Climate Framework for Delaware

Appendix D
Executive Order 41 Agency Adaptation Recommendations

December 31, 2014

The adaptation recommendations from each agency can be found on the following pages:

Delaware Department of Agriculture - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Evaluate response to increased susceptibility of forest wildfires	The Department of Agriculture should evaluate adjustments to internal policies related to risk management, fire prevention, and management for forests. In partnership with Extension Service/USDA/Dept. of Interior, DDA would develop and distribute educational materials related to risk management and fire prevention. This recommendation anticipates increased potential government cost to prevent/mitigate/respond to drought and increased local temperatures. Will require collaboration with DEDO, DNREC, and USDA.
Evaluate nutrient management, pesticide application, risk assessment, fire prevention and management, and cropping practices policies that may be impacted by potential increases in the number of hot dry days per year	The Department of Agriculture should evaluate adjustments to internal policies related to nutrient management, pesticide application, risk management, fire prevention and management, and cropping practices. In partnership with Extension Service, DDA would develop and distribute educational materials related to risk management. This recommendation anticipates increased potential government cost to prevent/mitigate/respond to drought and increased local temperatures. Will require collaboration with DEDO, DNREC, and USDA.
Educate landowners and agricultural operators on the possibility of, and how best to address and mitigate, loss of land due to sea level rise	The Department of Agriculture should create and distribute educational materials concerning effects of sea level rise, conduct workshops with producers in possible affected areas, and work closely with Extension Service on education/outreach, as well as research efforts. Will require collaboration with DNREC and OSPC.
Educate landowners and agricultural operators on the effects of salt water intrusion through sea level rise	The Department of Agriculture should create and distribute educational materials concerning effects of sea level rise, conduct workshops with producers in possible affected areas, and work closely with Extension Service on education/outreach, as well as research efforts. Will require collaboration with DNREC and OSPC.

Delaware Department of Education - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Improve guidelines for siting of school facilities	DOE should work with the districts, State Planning Office, and the Office of Management and Budget under its authority as part of Title 29 §7525 to ensure that new school buildings are not built on sites subject to flooding by sea level rise. DOE's approval of siting new buildings complements the state's PLUS process. By reducing the risk for flooding at new school buildings, they may be used as shelters, if needed.
Promote LEED certification or Green Ribbon school designs	DOE should work with Facilities Management/OMB and the districts to encourage LEED certification, Green Ribbon standards, or any other standards to promote the most efficient design and construction for school buildings that reduces the environmental footprint. The state approves all major capital school plans and will support the use of third-party standards that guide design for capital school projects.
Promote the incorporation of cleaner school buses	DOE, when it purchases new buses, should continue to replace buses with cleaner buses meeting the most recent EPA requirements. DOE will also promote a pilot program for alternative fuel buses that produce fewer emissions, subject to the availability of alternative fueling locations, as well as a network of service providers to work on these vehicles.

Delaware Department of Health and Social Services - Division of Public Health - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
To develop new or improve existing monitoring and surveillance:	
Advocate for an expansion of vector surveillance programs	The DHSS Division of Public Health should advocate for an expansion of vector surveillance programs to identify new vectors and monitor the size of vector populations (e.g., ticks and mosquitoes). Increasing temperatures and rainfall may increase the incidence of vector-borne diseases. DPH will assist DNREC in determining the vectors of interest. This response could change the existing programs at DNREC, in particular the mosquito control program. It may require the establishment of a tick surveillance program. DNREC is or would be the lead agency for these surveillance programs with assistance from DPH.
Monitor new and emerging diseases related to climate change	The DHSS Division of Public Health should support monitoring new and emerging diseases resulting from climate change. The proposed response would require periodic meetings between DPH and DNREC to keep abreast of zoonotic, waterborne, and vector-borne diseases resulting from climate change. The information could be used to update surveillance programs to account for the new diseases. This response would require interaction between DPH and DNREC to cooperate and meet periodically to discuss new and emerging diseases due to climate change.
Evaluate benefits and costs of developing environmental public health tracking system	The DHSS Division of Public Health should evaluate the specific benefits and costs of developing and maintaining an environmental public health tracking system for the ongoing collection, integration, analysis, interpretation, and dissemination of data from environmental hazard monitoring, and from human exposure and health effects surveillance. Climate change–related data will be included in the tracking network database. The desired outcome from this response will be an environmental tracking network that is easily accessible by DPH staff, other state agencies, and the public. The adaptation response will require existing public health programs to collaborate with the Data and Informatics and Health Systems Protection sections. At this time it is believed that existing staff will be able to handle the increased workload; however, it may require full time staff to support the program. DNREC's involvement would be needed to provide environmental data, such as air quality, sea level rise, or mosquito populations to support the tracking network. The Department of Agriculture may also have environmental data (e.g., pesticide use data) that could be useful for environmental tracking.
Evaluate feasibility of monitoring private coastal drinking water wells for salt water intrusion	The DHSS Division of Public Health should evaluate the feasibility of monitoring private well water quality in coastal areas for salt water intrusion and investigate the potential to connect to a public water source. Salt water intrusion into drinking well water may result from sea level rise caused by climate change. This response would require changes to the Office of Drinking Water's policies and may require legislative changes to the Delaware Code. Collaboration with DNREC may be necessary. DPH would be the lead agency with assistance from DNREC. Working with local public water utilities may also be needed.
Examine ways to track new and emerging diseases	The DHSS Division of Public Health should examine ways to track new and emerging diseases related to climate change, such as Chikungunya fever, to respond to the influence that global climate change may have on infectious disease dynamics. Tracking of these diseases will provide evidence as to whether changes in disease patterns are occurring. Monitoring diseases is an important part of protecting the health of the public. The adaptation response may require public health program(s) to make changes to its existing program(s) to include the influence of global climate change on infectious disease dynamics. The reporting of new diseases may require policy and/or legislative changes. The Public Health laboratory may need to develop new protocols to identify new causative agents.
Expand List of Reportable Conditions	The DHSS Division of Public Health should expand the list of reportable conditions to include those related to extreme or adverse weather conditions, for example, heat stroke and heat stress. The reportable list should also be updated to include diseases related to climate change. The adaptation response may require public health program(s) to make changes to its existing program(s) to include conditions related to extreme or adverse weather events. At this time, it is believed that existing staff will be able to handle the increased workload.

To enhance current data management practices:	
Evaluate public health infrastructure and resources for data collection and analysis	The DHSS Division of Public Health should evaluate the specific costs and benefits of expanding and updating infrastructure and resources for data collection and analysis to include climate change impacts. The updated DPH databases should allow DPH climate change impacts to be included. The Data and Informatics section will take the lead. The desired outcome from this response will be a DPH database that is easily accessible by DPH staff and other state agency staff. The adaptation response will require existing public health programs to collaborate with the Data and Informatics section to expand and update the public health infrastructure and resources for data collection and analysis.
Evaluate GIS mapping of vulnerable populations and disease patterns	The DHSS Division of Public Health should evaluate the specific costs and benefits of developing geographic information system (GIS) mapping of vulnerable populations and disease patterns to help identify specific populations and health outcomes impacted by climate change–related events. This would improve DPH's ability to locate areas impacted by climate change and to assist the vulnerable populations. The GIS maps would be made available to the general public. GIS mapping of vulnerable populations and disease patterns in response to climate change–related events will require modest changes to existing programs within DPH. At this time, it is believed that existing staff will be able to handle the increased workload. The possible involvement of DNREC would be to provide environmental data, such as air quality, sea level rise, or mosquito populations, to support the GIS mapping. The Department of Agriculture may also have data (e.g., pesticide use data) that could be useful for GIS mapping.
Evaluate integration of DPH data sources	The DHSS Division of Public Health should evaluate the specific costs and benefits of consolidating DPH databases so climate change impacts to DPH can be tracked and monitored. The Data and Informatics section will take the lead. The desired outcome from this response will be a DPH database that is easily accessible by DPH staff and other state agency staff. The adaptation response will require existing public health programs to collaborate with the Data and Informatics section.
To assist in outreach and education:	
Incorporate climate change impacts information in DPH outreach materials	The DHSS Division of Public Health should incorporate information on climate change impacts on health in DPH outreach materials (web-based and printed materials). The inclusion of climate change information will assist in educating the public on the health impacts caused by global climate changes. The adaptation response will require public health programs to make changes to existing outreach materials to include climate change impact on health.
Develop outreach materials on climate change and health	The DHSS Division of Public Health should update and develop new materials on climate change and health for outreach. The response will include printed materials, web-based materials, and media communications. The initial foci could be on heat-related issues, vector-borne diseases, vulnerable populations, and mental health impacts related to climate change. An educated public is an informed public, and this is the goal of this adaption recommendation. The response will require DPH programs to include climate change information in their outreach materials. It may also require the development of new media communication and materials for public education.
Provide training for DPH staff on climate change impacts and risks to health	The DHSS Division of Public Health should provide internal outreach, education, and training for the DPH staff on climate change impacts and risks to health. This response's desired outcome is to have a well-educated DPH staff pertaining to the impacts and risks of climate change on the health of the public. This response will require a new DPH training program on climate change impacts to health to be presented to DPH staff.
To accomplish other Department priorities:	
Review and update DPH programs for climate change impacts	The DHSS Division of Public Health should review and update their programs to include climate change impacts. The DPH adaptation response will include reviewing and improving methods and response plans to protect vulnerable population from extreme weather events, heat events, and other climate emergencies. DPH will also review and develop communication strategies for at-risk groups. Additionally, DPH will review and improve planning for response capacity, for those with chronic health conditions such as transportation to cooling centers.
Develop health impact assessment tools	The DHSS Division of Public Health should develop a health impact assessment (HIA) and other tools for assessing the health of a community. HIA is a process that helps evaluate the potential health effects of a plan, project, or policy before it is built or implemented. An HIA can provide recommendations to increase positive health outcomes and minimize adverse health outcomes. HIA brings potential public health impacts and considerations to the decision-making process for plans, projects, and policies that fall outside the traditional public health arenas, such as transportation and land use.

Advocate integrating climate change with local activities	The DHSS Division of Public Health should advocate integrating climate change with local activities around sustainability and mitigation to deal with water issues, heat island effects, land use and infrastructure planning, building codes, and promotion of green energy and mass transit. This response would require the director's office to take an active role advocating for integrating potential climate change impacts into planning, codes, land use, etc. This adaptation response would require assistance and collaboration between DPH and other jurisdictions. The jurisdiction with regulatory authority would take the lead; however, DPH would support and advocate for changes in response to climate change impacts.
Advocate for an expansion of air quality monitoring	The DHSS Division of Public Health should support and advocate expanding DNREC's air quality monitoring program. DNREC is lead agency for air quality monitoring in the state of Delaware. Because of the potential for increased air pollution as a result of climate change, DPH will support and advocate for the expansion monitoring of air quality by the Department of Natural Resources and Environmental Control. This adaptation response would require changes to the DNREC air quality program by expanding the monitoring.
Identify funding opportunities for climate change and public health	The DHSS Division of Public Health should identify and share possible climate change funding opportunities related to health issues. Funds could be used for the development of a variety of program needs, such as an environmental public health tracking network, updating data infrastructure, GIS mapping, etc. The adaptation response would require existing public health programs to identify and share possible climate change funding opportunities with the rest of DPH.

Delaware Department of Health and Social Services – Social Service Divisions – FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Establish communication link to DDDS clients who live on their own	DHSS should establish a communication link to Division of Developmental Disabilities Services (DDDS) clients who live on their own, particularly those requiring respiratory assistance, who will be vulnerable during a heat wave or power outage. DDDS currently has a way to communicate to provider agencies about possible heat waves or power outages to see if assistance with clients is needed. However, there is no link established for reaching out or providing warnings to those families or individuals supported who live on their own. Social media networks are a possible option.
Expand medicine refill window	DHSS should expand the medicine refill window to ensure availability of medications during emergency evacuations or extreme weather events. Current law prohibits the refill of certain medications (psychotropic) to within three days of expiration. This 3-day window is sometimes not enough for a client to get a refill ahead of an extreme weather event. If an area of the state is forced into evacuation ahead of an event, it could be several days before a client is allowed to return, which could be after their medication runs out. The Division of Medicaid and Medical Assistance (DMMA) currently regulates the 3-day window.
Implement a statewide Smart-911 system	DHSS should implement a statewide Smart-911 system. Climate change will have an effect on the amount of calls in to first responders. First responders do not always have the details on the place or people they are responding to. A statewide Smart-911 system would contain all the relevant details first responders would need when responding.
Discuss feasibility of requiring contingency plans from managed care organizations (MCOs)	DHSS should discuss with managed care organizations (MCOs) the feasibility of requiring contingency plans for extreme weather. MCOs are the main point of contact for individuals who receive assistance from DMMA. MCOs should be responsible for developing contingency plans for the clients they serve. These individuals are more vulnerable to the effects of climate change than the average citizen in the state.
Remove potential hazards from low-lying areas prior to a major event	DHSS should remove potential hazards from low-lying areas near DHSS facilities to prevent damage during flood events. Vehicles and other objects in parking lots (e.g., dumpsters) and on building grounds can become buoyant and damage buildings during periods of extreme precipitation. These objects should either be moved to higher ground or secured in place.
Advocate for additional resources for Low-Income Home Energy Assistance Program (LIHEAP)	DHSS should advocate for additional resources for the Low-Income Home Energy Assistance Program (LIHEAP). LIHEAP provides outreach activities and assistance to low-income households in meeting their home energy costs, particularly to those with the lowest incomes that pay a high portion of household income for home energy. Low-income individuals spend a larger share of their budgets on energy costs and are more likely to be living in poorly insulated homes with older, less energy-efficient appliances. The State of Delaware should advocate for an increase in LIHEAP funds as part of their climate resiliency and adaptation strategy, because this federal grant reaches millions of households that are vulnerable to potential higher costs arising from climate change. The State of Delaware should advocate for additional flexibility to utilize LIHEAP funds to not only provide low-income clients with assistance in energy costs associated with their current household/dwelling, but also additional benefit assistance and education around other consumer-related costs impacted by climate change.
Create a statewide climate resiliency educational campaign	DHSS should create a statewide educational campaign to engage DHSS clients on climate change, resiliency, and adaptation initiatives. DHSS clients and vulnerable populations may not be prepared or have easy access to adaptation tools and strategies that mitigate the effects of climate change. Community Services Block Grant, LIHEAP, United Way 211, and other public and private stakeholders could work together to implement an educational campaign focused on engaging consumers/clients on climate change and adaptation initiatives.
Consider creating mobile State Service Centers	DHSS should consider creating mobile State Service Centers to provide access to services to clients during emergency evacuations or extreme weather events. For the purposes of climate adaptation and emergency preparedness, mobile State Service Centers can be developed and equipped with private offices, desks, computer system, kitchen, restrooms, and more to effectively engage, connect, and serve Delaware communities in place. These mobile centers could be utilized during winter storms, periods of extreme heat, or as alternative sites in the event of coastal storms that may force clients to relocate (evacuate) on a temporary or permanent basis. By creating mobile service centers, the division can bring the services to clients. Best case scenario for this recommendation would be to fund the purchase of 3 service center vehicles (one per county) and retrofit the vehicles with the equipment, office supplies, and wireless technology needed to access DHSS benefit systems and records and by so doing provide site-specific/community-based services.

Designate State Service Centers as critical facilities	DHSS should designate State Service Centers as critical facilities to ensure continued availability of services during extreme weather events and during power outages. DHSS, through its Division of State Service Centers, oversees 15 multiservice facilities in which over 160 health and social service–related public and private agencies and/or programs are co-located. The goal of the centers is to promote convenient access to Delaware's health and human services system. The effects of climate change combined with the steady increase in Delaware's population could result in increased client flow to these centers due to increased demand for socioeconomic resources from our already vulnerable populations. In the event of weather-related emergencies (e.g., floods), high demand on the electrical grid during a heat wave, and/or other extreme weather event, the clients of the programs housed in the State Service Centers could be unable to receive the critical assistance on which they depend. By designating these Centers as critical and providing the necessary infrastructure (e.g., emergency generators), the Centers can continue to function at all times.
Provide training and education on climate preparedness and adaptation	DHSS should convene health and social service providers from multiple sectors, including state and local agencies, and experts who are developing mitigation and adaptation strategies and other information, to train/educate the state on best practices for community climate resiliency. As part of training, DHSS agencies and partners representing the health and social services sector could use these opportunities to review current climate preparedness, assess additional risks to services and clients, identify strategies, and establish guidance necessary to become more prepared and resilient to climate change. There is a clear need for better communication of information to support different groups, especially the disadvantaged, to adapt effectively to current and impending impacts of climate change. Knowledge, tools, and strategies that aid in preparedness and behavioral change are important for individuals, families, and communities to adapt to and combat the effects of climate change.
Identify sites to be used as designated cooling and heating centers	DHSS should identify sites to be used as designated cooling and heating centers. Climate change is expected to increase the frequency of extreme events, which includes high heat days and low temperature days. This may place a higher need for and demand on social net programs. Consequently, this would negatively affect vulnerable populations, who may not have adequate resources to cool or heat themselves within their environs during the hottest and coldest hours of the day. During stretches of extreme high heat or extreme cold days/nights, when many of the vulnerable populations have no means to heat or cool their homes, DHSS along with the Division of State Service Centers can work with the Delaware Emergency Management Agency (DEMA), local governments, faith-based, and other community partners to ensure that the state has adequate shelters and other resources for the homeless and other vulnerable populations. With additional resources, partnerships, and support, additional cooling or heating centers could be developed.

Delaware Department of Natural Resources and Environmental Control - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
To incorporate climate change into land management and stewardship decisions:	
DNREC should incorporate the expected impacts from climate change into our management and stewardship plans for DNREC-owned lands, making cost-effective decisions for climate resilient management of all such property. DNREC owns or manages over 100,000 acres of land through simple ownership, through conservation easements, and other means, largely through our Divisions of Parks and Recreation and Fish and Wildlife and the Delaware Coastal Program office. Sea level rise, flooding, invasive species, species extinction and migration, and other impacts from climate change will all impact how we manage public lands into the future, and DNREC must begin planning for those eventualities now.	
Design and implement restoration activities to slow loss of coastal habitats	DNREC (Division of Fish and Wildlife) should design and plan to implement restoration activities to slow the current loss of coastal beach, marsh, and forest habitats in the near term; identify and secure opportunities for beach and marsh transgression and afforestation in the mid- to long-term; and begin on-the-ground restoration actions to replace future loss of coastal habitat. Extensive loss of coastal habitats will result in loss of revenue from hunting, angling, boating, wildlife viewing, and tourism, as well as impacts to farmland from increased inundation and salinity.
Discuss expansion of invasive species control	DNREC (Division of Fish and Wildlife) should prepare to discuss expansion of invasive species control work and consider establishing early-detection and rapid management response teams in coordination with other land management agencies and partners. Problems with existing invasive species are expected to worsen, and the introduction of new and more aggressive species is anticipated. Revisions of regulations or flexibility provisions in regulations may be needed to support rapid response for controlling emerging invasive species problems.
Prepare to restore riparian buffers	DNREC (Division of Fish and Wildlife) should prepare to restore riparian buffers on wildlife areas, fishing and boating-access areas, and on private lands by planting native vegetation buffers and developing incentive programs for private landowners. Highest priority restoration sites and improved incentives for private landowners will need to be identified.
Prepare to restore ecological integrity of unique ephemeral wetlands	DNREC (Division of Fish and Wildlife) should prepare to restore adequate buffers around coastal plain seasonal ponds and other vernal pools, remove invasive vegetation in and around these freshwater wetlands, and evaluate the impact of groundwater withdrawals on these habitats on state wildlife areas and in cooperation with other land-managing agencies and partners, as well as with private landowners. Changing drought periods affecting these unique freshwater habitats will impact plant, invertebrate and amphibian species adapted to current average annual rainfall and drying periods. Incentive programs may need to be re-evaluated to entice private landowners to participate in restoration. In order to do so, the Division may need additional resources for analysis to identify highest priority restoration sites and for improved incentives for private landowners.
Prepare to manage different fish and wildlife species and habitat	DNREC (Division of Fish and Wildlife) should prepare to manage a different group of important fish and wildlife species and habitats (e.g., a northward shift of some fish species that support important commercial and recreational fisheries, a northward shift in more southern pine forest habitat). More specific guidance regarding species and habitats expected to shift ranges will be provided by the updated Delaware Wildlife Action Plan. Technical assistance and training will be needed with biologists and managers across the southeastern U.S. to help adapt local practices. Changes in species populations that are hunted, trapped, fished, and viewed may result in increased complaints from user groups and constituents who may not understand lasting climate change impacts and adaptation needs. Additional resources may be needed, as well as outreach to help the public understand lasting changes to local habitats and species and agency adaptation responses.
Evaluate strategies for increasing native pollinator habitat on public and private lands	DNREC (Division of Fish and Wildlife) should evaluate strategies for increasing native pollinator habitat on state wildlife areas and private lands, minimize use of insecticide use on wildlife areas, and encourage private landowners to minimize insecticide use. Increasing temperatures and longer growing seasons may impact pollinator species that are critical for native plant species and agricultural crops.
Evaluate need for revisions to technical specifications for vegetative practices	DNREC (Division of Watershed Stewardship) should evaluate the need for revisions to technical specifications for vegetative practices in consideration of sea level rise and saltwater intrusion. Sea level rise impacts may also affect maintenance schedules as existing management facilities are subjected to changes in salinity. Some of these vegetative practices are developed by NRCS and other technical recommendations not initiated at the state level.

Incorporate climate change into land stewardship decisions at the Delaware National Estuarine Research Reserve	DNREC (Delaware Coastal Programs) should incorporate climate change into land stewardship decisions at the Delaware National Estuarine Research Reserve properties. The DNERR Stewardship Program provides long-term protection of natural resources associated with the Reserve and serves to model responsible management practices to other organizations and individuals in nearby coastal communities. The Stewardship Program works on land acquisition, habitat mapping, ecological restoration, invasive species monitoring, and creating demonstration areas. Climate change adaptations should be incorporated into all aspects of the Stewardship Program, including but not limited to new management techniques, mapping needs, demonstration areas, and land acquisition.
Increase climate change–focused research and monitoring on DNERR land	DNREC (Delaware Coastal Programs) should increase climate change–focused research on Delaware National Estuarine Research Reserve properties. DNERR research staff support and conduct research with a focus on NOAA's mission to protect, restore, and manage use of coastal and ocean resources through an ecosystem approach to management. The DNERR serves as a platform for long-term research and monitoring related to climate change.
To incorporate climate change into asset management for hard and natural infrastructure:	
DNREC should apply an asset management approach when addressing climate risk to building facilities, other structures, and natural infrastructure. The elements of an asset management approach—monitoring of asset quality, risk analysis of climate science and impacts, and options for addressing vulnerabilities based on cost and budget—can improve long-term decision making and minimize future costs to maintain infrastructure. DNREC programs should integrate relevant elements into existing asset systems used for planning to preserve invested dollars over the expected life cycle of the asset/infrastructure.	
Adapt building processes	DNREC (Division of Parks and Recreation) should develop new standards for buildings in response to changing threats. Evaluate vulnerable facilities, decide which to abandon and which to rehabilitate to new standards, and transition facilities to new locations at the end of their "life cycle."
Consider relocating Division of Fish and Wildlife facilities	DNREC (Division of Fish and Wildlife) should consider relocating facilities, including offices, education centers, boat ramps, and equipment storage areas, and redesign or relocate facility access roads already at risk from flooding and storm surge. Several coastal public-access areas managed by DFW are already prone to flooding caused by extreme tides and storm surge. Other facilities will be at greater risk as sea levels rise and more frequent extreme storms impact coastal areas. An interruption in outdoor recreation and education services is already occurring at facilities due to flooding, and personnel have not been able to reach offices as a result of flooding during storms and extreme high tides. Loss of license revenue will result if access to wildlife areas and boat ramps is prevented by persistent flooding, and loss of productivity will result if personnel cannot reach assigned work locations. DelDOT will need to be involved regarding flooded and damaged public roads that lead to DFW facilities.
Develop a climate change adaptation plan for the Delaware National Estuarine Research Reserve	DNREC (Delaware Coastal Programs) should develop a climate change adaptation plan for the two Delaware National Estuarine Research Reserve properties in the state—St. Jones Reserve and Blackbird Creek Reserve. This plan will provide ways to incorporate sea level rise considerations into land acquisition activities; develop a framework for decision making regarding land protection and restoration strategies based on habitat vulnerability; and develop wetland protection, restoration, and retreat strategies in response to sea level rise. Additionally, the plan will also provide land managers and farmers with guidance on ways to manage lands and habitats affected by sea level rise and on preparing a description of best management practices and considerations for adaptation.
Adapt coastal impoundments and ponds	DNREC (Division of Fish and Wildlife) should adapt coastal impoundments and ponds by stabilizing and increasing the resiliency of levees, water-control structures, and dams, and implement water-level management and restoration activities that will improve accretion and vegetation growth. Adaptation plans should be developed to slow the pace of current impacts and to mitigate for current and future loss of habitat functions and values for wildlife and fish as well as mosquito and flood control functions. Failure to address stabilization, restoration, and retreat can result in catastrophic and rapid loss of hundreds of acres of protective coastal wetland impoundments to open water, which will be far more costly to recover, if recovery is possible at all. DelDOT will need to be involved for road and levee repairs under their ownership.
Evaluate need for revisions to technical standards and specifications for stormwater management	DNREC (Division of Watershed Stewardship) should evaluate the need for revisions to technical standards and specifications for stormwater management. Stormwater requirements are subject to criteria that are modeled. Predictive models use surface water elevations that will be impacted by sea level rise. Future conditions will also require more frequent stormwater maintenance schedules as existing management facilities are subjected to backwater conditions and other impacts.

To provide technical assistance to local governments, communities, and businesses:	
DNREC should integrate actions to address climate change impacts as part of technical assistance provided to local governments and businesses. Multiple DNREC programs offer guidance to local governments and businesses. Assistance to local governments can include adding climate change impacts analysis and response strategies into hazard mitigation planning, feedback on land use decisions (PLUS), and economic development planning occurring at the local level; developing model ordinances to reduce the risk of climate impacts on infrastructure (e.g., secure heating oil and propane tanks); and developing climate adaptation projects for communities.	
Provide technical assistance to Delaware communities for climate change adaptation projects	DNREC (Delaware Coastal Programs) should provide technical guidance and funding to encourage communities to plan for and implement appropriate climate change adaptation measures. The Coastal Management Program's Coastal Management Assistance Grants provide grant funding to support projects and activities that improve local and regional capacity to conserve, manage, and promote the incorporation of coastal management issues into local planning and implementation activities.
Study how to prioritize funding options to give preference to areas with effective practices for drainage and floodplain management	DNREC should study how to prioritize funding to give preference to projects in communities that have taken effective steps to adopt best practices and standards for drainage and floodplain management. The Floodplain and Drainage Advisory Committee formed under Senate Bill 64 identified recommendations to reduce vulnerability to ongoing inland and coastal flooding and drainage challenges, coastal storms and other extreme weather events, and rising sea level. Working with local and county jurisdictions, current practices and future needs should be reviewed to identify options to fund projects in jurisdictions where policies that continue to reduce risk from flooding are in place.
Aid local governments in planning for climate change	DNREC (Division of Energy and Climate) should provide technical support to local governments, in coordination with OSPC, to enhance focus on climate impacts (including the reduction of greenhouse gas emissions) and long-term sustainability (through adaptation and mitigation) in the comprehensive plan and in implementing ordinances. Improving community resiliency is best accomplished by local governments through their Comprehensive Land Use Plans. The majority of local governments in Delaware do not have the resources (e.g., staff/expertise/finances/time) to adequately address climate change, thereby improving their community's preparedness and resiliency. DEC can assist the OSPC by ensuring that revised plan guidelines and checklists include consideration of future climate impacts.
Ensure effective energy code compliance	DNREC (Division of Energy and Climate) should work with county, municipal, and local governments to ensure the uniform training, compliance, and enforcement of energy codes. New energy code requirements are driving the need for additional highly specialized training and compliance inspection methods that arguably need to be standardized across the state. Energy codes are critical to ensure that the buildings being built today meet modern conservation and efficiency standards. Having an up-to-date, progressive, and well enforced energy code can do much to lessen energy demands over the long term, ensure a reliable energy grid, and save consumers money in the long run. DNREC should work with affected stakeholders to evaluate ways to ensure that new energy code requirements are uniformly and successfully implemented.
Develop model building code	DNREC (Division of Energy and Climate [DEC]) should develop a model building code that could be adopted at the state or local level. Various groups, including local governments, the Home Builder Association of Delaware, and Delaware AIA, have expressed strong interest and acknowledged benefits of a model code. DEC can facilitate a dialogue between responsible and affected parties to support improved building codes that improve resilience to climate impacts in the building sector.
Develop model ordinance to secure home heating oil and propane tanks	DNREC (Division of Waste and Hazardous Substances' Tank Management Section) should develop a model ordinance for local governments to use to require that home heating oil tanks, both propane and oil, be strapped down or otherwise secured to prevent detachment and release during a flooding event. Propane tanks for home heating and gas grills routinely become detached during flood events, creating hazards to property and emergency responders as they can become like torpedoes until the gas is spent. Home heating oil tanks can also become disconnected and release their contents. Several propane companies in coastal areas are now requiring that their home heating propane tanks be strapped down. From the Accidental Release Prevention Program (ARPP) viewpoint, the outreach to the owners of the large, ASME propane tanks regulated by the ARPP, which may be located in the flood/storm surge zones, can be made through ARPP itself. ARPP can notify and verify that the owners ensure that their tanks are securely anchored to prevent both floatation and inversion (tank rotation that severs the piping connections). The outreach to the owners of the propane tanks and DOT cylinders that fall outside of the ARPP inclusion would need to be conducted with coordination with other Divisions and Departments.

Assist local governments in developing strategies to protect wastewater treatment facilities from flooding	DNREC (Division of Water's Surface Water Discharges Section) should develop a strategy to assist local governments in protecting wastewater treatment facilities from flooding and inundation from sea level rise. Wastewater treatment plants are often located near sea level in Delaware and thus are subject to periodic flooding events and may be subject to more long-term flooding influenced by sea level rise. Impacts include increases in spill incidence responses, plant capacity or engineering modifications, and increased field inspections. Increased frequency of flooding may require more dramatic responses, including facility relocation or increasing the elevation of vulnerable facility infrastructure.
Assist suppliers of potable water (from surface water intakes) in developing strategies to protect water intakes from flooding and salt water	DNREC (Division of Water's Water Supply Section) should develop a strategy to assist suppliers of potable water from surface water intakes to develop strategies to protect water intakes from flooding and salt water. The contamination of public water intakes from flooding or salt water due to sea level rise will require several likely responses depending on the local situation, including the following: more extensive treatment of surface water; abandonment/relocation of the intake; interconnection with other public water systems; and switching to groundwater where available. There are only a limited number of fresh surface water intakes in Delaware, but they serve a large percentage of the population of northern New Castle County. Hydrologic modeling studies should be conducted to provide better estimates on the need to protect existing intakes, the siting of new intakes, and projected time needed to respond.
Assist suppliers and users of potable water (from wells) to develop strategies for protection of wells from flooding and salt water	DNREC (Division of Water's Water Supply Section) should develop a strategy to assist suppliers and users of potable water from wells to develop strategies to protect wells from flooding and salt water. The contamination of public and private wells from flooding or salt water due to sea level rise or inundation of low-lying wells will require several likely responses depending on the local situation, including the following: treatment or reconditioning of the well; reconstruction of the well with a depth change or relocation; abandonment/relocation of the well; and interconnection with other systems. The increasing use of a limited and possibly shrinking fresh groundwater resource will challenge the general rules for fair distribution of this resource as users compete for the resource. Protection programs will become more important as the resource becomes more limited, particularly in coastal areas. Hydrologic modeling studies should be conducted to provide better estimates on the need to protect existing wells and for the siting of new wells. In addition, more comprehensive monitoring for salt water in coastal aquifers will improve our predictive ability.
To integrate climate impacts into scientific study, regulation, and permitting decisions:	
To the extent it is practicable and appropriate, DNREC should work to integrate anticipated climate impacts into the Department's permitting decisions. DNREC has more permitting programs and issues more permits to individual Delawareans than any other state agency. Permits are issued for myriad activities, including well and septic system permits for homeowners, air discharge permits for commercial and industrial sectors, stormwater and erosion control permits in the building sector, and dozens of other permits and approvals for activities that may have a detrimental effect on our land, air, water, or ecological resources, or which are otherwise required by statute to be approved by a government agency. In many cases, anticipated climate change impacts are not authorized as criteria that can be applied in deciding to approve, deny, or approve with conditions permit applications before the agency. In such cases, regulatory or statutory modifications may be necessary to allow use of those criteria in making permitting decisions on applications before DNREC.	
Evaluate need for improving spill containment requirements for hazardous materials	DNREC (Division of Waste and Hazardous Substances) should evaluate the need for improving spill containment requirements for Above Ground Storage Tanks and hazardous waste storage areas, which are vulnerable to flooding and storm surge impacts. The Accidental Release Prevention Program (ARPP), the Above Ground Storage Tank Program, the Hazardous Waste Program, and the Local Emergency Planning Committees can begin looking for necessary containment to cover storm surge heights, but only the ARPP has the regulatory authority to require increased containment wall height. The other programs can make recommendations. The state has requirements for adequate spill containment for contents of an Above Ground Storage Tank (AST) and hazardous waste, but this containment is based on the amount of material stored in the tank or containment area and not on storm surge height. Furthermore, if liquid raw materials or intermediate/finished products are not stored in regulated ASTs, then the state has no requirements for spill containment unless they are considered extremely hazardous substances and fall under the state's Extremely Hazardous Substances Act. There are also no containment requirements for hazardous raw materials or intermediate/finished products in a solid state. During a storm surge, such materials may dissolve in the floodwaters and be moved off site.
Incorporate Executive Order 41 in the Federal Consistency Program's enforceable coastal management policies	DNREC (Delaware Coastal Programs) should incorporate Executive Order 41 into its enforceable coastal management policies through the Coastal Zone Federal Consistency Certification Program. Consistency certification is a process that requires federal agencies to follow state coastal management policies when conducting a project or issuing a permit that could affect coastal resources, and will encourage better climate adaptation throughout the state.

Evaluate need for revisions to stormwater regulation	DNREC (Division of Watershed Stewardship) should evaluate need for revisions to stormwater regulation. Changes in magnitude and frequency of precipitation may require regulatory revisions based on updated weather data. May also require more frequent maintenance schedules as existing management facilities are subjected to these larger, more frequent events. The information that the Stormwater Program uses to base regulatory requirements upon is not developed at the state level but by federal and national data sets.
Evaluate changes to wetland and water quality monitoring	DNREC (Division of Watershed Stewardship) should evaluate potential changes to the methods of placement of wetland and water quality monitoring stations, methods of research and data collection, and possible redirection of research priorities in regard to changing conditions. Possible adaptation response would include moving monitoring stations to more secure sites, purchasing more rigorous equipment, changing monitoring parameters for climate change–related metrics, and either abandoning monitoring sites or establishing new sites. This adaptability would be necessary to continue to collect data to develop reports to agencies and the general public in regard to restoration success, wetland health and level of function, and water quality changes. Additionally, DNREC is required to report this data to EPA. Outreach would remain the same but would be changed to add more emphasis on monitoring and assessment in regard to changing climate. There already exists collaboration on monitoring with various agencies, such as USGS, Delaware Geological Survey, and intra-DNREC programs. Adaptation would be coordinated on a project-specific basis with other partners. The lead on the project again is project specific, and those that are the lead now would likely be the lead for adaptation response.
Evaluate design specifications and maintenance practices for rain gardens and other small-scale stormwater systems	DNREC (Division of Watershed Stewardship) should evaluate design specifications and maintenance practices to ensure that rain gardens and other stormwater systems on state lands remain functional with increases in extreme precipitation. Rain gardens and other stormwater practices using micro-topography may help offset the effects of more intense storms, so more promotion of their benefits would be beneficial. Small-scale stormwater best management practices (BMPs) can redirect a large amount of rainwater in a short period of time (< 48 hours) when properly designed and installed. With more intense storms and an increased amount of rainwater, a higher stormwater runoff coefficient may be necessary to properly design the size of these structures. The runoff coefficient is used to determine the most suitable size of the BMP and the amount of rainwater that the system can handle and infiltrate. If the amount of water is too much for the BMP structure to handle, they should be designed such that larger storm events bypass the system into a separate facility where site conditions allow. Routine maintenance of these small BMPs is critical to their function. The Division of Facilities Management within the Office of Management and Budget may see an increased need for their support in order to properly maintain on-site BMPs at state agency locations. Collaboration with the Department of Education may also be required because rain gardens have been installed as an educational component at a number of schools within the state.
Evaluate the adequacy of drainage infrastructure	DNREC (Division of Watershed Stewardship) should evaluate the adequacy of drainage infrastructure to address changes in precipitation and sea level rise. Climate change dynamics such as sea level rise and increased storm activity and precipitation will create the need for increased drainage services, and will stress already inadequate drainage infrastructure. Demand for new drainage infrastructure and service costs will increase where precipitation rates increase or sea level rise prevents adequate outlets to tidal waters. There are many densely developed parts of the state where a 2-foot rise in sea level will create major drainage issues. Land use decisions will be impacted as drainage infrastructure is incorporated into new development projects, which will be a challenge in many locations. DelDOT will face many of the same issues, and collaboration will be required between agencies.
Evaluate voluntary and regulatory strategies to ensure that Delaware emission sources are well controlled	DNREC (Division of Air Quality) should ensure that Delaware's emission sources of SO_2, NO_x, and volatile organic compounds (VOCs) remain well controlled. DE currently has issues with the attainment and maintenance of ozone and fine particulate matter, which are health-based air quality standards. Ambient concentrations of these pollutants are temperature-dependent, and increased temperature will exacerbate the problems. DE sources of these pollutants are generally well controlled, but as technology advances, additional control opportunities become available.
Consider incorporating equipment siting requirements into air permitting process	DNREC (Division of Air Quality [DAQ]) should consider a policy to require new permit applicants to consider inundation and sea level rise. Air emissions sources and emission control equipment may become at risk to flooding as more frequent extreme storms impact the state. DAQ should evaluate requiring as part of the existing permitting process that new sources of air emissions evaluate and appropriately site new equipment.

To incorporate adaptation into operational budget and capital planning processes:	
DNREC should integrate climate change into budget planning process and the long-range capital planning activities. Planning for and investing in infrastructure projects that improve Delaware's resiliency are possible when consistent and dedicated funds are available. Integrating climate adaptation strategies directly into the operating and capital budget planning process will help institutionalize discussions about future resiliency needs and investment into natural and hard infrastructure projects. DNREC should consider climate change impacts when reviewing proposed projects and suggest climate-related metrics for capital budget spending.	
Improve energy reliability and response to emergency events	DNREC (Division of Energy and Climate) should increase involvement and activities associated with energy emergency planning. DEC currently has direct involvement in Emergency Management response activities for energy-related events associated with state weather and other emergencies. As we prepare for more drastic weather and climate events, DEC expects to increase its Energy Assurance planning efforts and involvement with DEMA and preparedness for statewide Emergency Management activities and/or events, which may require additional resources for the Division.
Discuss additional support for living shorelines to support shoreline management and protection	DNREC (Division of Watershed Stewardship) should be the lead on shoreline management and protection for living shorelines. Assistance and collaboration with other state partners will be needed, because increased funding, more staffing resources, and collaboration with additional partners may be required. The increased use of mechanisms such as living shorelines to protect natural and human-made infrastructure will be crucial in regard to climate change. Adaptation to existing living shoreline methods and strategic placement for infrastructure protection is highly important so that sea level rise and climate change is planned for and counteracted well in advance. Responses would include ensuring the vitality and function of existing living shoreline projects. This could require more staffing, changes to policy, increased research, and more outreach. Climate change could also develop a response to increase the amount and scale of living shoreline projects, or conversely cause living shorelines to become obsolete due to increased sea level rise and shoreline energy, which would lead to increased erosion and/or the use of hardened/armored structures.
Plan for increasing demands for shoreline management and beach preservation	DNREC (Division of Watershed Stewardship) should plan for increasing needs, costs, and potential regulatory changes for shoreline management and beach preservation. The Division should monitor rates of coastal change, erosion, beach widths, storm damage, dune deterioration, and the cost of shoreline maintenance. Staff should consider the costs and benefits of project upgrades, which will likely be needed to maintain current levels of recreational beach amenities, park infrastructure, dune dimensions, and levels of coastal storm protection. Climate change dynamics such as sea level rise and increased storm activity could put additional stress on shoreline management and dune preservation/enhancement. Additional sand resources will be needed; more frequent and robust shoreline maintenance activities will be increasingly costly. Staffing increases could be needed if current service levels are maintained in the face of more frequent damage to beaches and dunes/dune crossovers. Regulatory changes to the Beach Use Regulations may be needed to maintain current levels of dune preservation/protection as sea levels increase and damages worsen. The Beach Preservation building line may not be appropriate in its current location to protect dunes as shoreline migration continues. The State Park system along the coast will be impacted by these changes. The major park infrastructure along the ocean and bay shorelines will be stressed by these increased risk factors.
Evaluate needs for channel maintenance	DNREC (Division of Watershed Stewardship) should evaluate needs for channel maintenance to maintain current levels of navigable waterways, recreational boating and fishing amenities, and park use. Climate change dynamics such as sea level rise, increased storm activity, and precipitation runoff could put additional stress on the Division's channel maintenance responsibilities. Increased storm activity and sediment accumulation could make channel maintenance activities increasingly costly. Staffing and contractual project increases could be needed if current or increasing service levels are required in the face of higher boating use and more frequent damage to channels by storm and tide-driven material. Major park infrastructure along the Delaware Bay and Inland Bays is linked to recreational and commercial boat use that depends on channel maintenance.

Prepare for expanded mosquito production season	DNREC (Division of Fish and Wildlife) should prepare to control mosquito populations nearly year-round to address increased complaints and to reduce transmission of mosquito-borne diseases, including maximizing use of non-insecticidal source reduction methods (e.g., open marsh water management, impoundment water-level management, fish stocking); expanding public education and outreach efforts to increase participation in water sanitation to decrease mosquito-breeding habitats; and exploring new regulatory tools to increase compliance. Increased mosquito population and mosquito-borne disease surveillance and monitoring will also be needed, as well as an increase in use of larvicides and adulticides as warranted to meet the public's needs, demands, and expectations.
Prepare for increased nuisance wildlife complaints	DNREC (Division of Fish and Wildlife) should prepare to address an increase in nuisance wildlife complaints by increasing outreach about best practices and services offered by commercial operators and volunteer organizations. Increased complaints are expected as suitable habitat for some species shrinks and wildlife move closer to residential and urban areas. An increased demand for assistance with sick or injured wildlife after extreme storm/flooding rain events is also anticipated. Permitting of commercial operators and volunteer rehabilitation organizations needs to be updated and refined.
Prepare for increased number of fish kills and harmful algal blooms	DNREC (Division of Fish and Wildlife) should prepare to handle an increased number of fish kills and harmful algal blooms. Increased fish kills will result from decreased holding capacity for dissolved oxygen in water. Increased need for response may require additional resources.
To ensure protection of public health and safety:	
Develop plan for access	DNREC (Division of Parks and Recreation) should develop a plan to provide alternative evacuation routes, access roads, and trails and ensure that communication would be available in the event of an emergency. DelDOT and DEMA should be involved, as they address roadways and emergency response.
Issue emergency waivers for repairs to infrastructure, environmental resources, and property resulting from storms and flooding events	DNREC (Division of Water's Wetlands and Subaqueous Lands Section) should issue emergency waivers for repairs to infrastructure, environmental resources, and property resulting from storms and flooding events. This adaptation would allow applicants to obtain expedited authorizations for repair and replacement activities in waters of the state and would reduce staff review time during these times of high permit demands. This adaptation has been important for the repair/replacement of roadways and bridges and for the repair/replacement of docks, piers. and shoreline stabilization on public and private properties. This adaptation has allowed the prompt allocation and utilization of federal funds for the nourishment of damaged beaches and the repair of damaged earthen dams.
Update and implement Debris Management Section of the State Emergency Operations Plan	DNREC (Division of Waste and Hazardous Substances) should work with DEMA to support the update of requirements in the Debris Management Section of the State Emergency Operations Plan and ensure their implementation. Many requirements were never funded and therefore never implemented. The plan requires updating before a storm hits that requires the plan’s implementation. This recommendation requires DEMA leadership.
To improve data and information available to the public:	
Update floodplain maps with consideration of climate change dynamics	DNREC (Division of Watershed Stewardship) should update floodplain maps with consideration of climate change dynamics. As flood risk factors increase, there will be an ongoing need to update these maps frequently and potentially to produce maps that are future-risk-based. Demand for updated floodplain maps and forward-looking study methodology is likely as flood and coastal storm risks are impacted by climate change. Climate change dynamics such as sea level rise, increased storm activity, and precipitation runoff will likely drive the need for updates to floodplain maps to reflect changing flood risk. Current federal policy and modeling practices intentionally do not factor future changes in sea level and precipitation into 100-year floodplain maps. In part this is due to federal insurance requirements that these maps reflect current risk, not future risk. Also, the hydrology and hydraulics practices for calculating flood levels and flood risk maps are driven by historical and current data and lack proven guidance for performing these studies for future conditions.

Coordinate on the use of updated floodplain maps to assist with flood mitigation activities	DNREC (Division of Watershed Stewardship) should coordinate with DEMA on the use of updated floodplain maps to assist with flood mitigation activities. Climate change dynamics such as sea level rise and increased storm activity and precipitation will create the need for updated floodplain mapping and higher floodplain standards for keeping development safe. The cycle at which floodplain maps are updated is currently inadequate, but is becoming more manageable as technologic advances lower the cost of flood studies. Floodplain mapping updates and floodplain development standards that account for rising sea level and increased flood risk will be needed. Ideally these programs become more "forward-looking" instead of being tied to historic data, stream flows, coastal storms of record, and models. The outcome should be flood risk maps that depict future risk factors, floodplain development standards to guide development away from current and future flood risk areas, and new standards that look at future risks. Because DEMA will be similarly faced with increased pressure to provide assistance for flood mitigation activities, a shared collaborative approach will be needed.
Update mapping of tidal wetland jurisdictional boundaries	DNREC (Division of Water's Wetlands and Subaqueous Lands Section) should update the existing tidal wetland jurisdictional boundary maps to more accurately identify the limits of the state's jurisdiction over tidal wetlands and develop a protocol for future updates. Sea level rise is resulting in the landward migration of tidal wetlands, which is not being depicted in the existing maps that are static and last updated in 1988. This adaptation will minimize impacts to tidal wetlands that result from unpermitted excavation, filling, and construction activities and provide guidance for the siting of infrastructure and structures vulnerable to sea level rise.
Increase educational awareness of climate change in Delaware	DNREC (Delaware Coastal Programs) should increase climate change content in educational and outreach programs that promote a better understanding of Delaware's estuarine and coastal areas and promote informed coastal decision making. DNERR offers education and training programs for a range of audiences, including students, teachers, and families, as well as state and local government leaders and other coastal decision makers. The goal of the program is to improve environmental literacy in our communities to enable environmentally sustainable decision making. Pertinent climate change information can be included in curricula that have been developed for the various education and outreach programs: Coastal Training Program, Community Programs, School Programs, Teacher Professional Development, and through Thank You, Delaware Bay.
Educate staff and the public	DNREC (Division of Parks and Recreation) should educate staff and develop educational brochures for constituents on vector-borne diseases, prevention and treatment of heatstroke and dehydration, and what to do in the event of extreme weather events. They should also consider changes in timing and duration of public programs and fee season.
Build capacity to conduct climate change–focused air quality modeling	DNREC (Division of Air Quality) should conduct regional-scale modeling with CMAQ and CAMx. These regional-scale models are necessary to evaluate the impact of temperature change on ozone levels and fine particulate matter in DE.
Increase climate change–focused research and modeling	DNREC (Division of Air Quality) should conduct additional research/modeling to better understand the impacts of increased temperature on ozone concentrations. Ozone formation is highly temperature dependent, and increased temperatures will increase the number of days that ozone levels are unhealthy and the level of ozone concentrations on those days. Research and modeling is needed to relate the increased ozone levels to the national ambient air quality standards, the quantity of NO_X and VOC emissions in DE, and the relative impact of ozone and ozone precursor emissions transported into DE from upwind states.
To address other Department-wide priorities:	
Develop and apply resiliency compliance criteria for distributing state and federal funds	DNREC should develop resiliency principles, incentive structures, and/or eligibility criteria for grant and contract funds based on the flexibility and intent of the funding source. When distributing funds to contractors, businesses, and communities, DNREC should ensure to the maximum extent possible that funds are used in ways that minimize risk from climate impacts (e.g., higher temperatures, increased precipitation, sea level rise, and greater risk of flooding) and that safeguard communities from preventable loss.
Support long-term climate resilience through Cabinet Committee on Climate Resiliency	DNREC should continue to support climate mitigation and adaptation policy in coordination with the Governor's Committee on Climate and Resiliency, convened under Executive Order 41. DNREC recommends that the Committee continue operating over the long term, and that the Division of Energy and Climate (DEC) provide annual updates to them on changes in our understanding of the effects of climate change on Delaware and its residents. Climate change will continue for decades, and our understanding of the science of greenhouse gas effects on the planet will continue to evolve. DEC needs to stay abreast of changing science and policy developments and continuously apply those changes to Delaware's climate adaptation and mitigation responses.

Delaware Department of Safety and Homeland Security - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Develop operational plans to adapt to sea level rise	DSHS should develop operational plans to address the potential impacts of sea level rise. These operational plans may also include measures to ensure that new facilities are not constructed in lower elevation areas, so as to mitigate flooding impacts.
Consider alterations to policies regarding worker safety in an increased temperature environment	DSHS should consider alterations to policies regarding worker safety in an increased temperature environment. Necessary policy changes may include additional training on the risks of extreme heat to outdoor workers, changes to uniform dress code under certain circumstances, and alterations in scheduling during extreme heat events. Increased temperatures affect all state agencies, but especially those whose employees work outside for extended periods of time, such as Delaware State Police, DelDOT, DNREC, etc. There will need to be collaboration among these and other state partners to address this issue. The lead should come from state agencies with the most employees affected by increased temperatures, along with guidance concerning heat-related illnesses from the Division of Public Health.
Conduct research on the potential effects of climate change on structures and vehicles	DSHS should conduct additional research to provide accurate information on the effects of increased temperatures and increased precipitation on buildings and vehicles, including the effects on existing structures and vehicles. A potential focus for the research could be to gauge the effects of increased temperatures and prolonged heat waves on state buildings and vehicles to ascertain if the current cooling systems in state buildings and vehicles are robust enough to handle the additional stress that will be placed upon them in the future. Additional research should be conducted to gauge the vulnerability of the state's communication infrastructure to ensure the reliability of this vital resource in the face of climate change. Based on the outcome of the research, action plans can be developed and implemented.
Make programmatic adjustments to adapt to increasing levels of precipitation, flooding, and sea level rise	DSHS should make programmatic adjustments to adapt to increasing levels of precipitation, flooding, and sea level rise. These programmatic adjustments can be tailored specifically to Divisions within DSHS based on need. For example, DEMA may need to have staff and Emergency Service Coordinators (ESCs) report to the Emergency Operations Center earlier in an event and also readjust timelines for evacuation of citizens from vulnerable communities. In addition, DEMA will need to expand its outreach and education to the local governments and the public concerning building in flood-prone areas and floodplains, and programs available through DEMA to assist with mitigating vulnerable properties. The Division of Communications (DivComm) may need to reevaluate the lightning suppression equipment to include the grounding of internal and external equipment that is currently in place at the state's radio communications sites to ensure its compliance with industry guidelines. DivComm may also need to reconfigure current or install new lightning suppression equipment and grounding systems where needed to ensure uninterrupted radio communications for the various agencies throughout the state, including the Delaware State Police, municipal police, fire departments, Department of Corrections, and DelDOT. Also, DivComm may need to reevaluate the ability to properly protect the state radio communications site shelters and auxiliary power generators from any potential sea level rise and should consider the feasibility of installing drainage culverts or water barriers around the sites to divert water away.

Delaware Department of State - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
To identify and support policy initiatives that reduce greenhouse gas emissions (climate mitigation):	
Review Commission options to help reduce greenhouse gases and mitigate climate change	DOS (Public Service Commission staff) should take the opportunity to chair an orderly, task force focused approach to review existing and potential utility actions to help mitigate climate change and reduce greenhouse gases with consideration for customer rate impact. The PSC should assign a Review Manager to coordinate and manage the task force process and to prepare a "Findings and Recommendations" report to the Commission.
Broaden utility review of climate change initiatives to include non-regulated entities	DOS (Public Service Commission staff) should broaden the review by inviting participation unregulated and municipal public utilities as members of the task force and establish a proposed schedule of work leading to a final report within 12 months. As the PSC only regulates investor-owned utilities, participation and cooperation of unregulated utilities would be on a voluntary basis.
Review utility tariff approaches to minimizing greenhouse gases	DOS (Public Service Commission staff) should broaden the review to include various tariff approaches that could help reduce energy use and related greenhouse gases, while minimizing customer rate impact. The review should include: a. Tariffs that encourage conservation of resources and stimulate growth of distributed resources; b. Tariffs that recognize the benefits of energy efficiency and the direct use of natural gas; c. Tariffs that improve customer choice and produce savings through dynamic or off peak energy use; d. The impacts made by peak demand costs, net metering limitations and other tariff issues.
To enhance utility infrastructure to ensure reliability of service:	
Review potential for infrastructure enhancements that can help mitigate climate change exposure	DOS (Public Service Commission staff) should utilize the existing task force to also review the following key issues on which actions could be taken to help mitigate climate change. The review should consider rate impact and supplement the "Findings and Recommendations" Report to the Commission: a. Major utility areas at risk from climate change and sea level rise; b. Discussions with utilities relating to their plans for infrastructure resiliency investment and where that might help to mitigate the impact of climate change; c. Potential mechanisms, including securitization of asset upgrades, to reduce ratepayer mitigation costs; d. Utility actions and monitoring/reporting requirements.
Coordinate review of storm response procedures with all regulated utilities	DOS (Public Service Commission staff) should consider a review of current utility policies related to storm response encompassing a wide range of response procedures currently in place to ensure public safety and address potential public health concerns related to climate change.
To incorporate climate change into asset management and protection of historic and cultural resources:	
Complete mapping of cultural resources into GIS-based system	DOS (Historical & Cultural Affairs) should increase readiness (preparedness) for climate change events by completing mapping of all cultural resources in the Cultural and Historical Resources Information System (CHRIS), a GIS-based system. This will allow for broader planning related to the risk to cultural resources and provide for expedited review in all federal undertakings requiring such review by the National Environmental Protection Act (NEPA) and/or the National Historic Preservation Act (NHPA).
Conduct vulnerability assessments	DOS (Historical & Cultural Affairs) should conduct vulnerability assessments and scenario planning, to include evacuation and triage procedures. Historical & Cultural Affairs will enhance adaptation/preparedness by developing risk criteria, assessing and characterizing the vulnerability of state assets (facilities and cultural resources), and providing scenario planning guidance and training to include evacuation and triage procedures.
Ensure preparedness for threatened sites	DOS (Historical & Cultural Affairs) should document underground utilities, underground storage tanks, septic systems, and other infrastructure of vulnerable assets, maintain site and floor plans, identify utility shut-off valves and exit routes, and maintain documentation in readily accessible formats.
Evaluate costs and benefits of creating historic preservation tax credit for adaptation and resiliency	DOS (Historical & Cultural Affairs) should evaluate the specific costs and benefits of creating a category of historic preservation tax credits that eligible property owners can apply for to offset the costs of adaptation and protection measures.

Publish cultural resource management plans	DOS (Historical & Cultural Affairs) should increase readiness (preparedness) for climate change events by: (1) developing and implementing cultural resource management plans that identify significant buildings and archaeological sites, and documenting and/or recovering information as indicated; (2) providing adequate facilities to protect curated artifact collections and associated documentation.
To incorporate climate change into asset management:	
Mitigate below-grade facilities	DOS should identify all work locations considered to be "below grade" and vulnerable to increased frequency of flooding and mitigate potential adverse effects by incorporating into maintenance plans regular inspections of drainage systems, ventilation, and entry and passageways, and by implementing corrections. Evaluate feasibility and incorporate into long-range planning relocation of these operations to less vulnerable sites.
Create energy baseline for leased sites	DOS should create baseline energy efficiency standards for all leased sites in the department, to include baseline energy consumption, tenant-available monitoring of energy usage, use of passive ventilation, and use of renewable energy sources.
Create energy baseline for office equipment	DOS should create baseline energy efficiency standards for all office equipment and promote the use of Energy Star equipment where appropriate.
Ensure new building compliance	DOS should ensure that all new buildings built by the Department of State shall be in compliance with Executive Order 18, especially in the categories of energy conservation and efficiency; use of clean, renewable energy; and environmentally responsible and energy conscious construction.
Ensure financed building compliance	DOS should ensure that all new buildings receiving funding from the State of Delaware through the Department of State shall be in compliance with Executive Order 18, especially in the categories of energy conservation and efficiency; use of clean, renewable energy; and environmentally responsible and energy conscious construction.
To ensure workforce safety and capacity to provide services:	
Increase amount of technical staff	DOS (Public Advocate) should address the need for additional technical staff to address the potential increase in call volumes and more complex hearings (where climate change mitigation costs may be built into rates).
Promote personal energy use awareness	DOS should enhance workforce climate literacy by developing a training program to ensure that all employees are aware of their personal energy use and ways to use energy more efficiently.
Establish protocols to protect outdoor workers	DOS should increase workplace safety by establishing protocols to protect employees working outside from adverse effects of extreme temperature days.
Evaluate and promote workplace options for employees	DOS should evaluate and promote the use of videoconferencing capability for all agencies, especially those with public hearing functions; a ride sharing program to allow for sharing of vehicles across agency lines; telecommuting options; and flexible work and leave schedules during weather events that result in disruption, where feasible and desirable.
To ensure consumer protection:	
Evaluate alternate utility rate structures	DOS (Public Service Commission staff) should, upon approval by the Public Services Commission, collaborate with utility companies, the Public Advocate, and various stakeholders to design measures that would be suitable to address climate change initiatives with reasonable attainable goals, reasonable costs, and reasonable expectations.
Assess financial impact of any new rates	DOS (Public Advocate) should work to ensure that the financial impact of any potential new rates includes consideration of the utility consumer interests.
Enhance outreach to utility consumers	DOS (Public Advocate) should enhance outreach to utility consumers on the issues of climate change, mitigation, energy efficiency, and any potential rate changes.
Include protected classes and undocumented communities in outreach efforts	DOS (Human Relations Commission) should establish public information protocols to ensure fairness and equity in the dissemination of information related to Executive Order 41 implementation and ensure that any relevant plans, programs, services, incentives, and relief include protected classes and undocumented communities.

Delaware Department of Transportation - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
To incorporate climate change into asset management:	
Continue development of geospatial data sets that can help identify vulnerable areas and help estimate the impact of reasonably anticipated events (such as a Category 3 hurricane)	DelDOT should work with outside agencies to review and revise current rainfall curves and to develop comprehensive and dynamic rainfall and maximum likely storm surge models to assess impacts to infrastructure (not just transportation) in vulnerable areas. Current models and geospatial data capture only a partial view of the effects of climate change, mostly from a static viewpoint, and not from the effects of major storm surge, periods of heavy rainfall, or other major catastrophic events. Updates to geospatial forecasts incorporating these scenarios will help suggest where to place investments to improve the resilience of our communities (e.g., bury utilities, build sea walls, reinforce dams, etc.) These data will then be used by local jurisdictions to determine land use in comprehensive plans. DelDOT will use previous storm data (i.e., from Superstorm Sandy) as scenario planning data for development of potential risks in these geographically vulnerable areas.
Conduct comprehensive assessment of state roadway risks and assets	DelDOT proposes to conduct a comprehensive analysis of the state's roadways, bridges, and other infrastructure (stormwater ponds, dams, and dikes) to identify those elements or portions of the transportation system that provide access to essential services, such as hospitals and emergency shelters, and that could be vulnerable to climate change impacts such as flooding. The purpose of this analysis will be to create a plan to improve the resiliency of the transportation system by rendering these essential elements as reliably and predictably available for use in emergency situations as possible given our current knowledge and understanding of the maximum likely events such as extreme weather.
Integrate climate resiliency into project development, traffic, bridge, and highway design	DelDOT should integrate into its bridge and highway design manuals strategies for improving the resiliency of the transportation system (including against sea level rise) for short-term, medium-term, and long-term anticipated effects. Current projects are developed with an eye toward present and future traffic flows, safety improvements, and maximum lifecycle value of the asset. New designs will also take into account short-term, medium-term, and long-term effects of climate change, based on geospatial information, to accommodate these effects over the lifecycle of the asset. Project development will assess the potential cost impacts of these adjustments to determine the efficacy of building to adapt to anticipated climate change impacts. For example, traffic safety and management will evaluate the need to increase and improve roadway messaging, lighting, and retro-reflectivity in their design manuals to accommodate the greater anticipated frequency and severity of rain events.
Build transportation enhancements (pathways, trails, roadscapes, etc.) to accommodate impacts of climate change	DelDOT should incorporate accommodations in its Transportation Alternatives Program to provide resiliency for extreme heat, drought, heavy rainfall, or extreme cold and prolonged freezing. Current Transportation Alternatives projects strive for minimum of maintenance and context-sensitive design. Future designs should include noninvasive resilient plants and should deliberately minimize stormwater runoff impacts.
Identify and assess existing chronic flooding and erosion problems caused by sea level rise, frequent storms, tidal forces, subsidence, and aging infrastructure	DelDOT should coordinate with DNREC (Divisions of Fish and Wildlife, Watershed Stewardship, and Water) to identify and assess existing chronic flooding and erosion caused by sea level rise, frequent storms, tidal forces, subsidence, and aging infrastructure (e.g., water-control structures, levees, culverts, and roadside shoulder erosion).
Evaluate materials used to reduce the impacts of stormwater runoff	DelDOT should evaluate and qualify materials used to treat roads to meet standards for environmental impacts to vegetation, rivers, streams, etc. As greater moisture events (heavy rainfall, snow) occur due to climate change, use of chemicals for snowmelt plays a part in the impact of stormwater on roadside vegetation, wildlife and fish, and other aquatic species. Development of new designs with stormwater management alternatives and use of low impact chemicals (or no chemicals at all) will reduce these impacts.
Reevaluate stormwater management approaches	DelDOT should work with DNREC and the Office of State Planning Coordination to review the state's strategy for stormwater management with an eye to improved resiliency. Special attention should be paid to striking the right balance between deliberately retaining stormwater in an effort to enhance groundwater recharge and accommodating efficient drainage. Currently, stormwater management designs focus on volume and location. Alternative designs for stormwater management and advanced techniques to capture runoff and pollutant discharge will be explored. If appropriate, changes should be made in our design standards and in our regulatory requirements for subdivisions.

Explore new pavement technology	DelDOT should explore the deployment of new technologies in asphalt and concrete pavement composition to mitigate melting of road surfaces or other damage. Currently, asphalt pavements are impacted by prolonged heat and other environmental effects (water, salt, etc.). Alternative materials and substrates will be explored to prevent climate change–related failures and lengthen the lifecycle of paved surfaces to withstand extreme temperature changes and moisture impacts.
Incorporate climate impacts into cost-effective investment in infrastructure	DelDOT should reevaluate the process by which projects are prioritized into the Capital Improvement Program to ensure that the process adequately reflects the strategies contained in currently adopted comprehensive land use plans. Currently, investments are made primarily for improving safety, accommodating greater traffic volumes, and maximizing the lifecycle value. As climate changes the variables for design (e.g., more right-of-way needed for a higher bridge), greater funding in the Capital Improvement Program will be needed to accommodate costs of longer and larger bridges (and subsequent increased maintenance costs). DelDOT will evaluate how best to include in the decision-making process the cost/benefit of building to accommodate potential vulnerabilities weighed against the financial means to build them.
Evaluate obtaining insurance to assist in recovery from catastrophic events	DelDOT should work with the Office of Management and Budget (OMB) and the Insurance Coverage Office to assess the efficacy of obtaining some sort of insurance that could help provide the funds necessary to recover from catastrophic and prolonged loss of major elements (roadways, bridges, and equipment) within the transportation system. Because the state self-insures, DelDOT is concerned that a catastrophic event involving either Delaware's roadways or DelDOT equipment and the revenue generated by opening the state to interstate commerce will put the state finances at risk, particularly if there was a significant loss of economic activity during this time.
To ensure workforce and public health and safety:	
Evaluate and adjust worker safety guidelines	DelDOT should evaluate, and as necessary, adjust guidelines addressing worker safety and train workers to identify risks of exposure to high heat, extreme temperatures, and impacts to roadway and project site conditions. Currently, DelDOT monitors extreme events and adjusts work schedules accordingly. DelDOT should review and adjust its safety guidelines to accommodate for higher temperatures, impaired air quality, and extreme site conditions. It should encourage its contractors to do the same for its workers.
Provide training to improve worker knowledge	DelDOT should train workers utilizing materials for roadway maintenance to apply more resilient materials in responsible ways. Contractors currently do not undergo DelDOT training programs on state-of-the-art materials science or application. DelDOT should develop a best practice training program for approved construction firms.
Evaluate driving restrictions for air quality events	In conjunction with the Governor's Office, DNREC, and DHSS, DelDOT should evaluate the costs, benefits, and feasibility of "reduced driving days" when atmospheric conditions are such that air quality is a significant health risk. Currently, air quality is assessed and advisory warnings are issued for certain segments of the population (aged, young, those with health conditions). As the temperatures begin to increase over historical averages, ever-greater numbers of citizens may be impacted. The state should develop policies for addressing advisory and required compliance for public safety to a greater number of people who previously would not have been impacted.
Develop revised maintenance schedules in response to air quality	DelDOT should develop revised maintenance schedules in response to air quality and climate conditions. During poor air quality days, less mowing and reduced work during the day will reduce our pollution footprint. Electrification of vehicle work areas should be considered for needed idling to maintain air conditioning in vehicles. Decisions to reduce workdays will be balanced against higher costs, nuisance issues (e.g., work at night), and lengthening of projects.

Adjust transit service in emergencies	DelDOT should build into its emergency response strategies to provide transit as necessary without endangering drivers or passengers. DelDOT currently weighs its transit deployment based on extreme weather events. As the intensity of these events grows, alternative deployment strategies should be considered. For instance, vehicles will be redistributed to more localized service routes based on density to avoid impassable roads to reach passengers in need. Also, transit vehicles will be taken out of service if imminent danger is posed to drivers and potential passengers. DelDOT will provide more maintenance and alternative vehicle types with longer life spans, and accommodate worker conditions as temperatures increase. In addition, both DelDOT and Delaware Transit Fleet vehicles will have location options for storage at higher elevations at times of flooding. Lastly, more shelters for passengers to protect them from the elements (rain, cold, and heat) will be evaluated.
Reevaluate emergency response protocols	DelDOT and Homeland Security will reevaluate our current long-term strategies for response to significant catastrophic events and our current short-term evacuation policies, and detour/evacuation route management and implementation. Currently, the Transportation Management Center, in conjunction with DEMA, provides coordination of emergency events ranging from 72 hours to two weeks in duration. If a catastrophic emergency hits Delaware, DelDOT and Homeland Security will assist in the long-term recovery process. It is recommended that a full-scale emergency response exercise occur with participation from all state departments and programs.
To support climate resiliency in local communities:	
Support local governments with land use assessment tools	DelDOT will continue to work with the Office of State Planning, the municipalities, and the counties on the development of geospatial mapping and infrastructure assessment tools to help inform the municipalities and counties about the potential impacts of climate change and assist in developing strategies for enhanced resilience. Currently, comprehensive land use plans vary with respect to their treatment of resilience and do not account for greater rainfall, sea level rise, or dynamic events such as storm surge, drought, increased summer temperatures, etc. Adaptation of comprehensive plans to address these vulnerabilities will allow governments to do more to protect the long-term health and safety of residents.
To identify and support policy initiatives that reduce greenhouse gas emissions (climate mitigation):	
Evaluate low-emission vehicle deployment	DelDOT should purchase and deploy lower emission light-duty vehicles equal to 10% of its fleet by 2020. Currently, DelDOT does not purchase lower emission/no-emission vehicles due to the high cost, maintenance requirements, and state bidding rules. DelDOT will re-evaluate the purchase of these vehicles and will coordinate efforts with the Office of Management and Budget. Until government provides a catalyst for the purchase of the vehicles, the cost will not decrease for the market in general. DelDOT will perform a life cycle cost analysis to determine the financial efficacy of various types of alternative vehicles. This analysis does not preclude the adoption of the vehicles, but rather will inform what types of vehicles may be more cost-effective and evaluate the economic benefits in stimulating the market for these types of vehicles.
Evaluate alternative energy technology in facilities	DelDOT will consider the deployment of more alternative energy technologies, namely energy efficiency and wind and solar technology, in its administrative and operational buildings. Currently, only one facility has solar installed. DelDOT will evaluate these programs for all new and renovated facilities for life cycle cost/benefit.

Delaware Economic Development Office - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Advocate for adoption of state recommendations for climate change adaptation	DEDO should position itself as an advocate for the adoption of the state's recommendations for climate change adaptation to the business and tourism communities. DEDO should further educate these interest groups on the vulnerabilities the state faces from climate change to further support the adoption of the adaptation recommendations. In doing so, DEDO will foster resilience to the business and tourism sectors, thus ensuring economic prosperity and longevity.
Provide and market public transportation to attractions throughout the state	DEDO should evaluate the possibility of establishing a joint marketing effort by state agencies working in partnership to instill a deeper awareness of the public transportation services capable of transporting travelers to Delaware's attractions. This strategy has the potential to mitigate greenhouse gas emissions by reducing the number of vehicles on the road due to increased use of public transportation.
Alter the standard for weekly rentals	DEDO should focus a Delaware Tourism Office outreach effort on realtors and rental agents at the Delaware beaches to create awareness of the benefits of changing the current standard of what constitutes a “weekly rental” of beach properties. Brokers/owners would be asked to work toward a system wherein rental changeover days and times would be staggered through the week, thus reducing the simultaneous influx and outflow of vacationers on specific weekend days only. This strategy would help reduce greenhouse gas emissions from traffic congestion, while also benefitting residents, tourists, and local businesses.
Promote economic growth and development in climate-resilient locations	DEDO should target growth and expansion of clean/light industry statewide to the areas most resilient to the impacts of climate change. This strategy has the potential to spur new jobs in sustainable industries while also ensuring the longevity of these structures.
Assist in bolstering resilience in the agriculture sector	DEDO should work with the Department of Agriculture and universities to develop approaches that reduce the impacts of climate change on local farmers, crops, and production facilities and to expand the use of agricultural technology in Delaware. This strategy will help improve the resilience of one of the major sectors contributing to Delaware's economy, while also having the potential to mitigate greenhouse gases through the use of more efficient technology.
Educate and assist businesses and industry in adapting to climate change	DEDO should utilize existing business retention outreach efforts to educate existing business and industry on the risks of climate change to their Delaware location(s) and develop approaches to mitigate that risk. This strategy will help ensure the resilience of the business and industrial sectors in Delaware, both of which contribute heavily to the state's economy.
Advocate for the reuse of existing industrial brownfield sites	DEDO should advocate for the reuse of existing industrial brownfield sites and support infrastructure statewide to reduce the use of greenfield sites and the construction of new, duplicate infrastructure. This strategy would allow for future development, while maintaining greenfields throughout the state.

Delaware State Housing Authority - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Evaluate energy-efficiency standards of the Low Income Housing Tax Credit (LIHTC) program	The Delaware State Housing Authority (DSHA) should review the Low Income Housing Tax Credit program to identify areas for improvement so that current energy standards will be exceeded. As weather and climate change, buildings may not be sufficient from an energy-efficiency standpoint. Incorporating increased standards will ensure that developers design and construct energy-efficient buildings and therefore alleviate health and safety concerns from excessive heat. DSHA is the allocating and monitoring agency for the LIHTC program for Delaware. The program was developed to stimulate production and preservation of low-income housing. Each state is given the responsibility of allocating credits to qualified projects in an amount not to exceed that which is needed to obtain financial feasibility up to the maximum amount available to that state. Each allocating agency must have a qualified allocation plan as part of their LIHTC application. This allocation plan lists all of the requirements needed and categories with which DSHA prioritizes LIHTC applications for funding. DSHA will review the current required energy standards and determine areas that can be improved without adversely impacting the program's ability to provide quality affordable rental housing to low- and moderate-income households. There will likely be a need for training for developers who use the program or a resource that developers can go to for technical assistance (perhaps from DNREC) on the new energy requirements.
Explore partnering on grants that address resiliency, such as the upcoming HUD National Disaster Resilience Competition	The Delaware State Housing Authority (DSHA) should explore applying for grants that address resiliency by partnering with other state agencies, including DNREC. For example, in 2014 DHSA and DNREC are exploring the feasibility of applying for a major grant through the U.S. Department of Housing and Urban Development's (HUD) National Disaster Resilience Competition. This grant program, announced in September 2014, will make available $1 billion to the 67 communities (including Delaware) that suffered a presidentially declared major disaster from 2011 to 2013. The grant funding will be administered through a Community Development Block Grant process. DSHA should play a lead role in coordination with other state agencies, including DNREC, OSPC, and DelDOT, and with local governments. The money would fund the implementation of innovative resilience projects to better prepare communities for future storms and other extreme events.
Consider sea level rise in DSHA programs	The Delaware State Housing Authority should consider sea level rise impacts in its programs that facilitate new construction and or rehabilitation. These include the Low Income Housing Tax Credit program, the State Housing Development Fund, the HOME program, and the Community Development Block Grant program. DSHA will review these programs, in consideration of sea level rise, to determine modifications necessary to avoid, when possible, new construction in areas prone to flooding. For program changes, there will likely be a need for training for developers that use the program or a resource that developers can go to for technical assistance (perhaps from DNREC) on new building and construction requirements.
Incorporate information on sea level rise in homeownership counseling	The Delaware State Housing Authority should work with the eleven housing counseling agencies to incorporate awareness on sea level rise into their pre-purchase counseling. This can include information on how to determine whether a property is located in a flood zone or area prone to sea level rise. DSHA administers a single-contract system with all eleven housing counseling agencies in Delaware. Contract language specifies that services to clients will include counseling sessions covering specific topics, such as rebuilding credit, saving, and reducing debt. Providing meaningful outreach to homebuyers to investigate a property's potential vulnerability to sea level rise prior to purchase can help homebuyers avoid areas that would make them susceptible to expensive building damage resulting from rising sea levels or extreme storms causing floods. Many homebuyers who participate in pre-purchase counseling are first-time homebuyers or are financially constrained and would be severely burdened by additional expenses associated with flood-related building damage.
Promote sustainable building practices into the Downtown Development District (DDD) grant program	The Delaware State Housing Authority should promote sustainable building practices into the Downtown Development District grant program. DSHA should work with DNREC to incorporate incentives for developers to design and construct energy-efficient buildings that meet specified energy goals, as certified through a third party. Because DSHA does not have the capacity to ensure that participants in the program are actually meeting the identified energy goals, success will depend on collaboration with DNREC and Delaware Sustainable Energy Utility. Developers will need technical assistance.

Delaware Office of Management and Budget - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Advocate for changes to state building design practices and policies	OMB should advocate for changes to state building design practices and policies to promote environmentally friendly design considerations for state facilities to minimize environmental impact. Examples could include incorporation of higher building performance levels (such as LEED, Energy Star, etc.), utilization of renewable energy sources where practicable, utilization of high efficiency building systems that require less energy for operation, incorporation of drought-tolerant landscaping, and utilization of innovative design, such as green roofs, to keep buildings cooler. This strategy will require coordination with other state agencies that perform public works building projects.
Improve resilience of state facilities and equipment	OMB should work to improve the resilience of state facilities and equipment. Extreme weather–tolerant designs should be incorporated into state facility plans for new construction and for renovation of existing structures. OMB should also design and size replacement equipment for state facilities to accommodate additional stress caused by extreme weather events. OMB should target leased facilities housing critical state services that are resistant to extreme weather conditions.
Incorporate flooding considerations into siting of state facilities	OMB should develop comprehensive guidelines to site state facilities that account for sea level rise and flooding due to extreme rain events. OMB should review existing state facilities for potential effects of flooding.
Revise Life Cycle Costing Analysis to account for climate change impacts	OMB should review and revise Life Cycle Costing Analysis (LCCA) procedures to account for potential increased precipitation, sea level rise, and extreme temperatures. Doing so will aid in designing state facilities to economically minimize the impacts of climate change. Coordination with other sState agencies that perform public works building projects will be required.
Increase maintenance of state facilities as a result of climate impacts	OMB should evaluate maintenance schedules of buildings and grounds for potential climate change effects, building equipment specifications to ensure acceptable performance during extreme events, and roof replacement intervals to adjust for the potential for accelerated wear due to extreme weather events. OMB should also evaluate how extreme weather could impact grounds maintenance. Maintenance staff should become familiar with potential effects of extreme weather.
Investigate alternate work schedules for outdoor workers	OMB should investigate alternate work schedules as appropriate for outdoor workers. Consider where appropriate flexible work schedules or scheduling during cooler times of day.
Incorporate resilience in Government Support Services (GSS) contracting	OMB should incorporate resilience into GSS contracting by building heating/cooling and weather-resistance requirements into contract specifications as necessary and as contract specifications are developed.
Incorporate resilience into Messenger Services	OMB should incorporate resilience into Messenger Services. The agency should review current delivery vehicle inventory for sufficiency during extreme weather; review whether daily service is absolutely necessary during extreme weather, including heat waves; and maintain contingency plans for those sites located in flood zones that may be difficult to access during extreme rain events.
Offer training opportunities for employees on impacts of climate change	OMB should offer employees training on the potential impacts that climate change may have on their employment and their homes. For example, training could include the use of personal protective equipment for employees working outdoors and emergency medical training such as first aid. This response would require assistance and collaboration with other state partners, with Statewide Training and Development taking the lead.

Delaware Office of State Planning Coordination - FINAL RECOMMENDATIONS	
Recommendation Title	**Recommendation Summary**
Revise PLUS checklist for Comprehensive Plans	The Office of State Planning Coordination should revise the PLUS checklist used by local governments for preparation of their Comprehensive Plans. OSPC has prepared checklists (last revised in 2003) designed to help municipal governments meet the requirements of state laws regarding the preparation of comprehensive plans. Revise the checklists to "strongly encourage" (in light of Executive Order 41) the consideration of future climate impacts. Improving community resiliency (including assessment of infrastructure vulnerabilities, land use policies, and other adaptation strategies) is best accomplished by local governments through their Comprehensive Land Use Plans.
Examine ways to incorporate climate change and sea level rise impacts into PLUS application	The Office of State Planning Coordination should examine ways to incorporate climate change and sea level rise impacts into the PLUS application used by project applicants. PLUS is an opportunity for projects to be reviewed for a variety of considerations, and climate change/sea level rise could be one of the criteria considered.
Provide technical support to local governments for Comprehensive Plans and local ordinances	The Office of State Planning Coordination should provide technical support to local government to address climate change impacts in their Comprehensive Plans and local ordinances. Improving community resiliency is best accomplished by local governments through their Comprehensive Land Use Plans. Many local governments in Delaware do not have the resources (e.g., staff, expertise, finances, and time) to adequately address climate change, thereby improving their community's preparedness and resiliency. OSPC should facilitate meetings with local governments, in coordination with DNREC, approximately 12–18 months before they begin to update their Comprehensive Plans. The purpose of meeting with local governments early in the process would be to provide technical (and, potentially, financial) support to enhance focus on climate impacts (including the reduction of greenhouse gas emissions) and long-term sustainability (through adaptation and mitigation) in the comprehensive plan and in implementing ordinances. This recommendation may require OSPC to modify existing policy/service and to create a new financial assistance fund.
Provide technical assistance to support integration of climate impacts and to reduce greenhouse gas (GHG) emissions through adaptation and mitigation at the local level	The Office of State Planning Coordination should provide technical assistance to support integration of climate impacts and to reduce GHG emissions through adaptation and mitigation. The majority of local governments in Delaware do not have the resources (e.g., staff/finances/time) to adequately address climate change, which would improve their community's preparedness and resiliency. OSPC can provide financial assistance for the same if funds become available through DNREC or another state agency. OSPC would administer financial assistance, with administrative support from outside of OSPC.
Examine ways to incorporate climate change and sea level rise as factors in the next update to State Strategies for Policies and Spending	The Office of State Planning Coordination should examine ways to incorporate climate change and sea level rise as factors in the next update to State Strategies for Policies and Spending, which is due in 2016. During 2015, OSPC will be working with stakeholders involved with the update process. A special focus of the update process will be coordination with DNREC to effectively include the goals and objectives of EO 41.
Establish and maintain GIS layers related to climate change and sea level rise impacts in FirstMap	The Office of State Planning Coordination should continue to work in conjunction with the Department of Technology and Information to operate FirstMap, the geospatial data warehouse for the State of Delaware. All geospatial data related to climate change and sea level rise should be loaded into FirstMap for statewide access. The Delaware Coastal Program should develop a web application using FirstMap to show appropriate information for contractors, consultants, and the general public regarding climate change and sea level rise.