2021
State Hazard Mitigation Plan
MARYLAND EMERGENCY MANAGEMENT AGENCY

August 2021

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LARRY HOGAN
GOVERNOR

STATE OF MARYLAND
OFFICE OF THE GOVERNOR

August 23, 2021

Mary Ann Tierney
Regional Administrator
FEMA Region III
One Independence Mall, 6th Floor
615 Chestnut Street
Philadelphia, PA 19106

Dear Ms. Tierney,

In accordance with the authority vested in me by the *Annotated Code of Maryland*, Public Safety Article 14 Sections 106(b)(2) and (b)(4), I hereby approve and declare the State of Maryland *2021 State Hazard Mitigation Plan* to be adopted. This plan shall be effective as of August 24, 2021.

The *State of Maryland 2021 Hazard Mitigation Plan* has been developed collaboratively across the state in accordance with the Disaster Mitigation Act of 2000 and 44 CFR Part 201 Mitigation Planning.

The plan exemplifies the need for a whole community approach to reduce disaster risk and build community resilience. This plan shall serve as a guide to implementing transformative mitigation for the State of Maryland.

Sincerely,

Larry Hogan
Governor

Cc: Russell Strickland, Executive Director, Maryland Emergency Management Agency

STATE HOUSE, ANNAPOLIS, MARYLAND 21401
(410) 974-3901 1-800-811-8336
TTY USERS CALL VIA MD RELAY

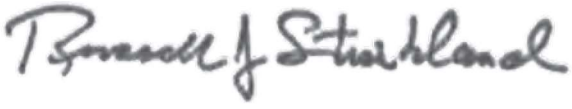
A Message from Executive Director Russell J. Strickland

The vision of the Maryland Emergency Management Agency (MEMA) is "to shape a resilient Maryland where communities thrive." This vision is achieved through the collaborative efforts of our citizens, community organizations, private partners, and all levels of government. The *State of Maryland 2021 Hazard Mitigation Plan* serves as a roadmap to identify, assess, and address our risk.

This plan includes updated assessments of the eight hazards from the 2016 version. In addition, this reassessment incorporates several new hazards including public health emergencies, soil movement, extreme temperatures, dam failure, and human-caused hazards and threats. Developing a pathway to reduce disaster risk starts first with a comprehensive assessment of what hazards Marylanders face and how they have changed in the last five years.

We have refined the goals of the plan in order to address the changing risk in our communities. The goals prioritize focusing on flood risk occuring outside floodplains to better prepare for smaller, frequent events; addressing inequities to ensure every Marylander has the resources to stay informed and protected before, during, and after an emergency; fostering opportunities for partnerships and collaboration across the whole community; and reducing flood hazards in areas of high risk with repetitive flooding.

Simply put "mitigation is the center of the universe" and by putting mitigation at the forefront we prioritize building community resilience. Doing so permits us to execute all mission areas of Emergency Management from a safer perspective.



U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

August 23, 2021

Mr. Russell Strickland
Executive Director/Governor's Authorized Representative
Maryland Emergency Management Agency
5401 Rue Saint Lo Drive
Reisterstown, Maryland 21136

Dear Mr. Strickland:

I am pleased to announce that the State Hazard Mitigation Plan of Maryland has been approved. The plan meets the requirements set forth in Title 44, Chapter 1, Section 201.4, of Code of Federal Regulations (44 CFR 201.4), as authorized by the Disaster Mitigation Act of 2000, by adequately addressing the following required elements: planning process, risk assessment and hazard identification, mitigation strategy, coordination of local mitigation planning, maintenance and implementation, and adoption. In addition, the State Hazard Mitigation Plan meets the requirements to address all dam risks in the mitigation plan.

A FEMA approved state mitigation plan is a condition of receiving certain non-emergency Stafford Act assistance and FEMA mitigation grants from the following programs:

- Public Assistance Categories C-G (PA C-G)
- Fire Management Assistance Grants (FMAG)
- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)
- Rehabilitation of High Hazard Potential Dams (HHPD)

The State of Maryland must revise its plan and obtain approval within 5 years to continue to be eligible for non-emergency Stafford Act assistance and FEMA mitigation grants. This plan should be reviewed at least annually to keep it relevant to the mitigation goals throughout the state. Please consider the enclosed recommendations to further strengthen your plan during the next plan update.

FEMA recognizes Maryland's dedication demonstrated in your timely preparation and adoption of a strategy to reduce future disaster losses. If you have any questions, please contact Mari Radford, Community Planning Lead, at (267) 319-6310.

Sincerely,

MARYANN E TIERNEY
Digitally signed by MARYANN E TIERNEY
Date: 2021.08.23 19:07:37 -04'00'

MaryAnn Tierney
Regional Administrator

Enclosure

cc: JaLeesa Tate, CFM, State Hazard Mitigation Officer, MEMA
Kyle Overly, Director, Disaster Risk Reduction Directorate, MEMA
Chas Eby, Deputy Executive Director, MEMA

Executive Summary

Hazard mitigation helps to reduce or eliminate potential losses from future disasters. Hazard mitigation planning helps to establish and maintain a process that leads to the implementation of hazard mitigation actions. The State of Maryland is intimately familiar with the impacts of hazards on its residents, visitors, infrastructure, and economy. This 2021 update to the State's Hazard Mitigation Plan (Plan) again re-affirms the state's commitment to continual improvements to its statewide mitigation strategy and program.

The 2021 hazard mitigation planning process began with the identification of a broad-reaching State Hazard Mitigation Team, led by the Maryland Emergency Management Agency (MEMA), which guided the development of the updated plan. Based on significant updates and actions from the major Lead Agencies charged with implementation of the Plan and other stakeholders, as well as the inclusion of five new hazards, this Plan includes significant changes as compared to those completed in a typical update cycle. Since the 2016 Plan was approved, the state has been subjected to six major disasters, a challenge in any operating environment. But 2020 presented a new hurdle, the challenges brought on by the ongoing coronavirus pandemic and COVID-19 response, which necessitated a completely virtual approach to the update, something never before attempted.

The steps involved in plan development included the detailed identification of natural, technological, and human-caused hazards that can impact Maryland and an assessment of the vulnerability, and ultimately the risk, presented by those hazards. Next steps included a thorough evaluation of the state's current mitigation capabilities, followed by an update to the state's mitigation strategy.

This strategy identified five overarching Mitigation Themes, and related Mitigation Objectives, that define Maryland's path forward to implementing hazard mitigation.

Overarching themes of the *2021 State Hazard Mitigation Plan* include:

- Identifying natural hazards that are most likely to impact Maryland now and, in the future, providing an opportunity for a focused risk analysis and prioritization of mitigation strategies and resiliency efforts to include:
- Minimizing the loss of life and personal injuries from all-hazard events
- Reducing losses and damage to state and local governments and private assets
- Decreasing federal, state, local, and private costs of disaster response and recovery
- Developing strategies and actions for five new hazards, including public health emergencies, dam failures (previously in the Plan but removed for security reasons following 9/11), man-made hazards, extreme temperatures, and soil movement

- Supporting mitigation initiatives and policies that promote disaster resiliency, nature-based solutions, cultural resources and historic preservation, and climate adaptation strategies
- Verifying critical facilities and state assets data
- Maximizing opportunities for collaboration and excitement between stakeholders over future hazard mitigation opportunities to ensure the safety of Maryland's citizens, protection of property, environmental sustainability, community resiliency, and the preservation of Maryland's cultural and historic resources for future generations

Implementation of these overarching themes requires goals, strategies, and actions. Section 4 of the Plan outlines these implementation measures for this Plan update. The Steering Committee elected to separate the single goal and the five objectives included in the 2016 Plan Update into six independent goals. In addition, the two goals for RL and SRL properties from the 2016 Plan have been incorporated into this list of goals. The Steering Committee also added new considerations for social equity and environmental justice, bringing the total number of goals to 10, which are listed below. Newly developed goals for the 2021 Plan are emphasized in **bold**.

2021 Maryland Hazard Mitigation Plan Goals

1. Protect life, property, the economy, and the environment from hazard events to the greatest extent possible.
2. Increase public awareness of potential hazards, mitigation actions, preparedness efforts, and resiliency planning.
3. Protect state assets, infrastructure, and critical facilities from hazard events.
4. Enhance coordination across the whole community, including federal, state, and local government, and nongovernmental organizations, by strengthening existing linkages and creating new linkages between state and local mitigation and resiliency efforts.
5. Promote actions that protect natural resources while enhancing hazard mitigation and community resiliency.
6. Identify and implement projects that will reduce the impacts of hazards and efficiently use state resources.
7. **Integrate hazard mitigation planning into other state planning efforts (comprehensive plan, floodplain management regulations, land use/zoning, green infrastructure) and encourage and educate counties and municipalities to integrate across local plans and ordinances.**
8. Identify and reduce flood hazard impacts in areas outside of the Special Flood Hazard Area (SFHA), that have experienced increased frequency and intensity in flooding but do not meet FEMA's RL and SRL criteria.

9. Reduce flood-related losses, with an emphasis on reducing RL and SRL properties over the next hazard mitigation planning cycle.
10. **Promote the development of policies, programs, initiatives, and projects that prioritize diversity, equity, and environmental justice.**

Since the completion of the 2016 Plan, Maryland reevaluated the state's exposure relative to dams and dam safety. In the Summer of 2020, MEMA received formal approval from the Federal Emergency Management Agency (FEMA) for the revised Dam Safety Addendum to be included as part of the 2016 Plan. This Addendum has been incorporated into the Hazard Identification and Risk Analysis of this 2021 Plan Update, and the document in total may be found in Appendix C. This was a significant revision to the Plan, along with the addition of other new hazards as mentioned above.

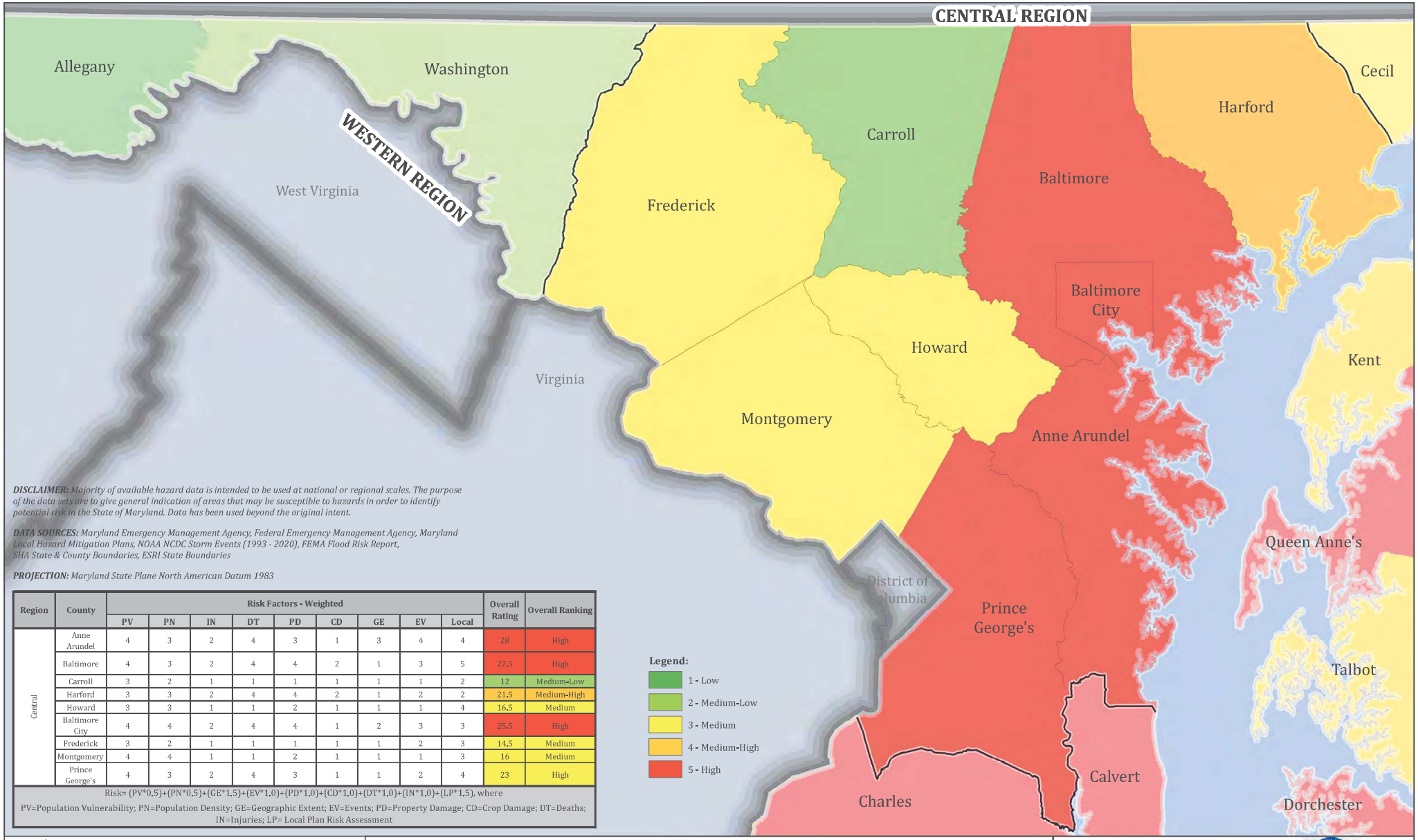
The final and most important piece of the Plan is defining the path forward. The planning process defined a clear direction for implementation and maintenance. The Plan addresses each required element of 2 CFR §201.4. Finally, MEMA has developed this Plan update to proactively support the new FEMA Hazard Mitigation program and ensure that during the first 5 years of that program's life, MEMA submits applications for mitigation projects that will support the goals and priorities of the Building Resilient Infrastructure in Communities (BRIC) program.

Federal Compliance

The Plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (DMA) (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the *Federal Register* on February 26, 2002 (2 CFR §201.4 and §201.5) and finalized on October 31, 2007. (Hereafter, these requirements, and regulations will be referred to collectively as the Disaster Mitigation Act.)

While the Act emphasizes the need for mitigation plans and coordinated mitigation planning and implementation efforts, the regulations established requirements that hazard mitigation plans must meet in order for a state jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288).

The 2021 Plan falls under assurances proclaimed in this Plan. The State of Maryland assures that it will comply with all applicable federal statutes and regulations in effect with respect to the periods for which it receives grant funding in compliance with 2 CFR Part 200, Subpart C. The state will amend the Plan whenever necessary to reflect changes in state or federal laws and statutes, as required in 2 CFR Part 200, Subpart C. The adoption of this Plan demonstrates the State of Maryland's commitment to fulfilling the mitigation objectives in the Plan and authorizes the agencies identified in the Plan to execute their responsibilities.



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PROJECTION: *Maryland State Plane North American Datum 1983*

Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Central	Anne Arundel	4	3	2	4	3	1	3	4	4	28	High
	Baltimore	4	3	2	4	4	2	1	3	5	27.5	High
	Carroll	3	2	1	1	1	1	1	1	2	12	Medium-Low
	Harford	3	3	2	4	4	2	1	2	2	21.5	Medium-High
	Howard	3	3	1	1	2	1	1	1	4	16.5	Medium
	Baltimore City	4	4	2	4	4	1	2	3	3	25.5	High
	Frederick	3	2	1	1	1	1	1	2	3	14.5	Medium
	Montgomery	4	4	1	1	2	1	1	1	3	16	Medium
	Prince George's	4	3	2	4	3	1	1	2	4	23	High

Risk= (PV*0.5)+(PN*0,5)+(GE*1,5)+(EV*1,0)+(PD*1,0)+(CD*1,0)+(DT*1,0)+(IN*1,0)+(LP*1,5), where

PV=Population Vulnerability; PN=Population Density; GE=Geographic Extent; EV=Events; PD=Property Damage; CD=Crop Damage; DT=Deaths; IN=Injuries; LP= Local Plan Risk Assessment

0 2.5 5 10 15 Miles

Coastal Hazard Ranking & Risk Map (Central Region)

State of Maryland Hazard Mitigation Plan 2020

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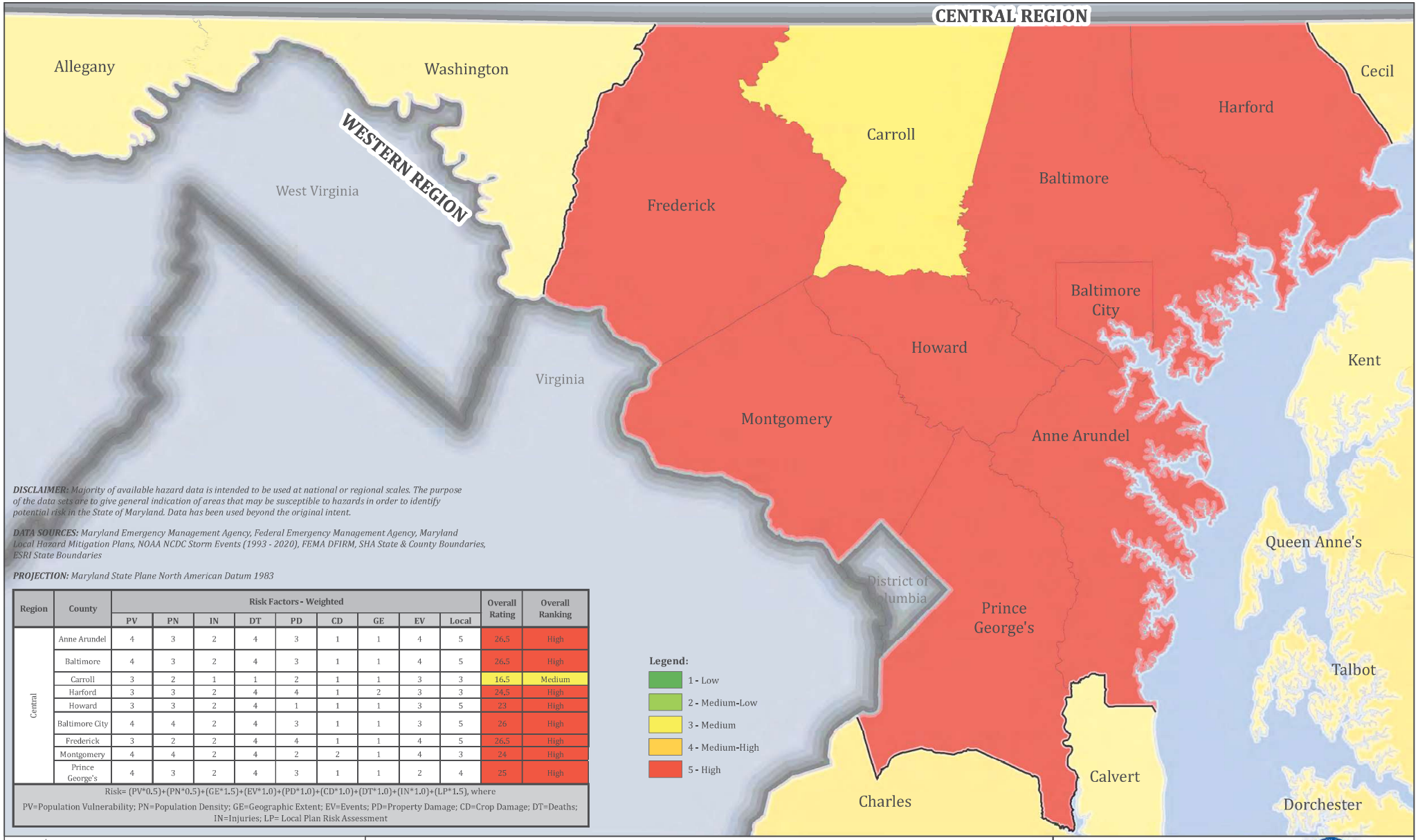

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Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Central	Anne Arundel	4	3	2	4	3	1	1	4	5	26.5	High
	Baltimore	4	3	2	4	3	1	1	4	5	26.5	High
	Carroll	3	2	1	1	2	1	1	3	3	16.5	Medium
	Harford	3	3	2	4	4	1	2	3	3	24.5	High
	Howard	3	3	2	4	1	1	1	3	5	23	High
	Baltimore City	4	4	2	4	3	1	1	3	5	26	High
	Frederick	3	2	2	4	4	1	1	4	5	26.5	High
	Montgomery	4	4	2	4	2	2	1	4	3	24	High
	Prince George's	4	3	2	4	3	1	1	2	4	25	High

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Flood Hazard Ranking & Risk Map (Central Region)

State of Maryland Hazard Mitigation Plan 2020

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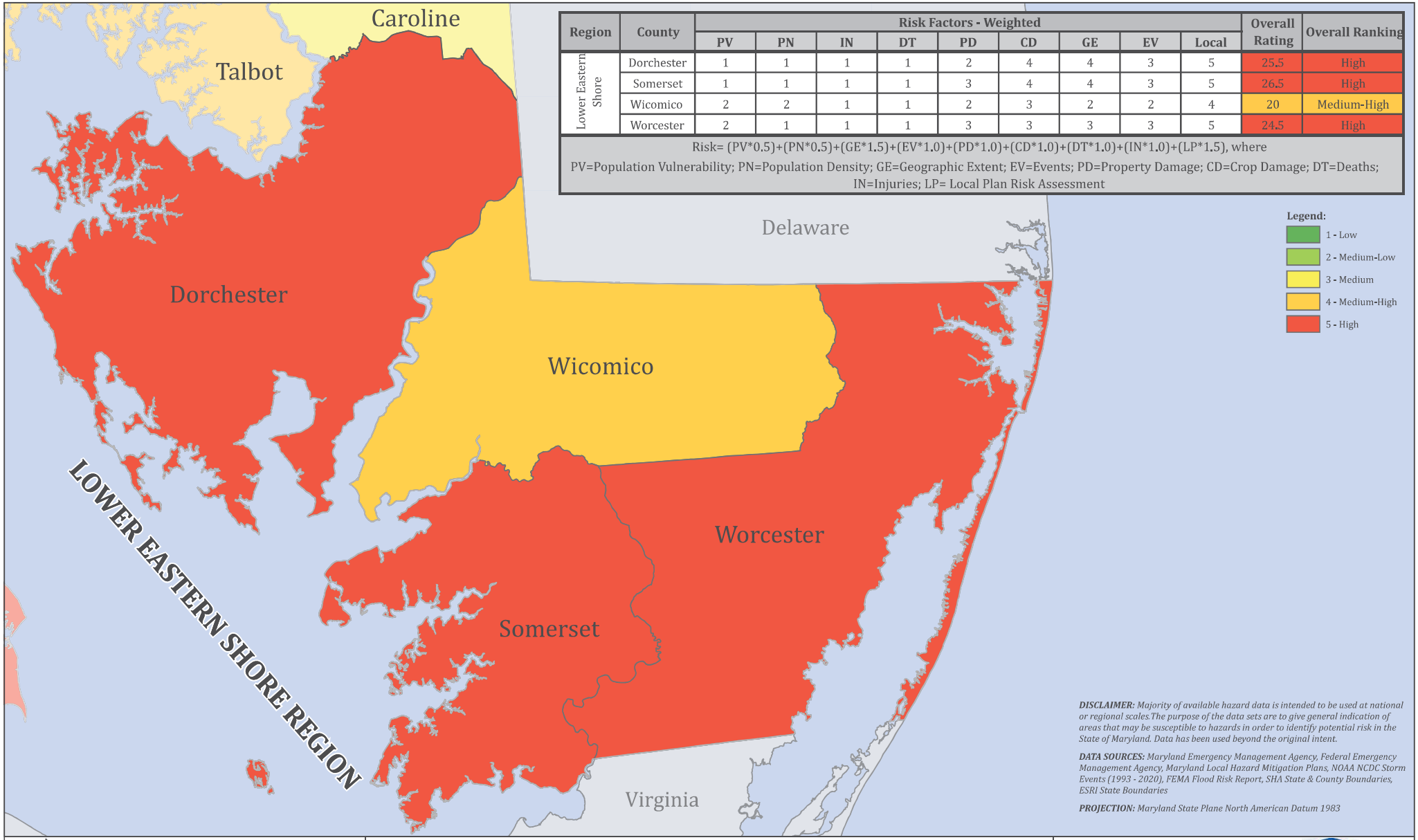

Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Lower Eastern Shore	Dorchester	1	1	1	1	2	4	4	3	5	25.5	High
	Somerset	1	1	1	1	3	4	4	3	5	26.5	High
	Wicomico	2	2	1	1	2	3	2	2	4	20	Medium-High
	Worcester	2	1	1	1	3	3	3	3	5	24.5	High

Risk= (PV*0.5)+(PN*0.5)+(GE*1.5)+(EV*1.0)+(PD*1.0)+(CD*1.0)+(DT*1.0)+(IN*1.0)+(LP*1.5), where

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Legend:

- 1 - Low
- 2 - Medium-Low
- 3 - Medium
- 4 - Medium-High
- 5 - High

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0 2.5 5 10 15 Miles

Coastal Hazard Ranking & Risk Map (Lower Eastern Shore Region)

State of Maryland Hazard Mitigation Plan 2020

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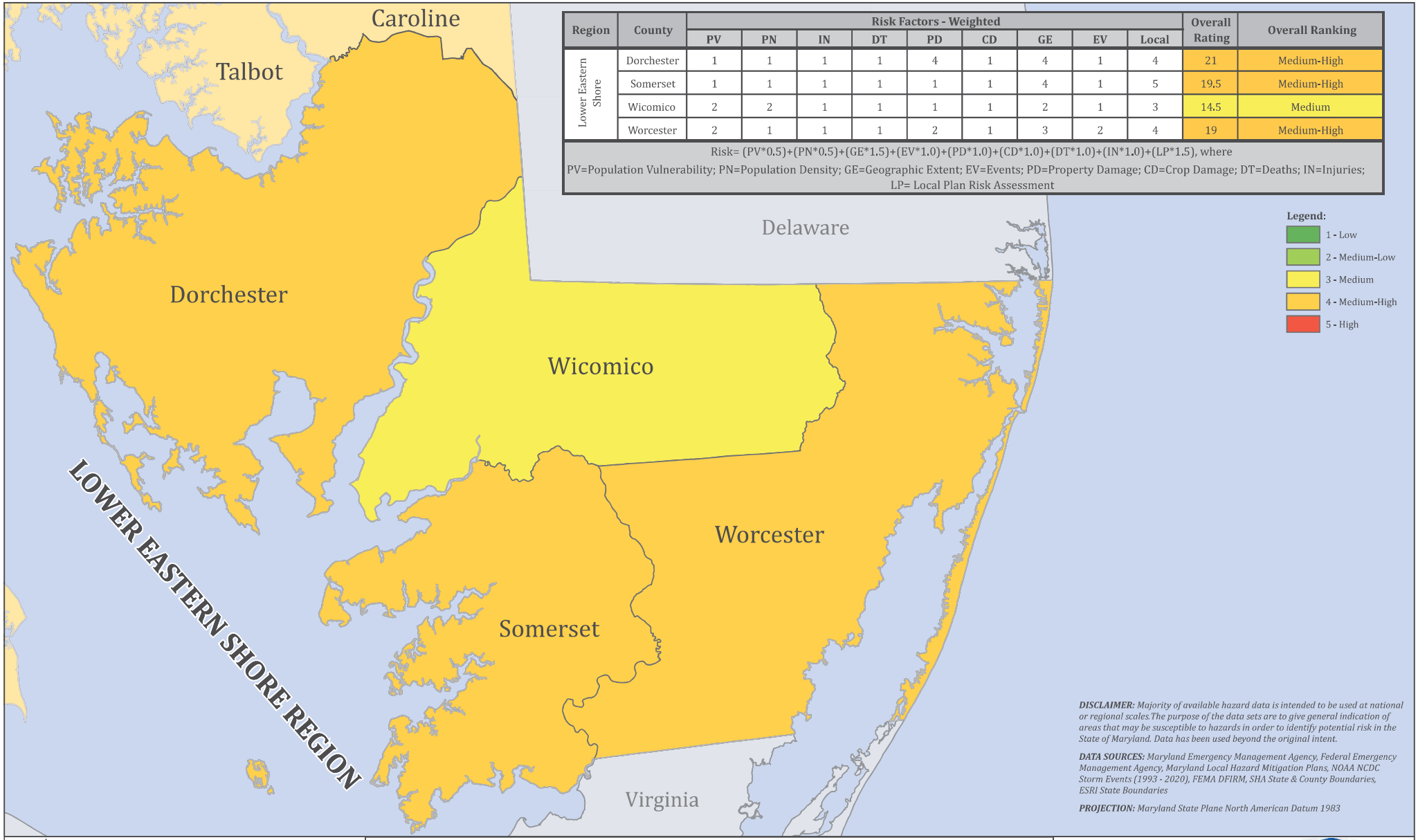

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		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Lower Eastern Shore	Dorchester	1	1	1	1	4	1	4	1	4	21	Medium-High
	Somerset	1	1	1	1	1	1	4	1	5	19.5	Medium-High
	Wicomico	2	2	1	1	1	1	2	1	3	14.5	Medium
	Worcester	2	1	1	1	2	1	3	2	4	19	Medium-High

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Flood Hazard Ranking & Risk Map (Lower Eastern Shore Region)

State of Maryland Hazard Mitigation Plan 2020

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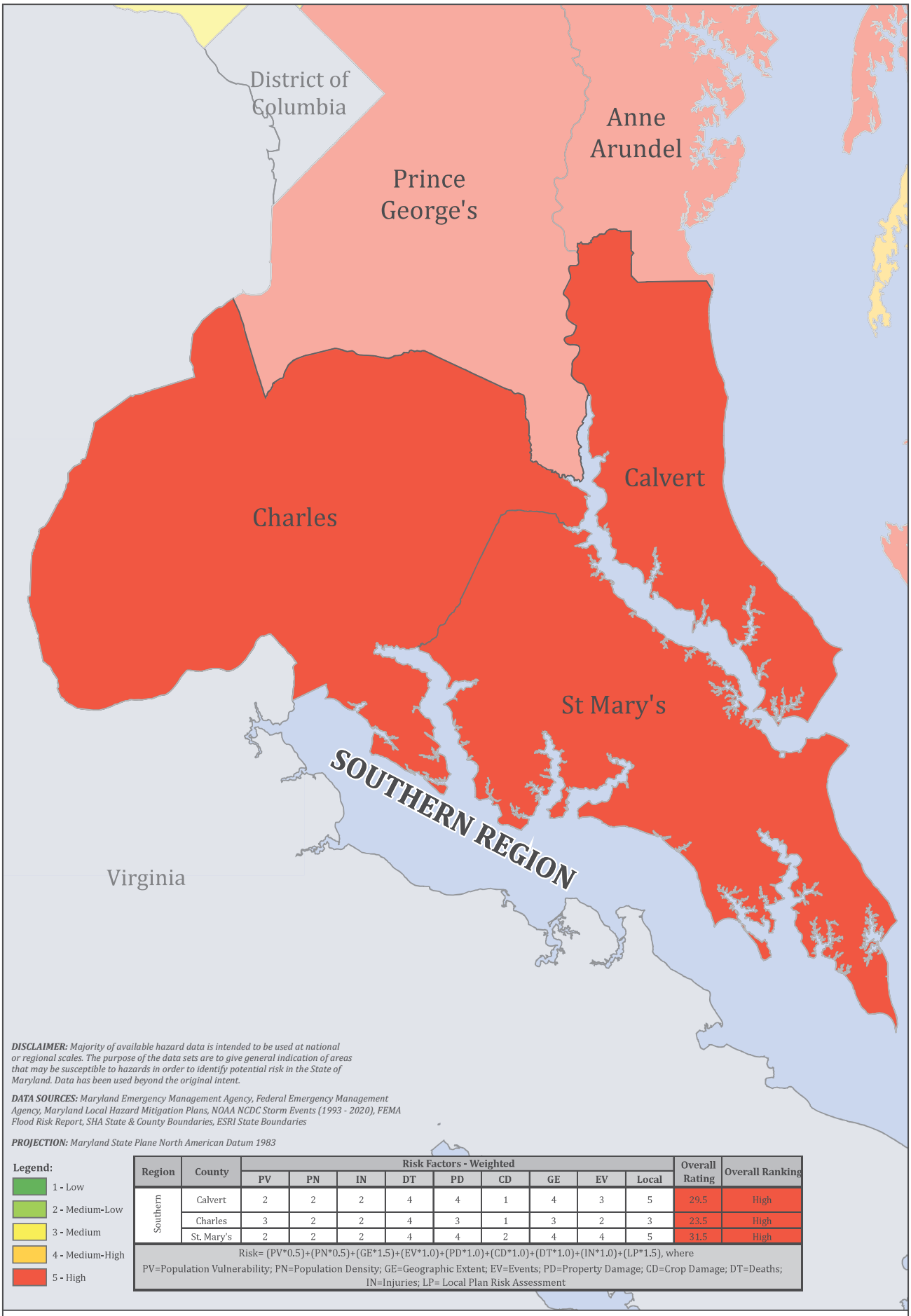

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PROJECTION: *Maryland State Plane North American Datum 1983*

Legend:

- 1 - Low
- 2 - Medium-Low
- 3 - Medium
- 4 - Medium-High
- 5 - High

Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Southern	Calvert	2	2	2	4	4	1	4	3	5	29.5	High
	Charles	3	2	2	4	3	1	3	2	3	23.5	High
	St. Mary's	2	2	2	4	4	2	4	4	5	31.5	High

Risk= (PV*0.5)+(PN*0.5)+(GE*1.5)+(EV*1.0)+(PD*1.0)+(CD*1.0)+(DT*1.0)+(IN*1.0)+(LP*1.5), where
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Coastal Hazard Ranking & Risk Map (Southern Region)

State of Maryland Hazard Mitigation Plan 2020

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Legend:

- 1 - Low
- 2 - Medium-Low
- 3 - Medium
- 4 - Medium-High
- 5 - High

Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Southern	Calvert	2	2	1	1	2	1	1	2	5	18	Medium
	Charles	3	2	1	1	2	1	2	2	5	20	Medium-High
	St. Mary's	2	2	1	1	2	1	1	3	5	19	Medium-High

Risk= (PV*0.5)+(PN*0.5)+(GE*1.5)+(EV*1.0)+(PD*1.0)+(CD*1.0)+(DT*1.0)+(IN*1.0)+(LP*1.5), where

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Flood Hazard Ranking & Risk Map (Southern Region)

State of Maryland Hazard Mitigation Plan 2020

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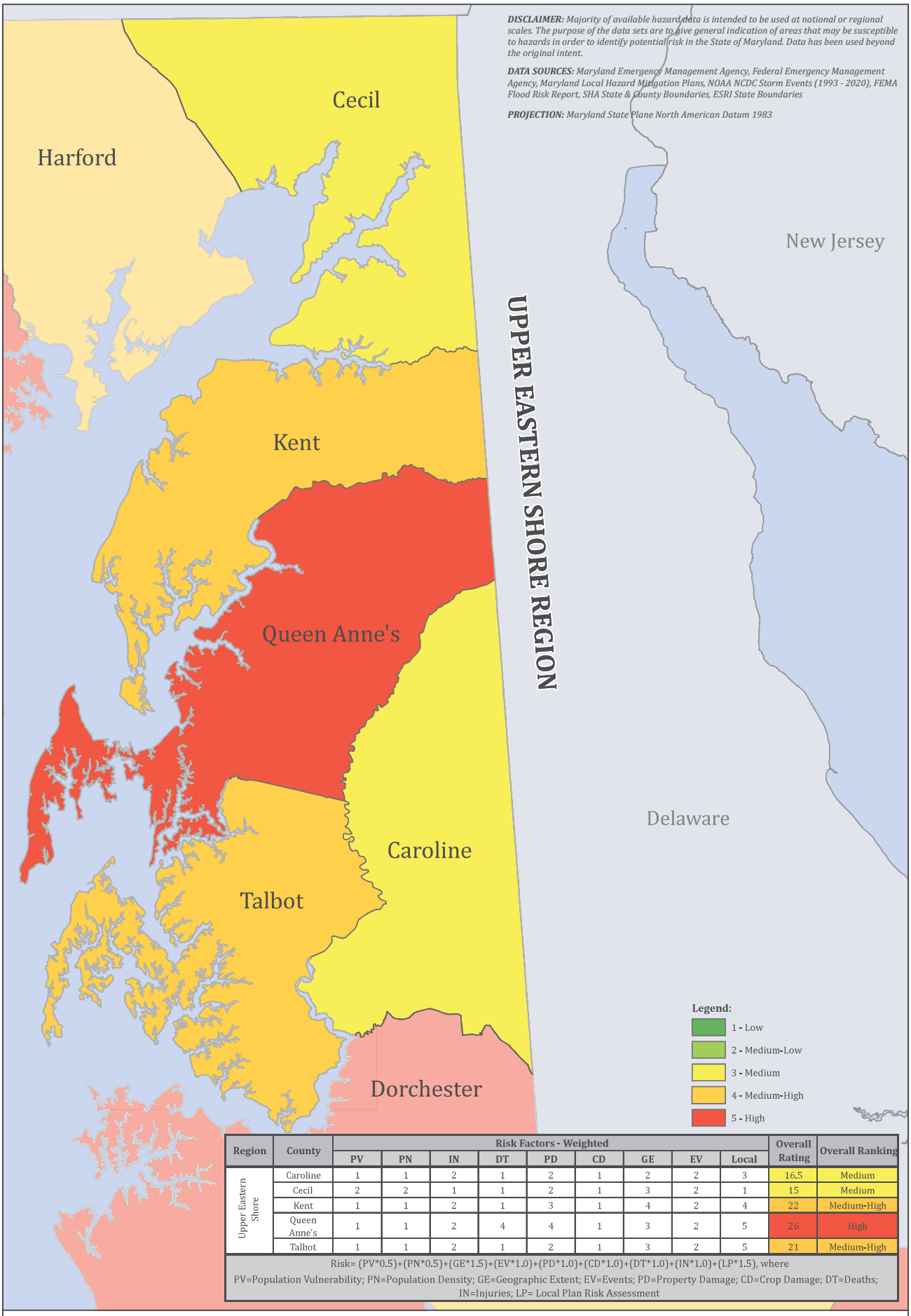

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Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Upper Eastern Shore	Caroline	1	1	2	1	2	1	2	2	3	16.5	Medium
	Cecil	2	2	1	1	2	1	3	2	1	15	Medium
	Kent	1	1	2	1	3	1	4	2	4	22	Medium-High
	Queen Anne's	1	1	2	4	4	1	3	2	5	26	High
	Talbot	1	1	2	1	2	1	3	2	5	21	Medium-High

Risk= (PV*0.5)+(PN*0.5)+(GE*1.5)+(EV*1.0)+(PD*1.0)+(CD*1.0)+(DT*1.0)+(IN*1.0)+(LP*1.5), where
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Coastal Hazard Ranking & Risk Map (Upper Eastern Shore Region)

State of Maryland Hazard Mitigation Plan 2020

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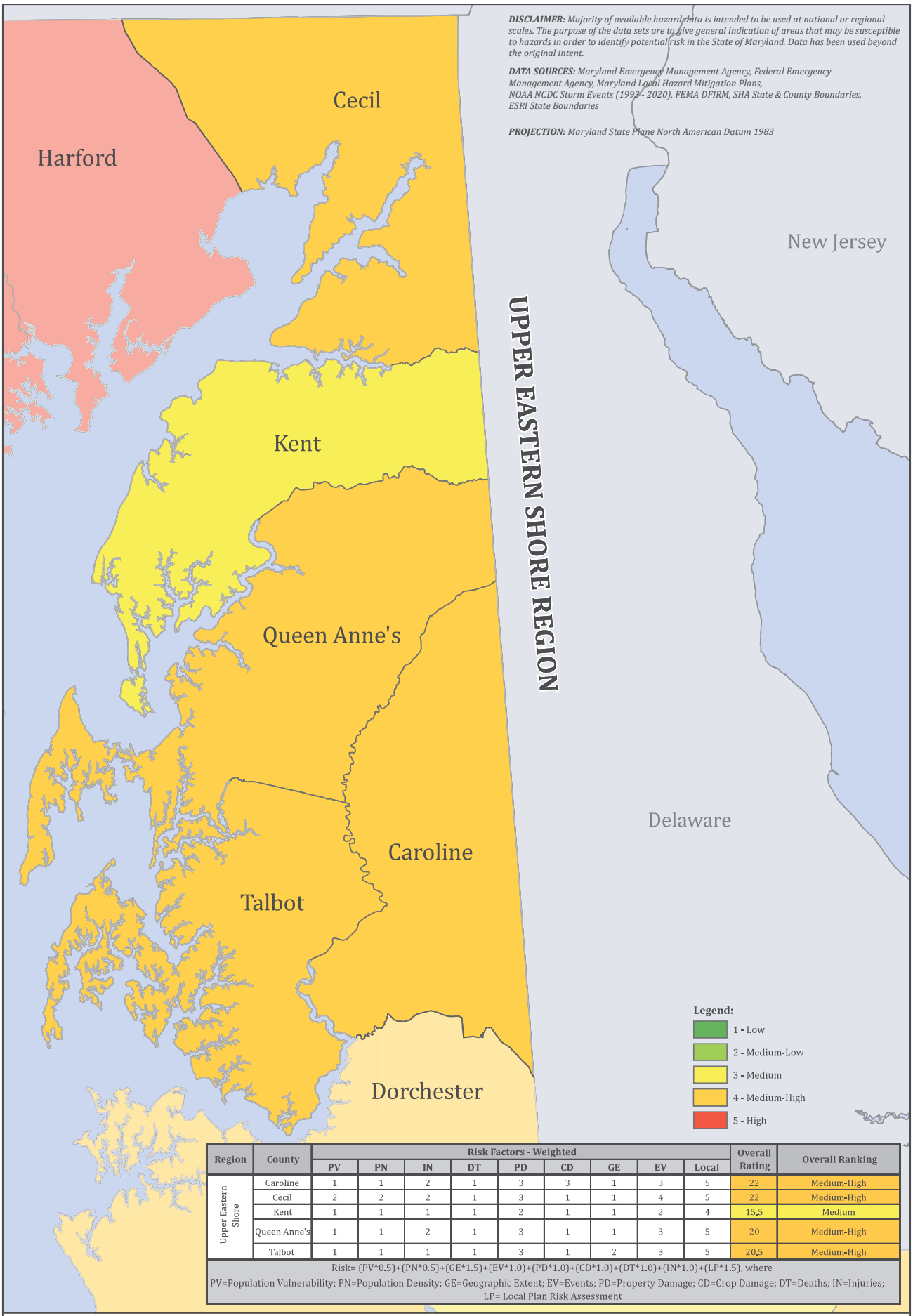

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		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Upper Eastern Shore	Caroline	1	1	2	1	3	3	1	3	5	22	Medium-High
	Cecil	2	2	2	1	3	1	1	4	5	22	Medium-High
	Kent	1	1	1	1	2	1	1	2	4	15.5	Medium
	Queen Anne's	1	1	2	1	3	1	1	3	5	20	Medium-High
	Talbot	1	1	1	1	3	1	2	3	5	20.5	Medium-High

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Flood Hazard Ranking & Risk Map (Upper Eastern Shore Region)

State of Maryland Hazard Mitigation Plan 2020

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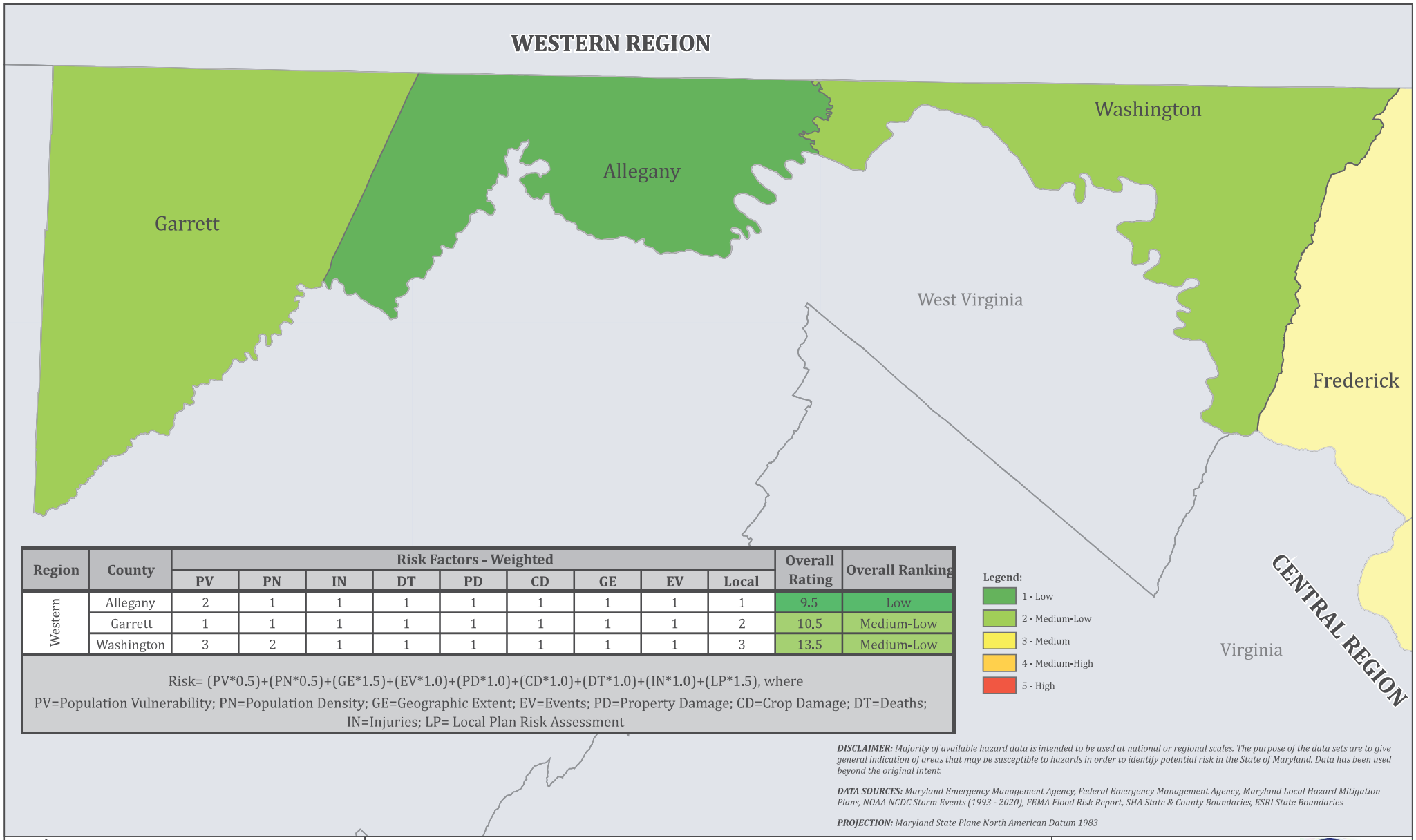


Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Western	Allegany	2	1	1	1	1	1	1	1	1	9.5	Low
	Garrett	1	1	1	1	1	1	1	1	2	10.5	Medium-Low
	Washington	3	2	1	1	1	1	1	1	3	13.5	Medium-Low

Risk= (PV*0.5)+(PN*0.5)+(GE*1.5)+(EV*1.0)+(PD*1.0)+(CD*1.0)+(DT*1.0)+(IN*1.0)+(LP*1.5), where
PV=Population Vulnerability; PN=Population Density; GE=Geographic Extent; EV=Events; PD=Property Damage; CD=Crop Damage; DT=Deaths; IN=Injuries; LP= Local Plan Risk Assessment

DISCLAIMER: *Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards in order to identify potential risk in the State of Maryland. Data has been used beyond the original intent.*

DATA SOURCES: *Maryland Emergency Management Agency, Federal Emergency Management Agency, Maryland Local Hazard Mitigation Plans, NOAA NCDC Storm Events (1993 - 2020), FEMA Flood Risk Report, SHA State & County Boundaries, ESRI State Boundaries*

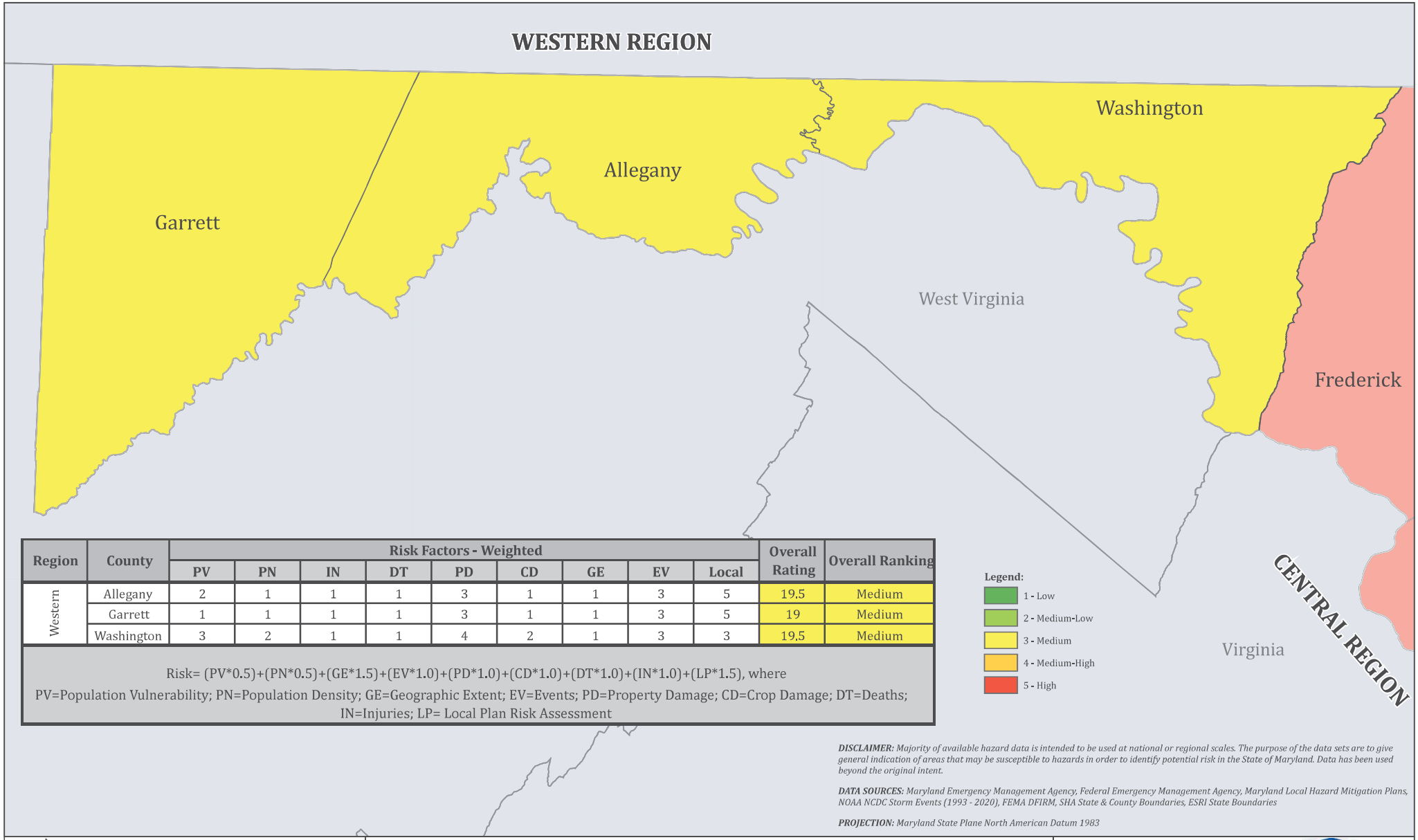
PROJECTION: *Maryland State Plane North American Datum 1983*

0 2.5 5 10 15 Miles

Coastal Hazard Ranking & Risk Map (Western Region)

State of Maryland Hazard Mitigation Plan 2020

AECOM



Region	County	Risk Factors - Weighted									Overall Rating	Overall Ranking
		PV	PN	IN	DT	PD	CD	GE	EV	Local		
Western	Allegany	2	1	1	1	3	1	1	3	5	19.5	Medium
	Garrett	1	1	1	1	3	1	1	3	5	19	Medium
	Washington	3	2	1	1	4	2	1	3	3	19.5	Medium

Risk= (PV*0.5)+(PN*0.5)+(GE*1.5)+(EV*1.0)+(PD*1.0)+(CD*1.0)+(DT*1.0)+(IN*1.0)+(LP*1.5), where
PV=Population Vulnerability; PN=Population Density; GE=Geographic Extent; EV=Events; PD=Property Damage; CD=Crop Damage; DT=Deaths; IN=Injuries; LP= Local Plan Risk Assessment

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DATA SOURCES: *Maryland Emergency Management Agency, Federal Emergency Management Agency, Maryland Local Hazard Mitigation Plans, NOAA NCDC Storm Events (1993 - 2020), FEMA DFIRM, SHA State & County Boundaries, ESRI State Boundaries*

PROJECTION: *Maryland State Plane North American Datum 1983*

0 2.5 5 10 15 Miles

Flood Hazard Ranking & Risk Map (Western Region)

State of Maryland Hazard Mitigation Plan 2020

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