

Flood Adaptation Assessment for Enhanced Community Resilience

A Collaboration Between

The Crisfield Community, The Nature Conservancy, Environmental Finance Center (UMD), George Mason University, & EPA

Supported Provided by



Goals for Today

| TIME | ACTIVITY |
|---------------|--|
| 9:45 - 10:00 | Sign-in and Breakfast |
| 10:00 – 10:30 | Welcome and Introductions |
| 10:30 – 11:10 | Project Overview |
| 11:10 – 11:20 | BREAK |
| 11:20 – 11:45 | Advisory Committee Questions and Input |
| 11:45 – 12:00 | Establishing Partnership Expectations |
| 12:05 – 12:35 | LUNCH |
| 12:30 – 12:50 | What We've Learned So Far: Overview of Interview Input on Local Flood Challenges and Goals |
| 12:50 – 1:15 | Collaborative Discussion: What's Missing? |
| 1:15 – 1:35 | Finance/Cost Survey Overview and Feedback |
| 1:35 – 1:45 | BREAK |
| 1:45 – 2:45 | Refining the Project Focus: Community Goals and Assets, Flood Hotspots and Conditions, Selecting Project Focus Areas |
| 2:45 – 3:00 | Wrap-Up, Stipend Distribution, and Next Steps |

“When the Boom hit, It just expanded into almost like a western town. Facade buildings went up. And you could buy anything you want to here. There were theatres, there were clothing stores, you could have your clothes made here. It was amazing what was here. Because of the oyster and crabbing industry and fishing. All based on the railroad. Railroad came in 1866. There were tracks that went right down the middle of Main Street, right to the boats, the steamships. It connected Crisfield to big cities like Norfolk, Baltimore, Boston. Philadelphia. Crisfield had it made.”

“All this land here is literally oyster shells. I don't care where you dig. All of this was not here. It's oyster shell ...[that] we used to build up this land.”

“Absolutely, absolutely [the flooding takes a toll of you]. But you know, 350 days a year, I have the most beautiful sunsets. I have the most beautiful smelly salt air. I have the most beautiful breeze. And I have the fortune of living with 2700 people who all for the most part care about me and I care about them. So you know, the juice is worth the squeezing for me.”

Meet the Project Team

The Nature Conservancy
Resilient Coast Program



Liz Van Dolah



Joe Galarraga



Jackie Specht

George Mason University
Coastal Engineering Department



Celso Ferreira



Andre De Lima



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MARTIN
HEADSHOT

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University of Maryland
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Jenny Egan



Stephanie Dalke



Brandy Espinola

Environmental Protection Agency
Office of Research and Development



Emily Eisenhauer



Louie Rivers



Lana Kashuba

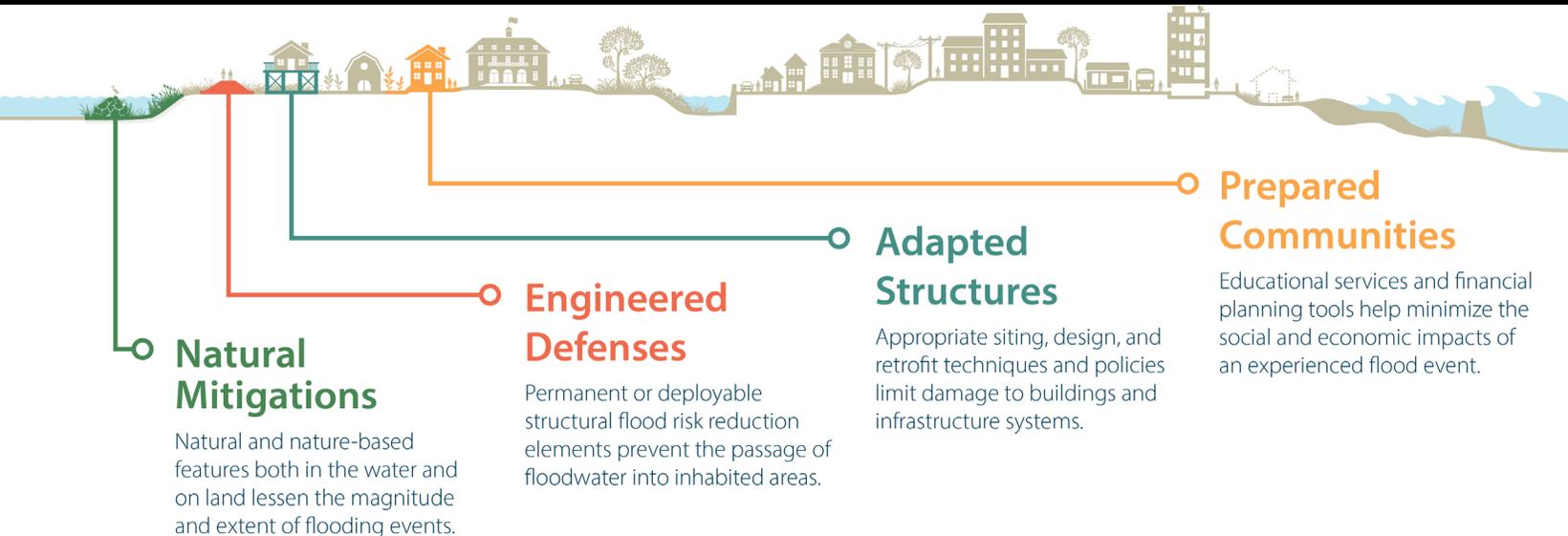
Why are we bringing this project to Crisfield?

Needs

- Flooding challenges
- Adaptation decision-making resources and support networks

Opportunities

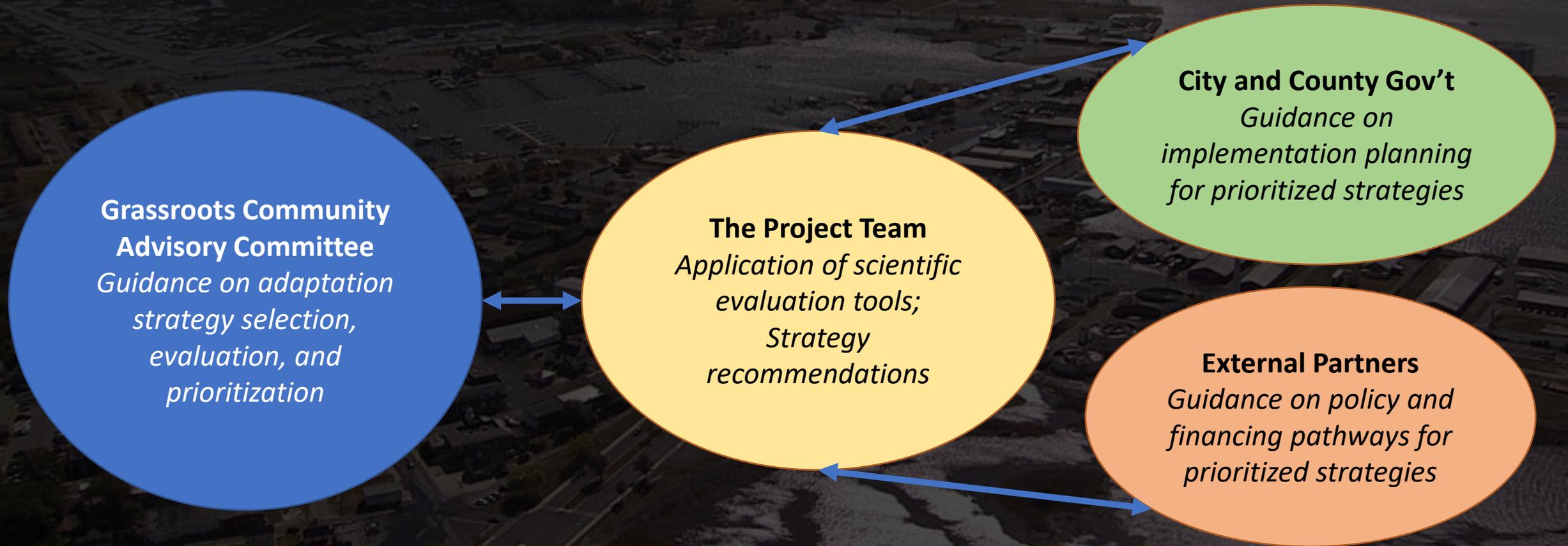
- Coastal resilience research and programmatic goals
- Meaningful partnerships



Project Goals

- Collaboratively scope adaptation strategies to flooding that support Crisfield's social and economic health
 - Assessment of the efficacy, cost-benefits, and feasibility of adaptation options
 - Innovative funding and policy recommendations
 - Recommended implementation plan for flood resilience

Who We Need at the Table



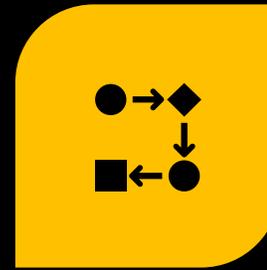
What We've Done to Get Here



INTERVIEWS WITH
CRISFIELDERS



PROJECT
INTRODUCTION TO THE
CITY COUNCIL



LEARNINGS ABOUT
PAST/ONGOING
PLANNING EFFORTS



COMMUNITY
ADVISORY COMMITTEE
RECRUITMENT

An aerial photograph of a coastal town, likely in Alaska, showing a mix of residential and industrial buildings. A large body of water is visible in the background, and a road with traffic runs through the town. The image is split vertically, with the left side being a darker, more muted version of the same scene.

What We've Learned So Far: *Insights from Community Interviews*

Liz Van Dolah

TNC Environmental Anthropologist

Interview Approach and Analysis Process

- Identified individuals representing a range of community voices
- Conducted 30 hour-long interviews
- Content analysis of transcripts/notes for shared themes

Targeted Community Groups:

- Faith community
- Business community
- Education community
- Community-based organizations
- Emergency services
- City government officials



Goals of Interviews: Establish baseline knowledge

What makes Crisfield special?

Where are the flooding hotspots in Crisfield?

What sources of flooding are of most concern?
How is flooding changing/worsening?

What are the community costs of flooding?
Who/what is most at risk?

What community resilience goals should this project consider through its evaluation?

What Makes Crisfield Special?

The People

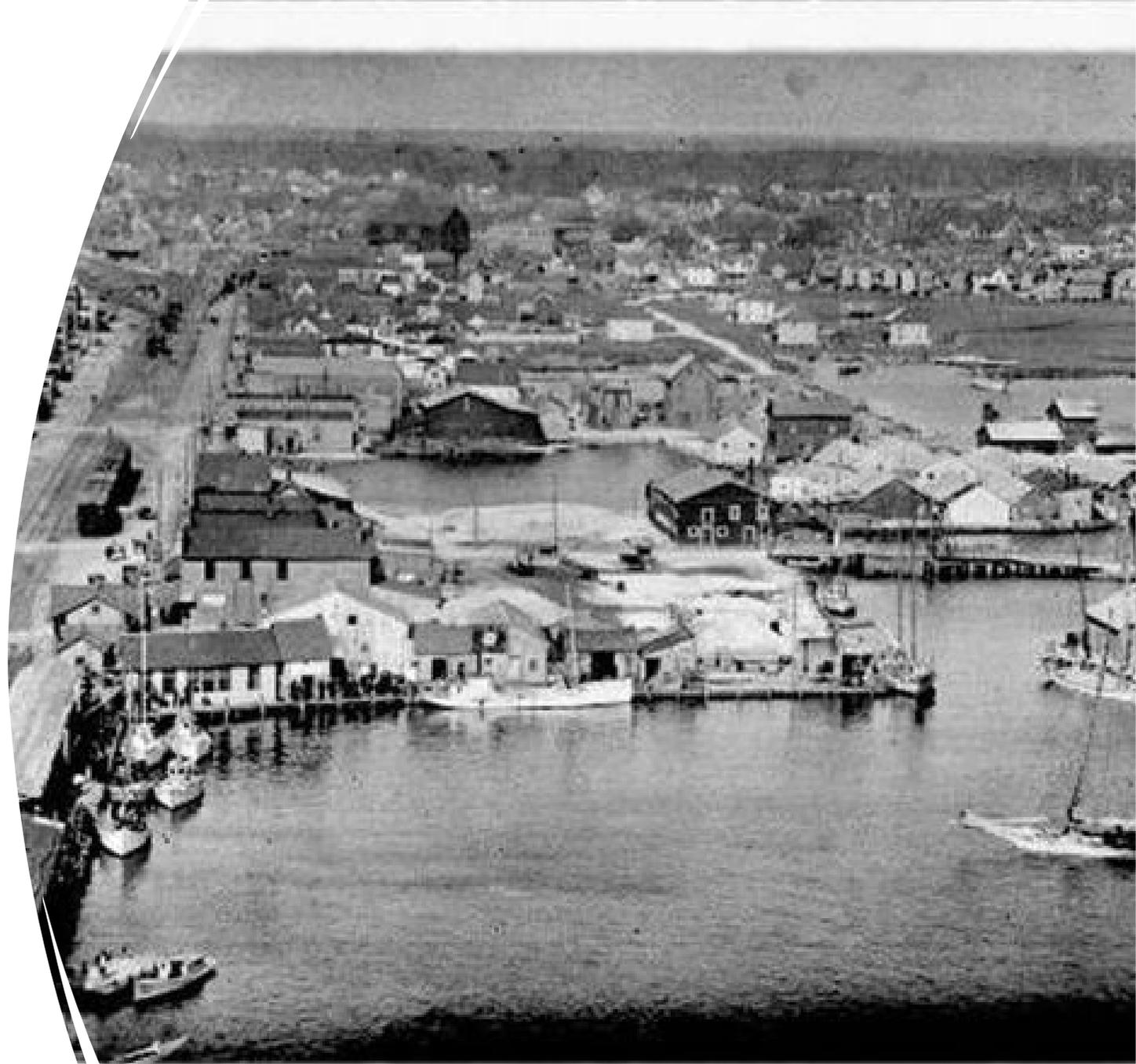
“I couldn't imagine going to another place and having a people as kind as Crisfielders. Growing up, every time I got myself in a jam, help was right next door. We're different people in a lot of ways, Crisfielders are, but if you're in trouble, people put those differences aside and are there for you. Why leave here when you've got that? That's a reason why I stayed. Not because there's a lot of good paying jobs in Crisfield, or to have the opportunity for a bigger career. Nothing like that. I stayed to be close to the people.”



What Makes Crisfield Special?

History & Cultural Heritage

“It's unique. It's, it's still truly a working waterfront. One day, I pulled up outside of the post office, and there was a pickup truck with bushel baskets full of crabs on the back. And I was like, you don't see that anymore, you know? It's a very close community. And it's a really, really beautiful place with a lot of history”



What Makes Crisfield
Special?

Natural Amenities

“If you like to kayak, and you like just nice, pleasant little running trails and stuff like that, it just doesn't get any prettier than that here.”



Sources of Problem Flooding

- Poor drainage
- Hurricanes and Nor'easters
- Higher tides/rising sea levels
- Wind
- Low elevation and subsidence
- Erosion of barrier islands



Most Mentioned Events

- Hurricane Sandy
- October 29th event

“It was the perfect set of circumstances with the high tide, the wind blowing from the south, the storm at sea. Everything put together to just push it right up here. And that's gonna happen more and more as time goes on.”

(Interviewee reflecting on the October 29 event)

Flooding Hotspots

- Downtown
- “The Soup Bowl”
 - Cove St.
 - South Somerset
 - Myrtle
 - Maple
 - 4th St.
- Down Neck
- Hall Highway area



Concerns about flood frequency and severity

- Changes are most notable from storm-driven flooding:

“Used to be that you'd get one [big flood event] every 8 or 10 years that was like that **[Oct 29]**. Maybe 10-15 years. And then it seems like you get one every four or five years. **Now it seems like we get at least a devastating tide at least once a year.** And somewhere along the line, we get one that makes you go ‘Whoa! Here it is!’”

- Higher tides are being noticed too, but to a lesser extent

| Flood Frequencies | Quoted ranges | | |
|--|--|---|--|
| 1-3/year | “1 big flood per year” | “2-3 times per year, routinely in the falls and springs” | |
| 4-6/year | “5-6 times per year” | “Crisfield has had 4-5 good flooding events in the last 2 years that I’ve worked here.” | |
| 6+/year (*all 3 individuals specified that most of these are not disruptive though) | “1-2 times per month in [area 4 th Street]” | “We get nuisance flooding 10-15 days a year, 2-3 of those are disruptive” | “1x per month, when moon’s full and tides are at their highest. But they’re not always disruptive” |

The impacts of flooding on Crisfielders

- Limited economic opportunity/upward mobility
- Increase maintenance and replacement costs
- Mental & physical health costs
- Dwindling tax base
- Declining quality of life

“The one way that flooding impacts us is that people can't, you know, do the things they need to do, whether that's go shopping or getting emergency care. But the other way is that the town needs to grow. Crisfield has a lot of vacant buildings, and it [flooding] is something that people consider when they're thinking of moving their business or their home here. It impacts how willing people are to do that.”

“It's so hard as a business owner. It's so hard as a people. You get yourself squared away... And we went through a devastating storm with Sandy. Sandy was... and I hate even mentioned that name, because I get so tired of hearing about it. But it was very impactful here. It really did a number on us as far as physical, economically, psychologically, however you want to go with it. It was very impactful.”

Community Resilience Goals

- Community retention/cultural preservation
- Improved quality of life



- Resilient infrastructure
- Job creation & training
- Flood safe & affordable housing
- Recreational opportunities

“I think we are a number one tourist destination with our waterfront and our history, our maritime. We just haven't rolled it all out, or it hasn't just been knitted together like it needs to.”



One Possible Pathway
Heritage Tourism

Reminder of Project Goals

- Recommendations to inform flood planning and community development
- New partnerships to support Crisfield's flood resilience beyond this project
- Opportunities to bring additional funding and resources to Crisfield

Our Research Questions

- Which adaptation strategies withstand coastal hazards best over time?
- Which adaptation strategies provide the best social and economic benefits over time?
- Which adaptation strategies are most financially feasible?
- What policy and financing pathways could best support implementation?

Phase 1:
Select strategies &
coastal hazards

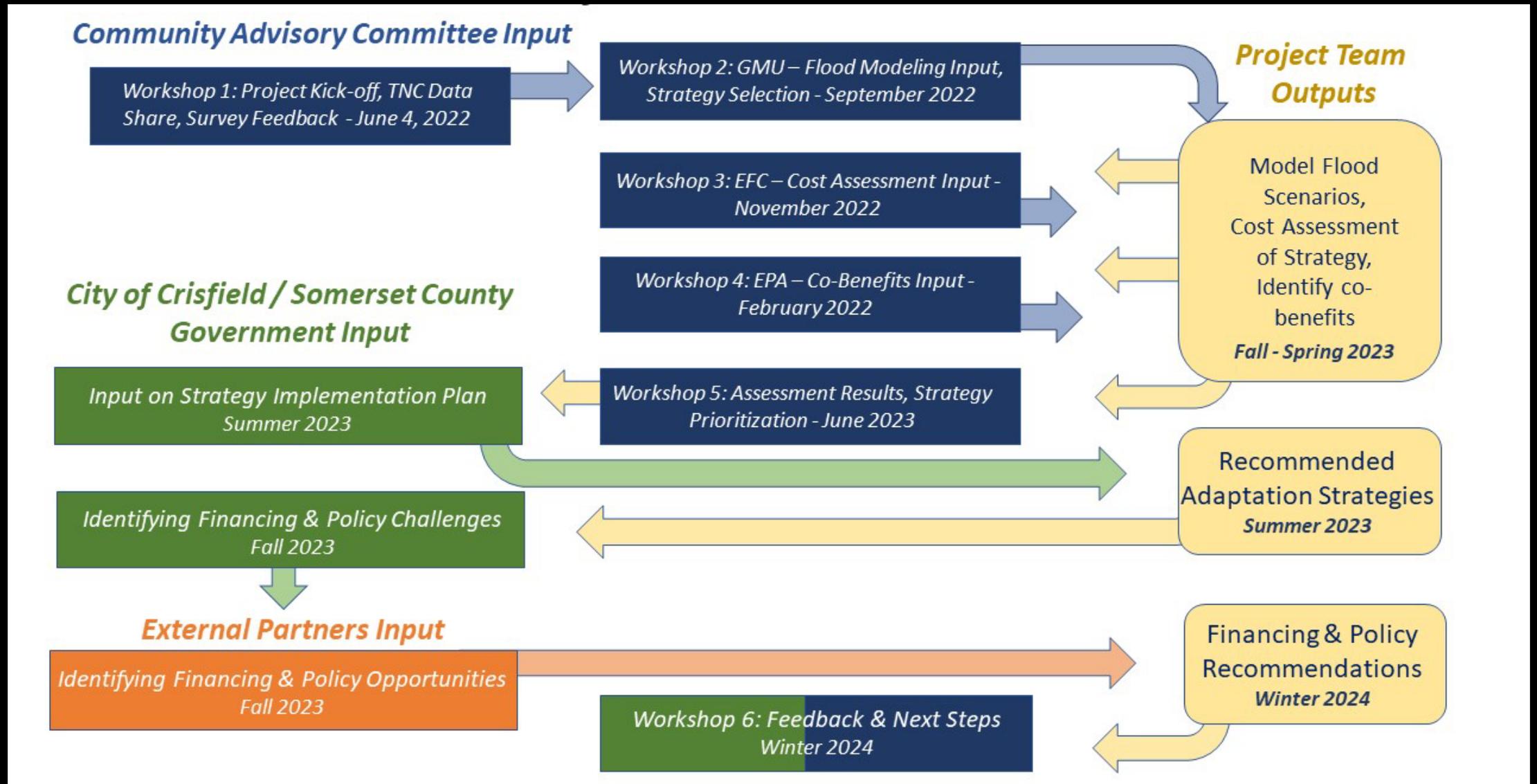
Phase 2:
Test strategies to ID
most feasible and
beneficial

Phase 3:
Scope implementation
plans for strategies

Phase 4:
Identify policy and
financing pathways

Phase 5:
Deliver
recommendations

Project Timeline

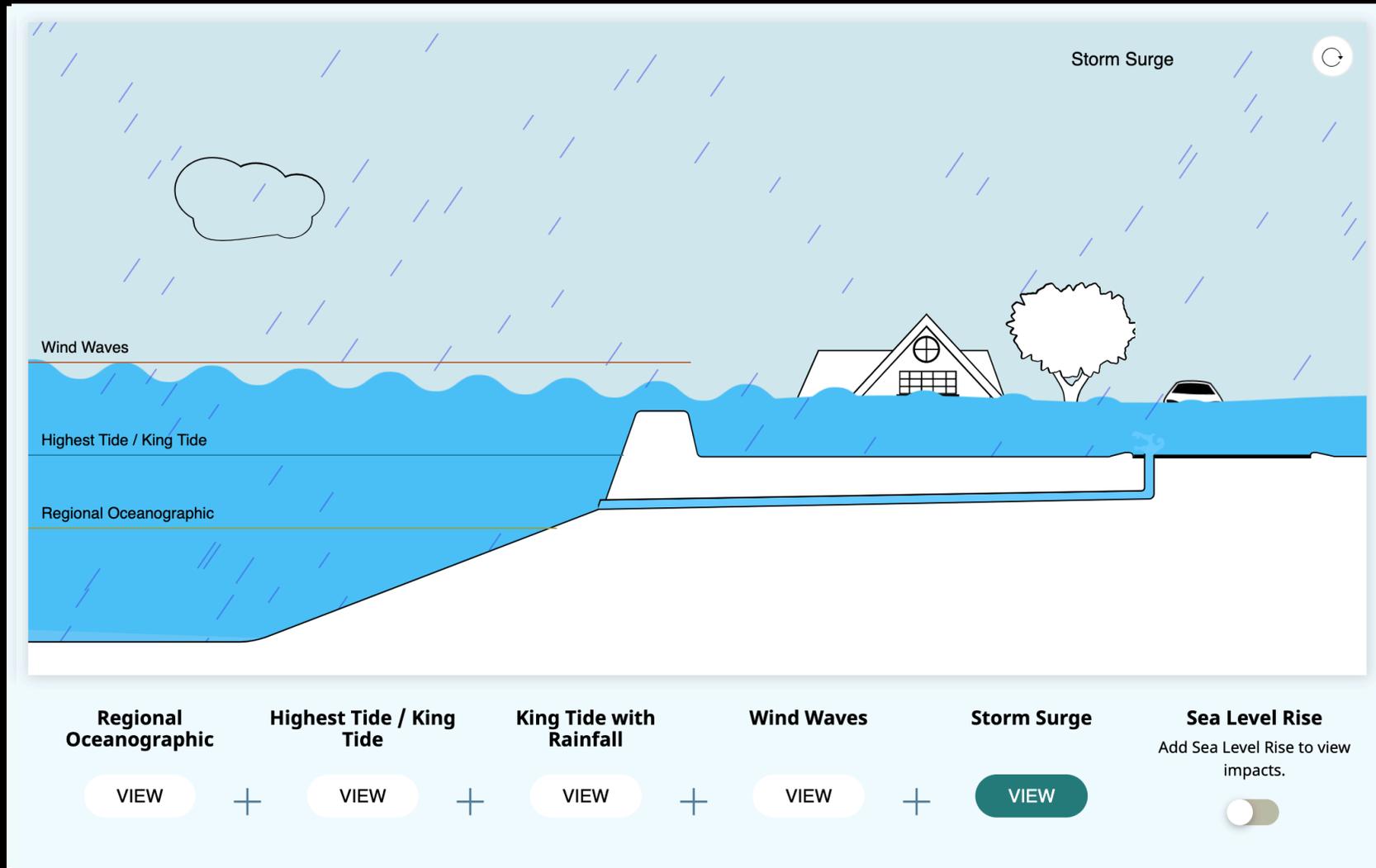


Adaptation Strategy Assessment Overview:

Coastal hazards modeling, evaluating the financial feasibility and costs/benefits, identifying other community benefits

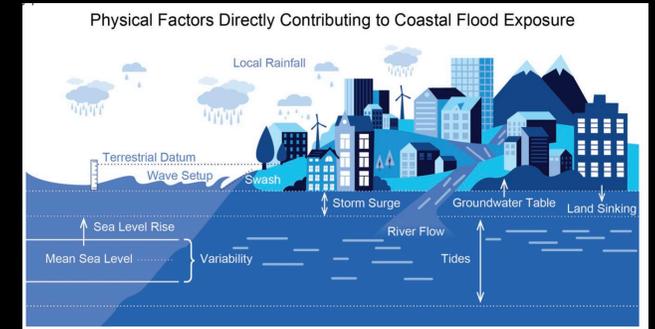


Coastal Flood Hazards



Coastal Total Water Levels

- Tides
- Storm surges
- Waves
- Changes in sea-level
- Precipitation
- Groundwater
- Sea-level rise
- Other flow sources

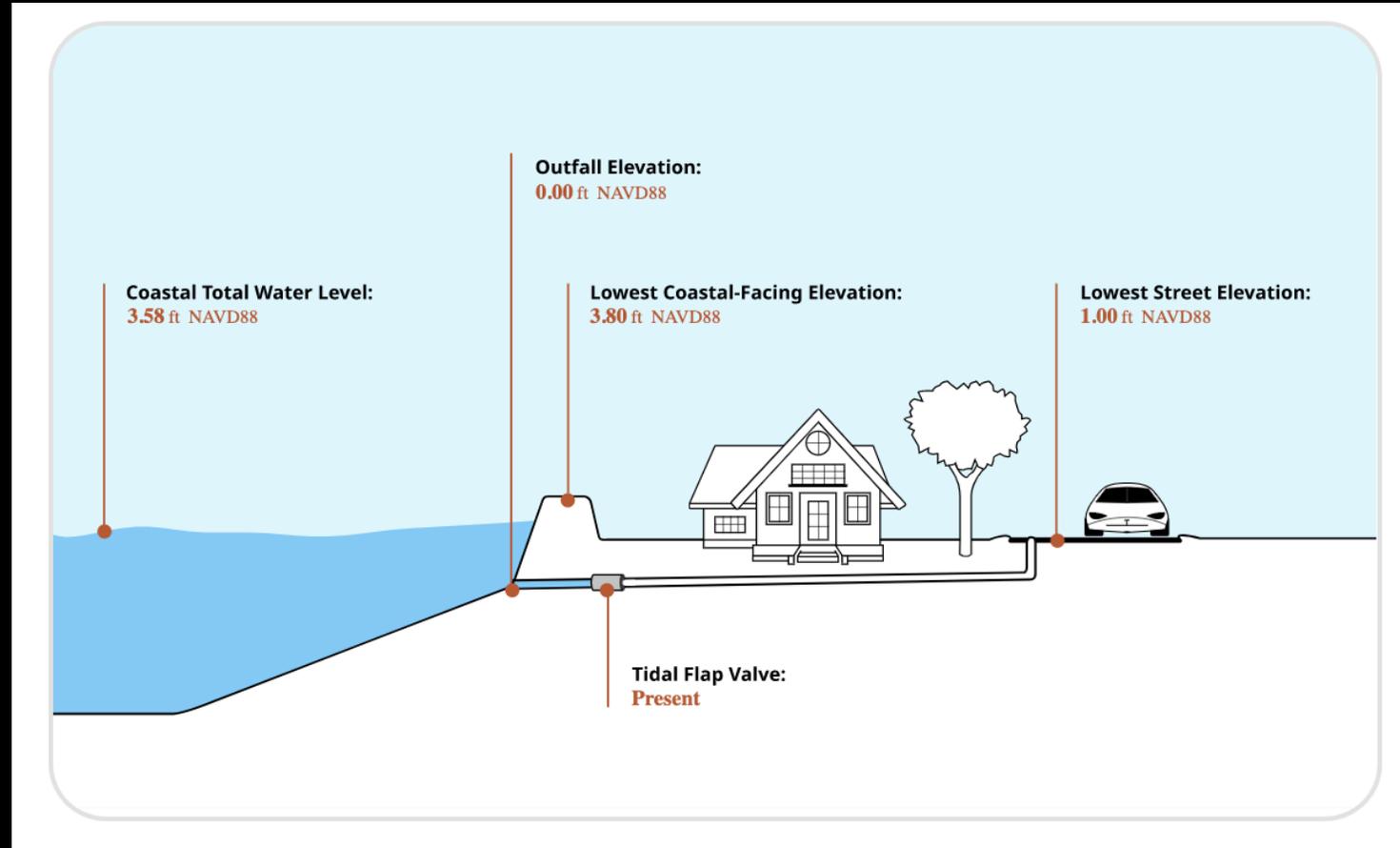


Coastal Total Water Level – 10.6 ft.

| | | |
|----------|-----------------|--|
| | (6.23 ft.) | Storm Surge Component |
| 4.37 ft. | (0.30 ft.) | Seasonal Variation Component |
| 4.07 ft. | (0.64 ft.) | Extreme Tide Component |
| 3.43 ft. | (1.66 ft.) | Sea Level Rise Component |
| 1.77 ft. | MHHW (1.77 ft.) | Tidal / Orthometric Relationship Component |
| 0 ft. | | |

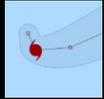
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Balancing Hazards and Adaptation



Numerical Modeling of Coastal Hazards

Scenarios



Extreme events



Management actions

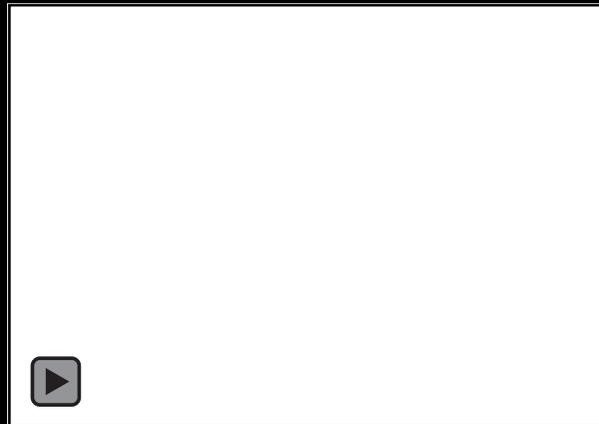


Sea-level rise



Marsh migration and conservation

Costal Flood Hazards Models



Local coastal hazards and adaptation information



Scenario-based simulations that compare the benefits of various management actions

What is UMD EFC's part of this project?

- Assess potential options selected by the community and researchers
- Work with flood and coastal hazards data
- Use a benefit and cost process to evaluate the options
- Provide the community with a menu of the options and ways to evaluate the options (e.g. compare the costs and benefits)
- Assist community through this process

How assess options?

- What is impacted?
- Who is impacted?
- What is the cost of impact?
- What are the options for reducing storm and flood impacts?
- Assess feasibility of options
 - Short and long term
 - Technical (reduce exposure)
 - Financial (benefits and costs)
 - Political
 - Community



How estimate storm damage?

- HAZUS – a FEMA product that helps analyze community risk to and potential losses from natural disasters (standard national model)
 - Physical, economic and social impacts of disasters
 - Mapped results
 - Community-level risks and losses
- Nuisance survey
- Qualitative and quantitative descriptions of impacts, costs, and benefits



What we are delivering

- Table of options with qualitative and quantitative information
- Information and support so the community can select priorities



Coastal Adaptation Strategies Handbook. National Park Service. Report 2016. Edited by Rebecca Beavers, Amanda Babson, and Courtney Schupp. Accessed at <https://www.nps.gov/subjects/climatechange/coastalhandbook.htm>

Tourism and recreation

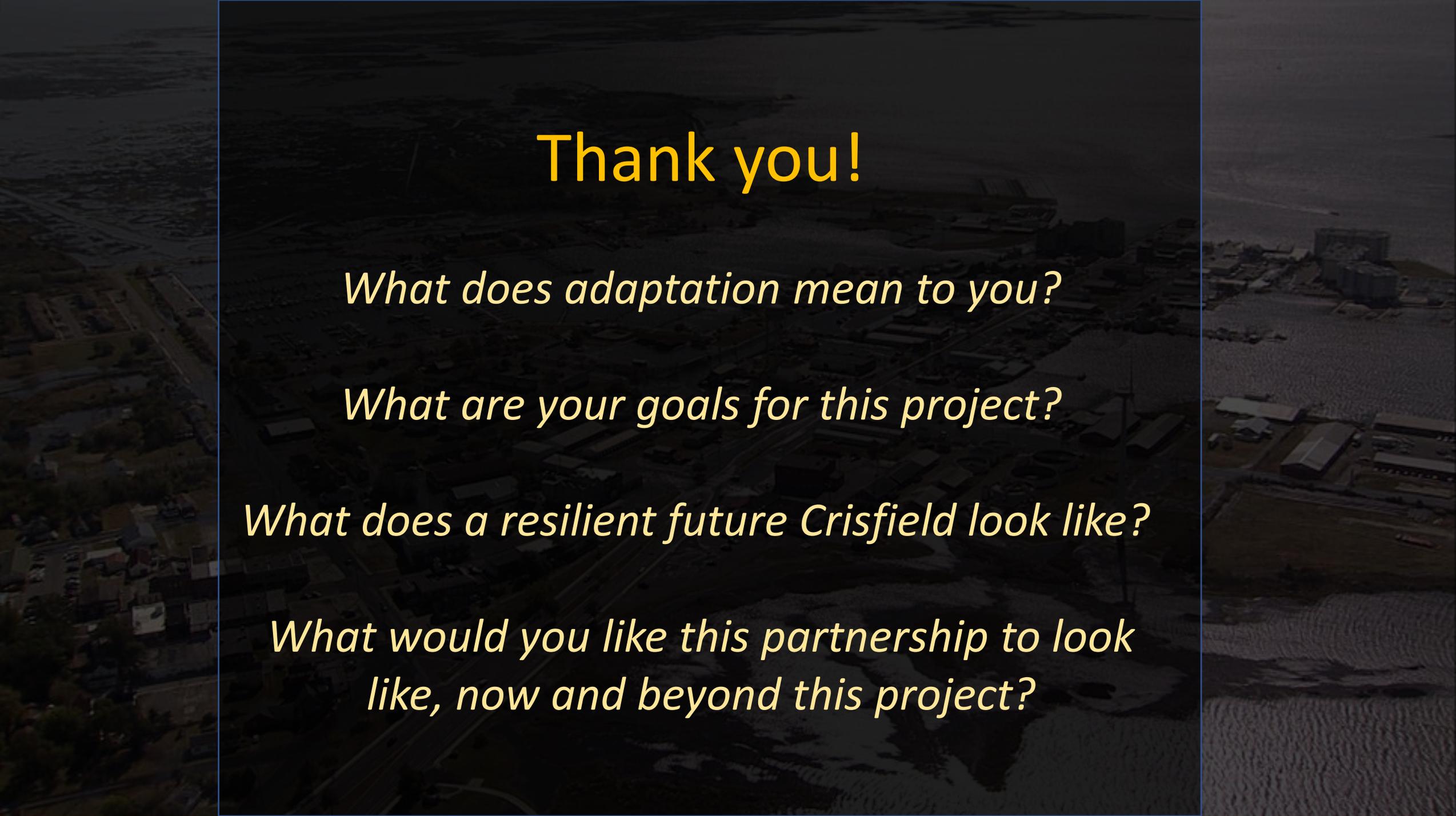


Stormwater management



Salt marsh bird watching

Oyster beds
in coastal salt
marsh

An aerial photograph of a coastal town, likely Crisfield, Maryland, showing a mix of residential and commercial buildings, a large parking lot, and a beach area. The ocean is visible in the background. The image is darkened to serve as a background for the text.

Thank you!

What does adaptation mean to you?

What are your goals for this project?

What does a resilient future Crisfield look like?

What would you like this partnership to look like, now and beyond this project?



Establishing Mutual Expectations

FLOOD ADAPTATION ASSESSMENT
FOR ENHANCED COMMUNITY
RESILIENCE PROJECT & THE
CRISFIELD COMMUNITY ADVISORY
COMMITTEE

What is the Community Advisory Committee?

“... to guide the planning process, research activities, data collection and dissemination, and recommendations to ensure the Flood Adaptation Assessment Project outputs address local needs and concerns about flood impacts in Crisfield.”



Why Have a Community Advisory Committee?

- "To foster...
 - Community Ownership
 - Co-Creation of Knowledge
 - Prioritization of Community Expertise and Resiliency Goals..."

“The Project Team (PT) and the Community Advisory Committee (CAC) will evaluate and prioritize adaptation options that provide the most social and economic benefits to the Crisfield community over time.”

Drafted Expectations and Responsibilities

Project Team

- Meeting agendas and a meeting space
- Relevant documents and materials for review at least two weeks ahead of corresponding meetings
- Facilitation support for all CAC meetings
- Access to analytical tools when applicable
- Compensation for CAC members following scheduled meetings
- Online platform to facilitate shared ownership of project process, resources, and outputs
- Final report documenting project process, results, and recommendations

Community Advisory Committee

- Participate in at least 4 of 6 CAC workshops/meetings
- Assist with identification of sites and assets critical to the Crisfield community
- Provide feedback on flooding, financial, and other assessment processes
- Assist with selecting adaptation options to recommend to the City of Crisfield
- Provide feedback on project communications
- Help to figure out next steps for pursuing implementation of findings

Project Dissemination and Data

- Community First Model
- Both the PT and the CAC are encouraged to engage in dissemination of the research findings and share information about dissemination activities
- Research findings may be disseminated in several ways, including:
 - Community forums
 - Community reports
 - Newspapers
 - Peer-reviewed publications
 - Professional conferences
 - Other ideas?

With That
Being Said...

What's working?
What's missing?





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