



Photo Credits: Virginia Sea Grant, Dewberry

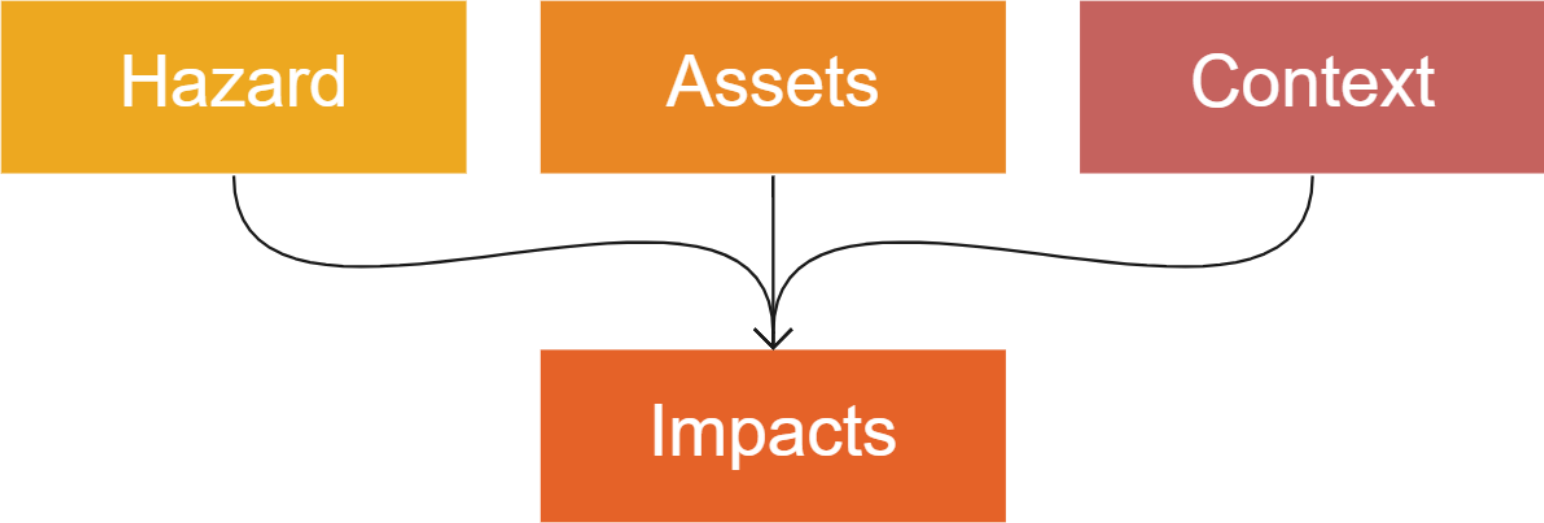
# Virginia Coastal Resilience Master Plan

Technical Advisory Committee Meeting | 6/22/2021

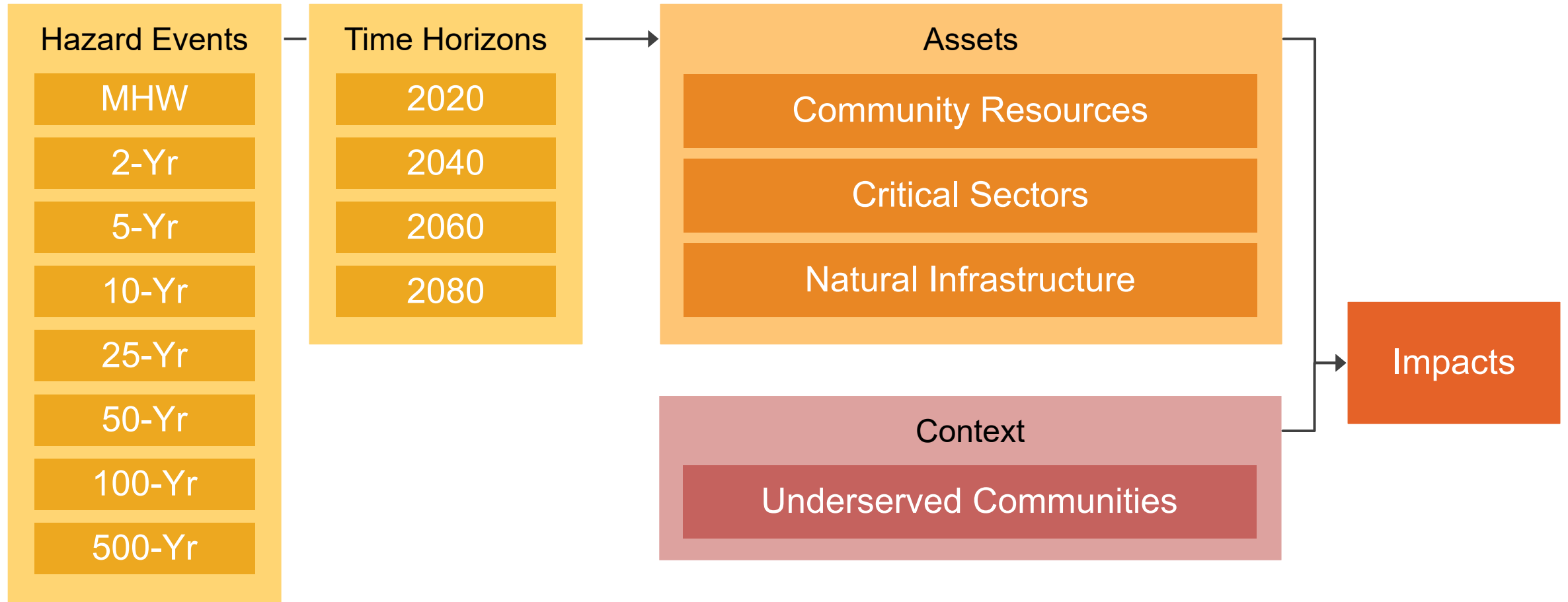
# Built / Natural Infrastructure Impact Assessment and Summarization

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# Impact Assessment Elements



# Impact Assessment Elements



# Impacts & Examples

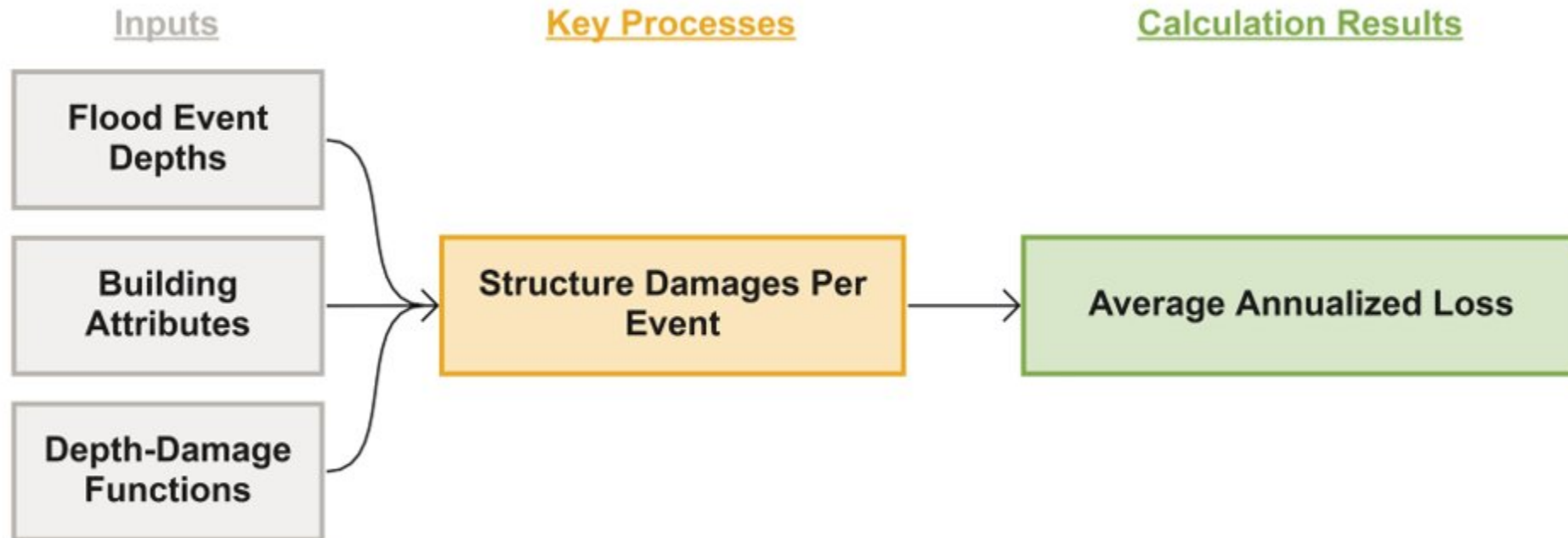
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# Impacts to Community Resources

Impact Type	Component
<b>Residential Neighborhoods</b>	Population Exposed to Flooding
	Residents Displaced
	Residential Structure Damages
<b>Tribal Resources</b>	Tribal-Owned Land Lost
	Tribal Reservation Structure Damages
<b>Businesses &amp; Employers</b>	Non-Residential Structure Damages

# Impacts to Community Resources

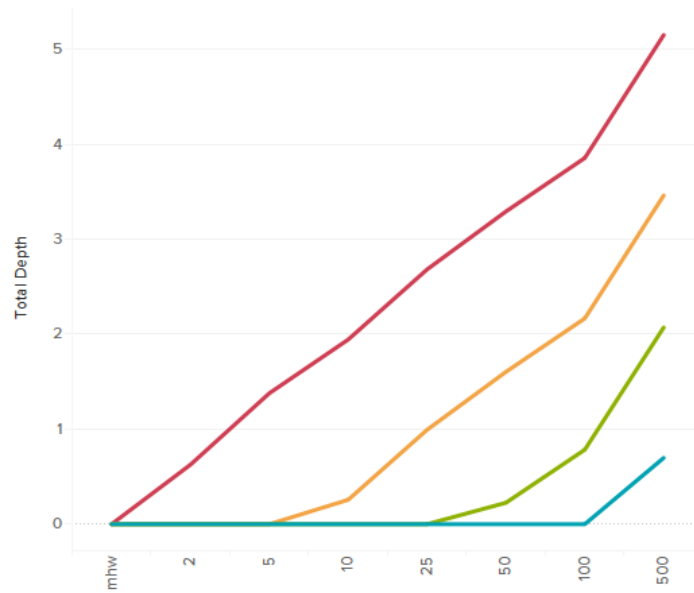
## Residential Structure Damage Example



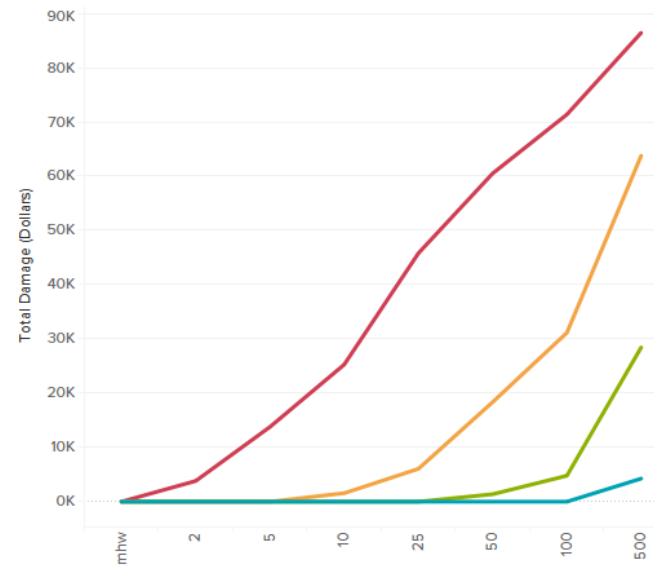
# Impacts to Community Resources

## Residential Structure Damage Example

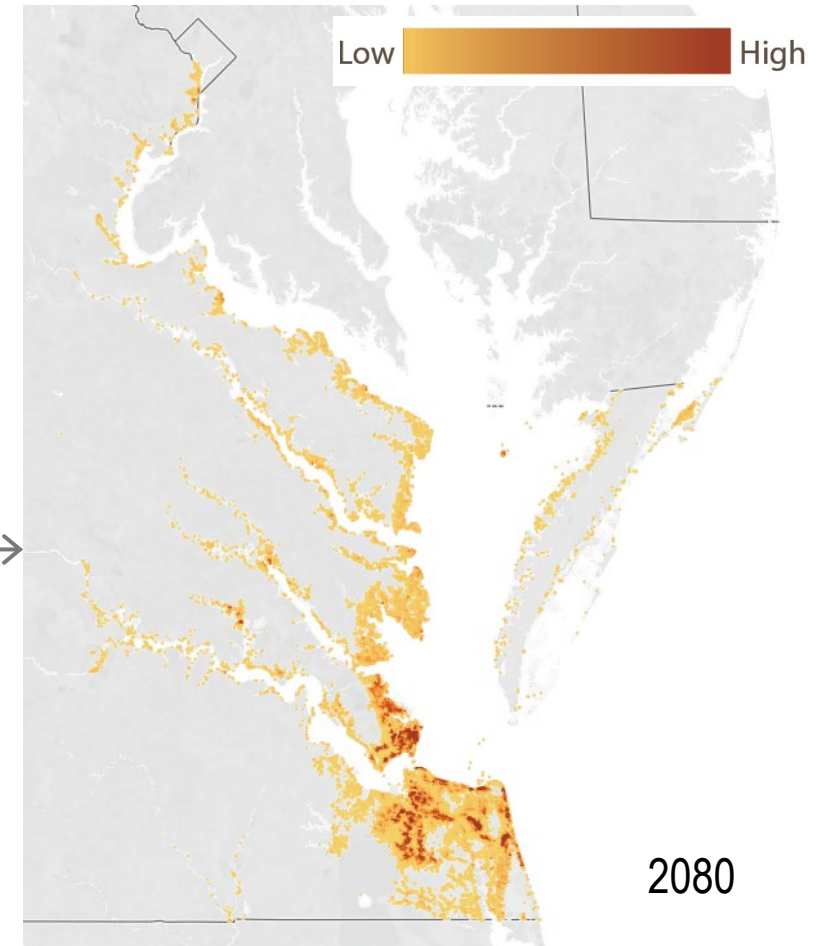
Flood Depth Curves (Hazard Exposure)



Flood Damage Curves (Economic Risk)



Average Annualized Losses Associated with Residential Structure & Contents



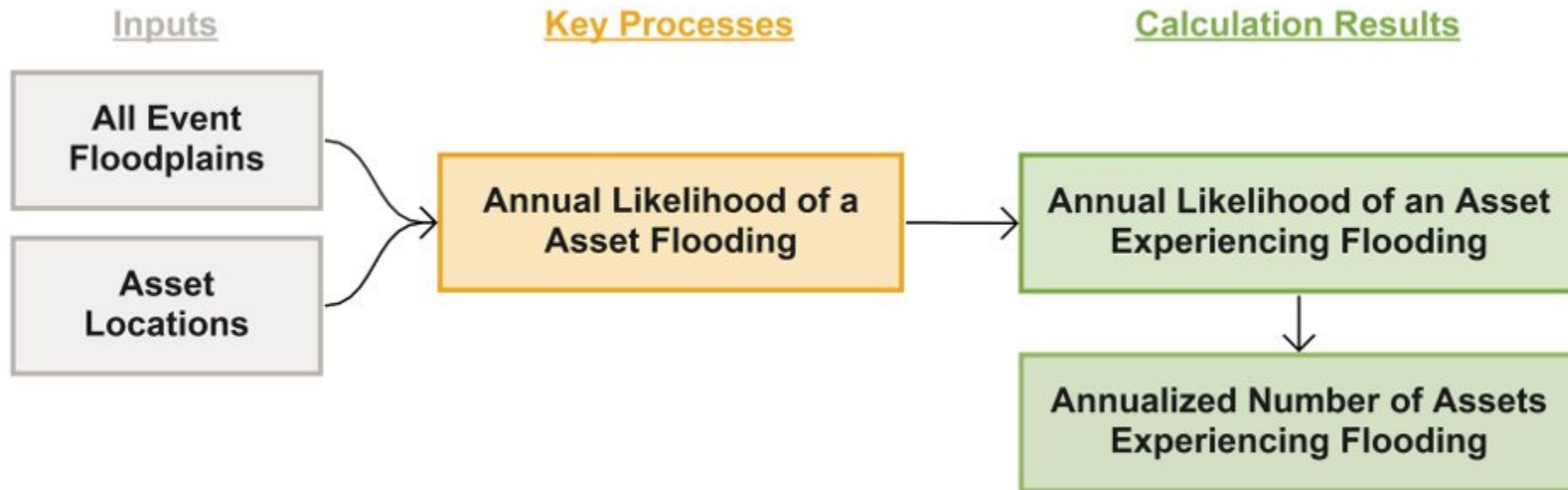


# Impacts to Critical Sectors

Impact Type	Component
<b>Transportation</b>	Depth of Roadway Flooding
	Transportation Assets & Facilities Exposed to Flooding
<b>Communications</b>	Radio, TV, & Cellular Services Exposed to Flooding
	Broadband Services Exposed to Flooding
<b>Defense Industrial Base</b>	DoD Sites Exposed to Flooding
<b>Energy</b>	Oil & Biofuel Facilities Exposed to Flooding
	Power Plants & Substations Exposed to Flooding
<b>Food &amp; Agriculture</b>	Agricultural Farmland Lost
	Food Processing Facilities Exposed to Flooding
<b>Health &amp; Emergency Services</b>	Hospitals Exposed to Flooding
	Emergency Operations Centers Exposed to Flooding
	EMS, Fire & Police Stations Exposed to Flooding
<b>Government Facilities</b>	Major State Government Buildings Exposed to Flooding
	Child Care, Schools, & Higher Education Facilities Exposed to Flooding
<b>Waste &amp; Wastewater</b>	Solid & Hazardous Waste Sites Exposed to Flooding
	Septic Systems Exposed to Flooding
	Wastewater Treatment Plants Exposed to Flooding

# Impacts to Critical Sectors

## Hospitals Exposed to Flooding Example



# Impacts to Critical Sectors

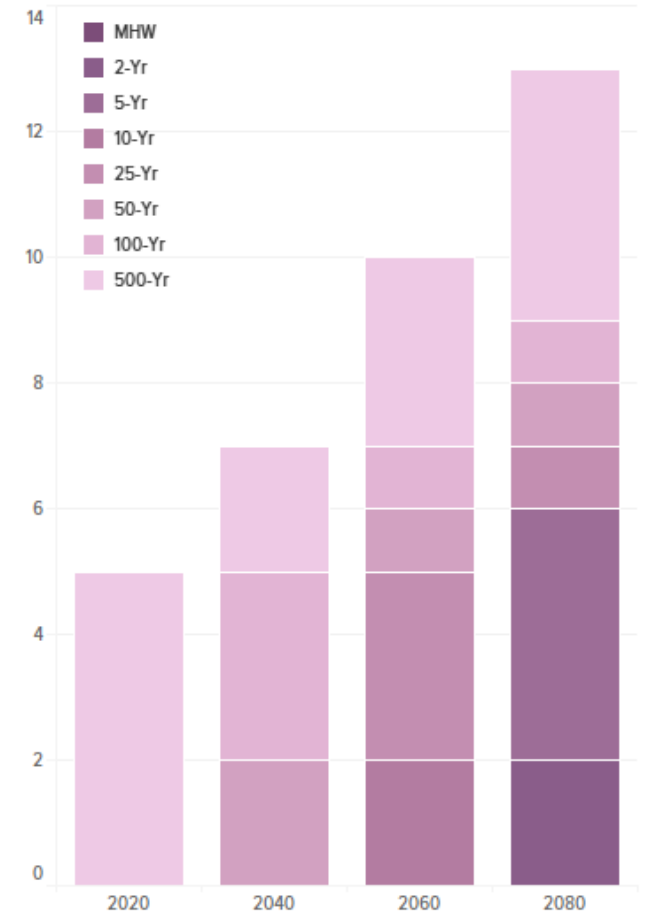
## Hospitals Exposed to Flooding Example

### Asset Inside or Outside of the Floodplain

	mhw	2	5	10	25	50	100	500	
2020	OUT	OUT	OUT	OUT	OUT	OUT	OUT	IN	<b>2020</b> 500-Yr Floodplain .2% ALF
2040	OUT	OUT	OUT	OUT	OUT	IN	IN	IN	<b>2040</b> 25-Yr Floodplain 4% ALF
2060	OUT	OUT	OUT	IN	IN	IN	IN	IN	<b>2060</b> 5-Yr Floodplain .20% ALF
2080	OUT	IN	IN	IN	IN	IN	IN	IN	<b>2080</b> 2-Yr Floodplain 50% ALF



Number of Hospitals Exposed by Event Type

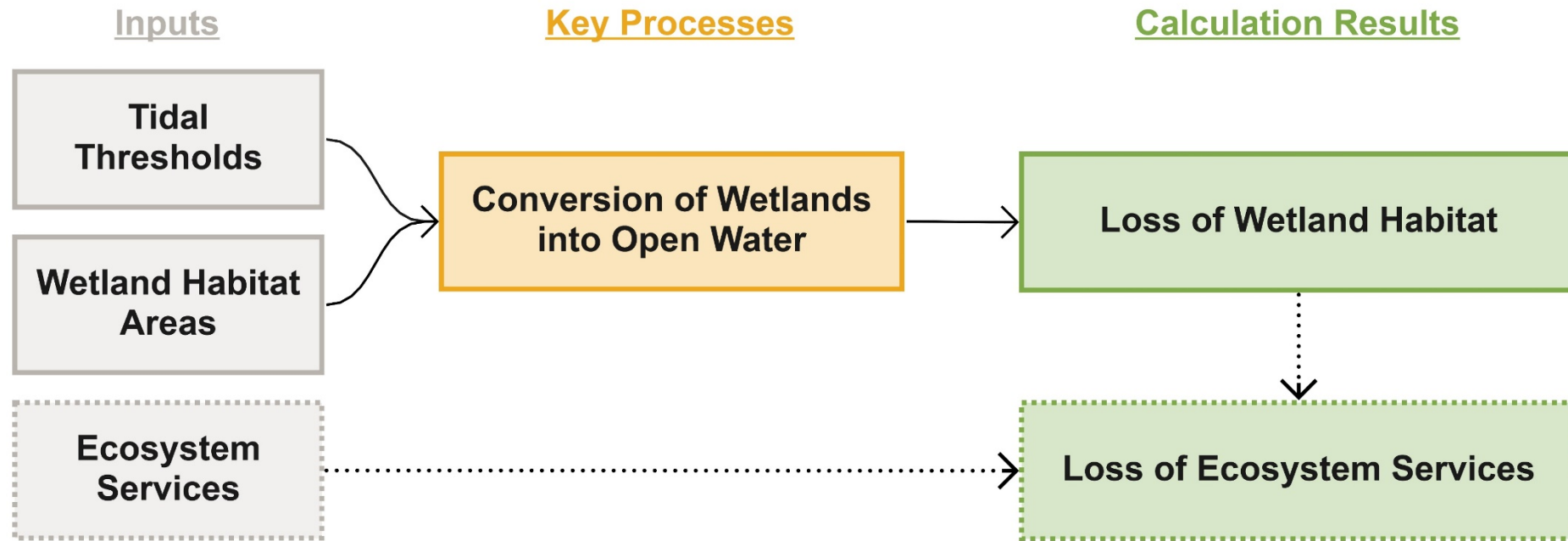


# Impacts to Natural Infrastructure

Impact Type	Component
<b>Coastal Habitat</b>	Loss of Wetland Habitat
	Prevention of Habitat Migration
<b>Aquatic Habitat</b>	Loss of SAV Habitat

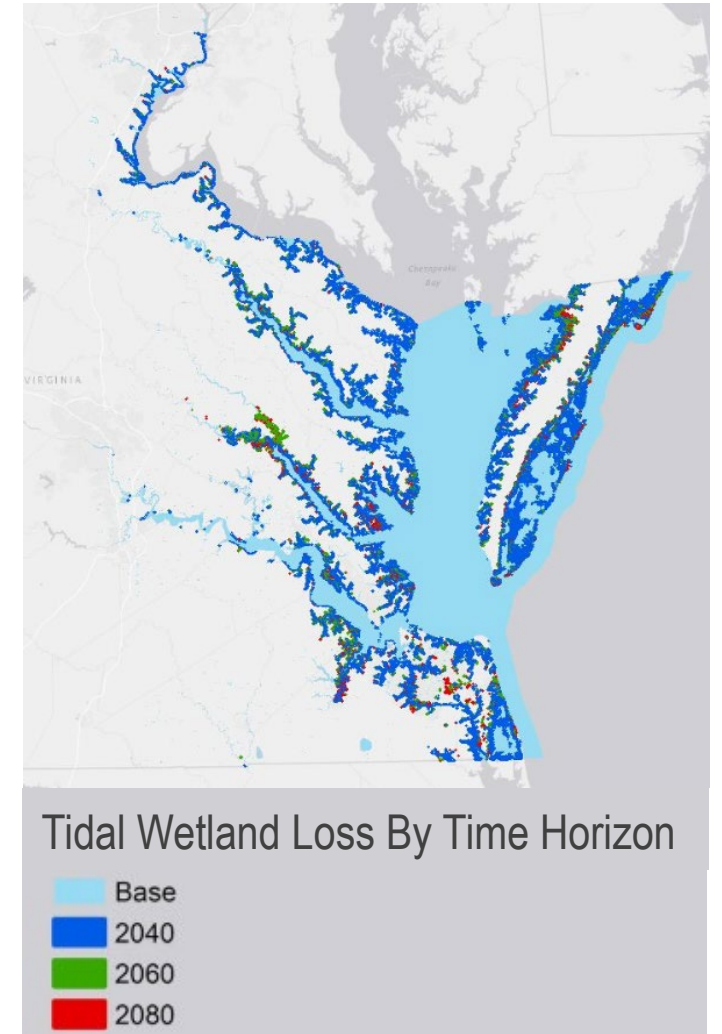
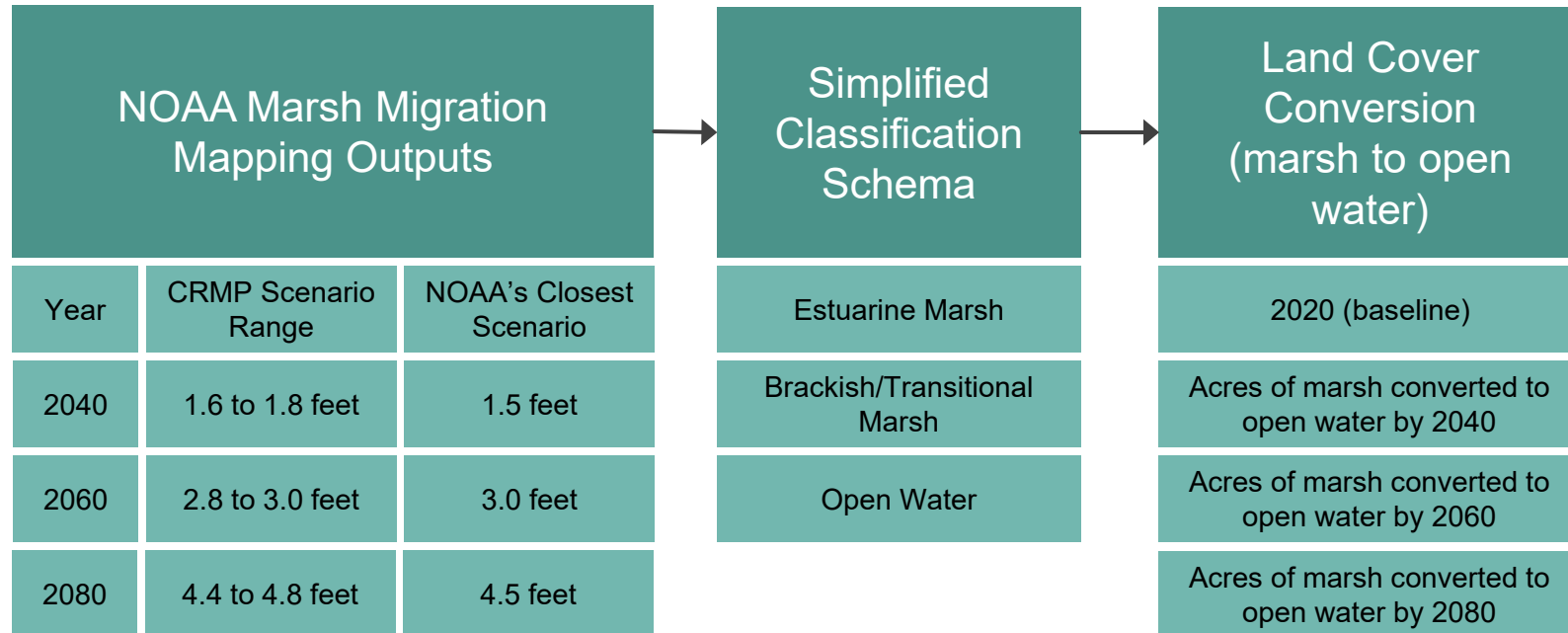
# Impacts to Natural Infrastructure

## Loss of Wetland Habitat



# Impacts to Natural Infrastructure

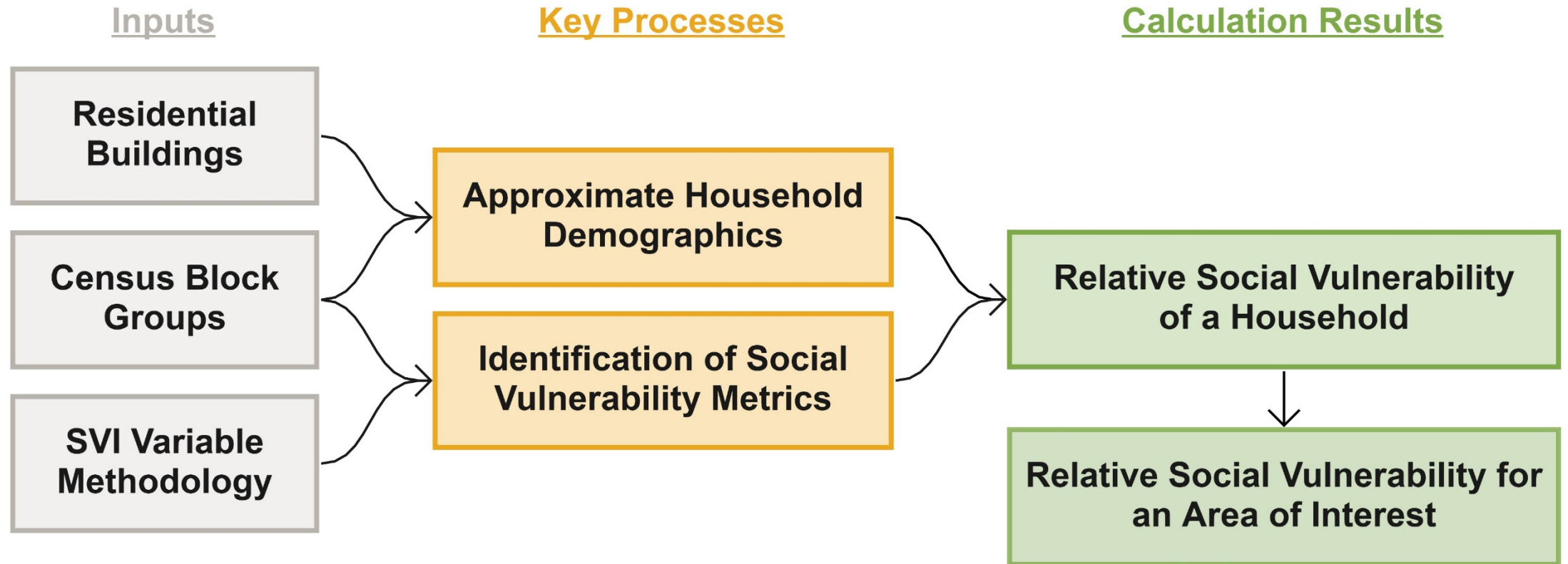
## Loss of Wetland Habitat



# Impacts Related to Underserved Communities

- Underserved Communities are defined using two factors:
  - **Social Vulnerability** – Populations that experience the adverse impacts of coastal hazards more acutely than other groups due to demographic characteristics.
  - **Jurisdictional Resources & Capacity** – Jurisdictional areas that suffer from a relative lack of financial resources and technical capacity for resilience planning and project implementation, relative to other areas.

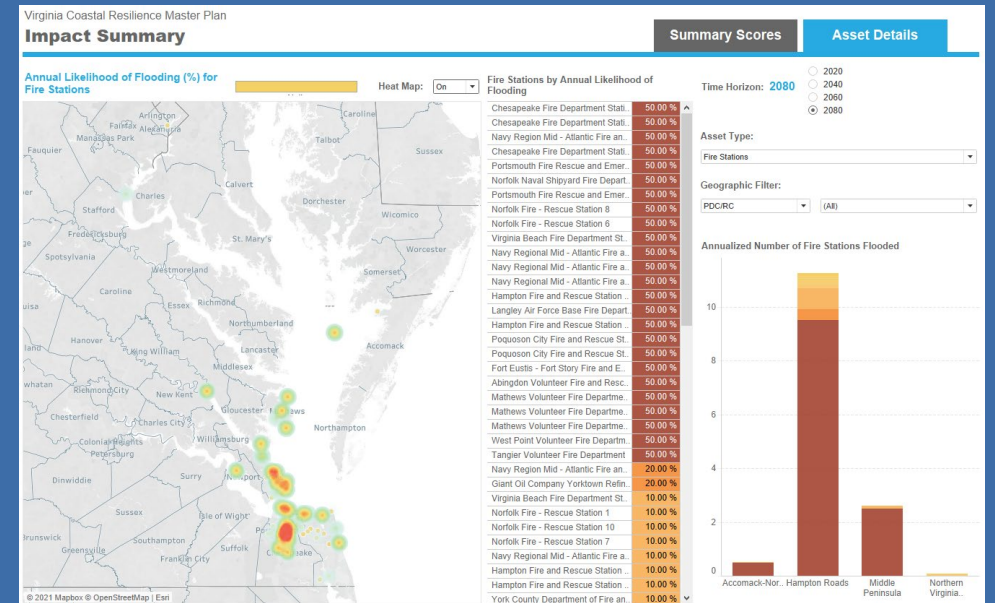
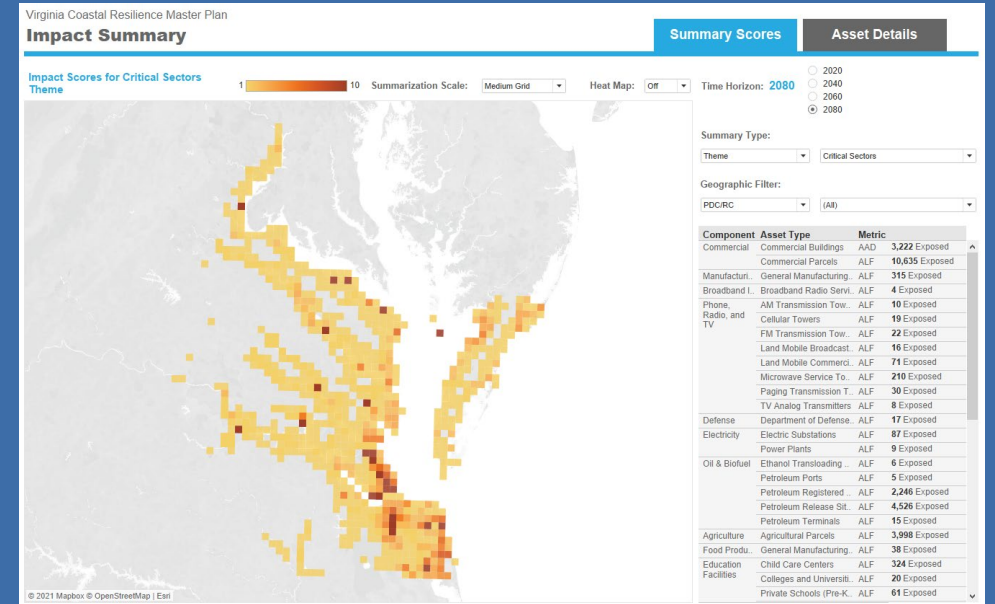
# Process for Assessing Social Vulnerability





# Next Steps

- Impacts Summarization
- Project Gap Analysis
- Data Updates and Refinements
- Opportunities for Development



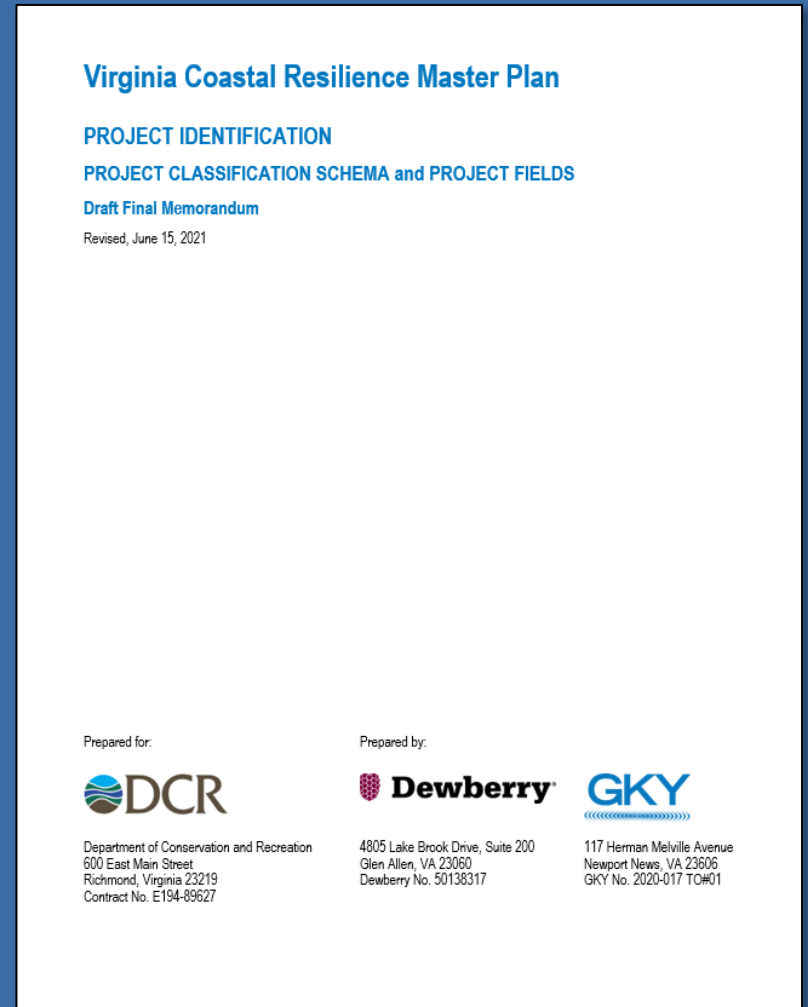
# Questions?

# Project Identification Criteria

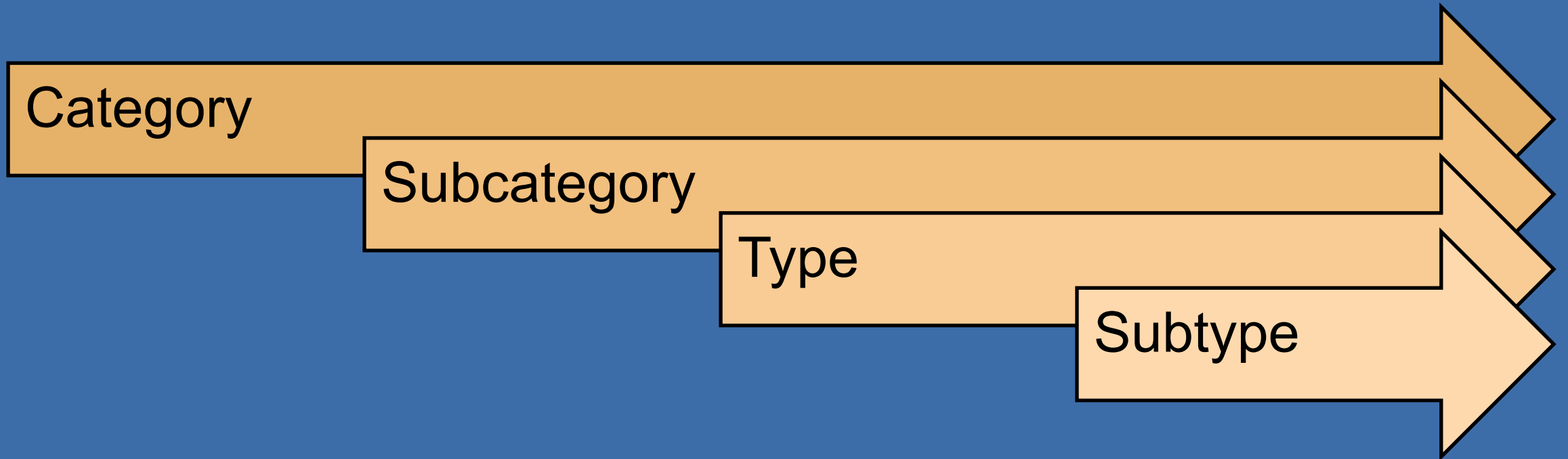
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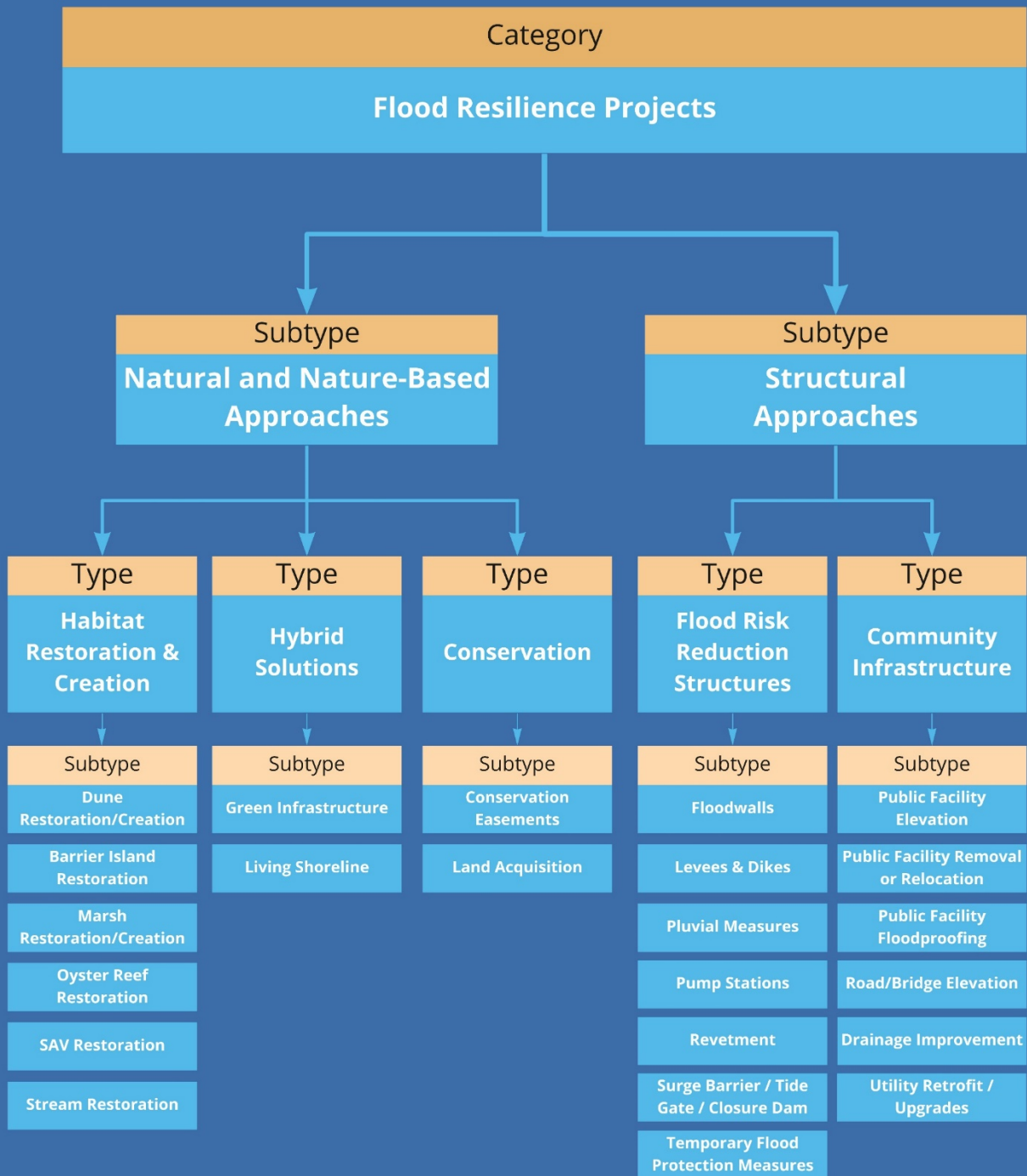
# Project Identification Criteria

- CRMP Projects Database
- Project classification schema defined
- Database field descriptions developed
- Draft document prepared
  - Project classification schema
  - Project attributes
- Data call

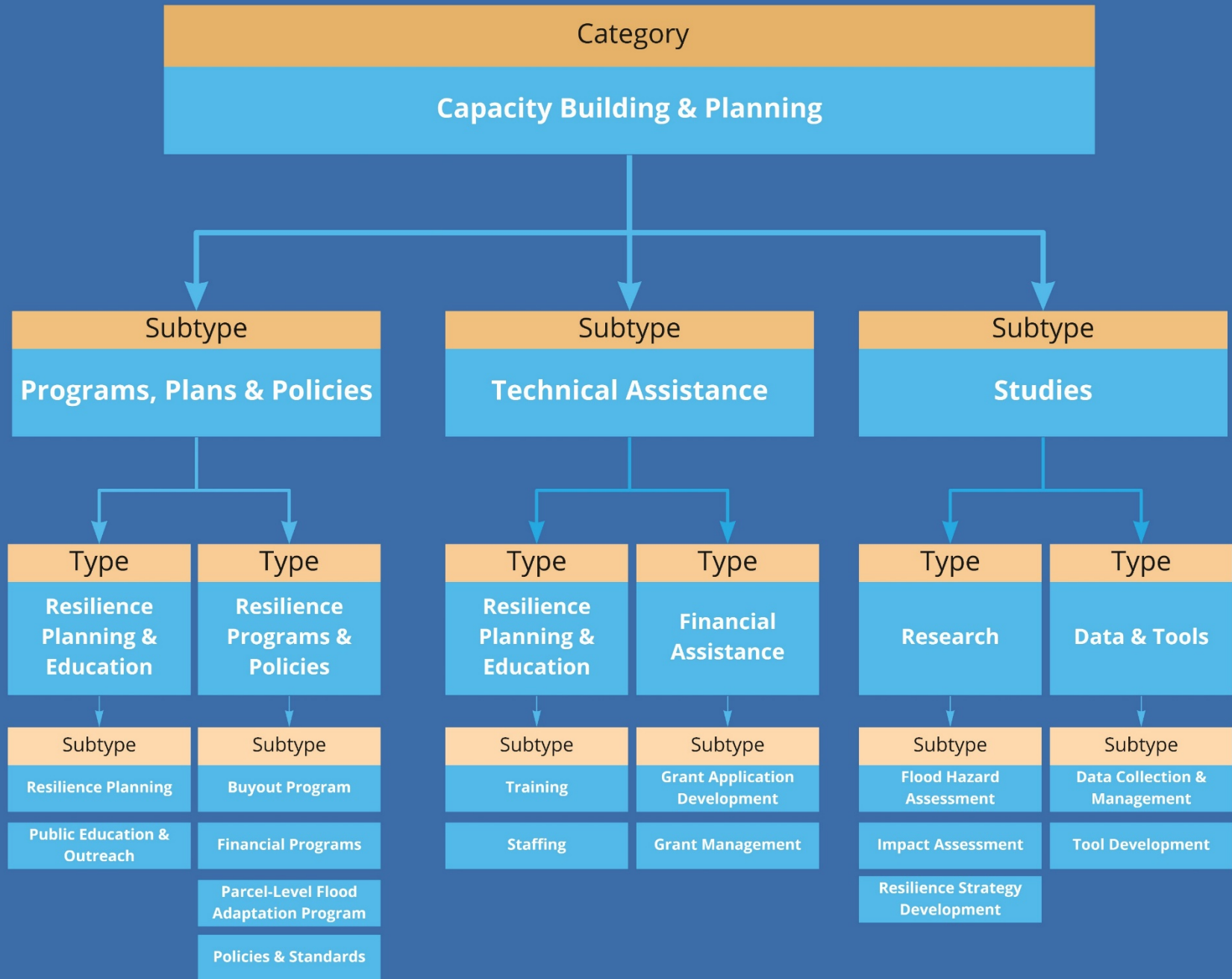


# Classification Schema





“**Project**” – defined as an effort that addresses a flood resilience response to sea level rise, tidal, storm surge, coastal, or rainfall-sourced (pluvial/fluviial) flooding, for localities within the Coastal Communities.



# Attributes

Both Categories

Flood Resilience  
Projects

Capacity Building &  
Planning

- Required Fields
- Optional Fields
- Populated Fields



# Attributes – Both

Required	Optional	Populated
Contributor contact info	Owner classification	Category
Owner	Start date	Subcategory
Description	Completion date	Type
Type and subtype	Project URL	NFIP community
Funding status (cost share)	Notes	CRS community
Funding status (applications)		SFHA area

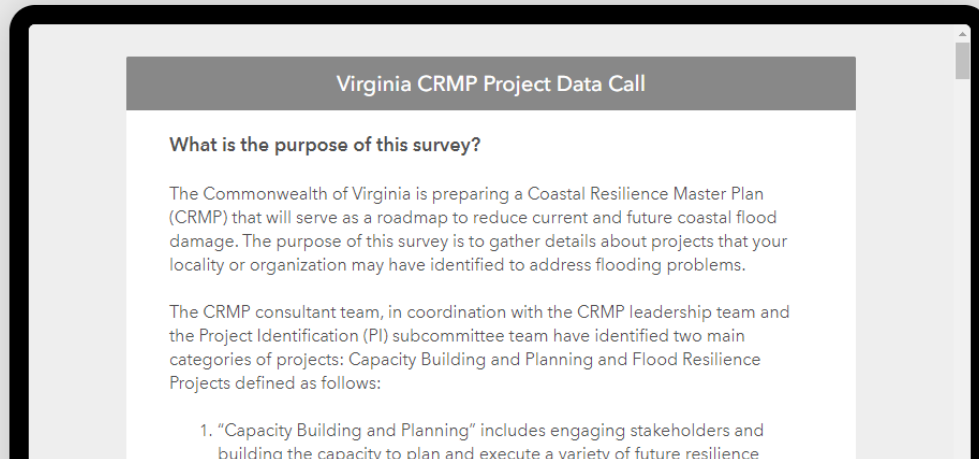
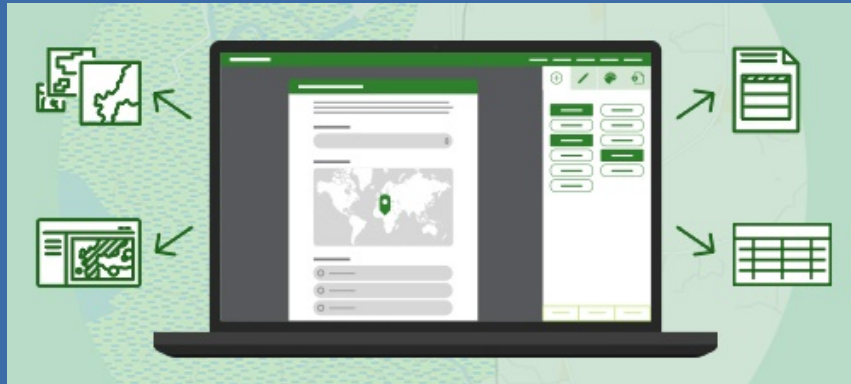
# Project Attributes – Flood Resilience Projects

Required	Optional	Populated
Project name	Design life	Evaluation scores
Purpose and need	Planning, engineering, permitting cost	
Footprint	Construction cost	
Scale	Annual O&M cost	
Status in 2021	Land cost	
Future conditions considered?		
Total implementation cost		

# Attributes – Capacity Building & Planning

Required	Optional	Populated
Purpose and need		Evaluation scores
Geographic location		
Status in 2021		
Total implementation cost		
Resilience planning considered?		

# Data Call – Survey123



## Isn't this information available already?

Yes! Some information is available but it is incomplete or outdated. Some information was provided by third or fourth parties rather than directly by contributors, and some did not contain key project attributes to enable project evaluation and prioritization.

The Commonwealth wants your projects represented correctly and equitably, and this can only happen if the information about them is accurate and current.

## How will this information be used?

The contributed project information will be used to evaluate projects against the CRMP guiding principles and prioritize projects for purposes of the CRMP.

## What is the minimum information that I need to provide?

This survey is organized into two sections, Required and Optional.

- *Required Fields* - attributes that are essential to characterize your projects and evaluate their effectiveness. While some projects might not be fully ready to answer some of these questions, please provide your best guess.
- *Optional Fields* - project attributes that are desirable and would help better assess the merits of your project, which could improve its chances of being funded.

## What projects should I focus on first?

To help you focus your effort (as a provider of projects), for the first iteration, we are focusing on projects addressing primarily coastal hazards. Future iterations will bring additional focus to fluvial and pluvial hazards and related mitigation projects. However, Project owners may submit such projects at any time, so that we understand the priority, need, and number of such projects.

## Need additional guidance?

Please see the [Project Identification: Project Classification Schema and Project Database Fields memo](#) for additional background and definitions.

# Data Call – Capacity Building & Planning

## Virginia CRMP Data Call - Capacity Building & Planning

### Required Fields

#### Contributor Name\*

Please provide the name of the person familiar with the project planning who can answer questions; typically, an employee of—or agent for—the project owner. The contributor should be the contact person providing the project information for this data call.

#### Contributor Contact Info\*

Please provide the project contributor's email address, in case we need to reach them to clarify information about the project.

#### Title\*

Please provide a short, descriptive title that will distinguish this initiative from other proposals and indicate the purpose.

#### Description\*

Please provide a brief description of the Capacity Building and Planning need. This should be two sentences long in most cases. The first sentence should clearly state the scope and goals of the project. The second sentence should state the expected outcome from the project and its relevance to the CRMP.

#### Purpose & Need\*

What is the primary purpose and need for the Capacity Building and Planning initiative? Select all that apply:

Community resilience - the initiative would increase the capacity of the community to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimal damage to social well-being, health, the economy, and the environment.

Economic resilience - the initiative would lead to the protection or adaptation of critical assets, systems, and networks that are vital to everyday functions, that if damaged or destroyed, would have debilitating effects on the economy, public health, and safety, and/or security.

Ecosystem resources

Risk aware jurisdiction and future

#### Geographic Location\*

Please list the Virginia locality or localities the Capacity Building and Planning initiative is expected to benefit, i.e., the counties, cities, towns, and tribal territories that comprise the eight coastal Planning District Commissions and Regional Commissions (PDCs/RCs). This directory (<https://www.vapdc.org/pdc-directory>) can help you determine which counties, cities, and towns comprise the Commonwealth's PDCs/RCs.

It can be assumed that Capacity Building would benefit the entire community (e.g. locality or localities) it is intended to serve.

Please separate names of counties, cities, towns, and tribal territories, separated by commas.

# Data Call - Flood Resilience Projects

## Virginia CRMP Data Call - Flood Resilience Projects

### Required Fields

#### Project Name\*

Please provide a short, descriptive name that will distinguish it from other project proposals and indicate the project purpose.

#### Project Description\*

Please provide a short, descriptive name that will distinguish it from other project proposals and indicate the project purpose.

1000

#### Contributor Name\*

Please provide the name of the person familiar with the project planning who can answer questions; typically, an employee of—or agent for—the project owner. The contributor should be the contact person providing the project information for this data call.

### Future Condition Consideration\*

To what degree does the project account for future increases in flooding? Select all that apply.

The project considers the SLR Scenario in alignment with the CRMP (defined as the NOAA 2017 Intermediate-High sea level rise projection)

Local Standards that are higher and more risk-averse than CRMP SLR Scenario

Local Standards that are lower than and less risk-averse CRMP SLR Scenario

The project considers increased rainfall

The project does not consider future sea level or rainfall conditions

# Data Call - Flood Resilience Projects

## Project Footprint

Use the map tool below to draw the approximate geographic footprint of the project installation (not the overall benefit area).

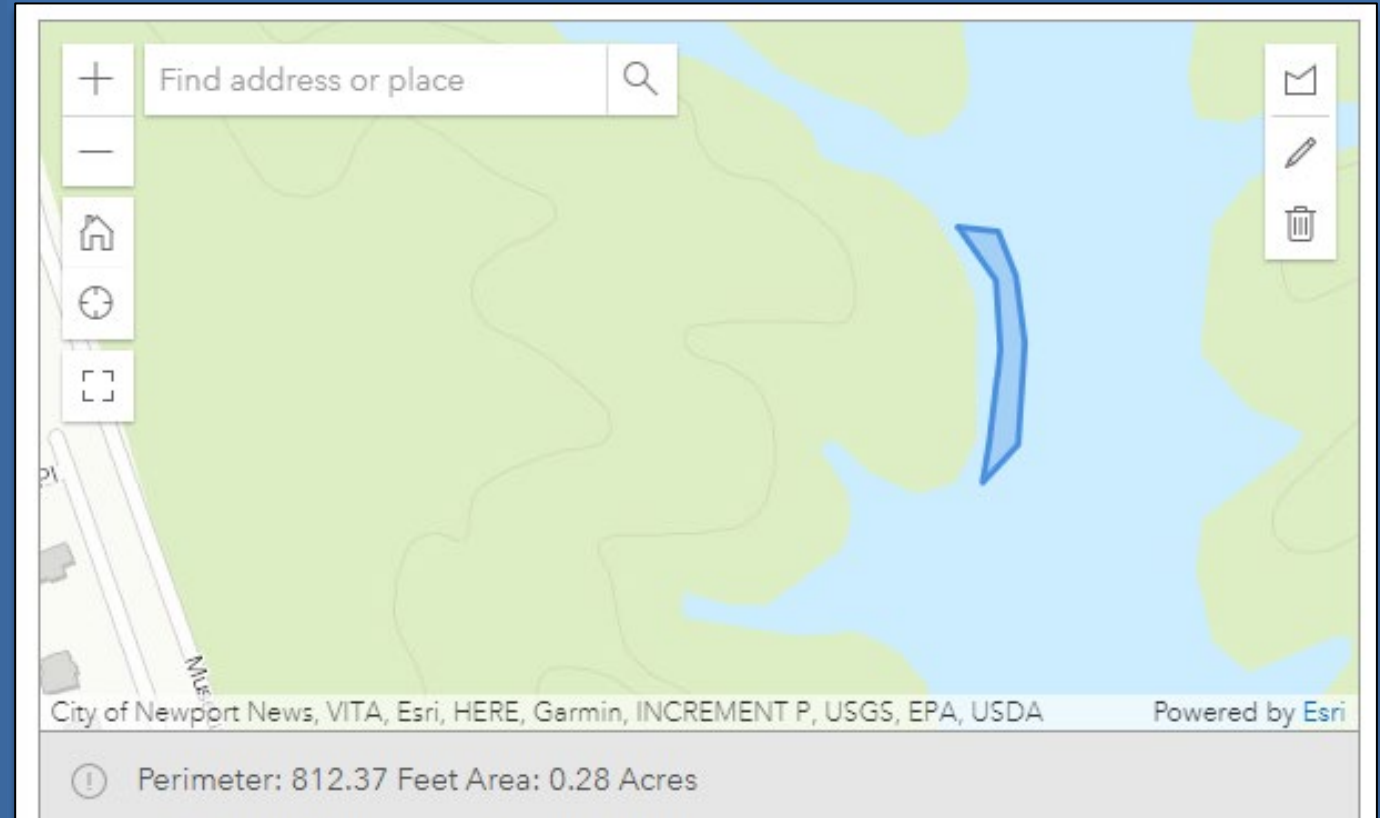
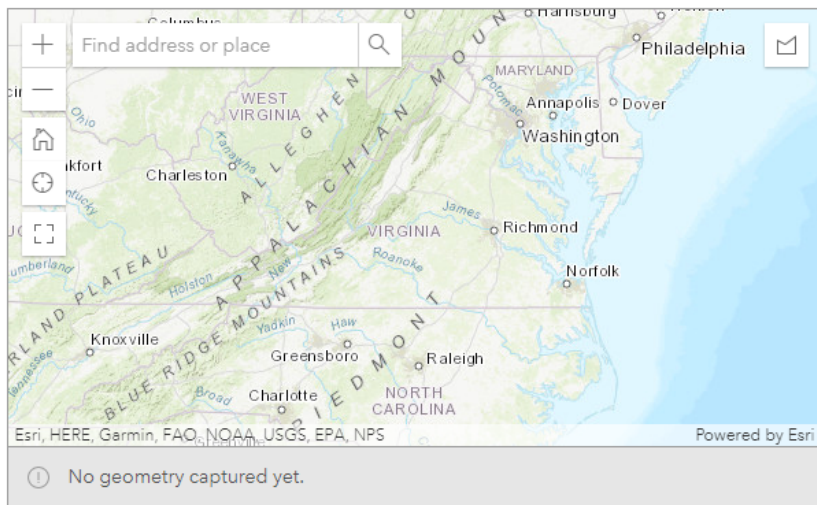
Polygon - this is the term used for the shape of your project location. It is made up of multiple vertices (i.e. points).

### Tips:

1. Expand the window to make it larger and easier to use.
2. Navigate to the location where you will be creating your polygon by using the Zoom In/Out feature or the 'Find address or place' search bar.
3. Click the Area widget, located at the top-right of the screen.
4. Move your mouse to the map. Click once to create the first vertex. Move your mouse to the next place you want to place another vertex. Continue placing vertices until you are ready to close the polygon. To finish, double click.
5. You can use the Undo, Reset, Cancel, Delete and Edit tools to revise your polygon.
6. When you are finished, click the "X" button in the upper-righthand corner.

The footprint will depend on the type and scale of your project. A few examples include:

- A project footprint for a structural or natural infrastructure project should represent the estimated extent of the project, once it has been implemented.
- A project footprint for a land conservation strategy (e.g. acquisition or conservation easement) would represent the area of land (e.g. parcel)



# Questions?



# Project Evaluation & Prioritization Approach

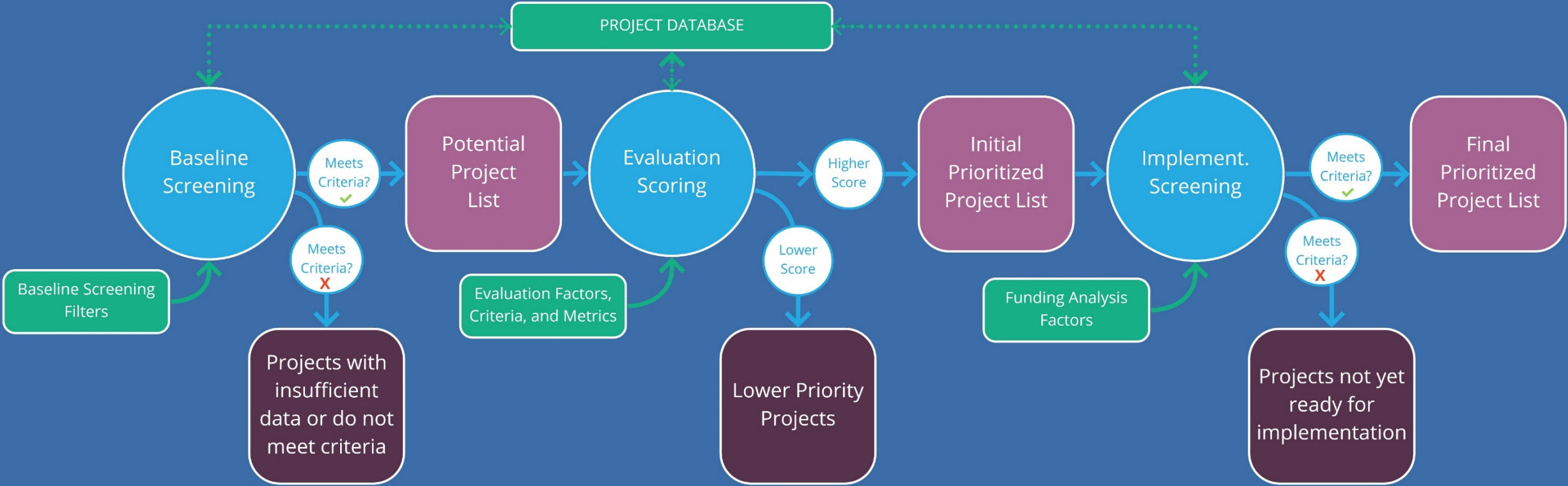
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# Objectives

- Review the CRMP Framework to shape the prioritization approach.
- Leverage lessons learned from other plans into a Virginia-specific approach.
- Coordinate with Coastal Flood Hazard, Impact Assessment, and Project ID Tasks to understand potential data sources for evaluation factors.
- Engage with the Commonwealth and TAC to gather perspective on approach and incorporate feedback.

# Approach

Inputs    Process    Outputs (Project Lists)

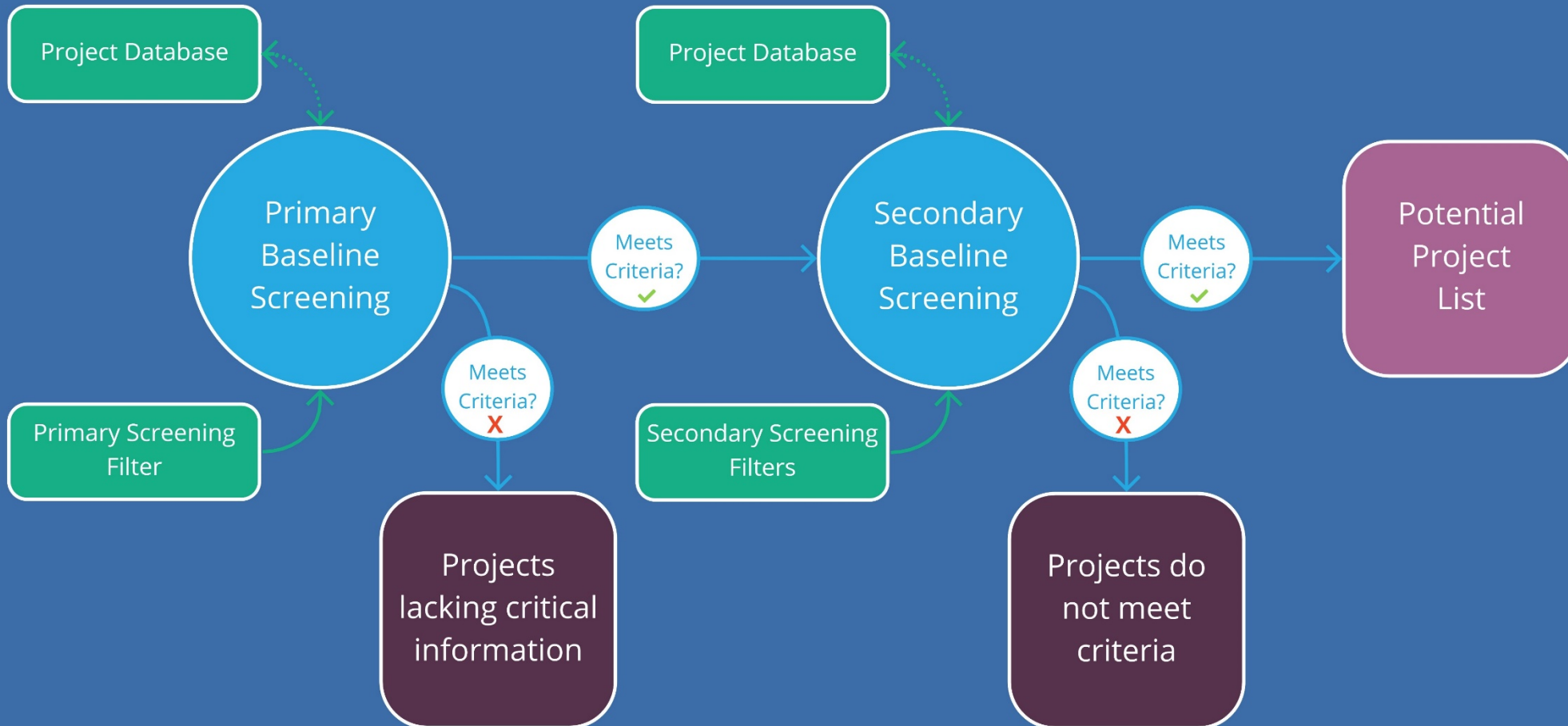


# Evaluation Approaches

- Project Owner Input
- Quantitative Analysis
- Qualitative Analysis
- Expert Evaluation

# Baseline Screening

Inputs Process Outputs (Project Lists)



# Primary Screening Filter: Extent of Information Provided

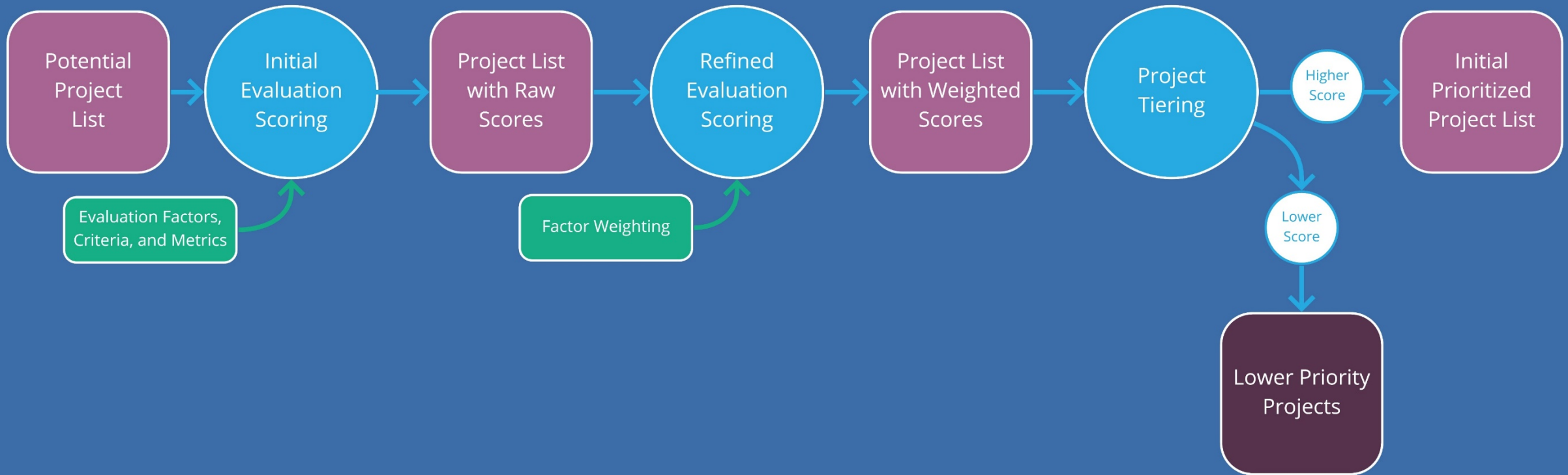
- Screening Criteria (Yes/No): does the project have the minimum information required to enable prioritization?
  - Project Name & Description
  - Project Type
  - Project Purpose & Need
  - Project Owner
  - Geographic Location
  - Resilience Considerations
  - Project Scale / Impact Area
  - Project Status

# Secondary Screening Filters: Against CRMP principles

- Is the project located within Virginia coastal PDCs/PCs
- Is the project not already complete?
- Does the project addresses flood resilience to sea level rise, tidal, storm surge, coastal, or pluvial/fluvial flooding?
- Is the project unique?

# Evaluation Scoring

Inputs Process Outputs (Project Lists)

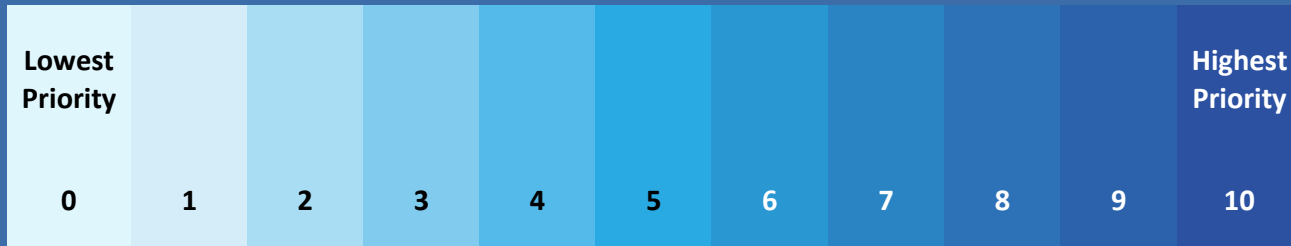




# Flood Resilience Projects

- Factor 1: System Performance & Design
  - Criteria 1.A: Resilient Design Criteria
  - Criteria 1.B: Nature-Based Approaches
  - Criteria 1.C: Flood Reduction Potential
  - Criteria 1.D: Project Purpose & Need
- Factor 2: Extent of Benefits & Impacts
  - Criteria 2.A: Project Scale
  - Criteria 2.B: Adverse Impacts
- Factor 3: Co-Benefits
  - Criteria 3.A: Critical Infrastructure Co-Benefits
  - Criteria 3.B: Social & Cultural Co-Benefits
  - Criteria 3.C: Natural Infrastructure Co-Benefits

# Metrics & Scores

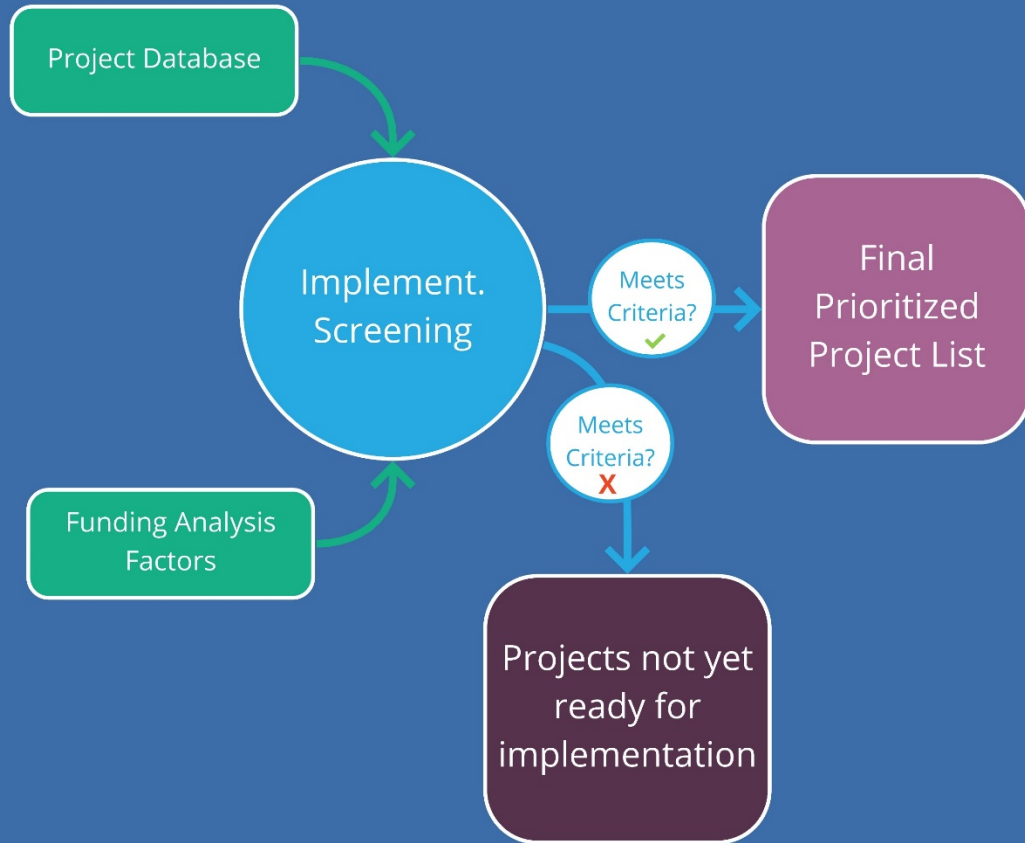


Metric	Basis for Metric Ranking	Score (Additive)
Tidal Flooding	The project is intended to reduce flooding caused by today's daily or extreme high tides	2
Storm Surge Flooding	The project is intended to reduce flooding caused by coastal storms including nor'easters and hurricanes	2
Riverine Flooding	The project is intended to reduce flooding caused by overflowing of rivers and streams	2
Stormwater Flooding	The project is intended to reduce flooding caused by lack of drainage or overflowing drainage systems due to intense rainfall	2
Shoreline Erosion	The project is intended to reduce loss or displacement of land, vegetation, or sediment along the coastline	1
Groundwater Impacts	The project is intended to reduce impacts associated with changes in the boundary between freshwater and saltwater	1

Factors	Criteria	Metrics & Scores
<b>Factor 1: System Performance &amp; Design</b> Incorporates forward-looking and adaptive design principles.	<b>1.A. Resilient Design Criteria:</b> The project incorporates resilient design standards (e.g. Sea Level Rise scenarios).	<ul style="list-style-type: none"> <li>Standards more conservative than CRMP standards</li> <li>CRMP standards</li> <li>Standards less conservative than CRMP standards</li> <li>No considerations of future conditions.</li> </ul>
	<b>1.B. Nature-Based Approaches:</b> The project incorporates nature-based design elements.	<ul style="list-style-type: none"> <li>Incorporates nature-based design elements.</li> <li>Does not incorporate nature-based design elements.</li> </ul>
	<b>1.C. Flood Reduction Potential:</b> The project is expected to reduce economic flood risks today, and in the future.	<ul style="list-style-type: none"> <li>Expected to reduce existing flood risks.</li> <li>Expected to reduce near-term flood risks.</li> <li>Expected to reduce mid-term flood risks.</li> <li>Expected to reduce long-term flood risks.</li> </ul>
<b>Factor 2: Extent of Benefits &amp; Impacts</b> Maximizes positive impacts and minimizes adverse impacts.	<b>2.A. Project Scale:</b> The project is part of a larger, more comprehensive effort designed for greater impact while minimizing adverse impacts	<ul style="list-style-type: none"> <li>Large-scale project</li> <li>Pilot or demonstration project.</li> <li>Small-scale project.</li> </ul>
	<b>2.B. Adverse Impacts:</b> The project is not anticipated to result in adverse impacts beyond the project area.	<ul style="list-style-type: none"> <li>Unlikely to result in adverse impacts.</li> <li>Likely to result in adverse impacts.</li> </ul>
<b>Factor 3: Co-Benefits</b> Provides multiple co-benefits to the social, built, and natural environment.	<b>3.A. Critical Infrastructure Co-Benefits:</b> The project protects infrastructure critical for national security, public health and safety, or the economy.	<ul style="list-style-type: none"> <li>Benefits transportation systems.</li> <li>Benefits public health and safety assets.</li> <li>Benefits energy and communication assets.</li> <li>Benefits agricultural lands.</li> <li>Benefits other critical facilities.</li> </ul>
	<b>3.A. Social and Cultural Co-Benefits:</b> The project protects exposed populated areas, and historic, cultural, & tribal resources.	<ul style="list-style-type: none"> <li>Benefits chronically underserved communities.</li> <li>Benefits communities with high social vulnerability.</li> <li>Benefits one or more cultural resources.</li> <li>Benefits one or more tribal resources.</li> </ul>
	<b>3.C. Natural Infrastructure Co-Benefits:</b> The project protects or enhances the Commonwealth's natural infrastructure conservation priorities.	<ul style="list-style-type: none"> <li>Benefits the critical natural infrastructure.</li> <li>Does not benefit critical natural infrastructure.</li> </ul>

# Implementation Screening

Inputs Process Outputs (Project Lists)



# Next Steps

- Factor weighting
- Project tiering
- Sample project testing and refinement
- Initial prioritized project list
- Final prioritized project list

# Questions?

# Outreach

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# Outreach and Engagement



## Current Efforts

- Public Stakeholder Survey
- Centralized Stakeholder Survey
- Outreach Toolkit for Strategic Partners
- Webpage Content
- Stakeholder Contact Lists for PDCs, Local Governments, Tribal Leaders, Economic Representatives, and NGOs



## Upcoming Efforts

- PDC/Local Government Meetings
- Design Charettes
- Public Meetings
- One-on-One Interviews
- NGO Involvement
- Other Meetings:
  - Tribal Representatives
  - Military/Federal Partners
  - Chambers of Commerce

# Envisioned Schedule

June

- Public Survey Distribution
- Centralized Survey Distribution
- Outreach Toolkit Distribution
- One-on-One Interviews
- Social Media Posts
- Impact Assessment/Project Data Call

July

- Compile Survey Results
- Tribal Representative Meeting
- Military Federal Meeting
- Business/Industry Meetings
- Project Inventory - Initial Evaluation
- Design Workshop/Charettes
- Social Media Posts

Aug

- PDC/Local Government Meetings
- Underserved Population Meetings
- Project Prioritization
- New Webpage Content
- Social Media Posts



# Workshops/Charettes

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# Workshop/Charette Overview

- Four scoped across the Master Planning Regions
- Target Timeframe: Late July/Early August
- Includes:
  - Pre-Workshop Webinar
  - In-person Workshop/Charette Event
    - CRMP Project Stakeholders
  - Public Outreach Meeting

# Workshop/Charette Overview – Initial Agenda

- CRMP Overview
- Review of Hazard/Impact Assessment Outcomes
- Regional Visioning Charette
- Project Evaluation Demonstration/Feedback Session
- Stations:
  - Project Database/Data Call Support
  - Hazard/Impact Assessment
  - Project Gaps/Capacity Building Input

# Questions?