Virginia Coastal Resilience Technical Advisory (TAC)
Research, Data, and Innovation Subcommittee
2023Q4 Meeting Minutes

Subject	TAC Resource Data & Innovation (RDI) Subcommittee Q4 Meeting	**Date**	10/17/2023
Chair	Evan Branosky, Virginia Department of Environmental Quality (DEQ)	**Time – START/ADJOURN**	1:00pm/3:00pm
Location	Zoom (all virtual)	**Scribe**	CPP/VCU

Subcommittee Members		
Name	**Title, Organization**	**Attended?**
Evan Branosky, Chair [Dave Davis]	Chief Stormwater Policy Advisor [Manager of the Office of Wetlands and Stream Protection] Virginia Department of Environmental Quality (DEQ)	Y [Y]
Michael Fitch	Acting Director Virginia Transportation Research Council (VTRC)	Y
Norm Goulet [Rebecca Murphy]	Director of NVRC's Environment and Resiliency Planning [Coastal Zone Program Manager] Northern Virginia Regional Commission (NVRC)	 [Y]
Jamie Green [Randy Owen] [Rachael Peabody] [Zach Widgeon]	Commissioner [Chief of Habitat Management] [Director of Coastal Policy, Restoration and Resilience] [Public Information Officer] Virginia Marine Resources Commission (VMRC)	 [Y]
Dr. Troy Hartley	Director Virginia Sea Grant (Sea Grant)	
Whitney Katchmark [Ben McFarlane]	Principal Water Resources Engineer [Senior Regional Planner] Hampton Roads Planning District Commission (HRPDC)	 [Y]
Dr. Mark Luckenbach	Associate Dean for Research and Advisory Services Virginia Institute of Marine Science (VIMS)	Y
Karen McGlathery	Director of the Environmental Institute University of Virginia (UVA)	
Mary-Carson Stiff [John Bateman]	Executive Director [Policy Director] Wetlands Watch	 [Y]
Dr. Robert Weiss [Dr. Wendy Stout]	Director of the Center for Coastal Studies [Coastal Resilience Extension Specialist, CRES] Virginia Tech (VT)	 [Y]
Dr. Jessica Whitehead [Carol Considine]	Director of the Institute for Coastal Adaptation and Resilience [Director of Applied Projects, CCrFR] Old Dominion University (ODU)	Y

TAC Staff		
Name	**Title (Organization Abbreviation)**	**Attended?**
Matt Dalon	Resilience Program Manager, Virginia Department of Conservation and Recreation (DCR)	Y
Carolyn Heaps-Pecaro	Resilience Program Coordination, Virginia Department of Conservation and Recreation (DCR)	Y
Andrew Smith	Assistant Deputy Director, DCR	Y

Scheduled Speakers	
Name	**Title, Organization**
Matt Dalon	Resilience Program Manager, DCR

Invited Guests	
Name	**Title, Organization**
Celso Ferreira	George Mason University, Flood Hazards Research Lab
Mark Bennett	USGS, Virginia Water Science Center
Molly Mitchell	VIMS, Center for Coastal Resources Management

Reference Links	
Item	**Link**
Meeting Agenda	https://www.dcr.virginia.gov/crmp/meeting/document/20231017-tac-rdi-subcommittee-agenda-rev1.pdf
Meeting Handouts/Presentation Slides	https://www.dcr.virginia.gov/crmp/meeting/document/20231017-rdi-presentation-handouts.pdf
Video Recording of the Meeting	[To be provided in final minutes]

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1. Call to Order, Roll Call, Introductions	Evan Branosky (DEQ) called the meeting to order at 1:00 pm and reviewed the agenda. He welcomed the attendees to the meeting and Matt Dalon (DCR) called the roll. He also introduced invited guests, including Mark Bennet, Celso Ferreira, and Molly Mitchell.
2. Adoption of Meeting Minutes and review of the subcommittee's objectives	Matt Dalon (DCR) noted that the first order of business is to adopt the meeting minutes from Q3. Mark Luckenback moved and Evan Branosky seconded the motion to adopt the minutes. Mr. Dalon reviewed the Research, Data, and Innovation Subcommittee's objectives. Mr. Dalon reviewed the subcommittee actions to date, including the first meeting, where the subcommittee reviewed pluvial model and decision points, specifically depth threshold, land cover data, and precipitation data, and a discussion of fluvial data. He also reviewed the calendar, noting that there are 4 more subcommittee meetings before the end of next year to provide input and make recommendations for Phase 2 of the Coastal Resilience Master Plan (CRMP). This subcommittee's objectives are focused on the flood hazard exposure model and data display of those results. The goals of the quarterly meetings are currently to look at flood hazard data scenario planning and a new item covering how we report that information. These two items will be covered in new business. Moving forward the subcommittee's work will be more focused on future recommendation, as well as input and review of current effort on Phase 2 assessment.
3. Old Business	Matt Dalon reviewed the 3 decision points discussed at the subcommittee's last meeting and the full TAC meeting last month. The first was the question of depth thresholds for the pluvial model. There is a need to decide what depth will be used to show the most useful results. The goal is to focus on impacts. The committee was looking at the 0.5 foot threshold, which is used by FEMA guidance as a threshold for hazards, and Louisiana uses the same depth thresholds for evaluating floodplains. DCR's recommendation is to move forward with 0.5 foot. There were no objections to moving forward with this threshold from the subcommittee. The next question was around the land cover data set to use as an input for pluvial modeling. Matt Dalon presented three alternatives: Virginia statewide land cover dataset, which is high resolution; the Chesapeake Conservancy Land Cover Dataset, which has updated imagery but doesn't cover the entire project area; the third option is to create a mosaic high resolution dataset which would combine the best available data from the Chesapeake data set, which covers the Chesapeake Bay Watershed, and then the Land Cover Dataset for areas outside of the watershed, which is older, but still high resolution. The Chesapeake data set covers all of the study area except the counties of Greensville, Sussex, and Southampton, and the cities of Emporia and Franklin.

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	Based on input from the committee and Dewberry, DCR recommends using the high-resolution mosaic approach. Rachel Peabody expressed appreciation for DCR returning to this question, receiving feedback, and deciding to opt for the more difficult approach as it will ultimately result in a better product. Matt Dalon continued to discuss the next point, which was about which scenarios to use for pluvial flood modeling. One option is median climate scenarios based on MARISA, and the other is to use intervals, which is DCR's recommendation. The intervals haven't been finalized, and likely the top end of the range would be bumped up to maintain the maximum shelf life of this dataset. Mark Luckenbach asked for clarification on what the higher intervals would mean. Matt Dalon responded that, for example, with the 2-hour duration, DCR looked at the median range for flooding, which was 1.45 inches to 7.63 inches, therefore the idea would be to add an inch or so, which would add a few intervals, based on half inch intervals for the 2-hour duration. That would happen for each duration, the 2-hr, 6-hr, and 24-hr. Matt Dalon moved on to fluvial flood hazard data level, which is focused on advising on the statewide flood protection master plan. For the coastal resilience master plan Phase 2, DCR is planning on using available FEMA data. But for the statewide plan, some of the localities further west don't have updated data that some localities have. Those with FEMA HEC models have some limitations, like they don't include topography, don't have flood extents or return intervals. FEMA data does not include any pluvial modeling, which is a data gap out west. There is also pending future federal data from FEMA covering the southside and southwest VA for updated flood models and the National Weather Service is also working on flood inundation models, which are coming in future years. And, the Federal Flood Risk Management Standards data might be coming out mid or late next year. For the statewide plan due by December 2025, it will need to look at flooding across Virginia in the coming year. FEMA data has some better data in the green areas of the map, but the data out west is old and doesn't incorporate all of the areas of flooding. For example, the map of the Bedford County Big Island area does not include smaller waterways that cross roadways and endanger buildings and infrastructure, but DCR can't capture what that flood risk is because it's not mapped. Another example is that the FEMA data stops in certain areas and doesn't go upstream. Therefore, it's not possible to model the total flood risk. The challenge is to close that data gap. Texas has the "floodplain data quilt," which considers data across a wide continuum, from no data/ coarse data to detailed data that's field verified. There are steps in between that; and detailed hydrologic studies are not always needed. Higher quality data comes with increased effort and cost. This spectrum guides DCR to identify better data than what they currently have, but dealing with the constraints of limited resources to conduct data collection. DCR is looking at evaluating 3rd party vendors in the lower end of the spectrum to get

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	available data at a relatively lower resolution data, e.g., 30-meter, where currently DCR uses 10-foot. Is that good enough for what is needed to do for a statewide planning effort? It would allow the state to have data for areas where higher quality data is not currently available. DCR is working on getting data to evaluate before making decisions. Matt Dalon asked the committee if anyone knows of other data, or could help review to make decisions about what data would be best before the next TAC meeting on December 15th. Anyone who is interested in helping to review and evaluate data options should reach out; the plan is to do this between the start of November and the next TAC meeting. ● Ben McFarlane (HRPDC) offered to help with the review and shared that it would be a good idea to come up with an estimate of what it would take to get to base flood level engineering to be able to make the case for round two of this plan. Matt Dalon responded that DCR has done informal calculations and it looks like tens of millions of dollars for base-level engineering. Knowing that the federal government is working on data products means that DCR needs to consider if their data will be out of date by the time it comes out. The statewide plan should also include a plan for flooding, land use, and other data. But they can work on getting more refined numbers to inform decision-making. ● Jess Whitehead (ICAR) seconded Mr. McFarlane's comment that getting to base level engineering needs to be a long-term plan. She asked the question if any legal vulnerabilities have come up with other states using private sector data. The decision may be to proceed with a private sector product, but it is important to know what the vulnerabilities are that could come along with that use. Matt Dalon responded that the term "advisory" has come up related to private products, to make it clear it isn't a regulatory product. DCR can look into the legal liability question, which has to do with how the data is used, which is difficult once it is put out there. Dr. Whitehead added that this can help to justify why we need to get to base-level engineering.
4. New Business	Matt Dalon introduced the overall purpose of operationalizing flood hazard data; the data is intended to be used for planning district commissions, localities, and state agencies and programs that have a related mission or could be impacted by flood resilience. These entities could use this information for their own analysis, for long-range plans, to prioritize actions, to support grant applications, to increase collaboration. Matt Dalon then reviewed what happened in Phase 1 to get feedback and inform what happens in Phase 2. In Phase 1 DCR reported the flood hazard data in the Coastal Resilience Web Explorer. The Explorer shows low and high-water intervals

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	in raster format and in various tables. It is possible to download this information to create personal data sets. Reporting on the impact side also included reporting on the 9 interval levels, as well as the relative impact levels from very low to high using a raster-based grid with resolution as small as 1200 ft X 1200 ft. Within the CRMP document itself, DCR tried to make this data more accessible by including current and future impacts, looking at upper and lower bounds, and 5 flooding types. Regional summaries looked at upper and lower bounds of flooding for each PDC, as well as extreme flood exposure (500-year floods). Is this helpful? Is more or less detail needed? There are four key factors related to this data: coastal, pluvial, fluvial, and total flooding. The data quality varies across that spectrum, especially with the fluvial data. On the return intervals, DCR still has the 9 intervals, 7 in pluvial efforts (2-500), but in fluvial, DCR has 100-year data everywhere it's mapped, and in some limited places DCR also has multi-frequency return intervals. On the time horizon, DCR did 20-year intervals. Is that the right approach for Phase 2? And DCR also looks at impacts, which has 4 levels: qualitative, quantitative, vulnerability for those exposed to flooding, and the risk (how much does it matter financially). Data available on flood hazards: for coastal flooding, DCR has data from 2020 to 2100 based on NOAA sea level rise data for 10 return intervals. For pluvial flooding, data includes precipitation cross walked to Atlas 14 values and 4 options with MARISA data. For fluvial flooding, there are no future projections, but there is SFHA 100-year data where it exists (doesn't cover the whole state because of limitations to FEMA), and depth grids for 10-500 year floods for limited locations. There is a question around how to break down return intervals; should the plan stick with 5? Break it down to three (repetitive, severe, and extreme)? Or stick with all 9? This is a question about how DCR reports the data, it doesn't mean DCR won't do all the analysis. Should DCR make changes to Phase 1 approach? ● Molly Mitchell asked if annual exceedance probabilities are recalculated as you move forward in time, or if they are based on data from today. Matt Dalon responded that those levels change over time. With MARISA data, if the Atlas 14 currently says a 1-inch precipitation event is the 50-year return interval, in the future, that 1-inch event won't be a 50-year return interval. it will be close to 25. DCR will go back and cross walk annual exceedance probabilities to which intervals they selected, and match that to the appropriate coastal hazard. Ms. Mitchell summarized that the precipitation

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	and storm surge data are iterating, which means the pluvial and storm/ tidal flooding are consistent. Matt Dalon added that an additional challenge is the lack of fluvial projections. EPA has some climate risk indicators that look at river and stream flow. But the question is whether DCR should add elevation to base numbers, but that would have varied impact based on width of channels. It's a challenge to combine sea level rise with future precipitation projections with fluvial; those return intervals and confidence in the data gets messy. The "Time Horizon: Resilience Planning Scenarios" slide shows one option, but leaves the question of how to pick RCP values. Phase 1 used the median values for sea level rise; there is a lot of uncertainty and variability in those values. There is similar uncertainty with pluvial and fluvial modeling. Fluvial projections are based on watersheds and vary a lot. How should DCR capture major sources of flooding in a usable planning product? Would it make sense to simplify time horizons and work with upper and lower bounds given the level of uncertainty? Would this be confusing? Jess Whitehead asked about the timeline for making that decision. She observed that there is a social sciences problem; there's some scholarship that the language of return intervals tends to lead to a flood recency bias, which could point towards probabilistic info. The PDC audience and locality audience will vary in their sophistication in using this information. Perhaps a rapid response survey could look at existing studies to find out how to organize data to be more accessible, if time allows. Matt Dalon responded that DCR wants to have underlying data calculated; on pluvial data they have to crosswalk and select terms. They want to be sure they aren't missing components. There is more time on how this information gets packaged for the primary audience (PDCs and planners) to include it in their plans and to get it out to the public. The task of communicating this information to the general public is a much bigger task. DCR plans to put out a survey this quarter to get input from end users on what was helpful in how they've delivered the product so far through the plan and the Web Explorer. This will most likely need to be packaged next summer. It will be necessary to make this decision by the end of the year. John Bateman wrote in the chat that simplification is necessary. Ben McFarlane (HRPDC) recommended that DCR go with the simplified set of the scenarios for the plan to serve as an educational document and common reference. Training for the users on that data could equip them to talk about the data and context in a higher resolution way. Matt Dalon responded that everyone has different use cases for the data, and the plan is only delivered once. DCR could offer

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	post-plan technical support, and could also make data available for download so it could be customized by localities. Rachel Peabody (VMRC) supported what Ben McFarlane mentioned. VMRC's shoreline guidelines say that projects need to be designed for the life of the project, so people will need this kind of data to make those designs. Molly Mitchell shared a word of caution around picking a lower and upper bound because the lower scenarios aren't very realistic and it would be worth checking to see if lower bounds are considered realistic to achieve. Ben McFarlane added that illustrating the uncertainty of the future through the range is great for some uses, but not as good for others. Encouraging people to take more risk than is ideal would defeat the purpose of this document. The purpose is a plan to identify likely risk and plan for how to mitigate risk. Instead of lower and upper scenarios, the plan could emphasize the median and the upper bound. This could downplay the possibility that things could turn out better, but this would encourage people to take the actions this group wants to encourage them to do. Matt Dalon responded that DCR doesn't use these terms. Could use "minimal planning requirements" or "critical planning requirements." For critical infrastructure, the upper limit should be used. Using a median and an upper could be a good solution. To give a range of data at two or more time horizons. Matt Dalon commented that he went with two time horizons because pluvial data has two, and adding a third would be more complex. It was commented that the most recent NOAA guidance also uses 2 time frames. If DCR used a third they would have to somehow figure out what those numbers would be. Using the time frames that authoritative bodies are already using would be helpful. Jess Whitehead suggested that messaging should consider caution especially around rainfall. More climate change doesn't always equal wetter; extreme flooding isn't the only potential future; dryer scenarios also exist, and would matter for groups considering drought. Matt Dalon asked if anyone has thoughts on the Web Explorer and more pared-down pdf as a way to report data: ● Jess Whitehead noted how well done the Web Explorer is, and how useful it is for conversations with people interested in resilience but not familiar with information that's already pulled together. Matt Dalon commented that the major challenge now is combining the three kinds of data on the Web Explorer knowing that the data varies, but it's important to know what the risks are to all kinds of flooding for any given location. That will be discussed at a future subcommittee meeting.

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5. Subcommittee Members Discussion	No additional topics for discussion were raised
6. Public Comment	Celso Ferreira shared thanks for the work of the subcommittee, and echoed the importance of communication. The future scenarios table was hard to follow given the time windows, e.g., scenario with the three hazards. It was recommended the group think about how this is going to be presented to end users.
7. Action Items and Scheduling	Matt Dalon shared that he recommends DCR proceed with values from the old business discussion, which will be reported out at TAC meeting. Based on input, he will do research on how to organize the data with end-users in mind. DCR will do an end-user survey and will talk about how to capture details and will report back to the TAC at the next meeting on December 15th. There will be additional opportunities for input on the new items and decision points about packaging the total flood hazard. Minutes should be posted by the end of next week. The next meeting has not been scheduled but the Q1 meeting will happen in the new year and will need to be in-person. DCR will work with the chair to find a date, time, and location based on member responses to the survey. Members were asked to let Matt Dalon know if they have other preferences. DCR will put the slides out one week before the meeting. Agenda items for the next meeting will be updated based on these discussions around the climate scenario planning approach, and DCR wants to move into future plans and recommendations for future plans. They'd like the workgroup to come to consensus on what should be included in the plan document itself. Items brought up today are the need to look at flood data and a plan for what data is needed, whether it's BLEs or some other type of flood model, including an evaluation of cost. If members have any request for agenda items or guests to be invited, please send them to the chair.
8. Adjourn	The meeting was adjourned at 2:36pm.

Voting Records

A motion was made to adopt the meeting agenda. A second motion was made and all members voted in favor to adopt the agenda.

The purpose of these minutes is to record and preserve, to the best of our ability, the major contributors and general topics covered during this meeting. Verbatim transcription is not the intent of this document. If you have any questions, please contact flood.resilience@dcr.virginia.gov