[Final 5-04-10]

Report and Summary

Pinelands Science-Policy Forum

March 16, 2010

Purpose: The Forum was devoted to discussion of policy options to address the excessive flow of nutrients from developed land into Barnegat Bay-Little Egg Harbor (BB-LEH or the Bay), with the aim of reaching consensus among the participants on a policy agenda that will stop and ultimately reverse the eutrophication of the Bay. The Forum focused on actions that can be taken within the watershed of BB-LEH to restore the quality of the Bay's waters.

The scientific basis for seeking effective, comprehensive reform to save the Bay is summarized in Appendix A. Bob Martin, the new Commissioner of DEP, recently summed it up in stating "Barnegat Bay we know is dying."

After the Forum, participants will work on completing a consensus agenda, which they can then take to the public and to state, regional, county and local government leaders in an effort to move the agenda to fruition.

> *The results summarized here reflect the group's overall direction, but do not show that any given participant agrees with or has committed to the policy and implementation options we discussed. Once a policy agenda has been refined and completed, participants and others will have the opportunity to sign on to the agenda, but that step lies ahead of us.*

Organizers: The Forum was organized by a steering committee of representatives of the Pinelands Preservation Alliance, the Barnegat Bay National Estuary Program, the Jacques Cousteau National Estuarine Research Reserve, the Brick Township MUA, the American Littoral Society, and the Pinelands Commission. The members are listed in Appendix B.

Attendees: The Forum attendees were individuals who are working to protect the Bay through their work for a variety of public agencies and private organizations and institutions. A list of attendees, and others who were invited but could not attend, is attached as Appendix C. We noted at the start of the Forum that participants had a variety of jobs and affiliations, and specifically that some were employees of government agencies which have not taken formal positions on the policies we were debating. We therefore recognized that a person's statements did not necessarily reflect the position of his or her employer.

Structure: The Forum was structured to maximize discussion and measure consensus. The morning was devoted to watershed-scale policies, and the afternoon to parcel or development-scale policies. Rick Lathrop and John Hasse facilitated the morning session, and Steve Souza facilitated in the afternoon. We used anonymous key-pad polling to measure and display the group's views of specific policy and implementation options. Facilitators summarized a range of policy options and polled participants on each option; we then broke into smaller groups for further discussion and brainstorming; and finally reconvened for facilitated plenary discussions and re-polling of the group's views of policy and implementation options.

Polling Methodology: The key pad polling was anonymous, and it appears that a few participants did not participate in the polling by their own choice. The possible responses for all polling questions were:

1 – Agree and High Priority

2 – Agree and Low Priority

3 – Agree but not possible/practical

4 – Disagree – not effective and/or not worth pursuing

Polling results were immediately displayed for the group as the percentages choosing each answer. The full text of the polling options is attached as Appendix D, and the polling results are attached as Appendix E.

Results: The Forum discussions and polling resulted in a strong consensus on many key points and set clear direction for further work to flesh out details and resolve remaining areas of uncertainty. The points of consensus and uncertainty are summarized below.

For purposes of measuring consensus, we are treating as a point of consensus those options for which 90% or more of participants selected responses of 1, 2 or 3 – meaning they thought it was a good idea. In some cases, however, a large percentage of participants felt the option was not possible or practical (response 3), and those cases are noted in this summary. The points of consensus and uncertainty are summarized below.

A. *Watershed-scale Policies*:

There was strong support for a number of policy options, including most prominently:

- ✓ Zoning based on meeting specific environmental performance targets, such as nitrogen inputs or impervious cover, sufficient to protect water quality.
- ✓ Transfer of rights on a watershed basis, such as a "cap and trade" system that permits a development to exceed the performance standard if the developer buys rights of others in the watershed.
- ✓ Smart growth overlay districts, in which incentives would be provided to develop and redevelop in appropriate areas with improved low-impact designs.
- ✓ Improved riparian setbacks and buffers.

There was support for, but also greater opposition and concern with practicality regarding two additional policies:

- ✓ Expanding sewer service to currently-development areas using septic systems.
- ✓ Regulating the sale and use of lawn fertilizers in terms of time of application and use of slow-release formulations.

B. ***Watershed-scale Implementation*****:**

Government structures to implement policies for the BB-LEH watershed were a key point of discussion. There was nearly universal agreement that:

- ✓ Individual development actions have to take watershed and Bay impacts into account if the Bay is to be saved.
- ✓ All levels of government (state, regional, county and municipal) need to take a watershed perspective in their planning and regulatory actions.
- ✓ Zoning should be planned to meet watershed-based performance standards, such as maximum impervious cover or nutrient inputs.
- ✓ Voluntary compacts among government agencies will not be effective.
- ✓ Relying solely on municipal governments applying local zoning on a parcel-by-parcel basis will not be effective.

At the same time, there was uncertainty on the best way to bring that watershed perspective to land use decision. Many were skeptical of the practicality and/or value of creating a new watershed planning agency over and above existing local governments, or of expanding the geographic reach of the Pinelands Commission or CAFRA to cover the whole watershed.

In an effort to find a workable approach, there was a consensus for doing further work on an approach that would include two basic features:

- ✓ A state-mandated performance standard for land use plans and decisions, based on nitrogen, impervious cover, or another measure that would reduce nutrient inputs.
- ✓ A council of the existing county and municipal governments which would have the authority and responsibility to meet the performance standard through land use plans and zoning. Such a council would be controlled in some manner by the county and municipal governments, and include the Pinelands Commission and DEP in some form.

Forum participants agreed that the organizers will invite participants to a series of meetings to work out a specific proposal for the group's consideration.

Additional points of consensus on implementation were:

- ✓ Education of local governments and the public, including advocating for better local zoning and land use ordinances is an essential measure. Participants specifically endorsed a "water audit" program to show residents how they use and can save water.
- ✓ Coordination of local, regional and state permitting agencies could be helpful, particularly in ensuring that creative approaches can get a fair hearing and are not trapped between the various agencies.

A. ***Project-scale Policies:***

There was strong support for a number of policy options, including most prominently:

- ✓ Improve site planning to require low impact development (LID) techniques, such as compact development lay-outs, preservation of natural topography and vegetation, riparian buffers, permeable pavements, grassed swales, green roofs, and rain gardens.
- ✓ Manage stormwater runoff close to the point of its generation with BMPs that use a small footprint and remove and trap nutrients, sediment and other pollutants (rather than collecting and concentrating stormwater into centralized basins).
- ✓ Reuse/recycle stormwater by disconnecting downspouts and/or collecting water from downspouts into rain barrels, rain gardens, etc.
- ✓ Improve and implement working, new stormwater management designs to focus on volume reduction and nutrient removal, rather than solely rate control and sediment removal.
- ✓ Strengthen DEP stormwater rules and manual to incorporate green roofs and require the implementation of at least five of the non-structural stormwater strategies for major development.
- ✓ Implement the ground and surface water quality standard of 2 parts per million of nitrate in all development reviews and permitting.
- ✓ Require native vegetation landscaping for new development and limit turf to 25% of landscaped area (with no more than 500 square feet per dwelling unit).
- ✓ Create a non-native vegetation/turf replacement program for existing homeowners.

B. ***Project-scale Implementation:***

There was also strong support for a number of implementation options, including most prominently:

- ✓ State, county and local governments should provide funding to improve existing stormwater systems and correct existing stormwater problems.
- ✓ Update state soil conservation regulations to explicitly encourage natural re-colonization of native vegetation.
- ✓ Require LID design for new development and redevelopment:
  - ✓ State government adopt regulations requiring LID and incorporate these measures in State Building Codes
  - ✓ Municipal governments adopt ordinances requiring LID.

- ✓ Revise Residential Site Improvement Standards to include narrow street widths and narrow pavements, reduce parking lot requirements, and allow for shared parking.
- ✓ Legislation to require restoration of soil function and limit soil compaction in new developments.
- ✓ Revise the Pinelands Comprehensive Management Plan, CAFRA rules and municipal landscaping requirements to reduce the use of fertilizers and alteration of natural soils.
- ✓ Require continuing education in low impact design for members of land use boards, professionals and consultants.

There was also discussion, but no consensus, on the idea of creating a storrmwater utility to finance retrofits and provide financial incentives for low impact development and best practices. Many raised the concerns that a new taxing authority will not be welcome at this point in history, and that such authorities too often become self-perpetuating and wasteful fiefdoms for those in control. This discussion suggested that more work is needed to examine potential, realistic funding mechanisms, especially for the repair and retrofit of existing stormwater systems that are not functioning well.

Next Steps: The organizing committee has agreed to facilitate next steps towards bringing this consensus-building process to a conclusion and taking the resulting policy agenda into discussions with the public and government agency leaders:

1. The organizing committee will distribute a report of the Forum to participants for their review and comments, which the committee will use to finalize the report.
2. The organizing committee will invite participants to work in sub-committees to refine proposals dealing with key unresolved implementation options:
    - Watershed mechanism based on the general idea of a council of governments to implement watershed performance standards through Pinelands, CAFRA and local land use plans.
    - Education initiative for the public and local government agencies aimed at helping them do what they can to reduce nutrient inputs to the watershed.
    - Funding mechanisms for stormwater retrofit and incentives for best practices.
3. It is understood that some issues, particularly fertilizer controls and soil stewardship standards, are being actively worked on, so we will not organize new committees to work on these issues.
4. The organizing committee will seek to brief the Commissioner of DEP, the Ocean County Freeholders, state legislative leaders, and perhaps other government leaders on the progress of our discussions. The committee will invite other Forum participants to join in these briefings if they wish.

5. Taking the results of the additional subcommittee efforts, the organizing committee will create a draft Agenda for Barnegat Bay, and circulate it for review and sign-ons to the participants (understanding that not all participants will be in a position to sign on to such a document).

6. The organizing committee will schedule another gathering to review progress and work on carrying the consensus agenda forward.

Appendix A

Pinelands Science Policy Forum

Protecting Water Quality of New Jersey's Outer Coastal Plain

Summary of Scientific Findings Regarding Nutrient Contamination of Barnegat Bay-Little Egg Harbor

- The Barnegat Bay-Little Egg Harbor (BB-LEH) Estuary is suffering from eutrophication due to the over-enrichment of nutrients primarily from nonpoint watershed (surface water and groundwater) and atmospheric sources.
- Impacts to the BB-LEH system include nuisance and toxic algal blooms, epiphytic infestation, reduced submerged aquatic vegetation (SAV), loss of shellfish resources (most notably hard clams and scallops), deterioration of essential habitat (seagrass and shellfish beds), and declining dissolved oxygen levels in the northern segment of Barnegat Bay.
- Excessive nutrients are also contaminating and changing many interior, freshwater habitats of the Pine Barrens, resulting in the loss of native plant and animal species and the degradation native plant and animal communities in many parts of the Pinelands.
- These excessive nutrient inputs to Barnegat Bay and other aquatic habitats of the Pinelands are due to human activities in their watersheds associated with development and agriculture. These activities include the application of fertilizers on lawns and crops, the use of cars whose exhaust includes nitrogen by-products, and the use of septic systems. The atmospheric deposition of nitrogen by-products from power plants and similar activities outside the region also contribute to the excessive nutrients entering the waters of the Pinelands and coastal estuaries.
- There is a strong linkage between urban and upland agricultural land uses and nutrient loading leading to impaired downstream water quality in New Jersey's Outer Coastal Plain watersheds. The more land in the watershed that is developed and farmed, the greater the nutrient input to the watershed's streams, lakes and estuaries.
- The nutrient of greatest concern is nitrogen, though phosphorus may also play a secondary role. The U.S. Geological Survey reports that most of the nitrogen entering the estuary in surface- and groundwater is coming from the heavily developed municipalities in the northern part of the watershed outside the Pinelands Area.
- Nutrients from natural processes and human activities enter BB/LEH via (a) surface water, including both the streams that flow into the estuary and direct stormwater runoff into BB-LEH, (b) groundwater flowing directly into the estuary from the Kirkwood-Cohansey aquifer system, and (c) atmospheric deposition from carbon-burning power plants and auto exhaust. (Some nitrogen enters the Bay's waters from the ocean and from bottom sediments, but these inputs have not been quantified.)
- Of the total nitrogen inputs to the BB/LEH estuary, a recent USGS study indicated that surface-water inputs (including stream baseflow, stormwater runoff to streams, and direct-stormwater runoff to the estuary) represent 66%, direct-groundwater flow adjacent to the

estuary represents about 12%, and direct-atmospheric deposition represents approximately 22%.

Sources:

Bricker, S., Longstaff, B., Dennison, W., Jones, A., Boicourt, K., Wicks, C., and Woerner, J. 2007. Effects of nutrient enrichment in the nation's estuaries: A decade of change. NOAA Coastal Ocean Program Decision Analysis Series No. 26 National Centers for Coastal Ocean Science, Silver Spring, MD.
http://ccma.nos.noaa.gov/publications/eutroupdate/front_materials.pdf

Bunnell, J. F. and R. A. Zampella. 2008. Native fish and anuran assemblages differ between impoundments with and without non-native centrarchids and Bullfrogs. *Copeia* 2008:931-939.

Kennish, M.J. 2001. Characterization of the Barnegat Bay-Little Egg Harbor estuary and watershed. *Journal of Coastal Research*, Special Issue 32:3-12.

Kennish, M.J., S.B. Bricker, W.C. Dennison, P.A. Glibert, R.J. Livingston, K.A. Moore, R.T. Noble, H.W. Paerl, J.M. Ramstack, S. Seitzinger, D.A. Tomsako, and I. Valiela. 2007. Barnegat Bay-Little Egg Harbor Estuary: case study of a highly eutrophic coastal bay system. *Ecological Applications* 17(5):S3-16.

Wieben, C.M. and R.J Baker. 2009. Contributions of nitrogen to the Barnegat Bay-Little Egg Harbor Estuary: Updated Loading Estimates. Barnegat Bay Estuary Program. Toms River, NJ.
http://www.bbep.org/dwnloads/USGS_NLoadUpdate_Final.pdf

Zampella, R.A., J.F. Bunnell, K.J. Laidig, and N.A. Procopio. 2006. The Barnegat Bay Watershed: a report to the Pinelands Commission on the status of selected aquatic and wetland resources, Pinelands Commission, New Lisbon, NJ.
http://www.state.nj.us/pinelands/images/pdf%20files/Barnegat%20Bay%20Watershed%20Final%20Report.pdf

Zampella, R.A., N.A. Procopio, R.G. Lathrop and C.L. Dow. 2007. Relationship of land-use/land-cover patterns and surface-water quality in the Mullica River Basin. *Journal American Water Resources Association* 43(3) 594-604.
http://www3.interscience.wiley.com/journal/118544653/abstract?CRETRY=1&SRETRY=0

Appendix B: Pinelands Science-Policy Forum on Water Quality Steering Committee Members

March 16, 2010

Sue Halsey, Ph.D.	
Lisa Auermuller	Jacques Cousteau National Estuarine Research Reserve
Michael DeLuca	Jacques Cousteau National Estuarine Research Reserve
Tim Dillingham	American Littoral Society
Rob Karl	Brick Municipal Utilities Authority
Martha Maxwell-Doyle	Barnegat Bay National Estuary Program
Nick Procopio	Pinelands Commission
Rich Bizub	Pinelands Preservation Alliance
Carleton Montgomery	Pinelands Preservation Alliance
Jaclyn Rhoads	Pinelands Preservation Alliance

Pinelands Science-Policy Forum on Water Quality
Attendees
March 16, 2010

Attended	Affiliation	FirstName	LastName	Email
X	Great Egg Harbor Watershed Association	Fred B.	Akers	akers@gowebway.com
	Richard Stockton College	Rudy	Arndt	Rudolf.Arndt@stockton.edu
	Pinelands Commission	Candace	Ashmun	cmcka@fvonline.net
	Jacques Cousteau National Estuarine Research Reserve	Lisa	Auermuller	auermull@marine.rutgers.edu
	Sierra Club	Greg	Auriemma	sierracluboc@aol.com
	Burlington County Department of Resource Conservation	Gina	Berg	gberg@co.burlington.nj.us
X	Drexel University	Walt	Bien	wbien205@comcast.net
X	Pinelands Preservation Alliance	Richard G.	Bizub	rich@pinelandsalliance.org
X	Save Barnegat Bay	Michael	Borgatti	michael.borgatti@gmail.com
	Monmouth County Planning	Linda	Brennan	lbrennen@monmouthplanning.com
X	Pinelands Commission Science Office	John F.	Bunnell	john.bunnell@njpines.state.nj.us
	Rutgers University	Joanna	Burger	burger@biology.rutgers.edu
	Pinelands Commission	Patrick	Burritt	
X	Join Base at Lakehurst	Kristina	Carroll	kristina.carroll-oz@mcguire.af.mil
	NJ Department of Environmental Protection	Robert	Connell	Bob.Connell@dep.state.nj.us
	Department of Environmental Protection	Amy	Cradic	amy.cradic@dep.state.nj.us
X	Richard Stockton College	William J.	Cromartie	Jamie.Cromartie@stockton.edu
	Save Barnegat Bay	Willie	deCamp Jr	wmdecamp@yahoo.com
	SJ League of Builders	Tony	DeLodivico	tdilodovico@cmxengineering.com
X	Rutgers University IMCS JCNERR	Michael P.	DeLuca	deluca@imcs.rutgers.edu
	New Jersey Conservation Foundation	Emile	DeVito	emile@njconservation.org
X	Pinelands Field Station	John	Dighton, Ph.D.	dighton@camden.rutgers.edu
X	American Littoral Society	Tim	Dillingham	tim@littoralsociety.org
		Donna	Drewes	drewes@tcnj.edu
	Rutgers University	Dr. Joan	Ehrenfeld	ehrenfel@rci.rutgers.edu
	Richard Stockton College	Claude	Epstein	Claude.Epstein@stockton.edu
	Pinelands Commission	Leslie	Ficcaglia	lficcaglia@igc.org
	Pinelands Preservation Alliance	Rebecca J.	Free	
X	Ocean County Soil Conservation District	David B	Friedman	dfriedman@ocscd.org
	Bay Head Environmental Commission	D'Arcy	Green	drohangreen@comcast.net
	Pinelands Commission	Susan	Grogan	Susan.Grogan@njpines.state.nj.us
X	CRSSA JCNERR	Scott	Haag	scotth@crssa.rutgers.edu
X	Pinelands Commission	John A.	Haas	JHaas@co.ocean.nj.us
X	Barnegat Bay Natl Estuary Program	Louis S.	Hales, Jr.	shales@ocean.edu
		Susan D	Halsey PhD	sdhalsey@aol.com
	Department of Environmental Protection	Debbie	Hammond	debra.hammond@dep.state.nj.us
X	Rowan University	John E.	Hasse	hasse@rowan.edu
X	American Littoral Society	Helen	Henderson	helen@littoralsociety.org
	Department of Environmental Protection	Jeanne	Herb	jeanne.herb@dep.state.nj.us

Pinelands Science-Policy Forum on Water Quality
Attendees
March 16, 2010

Attended	Affiliation	FirstName	LastName	Email
		Robert	Hordon, Ph.D.,P.H.	
	Pinelands Commission	Chuck	Horner	Charles.Horner@njpines.state.nj.us
X	Pinelands Commission	Robert E.	Jackson	surffishing54@comcast.net
	William Penn Foundation	Andrew	Johnson	ajohnson@williampennfoundation.org
X	Pinelands Preservation Alliance	Russell	Juelg	russell@pinelandsalliance.org
X	Brick Municipal Utilities Authority	Rob A.	Karl	rkarl@brickmua.com
X	Rutgers University IMCS	Dr Mike J.	Kennish	kennish@imcs.rutgers.edu
	Geraldine R. Dodge Foundation	Michelle	Knapik	mknapik@grdodge.org
X	Jackson Environmental Commission	Blanche	Krubner	bkrubner@aol.com
	Pinelands Commission	Kim	Laidig	
X	Rutgers University	Dr Richard G.	Lathrop, Jr.	lathrop@crssa.rutgers.edu
X	Pinelands Commission	Larry L.	Liggett	Larry.Liggett@njpines.state.nj.us
X	Columbia Law School Environmental Law Clinic	Ed	Lloyd	elloyd@law.columbia.edu
	Joint Base at Lakehurst	Laura	Malta	laura.malta@mcguire.af.mil
	NJDEP DWM	Bob	Mancini	bob.mancini@dep.state.nj.us
X	US Fish and Wildlife Service	Steve	Mars	steve_mars@fws.gov
	Department of Environmental Protection	Bob	Martin	Mark.Mauriello@dep.state.nj.us
X	BBNEP	Martha H.	Maxwell-Doyle	mmdoyle@ocean.edu
	Delaware Valley Regional Planning Commission	Suzanne	McCarthy	smccarthy@dvrpc.org
	Ocean County	Dave	McKeon	dmckeon@co.ocean.nj.us
X	Pinelands Preservation Alliance	Carleton K.	Montgomery	carleton@pinelandsalliance.org
X		Dave	Moore	marydavemoore@verizon.net
	N.J. Geological Survey	Karl	Muessig	njgsweb@dep.state.nj.us
	USGS	Tony	Navoy	anavoy@usgs.gov
	USGS WRD	Robert	Nicholson	rnichol@usgs.gov
	Rutgers	Chris	Obropta	obropta@envsci.rutgers.edu
	Save Barnegat Bay	Jen	O'Reilly	info@savebarnegatbay.org
	Brick Township	Terra	Paxton	tpaxton@twp.brick.nj.us
	Association of New Jersey Environmental Commissions	Dave	Peifer	dpeifer@anjec.org
X	NJDEP DWM	Kerry Kirk	Pflugh	kerry.pflugh@dep.state.nj.us
X	Pinelands Commission Science Office	Nick	Procopio	nicholas.procopio@njpines.state.nj.us
	Jacques Cousteau National Estuarine Research Reserve	Melanie	Reding	reding@marine.rutgers.edu
	Pinelands Commission	Kate	Reinholt	
X	Pinelands Preservation Alliance	Jaclyn M.	Rhoads	jaclyn@pinelandsalliance.org
X		Leon M.	Rosenson	suleret@verizon.net
	New Jersey Marine Sciences Consortium	Peter M	Rowe PhD	prowe@njmsc.org
X	Clean Ocean Action	Heather	Saffert, PhD	SandyHook@cleanoceanaction.org

Pinelands Science-Policy Forum on Water Quality
Attendees
March 16, 2010

Attended	Affiliation	FirstName	LastName	Email
	Rutgers Marine Field Station	Greg	Sakowicz	sakowicz@imcs.rutgers.edu
	Delaware River Basin Commission	Jessica	Sanchez	jessica.sanchez@drbc.state.nj.us
	Rutgers University	Karina V.	Schaefer	karinavr@andromeda.rutgers.edu
X		Chris	Smith	chrissmith@aol.com
X	Princeton Hydro	Steve	Souza	ssouza@princetonhydro.com
	Stafford Township	John	Spadafora	john.spodofora@navy.mil
	USEPA Region II Estuaries & Oceans Sect	Barbara	Spinweber	Spinweber.Barbara@epamail.epa.gov
X	Wells National Estuarine Research Reserve	Zachary R.	Steele	zsteele@wellsnerr.org
	Pinelands Commission	John	Stokes	John.Stokes@njpines.state.nj.us
	New Jersey Future	Chris	Sturm	csturm@njfuture.org
		Nancy	Sutley	
	Ocean County Health Department	Ken	Weinreich	kwenrich@ochd.org
	Pinelands Commission Science Office	Edward W.	Wengrowski	Ed.Wengrowski@njpines.state.nj.us
X	Pinelands Commission Science Office	Robert A.	Zampella	robert.zampella@njpines.state.nj.us
	Clean Ocean Action	Cindy	Zipf	SandyHook@cleanoceanaction.org

Appendix D: Final List of Keypad Polling Questions

Keypad Polling Options:

Policy Option X:

Rank Policy/Implementation Option X by selecting one of the below options:

1 – Agree and High Priority

2 – Agree and Low Priority

3 – Agree but not possible/practical

4 – Disagree – not effective and/or not worth pursuing

Questions used for AM discussion – Land Use Strategies:

Policy Options

1. **Urban/suburban growth boundaries:** watershed-wide designations of growth and conservation zones through setting growth boundaries.
2. **Watershed-based zoning with:**
    a. **Impervious surface targets**.
    b. **Specific performance-based targets *[added for second round of polling]:*** using subwatershed boundaries, rather than municipalities, as the basis for future land use planning and setting of performance-based targets scaled to protect water quality.
3. **Overlay zoning:** superimposing additional development standards, such as maximum and minimum densities, impervious cover limits, and low impact community and building design requirements.

    a. **Smart Growth District Overlay** providing incentives to develop or redevelop in the most appropriate locations using sustainable design and construction methods.

    b. **Nitrogen Management Overlay District** imposing standards to limit nitrogen inputs, such as limiting development footprint size/impervious surface, reducing lawn size and fertilizer use, and upgrading failing septic systems and storm-water management systems.

4. **Transfer of Development Rights (TDR)** on a watershed basis to direct development to the most appropriate locations and encourage redevelopment of built-up areas.
5. **Riparian Setbacks and buffers** to increase existing regulatory buffer widths and specify that buffers be maintained in natural vegetation.
6. **Expand sewer service in already-developed areas** to reduce septic effluent.

Appendix D: Final List of Keypad Polling Questions

7. **Watershed-wide Lawn Fertilizer Reduction** through either:
    a. Public education and voluntary application reductions, or
    b. Regulatory ban on sale and application of fertilizer during the growing season and required use of slow-release products.

Implementation Options:

1. **State planning and regulatory authority**:
    a. Expand the powers of the State Planning Commission and direct it to create and implement a watershed plan and/or implement policies as identified above.
    b. Expand the geographic jurisdiction of the Coastal Area Facilities Review Act (CAFRA) and direct DEP to create and implement a watershed plan.
    c. Establish an "office" of permitting agencies for Barnegat Bay to include coordination of CAFRA, Pinelands Commission, DEP, and county staff. ***[added for second round of polling]***
2. **Mandatory Watershed Management Structures**
    a. Expand the geographic jurisdiction of the Pinelands Commission to include the entire watershed and direct it to create and implement a watershed plan and/or implement policies as identified above.
    b. Authorize and create a Barnegat Bay watershed council of governments and give it the authority to create and implement a watershed plan, but include a form for electing/appointing representative of municipal and county reps
    c. Mandatory council of governments or other form of compact by county with land use authority only in those municipal jurisdictions which choose to join the council. ***[added for second round of polling]***
3. **Voluntary Watershed Management Structures**
    a. Voluntary council of governments or other form of compact with land use authority only in those municipal jurisdictions which choose to join the council.
    b. Voluntary sub-watershed compacts: planning agreements between municipalities within the 13 individual sub-watersheds in the BB-LEH.
4. **Voluntary Municipal Compliance with Watershed Stewardship Goals**. This is essentially the current situation.

Questions used for PM discussion – Development-based Strategies:

Policy Options

1. **Improve site planning to emphasize low impact development (LID) techniques**, such as permeable pavements, riparian buffers, grassed swales, green roofs, and rain gardens, compact development lay-outs, and preservation of natural topography and vegetation.

Appendix D: Final List of Keypad Polling Questions

2. **Manage stormwater runoff close to the point of its generation** with BMPs that use a small footprint and remove and trap nutrients, sediment and other pollutants.
3. **Reuse/recycle stormwater** by disconnecting downspouts and/or collecting water from downspouts into rain barrels, rain gardens, etc.
4. **Improve and implement working, new stormwater management designs** to focus on volume reduction and nutrient removal, rather than solely rate control and sediment removal.
5. **Use only native vegetation landscaping** for new development and limit turf to 25% of landscaped area (with no more than 500 square feet per dwelling unit).
6. **Create a non-native vegetation/turf replacement program for existing homeowners**.
7. **Revise Residential Site Improvement Standards** to include narrow street widths and narrow pavements, reduce parking lot requirements, and allow for shared parking.
8. **Legislation to restore soil function and limit compaction.** ***[added for second round of polling]***
9. **Create continuing education LID requirements for board, commissions and planning consultants and government staff.** ***[added for second round of polling]***
10. **Revise ground and surface water quality standards to 2ppm.** ***[added for second round of polling]***

<u>Implementation Options:</u>

1. **Retrofit existing stormwater systems.** State, county and local governments provide funding to improve existing stormwater systems and correct existing stormwater problems.
2. **Pinelands Commission, CAFRA and local governments enforce and revise landscaping requirements** through permitting processes.
3. **State legislation** requiring native vegetation landscaping for all new development with only 25% of landscaped area in turf (with no more than 500 square feet per dwelling unit).
4. **Update state soil conservation regulations** to explicitly encourage natural re-colonization of native vegetation.
5. **Require LID design for new development and redevelopment**:
    a. State government adopt regulations requiring LID and incorporate these measures in State Building Codes
    b. Municipal governments adopt ordinances requiring LID.
6. **Strengthen DEP stormwater rules and manual to** incorporate green roofs and require the implementation of at least five of the non-structural stormwater strategies for major development.
7. **Create Storm Water Utility Authority** to raise funds and implement stormwater management and repairs.
8. **Create user fee for impervious surface or stormwater generation and have funds dedicated to**

existing agency or environmental infrastructure trust fund. ***[added for second round of polling]***

9. **Create user fee for impervious surface or stormwater generation and have funds dedicated to county.** ***[added for second round of polling]***
10. **Water audit program to include outdoor water use assessment – voluntary program that would help educate residents about water use and limit that use.**

Polling Results - Watershed Policies First Poll

1.) Policy option #1 Urban/suburban growth boundaries

	Responses (percent)	(count)
Agree High Priority	46.88%	15
Agree Low Priority	18.75%	6
Agree not possible/practical	31.25%	10
Disagree not effective/worth pursuing	3.12%	1
Totals	100%	32

2.) Policy option #2 Watershed-based zoning with impervious surface targets

	Responses (percent)	(count)
Agree High Priority	68.75%	22
Agree Low Priority	6.25%	2
Agree not possible/practical	25%	8
Disagree not effective/worth pursuing	0%	0
Totals	100%	32

3.) Policy option #3A Smart Growth District Overlay

	Responses (percent)	(count)
Agree High Priority	63.33%	19
Agree Low Priority	13.33%	4
Agree not possible/practical	16.67%	5
Disagree not effective/worth pursuing	6.67%	2
Totals	100%	30

4.) Policy option #3B Nitrogen Management District Overlay

	Responses (percent)	(count)
Agree High Priority	70%	21
Agree Low Priority	16.67%	5
Agree not possible/practical	10%	3
Disagree not effective/worth pursuing	3.33%	1
Totals	100%	30

5.) Policy option # 4 Transfer of Development Rights

	Responses (percent)	(count)
Agree High Priority	67.74%	21
Agree Low Priority	19.35%	6
Agree not possible/practical	9.68%	3
Disagree not effective/worth pursuing	3.23%	1
Totals	100%	31

6.) Policy option #5 Riparian Setbacks and Buffers

	Responses (percent)	(count)
Agree High Priority	70%	21
Agree Low Priority	13.33%	4
Agree not possible/practical	6.67%	2
Disagree not effective/worth pursuing	10%	3
Totals	100%	30

7.) Policy option #6 Expanded sewer service in already-developed areas

	Responses (percent)	(count)
Agree High Priority	60%	18
Agree Low Priority	23.33%	7
Agree not possible/practical	6.67%	2
Disagree not effective/worth pursuing	10%	3
Totals	100%	30

8.) Policy option #7A watershed-wide lawn fertilizer reduction

	Responses (percent)	(count)
Agree High Priority	32.26%	10
Agree Low Priority	16.13%	5
Agree not possible/practical	32.26%	10
Disagree not effective/worth pursuing	19.35%	6
Totals	100%	31

9.) Policy option #7B watershed-wide lawn fertilizer reduction

	Responses (percent)	(count)
Agree High Priority	55.17%	16
Agree Low Priority	6.90%	2
Agree not possible/practical	24.14%	7
Disagree not effective/worth pursuing	13.79%	4
Totals	100%	29

10.) Implementation option #1A Expand State Planning Commission powers

	Responses (percent)	(count)
Agree High Priority	29.03%	9
Agree Low Priority	16.13%	5
Agree not possible/practical	22.58%	7
Disagree not effective/worth pursuing	32.26%	10
Totals	100%	31

11.) Implementation option #1B Expand geographic jurisdiction of CAFRA

	Responses (percent)	(count)
Agree High Priority	13.79%	4
Agree Low Priority	13.79%	4
Agree not possible/practical	24.14%	7
Disagree not effective/worth pursuing	48.28%	14
Totals	100%	29

12.) Implementation option #2A Expand geographic jurisdiction of the Pinelands Commission

		Responses (percent)	(count)
Agree High Priority		25.81%	8
Agree Low Priority		12.90%	4
Agree not possible/practical		35.48%	11
Disagree not effective/worth pursuing		25.81%	8
	Totals	100%	31

13.) Implementation option #2B Authorize and create Barnegat Bay watershed council of governments

		Responses (percent)	(count)
Agree High Priority		35.71%	10
Agree Low Priority		10.71%	3
Agree not possible/practical		14.29%	4
Disagree not effective/worth pursuing		39.29%	11
	Totals	100%	28

14.) Implementation option #3A Voluntary council of governments

		Responses (percent)	(count)
Agree High Priority		14.29%	4
Agree Low Priority		14.29%	4
Agree not possible/practical		3.57%	1
Disagree not effective/worth pursuing		67.86%	19
	Totals	100%	28

15.) Implementation option #3B Voluntary sub-watershed compacts

		Responses (percent)	(count)
Agree High Priority		13.79%	4
Agree Low Priority		6.90%	2
Agree not possible/practical		10.34%	3
Disagree not effective/worth pursuing		68.97%	20
	Totals	100%	29

16.) Implementation option #4 Voluntary municipal compliance with watershed stewardship goals

		Responses (percent)	(count)
Agree High Priority		14.29%	4
Agree Low Priority		7.14%	2
Agree not possible/practical		3.57%	1
Disagree not effective/worth pursuing		75%	21
	Totals	100%	28

Note: Some polling questions were not re-polled due to overhwelming support or opposition to the question. In addition, new questions may have been added.

Polling Results - Watershed Policies Second Poll

17.) Policy Option #2B Watershed-based zoning with performance based standards

		Responses (percent)	(count)
Agree High Priority		80%	24
Agree Low Priority		6.67%	2
Agree not possible/practical		10%	3
Disagree not effective/worth pursuing		3.33%	1
	Totals	100%	30

18.) Implementation Option #1A Expand State Planning Commission powers

		Responses (percent)	(count)
Agree High Priority		25.81%	8
Agree Low Priority		12.90%	4
Agree not possible/practical		12.90%	4
Disagree not effective/worth pursuing		48.39%	15
	Totals	100%	31

19.) Implementation Option #1B Expand geographic jurisdiction of CAFRA

		Responses (percent)	(count)
Agree High Priority		28.12%	9
Agree Low Priority		3.12%	1
Agree not possible/practical		12.50%	4
Disagree not effective/worth pursuing		56.25%	18
	Totals	100%	32

20.) Implementation Option #2A Expand geographic jurisdiction of the Pinelands Commission

		Responses (percent)	(count)
Agree High Priority		13.79%	4
Agree Low Priority		3.45%	1
Agree not possible/practical		31.03%	9
Disagree not effective/worth pursuing		51.72%	15
	Totals	100%	29

Note: Some polling questions were not re-polled due to overhwelming support or opposition to the question. In addition, new questions may have been added.

21.) Implementation Option #2B Authorize and create Barnegat Bay watershed council of governments

		Responses (percent)	(count)
Agree High Priority		53.12%	17
Agree Low Priority		12.50%	4
Agree not possible/practical		12.50%	4
Disagree not effective/worth pursuing		21.88%	7
	Totals	100%	32

22.) Implementation Option #2C Mandatory regional watershed compacts led by county

		Responses (percent)	(count)
Agree High Priority		58.62%	17
Agree Low Priority		13.79%	4
Agree not possible/practical		3.45%	1
Disagree not effective/worth pursuing		24.14%	7
	Totals	100%	29

23.) Implementation Option #3A Voluntary council of governments

		Responses (percent)	(count)
Agree High Priority		3.57%	1
Agree Low Priority		3.57%	1
Agree not possible/practical		7.14%	2
Disagree not effective/worth pursuing		85.71%	24
	Totals	100%	28

24.) Implementation Option #3B Voluntary sub-watershed compacts

		Responses (percent)	(count)
Agree High Priority		3.45%	1
Agree Low Priority		3.45%	1
Agree not possible/practical		6.90%	2
Disagree not effective/worth pursuing		86.21%	25
	Totals	100%	29

25.) Implementation Option #4 Voluntary municipal compliance with watershed stewardship goals

	Responses (percent)	Responses (count)
Agree High Priority	10.34%	3
Agree Low Priority	6.90%	2
Agree not possible/practical	17.24%	5
Disagree not effective/worth pursuing	65.52%	19
Totals	100%	29

26.) Implementation Option #1c Establish single office of permitting agencies for Barnegat Bay

	Responses (percent)	Responses (count)
Agree High Priority	60%	18
Agree Low Priority	16.67%	5
Agree not possible/practical	13.33%	4
Disagree not effective/worth pursuing	10%	3
Totals	100%	30

Polling Results - Development Policies First Poll

27.) Policy option #1 Improve site planning to emphasize low impact development techniques

		Responses (percent)	(count)
Agree High Priority		100%	26
Agree Low Priority		0%	0
Agree not possible/practical		0%	0
Disagree not effective/worth pursuing		0%	0
	Totals	100%	26

28.) Policy option #2 Manage stormwater runoff close to the point of its generation

		Responses (percent)	(count)
Agree High Priority		96.15%	25
Agree Low Priority		3.85%	1
Agree not possible/practical		0%	0
Disagree not effective/worth pursuing		0%	0
	Totals	100%	26

29.) Policy option #3 Reuse / recycle stormwater

		Responses (percent)	(count)
Agree High Priority		66.67%	18
Agree Low Priority		14.81%	4
Agree not possible/practical		14.81%	4
Disagree not effective/worth pursuing		3.70%	1
	Totals	100%	27

30.) Policy option # 4 Improve and implement new stormwater management designs

		Responses (percent)	(count)
Agree High Priority		92.31%	24
Agree Low Priority		3.85%	1
Agree not possible/practical		3.85%	1
Disagree not effective/worth pursuing		0%	0
	Totals	100%	26

31.) Policy option #5 require native vegetation landscaping for new development

		Responses (percent)	(count)
Agree High Priority		77.78%	21
Agree Low Priority		11.11%	3
Agree not possible/practical		11.11%	3
Disagree not effective/worth pursuing		0%	0
	Totals	100%	27

32.) Policy option #6 Create non-native vegetation/turf replacement program for homeowners

	Responses (percent)	Responses (count)
Agree High Priority	57.14%	16
Agree Low Priority	21.43%	6
Agree not possible/practical	21.43%	6
Disagree not effective/worth pursuing	0%	0
Totals	100%	28

33.) Policy option #7 Revise residential site improvement standards

	Responses (percent)	Responses (count)
Agree High Priority	66.67%	16
Agree Low Priority	16.67%	4
Agree not possible/practical	16.67%	4
Disagree not effective/worth pursuing	0%	0
Totals	100%	24

34.) Implementation option #1 Retrofit existing stormwater systems

	Responses (percent)	Responses (count)
Agree High Priority	88.89%	24
Agree Low Priority	7.41%	2
Agree not possible/practical	0%	0
Disagree not effective/worth pursuing	3.70%	1
Totals	100%	27

35.) Implementation option #2 Enforce and revise Pinelands Commission, CAFRA and local governments landscaping requirements

	Responses (percent)	Responses (count)
Agree High Priority	60%	15
Agree Low Priority	8%	2
Agree not possible/practical	20%	5
Disagree not effective/worth pursuing	12%	3
Totals	100%	25

36.) Implementation option #3 State Legislation requiring native vegetation landscaping and limiting turf.

	Responses (percent)	Responses (count)
Agree High Priority	35.71%	10
Agree Low Priority	14.29%	4
Agree not possible/practical	42.86%	12
Disagree not effective/worth pursuing	7.14%	2
Totals	100%	28

37.) Implementation option #4 Update state soil conservation regulations

	Responses (percent)	(count)
Agree High Priority	66.67%	18
Agree Low Priority	14.81%	4
Agree not possible/practical	14.81%	4
Disagree not effective/worth pursuing	3.70%	1
Totals	100%	27

38.) Implementation option #5A State government require LID in State Building Codes

	Responses (percent)	(count)
Agree High Priority	87.50%	21
Agree Low Priority	4.17%	1
Agree not possible/practical	8.33%	2
Disagree not effective/worth pursuing	0%	0
Totals	100%	24

39.) Implementation option #5B Municipal governments adopt ordinances requiring LID

	Responses (percent)	(count)
Agree High Priority	59.26%	16
Agree Low Priority	3.70%	1
Agree not possible/practical	33.33%	9
Disagree not effective/worth pursuing	3.70%	1
Totals	100%	27

40.) Implementation option #6 Strengthen stormwater rules and manual

	Responses (percent)	(count)
Agree High Priority	84.62%	22
Agree Low Priority	11.54%	3
Agree not possible/practical	0%	0
Disagree not effective/worth pursuing	3.85%	1
Totals	100%	26

41.) Implementation option #7 Create stormwater utility authority

	Responses (percent)	(count)
Agree High Priority	53.85%	14
Agree Low Priority	0%	0
Agree not possible/practical	19.23%	5
Disagree not effective/worth pursuing	26.92%	7
Totals	100%	26

Note: Some polling questions were not re-polled due to overhwelming support or opposition to the question. In addition, new questions may have been added.

Polling Results - Development Policies Second Poll

42.) Policy Option #3 Reuse / recycle stormwater

	Responses (percent)	Responses (count)
Agree High Priority	66.67%	14
Agree Low Priority	28.57%	6
Agree not possible/practical	4.76%	1
Disagree not effective/worth pursuing	0%	0
Totals	100%	21

43.) Policy Option #6 Create non-native vegetation/turf replacement program for homeowners

	Responses (percent)	Responses (count)
Agree High Priority	54.55%	12
Agree Low Priority	18.18%	4
Agree not possible/practical	13.64%	3
Disagree not effective/worth pursuing	13.64%	3
Totals	100%	22

44.) Policy Option #7 Revise residential site improvement standards

	Responses (percent)	Responses (count)
Agree High Priority	76.19%	16
Agree Low Priority	14.29%	3
Agree not possible/practical	4.76%	1
Disagree not effective/worth pursuing	4.76%	1
Totals	100%	21

45.) Policy Option #8 Legislation to restore soil function

	Responses (percent)	Responses (count)
Agree High Priority	75%	18
Agree Low Priority	12.50%	3
Agree not possible/practical	8.33%	2
Disagree not effective/worth pursuing	4.17%	1
Totals	100%	24

Note: Some polling questions were not re-polled due to overhwelming support or opposition to the question. In addition, new questions may have been added.

46.) Policy Option #9 Continuing Ed. For LID of Boards etc.

	Responses (percent)	Responses (count)
Agree High Priority	78.26%	18
Agree Low Priority	17.39%	4
Agree not possible/practical	4.35%	1
Disagree not effective/worth pursuing	0%	0
Totals	100%	23

47.) Policy Option #10 Revise ground and surface water standards to N-2ppm

	Responses (percent)	Responses (count)
Agree High Priority	81.82%	18
Agree Low Priority	9.09%	2
Agree not possible/practical	9.09%	2
Disagree not effective/worth pursuing	0%	0
Totals	100%	22

48.) Policy Option #2 Enforce and revise Pinelands Commission, CAFRA, Municipal. landscaping requirements

	Responses (percent)	Responses (count)
Agree High Priority	73.91%	17
Agree Low Priority	8.70%	2
Agree not possible/practical	8.70%	2
Disagree not effective/worth pursuing	8.70%	2
Totals	100%	23

49.) Implementation option #3 State Legislation

	Responses (percent)	Responses (count)
Agree High Priority	56.52%	13
Agree Low Priority	13.04%	3
Agree not possible/practical	17.39%	4
Disagree not effective/worth pursuing	13.04%	3
Totals	100%	23

Note: Some polling questions were not re-polled due to overhwelming support or opposition to the question. In addition, new questions may have been added.

50.) Implementation option #5B Municipal governments adopt ordinances requiring LID

		Responses (percent)	Responses (count)
Agree High Priority		63.64%	14
Agree Low Priority		4.55%	1
Agree not possible/practical		27.27%	6
Disagree not effective/worth pursuing		4.55%	1
	Totals	100%	22

51.) Implementation option #8 User fee to exiting agency or EIT

		Responses (percent)	Responses (count)
Agree High Priority		66.67%	14
Agree Low Priority		0%	0
Agree not possible/practical		19.05%	4
Disagree not effective/worth pursuing		14.29%	3
	Totals	100%	21

52.) Implementation option #9 User fee to local county

		Responses (percent)	Responses (count)
Agree High Priority		38.10%	8
Agree Low Priority		23.81%	5
Agree not possible/practical		4.76%	1
Disagree not effective/worth pursuing		33.33%	7
	Totals	100%	21

53.) Implementation option #10 Establish water audit program to reduce water use & reuse stormwater

		Responses (percent)	Responses (count)
Agree High Priority		50%	11
Agree Low Priority		36.36%	8
Agree not possible/practical		4.55%	1
Disagree not effective/worth pursuing		9.09%	2
	Totals	100%	22