

Virginia Coastal Resilience Technical Advisory Committee

Research, Data and Innovation Quarterly Subcommittee Meeting

Date: Tuesday, January 23rd, 2023

Time: 01:00 pm

Location: DEQ 3rd Floor Conference Room

1111 East Main St., Suite 1400

Richmond, VA 23219

For Virtual Access, Register at

https://vcu.zoom.us/webinar/register/WN_7Y1dOc9WTdK1Okp41MtGlg



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Meeting Agenda

1. Call to Order, Roll Call, and Introductions
2. Adoption of Agenda
3. Adoption of 2023Q4 Meeting Minutes
4. Subcommittee Overview
5. Old Business
 - VFPMP Flood Hazard Data
 - Integrated Flood Hazard Scenarios for Planning
6. New Business
 - Combined Flood Hazard Analysis and Visualization
 - Future Recommendations
 - Subcommittee Members Discussion
7. Public Comment
8. Action Items, Scheduling
9. Adjourn

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Name	Title	Organization
Evan Branosky (Chair)	Chief Stormwater Policy Advisor	Virginia Department of Environmental Quality
Dave Davis (Alternate Chair)	Manager of the Office of Wetlands and Stream Protection	
Whitney Katchmark	Principal Water Resources Engineer	Hampton Roads Planning District Commission
Ben McFarlane (A)	Chief Resilience Officer	
Norm Goulet	Director of NVRC's Environment and Resiliency Planning	Northern Virginia Regional Commission
Rebecca Murphy (A)	Coastal Zone Program Manager	
Dr. Jessica Whitehead	Director of the Institute for Coastal Adaptation and Resilience	Old Dominion University
Carol Considine (A)	Director of Applied Projects, CCRFR	
Dr. Karen McGlathery	Director of the Environmental Resilience Institute	University of Virginia
Dr. Mark Luckenbach	Associate Dean for Research and Advisory Services	Virginia Institute of Marine Science
Jamie Green	Commissioner	Virginia Marine Resources Commission
Rachael Peabody (A)	Director of Coastal Policy, Restoration and Resilience	
Randy Owen (A)	Chief of Habitat Management	
Dr. Troy Hartley	Director	Virginia Sea Grant
Vacant	Director of the Center for Coastal Studies	Virginia Tech
Dr. Wendy Stout (A)	Coastal Resilience Extension Specialist	
G. Michael Fitch, Ph.D.	Acting Director	Virginia Transportation Research Council
Mary-Cason Stiff	Executive Director	Wetlands Watch

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Invited Guests

- Celso Ferreira
George Mason University, Flood Hazards Research Lab
- Molly Mitchell
Virginia Institute of Marine Science, Center for Coastal Resources Management

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Research, Data, and Innovation Objectives

1. Inform Development of Flood Hazard Exposure Model.

Using the best available data, provide recommendations to DCR and Dewberry to select pluvial modeling approach (including climate scenarios), advise on the selection of fluvial modeling data and scenarios, and advise on approach to compound flooding joint probability analysis.

2. Inform Inputs to Flood Hazard Risk Assessment.

Based on the flood hazard exposure model developed, advise DCR and Dewberry on how to utilize the flood hazard model for conducting the flood hazard risk assessment.

3. Develop recommendations for future planning.

This includes, but is not limited to:

- Develop a data development plan to fill gaps in advance of future planning processes. **Consider research and data products that can meet the state's needs.**
- **Advise on innovations suited to address flood risks and fill gaps in resilience action** for future planning efforts. Consider R&D, public-private partnerships, collaborative research.



CRMP Phase II - Plan Development Timeline

Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24	Oct 24	Nov 24	Dec 24	
Meetings																		
	Sub	TAC			Sub	TAC			Sub	TAC			Sub	TAC			Sub	TAC
Schedule																		
Develop Flood Hazard Exposure Model Research, Data, and Innovation						Data Display (CRWE Update) Research, Data, and Innovation												
Data Collection Project Prioritization			Flood Hazard Risk Assessment Project Prioritization															
Project and Initiative Info Collection Project Prioritization						Analyze Planned Resilience Actions Project Prioritization, Funding												
				Quantify Financial Need for Flood Resilience Funding														
Ongoing Stakeholder Outreach and Engagement Outreach and Coordination																		
Develop TAC Subcommittee Recommendations All Subcommittees																		



Subcommittee Schedule

2023Q3	CRMP PII - Pluvial Modeling Pilot Study
2023Q4	CRMP PII - Flood Hazard Data Scenario Planning CRMP PII - Flood Hazard Data Reporting
2024Q1	CRMP PII - Flood Hazard Data Scenarios, Combined Flood Hazards Future Plans - Recommendations
2024Q2	Future Plans - Recommendations
2024Q3	CRMP PII - Flood Hazard Assessment Review Future Plans - Recommendations
2024Q4	Future Plans - Final Recommendations

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Contractor Support for CRMP Phase II

- Existing Dewberry Contract
 - Pluvial Modeling
 - Combined Flood Hazard
 - Flood Hazard Impact
- Resilience Planning and Consulting Contract (Pending)
 - Plan Design, Development, and Production
 - Coastal Resilience Web Explorer Update
 - Outreach and Engagement
 - Planned Resilience Actions
 - Financial Tools and Information

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Old Business

VFPMP Flood Hazard Data

CRMP Integrated Flood Hazard Climate Scenarios for Planning

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Virginia Flood Protection Master Plan Fluvial/Pluvial Flooding Data Gaps

- Available FEMA Data Challenges
 - Limits of Study
 - Approximate Studies
 - Unmapped Floodplains
 - No Pluvial
- Does not:
 - Reflect today's best available science
 - Represent a consistent, comprehensive, or forward-looking flood hazard



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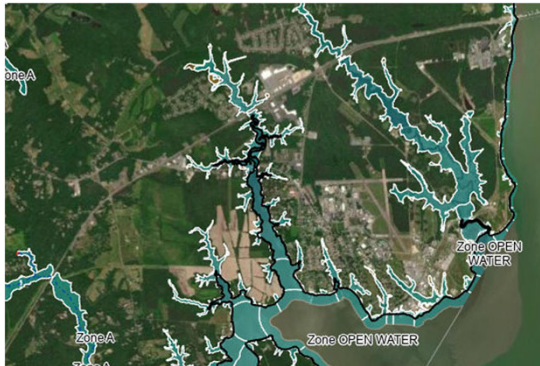
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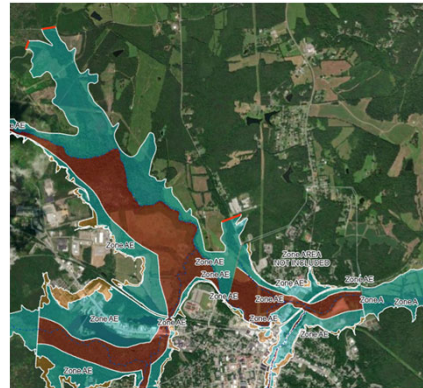
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VFPMP Data Evaluation Update

Dahlgren



Farmville



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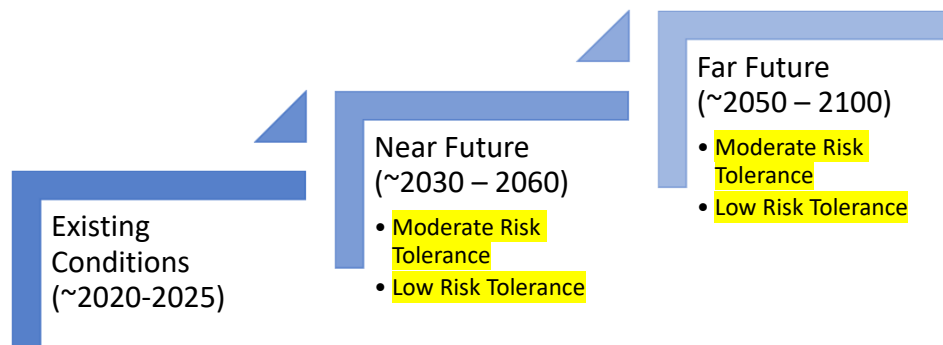
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CRMP Phase 2 Flood Resilience Planning Scenarios



Risk Tolerance

- Moderate ~ Minimum Planning Standard?
- Low ~ Critical Infrastructure Planning Standard?

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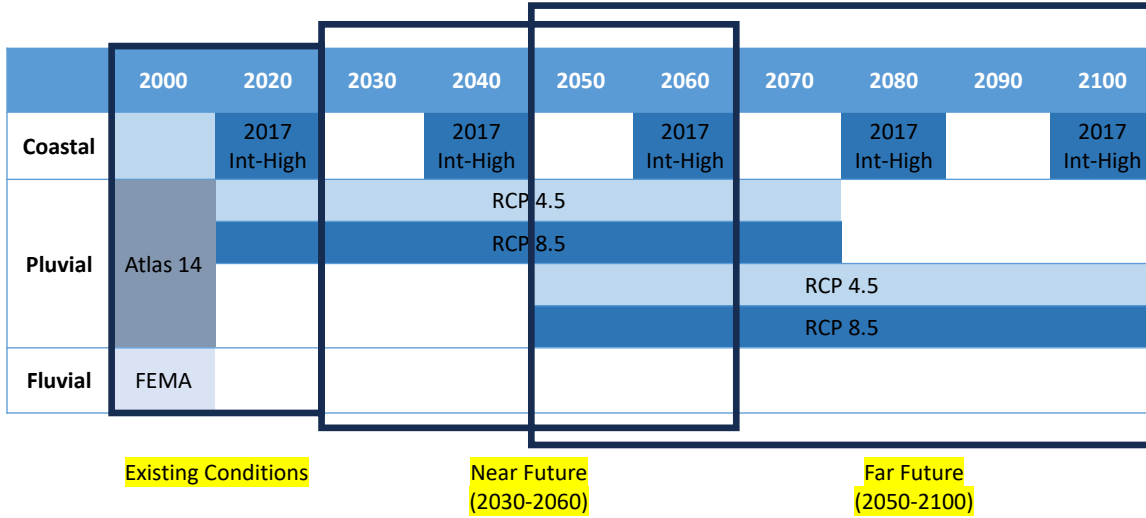
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Flood Hazard Data Time Horizons



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Phase 2 Flood Resilience Planning Scenarios?

Planning Horizon	Existing Conditions ~2020-2025	Near Future ~2030-2060		Far Future ~2050-2100	
Risk Tolerance		Moderate	Low	Moderate	Low
Coastal	2020 CRMP				
Pluvial	Atlas14				
Fluvial	FEMA				

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Coastal Scenario – Existing Guidance

ASCE Standard 7-22 Supplement 2 (aka the flood supplement)

- A project lifecycle of not less than 50 years shall be used for this quantification. The minimum rate of relative sea level change shall be the historically recorded sea level change rate for the site over a 50-year period (Linear Trend).

Virginia State Floodplain Management Standards

- Based on recommendations from VIMS and CCRFR, the Commonwealth shall use the **NOAA 2022 Intermediate-High scenario curve for 2100** or best available data, as the state standard for predicting sea level rise.

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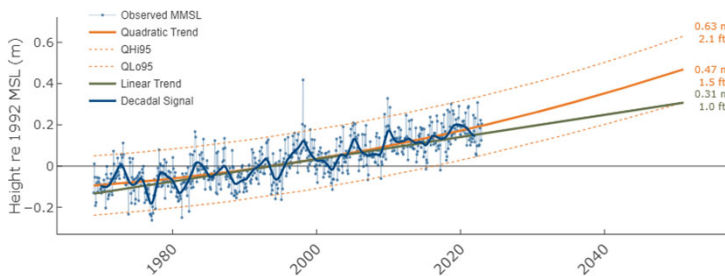
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VIMS Sea Level Rise Report Card

Norfolk (Sewells Point), Virginia



Year	Decadal [ft]	Linear [ft]	Quad [ft]	QHi [ft]
1970	-0.4	-0.5	-0.4	0.1
2000	0.0	0.0	0.0	0.5
2020	0.5	0.4	0.5	0.9
2050	-	0.9	1.4	2.0
2075	-	~1.3	-	-

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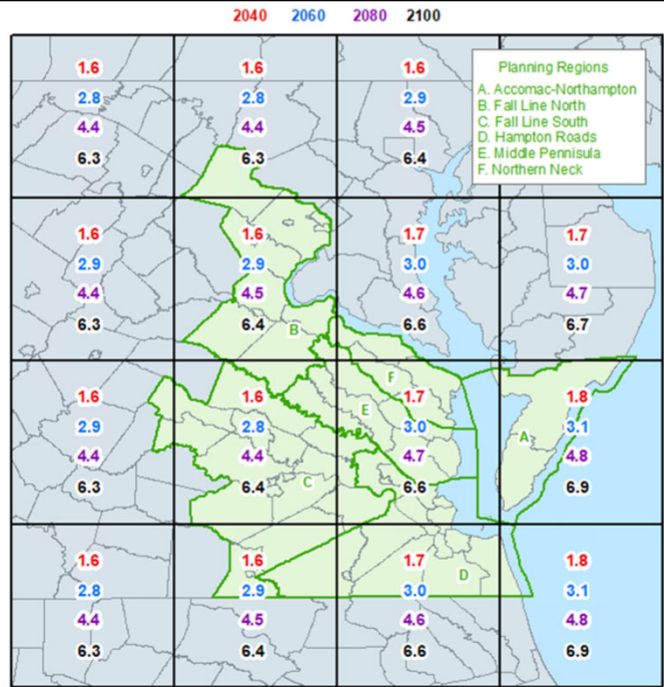
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CRMP Relative Sea Level Rise

Gridded representation of RSLR projections from 2000 for the NOAA 2017 Intermediate-High scenario, in units of feet.

Year	Max [ft]	Min [ft]	Delta[ft]
2040	1.8	1.6	0.2
2060	2.8	3.1	0.3
2080	4.4	4.8	0.4
2100	6.3	6.9	0.6

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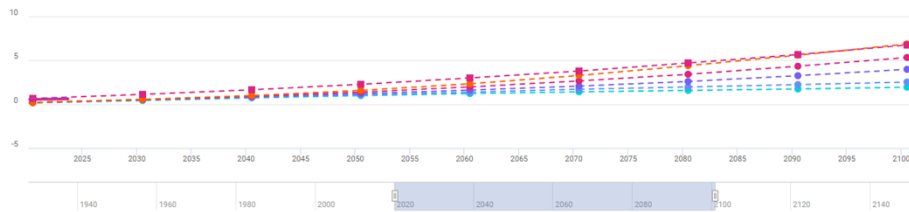
Source: NOAA Technical Report NOS CO-OPS 83 (2017)

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NOAA 2017 v 2022 SLR Projections

Sea Level Data and Projections: Sewells Point, VA (8638610)
NOAA Tide Gauge

Feet above Mean Sea Level Datum
(1983-2001 epoch)



Click on legend items to hide/show them in the plot

- MSL - 5-Year Moving Average
- MSL - NOAA et al. 2022 - Intermediate
- MSL - NOAA et al. 2017 - Low
- MSL - NOAA et al. 2017 - Intermediate-High
- MSL - 40-Year Record Trend
- MSL - NOAA et al. 2022 - Low
- MSL - NOAA et al. 2022 - Intermediate-High
- MSL - NOAA et al. 2017 - Intermediate-Low
- MSL - NOAA et al. 2017 - High
- MSL - Full Record Trend
- MSL - NOAA et al. 2022 - Intermediate-Low
- MSL - NOAA et al. 2022 - High
- MSL - NOAA et al. 2017 - Intermediate
- MSL - NOAA et al. 2017 - Extreme

MSL record span: 1927 to 2023 (96 years)
NOAA et al. 2022 start-year-to-datum offset: 0.251 ft.
NOAA et al. 2017 start-year-to-datum offset: 0.146 ft.

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NOAA 2017 v 2022 SLR Projections

Sewells Point, VA

Year	NOAA 2022 Low [ft]	NOAA 2022 Int [ft]	DCR VFMS		CRMP P1
			NOAA 2022 Int-High [ft]	NOAA 2022 High [ft]	NOAA 2017 Int-High [ft]
2040	0.8	0.9	1.0	1.1	1.7
2060	1.3	1.7	2.1	2.4	3.1
2080	1.7	2.7	3.5	4.5	4.8
2100	2.0	4.1	5.4	6.9	6.8

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Phase 2 Flood Resilience Planning Scenarios?

Planning Horizon	Existing Conditions ~2020-2025	Near Future ~2030-2060		Far Future ~2050-2100	
Risk Tolerance		Moderate	Low	Moderate	Low
Coastal	2020 CRMP	2040 CRMP	2060 CRMP	2060 CRMP	2080 CRMP

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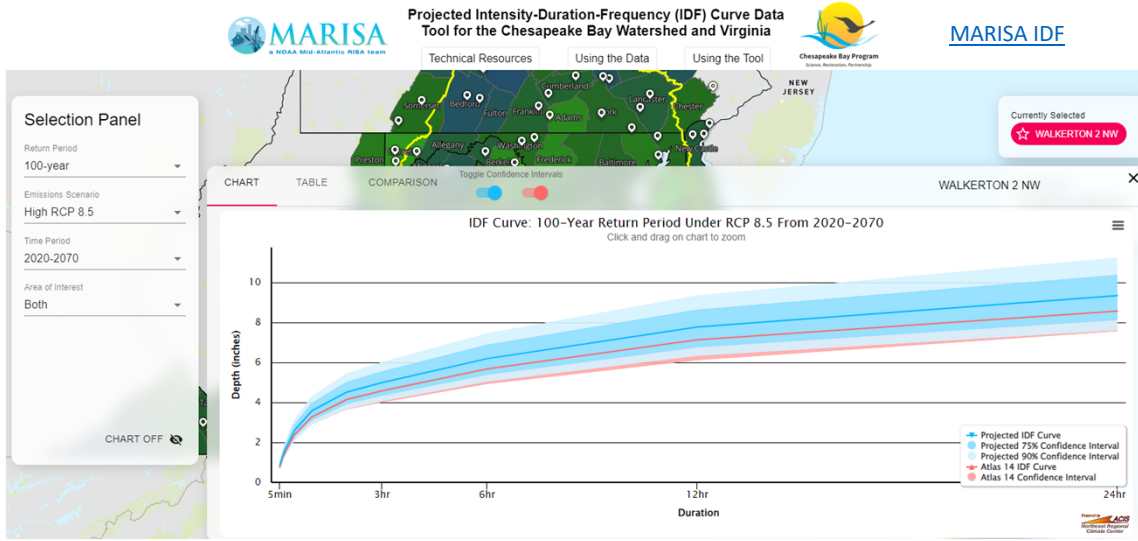
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Pluvial Scenario



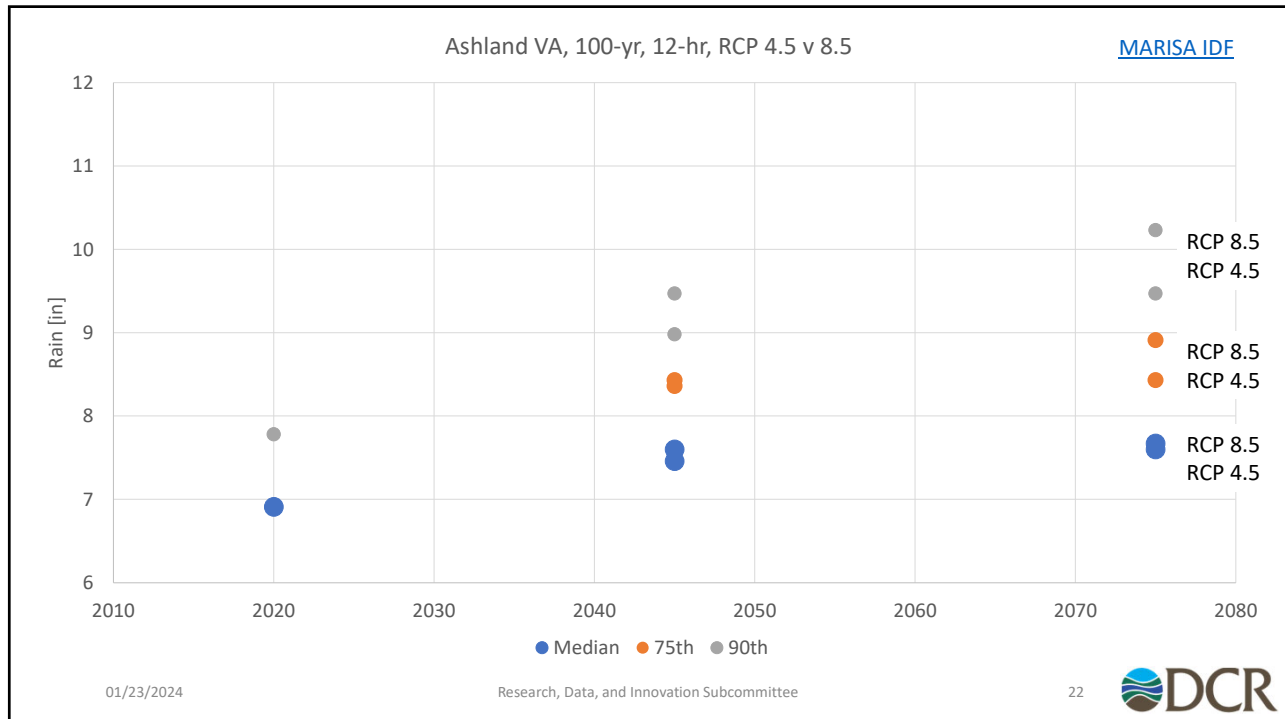
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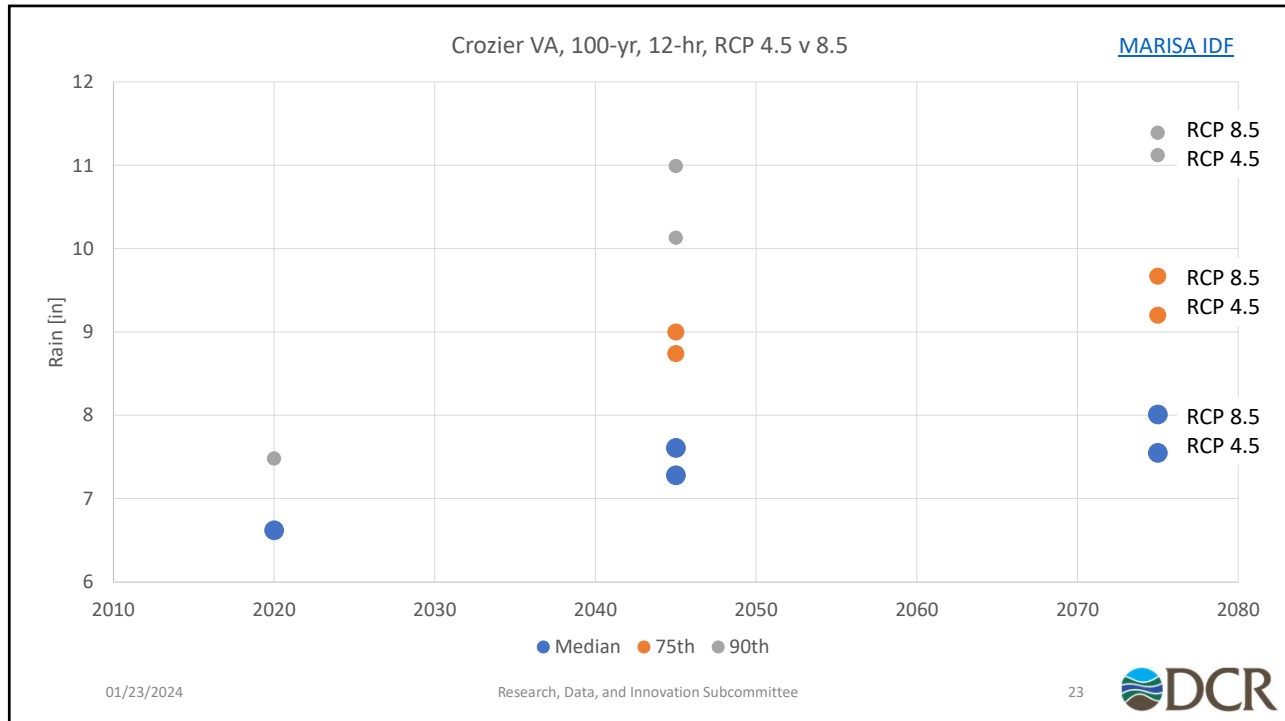
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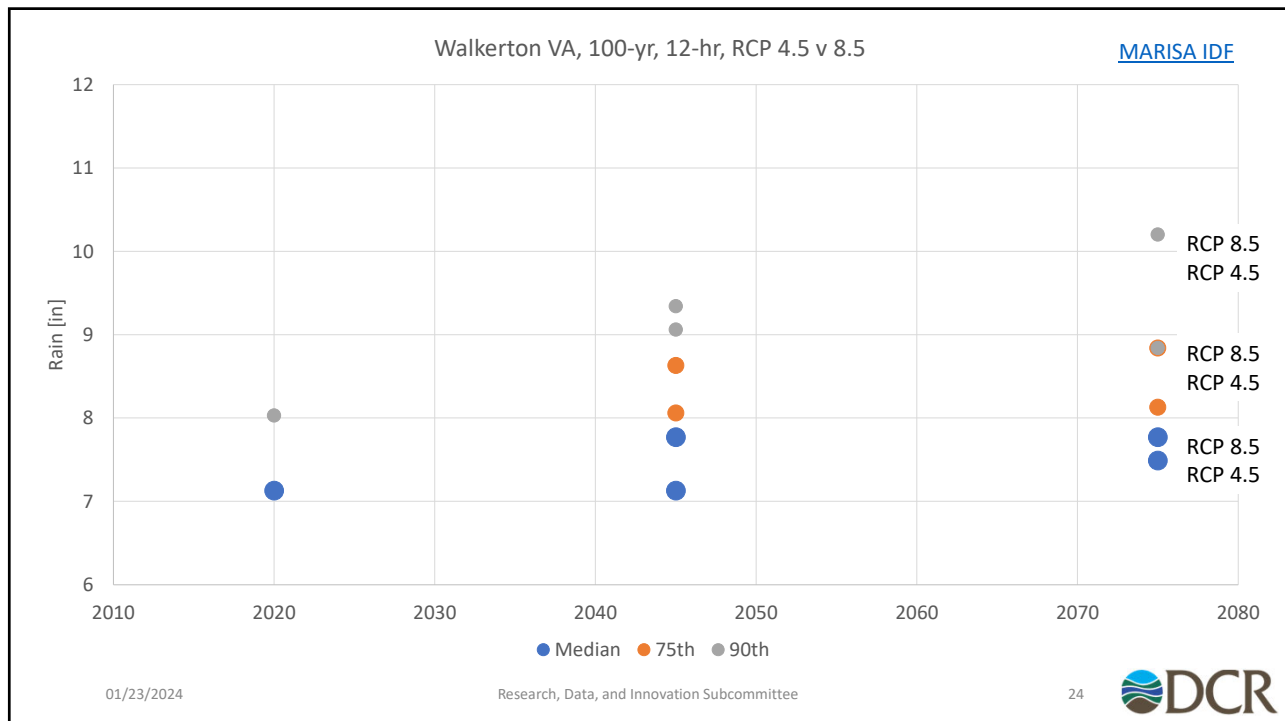
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Phase 2 Flood Resilience Planning Scenarios

Planning Horizon	Existing Conditions ~2020-2025	Near Future ~2030-2060		Far Future ~2050-2100	
Risk Tolerance		Moderate	Low	Moderate	Low
Pluvial	Atlas14	2020-2070 RCP 4.5 Median	2020-2070 RCP 4.5 75 th %	2050-2100 RCP 4.5 Median	2050-2100 RCP 4.5 75 th %

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Phase 2 Flood Resilience Planning Scenarios?

Planning Horizon	Existing Conditions ~2020-2025	Near Future ~2030-2060		Far Future ~2050-2100	
Risk Tolerance		Moderate	Low	Moderate	Low
Coastal	2020 CRMP	2040 CRMP	2060 CRMP	2060 CRMP	2100 CRMP
Pluvial	Atlas14	2020-2070 RCP 4.5 Median	2020-2070 RCP 4.5 75 th %	2050-2100 RCP 4.5 Median	2050-2100 RCP 4.5 75 th %
Fluvial	FEMA	FEMA	FEMA +1.0-ft*	FEMA	FEMA + 2.0-ft*

* Not included in current Dewberry Contract for CRMP Phase 2

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Comments + Questions

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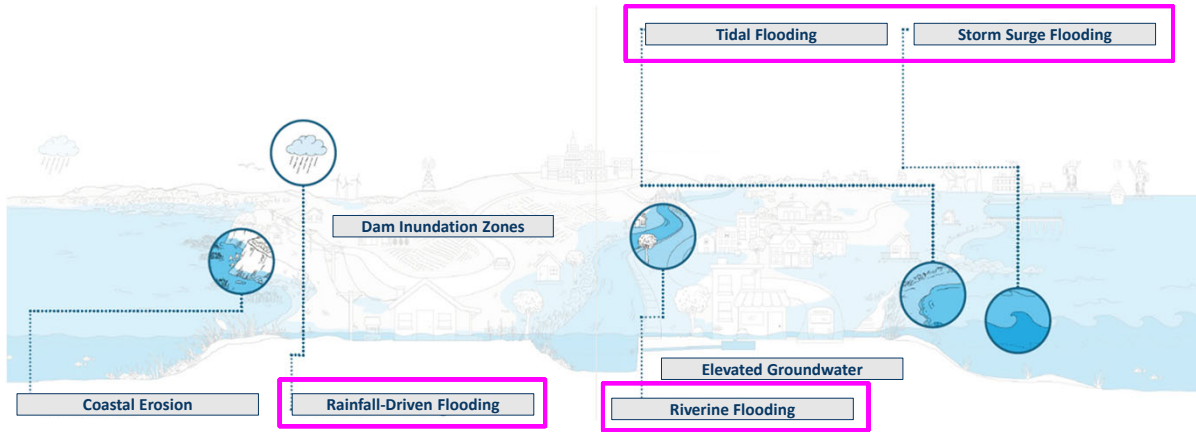
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Combined Flood Hazard Analysis and Visualization
Future Plans - Recommendations

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Representing Combined Flooding (Not Compound Flooding)



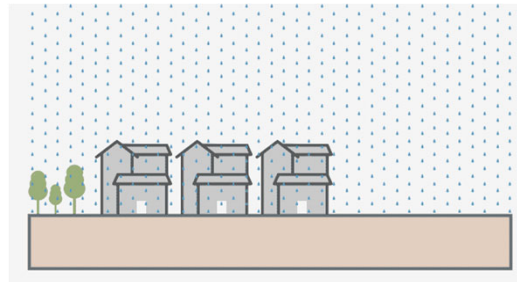
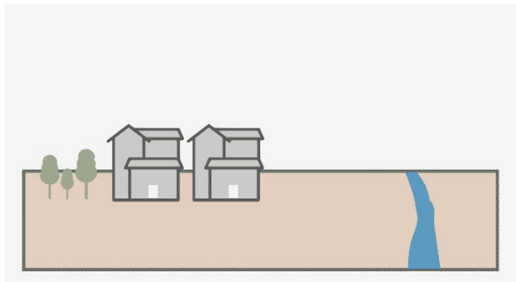
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Compound Flooding
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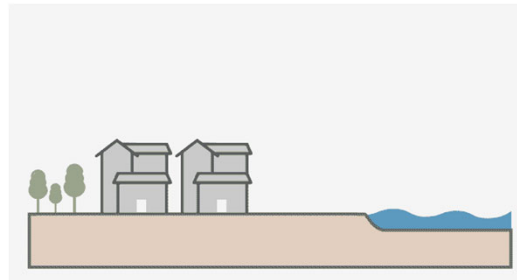
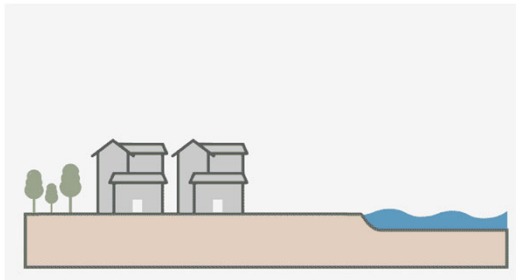
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(Source: [First Street Foundation](#))



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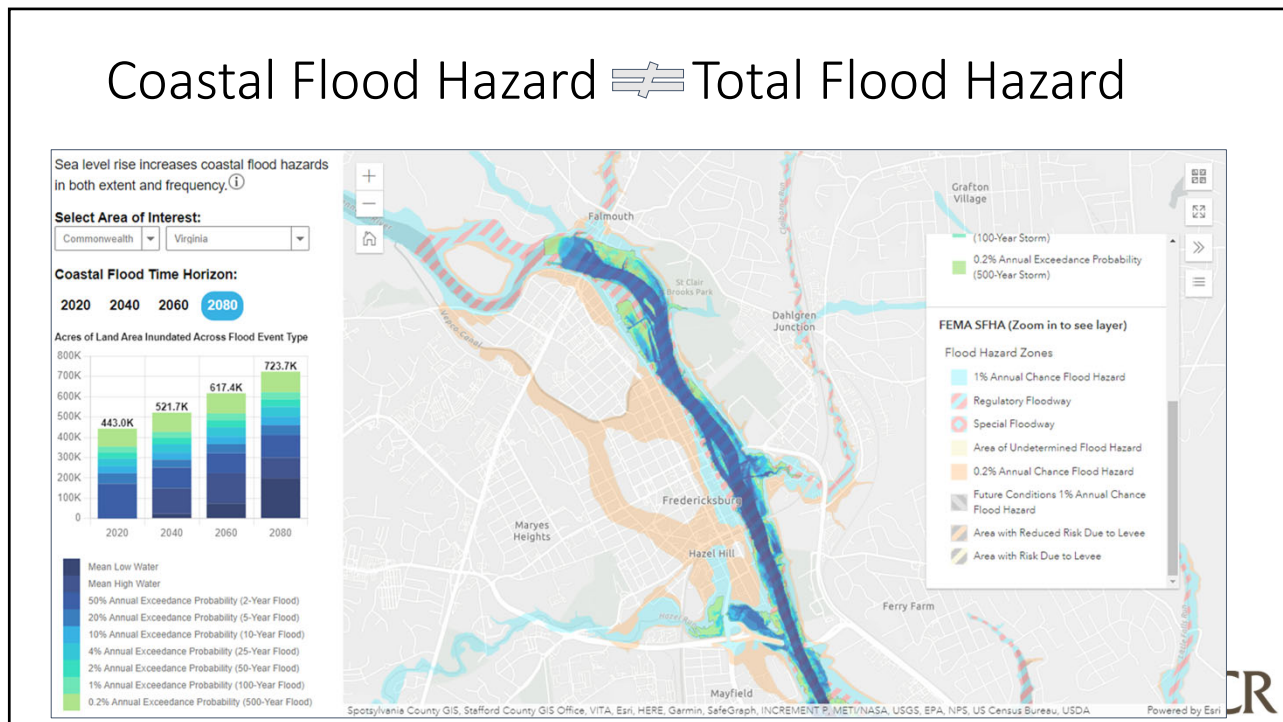
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Coastal Flood Hazard ≠ Total Flood Hazard



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Combined Flood Hazard - Visualization

- Combined Flood Hazard Data Availability Polygon
 - Flood hazard types, frequency, future conditions reported at the locality and HUC12 scale
- Combined Flood Hazard Data Raster
 - How many and what types of flooding for a specific area for each of the 5 planning scenarios
- Dominant Flood Hazard Raster
 - Most Frequently Occurring flooding for a specific area for each of the 5 planning scenarios

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Combined Flood Hazard – Data Summary

	Narrative	Exposure	Vulnerability	Risk
Coastal	All	All MF	Some Assets	Some Assets
Pluvial	All	All MF	Some Assets	Some Assets
Fluvial	All	All SF	Some Assets	
Combined	All			

Asset Categories:
 Community Resources
 Critical Built Infrastructure
 Critical Human Infrastructure
 Critical Natural Infrastructure


MF = Multi Frequency (2, 5, 10, 25, 50, 100, 500-yr)
SF = Single Frequency (100-yr)

Subcommittee Recommendations

Research
 Data
 Innovation


Subcommittee Recommendations

The Subcommittee previously provided input on the following:




Research

- Natural and Nature Based Functionality




Data

- Land Cover Data
- LiDAR Data



Innovation


- Coastal Resilience Products and Materials

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Subcommittee Recommendations

CRMP Phase I identified the following technical process improvement needs:




Research

- Expanding Tribal Engagement and Understanding of Cultural Resources
- Identifying and Developing Projects for Impact Hotspots




Data

- Standardized Data (Parcel, FFE, Demo, Critical Infrastructure)
- Flood Hazards (Rain, Riverine, Erosion, Groundwater, Compound)
- Impacts (Sensitivity, Adaptive Capacity, Economic)
- Resilience Actions (Project Benefit Areas)



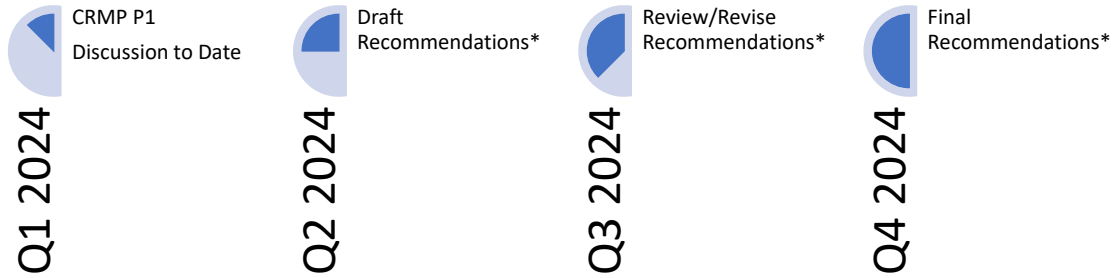
Innovation

- Financial Tools and Processes

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Subcommittee Recommendations Next Steps



* Facilitated by Resilience Planning and Consulting Contractor

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Comments + Questions

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Subcommittee Members Discussion

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Public Comment

If you would like to provide public comment, please let us know using the Chat window.

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Action Items, Scheduling

- Action Item Review
- 2024Q2 Meeting
 - Date/Time
 - Location
 - Agenda Items
 - Subcommittee Recommendations

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