



Photo Credits: Virginia Sea Grant, Dewberry

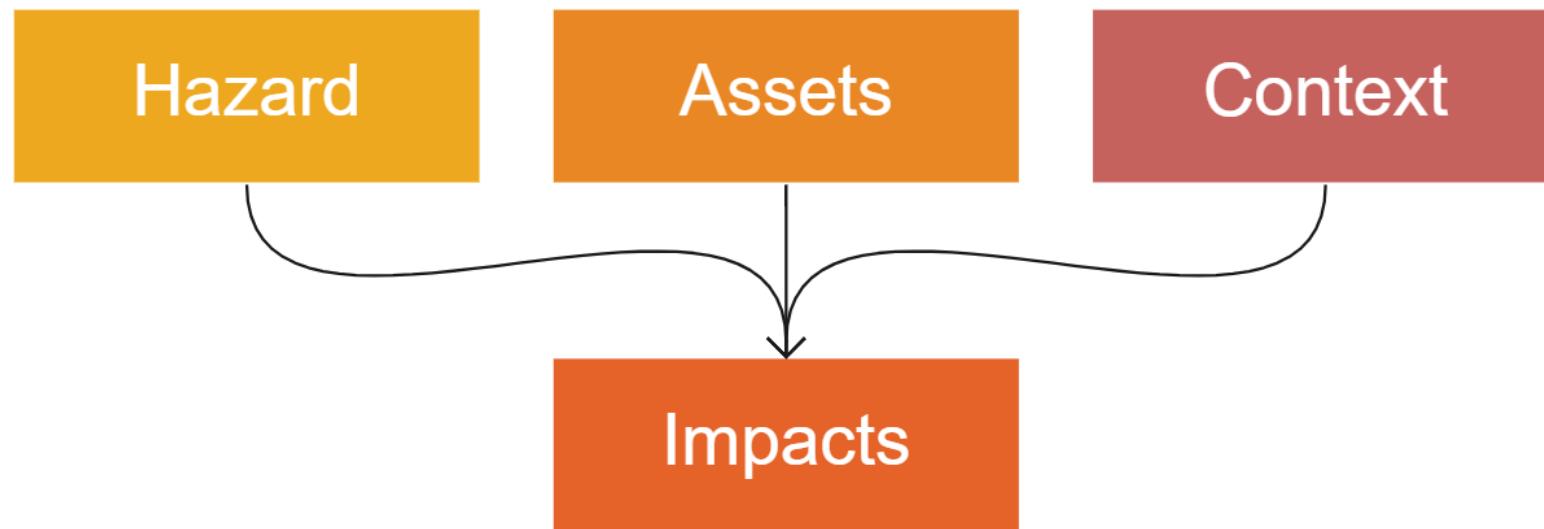
# Virginia Coastal Resilience Master Plan

Technical Advisory Committee Meeting | 6/22/2021

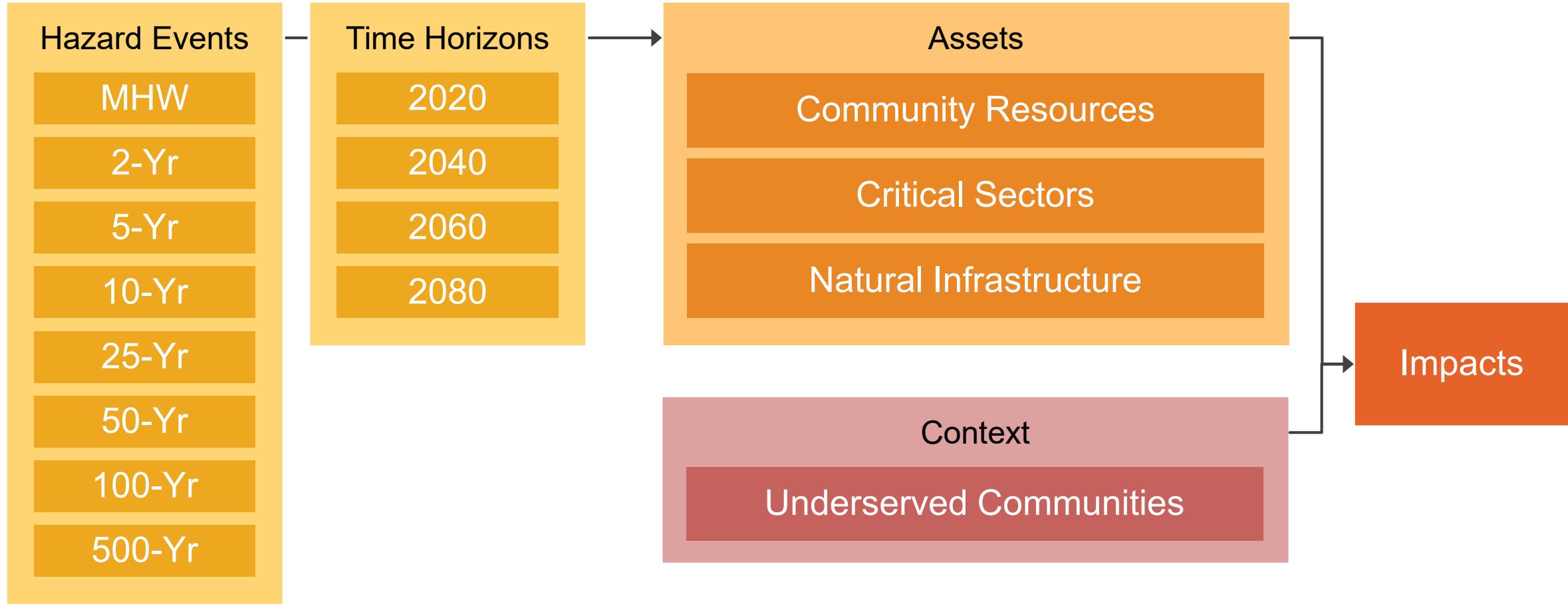
# **Built / Natural Infrastructure Impact Assessment and Summarization**

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# Impact Assessment Components



# Quantitative Impact Assessment Components



# Impacts & Examples

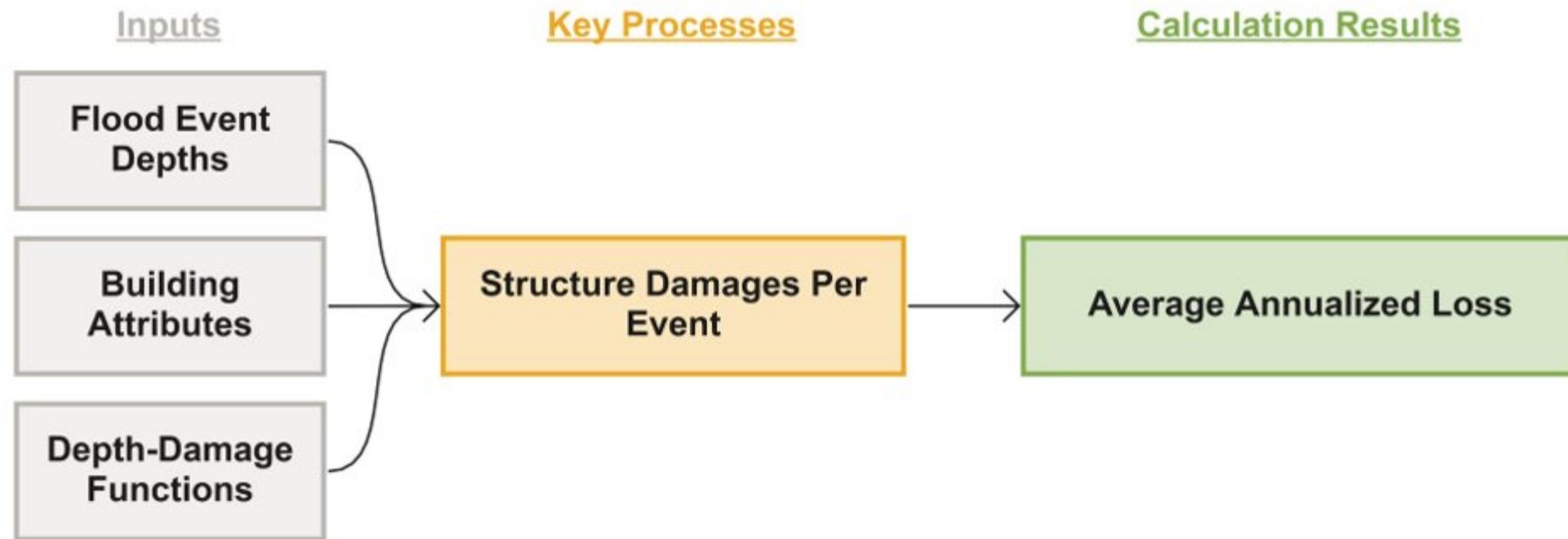
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# Impacts to Community Resources

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

# Impacts to Community Resources

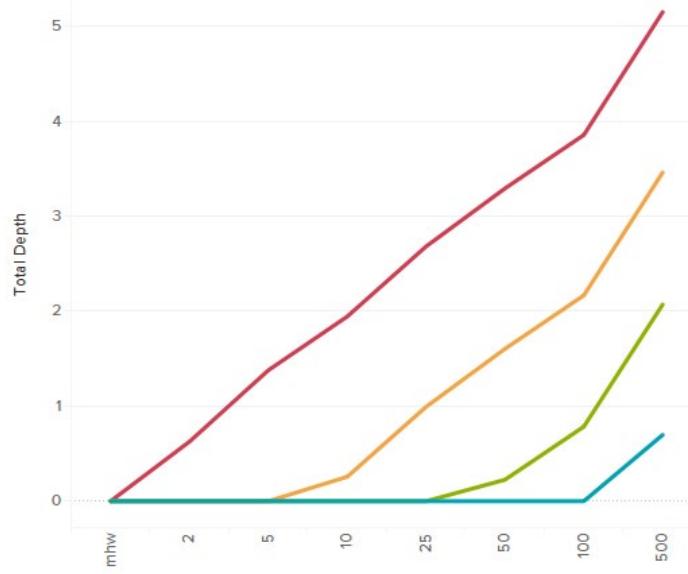
## Residential Structure Damage Example



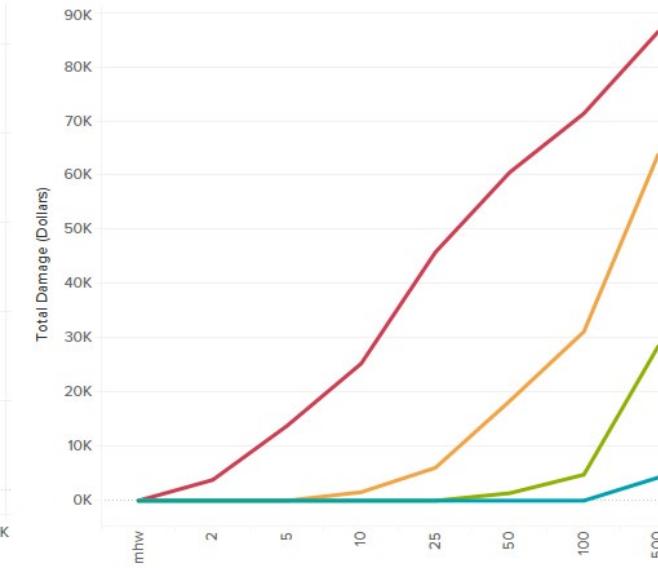
# Impacts to Community Resources

## Residential Structure Damage Example

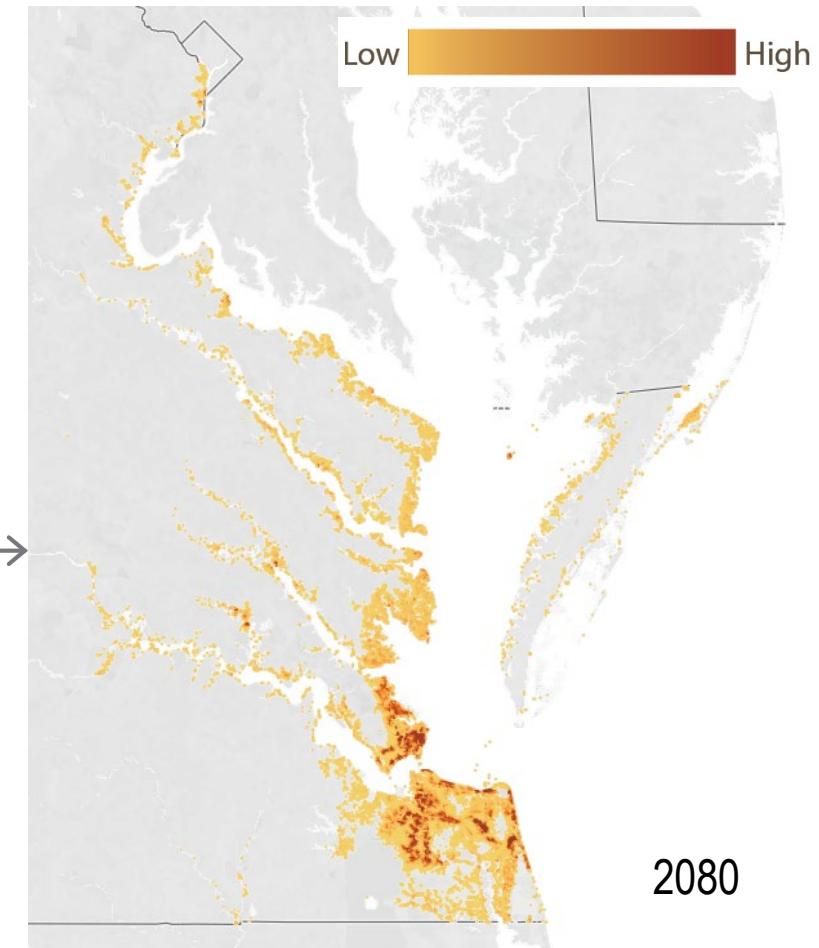
Flood Depth Curves (Hazard Exposure)



Flood Damage Curves (Economic Risk)



Average Annualized Losses Associated with Residential Structure & Contents

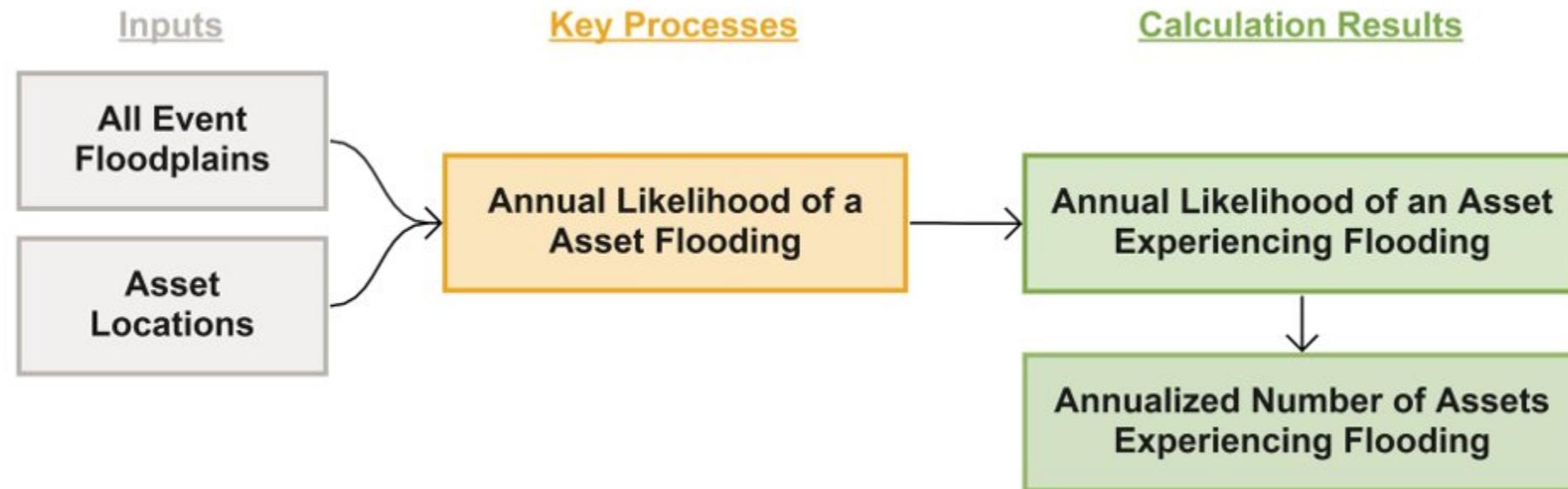


# Impacts to Critical Sectors

Asset Type	Impact Type
<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	IN						
2040	OUT	OUT	OUT	OUT	OUT	IN	IN	IN
2060	OUT	OUT	OUT	IN	IN	IN	IN	IN
2080	OUT	IN						

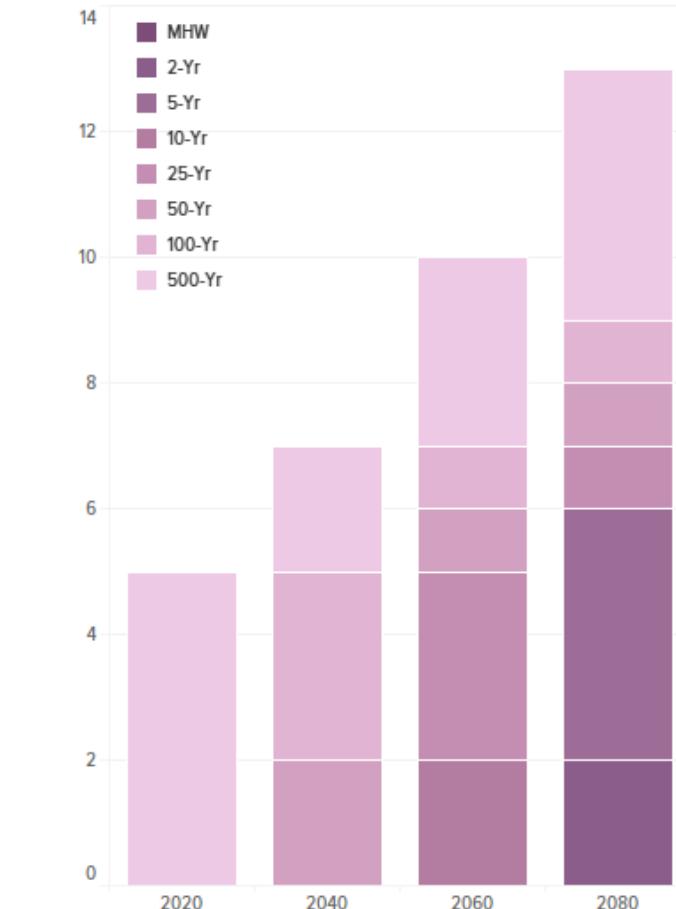
**2020**  
500-Yr Floodplain  
.2% ALF

**2040**  
25-Yr Floodplain  
4% ALF

**2060**  
5-Yr Floodplain  
.20% ALF

**2080**  
2-Yr Floodplain  
50% ALF

Number of Hospitals Exposed by Event Type

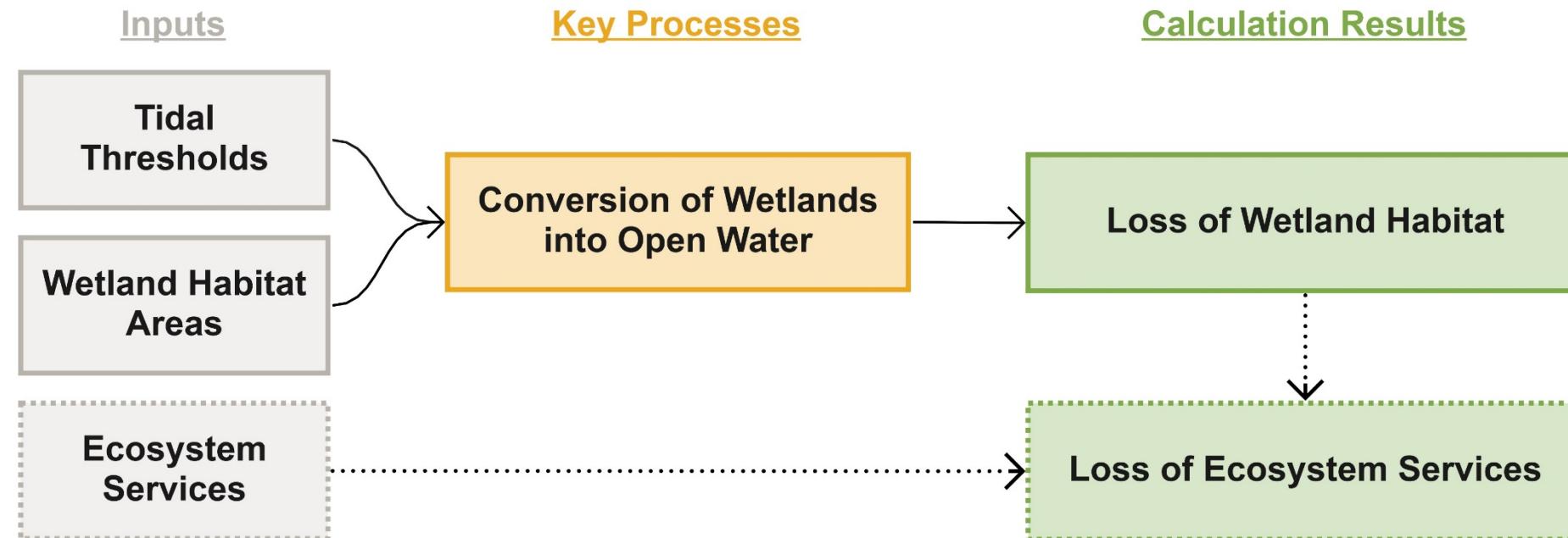


# Impacts to Natural Infrastructure

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

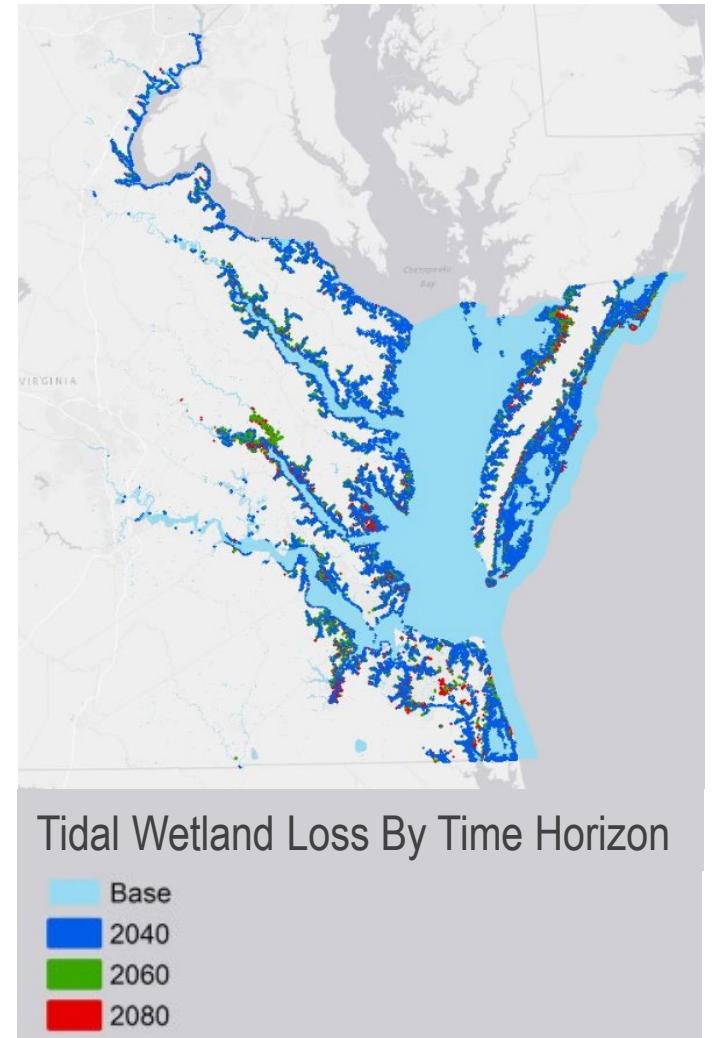
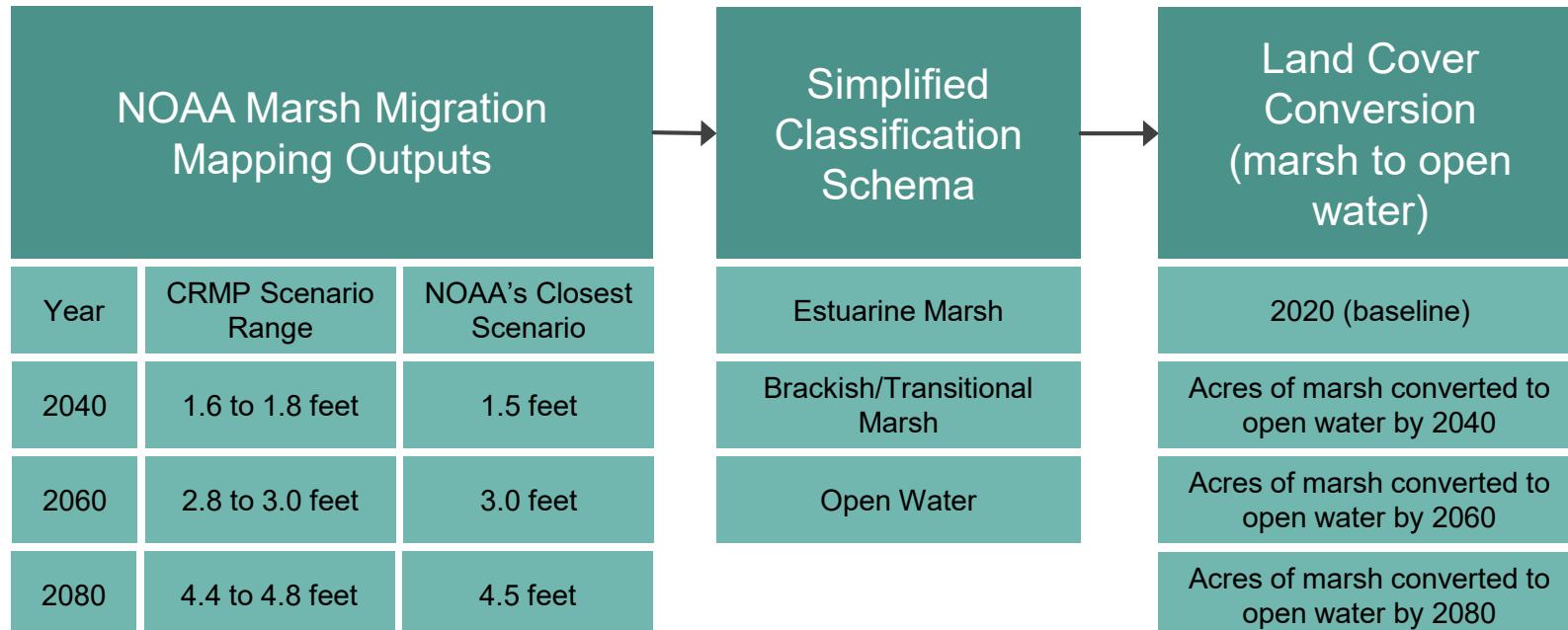
# Impacts to Natural Infrastructure

## Loss of Wetland Habitat



# Impacts to Natural Infrastructure

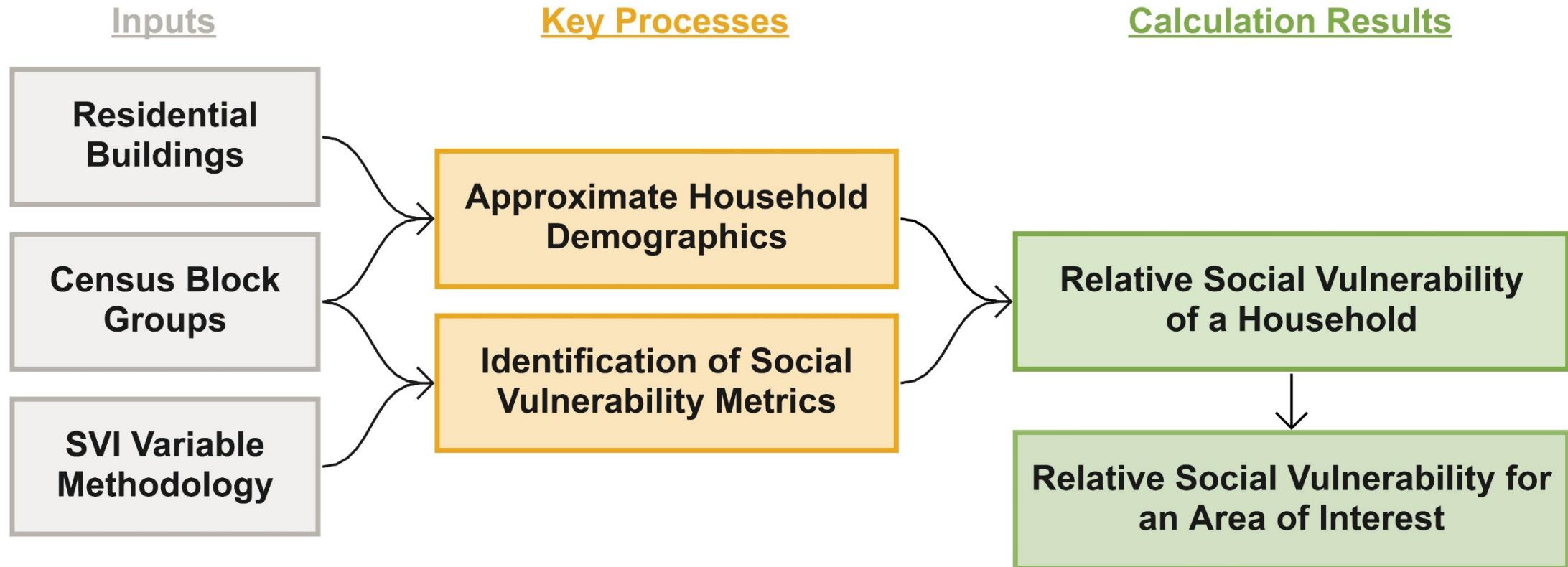
## Loss of Wetland Habitat



# Impacts Related to Underserved Communities

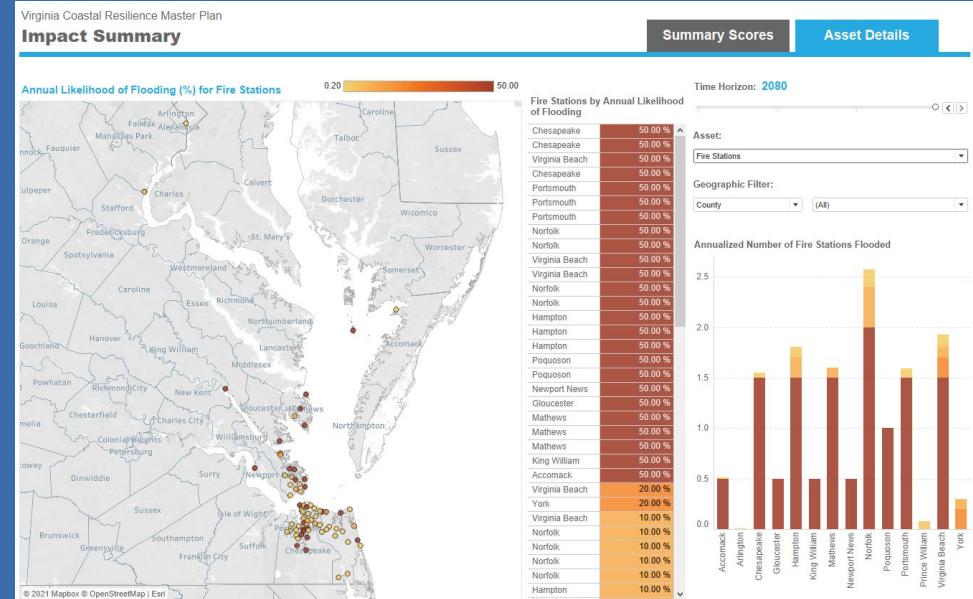
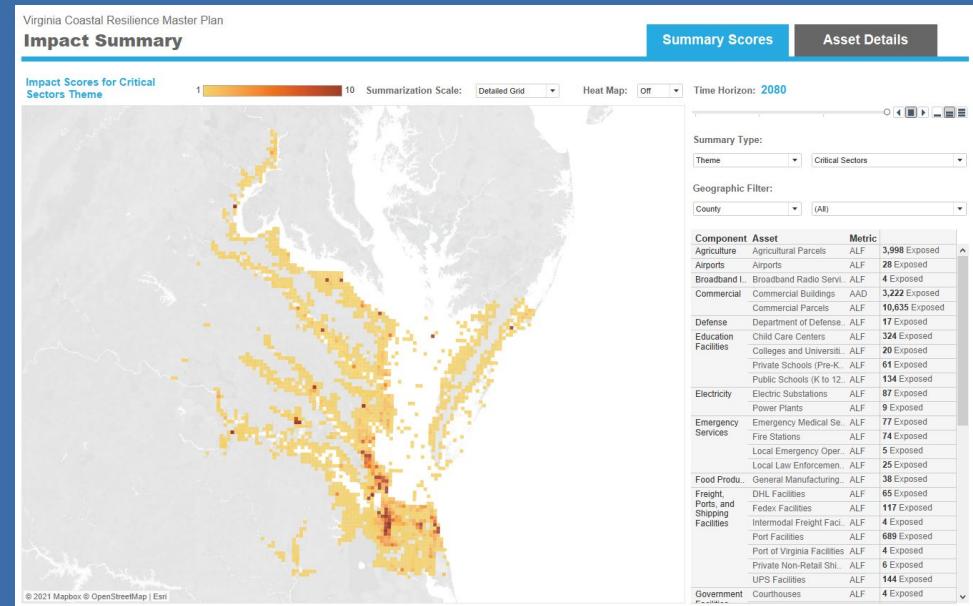
- Underserved Communities are defined using two factors:
  - **Social Vulnerability** – Populations that experience the adverse impacts of coastal hazards more acutely than other groups due to demographic characteristics.
  - **Jurisdictional Resources & Capacity** – Jurisdictional areas that suffer 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

## Virginia Coastal Resilience Master Plan

### PROJECT IDENTIFICATION

### PROJECT CLASSIFICATION SCHEMA and PROJECT FIELDS

#### Draft Final Memorandum

Revised, June 15, 2021

Prepared for:



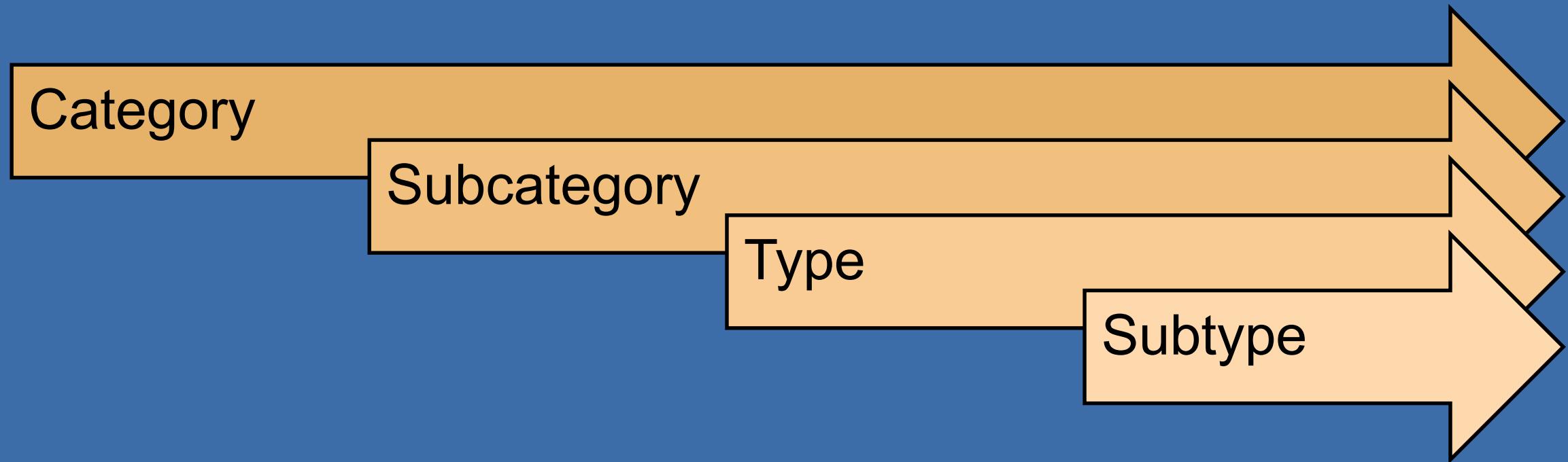
Department of Conservation and Recreation  
600 East Main Street  
Richmond, Virginia 23219  
Contract No. E194-89627

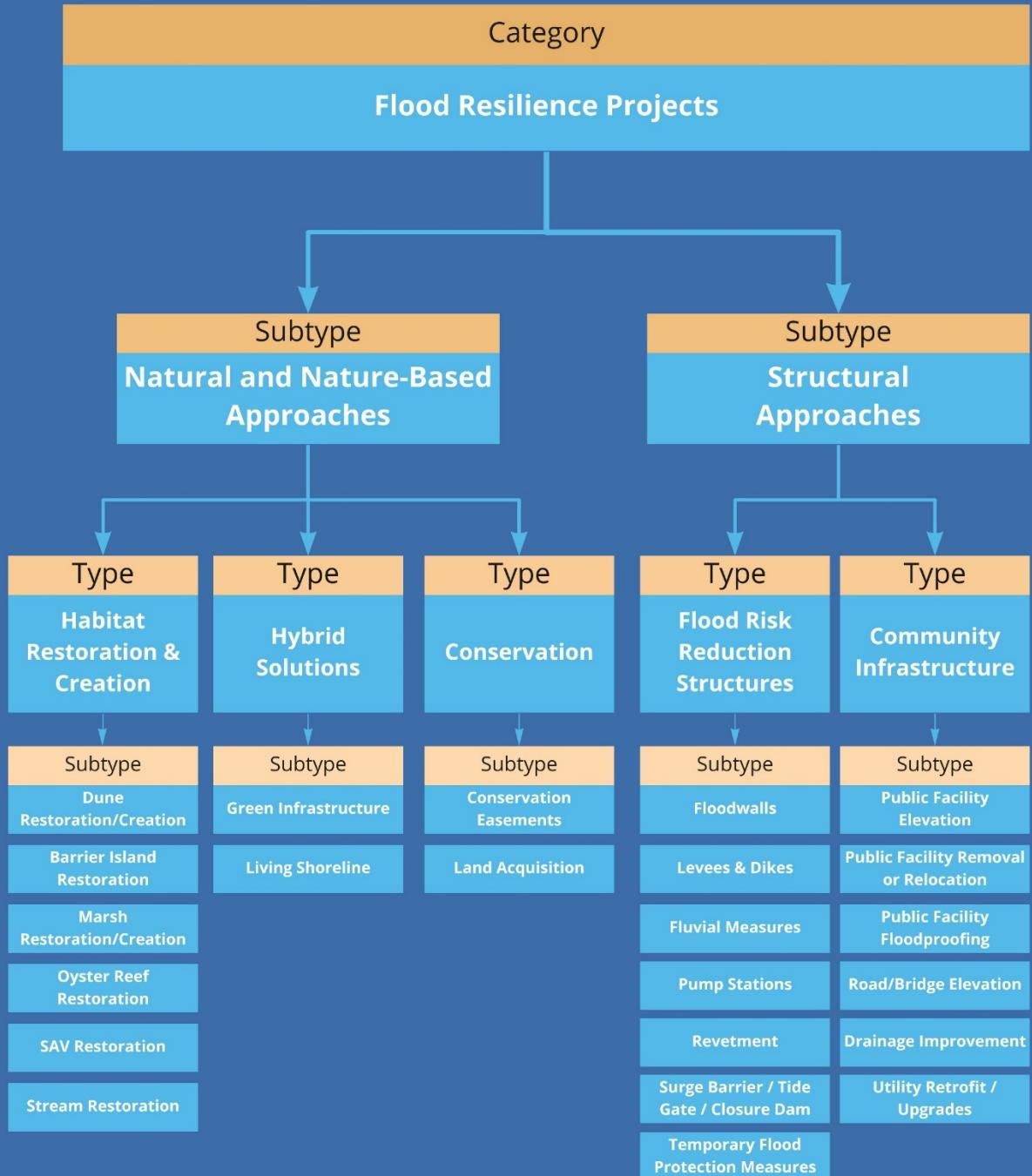
Prepared by:



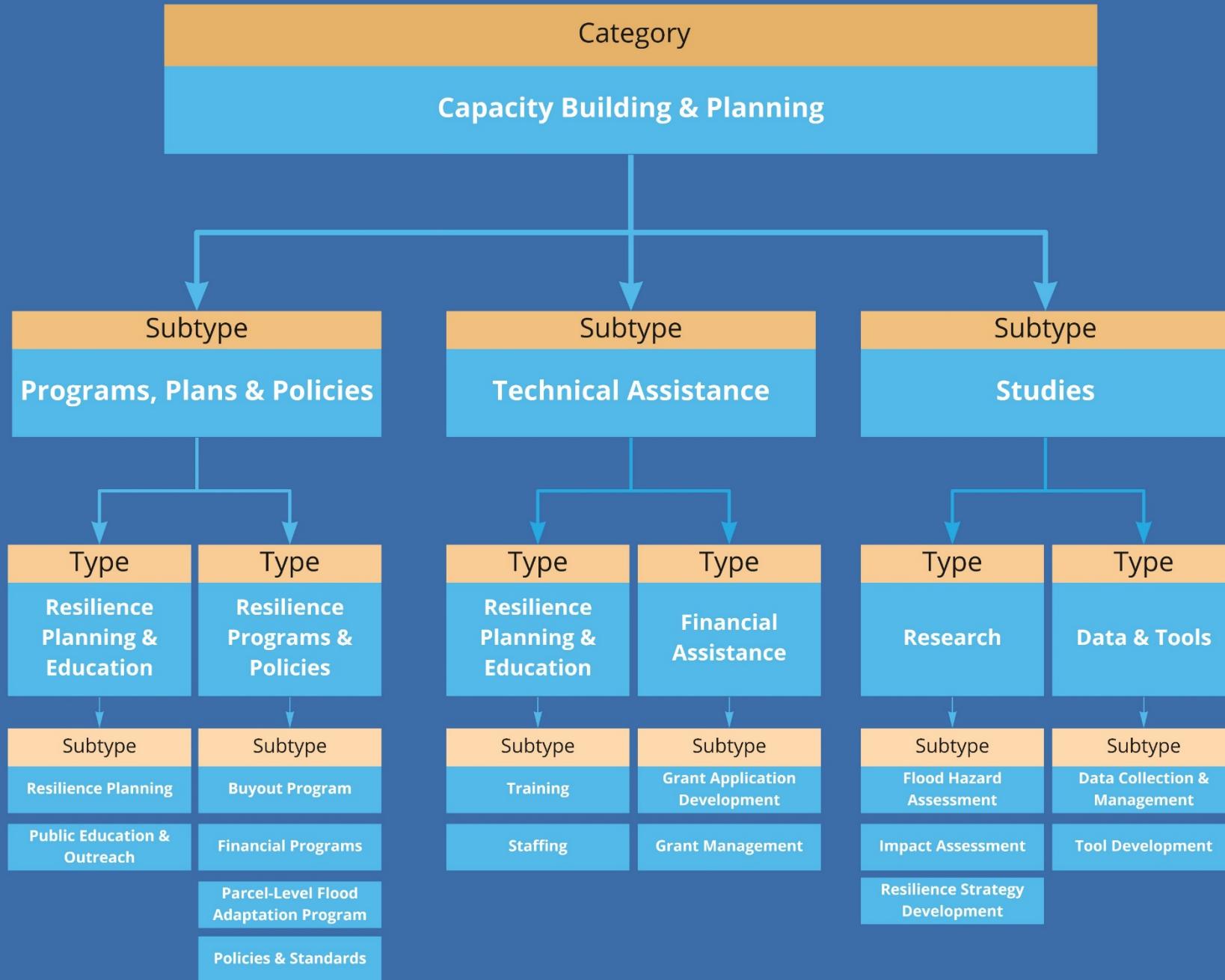
4805 Lake Brook Drive, Suite 200  
Glen Allen, VA 23060  
Dewberry No. 50138317  
117 Herman Melville Avenue  
Newport News, VA 23606  
GKY No. 2020-017 TO#01

# 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/fluvial) 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
Project Name	Owner classification	NFIP community
Contributor contact info	Start date	CRS community
Owner	Completion date	SFHA area
Description	Project URL	
Type and subtype	Notes	
Funding status (cost share)		
Funding status (applications)		

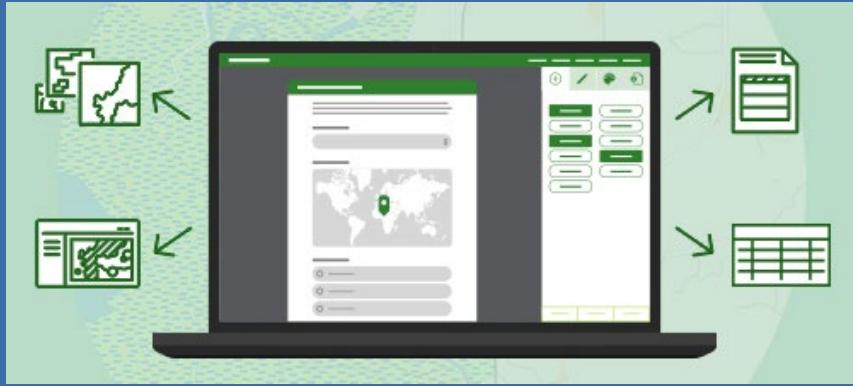
# Project Attributes – Flood Resilience Projects

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



**Virginia CRMP Project Data Call**

**What is the purpose of this survey?**

The Commonwealth of Virginia is preparing a Coastal Resilience Master Plan (CRMP) that will serve as a roadmap to reduce current and future coastal flood damage. The purpose of this survey is to gather details about projects that your locality or organization may have identified to address flooding problems.

The CRMP consultant team, in coordination with the CRMP leadership team and the Project Identification (PI) subcommittee team have identified two main categories of projects: Capacity Building and Planning and Flood Resilience Projects defined as follows:

1. "Capacity Building and Planning" includes engaging stakeholders and building the capacity to plan and execute a variety of future resilience

## 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?

**Please complete this survey by July 9 for your most important projects.** The rest of your projects can be submitted by the end of July.

To help you focus your effort (as a provider of projects), for the first iteration, we are focusing on projects addressing primarily coastal hazards. The future iteration (starting next year) will bring additional focus to fluvial and pluvial hazards and related mitigation projects. Project owners may submit such projects at that time.

## Need additional guidance?

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

### – Required Fields

### – Optional

**Submit**

[Powered by ArcGIS Survey123](#)

# Data Call – Capacity Building & Planning

Required Fields		Purpose & Need*	Geographic Location*
<b>Project Name*</b> <p>Please provide a short, descriptive name that will distinguish it from other project proposals and indicate the project purpose.</p> <input type="text"/>		<p>What is the primary purpose and need for the project? Select all that apply:</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Community resilience - the project 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.</li><li><input type="checkbox"/> Economic resilience - the project 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</li><li><input type="checkbox"/> Ecosystem resilience - the project would increase the capacity of the ecosystem 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.</li></ul>	<p>Please list the Virginia locality or localities the project 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 (<a href="https://www.vapdc.org/pdc-directory">https://www.vapdc.org/pdc-directory</a>) can help you determine which counties, cities, and towns comprise the Commonwealth's PDCs/RCs.</p> <p>It can be assumed that Capacity Building would benefit the entire community (e.g. locality or localities) it is intended to serve.</p> <p>Please separate names of counties, cities, towns, and tribal territories, separated by commas.</p> <input type="text"/>
<b>Project Description*</b> <p>Please provide a short, descriptive name that will distinguish it from other project proposals and indicate the project purpose.</p> <input type="text" value="1000"/>			
<b>Contributor Name*</b> <p>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.</p> <input type="text"/>			

# Data Call - Flood Resilience

**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.

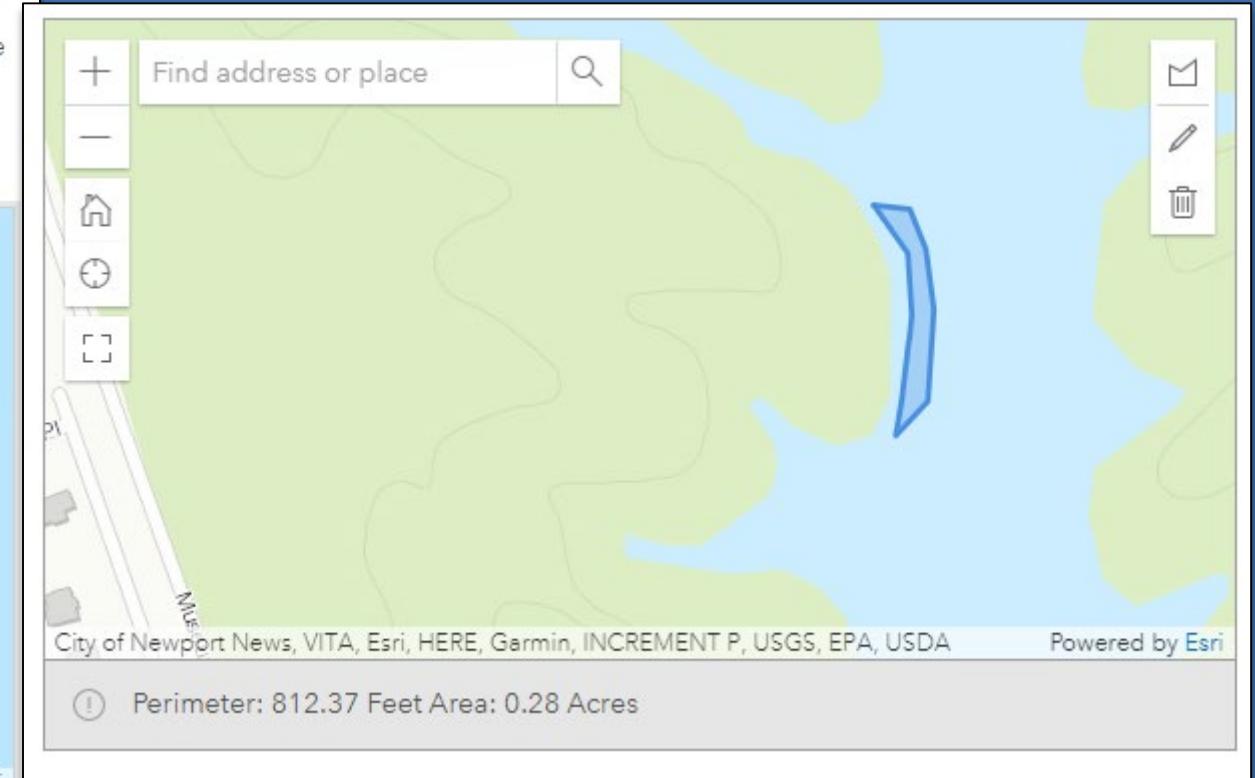
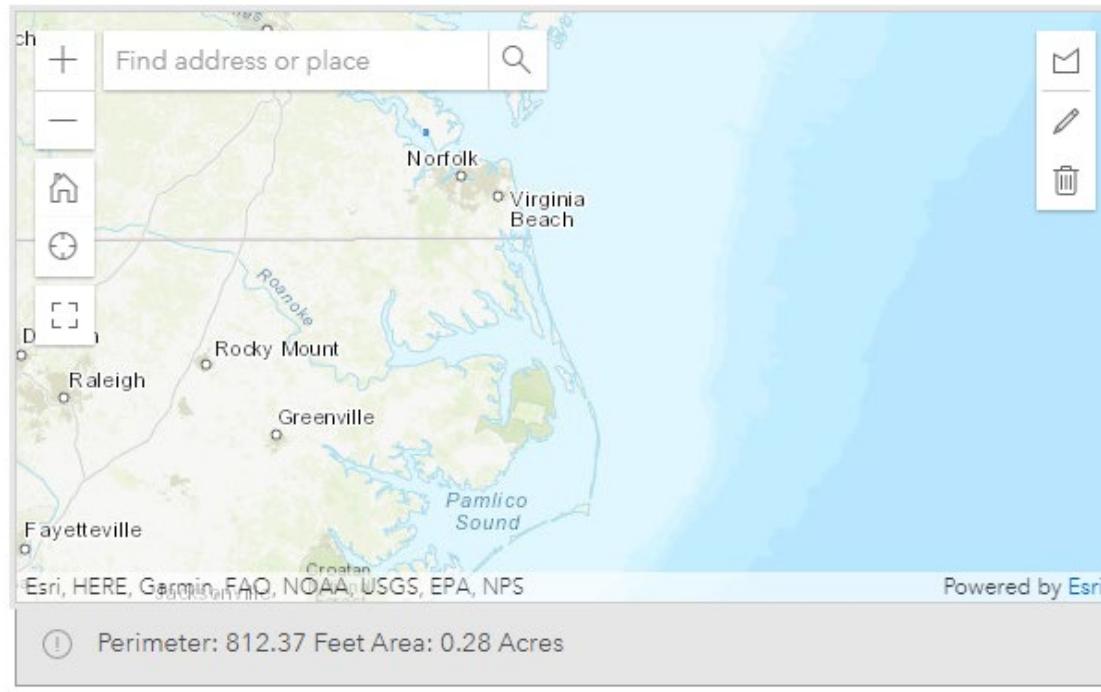
- The project considers the SLR Scenario in alignment with the CRMP (defined as the NOAA 2017 Intermediate-High sea level rise projection)
- Local Standards that are higher and more risk-averse than CRMP SLR Scenario
- Local Standards that are lower than and less risk-averse CRMP SLR Scenario
- The project considers increased rainfall
- The project does not consider future sea level or rainfall conditions

# Data Call - Flood Resilience Projects

## Project Footprint

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

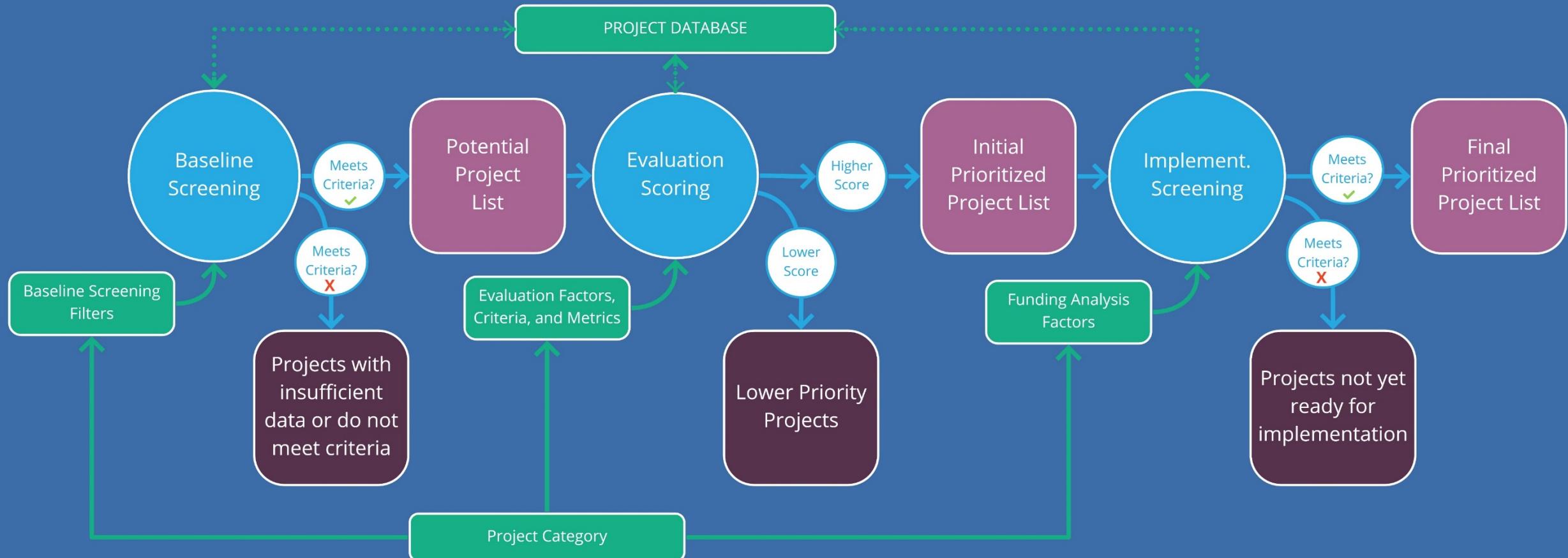
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# Objectives

- 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)

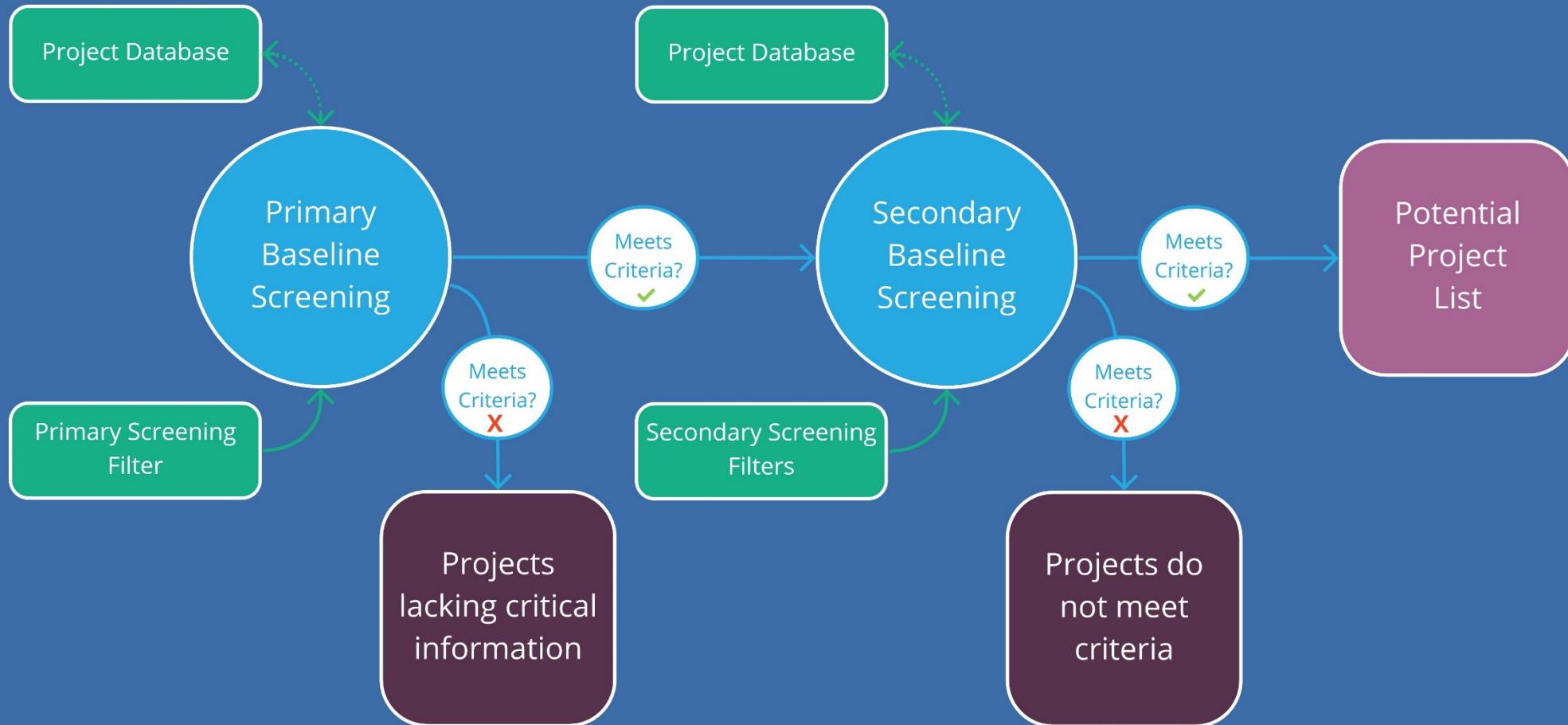


# Evaluation Approaches

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

# Baseline Screening

 Inputs  Process  Outputs (Project Lists)



# Primary Screening Filter: Extent of Information Provided

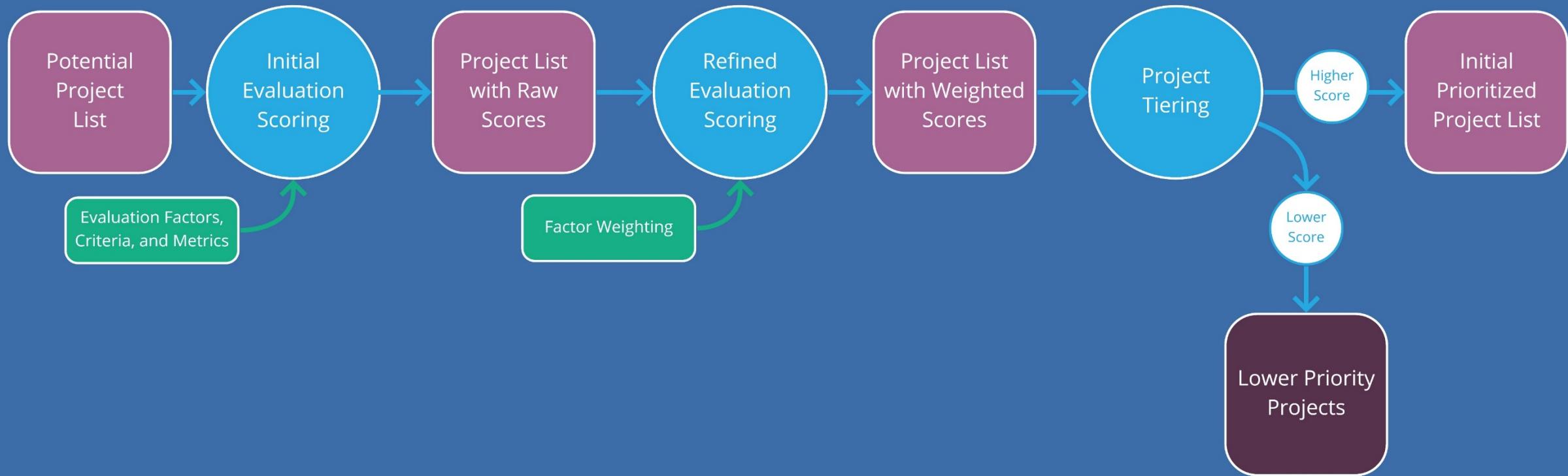
- Screening Criteria (Yes/No): does the project have the minimum information required to enable prioritization?
  - Project Name & Description
  - Project Type
  - Project Purpose & Need
  - Project Owner
  - Geographic Location
  - Resilience Considerations
  - Project Scale / Impact Area
  - Project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

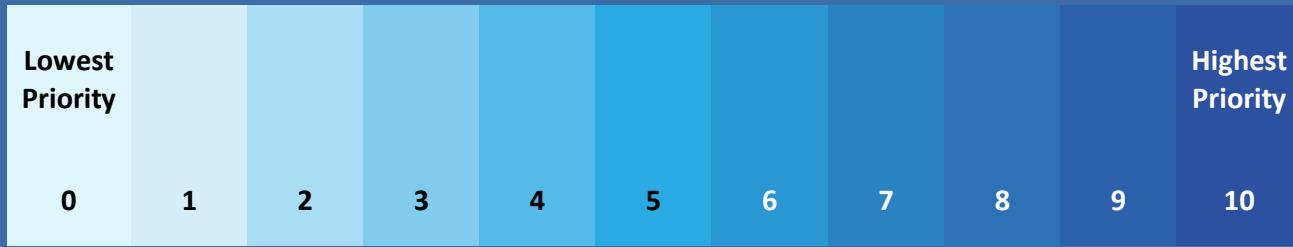
 Inputs  Process  Outputs (Project Lists)



# 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

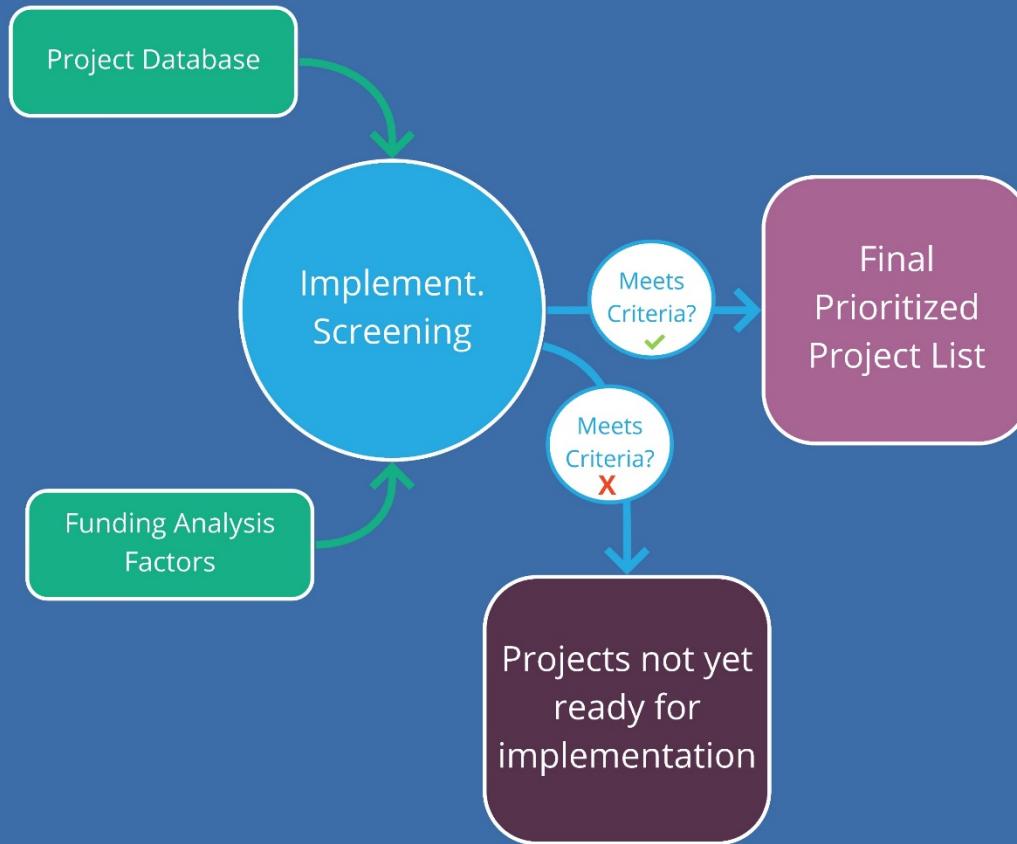


Metric	Basis for Metric Ranking	Score (Additive)
Tidal Flooding	The project is intended to reduce flooding caused by today's daily or extreme high tides	2
Storm Surge Flooding	The project is intended to reduce flooding caused by coastal storms including nor'easters and hurricanes	2
Riverine Flooding	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
Factor 1: System Performance & Design	1.A. Resilient Design Criteria: The project incorporates resilient design standards (e.g. Sea Level Rise scenarios).	 Standards more conservative than CRMP standards CRMP standards Standards less conservative than CRMP standards No considerations of future conditions.
	1.B. Nature-Based Approaches: The project incorporates nature-based design elements.	 Incorporates nature-based design elements. Does not incorporate nature-based design elements.
	1.C. Flood Reduction Potential: The project is expected to reduce economic flood risks today, and in the future.	 Expected to reduce existing flood risks. Expected to reduce near-term flood risks. Expected to reduce mid-term flood risks. Expected to reduce long-term flood risks.
Factor 2: Extent of Benefits & Impacts	2.A. Project Scale: The project is part of a larger, more comprehensive effort designed for greater impact while minimizing adverse impacts.	 Large-scale project Pilot or demonstration project. Small-scale project.
	2.B. Adverse Impacts: The project is not anticipated to result in adverse impacts beyond the project area.	 Unlikely to result in adverse impacts. Likely to result in adverse impacts.
Factor 3: Co-Benefits	3.A. Critical Infrastructure Co-Benefits: The project protects infrastructure critical for national security, public health and safety, or the economy.	 Benefits transportation systems. Benefits public health and safety assets. Benefits energy and communication assets. Benefits agricultural lands. Benefits other critical facilities.
	3.A. Social and Cultural Co-Benefits: The project protects exposed populated areas, and historic, cultural, & tribal resources.	 Benefits chronically underserved communities. Benefits communities with high social vulnerability. Benefits one or more cultural resources. Benefits one or more tribal resources.
	3.C. Natural Infrastructure Co-Benefits: The project protects or enhances the Commonwealth's natural infrastructure conservation priorities.	 Benefits the critical natural infrastructure. Does not benefit critical natural infrastructure.

# 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

July

Aug

- Public Survey Distribution
- Centralized Survey Distribution
- Outreach Toolkit Distribution
- One-on-One Interviews
- Social Media Posts
- Impact Assessment/Project Data Call
- Compile Survey Results
- Tribal Representative Meeting
- Military Federal Meeting
- Business/Industry Meetings
- Project Inventory - Initial Evaluation
- Design Workshop/Charettes
- Social Media Posts
- 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 Aug (7/19-8/6)
- Initiating Coordination/Planning
- Includes:
  - Pre-Workshop Webinar
  - In-person Workshop/Charette Event
    - CRMP Project Stakeholders
  - Public Outreach Meeting

# Workshop/Charette Overview – Initial Agenda

- Project 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?