

## **Delaware's Climate Action Plan Virtual Public Workshop Series**

Workshop No. 4- Maximizing Resilience to Heavy Precipitation and Flooding

October 1, 2020, 5:30 p.m. to 7 p.m.

Closed Caption Transcript (edited)

*Below you will find a slightly edited version of the live closed caption transcript that was taken during the Climate Action Plan virtual public workshop held via Zoom on October 1, 2020, 5:30 p.m. to 7 p.m. Closed captioning services were provided by a third party vendor, and the unedited transcript provided to the state was modified for readability by DNREC staff. Due to the nature of live captions, there may be misspellings, missed or miscaptions or other errors in this transcript. We regret these errors.*

*This transcript was modified to align with the presentation slides presented during the workshop. The slide numbers are indicated before the captions associated with that slide.*

### **BEGIN TRANSCRIPT**

#### **Slide 1**

>> Good evening, everyone. The time is now 5:30 so we're going to go ahead and get started. Welcome to the fourth and final workshop in the Delaware Climate Action Plan virtual public workshop series. Today's workshop we'll look at potential actions the state can take to maximize resilience to heavy precipitation and flooding.

My name is Ian Yue and I will be your facilitator tonight. We're pleased to have you-all here and we look forward to your input and to your questions. This workshop is being recorded, and the recording will be posted to our website at [declimateplan.org](https://declimateplan.org). And a transcript of the workshop. Before we begin we would like to address a few housekeeping items.

#### **Slide 2**

First, if you have any technical issues throughout this evening, throughout the workshop, please send a private message through the chat box.

The message should be directed to all panelists, and someone will be available to assist you. Please only use the chat box for technical assistance. To access the chat box, click the chat box icon at the bottom of your screen. This will open a new chat window on the right side of your screen. Please note that although the window may indicate that the chat box is a group chat,

private replies will not be visible to other participants. To close the chat box, click the Down arrow in the top left corner of the box and select close chat box.

We also have included a URL link to the Zoom help center in the chat box as an additional resource for you.

### **Slide 3**

During this workshop, you will also have the opportunity to ask a question or submit a comment related to the content of this workshop. For any questions or comments that do not have to do with technical support, please use the Q&A box. Again, the Q&A box is only meant for questions or comments related to the content of this workshop. Technical support questions should be directed to the chat box.

To access the Q&A box, click the Q&A icon at the bottom of your screen. After you select the Q&A icon, a new pop up screen will appear where you can submit your question or your comment.

If you are only joining us by phone this evening, first of all, welcome, or are having trouble accessing the Q&A box, you can also e-mail questions throughout this workshop to DE climate plan at Delaware.gov. Because we have over 200 participants registered for this workshop, we may not get to all of your questions. Additionally, answers to some questions may require more information and thus will not be possible to answer live.

However, we will be making note of all of your questions throughout the night, and we'll do our best to answer as many as we can during our live Q&A session at the end of the workshop. Additionally all questions we receive, whether answered or not will be consolidated into a single Q&A document that will be uploaded to the Climate Action Plan website by Friday, October 16th.

Please note that anything that you type into the Q&A box will be viewable to all participants. In order to create a safe and positive experience for all workshop participants we will not accept any hate speech and will be deleted immediately and the responsible participant will be deleted and not allowed to return.

### **Slide 4**

We would also like to give you some tips on using sound on Zoom. If you have any trouble using audio, you can try restarting Zoom or try switching to phone audio. If you would like to switch to phone audio, move your cursor to the bottom on the left where it says audio settings and click the up arrow. On the menu that appears, select switch to phone audio. This will cause a popup

box to appear that looks like the one on the screen, however, please note that this is just an example popup box, so the phone number and meeting information may appear different on your screen. If you have any trouble with this, please send a message to the chat box to all participants -- excuse me, all panelists and we will provide you with assistance.

For those only joining us by phone this evening, just a remind are a recording of this workshop along with a presentation slides and poll results will be made available on our Climate Action Plan, [declimateplan.org](https://declimateplan.org), and can submit comments any time at [declimateplan@delaware.gov](mailto:declimateplan@delaware.gov).

## **Slide 5**

As I mentioned, before, closed captioning is available during this workshop. To view captions click the closed caption button at the bottom of the screen and select show subtitle on the menu that pops up. If you don't see the closed caption icon, click the more button at the bottom of your screen, and select show subtitle.

If the captions are moving too quickly for you, click the closed caption icon and select show full transcript on the menu that pops up. If you need to change the size of the captions, click the closed caption icon and select subtitle settings on the menu that pops up. A slider bar will appear where you can adjust the size of the captions.

## **Slide 6**

Moving into our agenda for the evening, you will see that we have a packed schedule. However, out of respect for your time, we will be ending no later than 7:00 p.m.

We will begin by continuing our brief introduction of this workshop and using the Zoom polling feature to find out who all has joined us today.

Next, we will walk you through an overview of Delaware's Climate Action Plan and take a more in-depth look at heavy precipitation and possible maximizing resilience to it. If you joined us last Thursday or Tuesday for either the workshop on sea level rise or increased temperatures, some of the material may look familiar, such as the overview of the Climate Action Plan. However, the examples on how to maximize resilience are different and there are new actions we're excited to share for your input and feedback.

Finally, we will have a live Q&A session at the end of our workshop where our presenters will answer any questions that have been submitted into our Q&A box throughout the night.

## **Slide 7**

Our workshop this evening has a variety of goals that we hope to accomplish in our short time together. Goal number 1 is to provide an overview of the Climate Action Plan and its development process. Goal number 2 is to communicate how public input has shaped the planning process for the Climate Action Plan. Goal number 3 is to provide an overview of how actions identified for maximizing resilience were created, and our fourth and final goal is gather feedback on which actions to maximizing resilience you as participants would like to see.

## **Slide 8**

This evening we have several DNREC facilitators assisting tonight.

First, Dr. Robert Scarborough is the program manager of the program and has worked on adaptation and serves as scientific expert on the Climate Action Plan coordination team.

Ms. Maggie Pletta is a coastal resiliency planner with the Delaware coastal management program and will be the second presenter this evening. She's the project manager responsible for the part of the Climate Action Plan focused on maximizing resilience.

I've already introduced myself, I'm Ian Yue, and I'm a resiliency planner with DNREC's climate and sustainability section. I will be your facilitator and focusing on greenhouse gas emissions.

Ms. Kristen Thornton is a scientist with the Delaware coastal management program and will be assisting with workshop facilitation.

And finally, Ms. Nicole Marks is a coastal management fellow with the Delaware coastal management program which will be providing technical assistance through the chat box.

## **Slide 9**

Now let's learn a little bit about you. Throughout the evening we'll be checking feedback through the Zoom polling feature, and to get you familiar we're going to do two quick polling questions. These questions, as well as all polls that you'll see throughout the workshop are completely optional. You do not need to answer question you do not wish, however we certainly value your participation.

So our first polling question is, where are you from? The options we have are Delaware, Maryland, New Jersey, Pennsylvania, or other. So, we'll go ahead and get that poll going. So right when you see the poll show up, you can go ahead and select your answer and then click that blue button to submit it. I'll keep the poll open for about 30 seconds and just as a tip for those

getting used to this polling feature because we are going to be using this throughout the night, once you submit a poll answer, you cannot take it back. So, be sure that you select the answer that you intend to submit.

[POLL]

So we'll go ahead and keep this open for about five more seconds. And I'll go ahead and ended poll and share the results. So the large majority of you are from Delaware, welcome, but we also have people joining from Maryland and Pennsylvania, so welcome to you, also.

## **Slide 10**

All right. Our next polling question is this: Why have you joined us tonight, and what type of organization, if any, are you representing? Are you simply joining us tonight as a concerned citizen, are you a representative of state or local government, do you represent nonprofit, perhaps a private business, or some other entity? So we'll go ahead and launch that poll and go ahead and submit your answers.

[POLL]

And I'll leave this open for about 30 seconds. If you are multitasking, come back to your Zoom screen and go ahead and answer this poll. I'll keep it open for about ten more seconds so if you haven't submitted your answer, go ahead and do so. Five, four, three, two, one. And I'll go ahead and end it right now and share the results.

So, it looks like a little more than half of you are concerned citizens, followed by representatives of nonprofits, about a quarter of you, and then we also have about 20% representing state and local governments, though we also have some participants representing private businesses and other entities. So welcome to you-all, and thank you so much for helping us get to know you a little bit more.

I'm now going to turn over the presentation to our first presenter, Dr. Robert Scarborough, who will walk you through the first presentation of this evening. Go ahead and take it away, Bob.

## **Slide 11**

>> Thank you, Ian. Before we get into the topic of Maximizing Resilience to Heavy Precipitation and Flooding, for those of you that did not attend the earlier workshops, I would like to give you a brief overview of the Climate Action Plan, specifically the purpose of its plan and the development.

The Climate Action Plan will outline possible actions that can minimize emission and maximize resilience. We want to minimize carbon dioxide, methane, and industrial refrigerants into our atmosphere and are the primary cause of the changes we are experiencing. You can review the online recording of a previous workshop on mitigation. A link to the web page for the recording will be available soon, if not already. It has been added to the chat box.

The plan will also include how we can maximize our resilience to climate change impacts. This evening, we are going to focus on adaptation to increased precipitation, extreme weather events and flooding.

The biggest thing to understand about the plan is that it will be providing to state agencies and others what are the steps that they can take to prepare the state for climate change.

This is the last workshop in the series, and after reviewing the feedback we receive from these workshops, we will be business drafting the plan and will be made available in the winter of 2021.

## **Slide 12**

Once the plan is released, it will strengthen different sectors to protect the economy, infrastructure, natural resources, human settle and safety. By addressing all aspects-in Delaware, the state is best prepared for higher tele, sea level rise and extreme weather events. To create the plan, we employed multiple methods to guarantee we gather the most information and input.

## **Slide 13**

The plan builds on past efforts to address climate change and sea level rise in Delaware.

In 2010, the sea level Rise Advisory Committee was formed to assess the impacts of sea level rise on Delaware and determine what can be done to address these impacts. Their work resulted in the sea level rise recommendation report and we reviewed recommendations outlined in that report to identify what actions have been implemented and where additional efforts are still needed.

The second guiding document was the 2014 climate framework for Delaware. This document was one of the outcomes of the previous administration's executive order 41 that instructed state agencies to prepare for climate change. The report included discrete actions each of the cabinet agencies could help adapt to climate change. Many of these actions were implemented

but many areas need additional attention, similar to the 2013 sea level rise report, we reviewed the report actions to identify areas for further efforts may still be needed.

Finally, we conducted a literature review of the Climate Action Plan throughout mid-Atlantic and northeast states to identify possible actions that were successful in those states.

Our next step was interviewing various agency experts to understand where they see climate change impacts and possible actions their agencies can take to address them. By conveying the information of the technical experts to agency leadership, we ensured all proposed actions are variable and will address the needs of each agency and their stakeholders.

Similar to the literature review we spoke to other resilience programs to identify successful, implementable actions. Also in the conversations we identified possible actions states could work together to use available resources as efficiently as possible.

Finally, we reviewed peer reviewed articles, documents and other reports on Climate Action Plan impacts and adaptations from other federal and international organizations and included the Delaware impact report of 2014, done by the state office of the climate projections.

Lastly, we engaged stakeholders, residents and visitors through public workshops in March and online feedback forums. This current workshop series is a continuation of these efforts to ensure we are meeting the needs of the public and public and keeping everyone informed.

Now that we have discussed the purpose of the plan and how it's being developed I'll turn you over to Ms. Maggie Pletta who will walk you through the impacts of increased precipitation, flooding and some of the proposed actions the state can take to prepare. Maggie?

## **Slide 14**

>> Thank you, Bob. Before I begin discussing the impacts of increased precipitation this evening, I want to do a quick housekeeping reminder for any participants who may have joined late.

If you have any technical difficulties or questions please use the chat box that can be accessed via chat box button. Send a message to all panelists and someone will assist you.

For any questions or comments, please use the Q&A box that can be accessed via the Q&A button at the bottom of your screen. We will do our best to answer as many questions as possible during the live Q&A session at the end of the workshop. However, as we've had such a great turnout, we may not be able to answer all the questions live. Any submissions to this box will be visible to all participants.

Closed captioning is available and accessed via the closed captioning box at the bottom of your screen.

And finally, if you are joining us via phone this evening, the presentation recording will be uploaded to the website within a week of tonight and throughout the workshop you can submit questions.

Tonight topic is the impact of heavy precipitation and flooding to the state. We've prepared a short video about the impacts so let me go ahead and get that started for you, and we are good to go.

[\[Impacts of Precipitation Changes Video\]](#)

## **VIDEO TRANSCRIPT**

>> Climate change will impact weather patterns in Delaware, with the most notable impacts on precipitation averages and extremes.

Historically Delaware is a wet state with an average of 45 inches of precipitation annually. The 2014 Climate Impact Assessment predicts that Delaware will become wetter over the next century with a 10% increase in average precipitation and an increased frequency of extreme precipitation events.

The most common extreme precipitation events that we experience in Delaware are related to hurricanes and Nor'easters, but extreme events can occur any time and not in coordination with a larger storm system. It is predicted that as the climate changes we will experience these events more frequently, which could impact our homes, businesses, and infrastructure.

Increases in precipitation and extreme weather events will have statewide impacts to human health and safety, agricultural land, infrastructure, and the economy. Some of the impacts from these events, like flooding, will be amplified along the coast when combined with the increased water levels predicted from sea level rise.

During extreme events flooding will not be confined to the coast and will include inland flooding of rivers and streams from runoff, as well as an increase in flash flooding occurrences during the most extreme events, which can be devastating to human safety.

But flooding during these events is not the only concern, extreme weather events bring high winds and storm surge, both impact human health and safety, as well as our homes, businesses, and infrastructure.

Increased precipitation and storm events during the growing season will have wide ranging impacts on agriculture, including a delay in getting crops planted, crops drowning in the field, and delayed harvests. All of which can impact the food supply in Delaware and the region.



Increases in overall moisture from greater precipitation is linked to increased mold production in homes. Mold impacts the respiratory system making individuals sick and aggravating existing respiratory conditions.

The challenges of changing precipitation patterns may sound daunting, but if we work together now to adapt, we ensure a safe, livable, and economically vibrant state.

Join us throughout the Climate Action Plan process in 2020 to make your voice heard and help strengthen the state's response to increased precipitation and extreme weather events.

## **END VIDEO TRANSCRIPT**

### **Slide 15**

>> Okay. So we're going to go ahead and switch back now to our PowerPoint. So as you heard in the video, the state is expected to see an increase in 10% in overall precipitation and increase in intensity in extreme weather events. Before we discuss possible adaptation actions the state could take we're going to dive a little bit deeper into the impacts of heavy precipitation and flooding unless otherwise indicated, impacts indicated here are from the 2014 Delaware Climate Change Impact Assessment.

### **Slide 16**

The first sector we will discuss that we'll see impacts is our agricultural community. According to a University of Delaware study, agriculture adds \$8 billion annually to the Delaware economy, so any disruptions to the sector could have wide-reaching ramifications for the state.

One way that agriculture can be impacted by heavy precipitation and flooding is a reduction to field conditions needed to plant and harvest crops. When heavy precipitation and flooding occurs in the spring, it can delay planting or force producers to operate heavy equipment on wet soils, which can lead to soil compaction. And if there are heavy rains after seed planting occurred, it can wash out seeds or cause soil crusting that can reduce seed emergence. Or if heavy precipitation occurs later in the season, it can inhibit producers from harvesting their crops.

Another way that agriculture can be impacted by heavy precipitation and flooding is reduction in crop and livestock health. When heavy precipitation occurs during the growing season, it can impact crop health in a variety of ways. Directly, it can knock over crops, increase crops susceptibility to root disease, and produce a lock of oxygen in the soil.

Indirectly, crops can be impacted by soil erosion and nutrient loss, which can inhibit healthy plant development, and increase standing water after a flooding event, which can result in increased mosquito populations. An increase in mosquitoes can lead to increase livestock that can stress the animal and reduce their overall fitness, leaving them susceptible to disease and other pests. All the impacts can increase the costs of farming and directly impact producers' profits.

## **Slide 17**

The next section we're going to discuss is human health. One way that human health can be impacted by heavy precipitation and flooding is increase in mold production. Damp and wet conditions in homes and structures damaged by floodwaters can create the ideal conditions for mold growth. Mold can cause respiratory illness and can be particularly dangerous to individuals with pre-existing conditions like asthma. In addition, to possible increases in mold production, there is also the potential for increase instance debts of water-borne pathogens.

During heavy precipitation events, wastewater treatment plans and sewer systems can experience backups or overflows. This can lead to the possible contamination of drinking water with water-borne pathogens can cause illness and severe cases, left untreated death.

Heavy precipitation can impact safety. Extreme weather events may lead to frequent and extensive evacuations especially in coastal areas. This can cause a significant threat to public safety if roadways are inaccessible from storm damage or flooding. Additionally, evacuations associated with extreme weather events like Hurricanes can be costly. According to one study, the losses to tourism, Commerce, and general productivity can exceed \$1 million per coastline.

## **Slide 18**

That brings us to the next sector of infrastructure. Dams, levees and other water-control structures can all sustain damage during heavy precipitation events and can have flooding for homeowners and during extreme weather events they can be damaged or overtopped.

There are a total of 48 dams in Delaware and 42 are owned by the state and many integrated into roadway asks bridges. Heavy precipitation can lead to the dams becoming damaged or overtopped leading to flooding and washouts and increase flooding risk to visitors and residents.

Bridges can also be impacted by heavy precipitation. Many of the roadways and bridges in the state are already susceptible to flooding and increase in volume and velocity of stormwater

runoff can result in rapid erosion and can erode away banks and pavements, underlying structure supports and weakened and washed-out bridges, road, and culverts.

Additionally, if culverts are under sized or damage, they cannot move as efficiently, which can in flooding on the roads. Damage to the infrastructure can impact in human safety and increase cost to repair and rebuild damaged structures.

## **Slide 19**

The next sector that can be impacted are our natural resources. The typical Delaware beach includes a berm, or recreational beach, and dune system to the protection behind it, and it is a dynamic system, meaning it is constantly moving due to wave action, wind and coastal currents.

However, heavy precipitation and extreme weather events can cause massive changes to the beach and the dune system. This may require additional beach replenishment activities to retain and rebuild these areas, which is costly. A lack of necessary resources could result in a loss of tourism revenue from beach visitors, as well as a loss of protection to the communities and businesses.

In addition to our beaches and dunes, our coastal impoundments and rivers could be impacted. Coastal impoundments are wetland have been constructed where Delaware's impoundments along the coast provide feeding, roosting and breeding habitats to a variety of bird species and can be used for mosquitoes control. Over topping of impoundment dikes, can dramatically change the habitat within the impoundment funds in change to water depth and any changes to these systems can result in a loss of useable habitat for the animal species that depend on these impoundments.

Our rivers can also be impacted by heavy precipitation from the erosion of their stream banks and surrounding floodplain due to the increase in volume and velocity in stormwater flow. This erosion can create conditions the animals that live and depend on the river for survival cannot cope with resulting in reduced health and possibly death.

## **Slide 20**

The final resource we're going to discuss this evening, that can be impacted are our state's water resources. Heavy precipitation events can cause increased runoff of sediments and pollutants into the waterways. For areas that rely on water sources for drinking water, which is most of New Castle County, it could require treatment and filtering of water before use and could increase costs for both drinking water providers and the consumer.

The sewer and stormwater systems can be impacted by heavy precipitation events and in some areas municipalities still have combined sewers, which actively collect both stormwater and sewage in one shared system and heavy precipitation events can overflow resulting in the release of untreated human and industrial waste, toxic materials, and debris into waterway, resulting in disease and damage.

Drainage can also be overwhelmed by heavy precipitation. When these systems are overwhelmed, it can result in localized flooding, damage infrastructure and impact human safety.

## **Slide 21**

Now we've covered future precipitation projections and what's at risk, we will now discuss ideas that state can take to adapt now to reduce the impacts of changes in precipitation and extreme weather events.

## **Slide 22**

As Bob mentioned before we reviewed a variety of resources and spoke with a cross-section of experts to identify possible actions that can be taken to help the state adapt. This work led us to come up with seven overarching recommendation categories that each condition multiple actions.

I'm going to go through each proposed recommendation and action with implementation examples. Please note that the implementation examples given here are to demonstrate potential actions agencies might take.

If you joined us for either of the other workshops on maximizing resilience, you will recognize some of the actions, however, the implementation examples have changed to reflect how the action can build resilience to heavy precipitation and flooding

. For each recommendation category there will be a short anonymous poll to gather feedback on which actions you think are the most important for the state to implement, for a total of seven polls. If answering polls is not your thing then feel free to submit comments and feedback into the Q&A box or at [declimateplan.org](https://declimateplan.org). Let's get started.

## Slide 23

The first recommendation category is that state agencies should update planning documents that outline agency actions and the management of resources. When I represent the actions tonight, they are in no particular order, so just keep that in mind.

The first action in this category is to update current natural and agricultural land protection programs to prepare for future climate conditions. An example of how this could be implemented is through the cover crop protecting the soil during precipitation. Farmers often plant what are known as cover crops in their fields to help reduce erosion, improve soil health, enhance water availability and smother weeds. Currently, there are programs to help Farmers with planting and using cover crops, however, there is a need for additional resources and assistance to farmers for the purchasing and planting of these crops. The more farms that have cover crops, the less soil and other nutrients run off into the waterways. This not only helps keep water resources cleaner. It also saves Farmers money on the purchasing and applying of nutrients.

The second action in this category is to create or update asset management plans that incorporate climate change impacts into long-term maintenance, repair and de-commission decisions. An example could be to create cultural resource management plans to incorporate climate change impacts for each of the sites owned by the Division of Historical and Cultural Affairs. Currently, they own 43 sites that preserve the unique cultural heritage of our state. As climate changes the need to adjust management and maintenance of the sites may shift to ensure their continuous survival. By updating plans now, it could help reduce costs of maintaining sites in the future and ensure these important cultural sites are preserved for future generations to enjoy.

The final action in this category is to update emergency response and hazard mitigation plans to incorporate future climate projects. An example of how this could be implemented is update standard operating procedures for emergency response during a flooding event.

## Slide 24

Now that you know a little bit more about the recommendations and the actions we're going to launch our first poll. Just as before, once I launch the poll, a small pop up box is going to appear on your screen. You can make the box larger by pulling the sides to make any of the longer statements into one line, however it won't make the font larger. If you have trouble, please send a message in the chat box and someone will assist you.

Please choose all actions that you think are most important for the state to implement. If there is one particular action you're really jazzed about, feel free to put it into the Q&A box for us. I will go ahead and launch the poll and leave it open for about a minute.

[POLL]

Okay. I see some good responses coming in. And they seem to be slowing down, so we'll give it just a few more seconds to provide us feedback. It seems like the answers have stopped coming in. We've got one more. If you didn't get a chance to tell us your thoughts, please feel free to put it in the Q&A box. About 80% of you in agriculture and land protection programs, and a decent amount for the other actions, as well. So thank you very much for your feedback.

## **Slide 25**

Our next recommendation category is to update and change some of the state's current regulations or policies to incorporate updated data and resource vulnerabilities. Please note the examples given here are to demonstrate potential actions agencies might take.

First action is to update agency policies and guides to incorporate climate change impacts. An example of how this can be implemented is prioritize funding for projects by giving a preference to areas with effective practices for drainage and floodplain management.

The second action is to develop a comprehensive, regulatory plan to protect and restore freshwater and saltwater wetlands for future climate conditions. These areas provide habitat for threatened plant and animal species and are excellent areas for storing floodwaters. When these areas are developed and lost, the flood storage capacity is also lost.

## **Slide 26**

So that was little bit of a short category, but again now that you know a little bit more about it, we'll go ahead and launch the poll. Remember you can choose all actions you think are most important to implement, and since there are only two of them, if there is one you feel more strongly about, feel free to add it into the Q&A box for us below. The poll is open and waiting for your responses.

[POLL]

We're getting some get feedback coming in. We'll leave it open for just a few more moments to make sure everyone has a chance. Okay. It looks like responses have started to slow down and stop, so I'm going to go ahead and end the poll and share the results.

So, it looks like overwhelmingly, about 92% of you support the idea of developing a comprehensive plan to protect and restore wetlands, so thank you very much. I wanted to do a quick reminder if you have any comments or questions, make sure to submit in the Q&A box, but if you have technical problems, use that chat box.

## **Slide 27**

Our next recommendation is to support the monitoring and research of the impacts of climate change and adaptation actions. This work can be used to help guide decisions to ensure resources are used as effectively as possible. The examples given here are to demonstrate potential actions agencies might take.

The first action in the category is to continue and expand research monitoring and modeling of climate impacts to Delaware's natural resources. This could be supporting community science projects to collect data when the impacts of climate change to Delaware's natural resources. An example of a community science project is one that collects data when flooding occurs during a heavy rainfall and how long the floodwaters last. The data could be collected through a smart phone app that anyone can access. By leveraging the eyes and experiences of individuals from across the state, we could increase our knowledge and understanding how surface and groundwater flows after a heavy precipitation event. This information could be used to improve natural resource management decisions.

The next action is to continue exploring how climate change impacts can affect human health and the cost of healthcare. An example implementation action could be continuing to monitor the impacts of storms and Hurricanes and water-borne diseases. By understanding how extreme weather events can impact water-borne illnesses, public health officials may be able to inhibit its spread and provide better treatment to those who may become sick.

The next action is to continue to expand research on the climatic impacts to Delaware's infrastructure and facilities. An implementation example would be to evaluate drainage infrastructure to determine at their current designs if it will be adequate during future heavy precipitation events. Drainage infrastructure includes start water ponds, and stormwater systems which can be over loaded leading to localized flooding. By studying structures now and identifying how they could be updated for the projected extreme weather events can reduce impacts to human safety and costs.

The final section is collaborating with the mid-Atlantic region to continue participating in the mid-Atlantic coastal network on coastal certification research. As the ocean absorbs extra carbon dioxide, along with the secondary factor of nutrient runoff that could increase coastal water acidification. It reduces the availability of calcium carbonate in the water, which clams,

oysters and other species are used to maintain their habitats and working now to impact the PH of all coastal waters to help commercial shellfish operations adapt their practices now to ensure economically variable industry in the future.

## **Slide 28**

So we've gotten to the next poll. Before I launch it I just want to remind you how we're going to be using your feedback. We are going to identify which actions are most supported by the public, and which actions will need additional review. So same as before, I'm going to launch the poll and you can choose all actions you think are most important for the state to implement, but if there is one that you are particularly interested in, please feel free to add it to the Q&A box. We are halfway there. We'll leave it open for a little bit longer.

[POLL]

Okay. Responses are starting to slow down, so it looks like we may be getting to the end, so I'll go ahead and close it. If you didn't get a chance to put your information in the poll, please add it to the Q&A box. Overwhelmingly, it seems like most okays are pretty well supported for expanding research and infrastructure, as well as modeling and researching our natural resources. So thank you-all so very much. Let me go ahead and close that poll and we'll go on to the next recommendation.

## **Slide 29**

Our next recommendation does have the greatest number of actions because it is identifying ways that state agencies can provide port to communities and other stakeholders in the state to adapt to sea level rise and climate change. As well as implementation example are to demonstration potential actions agencies might take.

The first action is to increase grant opportunities for communities for adaptation projects and adjust current grant requirements to prioritize the funding of projects that incorporate climate change impacts and project design implementation. An example could be create funding opportunities for match-free grants to communities to update their water and wastewater infrastructure in preparation of climate change impacts and increased and heavy precipitation and extreme weather events.

The next action is to support programs and initiatives that help front line or environmental justice communities adapt to climate change. One example of how this could be incorporated is by state agencies partnering with community groups and our front line communities to provide



technical assistance and training. Through the power of partnerships, state agencies can learn more about the needs and desires of a community and provide the resources most important and needed to the community to build their resilience.

The next action is to provide outreach training and tools to public agencies and to public and to the government agencies to help them understand and adapt. An example of this is to continue improving and expanding real-time data or infrastructure conditions. This data is already available in many areas for residents and visitors to access and view, however there are still gaps in the system. By continuing to spread and improve data collection and information from flooding, safety risks to residents and visitors could be reduced.

The next action is to assist communities and homeowners prepare for the impacts of flooding and climate change or emergency response plans and safety. An example of this is to practice the execution of communities emergency action plans. The practice would include local government, community members and supporting state agencies to mimic who would be involved during a real emergency. By practicing the plan, it can highlight any additional areas of need, as well as preparing everyone involved and can be implemented more quickly during an extreme weather event.

The next action is to, assist local governments and planning documents and ordinances to make their community more resilience. An example is provide technical information to provide master plans. Community master plans outline where and how growth can occur, which can reduce sprawl and development occurring in flood-flown areas by creating an overarching plan of where the community can and cannot grow could reduce flooding to homeowners, businesses, and communities of the state.

The next action is to assist local governments and water suppliers to identify drinking water and wastewater vulnerabilities and adaptation actions. An example is develop strategies protecting wastewater treatment facilities from flooding. By their very nature wastewater treatment facilities are located along waterways, making them susceptible to flooding. With projected increase of heavy precipitation events, these areas may become more vulnerable to flooding. Flooding can damage facilities and shut down operations leading to costly repairs and back up for consumers. By identifying flooding vulnerabilities, and opportunities to adapt, it could save communities money and reduce service disruptions.

The final action in this action is to provide outreach and tools to the government agencies on the impacts of climate change and human health and safety. An example is to develop resource and trainings on emergency preparedness. Behavioral Emergency preparedness is the provision of mental health, substance abuse, and stress management services to disaster survivors and responders. Preparing healthcare providers on the emotional impacts on flooding and other

natural disasters could increase the likelihood of those impacted receiving the help and care they need sooner.

### **Slide 30**

So that was a large category, so thanks for hanging in there with me. The next ones have a little bit less to absorb. Same as before I'm going to launch the next poll where you can choose all actions you think are most important for the state to implement. Again feel free to leave it -- put a comment in the Q&A box. I'm going to leave this poll open for a little bit longer because it is more actions, and don't forget you can expand the poll box area if you need to make it easier to read.

[POLL]

We're getting some good answers coming in. I'm going to leave it open just a little bit longer to see if we can give everyone a chance. Responses are starting to slow down, but I'm going to leave it open for just a little bit longer to make sure everyone has an opportunity. Okay. It seems that we're not getting any more responses in. If you're getting ready to submit yours, go ahead and submit it now, and then I will go ahead and close the polling in five, four, three, two, one.

Okay. So looking at the results, there is definitely the highest amount of support only by a little bit, is for helping to identify vulnerabilities with water supplies. Then it looks like there is a pretty decent spread across the other actions of support with kind of the grant opportunities for adaptation and help assisting local governments. So thank you-all for your feedback.

Okay and with that, we are halfway through, so if you need to do a little stretch, and you know, move around, feel free, this is your chance.

### **Slide 31**

So, our next category is to outreach to stakeholders and to our communities, and this is to basically provide messages to the public on climate change impacts and adaptations.

The first action is to develop communication tools and resources in both English and alternate languages that educate the public about the impacts of heavy precipitation and flooding. The United States Census Bureau reports between 2014 and 2018, 13% of Delaware's population spoke a different language other than English when at home. This shows a need when agencies are producing communication resources about the impacts of precipitation and extreme weather events, there is a need to provide in languages other than English to ensure all residents of our state are reached.

The next action in this category, is to create targeted communication resources on specific impacts of climate change. An example of this could be create a communication tool kit that agencies can use to educate stakeholders on storm preparedness by creating one tool kit, it can reduce costs by not having to create their own, as well as ensuring the same message is being shared to even. And spreading information about how to prepare for extreme weather could help reduce impacts to human safety.

## **Slide 32**

So kind of a small category, so we'll go ahead and do our next poll. Remember you can choose all actions you think are most important to implement and since there are just two of them, if there is one you feel more strongly about, feel free to let us know in the Q&A box. We'll go ahead and launch the poll.

[POLL]

We're getting some good responses coming in. Responses have started to slow down. I'll give it just a little bit longer for any last minute responses that y'all want to put in. I'm going to close it in five, four, three, two, one.

So it looks like both actions are fairly well supported with just a little bit more for targeted communication resources, kind of that communication tool kit, but there are some votes right now we seem to have enough things going on and no further action is needed. So thank you-all so very much. And we'll move on to the next category.

## **Slide 33**

Our next category concerns updating facility infrastructure design and management plans to account for future extreme weather and flooding impacts. If you've been in any of the other workshops you will recognize these same actions because they can be used to address all three of the large areas of impacts from climate change. There are two general actions, but they do encompass a variety of implementation agencies to prepare for infrastructure to demonstrate possible okays agencies might take.

The first is prepare state facilities for equipment, flooding and other impacts. A simple example is review floodplain maps prior to purchasing property or building a new facility. By checking issues before any decision, the state could save money and resources by not putting structures in areas that are likely to flood during heavy precipitation events.

The second is updating facility guides and standards to make facilities more resistance to climate change impacts to update building design practices and policies to require the additional installation of drainage and precipitation management structures. Although it may cost more up front, in the long-term it could save the state money to prepare buildings for an extreme weather event.

### **Slide 34**

You know what's coming next, we're going to have our next poll. Again choose all actions you think are most important to -- for the state to implement, as well as if there is one you really prefer over the other, please let us know in the Q&A box. I'll go ahead and launch that poll for everyone.

[POLL]

We're getting some results coming in. Okay. Our results are starting to slow so I'll leave it open for just a little bit longer to see if there is anyone still thinking through and deciding which action they want to support. I'll go ahead and close it in five, four, three, two, one.

So it look like there is support for both, although there is a little bit more for updating facility guides and standards, so thank you-all for that.

### **Slide 35**

And we have reached our final recommendation category, and it is reviewing and updating current administrative actions by state agencies.

The first action is to increase state agency capacity to adapt a climate change impacts through staffing, funding, and training. Many of the adaptation actions may need additional resources as the current available resources may not be enough to implement some of the possible actions. Thus, identifying new resource opportunities will be an important piece to maximize resilience in Delaware.

Our next action is act as climate change adaptation leaders through the creation and implementation of Climate Action Plans. Organizations and partnering worthy states. While our state may be small, it provides many advantages including close collaboration between agencies and our communities, and the ability to pilot new projects and ideas to maximize resilience. Through our work we can provide valuable information to other states in the region to help build regional and national resilience for businesses, and residents and infrastructure.

Our next action is develop plans and policies to protect the health and safety of state agency personnel. An example is the training of enforcement officers and specialized response protocols like swift-water rescue extreme weather events many officers support and are the first responders to an incident. By providing specialized training not only are residents and visitors safer, so are our first responders and law enforcement officers.

Finally, improving state's response to disasters, one way is to continue improving interactions between federal, state, and local services. Additionally, it could help improve the state's ability to prepare and bounce back more quickly after know event.

### **Slide 36**

So we have reached our final poll of the evening. Just to remind you that we really appreciate the feedback you're giving. It's going to help us to identify what actions are most supported and which ones need a little bit more review. So I'm going to go ahead and launch the final poll. As before, please choose all actions you think are most important, and if there is one that you really think is more important go ahead and put that in the Q&A box for us.

[POLL]

We've got some excellent feedback coming in right now. Responses are starting so slow. I'll leave it open for a little bit longer. I'm going to go ahead and close it. We have a few more responses coming in. We'll close it in five, four, three, two, one. And if you didn't get a chance to put in your feedback, feel free to put it in the Q&A Box 88% of you on the call tonight want to improve state agency ability to respond to extreme weather events and disasters. There is some support spread out among the others but that seems to be the one that's most important for those on the call this evening.

I want to thank you for participating and providing your valuable feedback to help shape our Delaware maximizes its resilience to heavy precipitation and flooding. At this point I'm going to hand you back over to Ian who will lead you in our next activity.

### **Slide 37**

>> Thank you so much, Maggie. So as you just heard from Maggie's presentation, we at DNREC in coordination with other agencies have identified a number of ways to maximize resilience to heavy precipitation. We also realize we may have missed something.

Due to the large turnout we're unable to have a verbal conversation between the DNREC team, but we still want to hear your ideas, and we are going to gather your ideas on maximizing

resilience to heavy precipitation and flooding. We want to give you about five more minutes to have a dedicated session to brainstorm to put some ideas in the box.

In order to create a safe and positive experience for all workshop participants, we will not tolerate any kind of offensive, or inappropriate language or any kind of hate speech. If any such language is used, it will be deleted and the responsible party will not be allowed back in.

Now we're going to spend the next five minutes collecting your ideas for maximizing resilience to heavy precipitation and flooding play a little background music to get those creative juices flowing and brainstorm. If you haven't already start typing in your ideas into our Q&A box, and I'll check back in with you in just a few minutes.

[Music]

So you'll hear the music slowing down, but don't worry, you still have another two and a half minutes on ideas on how to maximize resilience to heavy precipitation and flooding and we'll check back in a few minutes.

[Music]

We're coming down to our final minute, so if you have any last minute thoughts, go ahead and jot those ideas down in the Q&A box.

[Music]

All right, thank you so much, everyone, for your wonderful ideas and questions. We look forward to reading more in depth at your ideas after the workshop and taking them into consideration for the Climate Action Plan. If you are still typing up your ideas, don't worry. Feel free to keep submitting them into the Q&A box and we'll be sure to capture them all.

## **Slide 38**

So now we are going to enter into the Q&A portion of our workshop where our presenters will answer questions that were submitted into the Q&A box. We may not be able to get to all of your questions. Additionally, some questions may require additional information and this cannot be answered live. However all questions answered tonight or not will be collected and seen and will be consolidating a question and answer document that will be uploaded to our website by October 16th.

Bob and Maggie, if you wouldn't mind joining us in the room, I have our first question here. This is actually a question that referred back to Maggie when you were talking about combined overflow systems and during heavy precipitation events sewer systems can experience backups or overflows. And this person specifically had a question about the fact that they noticed that

there were sewer issues like those that are located in Wilmington and Bob, I'm wondering if you might know -- this person's question was whether there are sewer issues like that in other places in the state.

>> As of a 2016 report, the only other combined sewer system is in the City of Laurel. There are numerous ones up in Pennsylvania, New Jersey, along the Delaware river. Delaware has two and is actively working on sewers. It is a work in progress.

>> Thank you, Bob. And I know I recently talked with DNREC community ombudsman and had mentioned septic systems are also vulnerable to heavy precipitation events and there are certain areas of tactually another question that came in talking about something the state works through, or does that -- working through those issues happen at the county and municipal level?

>> It's a -- I believe it's a county -- they're the ones that regulate the septic systems, but I think the state does support them.

>> And certainly the Climate Action Plan will look at all different impacts of heavy precipitation and flooding. Another question that came in looked at -- or was asking about protecting electrical distribution infrastructure, and what suggested actions or potential actions are looking at in early its of protecting this type of infrastructure. Maggie, I don't know if you want to touch on that a little bit and.

>> Yeah. So it wasn't presented tonight, but we did discuss a little bit on Tuesday, that there are some actions to look at grid resilience and ensuring that, you know, during extreme weather events or during high temperature days when more electricity is needed, we can diversify and make sure the grid is completely where it needs to be. There is also the Energy Assurance Plan in the state that is kind of the plan of what do we do during you know extreme weather events, disasters, how to ensure energy is still occurring. It was updated recently, but they're look at redoing that whole plan completely, really giving a whole overhaul, so that -- and I'm not sure what's going to be considered in that, but that's something that I would keep your eye out for and that, you know, I can -- if you're interested, if you sent a message to our energy program in the division of climate coastal and energy, they would be able to answer that question, as well.

>> Thank you, Maggie. Another question that came in has do with how coastal influences such as sea level rise and heavy precipitation and flooding are all work together specifically as coastal might be helpful, is does the state control development, that happens along the coast, or is it some other entity?

>> I guess I'll take that one unless you want to, Bob.

>> Go ahead.

>> So in the state, we have what's called the plus process, which is the preliminary land use services. I forgot what the S stands for. That reviews any planned actions before they're put in ask they're reviewed by DNREC and other agencies where we all provide feedback and input on whether or not that should be a good plan to do. So we do have that, and also it comes down to any final decisions on where development can occur. Occurs at the local and county level. Delaware is a home-rule state, so that means they have the power to decide building and zoning ordinances and where they can and cannot have growth occur. So this is where, you know, if there are concerns of this, concerned citizens can reach out to their county council, city council, and speak with them. We do offer additional resources to help those communities make those decisions. We have the resilient and sustainable communities league that meets and works to provide technical assistance and information to communities throughout the state. We also have the coastal training program through the Delaware National Estuarine Research Reserve, that provides assistance and training to communities to give them that information and help them change their plans and make the decisions to adapt and decide on where develop can occur. So that's kind of how the state can help and have a hand in it. Is there anything else you wanted to add, Bob?

>> I think you covered on it.

>> Another question came in on the fact many communities may want to support initiatives to maximize resilience to heavy precipitation and may not have the funding available. Are there grants with matching funding or not?

>> There are a couple grant opportunities throughout the state. There is the -- part of the clean water revolving fund, communities can get grants and loans through that program, however the grants do at this time require a match and the loans would need to be paid back. There is also the -- a program through DNREC. I apologize I'm spacing on the name right now, but I'll ensure that we have that for the notes that provides funding for the community improvement projects. That's been -- it can be anything from planting trees, to updating facilities in the park. And through the coastal programs we have the Resilient Community Partnership Grant, and through that program, we provide technical assistance to communities who help them make the plans and update kind of their protocols and it's been very successful. I'm not sure, Bob, if you want to give any more details on that.

>> There is one other thing I want to mention is a project we supported request University of Delaware, policies. If you look up the communities, and funding in the communities, that'll go through the funds if matches are needed or not needed, and application dates and everything is due. That's a very handy date a base that can be used by communities to look at funding.

>> Thank you, Bob and Maggie. The resilient and sustainable communities league is also keen on helping communities find access to funding opportunities, so I don't know if a listening has been



put into the chat box to that association, but that is a great resource for communities looking for funding. We have time for one more question. This person wanted to know whether there are examples of communities or the state having done something to maximize resilience to heavy precipitation and flooding. An example of why it was successful.

>> Well, I can go first, Bob, and I was thinking of the resilience community partnership we did with Slaughter Beach, I believe it was two years ago now, and they had a lot of flooding and access issues to the community as they -- it's only two access roads in and out. With that process, we went to Slaughter Beach and we actually -- we asked them through a series of workshops where they were seeing problems and what their concerns were to update their kind of planning documents for the town. One of the things that came out of that was actually -- the simple enough, but putting signs on the two access roads in to Slaughter Beach, closer to Route 1 have to head down to the next entry point and go in, so I think that's an example, it's a simple fix, but it has been successful in helping community know, you know, if there is flooding and what to do about that. Bob, do you have any examples?

>> We've worked with several communities and beach communities on impervious surface, and lessen the amount of stormwater around dikes around the city and projects helping them deal with storms and coastal flooding. There are projects that other groups have done, and I do believe we are developing a database to highlight a lot of those.

>> Thank you, Maggie and Bob. Unfortunately, we've run out of time for our question and answer session, but want to thank everyone for their great questions. I'm sorry we couldn't answer them all, but as I mentioned, before, we are consolidating all answers into a Q&A document we will be posting to our website [declimateplan.org](https://declimateplan.org).

## **Slide 39**

We just have a couple final remarks, and next steps to share about you all.

The workshop recording for this workshop as well as a closed caption transcript presentation slides, as well as polling results will be available at [declimateplan.org](https://declimateplan.org) and the Climate Action Plan will be available soon after.

Our virtual workshop series has come to a conclusion, however we are still looking for your ideas, so we are collecting feedback on the plan through Friday, October 16th. So please spread the word to family, friends, coworkers, anyone that you are who is not able to take one of these workshops to please go ahead and submit comments and suggestions and feedback on what you heard tonight or on any other of the workshops that we had or on the Climate Action Plan in general.

Feedback can be provided through the interactive survey or on the comment form on our website. More information on how to provide feedback by either of these two methods is at [declimateplan.org](https://declimateplan.org).

Finally, carrying out virtual workshops is something that's new for us, so would be always looking for ways to improve. In the next 24 hours, you'll be receiving a listening to a five-minute questionnaire that'll ask you how you felt this workshop went and what we can do to improve. You can feel free to either fill out the feedback form for this workshop specifically, or for all the workshops you attended if it happens to have been more than one. We hope you will take time to complete this form as we are looking for ways actively improve and feedback from post workshops to improve the later workshops in our workshop series.

### **Slide 40**

So thank you so much for joining us this evening, and for providing us with all of your valuable input, feedback, and questions. Please do keep connected with us on our website, [declimateplan.org](https://declimateplan.org). Please enjoy your evening and we look forward to connecting with you soon. Have a great night. Thank you.

**END TRANSCRIPT**