2019 Annual Report

Maryland Commission on Climate Change

Prepared for:

Governor Lawrence J. Hogan
State of Maryland

and the Maryland General Assembly

November 2019

Maryland Commission on Climate Change

Chair

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Maryland Department of the Environment

Co-Chairs

Anne Lindner
Business Community Representative

Vacancy

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Member of the Senate

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Environmental NPO Representative

Jim Strong
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Michael Powell
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Administrator Mark Belton
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Superintendent of Maryland Schools

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Director Mary Beth Tung
Maryland Energy Administration

Chuck Fry
Agriculture Community Representative

Jane Kirschling
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Delegate Dana Stein
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C. Richard D'Amato
Philanthropic Organization Representative

Mike Tidwell
Environmental NPO Representative

Gerald Jackson
Organized Labor Representative

Commissioner Michael Bibb
Maryland Municipal League

Charles Deegan
Chair of Critical Area Commission

Vacancy
Philanthropic Organization Representative

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Chapter One
Background

1.1 A History of Maryland Climate Action and the Maryland Commission on Climate Change

Maryland has been at the forefront of states taking action to address the consequences of climate change beginning in 2000 with the development of the Sea Level Rise Response Strategy. The state went on to pass the Healthy Air and Clean Cars Acts (2006, 2007, and 2019), join the Regional Greenhouse Gas Initiative (2007), and pass the 2009 and 2016 Greenhouse Gas Emissions Reduction Acts (GGRA). The Maryland Commission on Climate Change (MCCC) was established by Executive Order (01.01.2007.07) in 2007 and charged with developing an action plan and timetable for mitigation and adaptation to the likely consequences and impacts of climate change in Maryland.

Governor Hogan signed the Commission on Climate Change Act of 2015 to codify the MCCC. The MCCC is required to report to the Governor and the Legislature annually "on the status of the State's efforts to mitigate the causes of, prepare for, and adapt to the consequences of climate change, including future plans and recommendations for legislation, if any, to be considered by the General Assembly." Under the act, the Commission is charged with several actions, including:

- Strengthen the Climate Action Plan
- Develop broad private and public partnerships with local, State, and federal government;
- Communicate and educate citizens about the urgency of acting to reduce the impact of climate change;
- Conduct an inventory of GHG emission sources;
- Address the impacts of climate change on low income and vulnerable communities;
- Assess impacts that climate change may have on the State's economy, as well as specific sectors such as agriculture; and
- Develop strategies for adaptation and mitigation.

The MCCC consists of twenty-six members including representatives of state government, the legislature, business and labor, non-profit organizations, local government, and academia. The Secretary of the Environment serves as the Chair of the MCCC.

The MCCC has four Working Groups: Adaptation and Resiliency (ARWG); Education, Communication, and Outreach (ECO); Mitigation (MWG); and Scientific and Technical (STWG). These working groups are required to develop work plans that are updated annually. Each working group meets throughout the year to address the MCCC's responsibilities through a series of presentations and discussions to develop the recommendations made in the annual report. Working Group Chairs, members, and technical advisors are named by the Chair of the MCCC with advice from staff and commissioners. Every effort is made to have a balance of stakeholder perspectives represented on the Working Groups.

Details about the meetings and activities of the MCCC and its working groups can be found on the MCCC website (mde.maryland.gov/MCCC).

1.2 Science and the Maryland Commission on Climate Change Process

Throughout its tenure, the MCCC has relied upon the latest and most widely accepted science to guide its evaluations and recommendations. The body of scientific evidence for global climate change is both clear and growing, and has demonstrated with a very high degree of certainty that the dominant cause is human activity[1,2,3,4], particularly the emission of heat-trapping greenhouse gases (GHGs) into the atmosphere[2,3,4,5,6,7,8]. Anthropogenic GHG emissions (including carbon dioxide, methane, and nitrous oxide) have increased considerably since the pre-industrial era, and are currently found at atmospheric concentrations "unprecedented in at least the last 800,000 years"[1]. The Intergovernmental Panel on Climate Change (IPCC), an intergovernmental body of the United Nations dedicated to providing the world with an objective, scientific view of climate change, its natural, political, and economic impacts and risks, and possible response has concluded that human drivers, including GHG emissions, are "extremely likely to have been the dominant cause of the observed warming since the mid-20th century"[1]; recently estimating that human activities have already contributed to approximately 1°C of global warming above pre-industrial levels[9]. Furthermore, experts agree that there is no convincing evidence that natural cycles and variability alone can account for the changes observed over the industrial era[4,10].

These changes to the physical systems reverberate through biological and human systems, which have co-evolved to exist under current conditions. A thorough understanding of the ramifications which accompany unmitigated climate change, as well as the complexity of costs and benefits (economic, environmental and human) associated with climate action, is essential to the core function of the MCCC. The scientific community is constantly improving and refining the models and projections for various emission reduction scenarios, providing the policy makers with increasingly detailed information on which to base its decisions and recommendations. The Maryland Department of the Environment (MDE) has procured such models to develop the 2019 GGRA Draft Plan. It is the ongoing endeavor of the MCCC and its working groups to ensure that Maryland is utilizing the best science available in order to move forward with progress on limiting climate change (or mitigating) and adapting

[1] Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II, and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, R. Pachauri and L. Meyer, Eds., Geneva, 2014.

[2] Maryland Commission on Climate Change Scientific and Technical Working Group, "Appendix 1 of 2015 Maryland Commission on Climate Change Report: Reducing Emissions of Greenhouse Gases Beyond 2020," in *2015 Maryland Commission on Climate Change Annual Report*, 2015.

[3] J. Walsh, D. Wuebbles, K. Hayhoe, J. Kossin, K. Kunkel, G. Stephens, P. Thorne, R. Vose, M. Wehner, J. Willis and D. Anderson, "Chapter 2: Our Changing Climate," in *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. Melillo, T. Richmond and G. Yohe, Eds., U.S. Global Climate Change Research Program, 2014, pp. 19-67.

[4] U.S. Global Change Research Program, Climate Science Special Report: Fourth National Climate Assessment, Volume I, D. Wuebbles, D. Fahey, K. Hibbard, D. Dokken, B. Steward and T. Maycock, Eds., Washington, DC, 2017, p. 470.

[5] American Chemical Society, "Climate Change: ACS Pubilc Policy Statement," 2016. [Online]. Available: https://www.acs.org/content/dam/acsorg/policy/publicpolicies/sustainability/globalclimatechange/climate-change.pdf.

[6] American Geophysical Union, "Human-Induced Climate Change Requires Urgent Action," 2014. [Online]. Available: http://sciencepolicy.agu.org/files/2013/07/AGU-Climate-Change-Position-Statement_August-2013.pdf. [Accessed 9 August 2017].

[7] American Meteorological Society, "Climate Change: An Information Statement of the American Meteorological Society," 2012. [Online]. Available: https://www.ametsoc.org/ams/index.cfm/about-ams/ams-statements/statements-of-the-ams-in-force/climate-change/. [Accessed 9 August 2017].

[8] U.S. Global Change Research Program, Global Climate Change Impacts in the United States, T. Karl, J. Melillo and T. Peterson, Eds., Cambridge University Press, 2009.

[9] U.S. Global Change Research Program, Climate Science Special Report: Fourth National Climate Assessment, Volume I, D. Wuebbles, D. Fahey, K. Hibbard, D. Dokken, B. Stewart and T. Maycock, Eds., Washington, DC, 2017, p. 470.

[10] Intergovernmental Panel on Climate Change, "Summary for Policymakers," in *Global Warming of 1.5°C*, 2018.

to the changes that do occur, keeping open lines of communication in both directions with the residents of Maryland.

1.3 2019 Draft GGRA Plan and the Maryland Commission on Climate Change

The GGRA of 2009 was created based on the recommendations of the MCCC's 2008 Climate Action Plan. The original law required Maryland to achieve a 25 percent reduction in statewide GHG emissions from 2006 levels by 2020. MDE's *2015 GGRA Plan Update*, showed that Maryland was on target to not only meet but exceed this level of emissions reduction. In 2015, the MCCC recommended the Act be reauthorized with a new goal requiring a 40 percent reduction of emissions from 2006 levels by 2030. The law was reauthorized and ultimately signed into law by Governor Hogan in 2016. The updated law includes the same balanced requirements and safeguards as the original, such as protection of jobs and the economy, additional reporting, and a mid-course reaffirmation of goals by the General Assembly. Other considerations include: impacts implementation may have on all segments of the community (rural, low-income, minority) as well as various sectors of the economy (agriculture, manufacturing); ensuring reliable and affordable electrical service; producing a net economic benefit for Maryland and a net increase in jobs in the State; encouraging new "green jobs" in Maryland; and special provisions protecting the manufacturing industry.

In October 2019, MDE released the *2019 GGRA Draft Plan*. The law called for an original due date of December 31, 2018 for the draft plan to be made public, and an opportunity to provide comments; with the final plan to be due December 31, 2019. MDE has committed to a robust stakeholder process to ensure that opportunities exist for the interested parties to provide additional input on the *2019 GGRA Draft Plan* over the upcoming months. MDE will accept comments on the *2019 GGRA Draft Plan* for as long as necessary and reasonable. Details will be posted online when they are available. The *2019 GGRA Draft Plan* can be found on the MDE website (https://mde.maryland.gov/programs/Air/ClimateChange/Pages/2019-Greenhouse-Gas-Emissions-Reduction-Act-(GGRA)--Draft-Plan.aspx).

Due to the delay in receiving the draft plan, the MCCC is currently considering exactly how to address the *2019 GGRA Draft Plan* and intends to have a thorough discussion of the plan beginning now and into early 2020. Interested parties can find 2020 working group work plans and meeting schedules around these discussions as they are available online at the MCCC website (https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Pages/index.aspx).

Chapter Two

Recent Events

2.1 Intergovernmental Panel on Climate Change's (IPCC) report on Global Warming of 1.5°C

In 2018, the global scientific community sounded the alarm with the Intergovernmental Panel on Climate Change's (IPCC) report on Global Warming of 1.5°C.[11] The report includes over 6,000 scientific references, and was prepared by 91 authors from 40 countries. In December 2015, the 2015 United Nations Climate Change Conference called for the report. The report was delivered at the United Nations' 48th session of the IPCC to "deliver the authoritative, scientific guide for governments" to deal with climate change.

Its key finding is that meeting a 1.5°C target is possible but would require "deep emissions reductions" and "rapid, far-reaching and unprecedented changes in all aspects of society." Furthermore, the report finds that "limiting global warming to 1.5°C compared with 2°C would reduce challenging impacts on ecosystems, human health and well-being" and that a 2°C temperature increase would exacerbate extreme weather, rising sea levels and diminishing Arctic sea ice, coral bleaching, and loss of ecosystems, among other impacts.

The report includes modeling results indicating that, for global warming to be limited to 1.5°C, "Global net human-caused emissions of CO_2 would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050." The reduction of emissions by 2030 and its associated changes and challenges, including rapid decarbonization, was a key focus of the report.

The report encourages the global community to make planet-friendly choices now, which are critical for the long-term habitability of the planet. It says there needs to be immediate action to reduce greenhouse gas emissions as much as we can, as fast as we can, in order to avoid the increased risk and costs associated with additional warming.

2.2 Increased Sense of Urgency

Scientists have loudly proclaimed that the fate of the planet is at stake,. The scientific community provides significant compelling evidence that ambitious and urgent action to deeply decarbonize our economy starting right now and continuing over the next 30 years is required to avoid the most catastrophic effects of climate change. In addition, younger generations are demanding action. Maryland's elected officials are listening. Many Marylanders have experienced floods, and extreme weather in recent years. Even those not directly impacted by local changes would find it difficult to avoid reports of these extreme weather events and their link to climate change. Maryland has made significant progress in the fight against climate change since the late 2000s when the

[11] IPCC, 2018: Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. *World Meteorological Organization, Geneva, Switzerland, 32 pp.*

state initiated climate planning. That work was important but went relatively unnoticed by many. Now in 2019, we can read about millions of students around the world and thousands in cities across the United States have begun to push back against climate inaction. They are leaders of tomorrow and they are preparing to work hard for the future of our planet.

In October 2019, Maryland released a draft plan that includes meaningful GHG reductions for the next decade and beyond through a suite of programs aimed at the whole of the state's economy to mitigate GHGs and adapt to climate impacts in the State. The plan includes programs to reduce emission from the power sector with clean and renewable sources and efficiency measures. There are several important programs aimed at decarbonizing transportation, and significant expenditure on transportation infrastructure to improve efficiency and reduce emissions. The plan will also help Marylander's make their homes, businesses and industries more-efficient.

Looking into the future beyond 2030, carbon neutrality becomes the necessary path forward. Along with significant progress in maintaining and enhancing our carbon sinks, transforming and upgrading the electricity grid while reducing the carbon intensity of the transportation sector will get the State on the path to deep decarbonization. Some of the technology necessary for these major changes is not currently economically viable, however significant investments are being made in emerging technology, research, development and deployment.

Innovative policies to reduce or sequester CO2 are absolutely necessary, but these policies must also focus on ensuring equitable access to clean and affordable energy for low- and moderate-income households with high energy burden. Access to affordable clean energy, better mobility, good jobs, and healthy ecosystems will come from smart, balanced mitigation and adaptation.

2.3 U.S. Withdrawal from the Paris Agreement on Climate Change

For a path forward that reduces risk to climate impacts and positively impacts the economy, one need to look no further than Maryland who is leading on climate strategies and action to reduce emissions and maintain a healthy economy. The State continues to bridge partisan divides that can impede progress on climate change. An example of this impediment is seen at the federal level, with the Trump Administration's formal submission of its withdrawal from the Paris Agreement on climate change, which is the framework for global cooperation to reduce greenhouse gas emissions. Of the roughly 187 countries that have joined the Paris Agreement, the United States is alone in initiating a formal withdrawal. Under the Paris Agreement, each nation develops its own emission reduction target and all nations are held accountable to those targets. The Agreement also challenges countries to increase their ambition over time, bringing us ever closer to the goal of limiting temperature increases to 2°C, and with efforts to limit warming to 1.5°C.

The Trump Administration's formal declaration follows its June 1, 2017 announcement of its intent to withdraw from the Agreement. Governor Hogan responded that "while Washington continues to fail to address climate change, Maryland continues to lead",[12] and noted that he had joined with 24 other governors in the United States Climate Alliance to reaffirm our state's shared commitment to upholding the goals of the Paris Agreement through state and regional efforts to reduce greenhouse gas emissions.

[12] The Baltimore Sun, On climate change, Maryland's Republican governor stands tall. Nov 5, 2019

Chapter Three

Maryland Commission on Climate Change Recommendations

As noted in Chapter Two, each year the Commission is required to report to the Governor and the legislature. Per law, this report should include recommendations of future plans for consideration. Each year the four working groups draft recommendations that are reviewed by the Commission's Steering Commission and the full body. In Chapter Three you will find the consensus recommendations from this body.

3.1 Mitigation Working Group (MWG)

MWG 1. GGRA Plan Review. The working group expects to have comments on the GGRA Draft Plan as the working group reviews the draft plan in early 2020.

MWG 2. Transportation Recommendation. As part of the process to meet the State's current light-duty electric vehicle (EV) and zero emission vehicle (ZEV) goals and projections, the Maryland Zero Emissions Electric Vehicle Infrastructure Council (ZEEVIC) should specifically research and study to improve understanding of ZEV equity considerations and infrastructure needs to facilitate increased ZEV ownership.

MWG 3. Transportation Recommendation. The Maryland Department of Transportation **(**MDOT), Maryland Department of the Environment (MDE), Maryland Energy Administration (MEA), Department of Budget and Management (DBM) and Department of General Services (DGS) are currently reviewing state fleet procurement procedures and practices, as well as the procurement of EVs and other ZEVs, and associated charging/filling station installation guidance and targets. The MCCC recommends the state also consider infrastructure funding through the Volkswagen Mitigation Plan as a precursor to fleet purchase along with ZEEVIC recommendations and state agency group reviewing best practices in procurement.

MWG 4. Transportation Recommendation MDOT to continue providing technical support and coordination with regional partnerships and initiatives such as I-95 corridor coalition and, potentially, the Transportation Climate Initiative (TCI) to address transportation management and pricing issues of common interest. MDOT should affirm synergies and scale of regional level implementation of some transportation strategies for enhanced mobility, and GHG emission reductions are consistent with MDOT's investment prioritization criteria.

MWG 5. Transportation Recommendation MDOT to review the GHG impacts of shifts in mobility trends like congestion mitigation, bottleneck reduction, and travel reliability as a result of past, ongoing, and planned investments into Maryland's transportation network. This information will be shared with the MWG/MCCC for comment and feedback as it is developed.

MWG 6. Transportation Recommendation MDOT can strengthen partnerships and multimodal initiatives to support "Active Transportation," and Transportation Demand Management, and evaluate new tools and data techniques to support route planning for shared mobility options (car and bike sharing, dockless bikes, electric scooters). Provide research related to trends, needs, and opportunities that capture emerging trends.

MWG 7. Energy Recommendation. MEA and MDE should continue an open dialogue with the MCCC on the development of the Clean and Renewable Energy Standard (CARES) legislation and any subsequent policy implementation.

MWG 8. Buildings Recommendation. The MWG requests an update from the state on the "Maryland Leads by Example" energy-savings initiative, being developed in compliance with Governor Hogan's Executive Order 01.01.2019.08, Energy Saving Goals for State Government.

MWG 9. Land Use and Conservation Recommendation. The State should explore opportunities for resources for carbon sequestration including market-based cap and invest programs, such as The Regional greenhouse Gas Initiative (RGGI), and/or other emerging policies.

MWG 10. Land Use and Conservation Recommendation. The state could initiate and coordinate with metropolitan planning organizations and local planning authorities a study of household and employment growth scenarios that achieve the land use and location efficiencies necessary to facilitate plan implementation.

MWG 11. Land and Materials Management Recommendation. Maryland should build partnerships to identify sustainable products from the forestry sector that can be used instead of higher impact materials, such as building materials, consumer products, and packaging.

3.2 Adaptation and Resiliency Working Group (ARWG)

ARWG 1. Develop and adopt indicators to track progress. Work with the University of Maryland Center for Environmental Science (UMCES), the Education, Communications, and Outreach (ECO) Working Group, and others to inventory, synthesize and develop indicators of resilience and to track and measure progress.

ARWG 2. Evaluate and update the adaptation strategy. In 2008 and 2011, the state developed the Phase I and II Comprehensive Strategies for Reducing Maryland's Vulnerability to Climate Change. Through 2019, the ARWG membership evaluated progress on the actions outlined in the Phase I and Phase II Strategies as well as gaps and opportunities. In 2020, the ARWG will work to update the state's current "Adaptation Plan" and develop a framework for guiding and prioritizing action over the next 10 years, specifically in vulnerable and under-served communities.

ARWG 3. Advance saltwater intrusion plan recommendations. Develop a report that presents specifics for how to establish and implement conservation easements in Maryland that facilitate transitional land uses (e.g., saltmarsh) for salt-impacted farmland and develop the first phase of a statewide wetland adaptation plan, which would include marsh migration, and in some cases, measures to protect high priority wetlands in place, in response to sea-level rise inundation and salinization.

ARWG 4. Review nuisance flood plans from local jurisdictions. Local jurisdictions are required to develop plans to address nuisance flooding on or before Oct. 1, 2020. In 2019 the Maryland Department of Planning (MDP), Department of Natural Resources (DNR), and MDE collaborated through the ARWG to develop and publish guidelines to assist local jurisdictions in the development of nuisance flood plans. In 2020, MDP and DNR will

consult with ARWG as needed in the development of guidance for nuisance flood plans or when their expertise can be helpful to local jurisdictions developing plans.

ARWG 5. Maryland's Climate Leadership Academy. ARWG partners will continue to foster a community of climate-smart local government and infrastructure leaders through participation in and promotion of the Maryland Climate Leadership Academy. ARWG will continue to identify Maryland case studies and subject area experts/faculty and develop a "short course" on building financial resilience as part of the Maryland Climate Leadership Academy. ARWG will work with the ECO Working Group to coordinate on mutual goals.

ARWG 6. Water Quality and Climate Change Resiliency Portfolio. Policies and programs implemented since 2007 for Phase I and II WIPs for the Chesapeake Bay TMDL have placed Maryland on a path to achieve its pollution reduction targets by 2025. Many of the actions needed to restore the Chesapeake Bay are similar to those intended to improve environmental and economic resilience to changing climate. ARWG will support the State's effort to develop a long term portfolio of natural infrastructure projects that optimize water quality, living resources, GHG reduction, and other environmental benefits. Moreover, this effort reduces the risks posed by a changing climate to Maryland economies, communities and way of life. By having a portfolio of identified projects, Maryland and its communities are better prepared to build climate resilience by taking advantage of existing and emerging funding opportunities.

3.3 Education, Communication, and Outreach Working Group (ECO)

The GGRA law provides that the proposed plan to reduce statewide GHG emissions by 40% from 2006 levels by 2010 should be made available to the public and that the state should convene a series of public workshops to provide interested parties with an opportunity to comment on the proposed plan.

ECO 1. The ECO Working Group recommends the state make broad efforts to reach a diverse group of stakeholders and interested parties in a variety of ways, including but not limited to, public meetings, webinars, social media, online and printed material. ECO recommends meetings be held in various locations across the state and at various times of day to reach a variety of people.

ECO 2. Plans for presentations and discussions should be flexible to allow each encounter to best serve the needs of the audience. In that effort, the state should:

- Solicit opportunities to meet with existing groups and organizations that are already meeting in order to find people where they are and receive feedback on their interests.
- Provide the meeting organizers with a menu of options for the type of information available including special topics, printed materials, presentations, etc in order to provide the most relevant information to attendees.
- Consider pre-meetings or calls with the leadership of each organization to understand the interest of a group and to provide the most relevant information.
- Open meetings with questions from the group so the conversation can address concerns directly.

ECO 3. To the extent possible, MDOT and MDE should coordinate outreach efforts around GGRA outreach and the TCI process. This includes, but is not limited to sharing relevant information with interested parties about plans and opportunities to participate in the process.

ECO 4. The law specifically requires the state to ensure that the GGRA plan does not disproportionately impact "rural or low–income, low– to moderate–income, or minority communities." To this end, the state should make special efforts to reach out to these communities.

3.4 Scientific and Technical Working Group (STWG)

STWG 1. Advise on Implementation of the GGRA. The GGRA is a plan to implement strategies to reduce greenhouse gas emissions significantly from a wide range of sources. The overall ability to meet its goals will depend on the implementation of practices AND how well those practices actually reduce emissions when they are applied broadly (either more or less efficiently). The STWG in consultation with State partners will identify practices that may need additional review and consideration so that amendments to the implementation (either how or how much it is implemented) can be considered and adjusted accordingly. In particular, the STWG will review Chapter 1 to ensure that it has up to date references and projections.

STWG 2. Convene a Blue Carbon Workshop. Work with the MCCC and external partners to convene a workshop on the opportunities associated with blue carbon. Blue Carbon is defined as the carbon accumulating in vegetated, tidally influenced ecosystems such as tidal forests, tidal marshes and intertidal to subtidal seagrass meadows. Blue carbon exhibits significant potential for both mitigating and adapting to the adverse impacts of climate change. MCCC is interested to know if multiple benefits for sustaining wetlands, enhancing coastal resilience, reducing flood risks and protecting infrastructure can be achieved. If this is feasible, what are the opportunities in Maryland and can their benefits be quantified? The STWG is currently seeking partners that can assist in supporting and participating in this workshop likely to be held in the Spring of 2020.

STWG 3. Identifying New Technologies and Innovations. As the impacts of climate change continue to become a threat to ecosystems and human health, a significant number of innovative concepts are being recommended. For those new innovations that seem to hold promise, the STWG will hold mini-review sessions to determine if a broader study should be considered.

STWG 4. Advise the ARWG and UMCES on Resiliency Indicators. The STWG plans to work closely with ARWG, UMCES, policy makers and key stakeholders early in the initiative to determine which resiliency indicators should be chosen and how they should be assessed. This project has three phases:

1. Inventory of Existing Metrics used Nationally and Internationally.
2. Produce a Coastal Adaptation Report Card, including the following steps:
    a. Stakeholder mapping for coastal adaptation interests and influence;
    b. Facilitate 2 stakeholder workshops;
    c. Preliminary list of Coastal Adaptation Indicators;
    d. Draft Coastal Adaptation Report Card;
    e. Final list of Coastal Adaptation Indicators;
    f. Final Coastal Adaptation Report Card; and

g. Communications plan for dissemination and continued outreach.

3. Identify priority actions.

STWG 5. Continue to Assist other Workgroups as Requested. Continue to have STWG members participating in the other workgroups. This has occurred mostly with the ARWG and MWG and will be expanded to the ECO Workgroup. In addition, assist the workgroups with their specific scientific requests and, in particular, ensure that the science that is being translated to specific audiences is correct on based on the most current references and projections.

Appendices

Appendix A – MCCC and Working Group Rosters

MARYLAND COMMISSION ON CLIMATE CHANGE MEMBERS

Secretary Ben Grumbles	Commission Chair
Anne Linder	Commission Co-Chair

STANDING MEMBERS

Secretary Ben Grumbles	Department of the Environment
Nancy K. Kopp	Maryland State Treasurer
Karen Salmon	Superintendent of Maryland Schools
Secretary Joseph Bartenfelder	Department of Agriculture
Secretary Jeannie Haddaway-Riccio	Department of Natural Resources
Secretary Ellington Churchill	Department of General Services
Secretary Pete Rahn	Department of Transportation
Secretary Robert McCord	Department of Planning
Director Mary Beth Tung	Maryland Energy Administration
Peter Goodwin	President of UMCES
Chuck Fry	President of Maryland Farm Bureau
Charles Deegan	Chair of Critical Area Commission
Dr. Russell Dickerson	Climate Change Expert
Dr. Jane Kirschling	Public Health Expert

SENATE PRESIDENT APPOINTED MEMBERS

Senator Paul G. Pinsky	Member of the Senate
Vacancy	Philanthropic Organization Representative
Lori Arguelles	Environmental NPO Representative
Jim Strong	Organized Labor Representative
Michael Powell	Business Community Representative

HOUSE SPEAKER APPOINTED MEMBERS

Delegate Dana Stein	Member of the House of Delegates
Mike Tidwell	Environmental NPO Representative
Anne Linder	Business Community Representative
C. Richard D'Amato	Philanthropic Organization Representative
Gerald Jackson	Organized Labor Representative

LOCAL GOVERNMENT APPOINTEES

Commissioner Mark Belton	Maryland Association of Counties
Commissioner Michael Bibb	Maryland Municipal League

MCCC STEERING COMMITTEE MEMBERS

Ben Grumbles	Commission Chair
Anne Lindner	Commission Co-Chair
Secretary Joseph Bartenfelder	Department of Agriculture
Secretary Jeannie Haddaway-Riccio	Department of Natural Resources
Secretary Pete Rahn	Department of Transportation
Director Mary Beth Tung	Maryland Energy Administration
Nancy K. Kopp	Maryland State Treasurer
George "Tad" Aburn	Department of the Environment
C. Richard D'Amato	Philanthropic Organization Representative
Michael Powell	Business Community Representative
Peter Goodwin	President of UMCES
Lori Arguelles	Environmental NPO Representative

ADAPTATION AND RESILIENCY WORKING GROUP

Leadership

Secretary Jeannie Haddaway-Riccio	Chair
Allison Breitenother	Coordinator
C.Richard D'Amato	Commission Liaison

PUBLIC SECTOR REPRESENTATIVES

Frederika Moser	Maryland Sea Grant
Jim Bass	Eastern Shore Land Conservancy
Erik Meyers	Conservation Fund

MARYLAND GENERAL ASSEMBLY MEMBER

Dana Stein	State Delegate

STATE-AGENCY ADAPTATION SECTOR LEADS

Matt Rowe	Department of the Environment
Ryan Opsal	Maryland Energy Administration
Don Van Hassent	Department of Natural Resources
Bruce Michael	Department of Natural Resources
Catherine McCall	Department of Natural Resources
Clifford Mitchell	Department of Health
Jason Dubow	Department of Planning
Susan Payne	Department of Agriculture
Sandy Hertz	Department of Transportation

TECHNICAL ADVISORS

Katherine Charbonneau	Critical Area Commission
Susan Gore	Department of Budget and Management
Kevin Wagner	Department of the Environment

Nell Ziehl	Department of Planning
Spyridon Papadimas	Department of General Services
Lisa Lowe	Department of Information Technology
Sasha Land	Department of Natural Resources
Megan Granato	Department of Natural Resources
Matthew Fleming	Department of Natural Resources
Elizabeth Habic	State Highway Administration
Shawn Kiernan	Maryland Port Administration
Vacancy	Local Government Representative
JaLeesa Tate	Maryland Emergency Management Agency
Andrew Asgarali-Hoffman	Maryland Emergency Management Agency
Joy Hatchette	Maryland Insurance Administration

EDUCATION, COMMUNICATION, OUTREACH WORKING GROUP MEMBERS

John Kumm	Co-Chair
Lori Arguelles	Commission Liaison

PUBLIC SECTOR REPRESENTATIVES

Laura Bankey	National Aquarium
Ashley Pennington	Johns Hopkins Office of Sustainability
Dannielle Lipinski	Maryland League of Conservation Voters
Denise Robbins	Chesapeake Climate Action Network
Grant Samms	Washington College Center for Environment and Society
Isaac Hametz	Mahan Rykiel Associates
Joelle Novey	Interfaith Power and Light

PRIVATE SECTOR REPRESENTATIVES

Michele Peterson	Honeywell
James W. McKitrick	Maryland Chamber of Commerce
Stephan Levitsky	Purdue, Inc.

STATE GOVERNMENT REPRESENTATIVES

Vacancy	Department of Health
Colleen Turner	Department of Transportation
Donna Balado	Maryland State Department of Education
Julie Oberg	Department of Agriculture
Kaymie Owen	Maryland Energy Administration
Mark Shaffer	Department of the Environment
Sara Luell	Department of Housing and Community Development
Trystan Sill	Department of Natural Resources

Technical Advisors

George "Tad" Aburn	Department of the Environment

John Coleman	Department of Planning

MITIGATION WORKING GROUP MEMBERS

Michael Powell	Co-Chair
Vacancy	Co-Chair
George "Tad" Aburn	Working Group Lead

REPRESENTATIVES OF ENVIRONMENTAL ORGANIZATIONS

Elizabeth Bunn	Labor Network for Sustainability
Jana Davis	Chesapeake Bay Trust
Arjun Makhijani	Institute for Energy and Environmental Research

REPRESENTATIVES OF ACADEMIC INSTITUTIONS

Gerrit Knaap	University of Maryland, National Center for Smart Growth
Ben Hobbs	Johns Hopkins University

Represent

John Slocum	Exelon
R. Daniel Wallace	Bithenergy
Tom Weissinger	Talen Energy
Tom Dennison	Southern Maryland Electric Cooperative

REPRESENTATIVES OF LABOR ORGANIZATIONS AND BUSINESS INTERESTS

Tom Ballentine	NAIOP - Real Estate Development
Mike Remsberg	Trinity Consultants
Drew Cobbs	American Petroleum Institute
Colby Ferguson	Maryland Farm Bureau
Jim Strong	United Steelworkers
Gerald Jackson	Maryland and DC AFL-CIO

REPRESENTATIVES OF STATE AND LOCAL GOVERNMENT AGENCIES

Colleen Turner	Maryland Department of Transportation
Chris Rice	Maryland Energy Administration
Elliott Campbell	Maryland Department of Natural Resources
Susan Payne	Maryland Department of Agriculture
Tom Walz	Maryland Department of Housing and Community Dev
Les Knapp	Maryland Association of Counties
Lisa McNeilly	Baltimore Office of Sustainability

MWG STEERING COMMITTEE

George "Tad" Aburn	Maryland Department of the Environment
Michael Powell	Gordon Feinblatt, LCC
Colleen Turner	Maryland Department of Transportation

Ryan Opsal	Maryland Energy Administration
Elliott Campbell	Maryland Department of Natural Resources
Susan Payne	Maryland Department of Agriculture

SCIENTIFIC AND TECHNICAL WORKING GROUP

Peter Goodwin	Chair, University of Maryland Center for Environmental Science
Adel Shirmohammadi	College of Agriculture and Natural Resources, UMCP
Amir Sapkota	School of Public Health, UMCP
Eric D. Wachsman	University of Maryland Energy Research Center, UMCP
Fernando Miralles-Wilhelm	Earth Science Interdisciplinary Center, UMCP
Gerrit J. Knaap	National Center for Smart Growth Research and Education
Russell R. Dickerson	Department of Atmospheric and Oceanic Sciences, UMCP
Belay Demoz	Joint Center for Earth Systems Technologies, UMBC
David A. Vanko	Fisher School of Science, Towson University
Ghassem Asrar	Joint Global Change Research Institute
Jane M. Kirschling	School of Nursing, University of Maryland Baltimore
Donald Boesch	University of Maryland Center for Environmental Science
Eric A. Davidson	Appalachian Laboratory, UMCES
Charles Glass	Maryland Department of Transportation

REPRESENTATIVES OF STATE AGENCIES

Jason Keppler	Maryland Department of Agriculture

Appendix B – ARWG 2019 Work Plan

PURPOSE

The Maryland Commission on Climate Change (MCCC) is charged with advising the Governor and the General Assembly on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change and maintaining and strengthening the state's existing Greenhouse Gas Reduction Plan (GHG Plan). The Commission is supported by a Steering Committee and four working groups. The members of the working groups are appointed by the MCCC Chair and include representatives of academic institutions, renewable and traditional energy providers, environmental organizations, government agencies, labor organizations and business interests. The Adaptation and Resiliency Working Group (ARWG) is charged with developing and implementing a comprehensive strategy for reducing Maryland's climate change vulnerability, and providing state and local governments with tools to plan for and adapt to climate impacts such as extreme weather and sea level rise.

Even as the state moves forward with actions that will reduce greenhouse gases and ultimately result in increased energy efficiency, a more sustainable economy, and cleaner air; numerous climate impacts will still be felt into the future if we fail to adequately adapt. The climate is already changing and Maryland is already seeing an increase in extreme weather events, presenting new adaptation challenges in both the coastal and non-coastal zones.

NEW 2019 PRIORITIES FOR ARWG ACTION

1. *Building Capacity to Compete for Natural Infrastructure Resilience Funds*: The ARWG recognizes there is a need to prepare Maryland and its communities to take advantage of upcoming federal funding (e.g. FEMA, NOAA, USACE) and public private partnership (P3) opportunities that promote the use of natural infrastructure to build resilience to climate impacts. MDNR is already leveraging beneficial use of dredged material opportunities to reduce project costs and make applications more competitive, and this could serve as a model as these larger-scale funding opportunities emerge. MDNR will lead a group of ARWG partners throughout 2019 to discuss landscape-level needs for natural and nature-based (NNBF) project identification so that Maryland and its communities are better situated to compete for future funding. An update will be provided at the third quarter (Q3) ARWG meeting.

2. *Mapping Zones of Vulnerability*: In October 2018 the MCCC Scientific and Technical Work Group (STWG) updated Maryland's sea-level rise projections[13]. Separately but concurrently in 2018, the Maryland General Assembly passed a bill concerning Sea Level Rise Inundation and Coastal Flooding - Construction, Adaptation, and Mitigation[14]. Part V of this bill requires the Maryland Coast Smart Council to establish criteria to evaluate whether state funds may be used to mitigate hazards associated with sea level rise inundation and coastal flooding, and to incorporate tools to assess the vulnerability of an area or structure to those hazards. In 2019, the ARWG will advise the STWG and the Maryland Coast Smart

[13] Boesch, D.F., W.C. Boicourt, R.I. Cullather, T. Ezer, G.E. Galloway, Jr., Z.P. Johnson, K.H. Kilbourne, M.L. Kirwan, R.E. Kopp, S. Land, M. Li, W. Nardin, C.K. Sommerfield, W.V. Sweet. 2018. Sea-level Rise: Projections for Maryland 2018, 27 pp. University of Maryland Center for Environmental Science, Cambridge, MD.

[14] House Bill 1350 / Senate Bill 1006

Council as they work to produce a uniform set of maps or mapping tools that are practical for use by local governments, practitioners and the public. The ARWG will then work with ECO to disseminate and communicate the appropriate uses of these mapping products by the end of 2019. Progress updates will be provided at ARWG meetings as appropriate.

3. *Integrating Climate Change into the Phase III Watershed Implementation Plan*: Preliminary EPA estimates project that climate change will increase nitrogen, phosphorus, and sediment loads to the Chesapeake Bay. Between now and March 2021, the Chesapeake Bay Program (CBP) Partnership has committed to improve scientific understanding of these impacts, identify outstanding research needs, and refine nutrient and sediment load estimates for each Bay jurisdiction. Within the Maryland jurisdiction, the MCCC is the entity charged with implementing actions and strategies to mitigate and adapt to the likely consequences and impacts of climate change. Therefore, it makes sense for MCCC work groups to collaborate with the CBP Phase III Watershed Implementation Plan (WIP) teams throughout 2019 and beyond to determine how best to account for additional nutrient and sediment loads resulting from climate change. The Draft Phase III WIP will be published for public comment between April and June 2019. ARWG member agencies will review the Draft Phase III WIP for climate change considerations and provide constructive feedback to the CBP. MDE will lead efforts to coordinate and brief the ARWG as appropriate.

4. *Adaptive Retreat*: The State's adaptation strategies include both short- and long-term measures that state and local governments may undertake in planning for and adapting to diverse impacts of climate change. As landscapes change and shift, retreat or relocation is an emerging issue being discussed in many jurisdictions across the country. In 2019, ARWG will provide a forum for discussing retreat as an adaptation strategy. During the first quarter meeting the ARWG heard from Georgetown Climate Center about the toolkit they are developing to frame the legal and policy considerations of managed retreat. Throughout 2019, MDNR will convene a group of ARWG members to explore the concept of retreat as it is currently being used in other jurisdictions and gather key methods, tools, case studies, financial rationales, etc. that would be useful to Maryland. In this exploration phase, the group will also identify measures to ensure that all communities and landowners, regardless of income level, are given the same opportunities and choices. An update will be provided at the third quarter (Q3) ARWG meeting.

5. *Tracking Progress*: In 2018 the ARWG undertook a review of its Phase I and II Comprehensive Strategy for Reducing Maryland's Vulnerability to Climate Change recommendations to identify progress and highlight gaps and needs. The MCCC 2018 Annual Report called on the ARWG to develop metrics for tracking adaptation progress, and while this review was a start, more could be done to standardize metrics. In 2019, MDNR will convene a group of ARWG members to discuss possible metrics for tracking progress. In support of this work, MDP will continue to track progress on the integration of coastal resilience components in comprehensive plans and, with guidance from MEMA, hazard mitigation plans, and MDH will continue to track climate adaptation projects happening across the state via the Maryland Environmental Public Health Climate Adaptation Tracker online mapping portal. The ARWG will also consider the merit of developing a Phase III Strategy based on where progress can continue to be made. An update will be provided at the second quarter (Q2) ARWG meeting.

Appendix C - ECO 2019 Work Plan

Purpose

During its 2015 session, the Maryland General Assembly codified the Maryland Commission on Climate Change (MCCC) into law, and charged the Commission with advising the Governor and the General Assembly on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change. The MCCC is chaired by the Secretary of the Maryland Department of the Environment, and consists of 26 members representing diverse interests in the State.

The Education, Communications, and Outreach (ECO) Working Group is one of four working groups that support the objectives of the Commission. The Commission is responsible for prioritizing working group activities, including the following activities noted in the governing legislation that are especially relevant to the ECO Working Group:

- Developing broad public and private partnerships with local, State, and federal agencies;
- Communicating with and educating citizens about the urgency of acting to reduce the impacts of climate change; and
- Addressing any disproportionate impacts of climate change on low-income and vulnerable communities.

To support education, communication, and outreach among diverse stakeholders on the causes of climate change, its potential impacts to Marylanders, and mitigation and adaptation strategies, the ECO Working Group has the following core strategies:

- Advising on effective communications strategies and best practices for education, communication and outreach to diverse stakeholders;
- Identifying and advising on opportunities for stakeholder engagement in Commission and State activities, or for State and Commission support of existing community activities;
- Engaging the network of Commission members (inclusive of working groups) to coordinate and provide capacity for such initiatives, as feasible; and
- Leveraging the interests and initiatives of public and private sector organizations outside of the Commission, to advance the Commission's objectives.

2019 Priorities

Each working group is charged to establish a comprehensive and accountable annual plan that sets goals and performance benchmarks for the year; prioritizing new and existing climate change actions and initiatives. The following items represent those actions and initiatives which ECO has determined to be a priority in 2019, and those members that have been assigned to take the lead on each are indicated. This work plan may be adjusted as is appropriate to maintain the group's purpose as new events and opportunities arise during the 2019 year, and furthermore is subject to the approval and will of the Commission.

Increase external awareness of State climate change work and GGRA

ECO consistently aims to increase external awareness of the Commission and the State's work on climate change. In 2019, ECO will concentrate on increasing stakeholder engagement with in the 40 by 30 Draft Plan and the 2019 Commission Report which will also address the Draft Plan's release.

ECO will also consider materials that may support the State's outreach efforts around the 40 by 30 Draft plan, which may include (1) information on appropriate educational usage and application of the Report; (2) FAQs about the Report; (3) ways to keep up-to-date on the State's climate change efforts; and/or (4) a timeline of upcoming events related to the State's climate change efforts, including expected opportunities for public engagement.

Finally, ECO will work to identify new communities to work with in increasing awareness of State climate change work. It will be a priority of ECO to ensure underserved communities are included in outreach efforts throughout the year.

Facilitate awareness of Climate Change through common points of entry to state and local government (Implementation of the 2018 Annual Recommendation Related to ECO)

"The State should seek ways to provide materials to the public to inform and educate on climate change through common points of entry to state and local government and state facilities, in order to leverage existing contact between the State and the public. To the extent possible, the State should look for similar opportunities with private organizations that have widespread interaction with the public." - 2018 MCCC Annual Report Recommendation

ECO will gather a packet of information on what the Commission is doing including fact sheets, posters, and encouragement to reach out to ECO for more information in order to engage state government on this recommendation. This will be a useful tool for other stakeholders as well.

Communicate climate action co-benefits for the climate, employment, and the economy

ECO is interested in exploring the connection between climate action and the economy, and how we can better support business efforts to communicate and adapt to climate change. In 2019 ECO wil gather case studies and success stories, and consider materials, such as fact sheets, that we may develop on this issue.

Recognize and support Climate Change Action in the private sector

Over the past two years, ECO members facilitated the development of a pilot Climate Ambassador Program which partners MDE and Bon Secours in Baltimore. This program utilizes a train-the-trainer approach, and incorporates materials on climate change into an existing framework. ECO will attempt to identify additional opportunities to use this strategy in 2019 and beyond, as capacity exists. At a minimum, ECO would like to compile materials to support climate change education in a train-the-trainer manner, to share with organizations for education and training purposes.

Over the past year and a half, ECO worked with MDE to incorporate recognition of climate change action taken by businesses, as part of the existing Maryland Green Registry program. In 2018, ECO engaged with the Chamber of Commerce about ideas to recognize business' efforts to save energy or reduce GHG emissions. ECO has also engaged with MSDE to develop a program which recognizes schools engaged in efforts to reduce their GHG emissions, educate on climate change, or otherwise contribute to the State's climate goals. We will continue this effort. MEA's Smart Energy Community Grant and MDH's Community Ambassadors Program will be followed as well.

Appendix D – MWG 2019 Work Plan

Purpose

During its 2015 session, the Maryland General Assembly codified the Maryland Commission on Climate Change (MCCC) into law, and charged the Commission with advising the Governor and General Assembly on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change. The MCCC is chaired by MDE Secretary Ben Grumbles and consists of 26 members representing diverse interests in the State.

The Mitigation Working Group (MWG) is one of four working groups that support the objectives of the Commission. The purpose of the MWG is to recommend regulatory, market-based and voluntary programs to reduce greenhouse gas (GHG) emissions. These strategies are to be designed in support of a strong economy and job creation in Maryland.

2019 Priorities

The MWG is partially driven by the schedule set by the 2016 Greenhouse Gas Reduction Act (GGRA) legislation, which required MDE to present a draft plan to the Governor and General Assembly by the end of 2018, outlining specific strategies to achieve the most recent benchmark GHG emission reduction requirement (40 percent reduction from 2006 levels by 2030). Furthermore, the plan has been developed in recognition of the IPCC's finding that developed countries must reduce GHG emissions between 80 to 90 percent below 1990 levels by 2050. The MWG agrees that such considerations for reductions beyond 2030 are important to achieving long-term emission reduction goals, especially when it comes to actions which may take longer to achieve results. Due to the significance of the GGRA Plan for the State's climate change mitigation targets in 2030 and beyond, the MWG has provided guidance and assistance to MDE during the development of the draft, and intends to continue to do so in 2019 once the draft plan is released. However, the topics chosen by the MWG for discussion this year are not singularly applicable to this plan, and may more generally address future climate actions within Maryland. Accordingly, the 2019 MWG Work Plan focuses on reviewing the draft plan for particular elements that the group has been refining over the past several years, and taking on some emerging/evolving topics as well. Appendix C contains more detail on the expected meeting topics, taken from the MWG's 2018 recommendations, the minority note in the 2018 Commission report, and discussion at the working group. Below you will find a very abbreviated version of this plan.

1. Analysis of the draft GGRA Plan, including: tracking of data/indicators to monitor progress, ensuring quality job creation, equity considerations, and compatibility of the plan with long-term goals.
2. Transportation measures, including: market-based programs, EV and infrastructure technologies and goals, ZEV school and transit buses, travel-demand management strategies, and transition timelines.
3. Energy measures, including: a long-term pathway and timeline, and mechanisms to achieve the pathway such as RPS, RGGI, enhanced solar, and energy efficiency.
4. Emission reduction measures, targets, and timelines for residential and commercial buildings.
5. Land Use and conservation mechanisms, including those related to soil carbon sequestration and other agricultural practices, net forest and tree canopy gains, and sustainable growth and development plans.
6. Additional items such as strategies for net zero waste, State procurement procedures, federal decisions, and a carbon pricing program.

Appendix E – STWG 2019 Work Plan

Introduction

2019 is an important year for the MCCC with several major decisions and deliverables to be completed. The intent of the STWG is to assist MDE staff in reviewing pertinent information and preparing information that can help inform actions or decisions taken by the MCCC. The functions can be defined as hindsight (review of past information), insight (working with agency staff and others to package unbiased information in an understandable and actionable way). and foresight (anticipation of issues and articulation of alternative futures based on different actions).

Workplan

1. Interaction with other Working Groups

A small liaison team from the STWG will be established so that a representative will be present at MWG, AWG and ECO Working Group Meetings. If advance warning is provided by a Working Group on a particular topic, STWG will strive to ensure the relevant experts from the STWG are also present. Scientific information may not be provided immediately but it will shorten the response time from the STWG.

2. Tracking IPCC and Related Reports or Activities

MDE Staff and STWG will track relevant IPCC and related products, including papers, reports, press releases, workshops, webinars and seminars in the region. MDE will maintain this e-library of papers and reports. MDE will send links or announcements of key documents/links to MCCC participants Additions from other MCCC members are welcome.

3. Reviews. (Hindsight)

3.1. *Maryland GHG Inventories.*

Provide advice to questions posed by MDE Staff on the current Inventories and how some estimates may be improved.

4. Insights.

4.1. Blue Carbon.

There is significant potential in Maryland to link wetland restoration to carbon sinks. This activity supports both the mitigation and adaptation mission of the MCCC. This may also create public outreach opportunities and linking with other Maryland programs such as the Dredge Material Management Program and Coast Smart.
Using the UN Report on Carbon Sequestration in Wetlands as a foundation, a summary report will be prepared that quantifies the opportunity and uncertainties with wetland sequestration for Maryland.

4.2. GGRA Over-the-Shoulder Review.

A small group of STWG will work with MDE staff to review the model assumptions, algorithms and uncertainties with accounting for GHG emissions.

This will not be a formal independent review but an 'over-the-shoulder' colleague review that explores the details of the model. This review will also consider the latest 2018 IPCC report on emissions.

4.3. *Requests from MCCC Working Groups and the Commission.*

STWG will respond to specific questions from Working Groups or the Commission.

5. Foresights

STWG will work with MDE staff prepare reports or presentations on the following:

5.1. *Climate Impacts to Maryland's Agriculture*

The summary report from the 2018 workshop will be completed.

5.2. *Building the Maryland Modeling Community*

Working with MDE, DNR, MDoT, MDA, MDP and other agency staff, recommendations will be developed for a Maryland Modeling Strategy for mitigating and adapting to climate change. This will include how model results can be communicated most effectively.

5.3. *Innovations:*

The STWG will work with scientists in agencies to track innovations that might include Direct Removal of GHG, Stabilization of Polar ice, Enhancing Reflectivity and other emerging concepts. The STWG will track these emerging technologies with periodic reporting to the MCCC.

Appendix F - Maryland Commission on Climate Change Legislation

Code of Maryland – Environment Article

§2–1301.

(a) There is a Commission on Climate Change in the Department to advise the Governor and General Assembly on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change.

(b) The Department and the Department of Natural Resources shall jointly staff the Commission.

§2–1302.

(a) The Commission's membership shall consist of the following members:

(1) One member of the House of Delegates, appointed by the Speaker of the House;

(2) One member of the Senate, appointed by the President of the Senate;

(3) The State Treasurer, or the State Treasurer's designee;

(4) The Secretary of the Environment, or the Secretary's designee;

(5) The Secretary of Agriculture, or the Secretary's designee;

(6) The Secretary of Natural Resources, or the Secretary's designee;

(7) The Secretary of Planning, or the Secretary's designee;

(8) The State Superintendent of Schools, or the State Superintendent's designee;

(9) The Secretary of Transportation, or the Secretary's designee;

(10) The Secretary of General Services, or the Secretary's designee;

(11) The Director of the Maryland Energy Administration, or the Director's designee;

(12) The President of the University of Maryland Center for Environmental Science, or the President's designee;

(13) The Chair of the Critical Area Commission for the Chesapeake and Atlantic Coastal Bays, or the Chair's designee;

(14) One member appointed by the Farm Bureau representing the agriculture community;

(15) One member appointed by the Maryland Association of Counties and one member appointed by the Maryland Municipal League to represent local governments;

(16) One member appointed by the President of the Senate and one member appointed by the Speaker of the House of Delegates to represent the business community;

(17) One member appointed by the President of the Senate and one member appointed by the Speaker of the House of Delegates to represent environmental nonprofit organizations;

(18) One member appointed by the President of the Senate and one member appointed by the Speaker of the House to represent organized labor, one of whom shall represent the building or construction trades and one of whom shall represent the manufacturing industry;

(19) One member appointed by the President of the Senate and one member appointed by the Speaker of the House to represent philanthropic organizations;

(20) One climate change expert appointed by the Governor representing a university located in Maryland; and

(21) One public health expert appointed by the Governor representing a university located in Maryland.

(b) The Secretary of the Environment or the Secretary's designee shall chair the Commission.

(c) (1) Subject to paragraph (2) of this subsection, the term of an appointed member is 2 years.

(2) The Governor, President of the Senate, and Speaker of the House of Delegates shall stagger the terms of the initial appointed members.

(3) At the end of a term, a member continues to serve until a successor is appointed and qualifies.

(4) A member who is appointed after a term has begun serves only for the remainder of that term and until a successor is appointed and qualifies.

(5) The Governor may remove an appointed member for incompetence, misconduct, or failure to perform the duties of the position.

(d) A member of the Commission may not receive compensation, but is entitled to reimbursement for expenses under the Standard State Travel Regulations, as provided in the State budget.

§2–1303.

(a) The Commission shall establish:

(1) A Scientific and Technical Working Group;

(2) A Greenhouse Gas Mitigation Working Group;

(3) An Adaptation and Response Working Group; and

(4) An Education, Communication, and Outreach Working Group.

(b) The Commission may establish other working groups as needed.

(c) The Chair of the Commission shall appoint working group members who represent both public and private interests in climate change, including representatives of:

(1) Academic institutions;

(2) Renewable and traditional energy providers;

(3) Environmental organizations;

(4) Government agencies;

(5) Labor organizations; and

(6) Business interests, including the insurance and real estate industries.

(d) The Commission shall prioritize working group actions, including:

(1) Strengthening and maintaining existing State climate action plans;

(2) Developing broad public and private partnerships with local, State, and federal agencies;

(3) Communicating with and educating citizens about the urgency of acting to reduce the impacts of climate change;

(4) Maintaining an inventory of Maryland's greenhouse gas emissions sources and carbon sinks;

(5) Addressing any disproportionate impacts of climate change on low–income and vulnerable communities;

(6) Assessing the impacts that climate change may have on the State's economy, revenues, and investment decisions;

(7) Assessing the needs for utilities and other public and private service providers throughout the State to adjust their operating practices and investment strategies to mitigate the impacts of climate change on their customers and the public;

(8) Assessing the impacts that climate change may have on agriculture in the State;

(9) Recommending short– and long–term strategies and initiatives to better mitigate, prepare for, and adapt to the consequences of climate change;

(10) Assisting local governments in supporting community–scale climate vulnerability assessments and the development and integration of specific strategies into local plans and ordinances;

(11) Establishing comprehensive and accountable annual working group work plans that set annual goals and performance benchmarks and prioritize new and existing climate change mitigation and preparedness actions and initiatives;

(12) Maintaining a comprehensive action plan, with 5–year benchmarks, to achieve science–based reductions in Maryland's greenhouse gas emissions;

(13) Convening regular working group and full Commission meetings to ensure that sufficient progress is being made across all sectors and communities in Maryland; and

(14) Considering other related matters as the Commission determines to be necessary.

§2–1304.

On or before November 15 of each year, the Commission shall report to the Governor and General Assembly, in accordance with § 2–1246 of the State Government Article, on the status of the State's efforts to mitigate the causes of, prepare for, and adapt to the consequences of climate change, including future plans and recommendations for legislation, if any, to be considered by the General Assembly. §2–1305.

(a) (1) Each State agency shall review its planning, regulatory, and fiscal programs to identify and recommend actions to more fully integrate the consideration of Maryland's greenhouse gas reduction goal and the impacts of climate change.

(2) The review shall include the consideration of:

(i) Sea level rise;

(ii) Storm surges and flooding;

(iii) Increased precipitation and temperature; and

(iv) Extreme weather events.

(b) Each State agency shall identify and recommend specific policy, planning, regulatory, and fiscal changes to existing programs that do not currently support the State's greenhouse gas reduction efforts or address climate change.

(c) (1) The following State agencies shall report annually on the status of programs that support the State's greenhouse gas reduction efforts or address climate change, in accordance with § 2–1246 of the State Government Article, to the Commission and the Governor:

(i) The Department;

(ii) The Department of Agriculture;

(iii) The Department of General Services;

(iv) The Department of Housing and Community Development;

(v) The Department of Natural Resources;

(vi) The Department of Planning;

(vii) The Department of Transportation;

(viii) The Maryland Energy Administration;

(ix) The Maryland Insurance Administration;

(x) The Public Service Commission; and

(xi) The University of Maryland Center for Environmental Science.

(2) The report required in paragraph (1) of this subsection shall include:

(i) Program descriptions and objectives;

(ii) Implementation milestones, whether or not they have been met;

(iii) Enhancement opportunities;

(iv) Funding;

(v) Challenges;

(vi) Estimated greenhouse gas emissions reductions, by program, for the prior calendar year; and

(vii) Any other information that the agency considers relevant.

§2–1306.

(a) The University of Maryland Center for Environmental Science shall establish science–based sea level rise projections for Maryland's coastal areas and update them at least every 5 years.

(b) The science–based sea level rise projections shall include maps that indicate the areas of the State that may be most affected by storm surges, flooding, and extreme weather events.

(c) The science–based sea level rise projections required under this section shall be made publicly available on the Internet.