State of New Jersey
THE PINELANDS COMMISSION
PO BOX 359
NEW LISBON, NJ 08064
(609) 894-7300
www.nj.gov/pinelands

PHILIP D. MURPHY
Governor
SHEILA Y. OLIVER
Lt. Governor

General Information: Info@pinelands.nj.gov
Application Specific Information: AppInfo@pinelands.nj.gov

LAURA E. MATOS
Chair
SUSAN R. GROGAN
Acting Executive Director

MEMORANDUM

To: Members of the Pinelands Climate Committee

From: Susan R. Grogan
Acting Executive Director

Date: July 20, 2022

Subject: Meeting materials

Enclosed please find the agenda for the Committee's upcoming meeting on Friday, July 29, 2022. We have also included the following documents:

- The minutes from the May 27, 2022 Committee meeting;
- Two memoranda from Commissioner Lohbauer, identifying conclusions and recommendations made in the recently issued Local Government Energy Audit reports. The full reports can be accessed through the Commission's website:

  https://njcleanenergy.com/files/file/LGEA/FY22/NJ%20Pinelands/LGEAFinal%20Report-NJPC-Fenwick+Carriage+Barn%20032122.pdf

  https://njcleanenergy.com/files/file/LGEA/FY22/NJ%20Pinelands/LGEA%20Final%20Report-NJPC-RJS%20Center%20032122.pdf

- In preparation for the discussion of the Committee's FY23 work plan and Pinelands Comprehensive Management Plan (CMP) amendments, a copy of the white paper previously submitted by the Pinelands Preservation Alliance. Also enclosed are two slides listing the issues and potential amendments to the CMP's existing solar energy facility regulations previously discussed with the Committee.

The Committee meeting will be conducted in-person and via teleconference. Specific access information will be provided to all Committee members in a separate email. The public will be able to attend the meeting in-person or view and participate in the meeting through the following YouTube link:

www.youtube.com/c/PinelandsCommission

State of New Jersey
THE PINELANDS COMMISSION
PO BOX 359
NEW LISBON, NJ 08064
(609) 894-7300
www.nj.gov/pinelands

PHILIP D. MURPHY
Governor
SHEILA Y. OLIVER
Lt. Governor

General Information: Info@pinelands.nj.gov
Application Specific Information: AppInfo@pinelands.nj.gov

LAURA E. MATOS
Chair
SUSAN R. GROGAN
Acting Executive Director

PINELANDS CLIMATE COMMITTEE MEETING

July 29, 2022
Immediately Following the 9:30 a.m. Policy & Implementation Committee Meeting

This meeting will be held in-person and virtually
Richard J. Sullivan Center for Environmental Policy and Education
Terrence D. Moore Conference Room
15C Springfield Road
New Lisbon, New Jersey
Watch the meeting on the Pinelands Commission's YouTube channel:
www.youtube.com/c/PinelandsCommission
To Provide Public Comment, Please Dial: 1-929-205-6099 Meeting ID: 861 7042 1150

Agenda

1. Call to Order
2. Adoption of the May 27, 2022 Committee meeting minutes
3. Continued discussion and recommendations concerning the Local Government Energy Audit reports
4. Continued discussion of CMP Amendments and the FY2023 Climate Committee work plan
5. Public comment

PINELANDS CLIMATE COMMITTEE MEETING

This meeting was conducted remotely
All participants were present via Zoom conference
The public could view/comment through Pinelands Commission YouTube link:
https://www.youtube.com/c/PinelandsCommission
Meeting ID: 844 3799 7322

May 27, 2022

Immediately following the 9:30 a.m. Policy & Implementation Committee Meeting

MINUTES

MEMBERS IN ATTENDANCE: Chairman Mark Lohbauer, Alan W. Avery, Jr., and Edward Lloyd

MEMBERS ABSENT: Jerome H. Irick

OTHER COMMISSIONERS PRESENT: Chair Laura E. Matos, Theresa Lettman

STAFF PRESENT: Susan R. Grogan, Stacey P. Roth, Charles Horner, Ed Wengrowski, Ernest Deman, Jessica Lynch. Paul Leakan, and Dawn Holgersen. Also present was Janice Venables, with the Governor's Authorities Unit

1. Call to Order

Chairman Lohbauer called the Pinelands Climate Committee meeting to order at 11:33 a.m.

2. Adoption of minutes from the February 25, 2022 Pinelands Climate Committee meeting

Commissioner Lloyd moved the adoption of the minutes of the February 25, 2022 Committee meeting. Commissioner Avery seconded the motion. All voted in favor.

3. Discussion of ongoing Pinelands Commission office initiatives

Local Government Energy Audit

Chairman Lohbauer said he distributed a memo regarding the energy audit of the Commission facilities. He apologized that he failed to add some remarks that he wanted to make as exceptions to the audit report. He said that he will outline them and suggested the Committee can take action on them this morning or at the next meeting.

He said that it is important that the Climate Committee take a stand regarding the audit report. He said the Committee's charge is to review potential climate change in the Pinelands and to mitigate impacts. He said that anything pertaining to energy consumption at the Commission

facilities would have an impact. He also suggested the Personnel and Budget (P&B) Committee review the reports for fiscal impacts.

Commissioner Lloyd expressed disappointment in the reports. He said that it should have included the costs and savings of implementing the suggested actions. He asked if there were anything that could be given to the P&B Committee for evaluation of costs and savings.

Chairman Lohbauer agreed with Commissioner Lloyd's observation and suggested that it is a concern for the P&B Committee. He said that the Climate Committee should focus on mitigation issues and present opinions to the full Commission regarding climate impacts.

Ms. Grogan suggested the Committee identify things to discuss at the next P&B Committee meeting. She said that Jessica Lynch, the Commission's Business Services Manager, will try to gather some financial information to support the discussion.

Chairman Lohbauer described the first exception regarding the recommendation of installing high efficiency air conditioning units for the Richard J. Sullivan (RJS) Center. He said the complex has a bifurcated system for heating and cooling. He suggested the use of a heat pump system for the facility's heating and cooling needs.

He said the next point is the recommendation of installing a heat pump system for heating. He said that instead of considering heating and air conditioning separately, a single system should be used for both heat and air conditioning and relies on electricity that can be derived from a renewable resource rather than fossil fuel.

Chairman Lohbauer said the third exception is with the recommendation not to pursue on-site generation of electricity. He said the report suggests that the facility lacks the capacity for such activity and does not have the kind of demand for electricity that would warrant the expenditure of money on that type of system. He reiterated that the Committee should not be focused on the costs involved and instead consider the appropriate answer about the use of renewable energy on the campus. He suggested that a study be made by a solar energy expert to determine whether a solar photovoltaic system could be installed on-site to generate enough electricity to avoid the purchase of fossil fuel generated electricity.

He said the next exception talks about combined heat and power (CHP). He said that the CHP system is one that involves burning fuel on-site to generate electricity and heat. He said the report does not recommend the use of a CHP system. He said that the Committee should make a comment to recommend against the consideration of a CHP system as they consume fossil fuel or wood fuel for operation, and that is contrary to the Committee's mission. He said since it was an option that was researched, it may be revisited, and it would be wise for the Committee to recommend against it.

Chairman Lohbauer said the fifth exception pertains to the energy purchasing and procurement strategies for the RJS Center. He said the recommendation is to examine other possible sources other than the standard utility to see if electricity could be purchased at a lower cost. He said that the Commission should investigate this if the facility is unable to generate its own renewable energy on-site. He said that the focus should be on options for electricity that is supplied from a renewable energy source, not on the lowest cost.

He said that the sixth exception is regarding the recommendation to review retail natural gas supply options for the RJS Center to find a supplier at a lower cost. He said the Commission should eliminate systems that are fueled by natural gas and replace them with electric powered alternative systems.

Chairman Lohbauer said the final exception is with the recommendation to install high efficiency air conditioning units in Fenwick Manor and other outbuildings. He said he also recommends the use of a heat pump system, as he outlined for the RJS Center.

Commissioner Lloyd said that he agrees that the Committee's focus should be on the climate perspective of these recommendations. He said, while there is a benefit to climate-friendly energy solutions, he is uncertain whether they could all be done within the constraints of a small agency such as the Commission.

Chairman Lohbauer suggested a deeper analysis from an expert that would not just focus on the costs of the activities. He stated again that cost is not a priority for this Committee. He suggested that the advice the Committee gives to the full Commission should only be on the climate impacts of the activities. He said the Commission would decide based on all factors.

He suggested that, because the reports call for conservation of energy use, which has a net benefit to the climate, the Committee should endorse the reports with exceptions.

Commissioner Lloyd inquired as to when economics will be considered in the process. Chairman Lohbauer replied that it should be debated at the Commission level, in front of the public.

Chairman Lohbauer said that the Commission should not refuse to look at renewable energy because of its economics. He said the issue is how to reduce the Commission's carbon footprint.

Commissioner Avery suggested that the audit report is a merely starting point . He mentioned that the RJS Center, dedicated in 2001, has systems that are going to be due for major changes or replacement. He said that the Committee should make sure that it is going down the path to promote and budget for more climate-conscious items instead of similar replacements.

He said there are energy consultants that would look at what opportunities there are for solar energy and its costs. He cautioned that a consultant should be found that will start from an efficiency perspective. He explained that his opinion is based on his experience with an energy audit that was performed for the Ocean County administrative buildings.

Chairman Lohbauer said that he understands the limitations the Commission may have to implement changes. He commented that it would make sense for the Committee to state climate-oriented goals when evaluating these kinds of policy issues. He said that things may not be resolved quickly, but as Commissioner Avery mentioned, it needs to be kept in mind for long-range planning for replacing systems. He said that the P&B Committee can help determine what can be practically achieved. Commissioner Lloyd concurred.

Ms. Grogan said staff will gather information for a long-range plan while being mindful of budget issues. She suggested the Commission might want to consider setting up a special reserve account for climate-related improvements.

She said that while she understands the disappointment with the audit reports, it was a necessary step not only to identify possibilities but also to make the Commission eligible for grants and loans to help offset the costs. She also said that Ms. Lynch is working to get more information as to what the Commission could be eligible for.

Chairman Lohbauer mentioned that his revised memo, with the added exceptions, was provided to Ms. Grogan. He suggested to have the memo circulated to Committee members and to discuss it again at the next meeting.

In response to Commissioner Lloyd's question regarding availability of funding for state agencies, Ms. Grogan said that staff were advised that funding may be available but has not yet received any details.

Ms. Grogan said that the next Committee meeting is in July. She also said that the next P&B Committee meeting is in June. She said that there will be opportunities to discuss the matter further during the budget process. She said the budget is expected to be presented to the full Commission at the September meeting.

Chairman Lohbauer again suggested the discussion be deferred to the July meeting. He stressed the importance of the Committee's making a recommendation to the full Commission regarding the audit report from a climate perspective.

Chairman Lohbauer mentioned his first point in the revised memo being a recommendation for the Commission to do a study, using an appropriate expert, to determine how the Commission could develop renewable power on-site.

His second recommendation is to install an on-site power storage system to allow for times when generation is inadequate to meet demand, in lieu of an emergency generator which are generally powered by fossil fuels.

He said his third recommendation is to convert separate space heating and air conditioning to a single heat pump system to eliminate the use of fossil fuels for heating and cooling.

Chairman Lohbauer said his fourth recommendation is to convert the water heater to an electric system to again eliminate the use of fossil fuels.

He said his fifth recommendation is to install an electric vehicle charging station to serve the public as well as to charge any electric Commission vehicles that may be acquired.

He said his final recommendation is to purchase electric vehicles when replacing Commission vehicles.

<u>Electric vehicle charging station and vehicle purchasing</u>

Ms. Lynch delivered a presentation on installing an electric vehicle charging station and purchasing electric vehicles (*attached to these minutes*).

Ms. Lynch said the Commission currently owns five late-model gasoline vehicles. She reminded the Committee that the vehicles are not part of the state fleet and that the Commission is independently responsible for insuring and maintaining the vehicles.

She said that the vehicles are primarily used for field work by the Science and Regulatory Programs departments. She said they are also used for errands and transportation to meetings.

In response to Commissioner Lloyd's question about the Toyota Prius, Ms. Grogan indicated that the vehicle is not appropriate for field use. With the increase in remote meetings, the Prius is rarely used. .

Ms. Grogan suggested that, since the Prius is underutilized, it should be sold and the Commission should purchase two new field use vehicles. She said that they would likely be pickups or sport utility vehicles (SUVs). She mentioned that in recent years, staff have used their own vehicles and received a mileage reimbursement. She said that the Commission would not want staff to put significant mileage on their vehicles; hence, the recommendation for purchase of additional vehicles.

Ms. Lynch listed the points to consider when deciding whether to purchase an electric or hybrid vehicle.

She said the first is installation of a charging station on-site. Next, she said the length of time for the vehicles to charge. She also mentioned the availability and location of charging stations in the field.

She said the next point is what level of charging station would be needed or available. She said another point being how long it would take for a vehicle to charge while in the field. She mentioned the question of staff needing to take the vehicle home.

She said another point is what vehicles would be available through State Contract. She mentioned the necessity of certain vehicle ground clearance for field use. Lastly, she stated the point of the possibility of the vehicles on State Contract not meeting the Commission's needs.

Ms. Lynch said that charging stations are great for the environment. She said that grants are available to offset a small portion of the cost. She mentioned that it was included in the Fiscal Year 2022 budget. She also said that a charging station would provide a service to the visiting public. She detailed the disadvantages of the charging station with the daily responsibility for charging the Commission vehicles and the consequences if the vehicles are not fully charged. She also mentioned the possible issue of monitoring and establishing priority for the Commission's use of the charging station before the public, and a payment structure for the public to pay for the use.

She explained the types of charging stations. She said that the level one can charge two to three miles per hour, level two can charge 10-20 miles per hour, and the DC fast charging that can charge 60-80 miles in 20 minutes. She said that there are currently three, level two charging stations within a 15-mile radius of the Commission offices. She mentioned the lack of charging stations in the Pinelands Area.

She said that staff often need to take Commission vehicles home in the evening in order to go directly into the field the next day. She said the Commission cannot pay to install a charging station at every employee's residence. Also, she said the Commission cannot assume the liability for electrical issues that may arise from the use of a charging outlet at an employee's residence.

In response to Commissioner Lloyd's question about home charging stations, Ms. Grogan said that she is not aware of anyone on the staff that has a charging station at home.

Chairman Lohbauer mentioned that the range of electric vehicles that could be purchased will likely exceed 200 miles, as much as 300 miles per charge. He said that would mean not having to charge every day.

Ms. Grogan said that the Commission would not be using the vehicles in a way that the typical commuter does, meaning they will be used to drive significant distances in the field, so it will add up quickly. She expressed concern with sending staff further away and not having an available charging station.

Ms. Lynch said that the fully electric vehicles currently available on state contract are the 2022 Nissan Leaf, which has five inches of ground clearance; the 2022 Chevrolet Volt, which also has five inches of ground clearance; and the 2021 Ford Mustang Mach-E, which also has five inches of ground clearance. She said that hybrid vehicles currently available are the 2022 Ford Escape, which has 7.3 inches of ground clearance and a 2021 Toyota Highlander, which has eight inches of ground clearance. She said that ideally, the Commission's field vehicles need nine inches of ground clearance.

She said that the state contract currently does not have a vehicle that would meet the Commission's needs. She said if there is an immediate need for a new vehicle, a request for quote can be created with the specifics that would be needed for the vehicle. She mentioned that the 2022 Jeep Sahara is a hybrid vehicle that would meet the Commission's needs. She said that a base model of this vehicle would cost $53,000.

Ms. Grogan said the Commission will continue to explore various vehicle options and prices to see what will be available..

She also suggested the possibility of replacing the Commission's gas-powered lawnmower and other landscaping tools with electric options.

Chairman Lohbauer commented that Ford has an all-electric version of its F-150 pickup truck. He also mentioned that Rivian is a company that makes electric pickup trucks.

Commissioner Avery commented that some of the all-wheel drive vehicles that are all-electric tend to be high-end models. He mentioned Range Rover and Mercedes as examples.

<u>Rain garden design and installation</u>

Mr. Leakan said that the Commission entered into an agreement to work with the Rutgers Cooperative Extension for the design and installation of the rain garden, which will be placed in front of the RJS Center. He described the rain garden as a shallow depression filled with plants that captures stormwater.

He said a landscape architect provided the Commission with several designs, including the engineering and planting plans for plant types and placement.

He also said that the goal is to have 100% native Pinelands plants, which is a challenge. He also mentioned that the Commission is working with as many as eight different nurseries to obtain all of the necessary plants.

Mr. Leakan said that the intent is to have the project completed in June. He said it will take approximately three days to complete. He said the Commission will install a wayside panel to describe the rain garden and the plants it contains. He also said a webpage will be created outlining the benefits of rain gardens and will include the plans for the rain garden on-site and a list of native Pinelands plants.

4. Update on state initiatives

NJDEP's Protecting Against Climate Threats (PACT) rulemaking efforts

Ms. Grogan started by saying there are few updates. She said there were plans to meet with the New Jersey Department of Environmental Protection (NJDEP) to discuss their rulemaking process and progress on their protecting against climate threats effort. She said that meeting was rescheduled to June. She said the intent of the meeting is to avoid any potential conflict with Pinelands rules. She said that there should be an update available for the July meeting.

Forest Stewardship Task Force

Ms. Grogan said that Charles Horner, the Commission's Director of Regulatory Programs, provided an update at the Commission meeting regarding the Forest Stewardship Task Force. She said that the Commission has not received any further information. She said that it still not clear what the Commission's role may be in the Task Force.

2021 Solar Act and BPU Competitive Solar Incentive (CSI) Program

Ms. Grogan made note of the State's Solar Act with a highlighted section of interest. She said that it mentions the Commission and several of the management areas are specifically mentioned in that legislation. She said that the New Jersey Department of Agriculture (NJDA), NJDEP, and the Board of Public Utilities (BPU) are working together to draft the proposal.

She said that Stacey Roth, the Commission's Chief of Legal and Legislative Affairs, and Steven Simone, the Commission's Planning Specialist are following along with the process.

In response to a question from Chairman Lohbauer, Ms. Grogan clarified that the Commission received notice like every other stakeholder. She said the Commission was not invited to participate in a direct way. She said that staff attended the stakeholder meeting.

Ms. Roth said the Solar Act of 2021 was signed on July 9, 2021. She said that it is legislation designed to incentivize production of solar generation facilities in the State and directed the BPU to double the growth of existing solar power and solar programs by incentivizing up to 3,750 megawatts of generation by 2026. She said the goal is to add 750 megawatts every year.

She said that the BPU issued an order as of July 28, 2021, to implement these incentive programs, called the Successor Solar Incentive program (SUSI). She said the program consists of two tracks. She said one is administratively determined incentives that are designed for

community solar and net leader solar that produces less than five megawatts and that provides fixed incentives through renewable energy credits for every megawatt generated under the program. She said that the Subsection T Facilities program under the old Solar Act ended. She said there is an interim program for those facilities that could have been eligible under the former program.

Ms. Roth said that the straw proposal process began in March for the Competitive Solar Incentives (CSI) program that is being developed to address and incentivize construction of grid supply solar or net metered facilities greater than five megawatts. She said hat NJDEP, BPU, and NJDA are the entities under the Solar Act that are working together to develop the incentive program. She said there was no discussion with the Commission and that act mentions siting requirements but does not directly involve the underlying siting of the facilities.

She said the Act incentivizes the construction of these facilities through a credit program. She said that the credit structure has yet to be determined. She said a large portion of the current discussion is about the siting criteria.

She said page seven of the bill includes a list of siting criteria. Facilities may not be sited in the Preservation Area, as it is delineated in the Pinelands Protection Act. She mentioned that the Pinelands Preservation Area District in the Pinelands Comprehensive Management Plan (CMP) is different from the Preservation Area. She said when the CMP was being determined, there was a realization that there were villages and the military bases (now the Joint Base MDL). She said these areas were ultimately designated as other management areas. She said that due to the way the siting criteria were delineated in the Act, and subsequently transferred to the development of the CSI program, there is an issue as to whether incentives can be received in this area.

Ms. Roth said there is a waiver process within the Act, which is also in the proposed stakeholder document. She said that it excludes the Forest Area, wetlands, a certain percentage of agricultural lands, , Green Acres lands, and the Highlands Preservation Area. She said that if it can be demonstrated that a facility is going to be constructed on a former landfill or an existing impervious cover, an application can be submitted to BPU for a waiver of the siting criteria in order to be eligible for the incentive.

She said the comment period is closing at the end of the month and the BPU is still in the stakeholder process. She said that two virtual meetings were held on April 7th and 8th. She said the first meeting was a general overview of how the CSI program is envisioned to function. She said the second meeting was a discussion of siting criteria pertaining to agricultural land because there will be a limit of 2.5% that can be used for those facilities.

She said there may be issues regarding the program's consistency with the CMP. She said that the Commission is not part of the waiver process; therefore, staff has asked BPU to make clear in its rules that it does not have the authority to waive the CMP or to make determinations of compliance. She said the Commission will need to be inserted into the process in some way, such as in the Subsection T process where applicants had to obtain a letter from the Commission indicating whether a proposed facility could be sited in a way that is consistent with the CMP.

Ms. Roth said that regulations themselves are not currently available. She said the stakeholder proposal is available on the NJDEP and BPU websites. She said the proposal does not give many details in terms of how the program is going to be constructed. She said the discusses more about the act itself and how to form it into their proposal.

She said the next step would be for BPU staff to make a recommendation for a draft rule proposal. She said it is not certain whether another stakeholder process will occur.

Ms. Grogan said that the Commission will be preparing written comments to remind the entities of the rules in the CMP and to clarify terminology of some areas.

In response to Chairman Lohbauer's question as to whether the CMP rules could be waived, Ms. Roth clarified that the waiver that is mentioned is to allow a facility to receive incentives. She said it is not a replacement for land use and development standards. She said that with the Subsection T rules, NJDEP realized that there needs to be a consistency determination from the Commission.

Ms. Grogan said there was no formal role for the Commission during the first round of NJDEP's Community Solar pilot program. However, during the second round, after a Commission staff meeting with BPU, it was determined that it was necessary for the Commission to have input on projects in the Pinelands Area. This became part of the application process.

5. Discussion of FY2023 Climate Committee work plan

Ms. Grogan said there are six meetings for the upcoming fiscal year, and they are scheduled to be held every other month. She noted the goal to have the Committee focus on CMP amendments and to provide staff with specific amendments or topics to investigate and write language for the Committee to consider and recommend to the Policy & Implementation (P&I) Committee.

<u>Resilience Action Plan for the Interagency Council on Climate Change</u>

Ed Wengrowski, the Commission's Environmental Technologies Coordinator, reminded the Committee that the Commission was invited to participate in the New Jersey Interagency Council on Climate Resilience (NJIAC). He said the member agencies have recently been tasked with completing what is being called Resilience Action Plans (RAPs). He said the RAPs will be due from the agencies in October 2023. He said the Commission will be asked to incorporate in the action plan means by which the agency will address climate resilience in policies, programs, and decision making to be consistent with the 2021 New Jersey Climate Change Resiliency Strategy.

He said the NJIAC will provide a template through which the plan will be developed and will have a glossary to ensure uniformity among the agencies. He indicated there are at least 22 member agencies participating in the Council. He said the agencies have been split into several working groups. He said the Commission is assigned to the environmental systems and land use group, as well as NJDEP, NJDA, Department of State, Highlands Council, and the New Jersey Sports and Exposition Authority.

Mr. Wengrowski said the first meeting of the group will be held on June 2nd. He mentioned that there is no specific schedule other than the due date for the plan to be finalized. He said there will also be development of an interim resilience action plan based upon the discussion within the group.

He said the NJIAC will hold stakeholder webinars to include the public. He said the Council will share the template that will be used to develop the plans and allow for public feedback. He said after the feedback and interim plan, a draft final plan will be created and circulated among the Council, with the project being completed by October 2023.

He said that the Commission will be asked to share recommendations with the other agencies in the group, as they will do the same. He said staff will be looking to the Committee for feedback and guidance. He said there will be updates at the July meeting.

Chairman Lohbauer asked if those meetings will be open to the public. Mr. Wengrowski replied that the meetings will not be open to the public. He said there will be opportunities for public involvement through stakeholder meetings and webinars.

CMP Amendments

Ms. Grogan noted that the discussion of CMP amendments will be on every meeting agenda. She said the Committee needs to be specific about what the staff will be asked to prepare in terms of amending the CMP. She clarified that there should be specific regulatory standards that could be adopted as part of the CMP and be applied to new development applications.

She said that many topics have been presented over the last year. She said the potential solar amendments were provided as an example of topics that require specific guidance. She said she also included the Pinelands Preservation Alliance (PPA) white paper as a reminder of public involvement. She recommended that the white paper be reviewed and for feedback to be provided in the future on how to proceed with amendments.

Chairman Lohbauer offered to work on discussion topics for the next meeting.

Commissioner Lloyd commented that he read the PPA's recommendations and thought they were phenomenal. He said he will look at it again with a climate lens in mind. He said the committee should go back and look at all the recommendations that have been received from a climate perspective.

Ms. Grogan mentioned that several items noted in the PPA white paper have been completed (the stormwater rules) or are nearing completion (the Kirkwood-Cohansey rules). She said there are other items where action has been taken but which aren't necessarily CMP amendments. She said that some other items could lead to amendments and recommended the Committee discuss how to proceed.

6. Public Comment

Rhyan Grech, from the Pinelands Preservation Alliance, said the PPA is pleased with the stormwater amendments and the Kirkwood-Cohansey rules in process. She mentioned that there are other high priority concerns, besides what is in the white paper. She expressed concern

regarding procedures and criteria around threatened and endangered species surveys. She said that vulnerable species are going to become increasingly vulnerable as climate change impacts their habitats. She recommended that the Commission change the way it addresses threatened and endangered species surveys by hiring consultants rather than accepting the results of surveys paid for and submitted by developers. This would ensure more independent findings. She also recommended the Commission provide rigorous survey methodologies and take advantage of the extensive expertise of the science staff in developing them.

Ms. Grech said PPA advocates requiring solar on new development. She said the Committee has spent a lot of time discussing what the Commission's role should be in the terms of promoting renewable energy in the Pinelands. She said it would eliminate the false opposition between promoting renewable energy and protecting the environment. She said the way to do that is to take advantage of the impervious cover that is already existing in the Pinelands and that which would come from new development. She said the way to efficiently do both would be to require solar for new development.

Commissioner Avery recommended this Committee, or the P&I Committee, take a subject, preferably solar, that is directly related to the Commission goals, and work through all the nuances of solar installation, connection to the grid, cutting down trees, and what management areas do not allow for it. He said that it would be a recommendation for next year's work plan. Chairman Lohbauer concurred.

Ms. Grech said that PPA recommends the Committee hold its meetings monthly, given the scope of work and the urgency of the issues.

Chairman Lohbauer commented that while he agrees with the idea, the staff need time to put things together. He said he will keep with the Executive Director's recommendation for bi-monthly meetings but will keep the recommendation in mind.

There being no further discussion, Commission Chair Matos moved the closing of the meeting. Commissioner Avery seconded the motion. The meeting concluded at 1:15 p.m.

Certified as true and correct

Dawn Holgersen
Office Assistant
July 19, 2022

Commission Vehicles

Planning for the future.

HYBRID

1

The Commission currently has 5 late model gasoline engine vehicles:

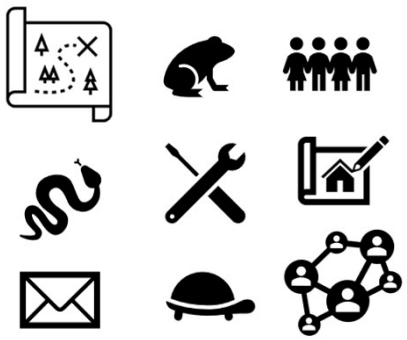
- Dodge Dakota Pickup
- Ford Ranger Pickup
- Toyota Prius
- Jeep Wrangler (2 door)
- Jeep Wrangler (4door)

The Commission is not part of the State Vehicle Fleet.

2

What the vehicles are used for:

- Field Work – Science & Regulatory Programs
- Facility Maintenance
- In-Person Meetings
- Mail pickup/supply pickup
- Outreach



3

FY23 Recommendations

- Sell Toyota Prius
- Purchase 2 new field vehicles (SUVs or Pickups) for use by Science and Regulatory Programs staff

4

Electric Vehicle (EV) or HYBRID

Points to consider:

- Installation of Charging Station at the Commission.
- How are all Electric Vehicles going to be charging?
- Location of Charging Stations while in the Field.
- What level Charging Station is needed or available?
- How long will it take to charge when in the field?
- What if staff need to take an Electric Vehicle home?
- What's available on State Contract?
- Vehicle ground clearance for Field Use.
- What if State Contract doesn't meet the Commission's needs?

5

Installation of Charging Station at the Commission.

Pros:

- Great for the Environment.
- Grants are available to offset a small portion of the cost.
- Included in the Commission's FY22 Budget.
- Provides service to the visiting public.

Cons:

- Daily responsibility for charging Commission vehicles
- Consequences if vehicles aren't fully charged
- Monitoring and establishing priorities for use of Charging Station (Commission or public vehicles)
- Payment structure/mechanism

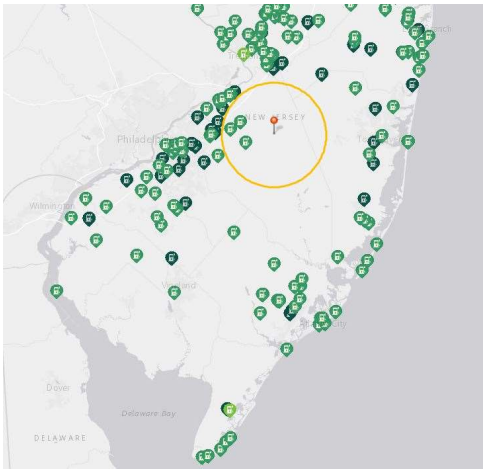
6

Off-site Public Charging Stations

Charging Levels:

- **Level 1:** These charging stations provide charging through 120 volt (V) AC dedicated circuit breakers. Based on battery type and vehicle, Level 1 charging adds about 2 to 5 miles of range to a plug-in electric vehicle (PEV) per hour.
- **Level 2:** These charging stations provide charging through 240V or 208V AC dedicated circuits of 20 to 100 amps, depending on the charging station requirements. Based on the battery type, charger configuration, and circuit capacity, Level 2 charging adds about 10 to 20 miles of range to a PEV per hour of charging time.
- **DC Fast Charging:** These charging stations provide charging through a 480V or 208V AC dedicated circuit. DCFC enable rapid charging and is often located along heavy traffic corridors and at public charging locations Based on battery type and vehicle, DCFC can add about 60-80 miles of range to a PEV in 20 minutes of charging time.

https://nj.gov/dep/drivegreen/dg-charging.html



https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=e41aa50dd8cd45faba8641b6be6097b1

7

Can staff take an Electric Vehicle home?

Staff often need take Commission vehicles home in the evening in order to go directly to site inspections or field work the next morning

- The Commission cannot pay to install a charging station at an employee's residence.
- The Commission cannot assume the liability of any possible electrical issues stemming from use of a charging outlet at an employee's residence.

8

What's available on State Contract and it's ground clearance for Field use.

Electric Vehicles:

2022 Nissan Leaf
Ground Clearance: 5 inches

2022 Chevrolet Bolt
Ground Clearance: 5 inches

2021 Ford Mustang Mach E
Ground Clearance: 5 inches

HYBRIDS:

2022 Ford Escape SE Hybrid
Ground Clearance: 7.3 inches

2021 Toyota Highlander Hybrid
Ground Clearance: 8 inches

9

What if State Contract doesn't meet the Commission's needs?

- Survey the Staff
- Create an RFQ (Request for Quote) that includes the specific needs of a future Commission Vehicle.

2022 Jeep Sahara 4xe
Ground Clearance: 9.7 inches

10

NJ Pinelands Commission
Climate Committee review of the TRC Energy Audit Reports

TO: Susan Grogan, Acting Executive Director
NJ Pinelands Commission

FROM: Mark Lohbauer, Chairman of the Pinelands Climate Committee

RE: Review of the Local Government Review Energy Audit by the Climate Committee At its meeting of May 27, 2022

DATE: May 18, 2022

On March 21, 2022, TRC, private energy analysts working for the NJ BPU Clean Energy Program, delivered two reports to the NJ Pinelands Commission: one on the Richard J. Sullivan Center, and the other on the Fenwick Manor, Carriage House, and Barn buildings at our complex. The reports summarized the energy audits that TRC performed at our complex. They evaluated current energy use, and recommended energy-saving measures for the Commission to undertake. The goal of the study was "… to identify potential energy efficiency opportunities and help prioritize specific measures for implementation." A further purpose of the Energy Audit was to help the Pinelands Commission reduce costs through these energy savings.

While these are laudable goals that are consistent with Commission policy, they are not specifically reflective of the goal of the Climate Committee, which is to "… review the potential effects of climate change in the Pinelands and consider measures to mitigate impacts." Mitigation of the climate crisis requires reduction of the production of greenhouse gases, particularly CO2 emissions and methane releases which are the by-products of fossil fuel combustion. As energy use is at the core of the Climate Committee's interests regarding the operations of the Pinelands Commission, it is appropriate that the Committee should review the reports which will inform the Commission's policy on energy use.

There are two steps that that Climate Committee should undertake in its review of theses Energy Audit reports:

1. Evaluate the conclusions of the Sullivan Center report and Fenwick Manor report to determine their consistency with climate change mitigation goals.
2. Determine whether other climate mitigation-oriented policies related to the Commission's use of energy might also be recommended in addition to the report recommendations.

Note: while the reports do address cost savings and costs of installation of energy-saving features, those points need not be addressed by the Climate Committee but should instead be reserved for the Personnel and Budget Committee to consider.

Here is a summary of the conclusions of each report, with conclusions that should be discussed in detail by the Committee highlighted **in bold type**. These are followed by a section on climate mitigation-oriented energy use policies to consider.

A. SULLIVAN CENTER REPORT

1. Energy conservation measures (detailed in Appendix A-1):
    a. Install LED fixtures
    b. Retrofit fixtures with LED lamps
    c. Install occupancy sensor lighting controls.
    d. Install high/low lighting controls.
    e. Install high efficiency air conditioning units

    "*We evaluated replacing standard efficiency packaged air conditioning units with high efficiency packaged air conditioning units. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average cooling and heating load, and the estimated annual operating hours.*

    Affected Units: *exterior split-systems and the server room mini-split AC unit. "*

    f. Install high efficiency heat pumps

    "*We evaluated replacing standard efficiency heat pumps with high efficiency heat pumps. A higher EER or SEER rating indicates a more efficient cooling system, and a higher HSPF rating indicates more efficient heating mode. The magnitude of energy savings for this measure depends on the relative efficiency of the older unit versus the new high efficiency unit, the average heating and cooling loads, and the estimated annual operating hours.*

    Affected Units: *mini-split HP unit in storage room 013."*

    g. Install pipe insulation
    h. Install low-flow DHW devices
2. Energy efficient best practices:
    a. Energy tracking with ENERGY STAR Portfolio Manager
    b. Weatherization
    c. Doors and windows
    d. Lighting maintenance
    e. Lighting controls
    f. Motor maintenance
    g. Fans to reduce cooling load
    h. AC system evaporator/condenser coil cleaning
    i. HVAC filter cleaning and replacement
    j. Ductwork maintenance
    k. Furnace maintenance
    l. Label HVAC equipment
    m. Optimize HVAC equipment schedules

n. Water heater maintenance
o. Water conservation
p. Procurement strategies

3. **On-site generation**
    a. **Solar photovoltaic:**

"A preliminary screening was conducted based on the facility's electric demand, size and location of free area, and shading elements. A solar PV array was evaluated for the facility's parking lot to avoid disrupting the historic buildings. However, due to the facility's low electric demand along with the amount of shading in the area, the preliminary screening shows that the facility has no potential for installing a PV array.

This facility does not appear to meet the minimum criteria for a cost-effective solar PV installation. To be cost-effective, a solar PV array needs certain minimum criteria, such as sufficient and sustained electric demand and sufficient flat or south-facing rooftop or other unshaded space on which to place the PV panels."

b. Combined heat and power

"Combined heat and power (CHP) generates electricity at the facility and puts waste heat energy to good use. Common types of CHP systems are reciprocating engines, microturbines, fuel cells, backpressure steam turbines, and (at large facilities) gas turbines. …

A preliminary screening based on heating and electrical demand, siting, and interconnection shows that the facility has no potential for installing a cost-effective CHP system.

Based on a preliminary analysis, the facility does not appear to meet the minimum requirements for a cost-effective CHP installation. The lack of gas service, low or infrequent thermal load, and lack of space for siting the equipment are the most significant factors contributing to the lack of CHP potential."

4. Project funding and incentives
    a. Utility energy efficiency programs
5. NJ Clean Energy Programs
    a. Large energy users
    b. Combined heat and power
    c. Successor solar incentive program
    d. Energy savings improvement program
6. Project development
7. **Energy purchasing and procurement strategies**

a. Retail electric supply options

"*Energy deregulation in New Jersey has increased energy buyers' options by separating the function of electricity distribution from that of electricity supply. Though you may choose a different company from which to buy your electric power, responsibility for your facility's interconnection to the grid and repair to local power distribution will still reside with the traditional utility company serving your region.*

If your facility is not purchasing electricity from a third-party supplier, consider shopping for a reduced rate from third-party electric suppliers. If your facility already buys electricity from a third-party supplier, review and compare prices at the end of each contract year."

b. Retail natural gas supply options

"*The natural gas market in New Jersey is also deregulated. Most customers that remain with the utility for natural gas service pay rates that are market based and fluctuate monthly. The utility provides basic gas supply service to customers who choose not to buy from a third-party supplier for natural gas commodity.*

A customer's decision about whether to buy natural gas from a retail supplier typically depends on whether a customer prefers budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by signing up for service through a third-party retail natural gas supplier. Many larger natural gas customers may seek the assistance of a professional consultant to assist in their procurement process."

B. FENWICK MANOR & OUT-BUILDINGS *(Only showing conclusions that were distinct from the Sullivan Building report)*

Energy conservation measures

4. Install high efficiency air conditioning units. (Unitary)

"*Replacing the unitary HVAC units has a long payback period and may not be justifiable based simply on energy considerations. However, most of the units are nearing or have reached the end of their normal useful life. Typically, the marginal cost of purchasing a high efficiency unit can be justified by the marginal savings from the improved efficiency. When the split-systems are eventually replaced, consider purchasing equipment that exceeds the minimum efficiency required by building codes."*

ENERGY ISSUES NOT ADDRESSED OR SUPPORTED IN THE REPORTS THAT SHOULD BE CONSIDERED BY THE COMMITTEE

1. Creation of on-site renewable power generation system.

2. Installation of an on-site power storage system to allow the campus to store power for times when generation is inadequate to supply demand. The system should be sized to enable the campus to be self-sufficient, as well as functional during grid power outages.
3. Conversion of separate space heating and air conditioning systems to a single electric heat-pump system to eliminate fossil fuel use. Our current heating system, described by TRC: *"The building heating system consists of seven gas-fired Ruud forced air furnaces, each with an output capacity of 55.8 MBh and an efficiency rating of 92%. Each unit is equipped with a fractional hp supply fan. Original to the building, the units are beyond their typical useful lifespan but were not recommended for replacement as they were observed to be in good condition, well maintained, and relatively efficient. Equipment is controlled by wall-mounted thermostats located throughout the building.*
4. Conversion of water heater to an electric system to eliminate fossil fuel use. Our current 48-gallon water heater was described by TRC: *"Hot water is produced by a 65 MBh gas-fired storage water heater with a 48-gallon capacity. Original to the building, the unit is in good condition. The domestic hot water pipes are partially insulated and the insulation is in good condition."*
5. Installation of an electric vehicle charging station to serve the public and Commission vehicles.
6. Replacement of existing fleet of vehicles with electric vehicles to eliminate fossil fuel use.

White Paper on Climate Change Solutions for the Pinelands of New Jersey

Provided to: New Jersey Pinelands Commission
Provided by: Pinelands Preservation Alliance
Contact: Jaclyn Rhoads, Ph.D., Assistant Executive Director
jaclyn@pinelandsalliance.org

March 2021

Summary

The Pinelands Commission is responsible for protecting the natural resources within the 1.1 million acres of the Pinelands National Reserve. The threats of development to water quality, water supply, plant and animal habitat still exist, but a potentially greater threat looms with climate change. Although more difficult to control and mitigate, it is still within the purview of the Pinelands Commission body to address.

Pinelands Preservation Alliance (PPA) created this white paper to provide suggestions on next steps for addressing climate change. Many of the suggestions are changes that have been pending with the Commission for years such as the recommendations from the Kirkwood Cohansey Aquifer study. Pinelands Preservation Alliance wants to help the Pinelands survive this change, and developed this white paper to document the impacts, potential changes, and opportunities. PPA would like to offer its assistance in further evaluating and implementing these changes.

A summary of our recommendations are as follows:

1. Adopt changes to reflect recommendations in KC Aquifer study.
2. Update stormwater requirements to include redevelopment, monitoring for at least five years, and non-structural requirements.
3. Assist municipalities in revising and adopting Climate Change and Hazard Vulnerability Assessments.
4. Adopt Pinelands Development Credit changes to incentivize more compact and mixed-use development.
5. Update list of Endangered and Threatened Plant Species to include protection of *all* listed plant species of concern.
6. Request DEP implementation of Prescribed Burn Bill.
7. Incorporate Coastal Area Facility Review Act (CAFRA) areas under Pinelands Commission jurisdiction.
8. Adopt no net tree loss.
9. Review Ecological Integrity Assessment and DEP mapping to determine if management area changes are needed to accommodate migration.

Introduction

Earth's climate is the average of all the world's regional climates. Therefore, climate change is defined as a change in the typical or average weather of a region or city as defined by NASA. A change in the climate could be a change in a region's average annual rainfall or a city's average temperature for a given month or season.

According to New Jersey's State Climatologist, New Jersey's climate has changed. New Jersey Department of Environmental Protection (NJ DEP) created a webpage specific to climate change indicators, impacts, and solutions at https://www.nj.gov/dep/climatechange/data.html. The DEP states on this page that:

> During the last century, New Jersey has experienced rising temperatures, increased rainfall, more frequent extreme weather events and rising sea levels. These changes are the result of increasing greenhouse gas emissions in the atmosphere due to human activities such as the burning of fossil fuels (coal, oil, and natural gas), agriculture, and land clearing.
>
> - New Jersey's average annual temperatures have increased by 2.2°F since 1900.
> - Since 1980 New Jersey has begun to experience more rapid warming, with five of the warmest years occurring after 1998.
> - 2012 was the warmest year on record for New Jersey, with an average temperature that was 2.8°F above the 1981-2010 mean.

Globally, sea level rose roughly 8 inches over the past 100 years. Along the coast of New Jersey, sea level has risen an additional 4 to 8 inches during the past 100 years due to subsidence (a sinking of the ground surface due to natural geological processes and/or human influences like removal of groundwater for human use) in the mid-Atlantic region. Total relative sea level rise (the combination of rising seas and subsidence) in New Jersey over the past 100 years is therefore approximately 12 to 16 inches.[1]

In addition, the U.S. National Climate Assessment notes that the Northeast United States has already seen "a greater increase in extreme precipitation than any other region" with a roughly 70 percent increase in intense storms between 1958 and 2010, defined as the heaviest 1 percent of precipitation events.[2] Global Circulation Models (GCMs) are used to assess the potential for climate change globally and in major regions of the world. On average, GCMs indicate that our region of the nation may experience a further increase in the intensity of storms.[3]

---

[1] U.S. Climate Change Science Program (USCCSP) Report. http://downloads.climatescience.gov/sap/usp/usp-prd-all09.pdf

[2] Horton, R., G. Yohe, W. Easterling, R. Kates, M. Ruth, E. Sussman, A. Whelchel, D. Wolfe, and F. Lipschultz. 2014: Ch. 16: Northeast. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 371-395. doi:10.7930/J0SF2T3P. Available from: http://nca2014.globalchange.gov/report/regions/northeast

[3] https://njadapt.rutgers.edu/docman-lister/conference-materials/166-climate-change-adaptation-in-water-supply-sector-final-1/file

On June 30, 2020 the NJ DEP produced a "Scientific Report on Climate Change". Key points that are relevant to the Pinelands include:

1. "Water supplies will be stressed from the increase in the growing season and extreme temperatures expected due to climate change."
2. "Surface and groundwater quality will be impaired as increased nutrients and contaminants enter waters due to runoff from more intense rain events."
3. "The persistence of Southern pine beetle in New Jersey represents an early example of the destruction of invasive pests that can occur due to climate change impacts."
4. "Wildfire seasons could be lengthened and the frequency of large fires increased due to the hot, dry periods that will result from increased temperatures."
5. "Atlantic white cedar, a globally rare species, is expected to lose habitat to New Jersey because of rising sea levels."
6. "Some vernal ponds may even disappear due to drought."

What does this all mean for the Pinelands? How can the Pinelands Commission address this threat?

The Pinelands has experienced changes and will continue to do so with increases in temperature, precipitation, wildfire risk, flooding, and invasive pests. The Pinelands Commission can play a role to help mitigate future climate change and foster opportunities for adaptation. The Coastal Flood Exposure Mapper[4] is a great tool to analyze flooding risk in New Jersey. The Mapper, created by the National Oceanic and Atmospheric Administration, color codes regions according to the number of hazards that an area may experience now and into the future. Yellow indicates the least number of hazards, and the dark red indicates an area that can experience the most hazards. These hazards include high tide flooding, sea level rise anywhere from one to three feet above mean higher high water[5], and storm surge categories 1, 2 and 3. In addition, each of these highlighted areas are designated a FEMA[6] zone which is defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood[7].

Screen shots are shown below that provide examples of high hazard areas in the Pinelands. Many of the areas in red include a hazard of 7 or greater which are all the hazards listed above. Some of the locations included in these zones are Bass River, Hammonton, Port Republic, Washington Township, Mullica Township, Mays Landing, Tuckahoe, and Galloway.

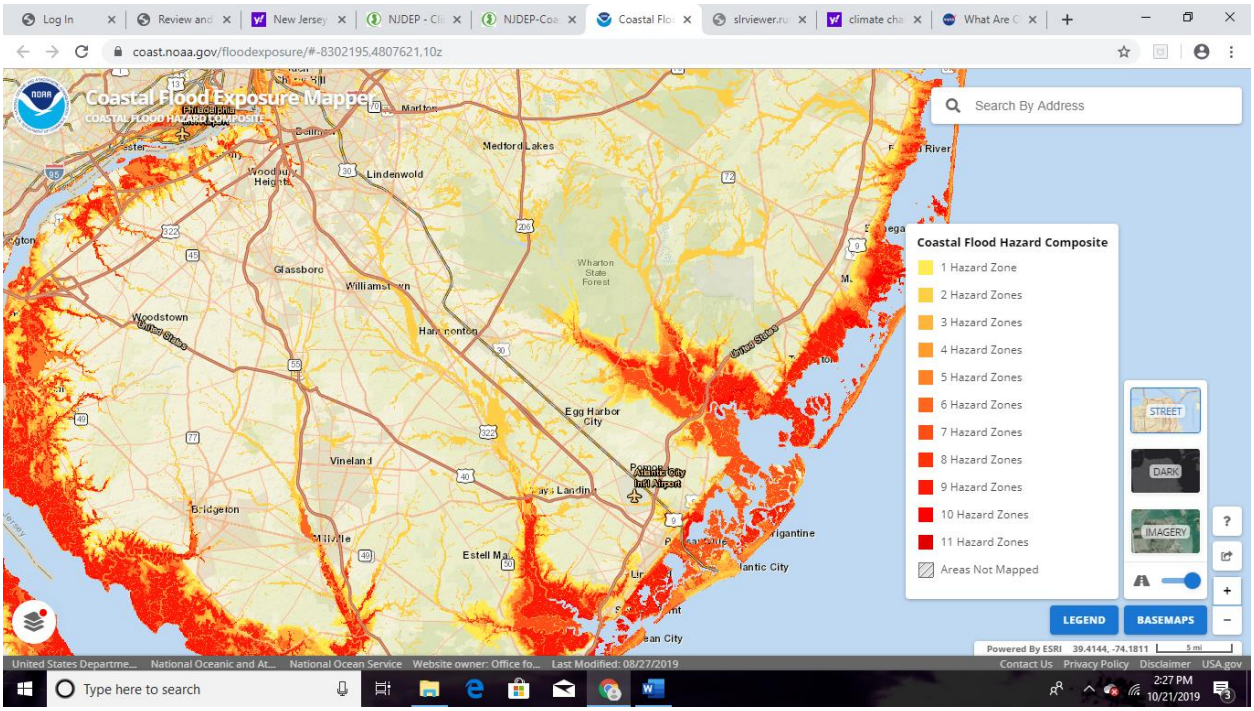
---

[4] https://www.coast.noaa.gov/floodexposure/#-8302195,4807621,10z

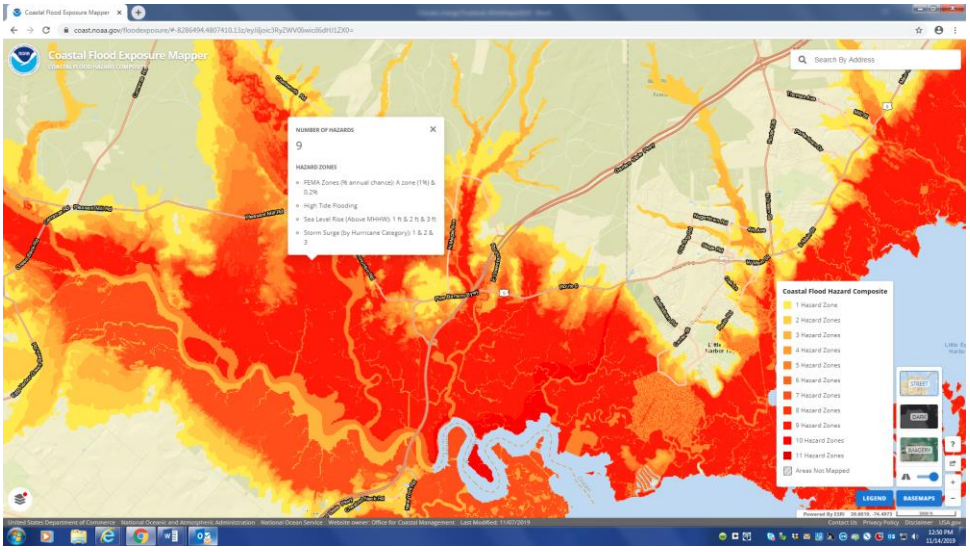
[5] The mean higher high water (**MHHW**), is the average height of the highest tide recorded at a tide station each day during the recording period. It is used, among other things as a datum from which to measure the navigational clearance, or air draft, under bridges.

[6] https://www.floodsmart.gov/why/all-about-flood-maps

[7] https://www.fema.gov/flood-zones



Besides the direct risk to people and property during flood events, water supply and quality are impacted because higher flows increase sediment, nutrient, and contaminant loads in surface waters used by downstream water users, and ecosystems. Mineral weathering products, like calcium, magnesium, sodium, and silicon and nitrogen loads, have been increasing with higher streamflows. Changing land cover, flood frequencies, and flood magnitudes are expected to increase mobilization of sediments in large river basins. [8] Pinelands Commission actions can't stop the flooding, but changes made to the Comprehensive Management Plan (CMP) can help to adapt to and/or limit additional changes.



[8] https://nca2014.globalchange.gov/report/sectors/water/content/water-quality-risks-lakes-and-rivers

1. Adopt Kirkwood-Cohansey Aquifer Study Changes

The Pinelands Commission has placed a high value on the Kirkwood-Cohansey aquifer system since the Commission's inception. The Pinelands CMP permits diversions from the Kirkwood-Cohansey system only for agriculture, or where there is no alternative source and it is demonstrated that no adverse ecological impact will occur as a result of the diversion. When water is obtained from the Kirkwood-Cohansey, the Commission has also acted to control transfers of water between watersheds from water supply distribution and/or centralized wastewater systems. In addition, State legislation (N.J.S.A. 58:1A-7.1) prohibits the exportation of surface and groundwater beyond ten miles from the boundary of the Pinelands National Reserve.

The Commission's concern with the Kirkwood-Cohansey system is amply justified. Since this shallow aquifer provides from 80 to 95 percent of baseflow to streams and associated wetlands within the Pinelands, removal and distribution of water from this aquifer is of particular concern so as not to reduce streamflow and negatively impact wetlands and aquatic species. As noted above, climate change increases the risk of drought and excessive water flow during major storm events. Several findings and episodes below illustrate the vulnerability of the Kirkwood-Cohansey and associated habitats to excessive water withdrawals or poorly located wells which gives greater urgency to implementing ways to reduce this vulnerability.

- In February 1987, the Camden County Municipal Utilities Authority prepared a water quality management plan for Chesilhurst Borough, Waterford Township, and Winslow Township. The proposal called for the transfer of sewage from the Regional Growth Areas of these Pinelands townships to the Delaware Basin. It was determined that if the Kirkwood-Cohansey aquifer was used for water supply, the interbasin transfer of all of the wastewater to the Delaware River Basin would impact the flow of streams entering Wharton State Forest. [9]

- The Pinelands Commission found that the use of the Kirkwood-Cohansey aquifer to supply water for projected buildout of the Regional Growth Areas in Hamilton Township and portions of Galloway Township would significantly deplete stream flows, if wastewater was exported out of the area via sewers.[10]

- In Berlin Township, Camden County, approval for a municipal water supply well was rescinded when it was determined that withdrawals from the Kirkwood-Cohansey was impacting Swamp Pink, a plant that is federally listed as threatened pursuant to the Endangered Species Act.

- During 2003, a private water company's request for a 20 percent increase in allocation from the Kirkwood-Cohansey aquifer was thwarted when it was determined that there would be a loss of stream flow, and associated impacts to

[9] Pinelands Commission. 1988. An assessment of sewer and water supply alternatives for Pinelands growth areas in the Mullica River Basin, Camden County. Pinelands Commission, New Lisbon, New Jersey, USA.
[10] Schock, D. A. 1990. An assessment of the hydrologic impact resulting from development in regional growth areas in Hamilton Township, Atlantic County. Pinelands Commission, New Lisbon, New Jersey, USA.

> Knieskern's beaked-rush, a Federal and New Jersey listed threatened wetlands plant. Seeing no alternative, the water company installed a new well to a depth of 1225 feet in a deeper aquifer.

In 2001, the State provided $5.5 million in funding through the "Gibson Bill," N.J.P.L. 2001 c. 165, to study the aquifer, and the federal government subsequently provided additional funds to the project. The study came about in response to two growing concerns: the increasing demand for water to serve growth in South Jersey, and the recognition that while the Kirkwood-Cohansey is a readily available source to help meet this demand, it is also critical to the surface ecology of the region.

Based on the numerous reports completed to date as part of the study and the findings from the Pinelands Science-Policy Forum on the Kirkwood-Cohansey Aquifer, Pinelands Preservation Alliance (PPA) recommends specific science-based amendments to the CMP to protect the Pinelands environment. PPA recommends the following:

1. ***Rules for Controlling Impacts of New or Increased Allocations*:**
   - For potential impacts to streams and rivers: Institute ecologically based thresholds for new or increased allocations from the Kirkwood-Cohansey Aquifer by using low flow margin, percent of 7Q10, or percent of drought of record, but with the ecological passing flow as a floor or limit in all cases.
   - For potential impacts on wetlands: Require species-specific and Pinelands pond-specific criteria for judging acceptable versus unacceptable impacts of withdrawals on wetlands.
   - Require quantifiable water conservation measures in the same sub-watershed to offset expected impacts of new and increased withdrawals.
   - Incentivize all water conservation measures as part of permitting for new or increased allocations.
   - Set a regulatory trigger that suspends new or increased allocations, or reduces existing allocation limits, in a watershed when a trend of increasingly severe impacts of current withdrawals shows the modeling on which permits are based is inaccurate.
   - Require recipients of allocations to monitor and report streamflow and water table changes in the future.
   - Permit no reductions of existing wetlands for applications for a new or increased allocation from the KC aquifer.
   - Require all applicants to show that other sources are not available before using the KC aquifer.

2. ***Water Supply Planning*:**
   - Set targets for total withdrawals from the aquifer in each basin/sub-basin and provide suggested water supply alternatives.
   - Using available information from the New Jersey Geological Survey regarding water withdrawals, uses, transfers, and discharges, set limits on total withdrawals from the aquifer in each basin and identify required water supply alternatives.

- Design plans to maintain current ecological functions and restore natural flow and water levels where existing withdrawals have already reduced flows or water levels.
- Set explicit criteria for determining when each potential alternative source will be considered available, desirable and required for consideration by purveyors.
- Incorporate water supply alternatives into targets, limits and options for those basins where the aquifer is already stressed.
- Incorporate impacts to and withdrawals from connected aquifers, such as the Atlantic City 800-foot Sands.

2. Adopt Changes to the Stormwater Management Rules

According to a November 2010 Report by the New Hampshire Stormwater Study Commission, "Through its work, the Commission found that stormwater is recognized as one of the leading causes of water pollution in the United States." States cannot meet their requirements under the Clean Water Act unless aggressive measure are taken to address stormwater. The report further adds, "While the monetary cost of managing stormwater is high, the potential cost of inaction is even higher. Without new programs, new revenue sources, and a significant shift of thinking, the state will likely experience even more extensive flooding and degradation of water resources."[11] We applaud the changes adopted and proposed so far by the Pinelands Commission and recommend additional changes for incorporation.

In particular, PPA suggests the following:

1. Incorporate non-structural stormwater requirements into site design. PPA agrees that the former stormwater requirements needed improvement, but removal of strategies that are absolutely necessary for environmental protection and stormwater reduction does not make sense. In addition, placing these requirements in only the stormwater management plan by municipalities creates unnecessary conflict and confusion for developers.

   When NJ Department of Environmental Protection removed the non-structural stormwater requirements, it created the possibility that developers could clear out vegetation and trees and place rain gardens or other "green" infrastructure and receive approval unless towns have ordinances that specifically limit clearance or provide tree protection. This process is detrimental to water quality, habitat, and water supply.

   The Pinelands Commission should adopt and clarify non-structural requirements. For example, Strategy 1 of the non-structural stormwater requirements[12], "Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss." The rules should require identification of riparian buffers, corridors, highly

[11] New Hampshire House Bill 1295 Chapter 71 Laws of 2008 Stormwater Study Commission Final Report November 2010.

[12] State of New Jersey, Department of Environmental Protection. (2004). *New Jersey Stormwater Best Management Practices Manual*. Retrieved from https://www.njstormwater.org/bmp_manual/NJ_SWBMP_2%20print.pdf

erodible soils, and wetlands and require no disturbance. Another option is to disconnect anything over 10% of impervious cover to better define Strategy 2.

2. All new stormwater management/green infrastructure should require 5 years of "monitoring" to guarantee the performance of the systems. Monitoring doesn't necessarily mean setting up a test well, but making sure that it is draining or functioning as designed. There should also be a bonding requirement so that there is a financial guarantee that the systems will work long term and that there is money available for the municipalities to use to fix failing systems. If the systems fail by year 4, the guarantee period should resume again to make sure there is a time frame of 3 to 5 years of proper functioning before returning the bond funds.

3. Redevelopment projects should be required to meet the stormwater requirements. New Jersey will never improve its water quality unless we address the problems of the past.

3. Incorporate changes to Pinelands Development Credits

As currently structured, the Pinelands CMP's transferable development rights program requires developers to purchase PDCs as a condition of building at *higher* densities. This structure provides a financial incentive to build at lower density and provides no incentive to adopt any other beneficial design feature in a development plan. Thus, the current structure encourages exactly the kind of sprawl development that most harms environmental, scenic and cultural values. The current system has also been slow to generate demand for PDCs in some growth areas, as builders have stuck with lower density subdivision designs.

PPA supports amending the PDC rules to reverse these incentives and to make the PDC system a positive incentive to build in a more environmentally and socially beneficial fashion. The Commission has already developed an extensive amendment to the PDC program that was fully reviewed by the Commissioners and reviewed by the public. PPA fully supports moving forward with these previously identified changes.

In general terms, we support the program that a developer:

a. must buy PDCs to build at *low* density or with a reduced wetlands buffer as defined by the buffer delineation model;
b. need not buy PDCs, or must buy a much lower number of PDCs, if developer builds using design features such as the following:
    - retain a 300-foot buffer to wetlands
    - manage stormwater using only non-structural stormwater strategies
    - have multi-use structures

We also hope that the original amendment for applying the PDC program to include non-residential (essentially commercial) structures to create incentives for reducing impervious coverage will still be included for consideration in plan review. This change would only apply in a small number of cases.

4. Offer Assistance to NJ Department of Environmental Protection to Review and Provide Guidance to Municipalities for Completing Climate Change-Related Hazard Vulnerability Assessments

A climate change-related hazard vulnerability assessment is meant to identify risks, vulnerabilities, and impact to communities, provide a rationale for allocating resources, and guide municipalities in considering climate change impacts on development. Senate Bill 2607 was signed into law February 2021 and requires municipalities to include in the land use element of their master plans a climate change-related hazard vulnerability assessment, which includes but is not limited to:

- Environmental effects and weather events associated with climate change
- Mitigation of reasonably anticipated natural hazards
- Current and future vulnerabilities in the municipality associated with climate change
- Build-out analyses of future development in the municipality and an assessment of the vulnerabilities related to that development
- Critical infrastructure for evacuation and life sustainability during a natural disaster
- Risk reduction strategies and design standards
- The most recent natural hazard projections and best available science provided by NJDEP.

The Pinelands Commission should offer assistance to NJ DEP and municipalities to review these assessments. First, the Pinelands environment is unique and so will face distinct challenges from climate change. Pinelands Commission staff have the expertise to keep the region's unique characteristics and vulnerabilities in mind when defining what areas municipalities should address in a hazard vulnerability assessment. Second, because Pinelands municipalities must submit proposed master plan changes to the Commission, the municipalities will have to ensure their assessments conform to the CMP and the Commission can thus exercise a level of oversight of the assessments.

An additional option is for the Pinelands Commission to spearhead a grant program, with funds perhaps coming from multiple sources. Grants could be offered to incentivize municipalities to write climate change-related hazard vulnerability assessments, and implement redesigns and retrofits of municipal infrastructure to address their respective vulnerabilities. By way of example, the Commonwealth of Massachusetts created a Climate Municipal Vulnerability Program, wherein municipalities can receive support to first identify their climate hazards, and then implement actions to address them. The program is divided into two components: planning grants and action grants. As part of the planning process in identifying climate hazards, the municipality must go through a community-driven process that prioritizes the voices of all affected communities and identifies environmental justice populations. Once planning is completed, municipalities may then be eligible to apply for action grants to carry out various works, including green infrastructure, improved stormwater management, and nature-based solutions for public health. To date, an overwhelming majority of municipalities in

Massachusetts have participated in the planning phase, and nearly half have embarked on action grant projects.[13]

5. Adopt List of Plant Species of Concern

The overriding purpose of the Pinelands Protection Act and the CMP is to conserve the Pinelands' natural resources. Both the Act and the CMP recognize that conservation of characteristic Pinelands resources includes protection of endangered and threatened flora and fauna. The CMP recognizes this policy specifically through its prohibitions on development at 7:50-6.27, "Development prohibited in the vicinity of threatened or endangered plants." This section reads, "No development shall be carried out by any person unless it is designed to avoid irreversible adverse impacts on the survival of any local populations of those plants designated by the Department of Environmental Protection as endangered plant species pursuant to N.J.A.C 7:5C-5.1 as well as the following plants, which are hereby found and declared to be threatened or endangered plants of the Pinelands" and is followed by a list of 54 plant species. The background story of how these protections came to be is too complex to briefly summarize here, but the main point we would like to make is that without protecting all of the plant species occurring in the Pinelands which are tracked by the New Jersey Department of Environmental Protection's Natural Heritage Program and therefore classified by the Natural Heritage Program as "endangered" plant species and plant "species of concern," the CMP is not providing the environmental protections it was enacted to provide, and climate change is going to make conditions for these species worse. Unless the Pinelands Commission take immediate action to protect them now, the Pinelands can lose more species than expected.

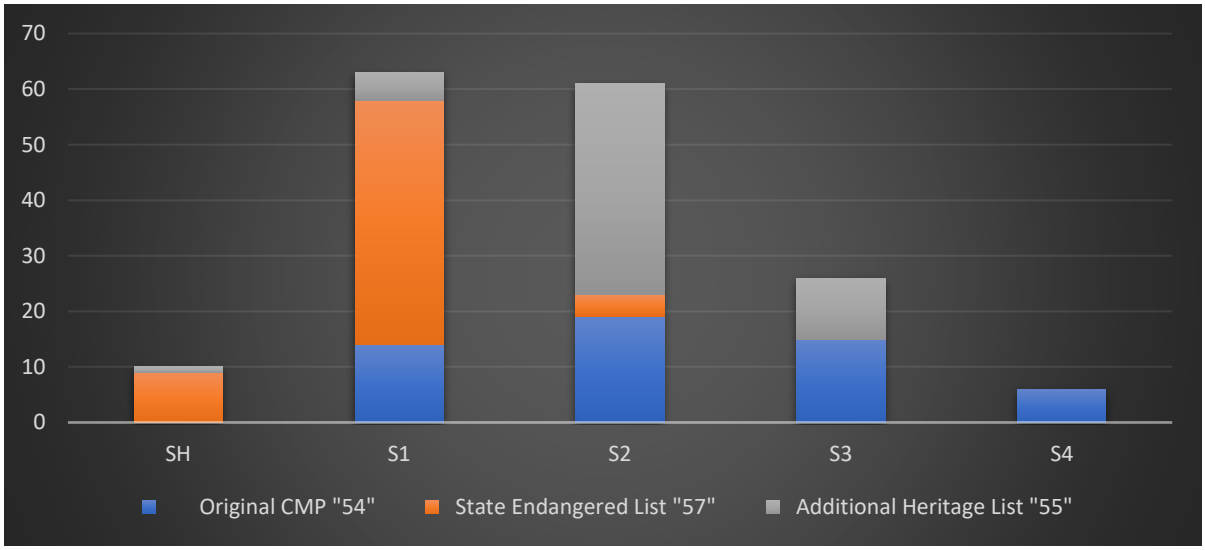
Currently, the CMP does not protect all threatened and endangered species of plants, because the list of species in the CMP omits a number of Pinelands species that the State of New Jersey recognizes as threatened. Though the Natural Heritage Program uses the phrase "species of concern" rather than the word "threatened," these species of concern are indeed understood to be threatened. The Federal Endangered Species Act defines "threatened species" as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." As defined in New Jersey's Endangered Plant Species Program rules, "Plant Species of Concern" serves as the official "working list for transition of species to and from the Endangered Plant Species List," and thus fits the federal model of "threatened" on which the CMP's use of the term is based. All Plant Species of Concern at issue in the Pinelands are ranked S1 (critically imperiled), S2 (imperiled), or S3 (rare and may soon become imperiled if current trends continue), with a small number designated SX (determined or presumed to be extirpated) or SH (historically present but no extant occurrences known). These rankings clearly fall under the definition of "threatened" and these species should therefore be protected under 7:50-6.27 which prohibits development "in the vicinity of threatened or endangered plants."

We propose that section 7:50-6.27 be amended to read, "No development shall be carried out by any person unless it is designed to avoid irreversible adverse impacts on the survival of any local populations of those plants listed by the New Jersey Natural Heritage Program as 'Endangered

[13] https://www.mass.gov/doc/mvp-webinar-recording-fy21-funding-round/download

Plant Species and Plant Species of Concern'." Doing so would bring the Pinelands protections into alignment with the Highlands protection standards, which call for protection of *all* listed plant species of concern. This is the only sensible approach from a conservation perspective. On the following chart:

- The **Gray** bars depict the 54 plant species protected by the original Pinelands Comprehensive Management Plan.
- The **Orange** bars depict 57 species listed on the current State of NJ Endangered Species Plant List. These species are protected as a result of the adoption of the Endangered Species List by the Pinelands Commission. About 19 of these 57 species may not actually occur in the jurisdictional Pinelands, as there are no recent records, or they generally would be expected to occur outside of the boundaries of the Pinelands CMP.
- The **Blue** bars depict 55 unprotected rare species (Heritage Ranks S1, S2, and S3) that do occur within the Pinelands, for which the NJ Heritage Program has accumulated more accurate information than was available 35 years ago as the original CMP list was being formulated.
    - **SH** = State Historic (no extant populations currently known)
    - **S1** = between 1 and 5 populations known
    - **S2** = between 6 and 20 populations known
    - **S3** = between 21 and 50 populations known
    - **S4** = more than 50 populations known.



6. Request DEP implementation of Prescribed Burn Bill

The New Jersey Pine Barrens is a fire dependent ecosystem where frequent fires create a mosaic of varying successional stages across the landscape[14]. The natural form of disturbance is important in maintaining the natural communities of fire adapted species we have come to consider characteristic of this region. Periodic burns can reduce shrub cover, maintain an open canopy, and delay the encroachment of late successional species[15]. The New Jersey Forest Fire Service for the last 60+ years has employed a wildfire suppression program and has conducted cold weather prescribed burns to control fuel loads[16]. Although prescribed burns are effective at reducing fuel load[17], their intensity and fire return intervals may deviate from historical cycles, which may impact the demography of early-successional, fire-adapted species[18]. Changes to our natural fire regimes have been documented for decades. Soon after the establishment of the Pinelands Protection Act, ecologists found significant changes in the scale and frequency of fires when compared to pre-1940 levels. While they found the number of wildfires from pre-1940 and 1940-1980 to be approximately the same, total area burned per year decreased significantly (54,000 acres per year to 19,000 acres per year) as well as the frequency of any one location in the pine barrens burning in a given year (every 20 years to every 65 years). This change in fire regime has led to measurable changes in forest composition, primarily near developed areas of the Pinelands. Researchers have found that fire frequency decreases near developed land and upland oak species cover increases in these same areas[19]. The change in disturbance regimes has led to a change in forest composition from the characteristic pine forest to an oak dominated forest.

Carbon Sequestration

Increasing carbon sequestration through land management is becoming an increasingly studied strategy particularly for states such as New Jersey that are looking to address and mitigate the impacts of climate change. Wildfires and prescribed burns produce a net release of carbon, but a pair of studies from the US forest service show that even with these forms of disturbance, the forests of the New Jersey Pine Barrens act as a carbon sink. Scheller et al. found that the Pine Barrens of New Jersey are expected to continue to be a carbon sink over the next 100 years in models that reflect current burning practices, an increase in prescribed burns and even a longer response time to wildfire.[20] More recent studies have shown that all carbon released during a fire is recovered within 2-3 years in Pine Barren systems[21]. These studies highlight that robust Pine

[14] McCormick, J., and R.T.T. Forman. 1998. Introduction: Location and boundaries of the New Jersey Pine Barrens. In: Forman, R. T. T. (ed.), Pine Barrens: Ecosystem and Landscape. Rutgers University Press, New Brunswick, New Jersey

[15] Forman, R.T.T. 1998. The Pine Barrens of New Jersey: An ecological mosaic.

[16] Buell, M.F., and J.E. Cantlon. 1953. Effects of Prescribed Burning on Ground Cover in the New Jersey Pine Region. Ecology 34:520-528

[17] Clark, D.L., and M.V. Wilson. 2001. Fire, Mowing and Hand-Removal of Woody Species in Restoring a Native Wetland Prairie in the Willamette Valley of Oregon. Wetlands 21:135-144

[18] Wilcove, D.S., *D.* Rothstein, *J.* Dubow, *A.* Phillips, *and E.* Losos. 1998. Quantifying threats to imperiled species in the United States. BioScience 48:607–615

[19] La Puma I.P., R.G. Lathrop and N.S. Keuler. 2013. A large-scale fire suppression edge-effect on forest composition in the New Jersey Pinelands. Landscape Ecology 28: 1815-1827

[20] Scheller R.M., S. Van Tuyl, K.L. Clark, J. Hom and I. La Puma. 2011. Carbon sequestration in the New Jersey Pine Barrens under different scenarios of fire management. Ecosystems 14: 987-1004

[21] Clark, K.I., N. Skowronski and M. Gallagher. 2015. Fire Management and Carbon Sequestration in Pine Barren Forests. Journal of Sustainable Forestry 34: 125-146

Barren systems not only thrive on fire but the resulting regeneration captures enough carbon to more than offset the burns, and to even function as a carbon sink.

Prescribed Burning

The duration of the wildfire season in New Jersey may increase as the spring season begins earlier in the year and the summer season is expected to be hotter and last longer. In addition, the winter season when the majority of prescribed burns are conducted is expected to become shorter and wetter[22]. This has the potential to limit the number of days conducive for prescribed burning. By supporting the implementation of the Prescribed Burn law pass in 2019, the Commission can support the expansion of burning for both safety and ecological reasons. Introducing mixed-severity fires can also be a usefully tool that is found to be more effective than traditional low-severity burns in driving structural complexity and post fire diversity[23]. Implementing the Prescribed Burn law may then have the effect of giving burn managers greater flexibility in their burning season but also the leverage needed to conduct burns that can promote the ecological functions we often associate with natural disturbance regimes.

7. Incorporate CAFRA areas under Pinelands Commission jurisdiction.

In considering the unprecedented scale and imminent threat of climate change, it is crucial to consider the Pinelands National Reserve (PNR) holistically, including the land and waters to which the Coastal Area Facility Review Act (CAFRA) applies. N.J.A.C. 7:7-9.42(d) recognizes the direct connection between coastal ecosystems and inland resources: "[b]ecause the living marine resources in the bays and estuaries of the coastal zone depend on the flow of freshwater from the pinelands, changes to the quality and quantity of the pinelands water resource caused by pollution and contamination would have a significant impact on coastal resources." The original PNR boundary was established to protect specific ecosystems, vulnerable species and their habitats, and vulnerable waters, all of which are now facing increased risk and should all be subject to consistent relief precisely because of their interconnectedness.

The Coastal Zone Management Rules and 1988 Memorandum of Agreement (MOA) between the Pinelands Commission and NJ Department of Environmental Protection (DEP) make an attempt at that consistency in the management of the overlapped area, which was clearly the intent of the Pinelands Protection Act. Section 13:18A-23 states, "[T]he Department of Environmental Protection shall, in consultation with the commission…, review the environmental design for the coastal area as it affects the planning and management of the development and use of any land in the coastal area which is also within the boundaries of the Pinelands National Reserve, make any necessary revisions to such environmental design as may be ***necessary in order to effectuate the purposes of this act and the Federal Act***…" (emphasis

[22] Runkle, J., K. Kunkel, S. Champion, R. Frankson, B. Stewart, and W. Sweet. 2017. New Jersey State Climate Summary. *NOAA Technical Report NESDIS 149-NJ*, 4 pp

[23] Roberts, C.P., V.M. Donovan, S.M. Nodskov, E.B.Keele, C.R. Allen, D.A. Wedin, and D. Twidwell. 2020. Fire legacies, heterogeneity, and the importance of mixed-severity fire in ponderosa pine savannas. Fire Ecology and Management 459: 117853

added). The Coastal Zone Management Rules themselves state, "Coastal development shall be consistent with the intent, policies and objectives of the National Parks and Recreation Act of 1978, P.L. 95-625, Section 502, creating the Pinelands National Reserve, and the State Pinelands Protection Act of 1979 (N.J.S.A. 13:18A-1 et seq.)" The 1988 MOA is even more explicit in mandating the application of Pinelands regulations to sections of the PNR within the Coastal Areas in its second point of agreement, which states, "The Department of Environmental Protection, Division of Coastal Resources (DEP-DCR), agrees to implement the Pinelands Comprehensive Management Plan within the coastal zone".

Despite this clarity, a lack of coordination between the Pinelands Commission and DEP in the overlapped areas have led to approval of projects held to lesser standards than the rest of the PNR. Some project applications are not sent by the DEP to the Commission for review, and when they are, Commission recommendations are only taken as advisory. Given that coastal areas are at the highest risk for climate impacts, those very areas should be held to the strictest standards allowable by the CMP ***and*** the CAFRA.

Since the State of New Jersey has adopted both the CMP and CAFRA regulations, resources within the overlapped area should be evaluated in accordance with the standards of both. In the event of different parameters, the strictest should be applied, therefore providing the maximum level of protection to these most vulnerable areas.

Currently, point 4 of the 1988 MOA states that "[b]oth agencies recognize that each agency has the independent authority to approve or deny applications pursuant to its own regulations." This language should be amended to mandate that both sets of regulations must be upheld, and to remove any question of which standards should be applied. It must be those which provide the greatest level of protections.

8. Adopt No Net Tree Loss

Requiring new developments to limit tree canopy removal and/or compensate for necessary tree removal would help reduce energy consumption, preserve tree function as a carbon sink, improve air quality, and generally contribute to maintaining Pinelands characteristics. This requirement could be implemented in a number of ways through either incentivizing canopy preservation and/or penalizing canopy removal. The CMP already requires certain landscaping and vegetation standards under N.J.A.C. 7:50-6.21, and amendments could be made to this section.

New Jersey already has a requirement for state projects. The New Jersey No Net Loss (NNL) Compensatory Reforestation Act, N.J.S.A. 13:1L-14.1 et. seq., 'the Act', requires that a State entity submit a compensatory reforestation plan to the NJ Department of Environmental Protection, New Jersey Forest Service (NJFS), for each project that results in the deforestation of one-half acre (0.5 ac/21,780 square feet) or more on land the State entity owns or maintains. The compensatory reforestation plan shall have a goal of no net loss of existing forested area. Each plan is subject to review and comment by the NJ Community Forestry Council prior to approval

by NJFS. The law requires that the State entity obtain NJFS approval of the compensatory reforestation plan prior to commencing the project.

The Pinelands Commission can adopt a similar provision for all development that result in deforestation of one-half acre or more. Extensive guidance for determining reforestation requirements is provided in New Jersey's program guidelines found here - https://www.state.nj.us/dep/parksandforests/forest/community/pdf_files/NNL_Program_Guidelines.pdf

9. Review EIA and DEP mapping to determine if management area changes are needed to accommodate migration

The following maps have been generated using the NJ Conservation Blueprint Mapper.[24] The Conservation Blueprint is an interactive mapping tool that empowers users to identify land best suited for conservation. A consortium of non-profit organizations, universities, state and local agencies oversaw the development of this tool and continue to oversee updates to the maps that are available to the public.

Included below is a reference called Connecting Habitats Across New Jersey (CHANJ) Habitat Stepping Stones. CHANJ is an effort to make our landscape more permeable for terrestrial wildlife by identifying key areas and actions needed to preserve and restore habitat connectivity across the state. This initiative is designed to help 1) prioritize land protection, 2) inform habitat restoration and management, and 3) guide mitigation of barrier effects on wildlife and habitats. CHANJ offers tools and resources to guide these goals forward in a strategic way and help target local, regional, and state planning efforts. The tools also help land use, conservation, and transportation planners to be more proactive and collaborative, which reduces conflict and saves time and money. The success of CHANJ depends on partnerships to implement its guidance.[25]

Areas of currently unpreserved lands are displayed in red, orange, and pink, and CHANJ Habitat Stepping Stones are identified in brown. Areas displayed are within the Pinelands, but the Pinelands reference layer was removed to make the maps more legible. We are recommending that the Pinelands Commission target lands for preservation or evaluate potential changes to management areas for the lands that are:

(1) Connected to wildlife habitat cores and corridors as identified by the NJDEP CHANJ maps
(2) Overlap with CHANJ Stepping Stones
(3) Are located within Pinelands Regional Growth or Rural Development Areas.

PPA is happy to share the maps as generated below at the request of the Pinelands Commission staff, but John Hasse with Rowan University is the expert for NJ Conservation Blueprint Mapper. He offered to provide an overview to the Pinelands Commission, and PPA highly encourages the Commission to take him up on his offer.

[24] www.njmap2.com

[25] https://www.njfishandwildlife.com/ensp/chanj_guidance.pdf

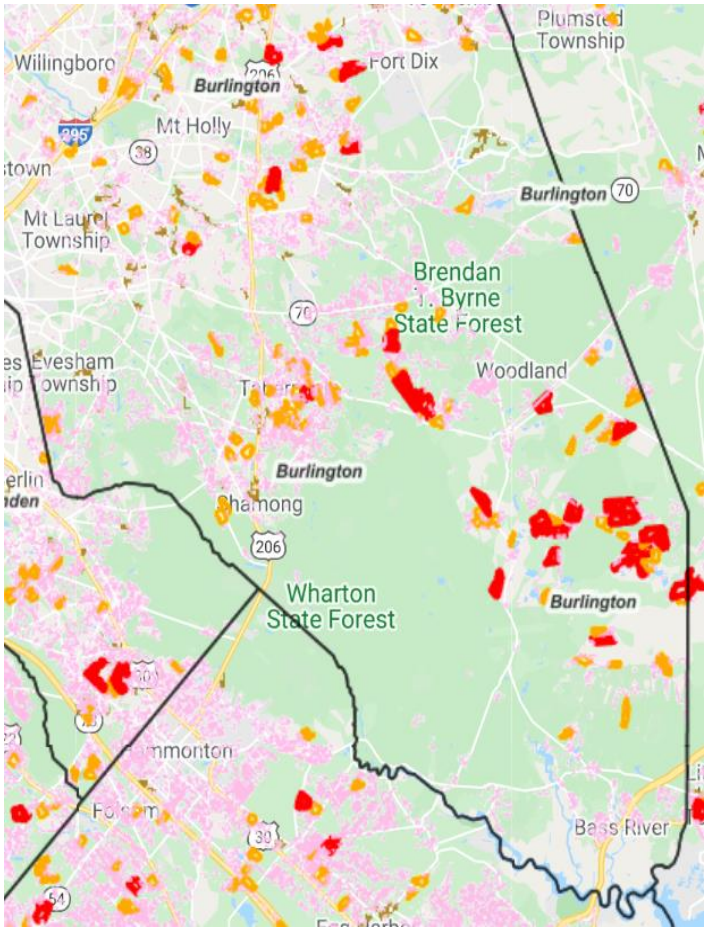


Figure 1 Unpreserved land in Burlington County (Red, Pink, Orange) and Stepping Stone habitat areas displayed in brown.

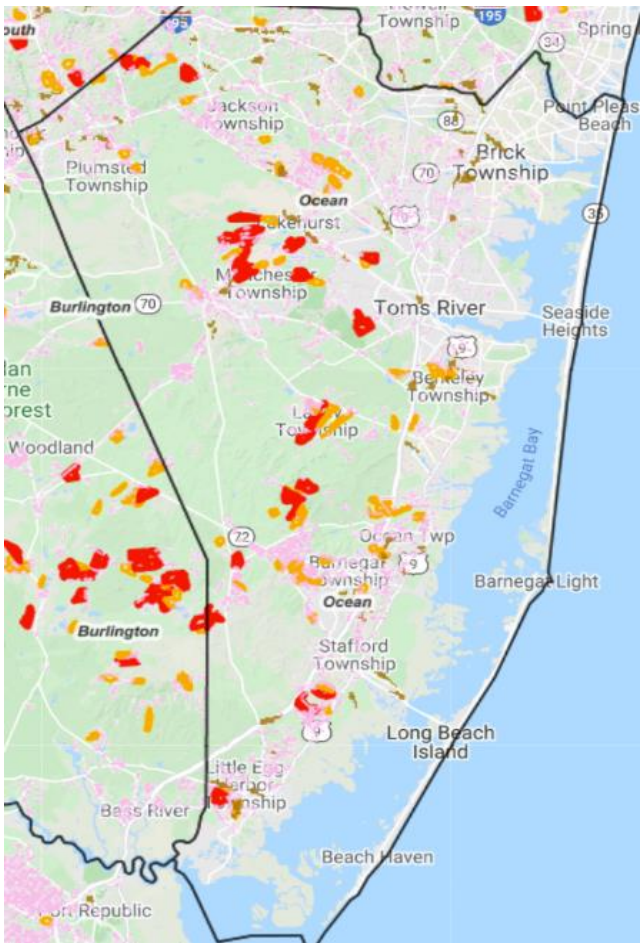


Figure 2 Ocean County Unpreserved Lands (Red, Pink, Orange) and NJDEP CHANJ Stepping Stones (Brown)

CMP Solar Standards/Issues April 2021

- Landfill closure requirements
  - Lack of impermeable cap, sufficient monitoring data and/or sufficient funding
- Outstanding violations
- Threatened and endangered species habitat and survey requirements
- Tree removal/clearing for ground-mounted facilities
- Extent and development of off-site infrastructure
- Restoration obligation at old resource extraction sites in PAD and FA

Possible CMP Solar Amendments April 2021

- Expand siting opportunities
  - Remove restrictions at mines in PAD and FA
  - Increase maximum size in APA (currently 10 acres)
  - Establish maximum permitted size in RDA and remove 30% clearing limitation
- Allow on closed but uncapped landfills and establish maximum permitted size in PAD and FA
- Limit extent of off-site infrastructure and amount of permitted clearing
- Establish specific limitations on clearing and tree removal
  - Require installation on existing impervious surfaces (rooftops and parking lots) before allowing clearing for ground-mounted facilities
  - Require tree replacement
- Require that new development incorporate solar energy facilities
  - Residential, Commercial, Public, Redevelopment