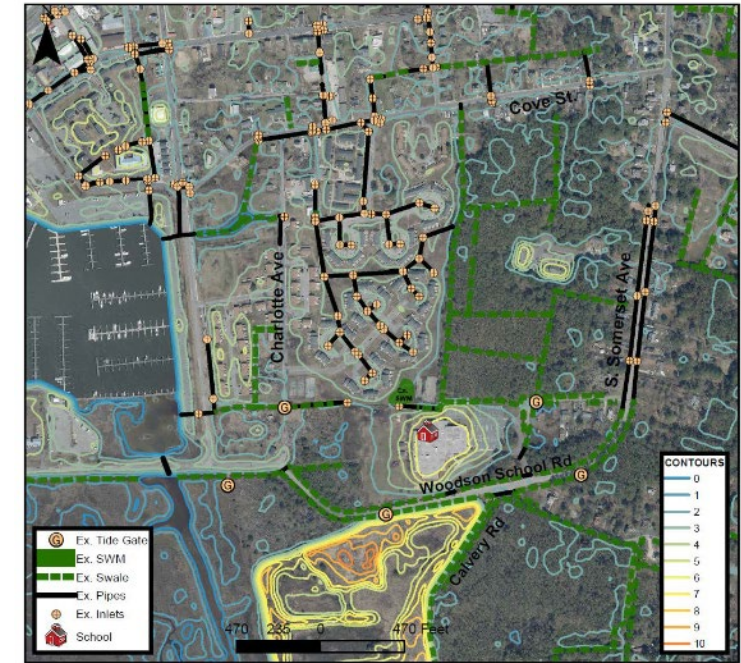


Figure 9 – South Somerset Avenue to Woodson School Road



# Climate Data & Scenario Planning

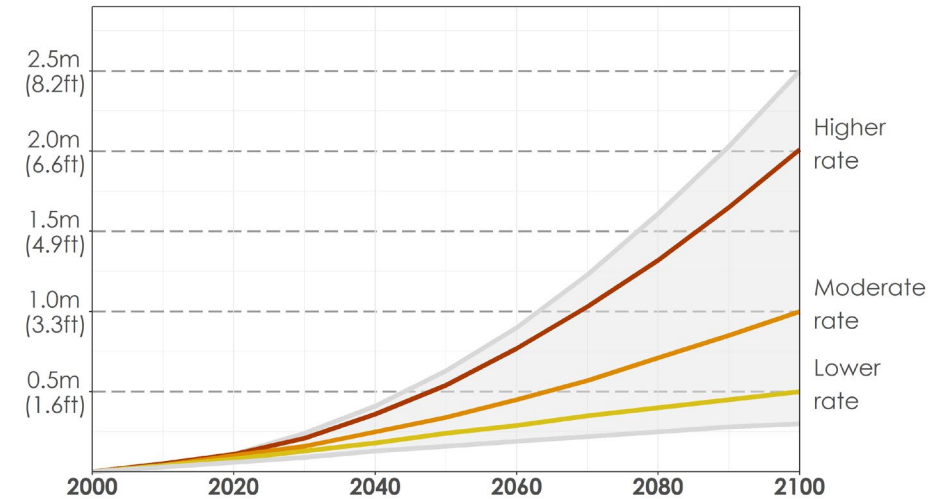
## Baseline scenario

- **Precipitation:** Crisfield Somers Cove weather station
- **Coastal inundation:** Wachapreague, VA tidal gauge

## Projected climate scenario

- 2040 planning horizon
- **Precipitation:**
  - Average of climate projections from CMIP5 models
  - Annual & monthly rainfall : **~5% increase**
  - Extreme rainfall intensity: **~10% increase**
- **Coastal inundation:**
  - Projections from NOAA report scenarios & Crisfield studies/experience
  - Sea level rise – **1.6 - 2 ft**
  - Annual days with tidal flooding – **271 days**

Sea Level Rise Projections



# Crisfield Flood Adaptations

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Existing:

- **Infrastructure monitoring and inspection**

Potential:

- **Ditch maintenance plan**
  - yearly dredging and upkeep of entire system
  - clearing out clogs, phragmites, maintaining shape and structure of ditches
- **Converting to closed system**
  - replacing ditches with closed stormwater piping system
  - closer to what a “typical” city stormwater system has



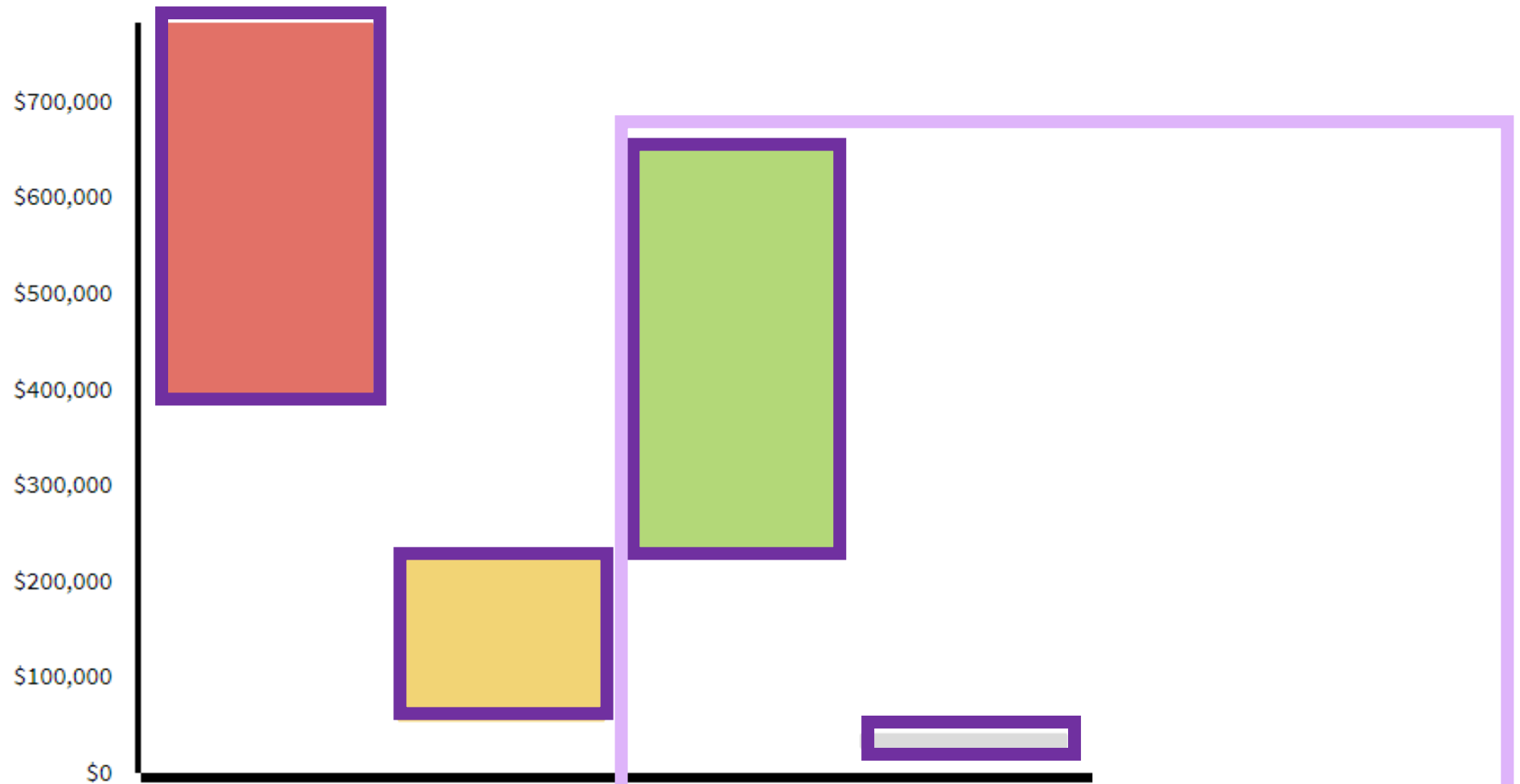


# Flood Adaptation Costs & Benefits

	Ditch Maintenance Plan	Convert to Closed System
<b>One-Time Costs</b>	Hire consultants for permitting & easements, engineer for grading, and city staff or contractor to create plan Purchase dump truck & excavator	Building 2,000 linear feet of pipe
<b>Annual Costs</b>	City staff time and dredging operations	Annual operation & maintenance costs
<b>Community Benefits</b>	Reduce flood disruption days from 10+ to 5-10 per year	Significantly reduce flood disruption days from 10+ to 2-5 per year
<b>City &amp; Infrastructure Benefits</b>	Reduce rate of ditch degradation and maintain functionality	Significantly reduce infrastructure damage and maintenance costs



# CREAT Cost-Benefit Analysis



**Climate impacts with no adaptation**

**Climate impacts WITH adaptation**

**Monetized risk reduction**

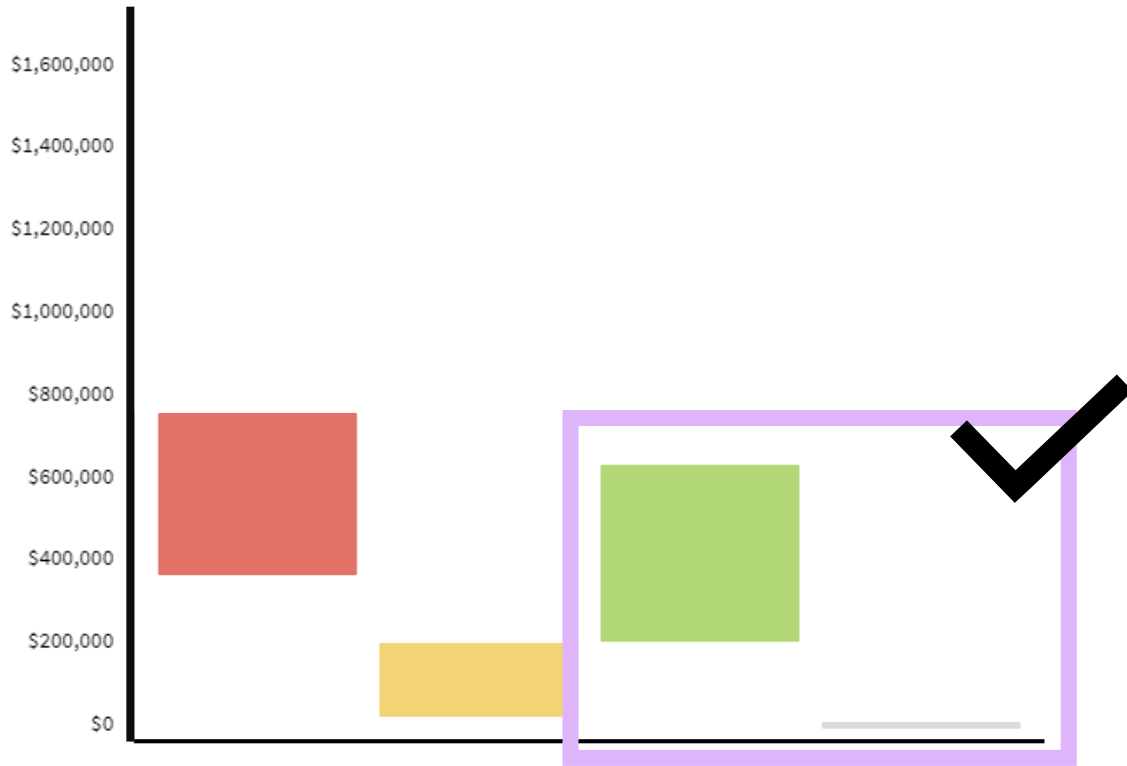
**compare**

**Adaptation costs**

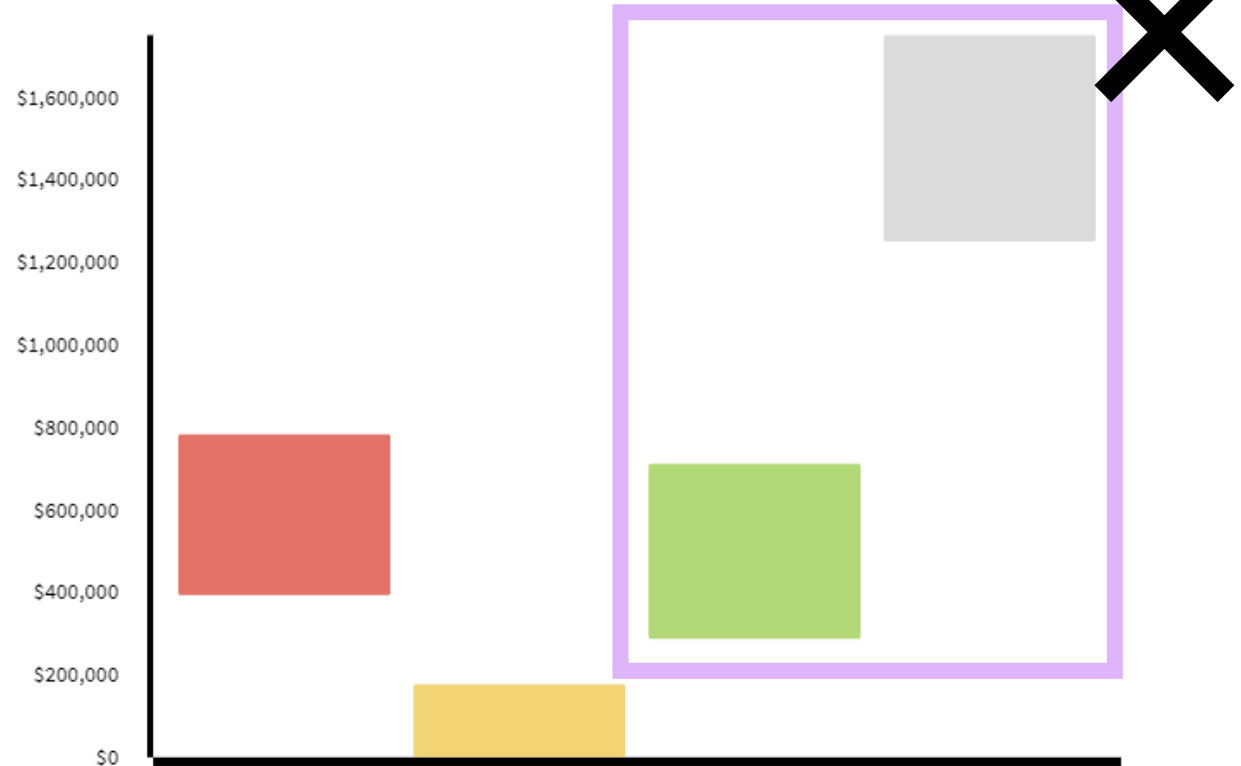
# CREAT Cost-Benefit Analysis

Assuming baseline scenario:

Ditch maintenance



Convert to closed system



Climate impacts with no adaptation



Climate impacts WITH adaptation



Monetized risk reduction

compare

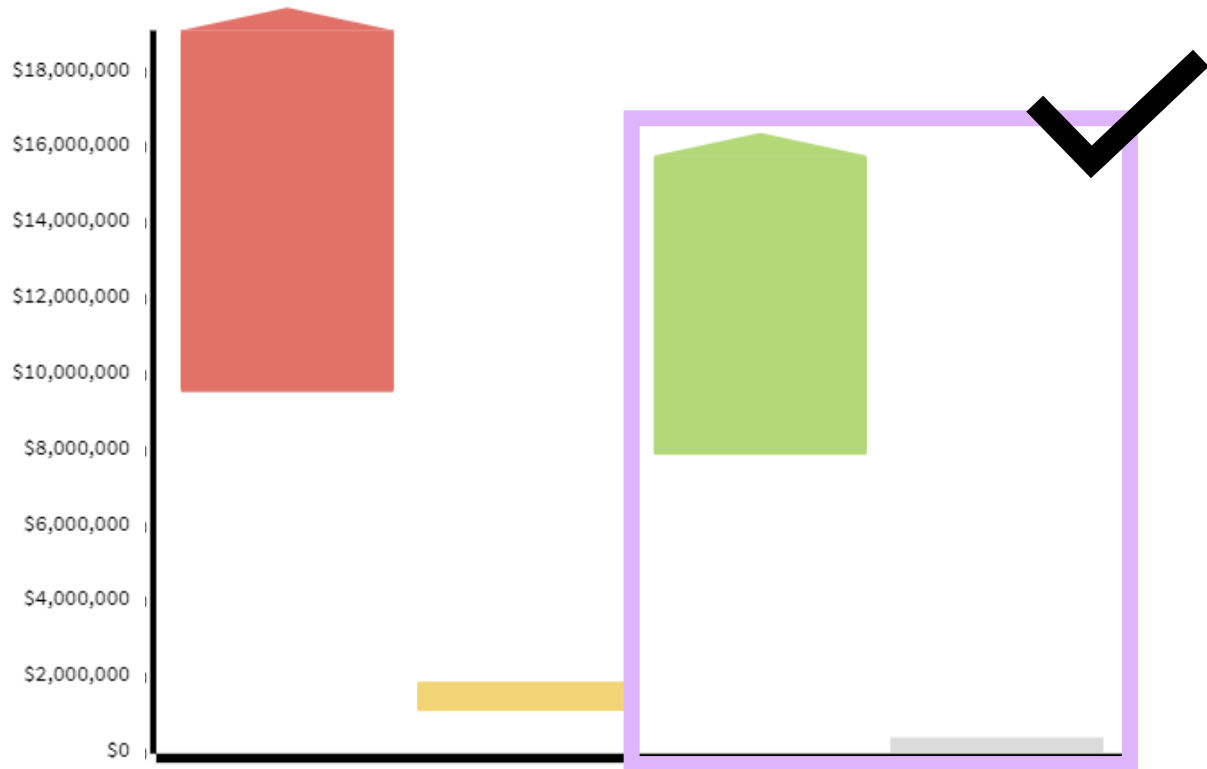


Adaptation costs

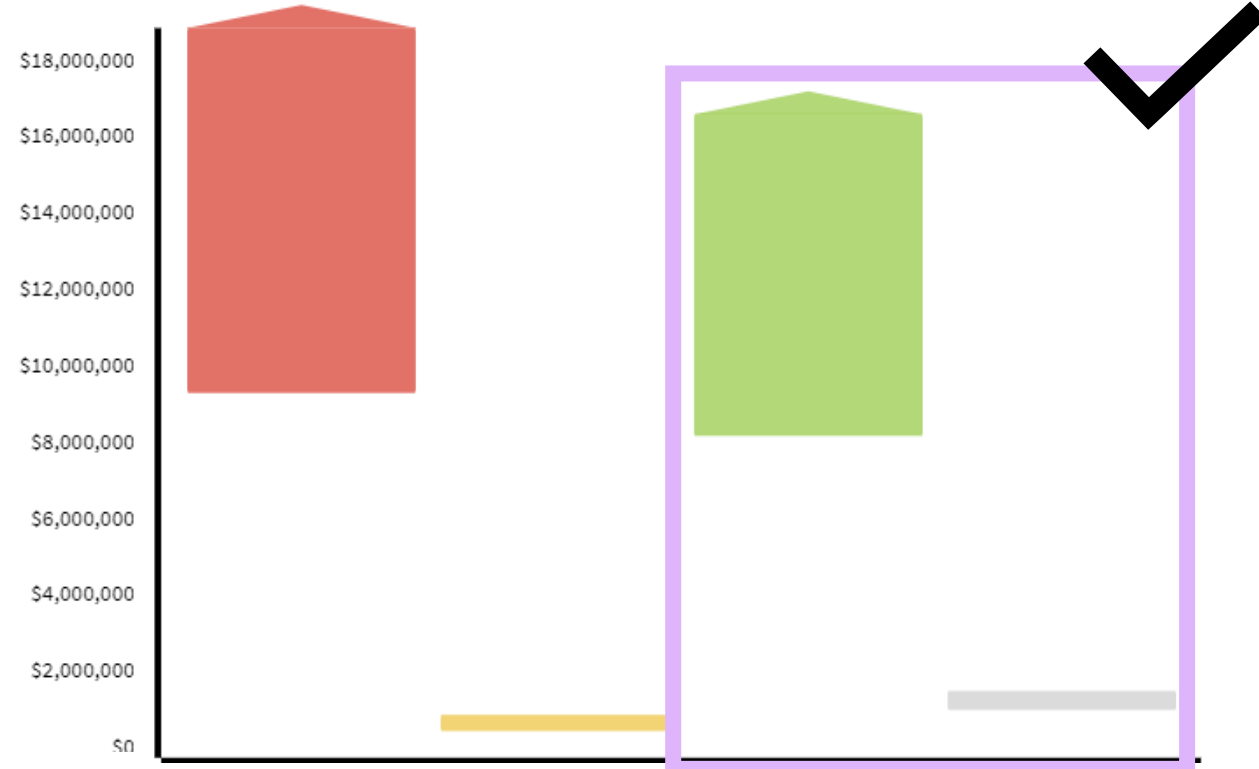
# CREAT Cost-Benefit Analysis

Assuming climate change scenario:

Ditch maintenance



Convert to closed system



Climate impacts  
with no adaptation

Climate impacts  
WITH adaptation

Monetized  
risk reduction

compare  
↔

Adaptation  
costs

# Risk Assessment Conclusion

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- Ditch maintenance
  - less expensive
  - **cost-effective and helpful NOW as well as in future!**
- Converting to closed system
  - more expensive, not cost-effective now
  - becomes cost-effective and very helpful in future only
- Next steps
  - FEMA BRIC technical assistance
  - More intensive flood protection measures beyond 2040

# More Info about CRWU

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- In FY24 we have worked with over 50 communities
  - Conducted focused risk assessments
  - Connected with other partners to continue their adaptation planning efforts
- CRWU has an open call for utilities to receive assistance in FY25
  - Includes discussions with funding experts
  - Option to incorporate discussion of environmental justice & equity issues
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