

Adopted September 28, 2018

CMP POLICY & IMPLEMENTATION COMMITTEE MEETING

**Richard J. Sullivan Center
Terrence D. Moore Room
15 C Springfield Road
New Lisbon, New Jersey
August 24, 2018- 9:30 a.m.**

MINUTES

MEMBERS IN ATTENDANCE: Chairman Sean Earlen, Robert Barr, Jordan Howell, Ed Lloyd and Richard Prickett

MEMBERS ABSENT: Candace Ashmun and Paul E. Galletta

OTHER COMMISSIONER PRESENT: Mark Lohbauer (as a non-member of this Committee, Commissioner Lohbauer did not vote on any matter)

STAFF PRESENT: Executive Director Nancy Wittenberg, Stacey Roth, Chuck Horner, Larry L. Liggett, Ed Wengrowski, and Betsy Piner. Also present was Craig Ambrose, with the Governor's Authorities Unit.

1. Call to Order

Chairman Earlen called the meeting of the Comprehensive Management Plan (CMP) Policy and Implementation (P&I) Committee to order at 9:34 a.m.

2. Pledge Allegiance to the Flag

All present pledged allegiance to the Flag.

3. Adoption of minutes from the July 27, 2018 CMP Policy & Implementation Committee Meeting

Commissioner Barr moved the adoption of the July 27, 2018 meeting minutes. Commissioner Prickett seconded the motion. The minutes were adopted with all Committee members voting in the affirmative.

4. Discussion of the 2004 Memorandum of Agreement between the Pinelands Commission and the South Jersey Transportation Authority related to short-term development projects at the Atlantic City International Airport

Ms. Wittenberg said there have been ongoing discussions with the South Jersey Transportation Authority (SJTA) regarding changes to the 2004 Memorandum of Agreement (MOA) for activities

at the Atlantic City Airport (ACY). She said staff has received much information regarding the issue but the discussion today represents the first step in any changes to the MOA.

Ms. Lauren Staiger, with Gilmore & Monaghan, P.A., counsel to the SJTA, noted that SJTA has requested the review of the MOA due to concerns with the current configuration of the airport. She noted that the Committee had been provided information on the current MOA at its July 27, 2018 meeting. She noted the provisions of the MOA that called for the creation of a designated Grassland Conservation and Management Area (GCMA) that is comprised of 298 acres to address habitat impacts associated with two upland bird species (the grasshopper sparrow and the upland sandpiper) as well as the frosted elfin butterfly. She said, because the GCMA is located within 175' of the runways, there is a concern for potentially dangerous bird strikes. She said currently SJTA is not in compliance with Federal Aviation Administration (FAA) safety requirements concerning wildlife management and wants to find a new location for the GCMA.

Mr. Tim Kroll, ACY Airport Director, said that shortly after the MOA was signed in 2004, the FAA changed the regulations, prohibiting the creation of wildlife habitat within 10,000' of airport operations. He said for ACY, that is within their perimeter fence. He noted that the airport is leased from the FAA and that beyond commercial aviation the airport property has shared uses including the 177th Air National Guard (ANG). He said that the ANG flies single engine F-16s that are highly susceptible to bird damage because of having only a single engine. The ANG provides 24/7 alert coverage from New York City to Washington D.C. in case of an emergency. He said the triggering event to revisit the MOA is the increase in bird strikes, notably 73 of them in 2017. Mr. Kroll stated that the ACY needs to move the attractant away from the active airport operations area.

Mr. Chris Boggs, with the United States Department of Agriculture, Wildlife Services Program, said he was a wildlife consultant who has been at the ACY for 27 years. He said his is a federal agency that assists homeowners, the public and other federal agencies with threatened and endangered species protection and, in the case of the FAA, wildlife hazards. He noted that previously, the presence of laughing gulls, attracted by insects, caused the airport to close due to bird strikes. He said prior to 1993, the airport grasses were meadows. In 1993, the airport went to long grass management to remove the primary gull food source: the Japanese beetle.

Mr. Boggs said that in the process of mitigating for various bird/mammal issues, there is a balance between mitigating for one species only to find one has attracted other, perhaps more hazardous, species. He said the long-term solution starts with habitat management and for now, the species management is sub-lethal control and trapping as well as raptor trapping and relocation. He said the turkey and coyote populations have increased in the vicinity of the ACY and they can hide easily in the tall grasses.

In response to Commissioner Lloyd's question as to which species are of most concern, Mr. Boggs said geese, gulls and swallows (the latter are attracted to insects in the tall grass) and hawks (attracted to small mammal populations) as well as fox and coyotes.

Mr. Boggs said it was hoped that the GCMA would stabilize the upland sandpiper population. He said his data had been used for the Environmental Impact Statement (EIS) for the MOA. He said there has been a continuing decline in the upland sandpiper population at ACY and no successful nesting had occurred this year. Meanwhile, the grasshopper sparrow population is thriving.

In response to Commissioner Lloyd's question as to what SJTA wanted with regard to the existing MOA, Ms. Staiger indicated that SJTA was looking to remove the GCMA, either through amending the current MOA or negotiating a new one. She indicated that SJTA had identified a few alternative sites for the GCMA. However, the sites had not been discussed with Commission staff. She said 290 acres will be expensive to purchase but the butterfly habitat could be placed on site as they cause no hazard to aircraft.

Mr. Boggs added that there is a substantial butterfly population at the FAA Tech Center so that is really not an issue as they cause no damage to aircraft.

Ms. Roth said there is an area of some six to eight acres for butterflies.

Ms. Staiger said SJTA has submitted a proposal that includes concerns expressed by other agencies including the ANG and the Coast Guard regarding significant safety issues.

Mr. Kroll said this year's safety inspection by the FAA noted the need to relocate the habitat due to bird strikes. He said currently the grass is at 3' and it should be mowed to 7 to 10".

With regard to the area where the GCMA is currently located, Ms. Staiger said the airport has no current development plans but may have some future needs for that area. Ms. Wittenberg added that, in the future if they want more development at the airport, there will be a discussion regarding additional habitat protection.

In response to Commissioner Barr's question if the Commission were required to give permission to pursue a new MOA, Ms. Roth said a proposal has been submitted. She said she advocated for a new MOA, rather than revising the exiting one, because so much of it needs updating. She said the original MOA had allowed expansion of a landing pad, runways and terminals to allow the airport to meet its needs.

In response to Commissioner Barr's question if the Commission would receive a clearer idea as to what is being proposed, Ms. Roth said staff would need to be directed to proceed with an MOA offering better or an equivalent level of protection to Pinelands resources. She said the New Jersey Department of Environmental Protection (NJDEP) was also involved with the preliminary discussions with SJTA, but the details have not yet been addressed. She said by authorizing staff to proceed, it can return to the Committee with a draft MOA for its review and then, following a

public process, provide a final draft of the new or amended MOA and a Recommendation Report, including response to comment, to the Commission.

In response to Commissioner Barr's question as to its recourse if the Commission did nothing, Mr. Kroll said as ACY is an FAA-139 airport, FAA could pull its grant funding if ACY is out of compliance with FAA regulations and guidance. Ms. Staiger added, thus far, although there have been no serious bird strikes, there is a concern with safety and liability issues.

Ms. Roth said, once another habitat area is designated, the existing GCMA would remain as grassland within the development pocket until such time as additional development is approved on that site.

Commissioner Lloyd said the Commission should look at a 20-year MOA, rather than a three-year MOA.

Commissioner Prickett said nature is finicky and, by creating another habitat, there is no guarantee that the species of concern will set up home there.

Mr. Boggs concurred and said one cannot trap and release upland sandpipers as they would be put at risk. He said it is not necessary to exclude species from existing at the current GCMA, but one wants to push the buffer away from the active airport area. He said mowing will exclude those bird species from the active area and the separate butterfly area will not be mowed. Mowing to a height of 7" will exclude laughing gulls as they like short grass as do Canada geese. Mr. Boggs said, outside the development area, the airport may attract other species such as geese that are attracted to non-functioning detention ponds. He said when one manages for one species, others may be attracted; with shorter grass, small mammal populations will decrease so raptors will not be attracted to the area.

In response to Commissioner Lloyd's question as to what is allowed within the 10,000' buffer, Mr. Boggs said the airport has lots of different buffers such as height and view obstructions but the 10,000' is specific to wildlife attractants such as ponds or fields of corn.

Responding to Chairman Earlen's question regarding off-site properties suitable for these species, Ms. Staiger said SJTA has identified some properties but has not yet examined them in detail. She said airports present a unique environment with wide open spaces. She said there will be discussions with staff regarding conservation restrictions or monetary contributions. Ms. Roth said staff had met at the airport and the habitat is close to the edge of the pavement. She said the upland sandpiper likes very open areas, and, as they are a migratory species, there may be an option to enhance other areas within the migratory pathway. Mr. Boggs said SJTA has looked at areas already open so trees would not need to be cleared. He said perhaps agricultural sites slated for development would provide suitable sites.

In response to Commissioner Prickett's question as to which of the three species were most in jeopardy, Mr. Boggs said, the upland sandpiper. He said these grassland birds have been in decline in the Northeast for many years. He said the habitat was probably not here previously but the birds expanded their range from the Midwest as eastern forests were cleared. In this area there are probably three populations: at the ACY, McGuire Air Force Base and Lakehurst Naval Air Station, as well as some in the northern portion of New Jersey

Mr. Boggs said SJTA had not done a butterfly survey in recent years but has planted wild indigo, the host plant, and will do so at the new site to attract them.

In response to Commissioner Prickett's question if there were any groups, e.g., non-governmental organizations, that were trying to propagate these species, Mr. Boggs said to his knowledge, no entity, including the Audubon Society or the Division of Fish and Wildlife, is doing so.

In response to Commissioner Prickett's question if there were concerns about the butterfly, Ms. Roth said it is a part of the MOA and that NJDEP is involved as a stakeholder because the frosted elfin is a state designated threatened species.

In response to Chairman Earlen's question if creating butterfly habitat will attract other species to the site, Mr. Boggs said the predatory species for the butterfly is dragonflies. He said SJTA will look to enhance sites where the frosted elfin butterfly already exists. He said there aren't other species attracted to wild indigo so should not pose any impacts.

In response to Commissioner Howell's question as to how many bird strikes have occurred and their impact, Mr. Boggs said there has been a significant increase in recent years from 30-40 annually in the late 1990's to 73 or 74 in the last couple of years. He said the bird strike rate is a mechanism of the amount of air traffic and the environment (weather and migratory patterns). Forty percent of the 33 strikes this year (a relatively low year for strikes) have been grassland species. Mr. Boggs said the impact on the plane depends upon the weight of the bird and one doesn't look at individual birds but the flocking of birds. He said, for instance a flock of 40 to 100 European starlings can do considerable harm due to the total body density and weight and can damage an engine.

In response to Commissioner Lloyd's question if flocking has been a problem, Mr. Boggs said, yes, the flocking of swallows in the spring and summer and then starlings, grackles and other blackbirds in the fall. He said the Pinelands, and all of New Jersey, is located in the coastal plain, a migratory flyway that funnels birds down to Cape May.

Commissioner Prickett said he believed it was important to have multiple locations for these species and that additional butterfly habitat should be established somewhere else in New Jersey. Since there are already grassland bird populations at McGuire and Lakehurst bases, perhaps that existing habitat should be enhanced.

Commissioner Lohbauer said if staff were to tour the airport facilities again, he'd be interested in seeing it first-hand. Ms. Staiger offered to arrange a tour and Ms. Roth said she would follow up with arrangements for the Committee to do so.

Chairman Earlen moved a recommendation to the Commission that the staff start preparing an MOA for the Atlantic City airport. The consensus of the Committee was that it proceed.

Ms. Roth noted that the steps for entering into a MOA are on the Commission's web site at: <https://www.nj.gov/pinelands/appli/moas/2016%20final%20MOA%20process.pdf>

5. Presentation on a 2018 Water Quality Restoration Grant proposal

As an aside, Mr. Wengrowski noted that some ten years ago he met Mr. Boggs during a meeting with public works directors overseeing stormwater basins in the vicinity of the Atlantic City Airport because of the concerns with waterfowl.

Mr. Wengrowski made a presentation on a competitive grant application the Commission will be submitting to the New Jersey Department of Environmental Protection (NJDEP) to seek funding to allow the Commission to partner with the United States Geological Survey (USGS) to evaluate pollutant control stormwater systems that are in use in the Pinelands and New Jersey at large, specifically in the Barnegat Bay watershed. (*Attachment A to these minutes and posted on the Commission's web site at:*

<https://www.nj.gov/pinelands/home/presentations/Stormwater%20BMP's%20NJDEP%20%20Grant%20Application%208.24.pdf>)

Mr. Wengrowski's opening slide depicted a state-of-the-art constructed wetlands developed by the University of New Hampshire (UNH), capable of removing up to 90% of total nitrogen. He said he believed it to be among the most successful pollutant removal techniques available and uses much of the same technology that is utilized by the alternate design wastewater treatment systems.

Mr. Wengrowski noted that the grant is to address nonpoint source pollution, that which comes from the sources not addressed when the state moved from septic to regional sewer systems. Stormwater is a major source of that pollution. He said that stormwater management is needed to prevent flooding, the spread of pathogens, and eutrophication of freshwater bodies. In addition, stormwater is a valuable water resource and he provided estimates (Slide 5) of the amount of annual non-infiltrating rainfall, with over one trillion gallons falling on the Pinelands every year. He said elsewhere in New Jersey, stormwater runoff is allowed to discharge directly into streams but the CMP prohibits the direct discharge of stormwater runoff to wetlands, wetlands buffers or surface water so as not to change water chemistry or hydrology or affect species. He said the CMP's aim is to return stormwater runoff to the Kirkwood-Cohansey aquifer.

Mr. Wengrowski further described how stormwater is managed in the Pinelands, with controls to address runoff and recharge, noting that Mr. Brian Szura, under Mr. Charles Horner's direction, reviews all stormwater plans for the Regulatory Programs office.

Mr. Wengrowski said the Commission's rules aim to return stormwater runoff to the aquifer and developers often propose larger stormwater basins than required by the Commission's rules because the municipalities want to keep water off the roads.

Mr. Wengrowski listed the potential pollutants in stormwater runoff (Slide 8) and described the inroads the CMP has made with improving stormwater quality. He said there are measures such as requiring additional controls for high pollutant load development such as garden centers and gas stations.

Mr. Wengrowski discussed the NJDEP guidance document providing strategies for pollutant removal (slide 6), noting that many are land consumptive and are therefore expensive. The document provides, by percentage, "typical" total nitrogen removal rates from specific BMPs (best management practices) for stormwater facilities.

Mr. Wengrowski said the Pinelands Area serves as the headwaters of the Barnegat Bay watershed and occupies some 38% of the total land area of the watershed. He said Commission staff has served on many Barnegat Bay Partnership committees. Furthermore, he said the grant opportunity is available to state agencies and project selection points are given to those applicants that have met previous NJDEP grant-funded project deliverables, which the Commission has done. He said the funding goal will include \$200,000 from the NJDEP grant, up to \$40,000 from the Pinelands Commission and some \$60,000 from USGS. He said the grant will be used to evaluate the NJDEP guidance document for pollutant removal in the NJ Coastal Plain and determining those BMPs that are most effective in removing select stormwater-borne pollutants. He said the study would identify the effectiveness in removing four pollutants (nitrogen, phosphorus, total suspended solids and bacterial pathogens). He said four to six BMPs will be selected for study, which might include the Commission's own basin. He said the natural vegetation of this basin appears to enhance the ability of the stormwater runoff to infiltrate into the groundwater.

In response to Commissioner Lohbauer's question if there is a system such as the UNH model in the Pinelands, Mr. Wengrowski said he was unsure but there may be one at Ocean County College, in the Pinelands National Reserve. However, if there is one in the Pinelands Area, it could be studied.

Commissioner Lohbauer referenced the list of pollutants on Slide 10, noting that mercury comes from atmospheric sources through the burning of coal.

Commissioner Prickett said this was a very interesting and comprehensive presentation. He noted that mercury accumulates in animals in Barnegat Bay and that there is a need for systems to remove mercury.

Mr. Wengrowski said that locally, there is a fish advisory for the streams in Pemberton because of the high mercury levels.

In response to a question from Commissioner Prickett regarding water that moves into Barnegat Bay, Mr. Wengrowski said that Dr. Baker, with whom the Commission had worked on landfill studies, identified groundwater nitrogen as a significant source of pollution. He said even though it has been years since the poultry farms left Ocean County, the nitrogen generated from those farms will persist for years to come.

Mr. Wengrowski said that many pathogens are attracted to soil particles. He said it is very expensive to test for all parameters but if the Commission had another partner or if NJDEP were to negotiate with the grant applicant, there might be an opportunity for more funding. He said he would have to speak USGS about preserving samples for potential later analysis.

Mr. Wengrowski confirmed Commissioner Lloyd's statement that collecting samples is cheap but analysis is expensive. He added that there may be an issue of sample deterioration with extensive holding times for deferred analysis.

6. Public Comment

Mr. Rich Bizub, with the Pinelands Preservation Alliance (PPA), said the proposed stormwater project was very important and he hoped the Commission could secure funds to do additional evaluations. He said the numbers for pollutant removal rates have been around for a while and are almost boiler plate numbers. He said it is important to see what those numbers really look like in Pinelands soils. He said during the last administration subsurface gravel wetlands were installed in Ocean County and one is outside the Agriculture building on Whitesville Road. He said PPA had recommended during construction that there be a feedback mechanism to monitor what they were doing but there was no follow-up and the last administration had no interest in doing so. He said it would be useful to include one of these systems in the study.

In response to Commissioner Prickett's question regarding the Buena Borough wastewater treatment plant and its ability to remove certain chemicals from wastewater, Mr. Wengrowski said that Mr. Liggett had relayed his interests to him and he was inviting the treatment plant operator to attend an upcoming meeting.

There being no other items of interest, Commissioner Barr moved the adjournment of the meeting and Commissioner Lloyd seconded the motion. The meeting was adjourned at 11:20 a.m.

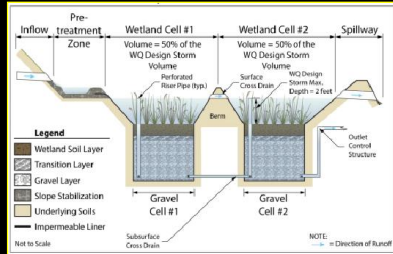
Certified as true and correct:



Betsy Piner,
Principal Planning Assistant

Date: September 17, 2018

GRANT APPLICATION TO QUANTIFY THE POLLUTANT REMOVAL CAPABILITIES OF SELECT STORMWATER BEST MANAGEMENT PRACTICES



August 24, 2018
Pinelands Policy and Implementation Committee

2018 Water Quality Restoration Grants for Nonpoint Source Pollution

BARNEGAT BAY WATERSHED REQUEST FOR PROPOSALS



New Jersey Department of Environmental Protection
Division of Water Monitoring and Standards
Bureau of Environmental Analysis, Restoration and Standards

Issuance Date: May 23, 2018
Proposal Due Date: August 31, 2018

NEED FOR STORMWATER MANAGEMENT

Stormwater runoff causes havoc when not properly managed.

- Flooding



Brick
August 2018

- Beach closings



Beachwood
Beach
July 2018

NEED FOR STORMWATER MANAGEMENT

Stormwater runoff causes havoc when not properly managed.

- Eutrophication



Buena
Borough
Sept. 2014

STORMWATER IS A VALUABLE RESOURCE

- Annual average rainfall in South Jersey $\approx 44"$ over 938,000 acres
 $\approx 3,439,333$ acre-feet
 $\approx 1.12071 \times 10^{12}$ gallons
- > One trillion, one hundred-twenty billion gallons of precipitation falls on the Pinelands each year
 - Of the 44" of total rainfall $\approx 24"$ runs-off or evapotranspires
 - 24" over 938,000 acres ≈ 1.8 million acre-feet $\approx 6.1129637 \times 10^{11}$ gallons
- > Six hundred-eleven billion + gallons of non-infiltrating rainfall each year

STORMWATER MANAGEMENT IN THE PINELANDS AREA

- The CMP prohibits the direct discharge of stormwater runoff to:
 - Wetlands;
 - Wetlands buffers; and
 - Surface water bodies.
- No change to natural hydrology (surface water and ground water levels, natural water chemistry, erosion / sedimentation, wetlands species composition).
- Recognizes stormwater runoff as a natural resource and necessary to the maintenance of groundwater levels in the unconfined Kirkwood Cohansey aquifer.
- The CMP prohibits (to the maximum extent practical) the direct discharge of stormwater to farm fields to protect crops from flooding, erosion and long term soil saturation.

STORMWATER MANAGEMENT IN THE PINELANDS AREA

CMP has long addressed stormwater **runoff quantity** issues

CMP rate controls:

- The rate (c.f./sec.) that stormwater exits a parcel can not increase in the post-development condition compared to the pre-development condition.

CMP recharge volume controls:

- The volume of stormwater generated from new impervious surfaces by a 10 year storm of 24 hour duration must be retained and infiltrated onsite.
 - For much of the Pinelands Area, the 10 year , 24 hour storm is an approximate 5 inch rainfall over a full day.
- This storm would produce nearly 15,000 gallons of runoff from an area the size of a basketball court (94' x 50'); enough water to fill 14' x 28' x 5' deep swimming pool.
- The CMP ensures that this significant volume of water is recharged to the K/C Aquifer.

STORMWATER MANAGEMENT IN THE PINELANDS AREA

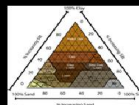
CMP rate and volume standards are typically addressed by installation of an infiltration basin (BMP). Many developers install much larger basins, large enough to infiltrate the 100 year storm.

In siting an infiltration basin the engineer must demonstrate:

- that there is at least **2 feet of vertical separation** between the bottom of the basin and the seasonal high water table;
- that **groundwater mounding** below the basin will not adversely impact (cause flooding of) adjacent below grade structures (e.g. basements, septic fields, etc.); and
- that the basin will fully **drain within seventy-two hours** after the end of the storm event.

STORMWATER MANAGEMENT IN THE PINELANDS AREA

To insure that volume of stormwater can infiltrate and recharge the aquifer, the CMP requires :



POTENTIAL POLLUTANTS IN STORMWATER RUNOFF

- Nitrogen
- Phosphorous
- Bacterial pathogens
- Deicing salts
- Heavy metals
- Oil
- Gasoline
- Sediment
- Mercury
- Pesticides
- Herbicides
- Temperature



MANAGING POLLUTANTS IN STORMWATER RUNOFF

CMP makes inroads into addressing **stormwater quality** issues

CMP requires add'l stormwater controls prior to recharge in:

High Pollutant Load Areas (HPLA) – fueling stations, garden centers, etc.

- Minimize the areal extent
- Cover the area to minimize exposure to rainfall
- Curb and segregate the runoff from non-HPLA stormwater
- Pretreat HPLA stormwater to remove 90% of TSS
- Oil/grease separator to remove petroleum hydrocarbons, if present

Pinelands Stormwater Control Ordinance requires:

- Reduction of the **nutrient load** in stormwater runoff from the post-developed site to the **maximum extent practicable**.

MANAGING POLLUTANTS IN STORMWATER RUNOFF

What constitutes pollutant removal "**to the maximum extent practical**"?
50%, 60%, 70%, 80%, 90%, higher

Typical Phosphorus and Nitrogen Removal Rates for BMPs
(Adapted from NJDEP BMP Manual)

Best Management Practice (BMP)	Total Phosphorus Removal Rate (%)	Total Nitrogen Removal Rate (%)
Bioretention Basin	60	30
Constructed Stormwater Wetland	50	30
Extended Detention Basin	20	20
Infiltration Basin	60	50
Manufactured Treatment Devices	See NJA.C.7B-3.7(a)	See NJA.C.7B-3.7(a)
Permeable paving	60	50
Sand Filter	50	35
Vegetative Filter	30	30
Wet Pond	50	30
Subsurface Gravel Wetlands	None Reported	90

"Typical" total N removal rates from specific BMPs

- Vegetative Filter = 30%
- Constructed Stormwater Wetland = 30%
- Wet Pond = 30%
- Infiltration Basin = 50%

BMPs can be linked in series (a "**treatment train**") to attain a higher pollutant removal rate.

However, the actual removal rate is not simply additive. Using the DEP's "typical" data:

Linking each of the four BMPs together in a treatment train produces only an 86% TN removal rate.

2018 WATER QUALITY RESTORATION GRANTS FOR NONPOINT SOURCE POLLUTION

- \$10M is being offered by NJDEP for watershed restoration, enhancement, and protection strategies that address NPS pollution in the Barnegat Bay watershed.
- The Pinelands Commission proposes to partner with the USGS New Jersey Water Science Center to quantify the nutrient and pathogen removal capabilities of existing stormwater BMPs in the Barnegat Bay Watershed.
- The Pinelands Area serves as the headwaters to the Bay and occupies 38 percent of the total land area that comprises the Barnegat Bay Watershed.
- The Pinelands National Reserve occupies fully 58.7 percent of the Barnegat Bay Watershed.

2018 WATER QUALITY RESTORATION GRANTS FOR NONPOINT SOURCE POLLUTION

- Both the Pinelands Commission and NJDEP share the common goal of controlling nitrogen discharges to the environment.
- Pinelands Commission staff actively participate on several Barnegat Bay Partnership Committees including the Science, Advisory, and Education Committees.
- State government agencies are eligible to apply for this water quality restoration grant funding.
- Points will be awarded to applicants that have previously received grant funding from NJDEP and successfully met all project deliverables.

2018 WATER QUALITY RESTORATION GRANTS FOR NONPOINT SOURCE POLLUTION

- Additional points will be awarded to applicants that contribute their own funding the proposed project.
- Our project funding goal:
 - \$200,000 from DEP grant
 - Up to \$40,000 from the Pinelands Commission
 - Up to \$60,000 from the USGS
 - Project total = \$300,000

EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPS

Why is this research needed?

- The estimated "typical" pollutant removal rates identified in the NJDEP Stormwater BMP Manual may not be representative of actual BMP performance in the NJ Coastal Plain.
- Nutrient and pathogen removal is dependent on physical, microbiological and geochemical processes. This research would determine if BMPs in the Pinelands Area perform equal to, less than or better than indicated in the NJDEP's guidance document.
 - For example denitrification requires sufficient alkalinity and a suitable pH range that may or may not be present in the Pinelands Area.

EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPS

- This research would identify BMPs are most effective at removing select stormwater-borne pollutants.
- Local (counties) and state agencies (e.g. DEP, DOT) could apply these findings in their BMP retrofits.
- The highest performing BMPs could be prioritized in state and local regulations and ordinances.
- Field-verified pollutant removal rate data could be used to meet existing and future Total Maximum Daily Loads. (TMDLs)

EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPS

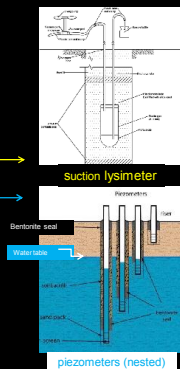
- We would likely select 5 BMPs types to study.
 - Each would be sampled 4 times following significant rainfall events over multiple seasons.
- USGS would sample (raw) stormwater flowing into each BMP at the inflow structure.
- "Treated" stormwater would be sampled from within the BMPs, at the outflow structure (if applicable) and from the subsurface using suction lysimeters and piezometers.
- The devices percent removal efficiency would be calculated for each BMP evaluated and presented in a citable report.



EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPs

"Treated" stormwater would be sampled from within the BMPs, at the outflow structure (if applicable) and from the subsurface using suction **lysimeters** and **piezometers**.

The BMPs percent removal efficiency would be calculated and presented in a citable report.



EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPs



"K5" Sand-Lined Infiltration Basin (Typ.) Garden State Parkway Lacey Township, NJ

EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPs



Vegetated Infiltration Basin
Pinelands Commission
Campus Pemberton
Township, NJ

EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPs



Newly constructed K5 sand lined basins



EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPs



K5 sand lined infiltration basins with volunteer propagules

EVALUATING THE POLLUTANT REMOVAL CAPABILITIES OF BMPs



Stormwater Wet Pond

Retrofitted Dig and Drop and Plant
BMP





Questions?