

Research, Data, & Innovation Subcommittee Meeting

VIRGINIA COASTAL RESILIENCE TECHNICAL ADVISORY COMMITTEE

THURSDAY, OCTOBER 10, 2024 | 1:00 PM

Meeting Agenda

- Call to Order, Roll Call
- Adoption of Agenda
- Adoption of Q3 2024 Meeting Minutes
- Subcommittee Overview
- Old Business
 - Coastal Resilience Master Plan update
 - Subcommittee Recommendations Development
- Public Comment
- *New Business*
 - *Voting on Subcommittee Recommendations*
- Action Items, Scheduling
- Adjourn



Name	Title	Organization
Alexander Samms (Chair)	Chief Deputy	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
Dr. Molly Mitchell (A)	Assistant Professor	
Dr. Troy Hartley	Director	Virginia Sea Grant
Dr. Wendy Stout	Director, Virginia Tech Coastal Collaborator Center	Virginia Tech
G. Michael Fitch, Ph.D.	Acting Director	Virginia Transportation Research Council
Mary-Cason Stiff	Executive Director	Wetlands Watch
Ian Blair	Policy Program Director	

Virginia Coastal Resilience Master Plan, Phase II

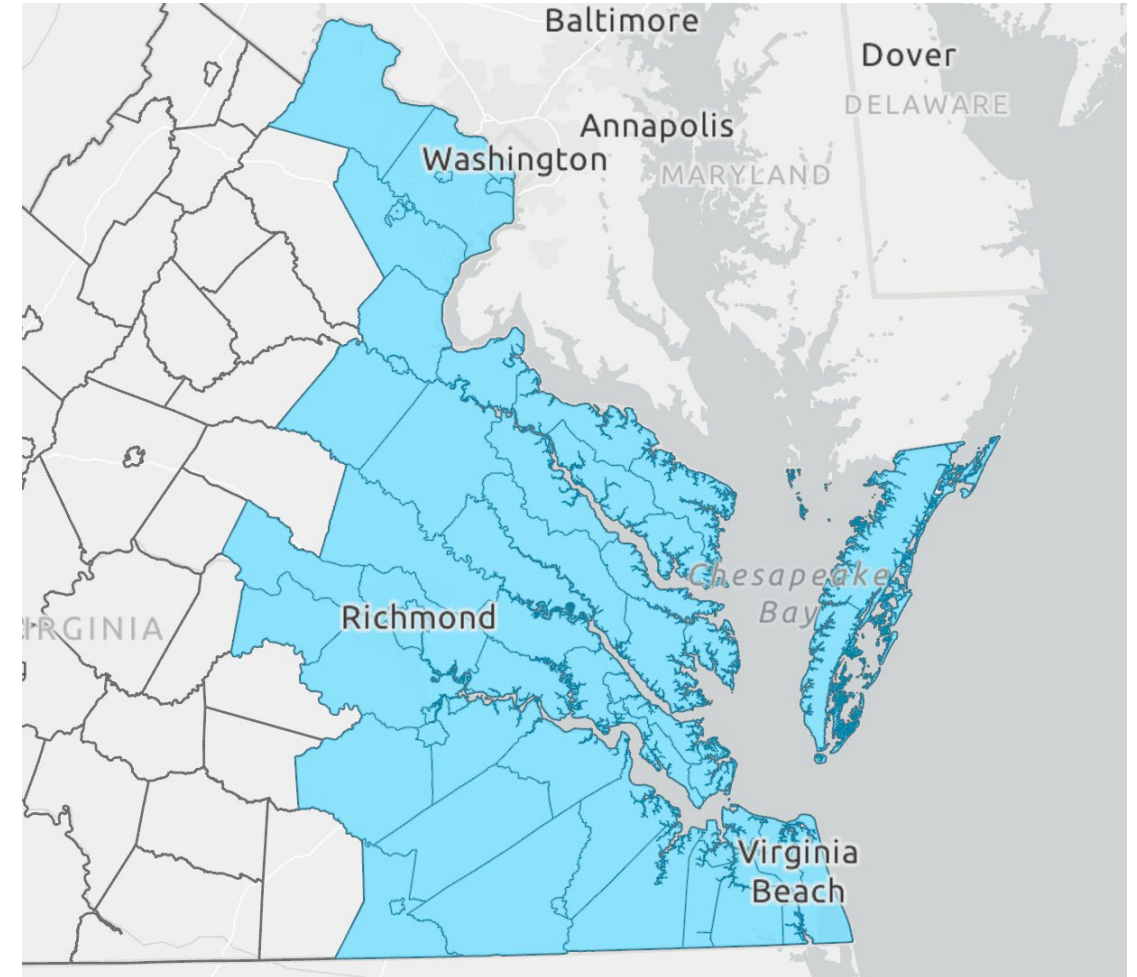
WHAT IS THE CRMP?

A **trusted resource** to assist government entities in making evidence-based decisions to mitigate severe and repetitive flooding.

- Provides a **unified baseline analysis** of the threat of increasing flood exposure and impacts in Virginia's coastal region due to sea level rise and changing precipitation patterns.
- Identifies **opportunities to prioritize impactful flood resilience solutions**, showcasing an inventory of government-led or supported projects and initiatives across the coastal region.

DELIVERY DETAILS

- Major plan elements: hazard exposure, impact assessment, planned resilience actions, financial needs, and subcommittee recommendations
- December 2024 timeline for delivery, updated every five years
- See Code of Virginia [§10.1-658, 659](#)



Research, Data, & Innovation Subcommittee 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.

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

CRMP PII - Flood Hazard Data Update

Future Plans - Recommendations

2024Q3

CRMP PII - Flood Hazard Assessment Review

Future Plans - Recommendations

2024Q4

Future Plans - Final Recommendations

Recommendations Development - Overview

OBJECTIVE

- Develop high priority recommendations to improve mitigation of severe and repetitive flooding in Virginia’s coastal region.
- The recommendations should be:
 - An action to implement prior to the next planning phase (in the next 1-4 years) by appropriate responsible actors (ex., state agencies, PDCs, localities, legislators, federal government, etc.).
 - A process improvement for DCR when developing the next Coastal Resilience Master Plan (to be released in 2029).

OUTCOME

- The high priority recommendations that receive a passing vote from the full TAC per Section 2-3 of the TAC charter will be included as recommendations in the plan.
- Each recommendation will comprise an action-oriented statement, identified responsible actor(s), and a brief purpose statement.
- The list of approximately 120 draft recommendations developed by the subcommittees at their Q2 2024 meetings will be included as an appendix to the plan.

PROCESS

July 15-19: <i>Prioritization Survey</i>	<i>Subcommittee members vote on their top 10 recommendations per subcommittee.</i>
August 7-15: <i>Q3 Subcommittee Meetings</i>	<i>Subcommittees review survey results, identify and refine the top 5 recommendations, and assign responsible parties.</i>
September 18: <i>Q3 TAC Meeting</i>	<i>The Full TAC reviews and refines each subcommittee’s top 5 recommendations.</i>
October 3-10: Q4 Subcommittee Meetings	Subcommittee members finalize and vote on up to 5 recommendations.
November 13: Q4 TAC Meeting	The Full TAC votes on all subcommittee recommendations.

Recommendation Development – Today's Process

Old Business - Finalize Recommendation Language

- For each recommendation we will:
 - Review the text from the 9/18 TAC meeting
 - Review TAC comments
 - Discuss changes
 - Text that you cannot support
 - Text to improve the recommendation
- 20 minutes per recommendation

Public Comment Period

New Business – Vote on Recommendations

- 5 minutes per recommendation
- Recommendation must pass by consensus or majority for TAC to consider at 11/13 meeting

[R-a] Research, Data, and Innovation Subcommittee

RECOMMENDATION

- State agencies and the Commonwealth's research universities should coordinate the collection and sharing of quantitative and qualitative flood resilience data, data production efforts, and inventories of data usage in decision-making applications across state agencies, planning district commissions, and the Commonwealth's research universities.

RECOMMENDATION PURPOSE

- Minimize duplication of efforts and effectively mobilize our collective capacity to support evidence-based flood resilience decision making.

[R-b] Research, Data, and Innovation Subcommittee

RECOMMENDATION

- The DCR Office of Resilience Planning and other state agencies should determine and adopt programmatic responsibility for acquiring, developing, processing, analyzing, updating, and managing critical (*temporal*) flood resilience data needs to support ongoing planning and decision-making.

RECOMMENDATION PURPOSE

- Maintain the best available data to inform decisions in a changing environment.

[R-c] Research, Data, and Innovation Subcommittee

RECOMMENDATION

- The Flood Resilience Advisory Committee should define resilience success, while the Commonwealth's research universities should identify and develop indicators and monitoring methods to assess the performance of resilience projects, with key and relevant stakeholders (entities, NGOs, etc.). The indicators should be based on Virginia-centric data and address ecological, infrastructure, social, economic, cultural, and environmental justice performance.

RECOMMENDATION PURPOSE

- Define, measure, and monitor the efficacy of resilience projects to support adaptive management.

[R-d] Research, Data, and Innovation Subcommittee

RECOMMENDATION

- DCR's Office of Resilience Planning should engage with local government stakeholders to understand local obstacles and gaps in state-level programs and develop a statewide strategy that leverages co-production of innovative state level solutions to meet local needs.

RECOMMENDATION PURPOSE

- Identify appropriate state-scale collective actions to support local resilience challenges through community engagement and innovation.

[R-e] Research, Data, and Innovation Subcommittee

RECOMMENDATION

- The Commonwealth's research universities should convene to evaluate the performance of existing and innovative nature-based solutions for water quantity and water quality protections through use-inspired collaborations with public (including other universities) and private partners, and establish working groups to track progress, adapt approaches, and identify funding sources for continued collaborative efforts.

RECOMMENDATION PURPOSE

- Understand the flood risk reduction and other benefits of existing and innovative nature-based solutions through collaborative research efforts.

Public Comment

IF YOU SEEK TO PROVIDE PUBLIC COMMENT, PLEASE SIGN UP EITHER IN-PERSON OR VIRTUALLY USING THE CHAT WINDOW.

New Business


VOTING ON SUBCOMMITTEE RECOMMENDATIONS


Remaining 2024 Meeting Schedule

October 2024						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November 2024						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December 2024						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

 Final Subcommittee Meetings

 Scheduled Plan Release

 TAC Meeting

CRMP, Phase II: Coastal Resilience TAC Recommendations

Research, Data & Innovation Subcommittee | Q4 2024 Subcommittee Meeting Handout

Recommendation A

DRAFT Revised Recommendation

State agencies and the Commonwealth's research universities should coordinate the collection and sharing of quantitative and qualitative flood resilience data, data production efforts, and inventories of data usage in decision-making applications across state agencies, planning district commissions, and the Commonwealth's research universities.

Recommendation Changes and Comments

TAC comments at 9/18 TAC meeting

- No Comments

Revised Recommendation Text presented at the 9/18 TAC meeting

See revised draft recommendation.

Subcommittee Comments prior to 9/18 TAC meeting

HRPDC

State agencies and the Commonwealth's ~~Research University Collaborative~~ research universities should coordinate ~~and collate~~ the collection and sharing of quantitative and qualitative flood resilience data production and application across state agencies, planning district commissions, local governments, and the Commonwealth's ~~Research University Collaborative~~ research universities.

- *Additional comment:* "Unless this is an official group, I would recommend changing the language - it's not a proper noun. Other options could include Virginia Sea Grant or the Commonwealth Center for Recurrent Flooding Resiliency, but I would recommend leaving it open-ended."
 - *Response:* "supported by VASG."

ODU

State agencies and the Commonwealth's Research University Collaborative should coordinate and collate quantitative and qualitative flood resilience data, data production efforts, and inventories of data usage in decision-making applications ~~coordinate and collate quantitative and qualitative flood resilience data production and application across state agencies~~, planning district commissions, local governments, and the Commonwealth's Research University Collaborative.

- *Additional comment:* "This is confusing about what is being coordinated and collated. Is it resilience data (and what is resilience data)? Or is it state, regional, local, and university efforts to produce data and apply it to flood resilience? I suggested an edit based on the original recommendation and purpose but open to clarification if it's the right edit based on correct emphasis."

Revised Recommendation for Subcommittee Comment prior to 9/18 TAC meeting

State agencies and the Commonwealth's Research University Collaborative should coordinate and collate quantitative and qualitative flood resilience data production and

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application across state agencies, planning district commissions, local governments, and the Commonwealth's Research University Collaborative.

Original Recommendation Text

Support multi-institutional efforts to collate quantitative AND qualitative data on modeling, risk assessment, and planning decisions in Virginia. [A.2.1.a.]

Additional Information about the Recommendation (For Context Only)

DRAFT Purpose for Subcommittee Review

Minimize duplication of efforts and effectively mobilize our collective capacity to support evidence-based flood resilience decision making.

Corresponding Flood Resilience Principle

The programs we implement must work together as parts of comprehensive, cohesive plans.

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Recommendation B

DRAFT Revised Recommendation

The DCR Office of Resilience Planning and other state agencies should determine and adopt programmatic responsibility for acquiring, developing, processing, analyzing, updating, and managing critical (*temporal*) flood resilience data needs to support ongoing planning and decision-making.

Recommendation Changes and Comments

TAC comments at 9/18 TAC meeting

- Remove parenthesis and italics around “temporal”
- Critical and temporal are not synonymous
- Discuss the meaning behind this recommendation and make sure the wording captures that meaning (e.g., refine what temporal flood resilience data is)

Revised Recommendation Text presented at the 9/18 TAC meeting

Same as revised draft recommendation.

Subcommittee Comments prior to 9/18 TAC meeting

HRPDC:

The DCR Office of Resilience Planning and other state agencies should determine and adopt programmatic responsibility for acquiring and managing critical ~~temporal~~ flood resilience data ~~needs to furnish recurrent updates to support ongoing planning and decision-making.~~

ODU:

The DCR Office of Resilience Planning and other state agencies should adopt programmatic responsibility for ~~acquiring, creating, processing, analyzing, and updating critical temporal flood resilience data needs to furnish recurrent updates~~ acquiring, creating, processing, analyzing, and updating critical temporal flood resilience data.

- *Additional comment:* “Edit to ensure that the original recommendation and purpose are there - the revision implied that DCR would be responsible only for tracking what data is needed, not actually doing it.”

Revised Recommendation for Subcommittee Comment prior to 9/18 TAC meeting

The DCR Office of Resilience Planning and other state agencies should adopt programmatic responsibility for critical temporal flood resilience data needs to furnish recurrent updates.

Original Recommendation Text

Identify critical data needs for resilience planning and develop a plan for regular funding for acquisition, processing, and analysis. [A.2.6.a.]

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Additional Information about the Recommendation (For Context Only)

DRAFT Purpose for Subcommittee Review

Maintain the best available data to inform decisions in a changing environment.

Corresponding Flood Resilience Principle

Acknowledge climate change and its consequences, and base decision-making on the best available science.

Recommendation C

DRAFT Revised Recommendation

The Flood Resilience Advisory Committee should define resilience success, while the Commonwealth's research universities should identify and develop indicators and monitoring methods to assess the performance of resilience projects, with key and relevant stakeholders (entities, NGOs, etc.). The indicators should be based on Virginia-centric data and address ecological, infrastructure, social, economic, cultural, and environmental justice performance.

Recommendation Changes and Comments

TAC comments at 9/18 TAC meeting

- New suggested purpose: “Once a project is implemented, how do we know if it’s working”
- Imposing assessment on public or private projects?
 - Possibility of private projects voluntarily accepting assessment and monitoring.
- There is a need to provide both public and private entities with resources and funding opportunities
- This recommendation is also about giving those private individuals the proper information they need to make informed decisions about their property.
- When considering rewriting or wordsmithing, discuss how “identify and develop” is doing important work in this recommendation.
 - We are not implying the forceful monitoring of someone’s property (for example, a living shoreline) against their will.
- Need to discuss the intent of the recommendation; while it is important to identify whether a project is working or not, it is also important to ensure the financial investments being made are effective.
- Once a project is implemented, how do we know that it is working?
 - Come up with criteria that tangibly will define success, then use the criteria to go out and make sure it works.
 - The need to understand the types of projects is more important than the monitoring of every project related to the plan.
- Find the connection or relationship between the funder and the researcher/monitor.
- Does this overlap with another recommendation about projects being effective?
Maybe P-e: The DCR Office of Resilience Planning should work with the Flood Resilience Advisory Committee to establish a coordinated framework to operationalize the Coastal Resilience Master Plan at local, regional, and state scales. The framework should be informed by data and needs assessments and should

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define success and set clear long-term goals, to be measured on regular, near-term timespans.

Revised Recommendation Text presented at the 9/18 TAC meeting

See draft revised recommendation.

Subcommittee Comments prior to 9/18 TAC meeting

Wetlands Watch

The Flood Resilience Advisory Committee should define resilience success, ~~while and~~ the Commonwealth's Research University Collaborative should ~~convene the evaluation of~~ examine both performance indicators to monitor the success of resilience projects, and innovative and cost-effective data gathering and analysis methodologies to monitor these measures with key and relevant stakeholders (entities, NGOs, etc.) who will be reporting on the resilience projects. The measures should include Virginia flood-centric data on ecological, infrastructure, social, economic, cultural, and environmental justice indicators.

HRPDC

The Flood Resilience Advisory Committee should define resilience success and the Commonwealth's ~~Research University Collaborative~~ research universities should identify and develop indicators and monitoring methods to assess the performance ~~examine both performance indicators to monitor the success of resilience projects, and innovative and cost effective data gathering and analysis methodologies to monitor these measures~~. The indicators should be based Virginia-centric data and address ecological, infrastructure, social, economic, cultural, and environmental justice performance measures ~~should include Virginia flood-centric data on ecological, infrastructure, social, economic, cultural, and environmental justice indicators~~.

Revised Recommendation for Subcommittee Comment prior to 9/18 TAC meeting

The Flood Resilience Advisory Committee should define resilience success and the Commonwealth's Research University Collaborative should examine both performance indicators to monitor the success of resilience projects and innovative and cost-effective data gathering and analysis methodologies to monitor these measures. The measures should include Virginia flood-centric data on ecological, infrastructure, social, economic, cultural, and environmental justice indicators.

Original Recommendation Text

- A.4.2.a Define what resilience success looks like.
- A.1.4.a Develop measures and methods to monitor performance of resilience projects (dashboards including ecological, infrastructure, social, economic, cultural, and justice indicators), including sensor, drone, and other smart-tech data gathering and analysis methodologies.
- A.1.1.e Support research on next generation Social Vulnerability Indices (SVI) and understanding of climate justice, cultural and historic resources, including a Virginia flood-centric SVI dataset to inform project prioritization.

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Additional Information about the Recommendation (For Context Only)

DRAFT Purpose for Subcommittee Review

Define, measure, and monitor the efficacy of resilience projects to support adaptive management.

Corresponding Flood Resilience Principle

These programs and plans must be developed and implemented with transparency and input from the public.

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Recommendation D

DRAFT Revised Recommendation

DCR's Office of Resilience Planning should engage with local government stakeholders to understand local obstacles and gaps in state-level programs and develop a statewide strategy that leverages co-production of innovative state level solutions to meet local needs.

Recommendation Changes and Comments

TAC comments at 9/18 TAC meeting

- Clarify “local government stakeholders.” Are we referring to the government themselves, or broader constituents?
 - Need to use the same language throughout.
- Considering obstacles and gaps: when identified, the state could potentially bring the resources to fill in the gaps.
- How does it relate to O&C-d: The DCR Office of Resilience Planning or the Flood Resilience Advisory Committee should develop a strategy to increase use of the Coastal Resilience Mater Plan by intended plan end-users, including local governments. The strategy should seek to bridge recognized capacity constraints that prevent plan uptake and should clearly define roles for state agencies to support resilience champions.

Revised Recommendation Text presented at the 9/18 TAC meeting

See draft revised recommendation.

Subcommittee Comments prior to 9/18 TAC meeting

HRPDC

DCR's Office of Resilience Planning should engage with local (government?) stakeholders to understand local obstacles and gaps in state-level programs, and develop a statewide strategy that leverages co-production of innovative state level solutions to meet local needs.

Revised Recommendation for Subcommittee Comment prior to 9/18 TAC meeting

DCR's Office of Resilience Planning should engage with local stakeholders to understand local obstacles and gaps in state-level programs, and develop a statewide strategy that leverages co-production of innovative state level solutions to meet local needs.

Original Recommendation Text

- A.3.2.a. Develop statewide strategy to support co-production of initiatives/products/future research needs with stakeholders, including mechanisms to engage and incorporate community and stakeholder input into research, data visualization, and project implementation.
- A.1.2.a. Research (planning, design, regulatory, legal, financial) obstacles that exist at the local scale, and what innovations are required at the state level to meet local needs innovatively and effectively.

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Additional Information about the Recommendation (For Context Only)

DRAFT Purpose for Subcommittee Review

Identify appropriate state-scale collective actions to support local resilience challenges through community engagement and innovation.

Corresponding Flood Resilience Principle

Utilize community and regional scale planning to the maximum extent possible, seeking region specific approaches tailored to the needs of individual communities.

Recommendation E

DRAFT Revised Recommendation

The Commonwealth's research universities should convene to evaluate the performance of existing and innovative nature-based solutions for water quantity and water quality protections through use-inspired collaborations with public (including other universities) and private partners, and establish working groups to track progress, adapt approaches, and identify funding sources for continued collaborative efforts.

Recommendation Changes and Comments

TAC comments at 9/18 TAC meeting

- The purpose was to recognize importance of nature-based solutions, and that there is more need for understanding (their uses and efficacy, etc.).
- Recommendation R-c covers all items, but this one is more for nature-based.
- Drop the "(including other universities)," because we said Research University Collaborative.
- Not sure that what's being described can or should be the only university function. Lost some context of other parties while combining the recommendations. It's not only university sources.
- What is meant by "use-inspired collaborations?"
 - There is a need to tweak this current wording because the original wording was more expansive, and it showed applied science rather than fundamental science.
- Consider the usage of the word "convene." That would imply the physical meeting of the universities—ICAR is on board with that, but we need to check with the other universities before finalizing wording.
- Importance of considering the whole catalog of solutions such as gray and hybrid approaches, as well as green/nature based. Is this the correct place to identify the wholeness of the catalog, and not just the singular of nature-based solutions?
 - We need to create hardened structures that adapt and move through time (not just nature-based solutions).
 - Consider what works under what conditions (and external factors).
 - Need opportunity costs of choosing one solution versus another
 - Should there be a space in the recommendation that speaks to the managing of water?

Revised Recommendation Text presented at the 9/18 TAC meeting

See draft revised recommendation.

CRMP, Phase II: Coastal Resilience TAC Recommendations

Research, Data & Innovation Subcommittee | Q4 2024 Subcommittee Meeting Handout

Subcommittee Comments prior to 9/18 TAC meeting

Wetlands Watch:

The Commonwealth's Research University Collaborative should ~~evaluate~~ convene evaluation of water quantity and water quality metrics for existing and innovative nature-based solutions through use-inspired, collaborative research with public (including other universities) and private partners, and by establishing working groups to track progress, adapt approaches, and identify funding sources for continued collaborative efforts.

HRPDC:

The Commonwealth's ~~Research University Collaborative~~ research universities should research and evaluate ~~water quantity and water quality metrics for the performance of~~ existing and innovative nature-based solutions for water quantity and water quality protection through use-inspired, ~~collaborative research~~ collaborations with public and private partners, and by establishing working groups to track progress, adapt approaches, and identify funding sources for continued collaborative efforts.

ODU:

The Commonwealth's Research University Collaborative should evaluate water quantity and water quality metrics for existing and innovative nature-based solutions through use-inspired, collaborative research with public and private partners, and establish working groups to track progress, ~~and by establishing working groups to track progress,~~ adapt approaches, and identify funding sources for continued collaborative efforts.

Revised Recommendation for Subcommittee Comment prior to 9/18 TAC meeting

The Commonwealth's Research University Collaborative should evaluate water quantity and water quality metrics for existing and innovative nature-based solutions through use-inspired, collaborative research with public and private partners, and by establishing working groups to track progress, adapt approaches, and identify funding sources for continued collaborative efforts.

Original Recommendation Text

- A.1.1.b. Support research to evaluate flood reduction metrics of natural and nature-based solutions. Establish topic-specific, standing, and ad hoc sub-working groups to track research progress on needed research and data gaps, identify research priorities regularly, and catalyze teams to secure funding from applicable RFPs.
- A.3.1.b. Conduct use-inspired collaborative R&D between public and private partners on adaptation solutions, including nature-based solutions that simultaneously meet water quality and water quantity standards; enhance marsh plant production; alternative septic; wells – saltwater intrusion; beneficial dredge use; property scale monitoring technologies (sensors, drones).
- A.1.3.a. Support research to evaluate the benefits and costs of resilience action and of failing to take resilience actions.

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Additional Information about the Recommendation (For Context Only)

DRAFT Purpose for Subcommittee Review

Understand the flood risk reduction and other benefits of existing and innovative nature-based solutions through collaborative research efforts.

Corresponding Flood Resilience Principle

Recognize the importance of protecting and enhancing green infrastructure like natural coastal barriers and fish and wildlife habitat by prioritizing nature-based solutions.

[R-a]

The Chief Resilience Officer should coordinate with the Commonwealth's research universities and the Interagency Resilience Management Team to regularly inventory existing data and to collect and share quantitative and qualitative flood resilience data, data production efforts, and assessments of data usage in decision-making applications across the Commonwealth.

Purpose

Minimize duplication of efforts and effectively mobilize our collective capacity to support evidence-based flood resilience decision making with best available data.

[R-b]

The DCR Office of Resilience Planning and other state agencies, in collaboration with research universities and local governments, should identify priority data needs to support ongoing planning and decision making and recommend implementation strategies for fulfilling those needs.

Purpose

Maintain the best available data to inform decisions in a changing environment.

[R-c]

The Flood Resilience Advisory Committee should actively support DCR in establishing clear and measurable resilience goals aimed at enhancing the Commonwealth's capacity to withstand and recover from flood events. DCR should solicit the involvement of the Commonwealth's research universities and other key stakeholders to contribute their expertise in developing relevant indicators and metrics to monitor progress toward these resilience goals.

Purpose

Define, measure, and monitor the efficacy of resilience projects to support adaptive management. This should be based on Virginia-centric data and address ecological, infrastructure, social, economic, cultural, environmental justice, and other emerging dimensions of resilience performance.

[R-d]

DCR's Office of Resilience Planning should engage with key stakeholders to understand local obstacles and gaps in state-level programs and develop a statewide strategy that leverages co-production of innovative state-level solutions to meet local needs.

Purpose

Identify appropriate state-scale collective actions to support local resilience challenges through community engagement and innovation.

[R-e]

The Commonwealth's research universities should evaluate the performance and co-benefits of existing and emerging nature-based and hybrid solutions for water quantity and water quality protections through collaborations with public and private stakeholders. These efforts should track progress, adapt approaches, and identify funding sources for continued collaborative efforts.

Purpose

Understand the flood risk reduction and other benefits of existing and emerging nature-based and hybrid solutions through collaborative research efforts.