October 29, 2026

Meeting 4 Summary

Workgroup on
Developing a Climate-Resilient Fishery Management Plan for Maryland
October 29, 2026
10:00 AM – 12:00 PM
In-Person and Virtual
Tawes State Office Building, C-1 Conference Room

Attendance

Workgroup Members

Greg Casten, ProFish Seafood Company (Virtual)
Kiley Dancy, Mid-Atlantic Fishery Management Council (Virtual)
Jorge Holzer, University of Maryland, College Park Virtual)
Harry Hornick, Retired DNR Virtual)
Henry Legett, Smithsonian Environmental Research Center (In person)
Mariah Livernois, Maryland Coastal Bays Program (In person)
Will Poston, Chesapeake Bay Foundation (In person)
Julie Reichert-Nguyen, NOAA Chesapeake Bay Office (Virtual)
Kenneth Rose, Horn Point Laboratory UMCES (Virtual)
Dave Sikorski, Coastal Conservation Association (In person)
Troy Tuckey, Virginia Institute of Marine Science Virtual)
Taylor Woods, USGS Eastern Ecological Science Center (Virtual)

DNR Staff

Amanda Malagari, DNR Project Lead (In person)
Tammy O'Connell (In person)
Jacob Holtz (In person)
Jeffrey Horne (Virtual)
Sarah Widman (In person)
Andrew Loftus, Workgroup Facilitator (In person)

Workgroup Members Not Attending

Sonny Gwin, Commercial Fisherman, Ocean City Maryland
Bill Sieling, Chesapeake Bay Seafood Industries Association
Ward Slacum, Oyster Recovery Partnership

Background Materials

1. Agenda (See Appendix A)
2. Review the "Draft Outline for the Fishery Management Plan for Adaptation and Resilience (Meeting 4)" (See Appendix B). Consider the list of Action Items under each Management Topic.
    a. Prior to the meeting:
        - Identify existing Action Items that need to be rephrased!
        - Identify additional Action Items that need to be added!

Workgroup Objectives

1. Exchange existing climate and fisheries data and industry knowledge.
2. Collaboratively develop a climate resilient fishery management plan (FMP) for state-managed fisheries in the Chesapeake Bay and Atlantic coast.

Meeting 4 Objectives

1. Continue evolution of the FMP by providing input into specific Action Items that need to be conducted under each Management Topic. These Action Items are what will make this FMP effective.

Introduction

Andrew Loftus, Group Facilitator, opened the meeting welcoming Workgroup members, DNR staff and guests both online and in the room. Attendees introduced themselves.

Recap of the Process

Loftus then provided a brief recap of how we arrived at this point in the FMP development process:

- In Meeting one, the Workgroup shared individual experiences with changes in the environment, particularly changes in climate, and discussed the types of information that might be needed to develop a Fishery Management Plan (FMP) to adapt fisheries to future changes.
- In Meeting two, DNR staff members discussed how this FMP was going to integrate with other FMPs. During this meeting the table of "topics" that DNR staff had generated was introduced for the first time and the Workgroup provided initial input into those topics.
- In Meeting three, the Workgroup agreed upon a goal statement, purposes of the FMP, and provided input into the objectives under each of the topics.
- In this meeting (Meeting four), will continue to develop more specific details into the action items under each of those topic areas and objectives.

Following this meeting, DNR staff will integrate all the input into a more definitive FMP format, then work with a broad range of DNR staff to refine and reorganize it into a functional plan. Workgroup members will have another opportunity to review and comment on it – either during another meeting or via email – in early 2027. After that, the plan will begin going through the normal FMP implementation process that DNR follows for all FMPs for official adoption.

Question: Will the final version contain information on how someone can use this document, how it will be applied to individual species, and examples describing action items?

Response: The final plan will be more specific, and the use of examples is a good thought. The plan will be used by the DNR – and specifically the Fishing and Boating Services – to prioritize aspects in the strategic plan and work plans that position the DNR to develop and implement management actions to adapt to changing conditions in the fisheries. The plan will help the DNR, partners, and advisory groups to elevate needed actions for research, management, and possible funding requests to the rest of the department and ultimately higher administration and the General Assembly when necessary.

The Goal Statement, Purposes, and Vision statement that were discussed and modified in the last meeting were quickly reviewed, with no additional comments.

Input and feedback on Action Items needed under each Management Topic

Overall Recommendations

- Slim down and focus the plan wherever possible.
- Provide a strongly written section on guidance pertaining to "how to use this plan."
- Align plan with DNR organizational flows to improve the implementation.
- Use examples for many of the Action Items; perhaps include an appendix with a crosstab type of table of Action Items and specific examples of how they are applied.
- Since many of the Action Items are applicable to more than one Topic Area, cross reference them whenever possible.
- Numbering Topic Areas and Action Items will greatly improve the ability to discuss the FMP and refer to specific sections (to be done in next version).

Section: Distribution and Productivity of Fishery Resources and Robust Monitoring Data

- Recommendation: Move the four bullets under Monitoring to the action item "Data Collection and Survey Design" under the topic "Robust Monitoring in Data" topic.
- Recommendation: Move the Action Item "Onboarding of Emerging Fisheries and Offboarding of Diminishing Fisheries" under the Action Item "Diversify Fishing Portfolios."
    - Concern: the term "off boarding of diminishing fisheries" is ambiguous and can be easily misconstrued.
    - Perhaps reconsider the word "diminishing."
    - Perhaps add descriptors to the word, such as "climate-driven diminishing fisheries."
    - Add another bullet under this action to reflect existing species that may need marketing support.
    - Some discomfort with the bullet item "Explore options for managing bycatch to maximize the value of harvested fish and minimize the possibility of dead discards across all species." While the concept may be good, caution should be exercised to avoid incentivizing nontarget bycatch. Additionally, this is not explicitly tied to climate-driven aspects so the wording needs to be changed and tied to the focus of this FMP. Perhaps refocus on improving education or research to minimize by catch and/or dead recreational discard.

Sections: Science-Informed Management and Interjurisdictional Management

- What is meant by "Initially focus on centralizing resources within DNR, then prioritize implementation of interjurisdictional management requirements?"
    - Prioritizing implementation of management requirements means prioritizing a provision of ASMFC or Mid-Atlantic Fishery Management Council plans.

    - Perhaps this statement needs to be clarified more.
    - Should these Topics be merged?
- Following some discussion, the general consensus was to keep two separate Topic Areas as the issues under each of these are somewhat different and the DNR program areas that deal with these are separate.
    - Recommendation: The Topic Areas of Engagement and Partnership, Science-Informed Management and Interjurisdictional Management all need to be clearly worded to identify the unique aspects of each and how they differ; make sure that that the bullets under each actually reflect those distinctions.

Section: Ecosystem Approaches and Habitat

- In some agencies (e.g., NOAA) Habitat usually falls under Ecosystem Approaches. Should these Topic Areas be combined in this FMP?
    - Some agreement with this concept.
    - Concern with what it might mean to communication between the different groups that manage different habitats (e.g., nearshore, reefs, watershed) versus fisheries. Several of the bullet points under ecosystem approaches are items that have some influence on for DNR; the habitat section contains many items that DNR relies on external partners to accomplish. So, from a programmatic implementation standpoint, perhaps keeping them separate would assist in in reaching out to those other non-fisheries divisions and programs that impact habitat.
    - Perhaps reorganize to have two distinct subtopics under Ecosystem Approaches that reflect the "internal DNR" programs and "external partner" programs related to Habitat.
- Consider adding an action item under Habitat on assessing how nearshore fish habitat changes due to sea level rise and subsidence.
- Ecosystem Approaches: Need to develop more specific language on what is meant by the first two bullets ("Explore the possibility of establishing environmental reference points for the prioritized set of environmental parameters" and "Assess thresholds for environmental tipping points. Develop management protocols that can be triggered when environmental conditions are unsuitable.")

Section: Altered Stock Dynamics

- Modify the fifth bullet to read "Update ~~Establish~~ species-specific sensitivity thresholds for multiple environmental parameters (e.g., DO, pH, salinity, temperature) based on the physiological limits of fish species."

Discussion: Funding

- Is a new Topic Area needed to address funding needs for implementation of provisions of this FMP?

- Funding requirements are not generally included in an FMP but obviously funding drives the ability to implement many aspects of it. One purpose of this FMP is to identify priority areas and actions that may be needed. With that information, the DNR administration can work with the General Assembly and others to identify where funding can be developed to support needed programs.
- Recommendation: Include language in the section describing how this FMP will be used that speaks to funding, and that the plan can be a way to identify the priority funding needs.
- Perhaps consider creating an appendix with a table that lists key existing funding sources and authorities for specific Topic Areas and Action Items and also areas that lack authorities and funding.

Wrap Up and Next Steps

The DNR staff thanked the Workgroup for their contributions and extensive input into this FMP. Following the addition of the input provided during this meeting, a broad section of the Fishing and Boating Services program staff will be asked to review the plan and add additional specificity. Sometime early next year, this Workgroup will have an opportunity to review a revised version that will be a closer reflection to the final draft. Once any additional input from that review is incorporated, the plan will be submitted to the formal DNR FMP process, including review by advisory commissions and the public.

Appendix A. Workgroup on Developing a Climate-Resilient Fishery Management Plan for Maryland

October 29, 2026

10:00 AM – 12:00 PM

In-Person: Tawes State Office Building, C-1 Conference Room

or

Virtual: meet.google.com/ywd-kpqr-ofp (see below for phone connection)

Background Materials

1. Review the "Draft Outline for the Fishery Management Plan for Adaptation and Resilience (Meeting 4)." Consider the list of Action Items under each Management Topic.

   Prior to the meeting:

   - Identify existing Action Items that need to be rephrased!
   - Identify additional Action Items that need to be added!

Workgroup Objectives

1. Exchange existing climate and fisheries data and industry knowledge.
2. Collaboratively develop a climate resilient fishery management plan (FMP) for state-managed fisheries in the Chesapeake Bay and Atlantic coast.

Meeting 4 Objectives

1. Continue evolution of the FMP by providing input into specific Action Items that need to be conducted under each Management Topic. These Action Items are what will make this FMP effective.

Meeting Agenda

10:00 AM Welcome – Andrew Loftus, Group Facilitator

- Brief recap of how we arrived at this point in the FMP development process.
- Self-Introductions

10:15 AM Orientation to Menti

Join our Menti session by scanning the QR code below with your device's camera or on the website www.menti.com. Then, enter the code 2413 1825.

10:20 AM	Group Discussion – Input and feedback on Action Items needed under each Management Topic to achieve a plan for adapting fisheries management to changing climate conditions
	Share your feedback through verbal discussion or through Menti.
11:45 PM	Closing Remarks and Discussion of next stages of FMP Development
12:00 PM	Adjourn

Connection to Google Meet

By phone: Dial 1-347-745-6957 PIN 261 429 640#

By internet: Video call link https://meet.google.com/ywd-kpqr-ofp

Appendix B. Draft Outline for the Fishery Management Plan for Adaptation and Resilience

Goal

Revised Draft Goal (feedback requested)

The goal of Maryland's adaptation and resilience fishery management plan is to incorporate adaptation principles into the fishery management system so that existing and emerging fishery resources, the ecosystems that support them, and the human communities that use them are resilient to short-term and long-term environmental change, especially when driven by climate change.

Purpose

Draft Purpose Statements (feedback requested)

- Summarize information about how observed and projected environmental changes could impact fishery resources, the communities that use them, and the fishery management system.
- Increase understanding of the environmental factors that affect fishery resources, monitor these factors over time, and use this information to develop projections about the future condition of the resource that can inform management actions.
- Foster innovative management approaches for integrating principles of adaptation and resilience to climate and other environmental changes into the existing fisheries management framework.
- Integrate ecosystem-based fisheries management principles with climate change adaptation and resilience principles.
- Enable the Maryland Department of Natural Resources to take management actions that are proactive and responsive in an appropriate timeframe to improve resilience.
- Build pathways for addressing fisheries adaptation and resilience priorities in other industries and governance bodies.

Vision for Resilient Fisheries

Example Vision (feedback requested)

Maryland's fisheries resources, fishing communities, and the ecosystems that support them are resilient to changes in the environment, especially due to climate change. Maryland builds a management system that is rooted in partnership and informed by science to support adaptive decision-making. Fisheries managers and fishing communities work proactively and optimize opportunities that arise as a result of changing natural and human environments.

Objectives

Draft Objectives (feedback requested)

- Enhance our understanding of how climatic and other environmental factors impact stock dynamics, and facilitate pathways for considering these factors in management.
- Enhance our understanding of how climatic and other environmental factors impact ecosystem dynamics, and integrate ecosystem-based fishery management approaches to support aquatic resources.
- Develop a system for detecting and documenting spatial and temporal changes in fish productivity and for managing a changing composition of available fishery resources.
- Coordinate with existing invasive species programs to manage the introduction and spread of invasive species as climate and other environmental conditions change.
- Promote programs that support robust recreational and commercial fisheries and fishing communities as environmental and climate conditions change.
- Establish pathways for fisheries managers and fisheries users to communicate and collaborate with other natural resources-based industries and governance bodies to conserve, protect, and restore fish habitats and the connectivity between them.
- Develop a system for collecting and sharing fisheries and environmental datasets to expand the capacity for analyzing the current and projected impacts of climate and overall environmental change.
- Develop decision processes that incorporate the best available data to prepare for and respond to changing climate and other environmental conditions in an appropriate timeframe.
- Continue to communicate and engage with fishing communities and other partners about adaptation and resilience, and identify opportunities for involvement in the information gathering and decision-making processes.
- Coordinate with interjurisdictional governance bodies to identify and monitor the regional impacts of climate and environmental change on fishery resources and develop complementary management approaches.

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Workgroup Task for Meeting 4: Review the action items below and identify any details that are missing and others that might need to be revised.

Management Topics and Action Items

Note: The project team adapted the draft management topic areas and associated action items from the workgroup's feedback on the Impacts and Actions table discussed at Meeting 2.

Topic: Altered Stock Dynamics

Action Items: Stock Assessments

- Assess and prioritize the specific environmental parameters that influence stock dynamics across species.
- Understand the basic relationship between the prioritized set of environmental parameters (e.g., temperature, dissolved oxygen, salinity, pH, impervious surface) and established stock assessment inputs and drivers (e.g. growth, mortality, spawning, recruitment). Then assess if stock assessment inputs and drivers have changed over time due to changes in stock dynamics.
- Monitor seasonal and long-term changes in stock assessment parameters. Adjust monitoring programs so that changes can be detected outside of the current timeframe or methodology.
- Monitor short-term changes in stock assessment parameters due to nonlinear environmental changes and extreme events. Assess how multiple environmental parameters are deviating from the norm, how those deviations could impact fish species, and if there is a pattern to those deviations.
- Establish species-specific sensitivity thresholds for multiple environmental parameters (e.g., DO, pH, salinity, temperature) based on the physiological limits of fish species.
- Consider how long-term and short-term changes to stock dynamics influence the availability of the fishery and the corresponding adaptive management measures.
- Consider the use of dynamic reference points.
- Incorporate environmental and climate parameters into stock assessment analyses to project current and future impacts to species.
- Consider employing Management Strategy Evaluation (MSE) and forecast modelling. This approach simulates what would happen under the future climate if we did x or y based on game theory. It can help incorporate social fishing preferences. Incorporate climate change, habitat, species, social, and economic interactions.

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Topic: Ecosystem Approaches

Action Items: Ecosystem Approaches

- Explore the possibility of establishing environmental reference points for the prioritized set of environmental parameters.
- Assess thresholds for environmental tipping points. Develop management protocols that can be triggered when environmental conditions are unsuitable.

Action Items: Robust Food Web

- Expand the scientific understanding of the interactions between fished species and forage fish, predators, and other non-fished species.
- Monitor changes in forage composition over space and time.
- Develop policy, management, and habitat strategies that support productive forage fish resources.

Action Items: Fish Health and Safety

- Assess the potential for parasites and diseases to spread given projected environmental conditions.
- Consider the appropriate timeline for implementing safety measures in the case that fish products are not safe to interact with (e.g., public notices). Coordinate with existing food safety protocols.

Topic: Distribution and Productivity of Fishery Resources

Action Items: Monitoring

- Assess observed and potential changes in the productivity of fishery resources over space and time.
- Monitor changes in the spatial and temporal distribution of species within Maryland waters and along the Atlantic coast.
- Monitor changes in migration patterns within Maryland waters and along the Atlantic coast.
- Establish and enhance processes for interjurisdictional coordination and monitoring for cross-boundary species.

Action Items: Onboarding of Emerging Fisheries and Offboarding of Diminishing Fisheries

- Identify species in southern jurisdictions that have the potential to become established in Maryland and species likely to expand or shift distribution into northern jurisdictions.

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- Establish a process for determining if a novel or emerging species could support a fishery and for setting up a monitoring and management program.

- Assist in building recreational and commercial demand for novel or emerging fisheries.

- Establish a process for determining when a population no longer supports a fishery and which management actions are most appropriate.

Action Items: Diversify Fishing Portfolios

- Explore developing a program to help commercial and recreational fishermen transition towards alternative fisheries if their preferred species becomes scarce.

- Adjust spatial and temporal gear use requirements to reduce conflicts with species during sensitive life history stages.

- Explore options for managing bycatch to maximize the value of harvested fish and minimize the possibility of dead discards across all species.

  Discussion Note: Allow commercial harvesters to keep more of what they catch and avoid killing unnecessary fish.

- Assess licensing and gear structures to allow for flexible permitting of spatially and temporally available species.

- Discussion Note: Question of commercial licenses and how those will be passed down if fishing resources become limited (some are limited entry). The licensing workgroups are currently talking through this issue. We could include a license item in the FMP and mirror that in the licensing law. The FMP will allow us to create pilot programs related to fishing and gear use.

Action Items: Invasive Species

- Coordinate with existing management plans to monitor and manage the spread of invasive fish due to environmental and climate changes.

- Prioritize early detection monitoring and proactive actions rather than reactive actions. Look ahead to species that we could anticipate coming into Maryland waters. Determine if there are science gaps in understanding the potential impacts of invasive species on existing fisheries. Conduct risk assessments for Maryland.

- Develop a series of questions for DNR to consider before deciding if the management goal for an invasive species should be to extirpate the species or establish a sustainable fishery. Once decided, communicate the management goal to interested and impacted parties.

- Promote public awareness and education about the spread and impact of invasive species. Communicate the differences between invasive species and naturalized species. Share voluntary best practices and regulatory requirements for invasive species management

and control. The public and partners can use the Maryland's Invasive Species Tracker to report invasives and track the spread.

Topic: Supporting Recreational and Commercial Fishing Activities

Action Items

- Support the adaptive capacity of fishing communities through education, information exchange, and training.
- Explore the use of new technologies and gear types.
- Explore options to maximize fishing access in response to severe weather conditions.
- Develop a better understanding of how environmental and climate changes may present economic challenges to fishing activities.
- Coordinate across DNR and its partners to implement projects that support resilient coastal infrastructure for fishing.
- Coordinate across DNR and its partners to implement projects that maintain public access to fishing locations.
- Explore expanding aquaculture as an alternative to supplement wild-capture fisheries.

Topic: Habitat

Action Items

- Improve our understanding of how fish currently use nearshore habitats and how habitat use could change given projected environmental conditions.
- Assess the current status of and the potential future condition of coastal habitats, including geographic distribution, connectivity, and ecosystem quality. Assess how habitat suitability could change over time.
- Determine priority areas for habitat conservation and restoration based on current and projected habitat distributions and ecosystem parameters.
- Identify pathways to connect fish habitat priorities with other industries (e.g., forestry, agriculture) and governance bodies at multiple levels (e.g., local to federal), especially with land management priorities and processes.
- Develop communication channels for fisheries knowledge to inform decision-making processes.
- Implement shoreline conservation, protection, and restoration strategies to maximize and preserve as much quality fish habitat as possible while utilizing nature-based solutions to support habitat transitions with sea level rise and protect shorelines from flooding

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Topic: Robust Monitoring & Data

Action Items: Robust Science Infrastructure

- Develop a data stream where fisheries and environmental datasets can be compiled, standardized, and shared across the state and with partners.

- Establish adequate data processing and sharing plans to fully utilize data that are collected. Assess how DNR and its partners can use data from multiple sources and surveys to supplement each other, and use data from existing datasets for novel analyses.

Action Items: Data Collection and Survey Design

- Modernize fisheries science capabilities and techniques to more effectively and efficiently track changing fishery and ecosystem dynamics.

- Assess existing survey designs so that they can be adapted if needed while maintaining the integrity of the datasets.

- Assess if existing surveys could be adapted to monitor multiple species.

- Explore using novel technologies, networks, and methodologies to collect, process, and share data. Explore the continued expansion of electronic reporting across fisheries so that commercial fishing data are more readily available for monitoring and detection purposes.

- Explore using additional data sources to supplement existing datasets that inform decision-making.

- Develop options for electronic self-reporting to collect recreational fishing data.

- Utilize citizen science programs to supplement fisheries and ecosystem datasets.

Action Items: Understand Mechanisms and Impacts, and Project Future Conditions

- Understand the mechanisms of how climate and other environmental changes impact fisheries resources, the surrounding ecosystems, and the human communities that rely on them.

- Develop a recommended set of climate change projection scenarios that are specific to Maryland. Standardize these projections across modelling efforts (e.g., UMCES sea level rise projections).

- Discussion Note: Utilize species distribution models to identify projected overlaps. For example, studying the physiology of species in combination with climate projections to find out where the ideal habitats between the suite of species overlap. The results can identify where we can allocate resources to maintaining and restoring key habitat areas baywide. We could potentially also identify specific regions or habitat qualities that are more susceptible or accommodating to new species.

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Topic: Science-Informed Management

Action Items

- Develop a process for timely decision making (e.g. RAD framework) and for improving approaches using newly gathered information.
- Use climate projections to inform decision making.
- Provide early warnings of changes to fisheries resources and ecosystems.
- Assess how adaptation-focused management actions could integrate with existing emergency response processes. Coordinate response actions across managing bodies.
- Assess the point at which an advisory could convert into a regulatory closure.
- Public notices to implement short-term or temporary actions (Note: Establish criteria that would flip the trigger).
- Develop a program to implement pilot projects to test adaptive management strategies.

Topic: Engagement and Partnership

Action Items

- Build and expand effective engagement and partnership strategies with interested and impacted parties in fishery resources to collectively increase adaptive capacity.
- Leverage existing pathways for interested and impacted parties to be involved in collaborative and inclusive decision-making processes.
- Encourage interested and impacted parties to exchange knowledge (e.g., scientific, technical, historical, cultural, industry) that can inform the implementation of adaptation and resilience strategies.

Topic: Interjurisdictional Management

Action Items

- Initially focus on centralizing resources within DNR, then prioritize implementation of interjurisdictional management requirements.
- Explore the possibility of establishing a data portal for sharing data across state and federal jurisdictions.
- Minimize negative interactions with protected resources (e.g., marine mammals, turtles, fish) whose distributions have the potential to change over space and time.

  Discussion Note: Look at ASMFC plans for guidance.

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Supplemental Information

Context for the Plan

- This plan is designed to complement existing fishery management plans and enable actions that apply across the Maryland state fisheries management system.
- This plan is intended to function as a toolbox of strategies DNR can pull from, rather than a prescriptive list of action items. The DNR will need to prioritize where to start, which could be based on priority species that are most vulnerable to environmental changes.
- Environmental change is an umbrella term, and climate change is one of many drivers of environmental change.
- Climate change includes long-term trends and short-term anomalies. Environmental conditions at different points into the future may differ from current and historic conditions.
- As environmental conditions change, habitats in Maryland may be suitable to new species that could establish naturally. These species may not necessarily become invasive.
- The Resist-Accept-Direct (RAD) framework can be used as a first step in the decision-making process.
- The DNR's capacity to plan and implement adaptation and resilience actions will be greatly expanded by partnering with other natural resources-based industries (i.e., agriculture, forestry) and other governance bodies at multiple levels (local to federal).

Key Terms

Adaptation (differentiate from Adaptive Management)
Adaptive Capacity
Climate Change
Climate Factor
Climate Regime
Climatic Factors (e.g., temperature and precipitation)
Environmental Change (umbrella term)
Exposure
Fishery and Fishery Resource
Fishery Management Plan
Framework
Invasive Species (in relation to new southern species becoming established)
Mitigation
Resilience
Sectors
Sensitivity
Stock
Vulnerability

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