Public Hearing

before

SENATE ENVIRONMENT COMMITTEE
ASSEMBLY ENVIRONMENT AND SOLID WASTE COMMITTEE

"Testimony from the public and invited witnesses on the health of the Barnegat Bay, on proposed legislation to provide stable funding to the interpretive centers at Liberty State Park and Island Beach State Park, and the impact in New Jersey of the new Federal saltwater fishing registry"

LOCATION: Lacey Township Municipal Building
Forked River, New Jersey

DATE: July 30, 2009
10:00 a.m.

MEMBERS OF COMMITTEES PRESENT:

Senator Bob Smith, Chair
Assemblyman John F. McKeon, Chair
Senator Jeff Van Drew, Vice Chair
Assemblyman Reed Gusciora, Vice Chair
Senator Robert M. Gordon
Assemblyman Matthew W. Milam
Assemblyman John E. Rooney
Assemblywoman Valerie Vainieri Huttle

ALSO PRESENT:

Senator Christopher J. Connors

Judith L. Horowitz
Carrie Anne Calvo-Hahn
Office of Legislative Services
Committee Aides

Kevil Duhon
Senate Majority Aide
Kate McDonnell
Assembly Majority Aide

John Hutchison
Senate Republican Aide
Thea M. Sheridan
Assembly Republican Aide

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SENATOR BOB SMITH (Chair): Will everyone take a seat, please?

We have good news and we have bad news. The good news -- the good news is that we're at the most beautiful place on the planet Earth, namely the Jersey Shore. We're here with you on a sunny day. The bad news is we don't have an amplification system. So legislators have to speak up, and citizens and witnesses have to speak up so that everyone can be heard. That's the bad news.

We're very happy to be in Lacey Township today. Chairman McKeon and myself, every year, try to have a summer environmental hearing, a joint meeting of the two Committees at the Jersey Shore to recognize particularly the issues that effect the Jersey Shore, and to make sure that your Assembly and Senate are working together to try and address those issues.

Today we have put three very important topics on the agenda. They're hot topics. We're starting with the health of the Barnegat Bay; and I want you to know that while Assemblyman McKeon represents part of Essex, and I represent parts of Middlesex, we both also spend a great deal of time in the Summer at the Jersey Shore. So we are as invested in the Barnegat Bay as you are, as are the members of our Committee, all right? And we want to do what's right for it. I think in the case of the Barnegat Bay we need more direction from the scientists and the citizens who live around the Bay to give us some idea of what we should do.

One of the things, however, that we can do -- and I want to get a commercial out early -- on the ballot this year is a bond issue for open

space. And I'm sure some of the witnesses today are going to say that if you want to do more for the health of the Barnegat Bay, open space preservation in this area goes a long way toward that goal. So if you care about the Barnegat Bay, you make sure you vote yes on that $400 million bond issue for open space (applause).

UNIDENTIFIED MEMBER OF AUDIENCE: You're going to have to turn the volume up; we can't hear a thing.

SENATOR SMITH: Oh, I *knew* this was going to happen (laughter). (Louder) Vote yes on the bond issue! (laughter)

In addition to that -- a very, very important issue, especially for the fisherman and fisherwomen of the Jersey Shore, and our tourism industry -- is this whole issue of the Saltwater Registry, which if New Jersey doesn't do, the Federal government will do, and they'll charge every fishing person in New Jersey somewhere between $15 and $25 a year. None of that money will ever be seen in New Jersey. So that's a big issue that we want to talk about with the affected people today, as well.

And then a third very, very important issue is funding for the interpretive programs at what is really one of the great jewels of our state, which is Island Beach State Park, and we want to get some input on that as well.

We are blessed today -- and I'm going to deal with the Senate side of the aisle -- we are blessed today to have two of our finest Senators present: we have Senator Robert Gordon, who is a great-- I'm sorry, we have *three* Senators present.

UNIDENTIFIED MEMBER OF AUDIENCE: When you say the finest (laughter)

SENATOR SMITH: Well, I -- I can't get into that. (laughter) I'm in trouble. (laughter)

Starting on our left, our Senator from Cape May, and that's Senator Jeff Van Drew, who is a real great source of support for the Jersey Shore. Senator Jeff Van Drew. Jeff, if you'd wave to everybody. Let's give the Senator a hand. (applause)

And from Bergen County, but who loves the Shore no less, Senator Robert Gordon. And by the way, Senator Gordon is working right now to try and protect a good area of southern New Jersey and Jersey Shorelands from the ravages of ATVs. I don't know if you've been following that, but he's been the leader on that issue and is doing a fabulous job.

And then we are in the home territory of your local Senator, who's been a great supporter of the environment, and that's Senator Chris Connors. Give him a wave. (applause) I'd ask Senator Connors if he would, if we have any local officials, to introduce them. And if he has a few words as the home Senator -- Senator Connors, please do so.

SENATOR CONNORS: Thank you, Mr. Chairman.

Good morning, Chairmen, and members of the Committee.

On behalf of Assemblyman Brian Rumpf and myself, I want to thank Chairman Smith and Chairman McKeon for agreeing to host today's hearing here in the 9th Legislative District. I also want to take this opportunity to thank Lacey Township officials for making available this wonderful venue.

The 9th Legislative District is proudly comprised of a number of bayfront communities, including the Barnegat Bay, as well as the

Manahawkin, Little Egg Harbor, and Great Bay regions. All have a vested interest in the preservation of this vital waterway and precious natural resource. We recognize the importance and value of the Barnegat and adjacent bays to our region and this state.

The Bay plays an integral role in the local area, perhaps most predominantly in the local economy, from tourism and the recreational fishing industry to the hardworking baymen, including the commercial hard clam and crabbing industry.

Just yesterday I spoke with a representative of this industry. This individual conveyed to me that he was going to make every effort to attend today; however, his industry would most likely be submitting written testimony on account that he and his colleagues would be working the water as it's their busy season. Over the years I've come to rely on the insight of the commercial hard clam industry as to the condition of the Bay and possible impacts on those industries whose operations center primarily on the Bay.

Assemblyman Rumpf and I requested a hearing on the Barnegat Bay in response to growing concerns expressed to us about the condition of the Bay, and the certain changes that are occurring that could threaten the unique and diverse wildlife that currently inhabit it. It is important to note that other parts of the country, including the states surrounding the Chesapeake Bay, have been compelled to take on the very difficult challenge of protecting their bays from harmful actions, even if unintentional.

To gain more comprehensive understanding of the condition of the Barnegat Bay, our delegation continues to maintain an open line of

communication with the Barnegat Bay National Estuary Program. Its staff, led by Program Director L. Stanton Hales, who will be testifying shortly, continues to advise our delegation; along with Michael DeLuca of the Institute of Marine and Coastal Sciences, at the University at Rutgers *(sic).* I'm sure that members of the Committee and members of the relevant State agencies will find the testimony offered by these two individuals, on behalf of the respective organizations, invaluable in determining the best course of action in which to proceed for better protecting the Barnegat Bay.

On a personal note, I want to testify for the record that as a life-long resident of Ocean County, I have a true appreciation for the true, natural treasure the Barnegat Bay is for our state. As an avid recreational fisherman, I stand with the thousands of residents in supporting protective measures that will ensure future generations will not only know a healthy Barnegat Bay that is enjoyed as a vacation destination, but equally important will continue to serve as a unique habitat to a number of thriving wildlife species. The number of concerned organizations here today from across the state stands as a testament to the unwavering commitment of residents who share a common goal to protect the Barnegat Bay.

Again, I want to thank Chairman Smith and Chairman McKeon for holding today's hearing in Ocean County, in the 9th Legislative District. Your considerable efforts have afforded all of us who care so deeply about the Bay the opportunity to speak today to convey the critical importance of this issue.

So thank you, Chairman Smith and Chairman McKeon, and members of this Committee.

ASSEMBLYMAN McKEON: Thank you, Senator Connors.

Are there any local officials that we should be recognizing, Senator?

SENATOR CONNORS: We have Committeeman Lachawiec from Ocean Township, the neighboring town of Waretown, which is on the Barnegat Bay. I'd also point out-- By scanning the audience, I know that Former Committeeman Ron Laird, who I had the pleasure of serving with on the Lacey Township Committee years ago, is here. He's an avid recreational fisherman, a member of a number of organizations in town, and hopefully he'll be able to testify here as well today.

I'm not seeing anyone else-- Oh, Commissioner DiAnne Gove, in the back, former Mayor of Long Beach Township, a member of the Barnegat Bay Estuary Program, is here as well.

SENATOR CONNORS: Thank you.

SENATOR SMITH: Thank you, Senator.

My colleague, my analog colleague in the Assembly, a real leader on the environment, Chairman John McKeon, will be doing some welcoming and introducing his members.

ASSEMBLYMAN JOHN F. McKEON (Chair): Thank you, Senator Smith. And every time I get a chance to say it publicly, my esteem for you knows no bounds. And you've been a wonderful role model, and I appreciate our partnership over the last eight years now in trying to do our best on behalf of the environment.

Speaking of deep-seated respect and warm personal feelings, it's always wonderful to be together with Senators Van Drew and Gordon, going back to when I taught them everything they know (laughter). We served in the Assembly together. And Senator Connors, I don't know you

as well, but just from your articulate remarks, thank you for being the host and for your advocacy, for not only this district but for the entire State.

The colleagues of mine that are here today -- I'll note the one that isn't -- Assembly Gusciora is on his way, coming in from Trenton this morning, and he'll get a chance to hear all your testimony shortly. Assemblyman Rooney, who is the longest-standing member of the New Jersey State Assembly, is here, and again, has always been an important part of this Committee who has provided very insightful guidance throughout my tenure. And thank you for being here, Assemblyman Rooney.

Assemblywoman Vainieri Huttle, although somewhat new to the Committee, has taken, in my view, advocacy to a level that's been exemplary. She's someone who fights for the environment and fights for what she believes in. And thank you for being here, Assemblywoman.

And finally, Assemblyman Matt Milam. Matt is from District 1, a large part of it being Cape May County. He's an accomplished and skilled outdoorsman; and frankly I'm not. (laughter) He's brought amazing perspective to me as it relates to the issues that we deal with regularly, with having that skill set -- is an important part to give some great insight to.

And always, all of our professional staff, both partisan and non-partisan -- we thank you for being here with us, and we couldn't do anything without you.

And lastly, I'd like to make a couple personal, kind of happy notes. I've got three daughters; my eldest at age 22 is named Lacey. So I was a few minutes late because I was trying to take a cell phone picture of the Lacey Township tower to send to her, to give her a kick out of (laughter). And speaking of the circle of life -- my eight-year Director of

Constituent Relations, Dawn Spango, gave birth to twins last night just shortly before midnight. So Brooke and Madison, welcome to the world, and welcome to this great state and this great area.

I mentioned my three daughters and the birth of these two beautiful infants just hours ago, because I always look at our position as, in part, environmental stewards. And certainly with the great advocates we're all looking at, your position -- never being about us, but being about them and about the future. All three of my daughters, with the 16-year-old now, have worked at the interpretive center that we're going to hear about today. And it's bought them a great wealth of understanding and appreciation for the environment; and many more who have the privilege of going through that program. The same reason that I love the Jersey Shore as many of you do, whether it be the waterskiing, or the surfing, or the just natural beauty of it all, is the same reason that they've grown to love it.

So what today is about, whether it be Barnegat Bay, or the interpretive center, or a great component of that -- and that's saltwater salt fishing. And I just note, Senator -- if it went by the number of fish you caught as a surfcaster, I wouldn't know anything (laughter). So it's all good.

That's what today is about -- to preserve an incredible aspect of, really, our culture and who we are in New Jersey. And all that goes with the Jersey Shore and its epicenter, the Barnegat Bay.

So with that, I think we're ready to go forward, Senator.

SENATOR SMITH: Our first topic today is the health of the Barnegat Bay. Our lead-off witness is a man who has many, many, many years of experience in environment protection, and that's John Watson, our

Deputy Commissioner at the New Jersey Department of Environmental Protection.

Commissioner Watson, if you would come forward and give us the DEP's view on the health of the Barnegat Bay, we'd appreciate it.

DPTY. COMMISSIONER JOHN S. WATSON JR.:

Thank you very much, Mr. Chairman.

SENATOR SMITH: Again, you have to speak up.

DEPUTY COMMISSIONER WATSON: Yes, sir.

Good morning, Mr. Chairman -- both Chairmen, Chairman Smith and Chairman McKeon, thank you very much; and members of this esteemed Committee. Thank you very much for inviting us from the DEP to talk about this very important topic.

Is someone going to turn the light box on? Okay, here we go.

We really appreciate the opportunity to come to talk about this important topic along the Barnegat Bay. We thank you for your ardent advocacy in this area, and all of the work that you do to make sure that we focus our attention on it. And we're also very thankful at the DEP--

SENATOR SMITH: Can I pick on you, Commissioner? Would you mind standing up; and turn to the side, so that-- We're going to see if the DEP can walk and chew gum at the same time (laughter). Could you stand and face the audience as well as us?

And now, loudly, loudly.

DEPUTY COMMISSIONER WATSON: Good morning. So thank you very much for inviting us. The DEP believes that this is one of the most important issues that we're facing in terms of natural resource protection in the entire State of New Jersey.

And we're thankful for your ardent advocacy, all of the members of this Committee and the Legislature, and certainly the Chairs of each Committee. We're also very thankful for the many advocates bringing this issue to our attention. We've been working very closely with Dr. Hales, obviously, from the Barnegat Bay National Estuary Program; Rutgers University, Save Barnegat Bay, The Littoral Society, and a host of other groups that have expressed an interest in making sure that the Department is doing all that we can to focus our resources to make sure that we're taking care of this important natural resources. So we thank all of you for kind of weighing in on this issue and making sure that the Department of Environmental Protection does what it's supposed to do within its resource capabilities to address these important issues.

So I wanted to just go through, very quickly, a few slides, because I know that there are a lot of speakers today, and just talk about what the DEP views as key issues. And I apologize to the audience for not being able to see the setup here.

We believe that the key issues that we're focusing on are the ecological decline of the Bay. Obviously, eutrophication is the thing that most people are pointing to as probably one of the most significant problems that we're facing, and obviously water quality.

The indicators of the problems that we're seeing, we believe, are related to those issues that I mentioned, the key issues. And we believe that they are borne out or they are demonstrated by the decline of subaquatic vegetation in the Bay, the decline of our shellfish beds and other fisheries, and the increase in sea nettles that we've been seeing in the Bay lately.

Some of the likely causes, as I'm sure all of you in the audience know, and certainly members of the Committees: stormwater runoff from streets and lawns and parking areas, much of it related to fertilizer applications and other contaminates; groundwater-- While many point to nitrogen as -- from run off from fertilizer -- as a major consideration for the eutrophication in the Bay, we are also under the understanding from the USGS that historic nitrogen contaminants due to historic chicken farms in the area might have also contaminated groundwater with nitrogen, and that may also be leading to some of the problems that we're seeing. And certainly septic systems, we're keeping an eye on. And most importantly, as the Senator and Assemblyman both mentioned earlier, land use and growth in this area has been considerable.

And just a quick demonstration of that -- I just wanted to show a depiction of the land-use patterns from over about a 30-year period, from 1972 to 2001, where you can clearly see the red area, showing up as developed areas in the Barnegat Bay Watershed, has significantly increased over those 30 years.

As all of the advocacy groups that have been coming to us to make sure that we focus on this important issue -- have come to the Department -- the then-Commissioner Lisa Jackson, and certainly continued by Commissioner Mark Mauriello -- Acting Commissioner Mauriello -- the DEP put together an action plan. And also, we've put together Strategic Scientific Teams where we have convened all of our top scientists in the Department -- across the various media that have impacts on these important issues in the Barnegat Bay and in the Barnegat Bay Watershed -- together, routinely, to meet with the outside organizations --

Rutgers and all of the advocacy groups, Barnegat Bay National Estuary Program and others -- to make sure that we bring all of our expertise to the table as we assess the problems and impairments that we see in the Bay Complex.

So some of the things in our action plan that we're implementing are: Right now we have about $2 million on the streets for various research projects. Much of that money is coming through the EPA, through 319 funding and others, that you'll hear about from EPA a little later, I'm sure. We have a lot of research projects out on the streets right now, with Rutgers, the Barnegat Bay National Estuary Program, and others all conducting a lot of the work that's going to be necessary for us to really understand what is causing the impairments in the Bay and how we go about addressing those problems.

We've established a technical work group to work across the media issues as related to Barnegat Bay health. We have what we believe is probably one of the most progressive Municipal Stormwater Programs in the entire nation. Beginning in 2004 -- and all of the Committee members have a copy of a Barnegat Bay Watershed specific report -- from 2004 until 2009 I believe it is -- which we are very proud of. It's very demonstrative of the type of successes that we can derive from putting in these important programs.

So I hope you get the opportunity to take a look through that document, because it is really very obvious that the changes that we made per NOAA and EPA are resulting in some very good improvements in the Barnegat Bay Complex.

And certainly land conservation. And both Chairman Smith, and Chairman McKeon, and the members of this Committee, and the Legislature -- we're very proud and very thankful for your leadership, and giving the voters of New Jersey another chance at approving additional funding to continue the good work in land preservation throughout New Jersey. We probably have the most progressive land preservation state in the entire nation, and we are very happy that you saw fit to try to continue that program and put that question before the voters this November.

Just since 1998, with the beginning of the Garden State Preservation Trust, the program has spent $66 million just in the Barnegat Bay Watershed on land preservation projects. And that's significant. As we speak, and as you know, you've just released the appropriation bills which contains another $8.5 million to continue that good work through the Green Acres Program; and also the Blue Acres Program, which is a set-aside of funding designed to address projects that are parcels that are subject to recurring flooding. So we're very thankful for your leadership there.

Just to give you a quick overview of the success of the Municipal Stormwater Program: Since April 2004, municipalities within the Barnegat Bay Watershed alone have swept 47,500 miles of roads and highways. We've removed 58,000 tons of trash and solids from our streets. We've cleaned 53,000 stormwater catch basins, removed almost 6,000 tons of sediment and trash from storm sewers, and conducted over 133 local public educational events to make sure that people understand that we all need to play a part in protecting this incredible resource. And we're very proud of this program -- not only the program, but we're also proud of the reporting that we've put in place, because we're probably the only state in

the nation that has the capability of keeping track of these numbers through the municipal programs.

Also through our NJPDES stormwater program, 101 marinas within the Barnegat Bay Watershed will have or will eliminate the discharge of boat wash water by 2010. By 2010, all of these marinas that are washing down boats -- dealing with the anti-thallium paints and the petroleum products that had, in the past, been washed directly into this water system -- will now be pre-treated and sent to treatment plants, which is going to be a measureable increase in the water quality in these areas.

Also I should mention that we have our Clean Marina Program, which is very successful. I think 18 marinas in the Barnegat Bay Complex are now considered Clean Marinas by the Department for implementing best management practices throughout the watershed.

One of the things that people are pointing to very frequently in the Complex is fertilizer. We're doing -- not only from an educational standpoint -- but we're dealing directly with the chemical companies. So for phosphorous we put together a team that has met directly with the manufacturers of fertilizer compounds. And through that process, more than a million pounds of phosphorous, statewide, were reduced by the fertilizer industry through a reformulation of the product, resulting in a 50 percent reduction of phosphorous, statewide, coming off of our lawns. Fifty-two percent reduction in the Barnegat Bay Complex alone, so that's pretty significant. But the other element in the fertilizer formulation that people are concerned about is obviously nitrogen. And right now we're exploring ways to reduce nitrogen in fertilizers, and we're implementing a stewardship plan for proper fertilizer selection and use, and make sure that

people in the Complex know that a green lawn is not necessarily the best thing for the environment, and we need not be in the greenest lawn race all the time. If we could just get out that message alone, we think that would go a long way.

The complexity here is that fertilizers are made up of NPK -- phosphorous, nitrogen and potassium. And so if you reduce the P and you reduce the N, that's pretty much just potassium. So we have to figure out how to deal with that through the formulation and make sure that people know what they're doing there.

Through our shellfish program we're really very proud of the work we're doing in terms of shellfish restoration, working with our outstanding partners at Rutgers and ReClam the Bay, and the Barnegat Bay National Estuary Program, and others. Right now we have a pilot hard clam restoration at Sedge Island Marine Conservation Zone, 15 acres of shallow water habitat -- we've planted 600,000 hard clam seed. This fall we're going to be planting another 400,000 seed to be planted over another 10 acres in the Sedge Island Marine Conservation Zone, in terms of our hard clam restoration project.

We also are piloting an oyster restoration project off Good Luck Point. We've planted 8,000 bushels of crushed shell placed over an acre of ground there; 100,000 oyster seed, through Rutgers and ReClam the Bay, were planted on that crushed shell. And this Fall we will be planting an additional 300,000 hatchery seed and 3 million eye larvae over another 100 bushels of shell that we will put down on the Good Luck Point site.

Additionally, on the shellfish restoration side, we are partnering again with Rutgers and ReClam the Bay, with volunteers, to make sure that

the public is educated about the importance of clean water and the relationship to our shellfish populations. And we've also established a lease program to make sure that Rutgers and ReClam the Bay have the properties necessary to establish the seed that will go in to service the stock for these important sites.

So with that, we come to the future, and I wrap up my portion of the presentation. I think the first thing that we want to do is to make sure that whatever we do to make corrections, we do it with the best science in mind -- and right now we're collecting all of the data to make sure that we're dealing with cause and effect through the research projects; that we accurately identify the impairments, accurately identify the source of those impairments so that we can then go down and do source track downs and make sure that we're addressing the actual problem; and then implement the actions to mitigate and offset the problems that we're seeing.

That's my piece of it. I thank you for the opportunity. I do have some of our experts in the audience -- Barry Chalofsky, our lead for our Stormwater Program; Bob Connell is our chief water quality manager; and Kerry Kirk-Pflugh is our liaison to the Barnegat Bay National Estuary Program -- just three of our experts that can really give you the scientific detail if you care to hear it today.

And we also, certainly, have other DEP staff and managers that you will hear from on different subjects later.

Thank you very much for the opportunity.

ASSEMBLYMAN McKEON: Commissioner, thank you for that; and we appreciate the expertise beyond your own that you brought

with you today, and might have occasion to reference them as we go forward with the testimony.

So that everyone in the general public can understand what our plan is -- as you know, there are three different topics to get through, one of which being Barnegat Bay; the second of which having to do with the Estuary Programs and interpretive centers, and the third relative to the marine fisheries and the potential for saltwater licenses. We're going to go in order; however, just to start things off, we have three principal witnesses from DEP who will go through each of those three things. Then we'll flip back to just Barnegat Bay, then to the interpretive centers, and then to the fishing issues.

I also want to let everybody know, besides Jay -- you know, you didn't take up too much time -- we'll give latitude to our first three principal witnesses. We'd like everybody to reflect and keep their comments to five minutes. We're hoping to conclude today's proceedings, give or take, by 1 o'clock.

So thank you again, very, very much. And with that, Amy Cradic, the Assistant Commissioner for Natural and Historic Resources -- if you could please go forward with your presentation as it relates to interpretive centers.

ASST. COMMISSIONER AMY CRADIC: I'll be very brief.

I just wanted to thank the Committee for the opportunity to talk about our interpretive programs at Island Beach and Liberty State Park.

And also, there's a lot of support in the room with our Friends group and partners, who help make those programs possible within the State Park Service.

Island Beach alone has several interpretive centers. We have a small Nature Center, the Forked River Coast Guard Station -- the No. 112 Interpretive Center -- and the visitors station at the Ocean Building. We do current tours and activities at Island Beach State Park with many of our interns. We have, at the current time, about 12 seasonal staff that help with the program, which equals about six full-time hourly staff in the summertime. We do programs such as the Beach Walk, Seine the Bay, and Fish Tank Feeding Frenzy programs year round, which I'm sure many of you, or your children, have been able to participate in.

We have a new concession program at Island Beach State Park to help us provide visitor services. It's a Kayak Interpretive Concession Program. We have for many years been working in partnership with our Friends group to provide Birding by Kayak tours through Island Beach State Park and the Sedge Islands. This year we partnered with the Conserve Wildlife Foundation, who helped us work on our beach grass planting program. So we have a lot of activities that go on in the summertime at Island Beach State Park. I've passed out -- and we have some extra copies -- the Friends group helps us publish every year a listing of those programs that are offered to the public.

At Liberty State Park we also have one interpretive center. It has about three full-time staff and it is busy year round. We do programming for local schools, we do training for teachers on the Hudson

River Estuary and Hudson Bay. Like Island Beach, it's a very popular location that we're very proud to provide services for.

ASSEMBLYMAN McKEON: Thank you. May I just ask one question relative to all the programs you spoke about, just focusing on Island Beach State Park? About how many students or people avail themselves of all those opportunities to learn?

ASST. COMMISSIONER CRADIC: The actual number of participants?

ASSEMBLYMAN McKEON: Over the summer, approximately.

ASST. COMMISSIONER CRADIC: I don't know the number of participants in the actual programs other than that they fill up constantly and there's high demand. Island Beach State Park has about a million visitors a year that join the park; and at Liberty State Park, about 5 million people visit the park annually.

ASSEMBLYMAN McKEON: Would it be fair to say that thousands of students go through these programs each year?

ASST. COMMISSIONER CRADIC: I think that's fair to say.

SENATOR SMITH: Which I think indicates how important it is that we in State government should try our best to make sure that those programs are funded properly.

Our third witness from the DEP is Dave Chanda from the Fish and Wildlife Division, to give us a little introduction to the marine fishing registry issue. And then after our three DEP witnesses, our third one, we're then going go to our list of witnesses who have signed up.

Dave, if you would.

And by the way, we found a microphone. So -- an amplification microphone -- so there's going to be a little turmoil here while it's being set up, but we're going to keep on going. The good news is that you'll be able to hear everything a little bit better in about five minutes.

Dave.

D A V I D C H A N D A: Well, I'll try and speak loud enough for everyone here in the back, which means this record's probably going to blast your ears out when you're done.

Thank you for giving me the opportunity to speak before the group on the Saltwater Registry. I will tell you our agency has been already going statewide, meeting with the angling groups discussing the issue. In front of you, you have a PowerPoint presentation that we've been sharing with the conservation groups that are out there. And anybody in the audience that would like to receive a program from our State, you can just go to our website, njfishandwildlife.com, and we'll be more than happy to send our staff out to meet with you and discuss the implications of the Saltwater Registry. I, myself, have been out with probably 20 different conservation groups, discussing this particular issue.

The Saltwater Angler Registry has sparked nationwide attention, coast-to-coast, on the marine fisheries community. It is slated to take effect January 1, 2010, and our saltwater anglers should be concerned about the implications that come with the management of the state's marine fisheries.

This registry program was created by a rule -- it's a Federal rule required under the 2006 Magnuson-Stevens Reauthorization Act. That Act is the primary law governing marine fisheries management in the United

States. Basically, anglers who fish from 3 to 200 nautical miles, and angler fishing inside 3 miles where anadromous fish species might be found -- such as striped bass, shad or herring -- must register. So essentially, you're talking about all anglers that fish in a marine environment.

Now, improving the quality and accuracy of the National Marine Fisheries Services data, which -- that's NMFS -- and if you hear me say NMFS that's what that would be standing for, the National Marine Fisheries Service -- that was the driving force behind this whole registry. And the potential benefits to a state like ours is that, obviously, if you have better surveys, the size, season and bag limits that affect New Jersey anglers will be based upon more reliable harvest data. Now, there are many states out there that already have some type of a registry, and those states are exempt from having to register with the National Marine Fisheries Service. In fact, there are 18 coastal states right now that have some type of a directory. Most of those are in the form of a saltwater license. New Jersey is one of only six coastal states that has nothing in place to register their anglers. So January 1, 2010, our anglers are going to be required to register with the National Marine Fisheries Service. And the National Marine Fisheries Service has made it absolutely clear that there will be no charge when they do this in 2010, but they have also been absolutely clear that in 2011, for those six remaining states, if nothing is in place, they will charge a $15 to $25 fee annually, every year, for anglers to register to go fishing.

Unfortunately, what that registry does-- It's paid to the Federal treasury and that money will *not* be used to benefit New Jersey anglers. It won't come back to help us in our management programs, and it will not even go to help the National Marine Fisheries Service. It just goes

straight to the Federal treasury. So basically we find ourselves at a crossroads right here in New Jersey. We're already struggling right now to meet Federal requirements on more than 22 different mandated Federal management plans on fish species. And if we're found out of compliance on any particular species, the National Marine Fisheries Service can put a complete moratorium on that particular fishery in the State. And the consequences are huge. Most recently here in New Jersey, our anglers have already seen reductions in their tautog and the winter flounder harvest because our State didn't have sufficient data to defend what our quota should be with the National Marine Fisheries Service.

Basically what I'd just like to offer in closing is that this registry poses both a challenge and an opportunity to our state. And the challenge for us is to create a Saltwater Registry that doesn't send the money down to the Federal treasury. And the opportunity is for us to make sure that we have a stable marine fisheries population and fishing opportunities, not just for our children, but our grandchildren and those that were just born last night, so that hopefully by the time they're interested in fishing, which will only be about five or six years from now, there's going to be something out there for them to catch.

So we thank you for the opportunity to speak on the issue. And as I said, our staff is available to go anywhere at any time to make the presentations to folks, both in the audience and to members of the Legislature.

So thank you.

SENATOR SMITH: Thank you, Mr. Chanda.

ASSEMBLYMAN McKEON: Thank you, Mr. Chanda. (applause)

That's pretty good -- no one ever gets any applause. (laughter) That's all right.

As I stated, we're now going to focus on the Barnegat Bay piece of this. And the first witness is Stan Hales, with the Barnegat Bay National Estuary Program.

Mr. Hales.

L. S T A N T O N H A L E S, Ph.D.: First I'd like to thank -- are we ready?

I'd like to start by thanking the Committee for the invitation to speak here.

My name is Stan Hales. I am the Director of the National Estuary Program. I don't come today to speak on my behalf, or the National Estuary Program staff, all five of whom are here today. I come to speak on behalf of all the program partners. Those logos on the screen, the six in red, represent the individuals and organizations to whom I report as the Director. You'll note that my bosses consist of Dr. Jon Larson, the President of Ocean County College; Commissioner Mark Mauriello, Regional Administrator for the USEPA; DiAnne Gove with the Mayor's Association, in the back of the room; and the Ocean County Board of Chosen Freeholders. So I report to all levels of government and I speak on behalf of all the other program partners -- the 35 or so agencies and organizations that are members in our program -- and they are members by their acceptance of responsibility for actions to protect the health of the Bay.

The Bay is a beautiful place. We all started this conversation today talking about what a wonderful place it was, and what a great opportunity it was to gather here. When I talk about the Bay, I talk about the entire watershed. Watershed is more than just the Bay -- if we're going to keep the Bay healthy, we have to protect the entire watershed. So we have lots of marine habitats in the watershed. All those habitats sustain all of us in many different activities: hunting, fishing, commercial activities, boating recreation. The economy of the Jersey Shore is tourism-based, and all that is based on the health of the Bay and the quality of its habitats.

They also provide us a lot of ecosystem services that we take for granted. And increasingly with climate change and the sea level rise, we're going to be challenged to address the development and growth in the area and also keep those services intact.

Finally, I want to point out that we do have a real opportunity here. Roughly 78 percent of the watershed remains in natural cover. It's starting to slip a little below that, but this is a critical juncture. This is essentially a tipping point, and so what I do today is challenge everyone in the room and all of you here today -- all of us represent the public, and we need to act at this time.

Also, perhaps reflecting my own background as a biologist, I enjoy being out in the Bay, all of its environments. There's a lot that we have -- part of my message to every group is to cherish the Bay and the things that it represents. Lots of different resources, migratory birds, managed species, unmanaged species -- we all enjoy all of these different resources and we need to act to protect them.

In recognition of these resources and other things -- the Bay, its resources and the entire watershed -- have been recognized by groups such as yours at the State level, the national level, and at international levels. I won't go through all these Federal laws. I do want to point out there's one State act up there -- in 1987, the State Legislature funded a study which led to the establishment of the National Estuary Program here in New Jersey. So the State previously has recognized the need to protect this area, and today I call on you again to support and uphold that commitment to protect the Bay.

Since being hired as the Director as National Estuary Program a couple of years ago, it's clear just from reading the paper there are a lot of concerns about the Bay. If you read newspapers in the region, you see lots of different headlines. Those reflect the fact that since the early 1990s there's been a long and consistent timeline of declines in the quality of Bay resources. I won't go through the entire list, but we have brown tide blooms, sea nettle blooms, declines in commercial stocks, recreational stocks. Ken Able at Rutgers University thinks even (indiscernible), a small Bay fish, are overfished in some parts of the Bay.

So two years ago when I was hired, the Bay program -- with Federal funding support from outside facilitators to round up all the partners and discuss the challenges and problems facing the Bay -- set out to develop a strategic plan. Essentially the Barnegat Bay National Estuary Program is a planning organization. We help pull together all the relevant parties, resources, and move -- sometimes slowly, sometimes rapidly -- but altogether we try to keep moving to address the problems in the Bay. In the

first year of development of the strategic plan, we came up with four environmental priorities. I want to run through those briefly now.

Deputy Commissioner Watson addressed some of them earlier, and by and large I agree with pretty much everything he said. But the primary problem in the Bay is eutrophication. Eutrophication is misunderstood a lot; it is basically an enhanced rate of biological production. Essentially it is too much growth. And we tend to regard growth as being good, so sometimes there is some misconceptions about this. But there should be no misconception in that eutrophication in the Bay is bad.

What's largely driving it are influxes of nitrogen and phosphorus. Unequivocal studies at Rutgers University made this clear. It's consistent with studies worldwide. We know that lots of nitrogen and phosphate, largely in groundwater, is flowing into the Bay. And that's driving eutrophication.

The Bay program itself, with our federal funding, has supported a lot of studies to better understand this problem and better sort out what we might do to fix it. We know that a large number of the sources of nitrogen flow into the Bay. We know a great deal of detail about where they come from, how much is coming, forms of it. We don't know everything, but we do know enough to take strong action.

The last thing I'd like to point out, and this is something that should alarm everyone in the room: a recent study by a scientist at USGS, who are members of our program, have tracked the lag time -- how long it takes water to get to the Bay if it falls on any spot in the landscape. And what it takes on average is at least 10 years. And we know in a heavy

rainstorm that water might run into the Bay very quickly. But most of the nitrogen into the Bay is in groundwater-driven surface flows. And those proceed very slowly. And so the water that's carrying all the nitrogen into the Bay right now essentially is decade-old water. We're looking at water quality in the Bay that reflects conditions from 10 years ago. The development today -- the inputs from today -- we're not going to see for 10 years. And so a cautionary note to all of us: we're seeing only a tip of the iceberg. And if we were to take concerted action today and stop all of the nitrogen and phosphate, we might not see a response for 10 years.

I'd also like to put this problem in a little perspective. This is a table slide given to me by Suzanne Bricker, who is the chief eutrophication scientist at NOAA. She works at the Coastal Ocean Science Center *(sic)* in Bethesda, Maryland. This is a list of coastal lagoons globally -- basically shallow systems very similar to the Bay. And there is information about eutrophic conditions and several other symptoms of eutrophication. I'll point out that here's Barnegat Bay, with measures across the board. Essentially in this report, which is just coming out right now and is based on several-year-old data, the Barnegat Bay is one of the worst coastal lagoon systems in the world.

I'd also like to point out one other thing: the rest of New Jersey's inland bays are not far behind it. So essentially what I tell everyone when I speak is that the Barnegat Bay is sort of a harbinger of problems, challenges facing the entire Jersey Shore.

So what do we do? Well, there are a lot of things that we can do. There's some relatively inexpensive options. We heard discussion of fertilizer ordinance earlier. The State has been proactive in working with

fertilizer manufacturers, but to be frank, there's not been substantial debate about whose role it is, whose responsibility -- should this be the State action or local action? And so it's been difficult to move forward quite as quickly as all the program partners would like on this action. I suggest that, based on similar programs in the Barnegat system and elsewhere, that you consider the need and the benefits of a State action.

In addition to fertilizer management, there are other things we can do: sewage system expansion is one that comes to mind; Barry Chalofsky and I discussed it earlier today. Sewage system expansion could improve water quality today, but unlike fertilizer management it's quite costly. Just for four subdivisions in Manchester Township alone, expanding sewage system treatment would cost about $32 million.

Now, there are a number of other actions that we're working on: Soil amendments, stormwater management-- DEP officials, earlier, were correct: the State is to be complimented for having one of the most progressive stormwater programs in the United States. We're living in one of the most densely populated states in the country, and so there is a need for that kind of management.

Essentially, with the current State budget situation, implementation of new stormwater rules -- we are moving forward on that, but as you all know, we could use more money. Towns could use more money, the County could use more money. Essentially this is a cost that's been shared between the State and local government, and right now that sharing is being challenged.

Also we have another priority action: basically restoration of detension and retention basins. In Ocean County alone, there are 2,000

basins where stormwater is stored or is dissipated. Many of those basins don't function properly. We have a small pilot program to improve them right now. We think we've figured out the details of that and know how to do it -- Dave Friedman with the Ocean County Soil District, Dave McKeon with Ocean County Planning Department, and Barry engaged in this, and so has Rutgers University. With those 2,000 basins, with what we know what to do, the cost of that total retrofit, county-wide, is something on the order of $150 to $200 million. If we had $20 million a year right now it would take five to 10 years to take it on. And hopefully we might even get a little better at it and the cost would get cheaper over time. So again, not a trivial cost.

Finally, all of those measures sort of deal with the problems that we know we have. And as several people have pointed out, we've got growing land use. Basically more and more people love the Jersey Shore, coming here, taking up residence. Our cumulative impacts grow larger every year. There's some frustration among program partners (indiscernible) NGOs, local government planning groups, municipalities, etc., about the effectiveness and consistency of some of our regulatory programs. DEP is aware of these issues. They have been, to their credit, working to streamline some of these issues. They've been working with program partners hand in hand. But I'm sure they could benefit from your support and assistance with those efforts.

Lastly, it's only been in the last year that the water quality in the Barnegat Bay has been identified as impaired. It's a regulatory distinction as water reaches a certain level of deterioration, in effect. We know of many other smaller-scale impairments which basically trip a

regulatory process to address that issue. Well, the process is called TMDL process -- Total Maximum Daily Load. We have to estimate all the sources and identify them. Best guess for those processes are just about $1 million a piece. We have about 30 other use impairments in the Bay. So again, there's another substantial task.

That was just priority issue one. I want to go through the rest of these pretty quickly because I know we have a time limit here.

The second priority that the program partners are addressing is supply and flow issues. Essentially, there needs to be better public recognition of the fact that Ocean County, in particular, has flow into two of the State's most critical water planning areas. There's a much greater need to conserve and reuse water in Ocean County than most people are aware of. And I call on all the public partners in the program, in particular, to help implement and develop these kinds of programs. The Ocean County Utility Authority a few years ago proposed a number of programs totaling something like $7 or $8 million that were never performed or undertaken for a variety of different reasons.

We also have a number of issues that we need better information about. Several towns in the County have essentially reached their groundwater withdrawal limits, and so there should be no more development in those towns. We are diverting a tremendous amount water offshore in the form of sewage effluent. We need to start looking at sewage effluent and stormwater as a resource -- basically ways to conserve the water that we're pumping offshore, and I'm talking about something like 100 million gallons a day.

Lastly, Oyster Creek is a contentious issue in the County -- no surprise there. The thing that concerns me most is that all of the program partners agree that the effects of the power plant's operation have never been adequately assessed. And this is a responsibility that all of us share, something that we must address.

The third program priority is to prevent habitat loss and restore critical habitats. You heard Commissioner Watson earlier talk about the tremendous commitment the State and local groups have made to acquire and protect property and open space in the watershed. And I'd like to applaud all of the groups, not only for the commitment they've made, but for the way in which they've worked together on this. Many times in this watershed, Green Acres, the Ocean County Natural Lands Trust, US Fish and Wildlife Service, and the Trust for Public Lands will all work together to acquire properties. And this is the kind of cooperation that I'd like to see more of. It's been almost exemplary in this watershed. But I certainly would support any of the efforts to keep those programs in place, and that would include funding for the Green Acres Program.

And lastly, we need to promote -- we need to do better at promoting protection of wetlands and riparian buffers. The figure here shows the losses of riparian buffers. This was a study done by Rick Lathrop and his partners at Rutgers University. Essentially, even though all of us in the room, all of the program partners, recognize the importance of buffers, we continue to allow them to be developed. This is one of the sort of regulatory inconsistencies that we would like to see addressed. As part of this protection, wetlands and submerged aquatic vegetation are going to become increasingly important. There are two habitat types present in this

particular slide, marshes in the background and submerged aquatic vegetation in the foreground. Marshes, essentially, are the battleground for climate change and se as most at risk along the entire eastern seaboard in the United States because of their particular topography. Basically our marshes are relatively flat. The short form of marsh we see here, which we refer to as high marsh, provides extensive coverage in New Jersey marshes. New Jersey marshes have more high marsh than marshes anywhere else in the world, whereas we have relatively little low marsh. As this next slide shows here, from some long-term studies in Virginia, that low marsh form does not keep up with sea level rise. One of the great misconceptions about sea level rise is that everything's going to drown. There are a number of habitats that will respond to the sea level rise; they'll be able to hold its place. Marshes are the way that we reclaim wetlands -- excuse me, waterways -- and actually turn it into land. But unless we allow for some natural processes to go forward -- that is, allow natural flow of the waterways, etc. -- we don't provide for the regular functioning in those areas. And I wish we had this kind of information available for New Jersey. The main program office, with some of its partners, just received Federal funding to put in two of these structures -- they are called SET -- so that we can get this kind of data in New Jersey. But we actually need a network of these statewide. And that's only a few million dollars.

The last program priority is to address fisheries declines. Fisheries declines are due to a lot of different factors in New Jersey. We recognize the causes are complex, they're interacting. Water quality, habitat loss, habitat alteration, overfishing, boating. There are 200,000 registered boats in New Jersey; a third of them are registered in Ocean

County, so there's no surprise that there might be some boating impact on the Bay. But we know little about it.

We'd like to support efforts to gather more geographic-specific information to better address fisheries issues in the Bay. For example: hard clams in the 1970s and '80s supported thousands of clammers in the Bay. Right now, there are just a few dozens clammers working in the Bay. So tremendous loss of income, tremendous loss of jobs, other opportunities that come from that. There is not a survey of the hard clams in the Barnegat Bay, the Upper Bay since 1986. If would only take about $400,000; it would be nice if there were a boat that the survey could be done from, that's probably another quarter million. So, you know, I have a long wish list here.

Lastly, I want to come back to the slide that I showed earlier from Suzanne Bricker, who has worked very hard to come up with an integrated assessment. And again, I want to point out that essentially the Barnegat Bay is rated terrible for its eutrophic condition and the symptoms it exhibits, one of the worst coastal lagoons in the world. And New Jersey Inland Bays, essentially the coast south of here, is not far behind it.

Again, I don't have to go through this land use -- you know, there's no big, bad ogre in the room. It's just the fact that all of us, everyday, there are more of us loving the shore. And we have to be better stewards of that.

Before I conclude, I'd like to challenge you in one particular way: I've tossed out a number of financial items and tasks. USEPA ranks, gathers information from all the National Estuary Programs for a five-year period. And what they do is they evaluate us based on how many Federal

dollars we get and then how many other dollars that generate from all of the program partners. And for the last five-year period, nationwide, for every dollar USEPA has given the National Estuary Program, it has generated about $15 from State, local and non-governmental organizations. The median-- There's some really, really good programs out there that have been working for much longer than we have. But the median for that is $6 for every dollar of Federal investment. For the last five years, program partners generate about $3 for every dollar of Federal spending.

Well, certainly dollars alone aren't a measure or reflection of the success of the program or everyone's commitments. I do think this suggests that we need to dig a little deeper in our pockets and come up with some additional resources to address the problems of the Bay.

Last Fall we held what we called State of the Bay meeting. Many State Legislatures were invited to it; and unfortunately the Governor called a special Legislative session regarding budget issues. I'd like to give you the findings of that symposium. Essentially we need better recognition across the board, through all organizations and levels, that the Bay is changing. It is increasingly in peril. The Bay economy is a function of Bay health. And there is about a $6 billion tourist-based, water-based industry. So we need to take care of what sustains that economy. The Bay is clearly a harbinger of conditions elsewhere on the Jersey Shore. We have other groups coming to us and asking us to work in other systems, to work in Manasquan, to work in Great Bay, to work in Great Egg Harbor, and on down the coast. We have the opportunity to do that, but it takes additional support. And we have enough challenges just working in the

Barnegat-Little Egg system. But that's certainly something for all of you to keep in mind.

The second conclusion from that hearing was that current regulatory protections are not adequate. Again, DEP is, to their credit, working hard with program partners on these issues. There are lots of different little challenges that come up, now that this one is an issue.

Third, we need a sustainable funding mechanism. The Barnegat Bay National Estuary Program was never intended to fund all of the efforts of the Bay. And it doesn't fund all of the efforts in the Bay. We have lots of groups here that make an incredible commitment. But it's clear that they're not adequate. We need to do more. There are a number of different funding mechanisms that have been proposed, and discussed, and debated. I'm a fish biologist, I'm not a legislator. I'm sure all of these different opportunities have their pros and cons. I'll leave those to you to discuss. I think the program partners would welcome the opportunity to participate in that discussion.

And lastly, this program office has committed more of its Federal funds to research than almost any other program nationwide. In some cases it's come at the expense of the program office -- we don't have many staff, because we give away so much of our money. There's clearly a recognized need to expand monitoring. We've been shifting program resources to help acquire and bring in other programs, funds, and other resources to the area -- in particular with USEPA and with New Jersey DEPL. Both of those organizations I couldn't say enough about, how much they've done to help us, assist us in that way.

But I started this talk by saying, "The Barnegat Bay -- is it a jewel of the Jersey Shore?" And I'd like to conclude by saying yes, I think it is, but we have a challenge in front of us. It's only going to remain a jewel if we work together to protect it.

Thank you. (applause)

SENATOR SMITH: Mr. Hales, thank you.

ASSEMBLYMAN McKEON: Thank you, Mr. Hales.

SENATOR SMITH: That was a lot of information for our Committee to consider, and I'm sure everybody has a lot of questions; I know I do. I hope you'll stay, so that when we conclude the hearing, we can ask a few questions to you individually. But we have so many people to testify today, we're going to have to save the questions until afterwards.

Thank you.

MR. HALES: Thank you.

SENATOR SMITH: Our next witness is Janice Rollwagen, from the USEPA, Region 2.

Ms. Rollwagen.

J A N I C E R O L L W A G E N: Good morning, Chairmen, and members of the Senate Environment Committee and the Assembly Environment and Solid Waste Committee.

I am pleased to be able to appear before you to provide the Federal perspective on this significant natural resource, the Barnegat Bay. I am Janice Rollwagen, and I serve as Chief of the New Jersey Watershed Management Section of the U.S. Environmental Protection Agency.

Barnegat Bay is a productive estuarine resource, rich in native fish and wildlife populations, and supporting both recreational and

commercial water-dependent activities. When those natural resources are imperiled, so are the livelihoods of many people who live and work along the coast. Protecting these resources is critical to the future sustainability of the Barnegat Bay area.

Congress recognized the importance of preserving and enhancing coastal environments with the establishment of the National Estuary Program, or NEP, in the Clean Water Act Amendments of 1987. The purpose of the NEP, which is managed by the USEPA, is to address many complex issues that can contribute to the deterioration of estuaries of national significance. The program's goals include the protection and improvement of surface and groundwater quality, as well as the protection and enhancement of living resources.

The USEPA accepted the nomination of the Barnegat Bay Estuary into the NEP in July 1995. The program convened a Management Conference which was responsible for the development of a Comprehensive Conservation and Management Plan, known as the CCMP, to restore and protect the ecological health and biological integrity of Barnegat Bay. Using a consensus-building approach, the Management Conference was charged with identifying environmental problems facing the estuary, recommending interim corrective actions, outlining compliance schedules to address the pollution problems; and ultimately developing the CCMP, which was approved by both the EPA Administrator and the Governor of New Jersey in May 2002.

EPA firmly believes that we must use sound science as a foundation to focus on the actions that we must take in order to protect

and preserve Barnegat Bay. The challenge is in the implementation of actions which will make an environmental difference.

The CCMP identified water quality in the Barnegat Bay Watershed as being degraded by both point and nonpoint source pollution. The CCMP states that excessive nutrient inputs, coupled with bacterial pollution, upset the balance of the Barnegat Bay ecosystem and directly impairs human uses of the Bay, including restrictions on shellfish harvesting and swimming.

Since publication of the CCMP, water quality has further deteriorated. Historically there were no water quality violations for dissolved oxygen in Barnegat Bay. For the first time, the northern section of the Bay is on the State of New Jersey's draft 2008 impaired water bodies list for dissolved oxygen. In addition, the ecosystem exhibits symptoms of eutrophication manifested by periodic harmful algal blooms and levels of submerged aquatic vegetation, and desirable fish and shellfish species are below historic levels.

We must also be prepared to address new and emerging issues in the Bay. Since the development of the CCMP, there has been a need to address climate change issues. Through its Climate Ready Estuaries Program, EPA has selected Barnegat Bay NEP to receive an additional $50,000 this year as a one-time start up grant to bolster efforts to develop a climate change adaptation plan. The funds will be used to develop a climate change workgroup, conduct a needs assessment, and hold a technical workshop to provide a clearer picture and consensus on climate change impacts and adaptation needs for Barnegat Bay.

EPA is committed to using our authorities and resources to restore and protect the health of Barnegat Bay. As a Federal partner, EPA has brought over $6 million in National Estuary Program funds to the Barnegat Bay NEP since its onset in 1995. In addition, over the last couple of years EPA has provided over $1.1 million of additional funds for projects within the Barnegat Bay Watershed.

For example: Rutgers University, in partnership with the Jacques Cousteau National Estuarine Research Reserve and the U.S. Geological Survey, was awarded almost $500,000 of Clean Water Act Section 106 funds for a project entitled "Assessment of Nutrient Loading and Eutrophication in Barnegat Bay-Little Egg Harbor, New Jersey."

NJDEP was awarded nearly $400,000 of Clean Water Act Section 319 funds to implement nonpoint source pollution control projects targeted at reducing pathogen and nutrient loads to Barnegat Bay. NJDEP is passing these funds through to the Ocean County Planning Department for project design and construction.

NJDEP was awarded nearly $100,000 of Clean Water Act Section 106 funds to determine the chronology of nutrient changes and associated ecosystem level responses.

NJDEP was awarded $150,000 of Clean Water Act Section 319 funds to conduct an integrated wetlands assessment of condition and function in Barnegat Bay. NJDEP is passing these funds through to the BBNEP program office.

It is important to have mandates that are clearly and adequately defined, and strong partners that are held accountable for meeting milestones. Just as EPA has made a commitment to Barnegat Bay

at the Federal level, we look to our State and local partners, as well as all other non-governmental stakeholders, to make a similar commitment. Most of the Federal programs in the Clean Water Act are delegated to the State of New Jersey and are implemented through the New Jersey Department of Environmental Protection. We look to the NJDEP to utilize these delegated programs, as well as its own State programs, to protect Barnegat Bay. For example, effective implementation and enforcement of stormwater permits will reduce nitrogen and phosphorous loads to the Bay, thereby, over time, improving water quality. Similarly, effective and innovative implementation of the nonpoint source program, including measures such as fertilizer restrictions and/or use modifications, will also decrease nutrient loads.

Since the environmental issues in the Barnegat Bay Watershed are confined to primarily one county within New Jersey, Ocean County and the 22 municipalities within the county must be prepared to do everything within its authorities to protect and preserve the Bay. All partners must be willing to use the mechanisms available to them to assure that actions are implemented to protect the Bay. Partners must be challenged to implement innovative measures, and to go above and beyond the traditional way of doing business.

Barnegat Bay is an ecological treasure and a vital economic treasure to those who reside and play on the New Jersey shore. Prompt actions must be taken by all stakeholders to preserve and protect this resource for future generations.

Thank you all for this opportunity to appear before you today.

ASSEMBLYMAN McKEON: Thank you, and we appreciate that you came from New York to be here to testify; and thanks again.

Senator Van Drew-- First off, let me acknowledge the presence of Assemblyman Gusciora. Reed, I said nice things about you before you got here (laughter) -- and he went to the back of the room. There you go. And no one believed them, either. (laughter)

Senator Van Drew has a commitment in district, so he'd like the opportunity to say a few words before he intends to absent himself, and the Committee's determined to give him that privilege.

SENATOR VAN DREW: Thank you both Chairmen, and thank you for holding this meeting.

Obviously these are extremely vital and important subjects, and it is a very, very necessary meeting and I wish I could be here during the entire time. I have some long-standing commitments.

On the fishing registry, I'm not going to go into that, out of respect to both chairmen, because the issue hasn't come up yet. I have strong feelings about it, and I continue to have those strong feelings on that issue and the charging of a fishing license. And I know we'll have a further debate in the future. But in respect of everybody's time, because I know you have a long meeting ahead of you, I'm not going to go into that now, other than to say I'm going to stay committed to the position that I have.

I thank both Chairmen and the members of the Committee for the good work that you do. And I would stay, but there's nothing worse than an angry senior citizen (laughter). And if I don't get there, they're going to be angry.

So thank you both, Chairmen.

ASSEMBLYMAN McKEON: Thank you, Senator.

Before I call the next witness, I want to remind everyone who has submitted written testimony to us -- which is, give or take, about three to four inches thick collectively -- that everything that you've submitted in writing will get scanned in and will be a part of the record. So please note that your written submissions indeed will be a part of the permanent record, and I'll ask you very -- in the strongest terms I can, on a going-forward basis, to summarize the testimony and to provide us a flavor of and gist of what your feelings are. We'll be here till 7:00 tonight, even at five minutes, based on the number of people we have, if we continue on this pace. So that's the way it's going to be handled going forward.

It is our honor and pleasure to have Dr. Jon Larson, the President of Ocean County College, here today.

President Larson, thank you for being here, and so patient.

P R E S I D E N T J O N H. L A R S O N, Ph.D.: We're going to make that pile three-and-a-half inches thick. I have a few things we'd like to distribute, and I will be very brief and we'll only speak around the edges of what we have here. I won't take the time to read the testimony.

We'd just like to say that we're very proud to be the host of the Barnegat Bay National Estuary Program, and that we are highly supportive of their initiatives and their efforts. And to say that we work with virtually every advocacy group that is here today, out here; we'll be speaking to you at some point along the way.

My purpose here today is to support their efforts to, once again, advocate for the importance, both economically and environmentally, of

this wonderful natural resource, Barnegat Bay. And also to offer our services.

Community College has a public education mission. And we believe that we can add to the existing component of services that are being provided, to achieve all the goals that all the advocacy groups and the Committee has with respect to the health of the Bay, by contributing to that public education mission.

We have before you a proposal that we have been circulating to our partners, many of the organizations who are partners with us in this effort -- the Center for Environmental Sustainability. And we have one particular agenda that we want to advocate for ourselves, and it's not to ask for money. It is to ask for cooperation, collaboration, and support. We need to be in a place where we can provide these services, where there is a couple of million people interested in hearing these messages. And we think that the spot for that is Island Beach.

We have talked, off and on over the past several years, with DEP and virtually every marina operator who wants to sell, the likelihood of our obtaining a place where we could carry out this mission. We think the ideal spot for that is the Wheelhouse Marina that is now owned by the State. And we're prepared to invest in it to develop an educational facility there that we would collaborate with and delivery of services with Monmouth University, with Rutgers, with Stockton, with the Barnegat Bay National Estuary Program, all of the advocacy groups that are here in the room, and with the State DEP in running the Park Service interpretive programs. And we believe that partnership in the future, when the State is facing some difficulties with funding programs, could be a cost-effective way

to achieve progress in this area, in this arena, without adding to the costs that come with these programs typically.

So that's my message. I want to say that we're very delighted that you are here today. Thank you so much for coming down here and taking your time to listen to us. I want to say especially to Senator Connors -- thank you for taking time to support Ocean County College as you do; and to offer to all of you on the Committee the notion that the Community College can play a much larger role in this entire initiative, and we're prepared to do so. So we hope you'll take us up on that and find a way to help this program become a reality.

Thank you very much.

SENATOR SMITH: Thank you. (applause)

ASSEMBLYMAN McKEON: Thank you, Mr. President.

SENATOR SMITH: Our next witness is Tom Fote from the New Jersey Coast Anglers Association.

Mr. Fote.

T H O M A S F O T E: When I signed up today, I signed up as the Barnegat Bay National Estuary Program. I sit on the Policy Committee. I am the longest-serving member of the Policy Committee. One of the scary things is that when I look at this table, I was always the kid testifying. And now, with John leaving -- Assemblyman John Rooney-- I testified back in the early 1980s on striped bass, about 25 years ago (laughter). And now he's going to be leaving, so I just feel like the old person.

Barnegat Bay National Estuary Program has been doing a fantastic job. I got involved in the mid-1980s with the Barnegat Bay Watershed and Management Plan, when Senator Connors Senior basically

was instrumental, with State Assemblyman Singer, in getting the money necessary to basically do that and start the preliminary work.

I fell in love with Barnegat Bay and Island Beach State Park when my wife took me there when I was a patient at Walson Army Hospital, coming back from Vietnam -- that was 1970. As soon as I got a chance I moved to here, because I fell in love with the Bay and with Island Beach State Park. My wife grew up actually crabbing with her grandfather. He had a house three blocks from where we bought our house, down in Toms River, right by the water.

There's a lot of problems in the Bay; we have a lot of good things going in the Bay. One of the things we do have, that most bays and estuaries don't have, is we don't basically deposit sewage directly into the Bay. But you do that -- and I'm going to talk about the rest of the state -- you do that in the Raritan River, you do it in the Delaware River, and you do it in a whole bunch of other places. And those are the places that you are doing that. There's Jersey Coast newspapers over there. I testified before Congress a couple of weeks ago about drugs in the water going into the estuary, and the effects it's going have on fish and wildlife, and probably humans, because it's showing up in our drinking water. And it's drugs we take -- the drugs that make us live longer, the drugs that basically people take legally. And also a lot of the detergents are all showing up because they're estrogen-mimickers -- they basically get into the bays and estuaries, and cause all kinds of messed up problems with the fish and the wildlife, and basically it's going to start affecting human populations.

I'm hoping those two twins -- their grandchildren won't be affected by what's going on here. We need to clean up our drinking water.

We need to clean up the water going. One of the problems we have in Barnegat Bay is because of the vast need for water. We pump a lot of water -- as it was pointed out, a 100 million gallons a day; over 100 billion gallons along the whole Jersey Coast, between Cape May, Atlantic County, Monmouth County and Ocean County. Those sewer systems go directly under the Barrier Islands, directly into the-- The Clean Ocean Act did a great report on that a couple of years ago, and I've been using those figures for years.

And we pump the aquifer dry every time we build a new reservoir -- like Brick and other places; we dam rivers coming into the Bay. That causes a problem.

One of the problems is also, I mean, we look at Oyster Creek. Oyster Creek -- and (indiscernible) talking about that -- basically passes through almost 7 percent of the Bay water and sterilizes it. Well, we don't want sterilized water. You need to do something about the cooling towers and basically make that implementation. Because we need to, basically, do everything we can. I've seen the difference in the Bay -- some of it's weather. The first couple of years I moved in -- I moved here in 1978 -- they were actually driving across Barnegat Bay, because we were freezing that hard for the first three or four years. My pilings were coming up because they would be pushed up by the ice. We haven't seen that in 15 years because the water's a lot warmer. That's one of the reasons we get the algae blooms, that's one of the reasons we get the jellyfish. And Oyster Creek contributes to that. That's why we need to get that source of heat out of the Barnegat Bay.

Stormwater -- Stan did a great job in covering that. And I'm going to leave it at that, because there's a lot of people here testifying, there's a lot of people, technical. I didn't sign up to come back and talk about the interpretive program at Island Beach State Park. When you do that, I'd like to come up, because I was very involved in setting that up, with three other people. So I'd like to talk about that.

ASSEMBLYMAN McKEON: Thank you, Mr. Fote. We appreciate the depth of your expertise and experience.

Mike DeLuca, Rutgers Institute of Marine and Coastal Services.

Mr. DeLuca.

M I C H A E L P. D E L U C A: Thank you.

Is this on? (referring to PA system microphone)

Good morning. Chairman Smith, Chairman McKeon, Senator Connors, and members of the Environmental Committees, thanks for the opportunity to present testimony this morning.

My name is Mike DeLuca. I am the Senior Associate Director for the Institute of Marine and Coastal Sciences at Rutgers. I also manage the Jacques Cousteau National Estuary and Research Reserve, which includes much of the Barnegat Bay and the surrounding watershed. And I co-chair the Science and Tech Advisory Committee for the Barnegat Bay National Estuary Program.

I do have a prepared statement; I appreciate that it will be added into the record, so I'll try and be as brief as possible.

This is certainly a timely and welcome hearing, given the issues affecting the Barnegat Bay ecosystem and the surrounding watershed -- especially the nutrient inputs into the Bay, human alteration of habitat and

water quality, and the effects of climate change on Bay ecosystems and communities. It is indeed my pleasure to speak with you today about measures that we can take to protect and restore the health of Barnegat Bay for future generations, including the two twins that were born yesterday evening.

I think we've heard Barnegat Bay is indeed in peril. Many of the previous speakers spoke to some of the specifics associated with that. We've actually reached a critical threshold where action is required to protect the Bay and to sustain the many benefits that it provides for boaters, swimmers, fishers, hunters, tourists, coastal communities, and many other users of the Bay.

There have been many, many meetings with Bay partners that have been convened to discuss the state of the Bay. Much research has been conducted on Bay structure and function. A host of blueprints, management plans, and action plans have been drafted to restore the Bay. Pilot-scale projects have been conducted to demonstrate how to mitigate human impacts on the Bay. It's now clearly time to act, with the best available science, best available management practices, best available tools, and a commitment to educational programs that support public stewardship of resources throughout the Barnegat Bay and its watershed.

And I'd like to review just a few specific recommendations that I have; but I think that it's important to understand that these recommendations, and those of the speakers before me, don't stand alone. There's no magic bullet here to restore the ecological integrity of Barnegat Bay. These measures have to be taken as a comprehensive approach and strategy to restore the structure and function of the Bay.

Stan Hales mentioned that there are about 2,000 stormwater basins; about 1,100 of these -- more than 1,100 -- have been constructed since 1991. Many don't function properly, they're poorly designed, and they're not doing the job. We've all heard about the impact of nutrients on Bay water quality and the eutrophic condition that it creates. So perhaps one of the key steps necessary is to retrofit existing stormwater basins with best available management practices, engineering designs that are available today, some of which are not that expensive. This is number one.

In addition, we really don't have a comprehensive database to identify the location and attributes of individual basins and their cumulative impact on water quality. So that sort of survey has to be taken. There is a pilot project underway through Rutgers to look at a sub-basin at Toms River Watershed -- Toms River sub-watershed -- but we need to do it for the entire watershed.

Open Space. Acquire open space to preserve water quality and recharge of watershed aquifers. We heard earlier about a few programs that are in place -- Green Acres, Blue Acres, there's a county-based land trust, and of course, as the Chairman indicated, an open space bond issue that's about to come up. There's a brand new Federal program called the Coastal and Estuarine Land Conservation Program, or CELCP, that can provide up to $60 million for coastal and estuarine land acquisition in particular. Fifteen percent of those dollars are dedicated to purchase of lands in and around estuarine research reserves, which we have one right here in Ocean County -- the Cousteau Reserve. So I recommend strongly that we, as a State, aggressively pursue those Federal dollars. In fact, next week there's a call for proposals to compete for that funding for the coming year.

Promote sustainable designs for coastal communities, and provide assistance with low-impact design strategies and water conversation measures. This really requires some grant and technical assistance. Last December, the Barnegat Bay National Estuary Program, the Cousteau Reserve, and other partners conducted a workshop in Toms River to provide and transfer some information on green building approaches, materials and strategies, sustainable designs. We actually had to change the venue because there was a strong community response, municipal response. People are seeking this type of information. We actually had to turn people away at the end. Those sorts of programs and workshops need to be scaled up throughout the watershed.

ASSEMBLYMAN McKEON: I appreciate that you're not reading, and very much so, but I know you're on three of nine recommendations-- (laughter)

MR. DeLUCA: Okay, I'll speed it up here.

There was a mention made of perhaps one of the major disturbances on the Bay, that being of the power plant. We do need some investment to understand the impacts on the Bay. And that can help guide and inform future management strategies.

Build capacity among local decision makers to employ best management practices. I gave an example of the green building practices. More of that needs to be done throughout the watershed. There's some really meritorious programs out there. They operate at the pilot or demonstration scale. Those need to be scaled up.

Increase public awareness and stewardship of Barnegat Bay resources. There's really a lot of good K-12 and informal educational

programs out there. I'll mention one very quickly because it has bearing locally here, and that's the MARE program -- Marine Activities Resources and Education. It's a K-8 whole school immersion program that focuses on providing content about the Bay, and other marine and coastal habitats for K-8 students. Six graders are teaching third graders; the nurse, the janitor, the phys ed teacher are all involved in this program. And it culminates in an Oceans Week. Lacey Township Schools have been involved in this program. I was standing in line one year -- well, one evening a few years ago -- waiting to get into the Oceans Week at one of the Lacey middle schools. And I was standing behind a gentleman who was lamenting the fact that he was a soccer coach and he had to cancel soccer practice that entire week because of the educational program occurring at the school. That doesn't happen too often, and those are the kinds of programs that we need to have in place to foster stewardship about the Bay.

I think I'll just end with the next recommendation, which is to establish a Barnegat Bay Commission.

Senator Connors and his colleagues in District 9 solicited input on this issue a short time ago. I do think it's a good idea, regardless of the fact there's a lot of cooperation and partnering occurring, focusing energy and talent and resources on the Barnegat Bay. I still think it's very important to have a State-mandated authority and firm source of resources to focus on Barnegat Bay issues.

And I think I'll just stop there. I did have a point about climate change -- I think these Committees are in the leadership position to begin to prepare for the effects of sea level rise on the Bay communities.

Again, there's some stellar programs out there. We just need to engage our coastal communities and get the word out.

So I'd like to thank you for the opportunity to provide input today, and I look forward to working with you. And thank you for your interest in science-based stewardship of Barnegat Bay.

SENATOR SMITH: Thank you, Mr. DeLuca.

Assemblyman Matt Milam has to leave, I believe for the same function that Mr. Van Drew--

ASSEMBLYMAN MILAM: I do, I have to apologize for myself along with Senator Van Drew. We are working on a project for our seniors down there in District 1, and if you think they don't want to be mad at him, I definitely don't want them mad at me when I go home tonight.

But I want to thank Senator Connors for hosting this, and it is an important issue. With all the expertise we have out here -- we have the DEP here -- and it is about working it all together. Likewise, with Senator Van Drew, I fish these waters up here, I fish them down in my own hometown off Cape May. I do have feelings on the registry as well. Maybe the registry's important on the data collection; not really, really sold on the whole fee thing. I think there's other avenues to take. I'm not going to go into a lot of it. I know Senator McKeon -- Assemblyman McKeon put me on five minutes, but I'm not going to take my five minutes at all. I look forward to seeing the transcripts when this is all done, and of course making all this happen. You know, it's one thing to get together and hear all the testimony; but to actually get it all going for the right reasons, and to actually get all these programs in place so we can clean up these waters for all the years to come, for our young folks to be able to enjoy it.

Thank you very much.

SENATOR SMITH: Thank you, Assemblyman.

Our next witness is Mike Kennish, research professor, Rutgers University. Professor Kennish, are you here?

M I C H A E L J. K E N N I S H, Ph.D.: Good morning to the Chairmen and members of the Committee.

My name is Dr. Mike Kennish. I'm a research professor at Rutgers University; an ecosystem scientist, which means I study the structure and function of entire water bodies, largely in New Jersey, a lot of work in Barnegat Bay-Little Egg Harbor system as well as coastal ocean.

I just want to mention, without repeating what other people have stated, and give some background of why the problems exist the way they do in the system that we're looking at right here. Barnegat Bay-Little Egg Harbor is a coastal lagoon. It's different than Delaware Estuary; it's different than Raritan Bay. You cannot develop to the level that's been developed in the coastal areas along the Bay and not have impacts that you're seeing. Once you get above about 20 percent development in the coastal watershed, like Barnegat Bay watershed, you are going to see impacts in estuaries like Barnegat Bay-Little Egg Harbor. Also, once you get above about 10 percent impervious cover, you're going to have serious environment effects manifested. We are now above 10 percent impervious cover in our watershed. We have a population of 565,000 people now. At build-out, it's expected to be 850,000 people. And if we don't get a handle on this situation in terms of sprawl development and the way things have been handled in the coastal watershed, we are going to have far greater problems -- far greater problems than you're seeing now. We have-- As

we've been shown, it's affecting now human use of a system. And unfortunately, if it had been regulated in a sense of aquatic life support, we wouldn't be seeing these kinds of problems. But water bodies in New Jersey are basically regulated on the basis of human use, and that's one of the problems to begin with. But seriously, we have a whole array of problems, and it's not just eutrophication. We have the problem with the power company -- discharging, entrainment, and impingement problems -- that have, as someone mentioned, never been really assessed properly, at least for the last 30 years. Deforestation, riparian buffer loss. In the past-- I'll give you an example: Between 1995 and 2006, we lost 1,000 acres of farmland, and during that interval we also gained 15,000 acres of urban land cover. It's now close to 105,000 acres of urban land cover in the watershed.

Now, if you're not upgrading stormwater systems to be commensurate with that kind of growth, you're going to be in trouble. And that's sort of like where we're at. There hasn't been the level of engineering controls in place. But the largest problem is that you cannot purchase open space in small areas that, relative to the entire watershed, while you're developing -- along the shoreline it has been developed. You have 20 to 45 percent growth in the area of Waretown and Barnegat. That is such an extreme amount of growth without backfitting with the tools that you need to do, in terms of best management practices. Best management practices are not there yet in terms of how people are building lots. Sprawl development is something that's got to be abandoned, basically, for more like a cluster development.

I'm not going to argue the technicalities here, but these are issues that the problem -- if you want to clean up Barnegat Bay and fix it, it's not answered by ReClam the Bay, all those great efforts done by people. You have to fix the watershed. The answers are in the watershed, they're not in the estuary. And if someone doesn't take a handle on how it's being developed, the rate of population growth, it's never going to turn around. It's very unlikely that this Bay will ever be what it was in 1950, because you're not going to be able to have it -- the resiliency of the Bay is in trouble. It cannot respond when you have this level of population growth.

Again, we are having negative effects manifest in the Bay, the Bay is telling us it's in trouble. We have 565,000 people; we're talking about moving it to 850,000 people at build-out. We've got some big problems, and if it's not handled in the way -- from the development side of it, it's not going to be resolved.

SENATOR SMITH: Thank you, Professor Kennish. (applause)

Mr. William Slack, Assistant Director, Ocean County Soil Conservation Service.

Mr. Slack.

W I L L I A M S L A C K: Good morning. I'm Bill Slack; I'm the Assistant Director of the Ocean Soil Conservation District. And I appreciate the time you're giving us to speak today.

I'm here primarily to talk about soil health, soil compaction, and its effects on the Barnegat Bay. Soil health is a key component of a thriving watershed, and it's an important overall function of the ecosystem.

It helps sustain clean water, abundant wildlife, and lush forest and wetlands.

Primarily, soils in Ocean County are sandy soils. There's an accumulation of organic matter that comes from leaves and pine needles that decompose and they form a substantial amount of organic matter. A healthy soil with a good organic matter can infiltrate water from runoff, hold nutrients, and hold moisture. Healthy soils encourage root growth, which creates pores that allow infiltration, and allow the runoff to filter through and flow to streams as base flow and maintain a health stream.

There's no process that man can come up with that can mimic that natural process of soil formation, but there's plenty of things man has done to damage the land which causes problems in the Barnegat Bay.

Since 1976, through the Soil Erosion and Sediment Control Act, the Ocean District has reviewed and inspected 13,000 projects in our County, and they're predominately all in the Barnegat Bay estuary. We routinely get complaints from people that they can't establish lawns; and there are calls from parks, athletic fields, lawns and gardens that people have soggy, wet problems because the water won't infiltrate properly through the soil. And this limits their use and costs homeowners additional money.

Field measurements confirm that, you know, there's a permanent and severe effect on soils that result from modern construction practices. It's the use of heavy construction practices, and the grading and filling of areas, and the use of bulldozers that have compacted the soil. Density measurements of many of the fields that we have tested -- and in the packet that I provided there's a report here on bulk density that

indicates that a healthy soil in the woods has a bulk density of about 1.4 grams per cubic centimeter. We have lawns in Ocean County that have bulk densities in the range of 1.8, 1.9 and 2, and that's comparable to concrete. So there's a big, huge change between the natural soils and what we end up with on construction sites.

Compaction not only destroys the physical, the chemical, and biological function of the soil, it reduces infiltration, which reduces base flows to streams, restricts root growth. We get homeowners who see poor lawns and they figure the first thing they're going to do is put more fertilizer on. Then they're going to irrigate it because it's turning brown, and they use up vital water that we could use for drinking water. And what happens in compacted soils is that, due to stormwater and irrigation, the nutrients wash off and they don't infiltrate through the ground like it normally would. And one thing that has been mentioned before, we see that the best management practices that are designed specifically to improve water quality just don't function. And it seems like-- Through the Erosion Control Act, we've tried to get ahold on non-source point pollution, and we've been pretty successful at that, and that's primarily keeping sediment from flowing into the streams. But there's not anything that helps with the sustainable and healthy soils. There's no standard or guidelines that ensure soils remain healthy and, you know, following land disturbance.

In conclusion, I'd like to request your assistance in a couple of areas. First, we'd like to support, and help inform and educate the public through the state about the significance of healthy soils. Our plan is to utilize existing education programs in our schools and disseminate information through the students to their parents. In conjunction with

that, about two years ago Assemblyman Dancer and former Assemblyman Fischer introduced a bill to recognize Downer soil as the State Soil. And we just ask that maybe that could be reintroduced, because we feel that would help in educating on what healthy soils are.

Secondly, we need your support so we can develop a pilot program for soil health in the Barnegat Bay. We'd like to develop, pilot, and test restoration guidelines and construction techniques, after which the Ocean Soil District will apply these new techniques to land disturbance sites and prevent further degradation of the water resources. Assist the district in development of a certification program that trains contractors and landscapers in proper techniques which can sustain soil health. We'd like to pilot this program in Barnegat Bay and then have it implemented throughout the state.

We'd like some assistance to develop best and most practical cost-effective measures to remediate compacted soils in developed areas, such as mechanical methods of loosening the soil and incorporating organic matter into the soil.

Following the piloting of the Barnegat Bay Watershed Soil Health Program, we'd need to encourage planning boards to incorporate these recommendations into their further review.

I'd like to just once again thank you for the time, and that's what we have to say.

SENATOR SMITH: Thank you.

ASSEMBLYMAN McKEON: Thank you, sir.

Tim Dillingham of the American Littoral Society.

Tim.

T I M D I L L I N G H A M: Chairman McKeon, Chairman Smith, members of the Committee. Thanks very much for the opportunity. Tim Dillingham; I'm the Executive Director of the American Littoral Society.

I know time is short, so I'm going to speak very plainly. Barnegat Bay is dying. It's going from a living, vital water body, full of life, to being nothing more than a reflecting pool for the development on its shores.

We are really here at a critical time. And I think the overriding message I want to leave with you is that the answer to this is putting Barnegat Bay and its health and its future first and foremost in our policies, in our regulations, in our planning.

We've heard a long laundry list of strategies, and tactics, and programs that we can put in place, all of which have great value to them. But the fundamental problem is that, whether it's our local land-use planning, or many of the programs that the Department of Environmental Protection runs, or the Office of State Planning -- do not put the ecological health and the future of the Bay front and center as organizing principle for the way those programs are carried out. We do a lot of work in this watershed, engaging around local land-use decisions. Rarely if ever is the impact of that growth and development on Barnegat Bay considered as we put zoning into place, as we send sewer lines out into the rest of this watershed. And as Doctor Kennish said, the answer to the recovery and the restoration of Barnegat Bay is in the watershed.

So that's the first issue.

The second is that what may sound like a fairly simply idea is very complex. What that is: We need to reduce the current pollution and

we need to prevent future pollution. We have a historic landscape here that was developed without a lot consideration for the Bay. We know we have an increasingly good handle on where those problems are, where those storm basins are, what some of the answers are in terms of fixes. In the newsletter I handed out to you, we're currently undertaking research with the support of the Barnegat Bay National Estuary Program to figure out what specifically we can do to tweak the storm basins in the Bay's watershed to do nutrient removal, to help clarify and increase the water quality.

We need to, I think, set a policy, that we can build programs and regulations from, that new development in this watershed cannot contribute to future pollution. And there are programs -- in the packages that I gave to the Committee aides -- that you'll see where in North Carolina, in the watersheds where they're dealing with nutrient problems, that developments are required to undertake an impact assessment and to ultimately come out with no additional loads to the bay. There are loads that we can't avoid, and they are required to go in and mitigate, perhaps to clean up historical sources like storm basins and old septic systems.

Those are enormous challenges to New Jersey, that fairly poorly deals with land-use issues and environmental protection. But those are the challenges, I think, that are central and key to actually restoring this Bay and preserving it for the future.

I think the good news is that even despite the lack of some of the approaches we need, there are significantly powerful tools available to us currently -- authorities that the Department has that need to be better coordinated, better focused on, on Barnegat Bay. I would urge the

Legislature to support the Barnegat Bay National Estuary Program, to build on and support the Department's efforts in terms of the investments they've made that Deputy Commissioner Watson described. Those were all good works. And we need more of those, and we're going to need the Legislature's support to do that, obviously, in these times.

I gave you a 10-point "Ten Steps to a Healthier Bay." I think a lot of these ideas that I've talked about, and will be talked about in the future -- I think what the Legislature can do-- There needs to be a clear expression that the Legislature wants this Bay restored. And I don't know what the vehicle of that is -- whether it's a piece of a legislation or otherwise. But we are increasingly running into push back and the sentiment among the State agencies, in particular, that the political support is not there for them to be more aggressive in the implementation of the authorities that they have currently to minimize or offset development, which clearly is at the heart of the problems of Barnegat Bay.

It's going to take money. I understand we all are sort of obsessed with the conversation now about the State's fiscal situation. But we've heard various numbers described as to how huge an economy is built on the water quality and environmental integrity of this Bay. So even if we talk about hundreds of millions of dollars, in comparison to the investment that we're making, I think that's a pretty good deal.

And I think, lastly, there are very specific new authorities that may need to be brought to bear or enacted to see the bills I just described. Senator Smith, I want to acknowledge that your legislation proposal, to create stormwater utilities that deal with what's clearly one of the major

threats to this Bay, has been stalled because of lack of support here in Ocean County. And that is a debate we need to wrestle with and resolve.

It will take money to protect this Bay, to restore it, to bring it back to health. But it's an investment well worth making. And we look forward to working with you all, the State, the rest of the stakeholders, and the Barnegat Bay National Estuary Program.

Thank you.

SENATOR SMITH: Thank you, Tim. (applause)

Mr. Carleton Montgomery, Pinelands Preservation Alliance.

C A R L E T O N M O N T G O M E R Y: Hello, good morning. Thank you for having this hearing.

I am Carleton Montgomery. I am Executive Director of the Pinelands Preservation Alliance. I, too, have submitted a written form of my comments, so I'll try to highlight what I think are the key points that have not been stressed as much by others.

Most of Barnegat Bay itself, and much of its watershed, is in the Pinelands National Reserve. We're an organization devoted to the resources of the Pinelands, and Barnegat Bay is a key priority for our organization.

Everybody has made clear, as Doctor Kennish said, the problems in the watershed; and the problems that are arising for the Bay are coming from development of the watershed. It's not just *that* we build; it's also *how* we build. This development has been in the form almost entirely of sprawling subdivisions. That's an extremely inefficient form of development that also does tremendous violence to soils, to vegetation cover, and to the capacity of the system to absorb, treat and dilute the

contaminates that come with all human activity. It also requires total dependence on the automobile to go anywhere or do anything, which adds additional nutrients through the products of combustion.

But in thinking about how to address the problem-- I think there are four factors that I hope we can focus on. The first one, I've got to be blunt about, local control of land use has been -- through municipal zoning -- has been a complete disaster for the Barnegat Bay Watershed. Local governments tend to be, by the nature of their jobs, highly parochial. They tend to not to coordinate and cooperate on decision making about land-use patterns. It's nothing personal. It's in the nature of the beast, when we fragment our political so extremely, as we do in New Jersey, with respect to land-use decision making. Unfortunately, local governments have also proven frequently to be subject to extensive domination by development interests, and they are also often inconsistent in their policies as administrations change from one election to the next. In some towns that never happens, in other towns it happens a lot. It is, again, a function of the fragmentation of our system.

So the Bay has no effective regional planning today. The Pinelands Commission, a regional planning agency, does not have jurisdiction over most of the Barnegat Bay Watershed. Although much of the watershed is in the Pinelands National Reserve, much of it is entirely outside the Pinelands because, when the Pinelands legislation was created, people didn't understand the fundamental importance of the watershed as the unit for the dynamic of natural systems and human impacts. So we get a totally artificial boundary to the Pinelands. Even within the National Reserve, much of the Barnegat Bay Watershed is excluded from the

jurisdiction of the Pinelands Commission because New Jersey chose to leave it within the Coastal -- the CAFRA program of DEP.

The Department of Environmental Protection, on the other hand, has extremely limited planning, as opposed to permiting, powers. And it does not generally use those powers it does have. The example that I cite is water allocations. It hasn't generally used those powers to achieve a regional land-use vision. So DEP has also not been a regional planning agency to control the land-use patterns, and the types and intensities of uses.

The counties in our system of government have historically very little influence to plan or control growth, and have not been able to coordinate local zoning plans and development patterns either. Now we do have, actually, a mechanism right now going on -- the creation of new waste water management plans -- where they give the counties a significant amount of influence through the designation of Sewer Service Areas and related functions. Many members of the Legislature are attacking that process and trying to make it so that counties will not be able to redesignate historical, but ill-considered, sewer service areas.

So counties have very little power in general over planning. What power they have now under the current rules is being seriously undermined by political pressure that I think is very ill-considered.

Another factor that you see in Barnegat Bay is something that is happening in many other parts of the state, and it has to do with affordable housing. There's a crisis of affordable housing, that's clear. And it threatens, among other things, to undermine rational planning of the remaining forested lands in the Barnegat Bay Watershed. Many towns have

frankly dragged their feet on creating affordable housing, we all know that. But at the same time, they have accommodated rapid development, which does two things: it increases their affordable housing obligation, because they've got that much more growth going on; and it eats away what developable land is left in environmentally compatible fashion.

So you're getting a situation where towns are being driven to look for some really big developments to take place to absorb this tremendous demand that they've built up. And that's a problem that again is not being looked at on a regional basis today.

So I think the key lesson from all of this is that the response needs to be a comprehensive and coordinated one. People have referred to the many different policies that we've pursued -- they need to be pursued comprehensively. And the key thing is, they need to be pursued in a structure or process that compels and rewards cooperation among local governments, the counties, and State agencies.

There are a lot of ways to do that. One option would be: we create a new regional planning agency, comparable to a Pinelands Commission, for Barnegat Bay Watershed. Another might be to extend the jurisdiction of the existing Pinelands Commissioner. But there are other options as well. A council of governments is an option. As long as, whatever the structure is, it has both a mandate and authority to bring coherence to land-use change in the watershed.

It's going to be critical to stop the bleeding, because for all of the good ideas about retrofitting existing development and adopting better design techniques -- low impact design techniques at the neighborhood and the home level -- if the watershed keeps growing through sprawl the way it

has been and the way it is currently embodied in all the land use plans for the municipalities out there, the additional impact of that development is going to swamp anything that we can do now in the way of retrofitting and improving the design of new developments. So there's going to have to be some kind of dramatic control of the way the additional development takes place and how much land, how much of the remaining landscape, it eats up.

There are a lot of good techniques out there. There's transfer of development rights techniques; there are clustering techniques; there are ways to build at a lower impact. It's not zero growth, but it's got to substantially change growth for the future if we're going to get a handle on the problem.

I just mentioned that Pinelands Preservation Alliance, along with the Jacques Cousteau Program, the Estuary Program, and a number of others have been involved in lots of discussion. The next milestone, we hope, is a session that we're helping to organize in the Fall or early Winter with a lot of partners, to try to get to the next step in very concrete policy measures around which we could build consensus to bring to you all, to the local government officials, to the counties, and to the public. And we look forward to having your cooperation in this continuing process.

SENATOR SMITH: We're going to make a big mistake here. We're going to allow a question, and hopefully this does not start a precedent. But Senator Gordon asked; he said he has a *tiny* question.

SENATOR GORDON: It's really not a question; it's more of an observation. I find it very compelling, your comments about the fragmented parochial nature of municipal land-use planning and the way that's been an impediment to regional planning. I'll just point out that in

this state we have what I think is a very successful model for regional planning, and in an environmentally fragile area, and that's the Meadowlands Commission. There you have an area of a dozen towns within a very fragile area. And that organization plans on a regional basis. It has identified areas that need to be preserved and restored, and areas where development can occur without there being a negative impact; and then provides a revenue-sharing mechanism to compensate those who have lost their right to develop. It's been working very well, and it could be a model for what could be done here and elsewhere in the state to deal with these regional problems.

MR. MONTGOMERY: Obviously I agree with that completely. New Jersey is a national innovator in regional planning. We have far more of it than any other state in terms of the number of robust regional planning programs we have. But it is also true that when one looks at the variety, not only within New Jersey, but across the country, you can really get a flavor of the different options you have in fashioning a regional program that is tailored to the culture, to the natural resources, to the political situation in a particular place. And I don't think that anybody should think if we're going to do regional planning, it's got to be just like the Meadowlands, or just like the Pinelands, or just like the Highlands. It is quite possible to fashion different structures that take advantage of what we see best in each of these programs. The key thing, though, is creating some kind of mandate and authority that will bring the locally based planning processes into a coherent regional program that can be calculated to solve these problems for the Bay.

SENATOR SMITH: Thank you.

ASSEMBLYMAN McKEON: Thank you, sir, very much.

Michael Borgatti, Save Barnegat Bay.

M I C H A E L R. B O R G A T T I: Thank you very much, Assemblyman McKeon, Senator Smith, members of the Committee.

It's a pleasure to be able to address you today. My name is Michael Borgatti. I am the science and technical associate for Save Barnegat Bay. And for the last 24 months or so we have been working to conduct an investigation of various fertilizer management techniques that may be implemented in the Barnegat Bay Watershe, or New Jersey as a whole.

I am here today to discuss some of those with you.

I would like to point out one thing that's kind of interesting that I've noticed about today's conversations. We've heard a lot about the two girls born last night at midnight. Many of the laws that Dr. Hales cited in his presentation earlier today were signed in when I was born over 25 years ago. So this is a conversation we've been having about Barnegat Bay for the entire time I've been alive. It's important to color that, because it's probably time now that we take some concerted efforts, some concerted actions to move forward.

Things like fertilizer legislation is an example of moving that process forward in a way that affects a positive change on the environment here.

I want to stress two points.

ASSEMBLYMAN McKEON: Just for the record: The two of us just recently turned 30. (laughter)

MR. BORGATTI: Nice.

Allright. As I was saying, I'd like to stress two points.

The reformulation aspect of fertilizers is not simply limited to phosphorous. The DEP did an excellent job of working in the State of New Jersey to outline some recommendations for using phosphorous fertilizers within the river waters in the upper portion of the state here. In our model ordinance, which I've submitted to you, we adopted a considerable portion of that language building upon the work that the DEP did. However, it is also possible to reformulate nitrogen in such a way so that it enters groundwater less regularly. You can coat the actual molecules of fertilizer in substances that allow them to leach into water less easily. As we heard again, in previous presentations, groundwater makes up a significant portion of the water entering the Bay. The more fertilizer we keep out of there, out of that water, the less nitrogen ultimately contributes to that 750,000 kilogram load a year that's entering the water body itself.

I encourage this Committee to consider regulating both the purchase and use of fertilizers with less than a specific amount of controlled release nitrogen in the State of New Jersey, as an opportunity to limit nitrogen leaching, as it effects both of our coastal waters and our fresh water systems here.

Recent scientific studies conducted-- Yes?

ASSEMBLYMAN McKEON: Is that -- what you just mentioned -- is that organic fertilizer that you're referencing? Or is that a chemically treated fertilizer that has the same effect, if you will, as it being organic?

MR. BORGATTI: Great question. Organic fertilizers, by nature, are generally slow-release products to begin with. The molecules

themselves are chemically slightly different than some of the other molecules of nitrogen that are available out there.

There's also the way you can take a physical molecule of usually urea, or uric acid, or ammonia, and you can coat it like a jawbreaker. You can actually put a chemical on the outside of it that breaks down slowly over time, subsequently makes those less available to the environment.

The idea is, rather than apply a quick-release product that either gets used up or enters the water quickly, that slow-release product sits there and the plant is able to use it over a period of time as that plant needs the nitrogen. So that's the theory behind those products. And again, both inorganic and organic forms are available.

As I was saying, regulating the sale and the use of those products is important to consider, because you're allowing the user to only have the availability of the products that are simply the best to be used here in the environment, the safest. Coupling that with educational programs that exist already allows people to be educated in the use of the products correctly and to use the tools that are less likely to affect the environment. Why is this important? Because an EPA study in 1999 surveyed fertilizer applicators in the Chesapeake Bay. They determined only about 55 percent of those people read the back of the bag. The instructions that are on there are just simply not getting read. Subsequently, 36 percent of the people that were subject to outreach, they got the message. "Hey look, we got to fertilize a better way." Didn't change their behavior. Education only doesn't affect the problem as completely as both education and regulation.

The State of New Jersey has an excellent opportunity here to move forward on preventing fertilizer leaching in Barnegat Bay and the New Jersey state waters.

Secondly, I'd like to offer my support, and I hope the Assembly here and the senators involved will support, Senator Scutari's bill, S2302, to license and regulate landscape professionals. This allows for two different things: one, in that bill is language which ensures the best management practices are taught to landscape professionals throughout the State of New Jersey. This means that as our understanding of how to fertilize evolves, the professionals -- who we're paying to treat each yard individually as a lawn experiment -- use those best management practices. Secondly, it provides passive data collection. It allows individuals studying nitrogen being put down on the ground to get a handle on how much of these products are being applied. It allows individuals making management decisions to subsequently take that information and to tailor the management decisions made throughout the State of New Jersey to actually affect the way these products are subsequently being used.

In conclusion, I'd also like to send my support and the support of Save Barnegat Bay, and I hope other members of this Committee, for Senator Smith's bill clarifying the county Environmental Health Act. Thank you very much for that.

And with that, I conclude. (applause)

SENATOR SMITH: Thank you, sir.

Kathy -- and if I mispronounce the name, don't get mad at me -- Haake, and Tom Gilbert, Trust for Public Land.

K A T H Y H A A K E: I'm Kathy Haake, I'm Senior Project Manager with the Trust for Public Land. Thank you for holding this hearing on the health of Barnegat Bay.

The Trust for Public Land is a national non-profit land conservation organization that works to conserve land for people to enjoy as parks, gardens, and other natural places, ensuring livable communities for generations to come.

The Trust for Public Land has been working in the Barnegat Bay since 1985, and we've helped preserve over 11,000 acres of the Bay watershed. In addition to our land acquisition activities last year, TPL worked with over 50 stakeholders in the Bay watershed to produce the Barnegat Bay 2020 Report, which I've provided to you. You should have it in your packets. TPL assembled the steering committee to help identify land conservation goals that are critical to the protection of the Barnegat Bay and to help design a GIS model that would map these goals.

The report identifies properties throughout the watershed that are the most important parcels for protection, and the map showing these priorities are in the report. Our report is available on the TPL website and we hope it will become a reference for land conservation in the watershed.

T H O M A S G I L B E R T: Thank you. My name is Tom Gilbert, and I'm Regional Conservation Services Director with the Trust for Public Land. I'm also the Treasurer of the New Jersey Keep it Green campaign, which is a coalition of 130 conservation, park, recreation, wildlife, farmland, and historic preservation groups that is strongly endorsing and supporting the $400 million Green Acres, Clean Water, Preservation Bond Act that will be on the ballot, as has been referenced several times today.

I'd like to thank Chairman Smith and Chairman McKeon in particular for your strong leadership in sponsoring the Bond Act, and all the Committee members for your bipartisan support for giving the voters the opportunity to decide whether to continue investing and protecting open spaces, clean water, natural areas, wildlife habitats, farmland, and parks throughout New Jersey.

As Kathy described, preserving land is critical. It's one of the key strategies to protecting the ecological health of Barnegat Bay. The Barnegat Bay 2020 Report that Kathy mentioned identified approximately 25,000 acres of unprotected, high-priority lands that must be preserved to protect water quality and supply, wildlife habitat, recreational access, and scenic areas in the Bay watershed.

Unfortunately, with the State Green Acres program essentially being out of funds, which has played such a critical role in land preservation in the Bay already-- As Deputy Commissioner Watson described, without continued funding through the Green Acres, Clean Water, Preservation Bond this November, it will not be possible to preserve the lands that have been identified as critical to the future ecological health and water quality in Barnegat Bay.

We can't afford to miss the opportunities to preserve land right now in this real estate market before it's too expensive, or worse, too late. And the annual cost per household would be only $10, which is a small price to pay for clean water and leaving a natural legacy for our children.

So thank you again for your leadership on these issues. We urge everyone who cares about clean water and protecting the Barnegat Bay

to vote yes on the Green Acres, Clean Water, Preservation Bond Act this November.

Thank you. (applause)

ASSEMBLYMAN McKEON: Thank you, Tom.

Tom, thank you for your leadership.

Cindy Zipf of Clean Ocean Action.

C I N D Y Z I P F: Good afternoon, everybody. Thank you for coming to the Jersey Shore.

It is great to see a bunch of guys in suits hanging here -- and women. Bringing Trenton to the Jersey Shore is a really great idea, and I want to thank you for that.

You have a copy of our written statement, which includes a couple of things, and including books like this. But just to highlight some of the things -- you know, in these times of economic crisis, it's always great to find a bargain, a really great bargain. And the marine environment is an extraordinary bargain. Just for being there -- just for the marine environment being there, according to the Natural Capital Report that the DEP did -- the marine environment generates $16 billion of assets for us, just from being there. And that doesn't include the tourism industry and the fishing industry, and the boating industry, and the surfing industry, and the just-loving-the-ocean industry. So there is an extraordinary economic asset here that we need to protect. And the Barnegat Bay is -- if you look at the state -- it is the heart of the marine environment. It's right in the center. And I have to say, it is heartbreaking to hear that the Barnegat Bay, even after all these years of focus and study and effort, is the second worst estuary in the world. What kind of title is that? What kind of legacy is

that for us, after all those years? And it should put a fire under us all to strive harder, because what we have done is clearly not enough.

So there are many solutions, as you've heard about. It's finding that political will to make them happen. Yesterday we released the Natural Resources Defense Council's report. Again, many of the closures are in the back bays of Barnegat Bay, and they're only getting worse. So now, not only is it unhealthy for marine life, it's unhealthy for people to swim and enjoy. And as you heard, they're not going to change overnight. So we've really got to have the long-standing commitment.

And the two most important actions that we feel could substantially affect and improve the conditions in Barnegat Bay are: to mandate Oyster Creek put in a closed-cycle cooling system, period. And if the State won't do it, the Legislature should. It is an abomination. It is massacring and murdering billions of marine life every year. And that can be done in a heartbeat, because its owner, Exelon, has the money to do it. Last year, in 2008, think about your portfolios, your economic portfolios, IRAs if you have them. Everything tanked. Exelon still earned almost $3 billion in profit. Profit, not even revenues. Profit. They've got the money to fix that thing and they ought to do it right away, and be mandated.

The second thing, of course, as you've heard, is reducing the stormwater pollution. And we encourage and are very supportive of the idea of a utility to help make that happen, and look forward to working with you all to make that happen.

The other thing I want to highlight -- I'm not sure it's been highlighted today -- is that you've passed some pretty good laws. But the fact is nobody's enforcing them. And the laws I'm talking about could

provide easy money to help implement many of these very costly but, considering the value of the marine environment, not costly efforts. Litter enforcement, for example. According to the latest results on littering -- Clean Communities Data 2006 -- there were only 18,500 violations for littering in the State of New Jersey. Can you believe that? Only 18,500 times did somebody litter in New Jersey. You know, we know that's not true. We know every day, many times a day, we see people littering. How many of you have known of people getting a ticket? And we're talking about big money here. The State has a law that says it's a $100 per fine. So if you multiply $100 times 18,500, you get $1.8 million. So if each county, each municipality, or even the State were to apply litter enforcement *a)* we'd get money that could be dedicated to implementing many of these programs that we're talking about, and *b)* maybe people would just stop littering -- which would be an overall benefit as well.

There's also money running down the streets. We heard about the soil erosion issues. Every time we see muddy water running down the streets, it's often linked to a violation. You should not see muddy water running down the street. Somebody is doing something wrong to their land and it's likely illegal. And that also allows for a fine, up to $3,000. Now, those funds could also be put into a fund to help pay for many of these initiative that we're talking about.

One that there isn't a fine for, and maybe you ought to think about it because it is a steady drip, is the oil drippings that come from cars and trucks, and whatever, that very much contaminate our waterway. When the water runs, you can often see an oily sheen. And that's from people just not maintaining their vehicles. And although there are some

requirements that are linked to inspection, you know that you have to fix your cars when you get reinspections. Now that it's two years, you could have two years of your car leaking. It's not only leaking money away, because you're paying for the oil, but it's also causing very significant harm to the marine environment. So maybe perhaps the Legislature could think about establishing a fine for that.

But it's more than just establishing a fine. It's encouraging municipalities to enforce these laws. I know police officers are busy, but this is a crime. What's happening to Barnegat Bay is a crime, and there are a lot of polluters out there that are contributing. And they may not know it, but they need to be held accountable.

So in addition to those, there are also free sources of money, of protection, and that is the fertilizer ordinance that you've just heard from Barnegat Bay. Senator Smith, you have a bill to reinforce those kinds of fertilizer ordinances -- that there is a way for there to be compliance there, or to require fertilizer ordinances. It's just a simple thing, but, absolutely, people need to be aware of that.

And education is so important. That is, again, a free way to reduce pollution.

And I just want to put in a really short plug for Island Beach State Park, because that is a huge educational opportunity. Clean Ocean Action hosts a student summit there once a year and has 500 students get wet and sandy, many of them for the first time, learning about the marine environment and their connection to it. So it's an extraordinary resource that ought to be protected.

And we, the people, we in the organizations that are out there -- we also contribute to ways in which to get the public to implement ways for them to be more Bay friendly. We developed a program with Save Barnegat Bay called the Barnegat Bay Buddy Program. It's a simple little thing, there's applications around. It's a pretty easy tool. There's 32 ways that you can be Bay-friendly, and if you add up enough points, you can become an exclusive member of the Barnegat Bay Buddy club. So there's a little bit of peer pressure there. We actually now have streets that are becoming Bay Buddy streets, because the neighbors are putting pressure on one another. We currently have 150 Bay Buddies, and today I am very, very delighted to introduce all of you to our latest Bay Buddy, and that is Senator Bob Smith. Welcome to the club. We have a medallion for you (applause). Every Bay Buddy gets a medallion that they get to put on their lawn. And this is focused on Barnegat Bay right now, but we're hoping it becomes a model program where we can have Bay Buddies all up and down the shore. Because as you saw, not only is Barnegat Bay number two on the worst in the world list, but the rest of our bays are number three. So we need to work on this statewide. And again, we want to recognize and commend the Committees for focusing on this.

Thank you. (applause)

SENATOR SMITH: Our next witness in Benson Chiles.

B E N S O N C H I L E S: Thank you. Thank you, Senator Smith, Chairman Smith, Chairman McKeon.

My name is Benson Chiles. I'm a consultant with environmental organizations, and I coordinate the work of the Coastal Ocean Coalition.

I want to thank you for this opportunity to briefly testify. I really don't want to say much; I'll keep things moving.

I want to offer a report that I've passed on that may be useful to the Committee. It's called "Ocean Water Quality in New Jersey: Redirecting the Management Effort." This is a report that was drafted by members of the environmental community. The report outlines ways that the State can better protect our marine water quality. And I think that one of things that I want to emphasize is that the State already has the authority to do a lot of the things that need to be done. For example, nitrogen. We heard about nitrogen earlier. Nothing is happening in the Barnegat Bay to address the nitrogen problem. We need to do more.

SENATOR SMITH: This Fall.

MR. CHILES: This Fall? Excellent. That's great news.

One thing I want to also raise that hasn't been discussed today is the idea of -- that's come up in the most recent myriad of complaints. I don't want to take it too far, but I do think there are some reforms that could happen within the DEP and the processes there to assure that we don't have too much undue special influence in the processes that we have in place already.

The environmental community is gathering. They are building a platform of reforms that would be helpful in this regard, so that the State can act on the authority that it already has to address some of the problems that we face here in the Barnegat Bay and in the marine environment generally.

So thank you.

ASSEMBLYMAN McKEON: Thank you very much.

Bill Wolfe.

B I L L W O L F E: Is this on? (referring to microphone) It's on?

Thank you, Mr. Chairmen, members of both Committees, for the annual shore hearings. I think it's a great moment.

My name is Bill Wolfe, for those who don't know me. I am a 13-year career DEP employee and I've been in the environmental community for just about the same amount of time, working mostly on land-use and water quality issues.

I want to preface my remarks by pointing to the 800-pound gorilla that nobody seems to want grapple with. And this is not to cast any aspersion on anybody up on this panel. But we are in a district of the legislator who was criminally indicted for seeking CAFRA and wetlands permit expedition and granting. And last week I released a letter from an assistant commissioner at DEP who put in writing the fact that he is getting political pressure from Legislators not to enforce the Department's wastewater rules. So I think, as a joint committee, you have the moment to both restore public confidence in the integrity of both the political process and the Department's regulatory processes. And I think that is necessary, and I think that somebody's got to stand up and say this was wrong, and it's not a pattern and practice in the department. Although I've been there 13 years, and I know, in fact, there are egregious cases of it -- personally, with personal experience. So my point is, we need to come to some kind of conversation around that issue to restore the public's faith and confidence in government. And you guys are the leaders and I look to you for leadership on that issue. And I look to the Commissioner of DEP to make some form of statement and put in place some form of reforms that says a

legislator cannot pick up the phone and call the Commissioner and get a permit. And we will never have healthy water quality, air quality, or otherwise if we don't have healthy government.

I think it's important that that be said.

ASSEMBLYMAN McKEON: Thank you, do you have anything else?

MR. WOLFE: Yes, I want to make two quick points.

I made a list of 10 specific policy reforms that could be implemented to improve the water quality of the Bay. And I'm disappointed to say they were all -- I'm pleased to say that they were all identified by the scientists and the Barnegat Bay National Estuary Program as problems, in that the estuary program pointed to the fact that the existing regulatory protections were not adequate. Those are very strong findings that you should look closely at.

I'm disappointed by the fact that not one of the 10 points that I had, that the DEP has regulatory and programmatic authority to implement, not one of them -- not one -- was mentioned by the DEP presentation. And the two that I would like to mention as the most effective, the most cost-effective and the most technologically effective, are: number one, the water quality standards, which have regulatory implications. And the department proposed water quality standards in April, and they did not propose a water quality standard for nitrogen to protect the ecological health of our water bodies. They had a clear moment and they have EPA guidance encouraging them to do so. The EPA guidance was adopted in 2000, stressing that the states needs to adopt numeric water

quality standards for nutrients, because nutrients are the number one threat to the nation's waters -- and obviously to the Bay.

So we have to have DEP take that on -- it's cost-effective, it doesn't cost a dime to adopt a water quality standard. And I was part of the last commissioner's work team that was given a Governor's Award by former Governor McGreevy for adopting water quality standards for phosphorous in freshwater systems. And the next step the DEP was supposed to follow that up on, that Commissioner Jackson talked about last Summer here in the watershed, was a nutrient standard for nitrogen that would do the same thing they had done for phosphorous.

So the fact that the department is not willing to move on that -- it's something legislatively you should be aware of.

The second most effective tool is protection of riparian buffers. You don't have to spend money to acquire them. The DEP can designate and protect 300-foot buffers on both sides of every drainage to the Barnegat Bay. It's a very cost-effective and very technologically effective strategy, and I think it needs further leadership by the DEP to do those designations.

Anyway, I'll be submitting written comments for the record, including the letter from Assistant Commissioner Brubaker that I think should really--

SENATOR SMITH: I'd like to see it.

MR. WOLFE: Thank you. (applause)

ASSEMBLYMAN McKEON: Apropos to the fact that we're getting almost beyond lunch time, Scot Mackey from Garden State Seafood (laughter)

S C O T M A C K E Y: We don't need to testify; we've provided written comments. We're happy to help in any way we can.

ASSEMBLYMAN McKEON: Thank you, Scot, very much.

SENATOR SMITH: He's a hero; let's give him a hand. (applause)

Mr. Bill deCamp, Save Barnegat Bay.

W I L L I A M d e C A M P Jr.: I would like to thank the Chairmen, both of them, both the Committees for coming to us in Ocean County. We're grateful for that. And thank you.

My name is Willie deCamp; I'm Chairman of Save Barnegat Bay. We're a not-for-profit group that gets contributions from approximately 1,500 families and businesses annually. We have a small office in Lavallette.

Before I speak to the one point out of the three that you will notice in my written testimony, I just want to mention and comment on a couple of other things. One is that we at Save Barnegat Bay -- as Mike Borgatti mentioned -- have worked hard to educate ourselves about the whole process of nitrogen in our estuary, and we will be very happy to give a private briefing to any public official. That's what we're here for, and we'd like to do that.

Second, I would just like to comment on the subject of sewer extensions and caution the Committees. It is ironic that sewer extensions create sprawl. Sewer extensions actually harm the waters of Barnegat Bay because the suburban sprawl follows the extension. An example of this would be North Green Street down in Tuckerton and Little Egg Harbor, where they proposed a sewer extension, and Save Barnegat Bay and others

got together and stopped the extension of the sewer line. And then the Trust for Public Land was able to buy 800 acres along North Green Street between Tuckerton and the Parkway.

The subject that I wanted to address in my verbal testimony is the cooling system at Oyster Creek. And if you have my testimony, there's a bar chart in it which I commend to your attention. The issue at Oyster Creek is not a nuclear issue. The issue is: how do you responsibly cool any energy plant? Now, what the existing once-through system at Oyster Creek does is, each day it pulls 1.7 billion gallons backward up Forked River, then it goes through the plant and almost every living thing is removed from that water. All the clam larvae, all the fish eggs removed from 1.7 billion gallons of water per day. And then it goes, in its heated-up state, out Oyster Creek and back into the Bay.

There are only 60 billion gallons of water in Barnegat Bay. Six-zero billion gallons of water. What that means is every single day the cooling system at Oyster Creek strains 2.8 percent of the volume of Barnegat Bay of life. That is over 1,000 percent of the volume of Barnegat Bay strained of life per year.

And this problem can be remedied by one man nodding in the direction of one other man. And that is Jon Corzine nodding in the direction of Mark Mauriello and saying, "Yes. Require the towers." Why? Because Oyster Creek is doing what it is doing on a Clean Water Act permit that expired 11 years ago in 1998.

So our pleas to this Committee, to all public officials, is to use any form of moral suasion to persuade our Governor to order the cooling towers built. The subject is on his desk, as we speak.

That's the primary thing that I want to convey. In my written testimony and here, I'm trying to focus on specific things we can do -- generalities are very important, but these are the specifics. And to neglect that would be a tragedy.

And I thank you very much.

ASSEMBLYMAN McKEON: Thank you very much.

(applause)

Assemblywoman Vainieri Huttle has another obligation back in her district, which is a solid two-hour drive from here. So I know everybody appreciates the fact that you're here, Assemblywoman; and if you care to make a few statements on your way--

ASSEMBLYWOMAN VAINIERI HUTTLE: Thank you, Chairman. I'll be brief.

First of all, I'd like to applaud all the members of the audience for really coming out in the middle of a hot summer day, and really being committed and passionate about this issue. Although I do come from Bergen County, I do have a residence in Ocean County, on Long Beach Island. Quite frankly, this is certainly an education for me in a lot of areas. My daughter, who's here today and going on this afternoon with me, I hope that she brings this to her peers. She's a 14-year-old, and we're talking about the next generation. She has done work in the Hudson River area with her science class. I just want to say that this is not only an issue for Ocean County, because when we know that there's 500,000 residents down here, in the summer it certainly swells to over a million. And I want to say that other half a million probably come from Bergen County and North Jersey.

So I just want to make a couple of points. Dr. Larson's partnership with his Ocean County College for Environmental Sustainability should obviously be advocated for all the community colleges here in New Jersey, especially since the community colleges right now are an excellent opportunity for all of our students in New Jersey, because it is a springboard for affordability to go onto four-year colleges. So I want to make that an issue or at least bring that to the attention of our president up in Bergen County, Dr. Ryan, to have really all of the students work on this. Because, again, it's not an Ocean County problem, it's a statewide problem or concern to save the Barnegat Bay.

I have a house down in Long Beach Island. I didn't know that, really, Barnegat Bay is polluted. Because we see it sparkling every night and every day. So this is an issue that we need to bring back.

The other point that I want to make: I am talking, as we have our sidebar conversations, with my colleague Reed Gusciora. We certainly are putting in a bill, whether Corzine nods to the DEP or not, to install a cycle cooling system here in Oyster Creek. (applause) I want to make that public right now that we are definitely getting OLS to draft that.

And lastly, I think that all of these issues that are brought to our attention are certainly a statewide problem, and I do, again-- If I may, Chairman, real quick, bring up my infomercial on-- I believe it was Tim who spoke, I don't recall who spoke, who gave this pamphlet out. But if I will-- Albany passed a bottle bill. I am a prime sponsor on the bottle bill, a Smart Container Act here in New Jersey. I would like to have that resurrected. We had it for public discussion -- I thank my Chairman for putting that on the agenda for public discussion. But I would like to re-

energize that come the Fall when we get back into session, because it's also an issue that I think could help. There are so many solutions that we can come up with, but we have to come up with a few right now.

So I thank you for the time. Thank you, Chairmen. Thank you, Senator Connors; you are my Senator when I-- I do pay taxes in Ocean County as well. (laughter) So thank you again. And I'm sorry to have to leave, but I will also get a copy of the transcripts. And we will be here to help, and certainly continue this issue statewide -- it's not just an Ocean County issue.

So thank you for your time. I appreciate it. (applause)

ASSEMBLYMAN McKEON: For the record, my 16-year-old said, "I'd rather stick needles in my eye, Dad, than to get off the beach and to be here with you," so your daughter gets double stars. (laughter)

ASSEMBLYWOMAN VAINIERI HUTTLE: Well, I promised her a few things. I guess I have to fulfill them. (laughter)

ASSEMBLYMAN McKEON: Jeff Tittel is here.

J E F F T I T T E L: Thank you. And I want to thank Assemblywoman Huttle who has worked very closely with the Club on the bottle bill issue.

I just want to throw in a quick plug: In New Jersey, we recycle 50 percent of our bottles; in Michigan, where they have a bottle bill, it's 99.7 percent. So, when you think of all that stuff on the side of the roads -- I want to thank her very much.

Just wanted to start off and say that Sierra Club has been part of different hearings and meetings on Barnegat Bay for 30 years. And unfortunately, in that time, we've seen a lot of great studies, reports, and plans. But we've seen the Bay also decline. And I want to thank, in

opening, my friend Willie deCamp, who has been a voice for this Bay and has focused on it for a long time. And his organization is called Save Barnegat Bay. But as I was driving down here and I was watching them widen the Parkway, I realized that the State of New Jersey's policy is Pave Barnegat Bay -- that we're seeing this Bay being threatened by sprawl and overdevelopment, and the widening of the Parkway is going to be putting more development pressure on this cherished resource.

Barnegat Bay is a place that on a weekend you could have up to 100,000 boats, between the boats that are already on the Bay from people who live on it, people who come down the canal from the Manasquan, and people who come up from Atlantic County. It is a resource that we all use.

Over a half a million people live around the Bay, and on some given days -- when you look at the people going to the beaches as well as the people with houses -- we have a million and a half people in and around the Bay; also people camping in the Pinelands. So this is really a recreational gem for this State. It is also an economic engine for the State. After Atlantic City, Barnegat Bay is the next biggest driver of tourism in New Jersey. It has, just on residential ratables, over $100 billion worth of investment by people who want to live or vacation around this Bay.

So when we talk about the fact that we have tough choices to make, and that if we don't do anything because we can't afford it -- all those people who invested all their hard earned dollars into having places here because they love it will be losing that investment. So it is in the best interest of this State economically, for the people who live here, the people who use it, to make sure that we work to clean this Bay up.

And I think that is really the lesson. I think Dr. Kennish can say more about the problems in a better way than I can, and I bet you never thought I'd say that about someone else. (laughter) But we know where the problems are. We need to do the solutions. And I think that's the problem. Even in the past, when we have attempted to fix some of the problems, we've created new problems. Back in 1980s, when we upgraded our sewer plants because leaky plants were causing tremendous pollution problems in the Bay, we all worked to get those plants upgraded. One of the mistakes we made is that we made those plants a lot larger, which extended sewer lines and sprawl into new areas.

Another mistake we made is we put that water off the coast. And on any given day, 100 million gallons get pumped -- on a day like today it's about 200 million gallons. And that freshwater that used to come into the Bay used to help flush the Bay, keeping the Bay more brackish. The Bay's becoming saltier and that's why we're seeing a lot of the problems that we're having.

Also because of over-withdrawal of groundwater-- Brick Township built a reservoir. The amount of water they're diverting out of the Metedeconk, and the evaporation also off that reservoir, is making that branch to the Bay become a lot saltier. And that's why you see jellyfish up there now, where years ago you never did.

So when you look at what we're doing to the Bay -- when we go to fix the problems we also need to make sure that we've looked at other possible secondary impacts. And I happen to strongly believe that we need do a few things, and also make sure that the State does no harm.

We had a great opportunity to put a nitrogen standard in the surface water quality standards. We had a great opportunity to upgrade streams like Cedar Creek to Category 1, which was petitioned and DEP scientists had wanted to do years ago. In fact, DEP had committed to making the Barnegat Bay C1 at one point so that we would be protecting this Bay resource with an anti-degregation criteria. And it fits it for both shell fisheries and for recreation purposes. We have those tools in our toolbox. Even in the CAFRA Law, which we think is broken, and how we've done the rules in the last reiteration-- You know, when Tim was talking about the findings that they do down in North Carolina -- they're in the CAFRA Law. You go read CAFRA 1, and they say the commissioner shall issue no permit that's going to cause saltwater intrusion. Yet we had to build a desalinization plant in Cape May, and we've got saltwater intrusion on Long Beach Island threatening wells, and also along the Bay. It says that we can't, we're not allowed to issue one permit that's going to put nutrient loads into water bodies. And yet we're doing it time after time. So part of it is getting the rules done right and fixing some of the problems with the existing tools we have.

There are other areas that we can also do. We need to look at a holistic approach for the shore, but there's a lot of things that we need to look at. And there's different models. And one of the models that I was thinking that may work for the Bay is something similar to like the Lake George Commission, which, if you go inland and you see how-- Because I look at, even through Barnegat Bay is saltwater, it's really almost like a lake for the people of New Jersey. It's just a saltwater lake. And when you look at how the Lake George Commission is structured to deal with stormwater

and water quality issues, it could be a good model to take a look at. And they also have a fee system which is based on boat registrations and boat use to help pay for the restoration and the cleanup of the lake. We don't want to talk about fees; but if we don't come up with a mechanism, then we're not going to be able to do it.

Another is the bill that we strongly support, which is setting up stormwater utilities -- which has done a great job in Florida in cleaning up a lot of the water issues and the bays in Florida.

So we have the opportunity; we just need to make sure we have the leadership. It will be our generation's loss if we cannot pass this great resource to the next generation. I mean, that's really what it's about. We also need to make sure that the State's policies in the interim do not interfere. We have to fix those CAFRA rules. Under CAFRA, if you're in a center, Planning Area 2, it's 30 percent impervious cover. But according to all the stormwater studies that have been done, if a watershed is 30 percent impervious it's considered urbanized and you've lost it.

We're at the tipping point. This Bay is 70 percent still pristine or undeveloped; 30 percent developed. The impervious cover numbers are moving up every year. We see policies with weakening of protections in the Pinelands, and things like the Stafford Business Park adding to the problems into the Bay itself. And so *1)* we need to get the DEP to do no harm and fix the CAFRA programs, put in a nitrate standard, designate streams going into the Bay, and the Bay itself, Category 1; we need the DEP to get off their butt and take the draft permit that requires a cooling tower for Oyster Creek and make it a reality. Because we don't want to have to eat steamed clams with tritium in them out of Barnegat Bay.

We have tools that we need to use. First we need to do no harm. And the second piece of that is for this Legislature to look at coming up with a regional planning and stormwater mechanism for this Bay, whether it's through a stormwater utility or commission like Lake George, or even the model of the 10 towns that has worked up in Morris County.

But that's really your charge. We've heard great testimony. We know what the problems are. We've studied this Bay to death. We've got to get something done before the Bay dies.

Thank you very much.

ASSEMBLYMAN McKEON: Jeff, thank you very much. (applause)

SENATOR SMITH: Mike Pisauro, New Jersey Environmental Lobby.

M I C H A E L L. P I S A U R O JR., ESQ: Chairmen and Committee members, thank you very much for this opportunity.

My name is Mike Pisauro, and I represent the New Jersey Environmental Lobby. I'm going to try to be super brief and I'll pass all my testimony to the next section.

You've heard how much this area generates in revenue for the State; you've also heard that Barnegat Bay is the second-worst estuary in the nation. That should urge people to stop talking and start doing. One of the things that the Legislature did, not too long ago, was pass the New Jersey Coastal Ocean Protection Council. That is a mechanism to start looking at putting in place activities to improve. And I'd like to thank both Chairmen and the Committees for doing that. But also, as you've heard time and time again, New Jersey has a 36-year old law that looked at -- 36

years ago -- the issues that we're facing now and said, the coastal areas are too important to fail. We need to protect them. CAFRA -- CAFRA has not worked.

There's a couple of things I want to highlight. Under 13:19-5, there's the 24-unit loophole. If it's 24 units or less, CAFRA doesn't apply in a lot of instances. So you have a lot of development going on at 24 units and under that are just skating through without any review on an environmental perspective. You have Section 11 of that statute that says permits -- even though as an individual project it might meet the standards, but because of the cumulative impacts that project has to be modified or denied. I looked at this a couple of years ago -- DEP has never denied a permit that I could find under Section 11. And in a meeting with the DEP they said they haven't, and they couldn't figure how to do it.

Well, the nation and 25 other states for 30-some years have done NEPR -- National Environmental Policy Review -- on cumulative impacts. New Jersey should have a NEPR process so we can take a look at all these impacts, so we can understand them and decide how to deal with them.

Also, CAFRA, as you heard, only applies to a certain part of this watershed. Those protections, since the entire watershed impacts the Bay -- then CAFRA should protect the entire watershed, not just a portion of it. And the laws that we have should be enforced. A recent appellate -- I think it was appellate, or Supreme Court case, Dragon vs. DEP -- DEP issued a permit, allowed development to go on even though that development would not meet a permit requirement, and it required a neighbor to spend time

and money to enforce the law. And the court said, "DEP, you can't just ignore the law, you have to abide by it."

I'll also just quickly mention green building practices. There's a lot of things we can do to reuse water -- rain gardens, porous pavement. Porous pavement is a great product that lasts longer than current types of pavement, allows the water to filter into the ground. It becomes cleaner, it recharges the aquifer, and it helps slow down runoff. And as you've heard, have TMDLs and enforce those TMDLs, including for nitrogen.

I look forward to having more conversation on this. Thank you.

ASSEMBLYMAN McKEON: Thank you very, very much.

Dave Pringle. David. New Jersey Environmental Federation.

D A V I D P R I N G L E: Thank you. Again, my name is David Pringle; I am the Campaign Director for the New Jersey Environmental Federation.

I will do my very best not to be repetitive. Lots of folks-- You've heard from many folks today that Barnegat Bay is sick and dying, and I want to focus more on the actions.

We need this hearing to take a step forward, but we need that step forward to happen more than this hearing. As Jeff mentioned, we've had many hearings to date, and Barnegat Bay is dying.

While it would be great for the State to have additional authority, the State already has plenty of authority. You didn't hear that from DEP today because it's their actions and inactions that have contributed to the problems we face today. And it doesn't start with the Corzine administration; there's a bipartisan tradition of not acting, or

acting in the wrong way, by prior governors as well. But it's happening now on his watch and more needs to be done.

There's a laundry list of things that can be done, and I just want to focus on what I think are the four or five most important.

Willie talked about cooling towers. In addition to moral persuasion, there's muscle persuasion. If the Governor doesn't act, you need to mandate it. So we're very pleased to hear that legislation is going to be introduced to that effect, and it can't pass fast enough.

While we have a coastal protection act, CAFRA, there's a key provision in it that the State has discretion to implement but hasn't -- which is to look at the cumulative impact of each permit decision. And they're not doing that -- they're not looking at the cumulative impact of each development project. They're only looking at it in a vacuum. And that's a cause for concern.

Finally, there is a fancy provision in the Federal Clean Water Act -- TMDL, Total Maximum Daily Load. It's a fancy word for clean up the water. Every impaired waterway is supposed to have a clean-up plan. It's supposed to be implemented and there is-- The State has been, across the board, pathetically slow in implementing these. And now that Barnegat Bay is impaired, that should be expedited.

Finally, there's a series of water rules, sewer rules, water allocation rules, all stemming from various laws, all of which are riddled with loopholes that need to be strengthened. Ideally regulatorily, but if need be, legislatively.

Finally, as Jeff talked about, the expansion of the Garden State Parkway. The State's own studies say that it's not going to fix the problem

of congestion. It's just going to make-- It's not going to solve the problem it's designed to solve, and it's going to cause additional problems.

So if folks really care-- We don't need another hearing that doesn't lead to action. We need you to provide the cover to the Corzine Administration now and whoever is in office next year, to do the -- give them the cover to do right the thing. When they fail to do the right thing, hold them accountable -- legislatively, mandated, close loopholes. And finally, get a handle on the culture of corruption. We can argue about how bad it is, but it's certainly out there and it's going to make a-- The perception is out there, and it's going to make your job and our job harder the longer it lasts.

Assemblyman Van Pelt is innocent until proven guilty, but at the very least, it's indicative of a much larger problem that has to be addressed if we're going to move forward.

Thank you.

ASSEMBLYMAN McKEON: Dave, thank you very much.

The last witness that we have in this area is Ben Giovine, a fine young man from the offices of Congressman John Adler who represents this region of our State. Ben, if you could provide greetings on behalf of the Congressman, so we can move on to our other components. We appreciate you being here.

B E N G I O V I N E: Sure.

I first want to thank Chairman McKeon, Chairman Smith, and Senator Connors for organizing this panel today.

I'm here on behalf of Congressman John Adler -- just wanted to add to the record. We're going to be submitting a statement from the

Congressman about legislation that the Congressman -- an amendment that he added, that was voted and passed a few months ago to the National Water Research Development Initiative Act, which directs Federal agencies that develop technologies to treat eutrophic bodies of water, including estuaries. The measure will task this interagency committee established in this bill with implementing a plan to develop technologies and practices to treat these eutrophic bodies of water. And I know, with great support from the American Littoral Society and others here in the county, we hope that this legislation will hopefully provide some help in the near future.

And again, I thank you very much for your time.

ASSEMBLYMAN McKEON: Thank you very much for being here.

Mike Karmatz is the president of New Jersey Builders Association. Mike, I don't know if you're here. (no response) All right, there was no slip put in, but he did provide, on their behalf, testimony that will be a part of the record.

That concludes the-- Although everything is interrelated, that concludes the formal testimony as it relates to Barnegat Bay.

ASSEMBLYMAN ROONEY: Mr. Chairman.

ASSEMBLYMAN McKEON: John Rooney, I promise you, as God is my judge, you will have every opportunity to speak. (laughter)

ASSEMBLYMAN ROONEY: Since we're completing this panel, I'd like to make some comments on this subject.

ASSEMBLYMAN McKEON: Go for it.

ASSEMBLYMAN ROONEY: I mean, this particular segment I'd like to make a comment on.

ASSEMBLYMAN McKEON: Okay, we're ready.

ASSEMBLYMAN ROONEY: Okay, good. First thing I'd like to do is introduce my better half -- my wife Martha is sitting in the back of the room. She came down with me today to the Committee meeting. (applause) We intend tonight to make some contributions to senior citizens, since we'll be staying in Atlantic City.

I really appreciate coming down here to this meeting. I've listened to all the testimony, and I see a lot of the problems. It's amazing that we're talking about sewage discharges into the Bay, and that $32 million is a stumbling block in order to clean up that problem. I was a commissioner on the Bergen County Utility Authority for five years. That didn't wash -- cost was not the object. We were told by the DEP that our effluent was not clean, it wasn't up to standards, and we had to make the corrections. There's all kinds of grants available -- there still are grants available. So there's no excuse for allowing sewage to get into this particular Bay. So that's the first thing.

The other thing -- and we can clean up that problem. We know the solutions for that; we can work on it. Fertilizers is the other problem that we can work on.

Oyster Creek -- I was down at Oyster Creek. This is -- supplies about 50 percent of the energy in New Jersey. It is the lowest cost of energy that we have available. At the time, there were problems when we did the tour of Oyster Creek as a Committee, and all of these things came up. I am in absolute shock that this hasn't been addressed. I happen to be in the electrical industry, I know a little about cooling towers. What you're looking for is a dry cooling tower. What happens is, the water recirculates,

it comes out of the plant, it goes through -- it's all enclosed. They're basically heat sinks. And you blow air across them, and it comes back and it's cooled. So it's a closed-loop system. You don't go back into the Bay. That should be done -- I'll support anything, any legislation, if it takes that. Or DEP can just reject that original permit and order that. And why would Exelon not do it? (applause) I'm not looking for that. Why would Exelon not do it? The costs that are associated with upgrading their plant are all passed on to the consumer anyway. So it doesn't make sense for us to sit here and say that Exelon's going to lose profits. They're not going to lose any profit, people. We know that the utilities are there to make a profit. So that will be their cost of doing business.

The other thing that I see -- and I've heard this -- Tom, you were the first one to bring it up -- the upper part of the Bay is a problem. And when we're looking at this situation, the thing that comes to me -- and I guess that Jeff had mentioned me -- you've got to flush the bay. If you have sewage going into a particular convenience in your home, what do you do? You flush it, you get rid of it. How do you do that? One of the things that -- I've looked at the map, and we have so few inlets going into the Bay. We're not getting the clean ocean water to come in and flush the Bay. What should be done is perhaps add additional inlets. Even if we put pipes under the island, the barrier island, we could make that exchange of clean ocean with-- What's happening is stagnant water. We're getting hotter summers, supposedly global warming, and we're getting the heat from Oyster Creek. This is a problem. So we've got to get that mix of water to flush out the Bay.

So these are the kind of things that I would look at if I were involved in a higher level of government. I'm one in 80 in the Assembly; one in 120 in the Legislature. But I've been on the Environment Committee forever. And as my Chairman says, I've been here 26 years. I decided not to run for reelection, that's another thing. I intend to stay involved. The dearest thing to my heart is the environment. This state has a terrible, terrible reputation for being a dirty environment. And I would like to see that changed. We've got to do some things.

One of the things I have to comment on -- Bill Wolfe brought it up -- as far as permits and doing things. One of the things a legislator does and has to do for constituents -- we get complaints-- The first primary complaint is Motor Vehicle. The second is DEP. And it's a situation of people making applications for permits and not getting them. So we have to go there. I'm not saying that anybody should ever take any money -- I'll never defend anybody for taking a bribe for going to do these things. But our job is to deal with the agencies. So I'll defend that part of it. Sometimes it only takes a call to ask, "What's with this particular permit? Why hasn't it been granted?" So I can go back to constituents and say, "Fine, do this." But notoriously, DEP will wait for the maximum amount of days to pass and then they'll come back and say, "Well, you didn't dot this I." And then the person goes and dots the I, puts it back in, and the maximum number of days pass, and then, "Well, you didn't cross this T." That has to stop. We have to do things correctly. Yes, we have to make sure people obey the rules. But we don't have to wait years and years to get those permits into effect.

So as far as this portion of the meeting, those are my comments, and I'm staying for the rest.

Thank you, Mr. Chairman, for the opportunity.

ASSEMBLYMAN McKEON: Assemblyman, thank you. And the State will continue to be enriched by your involvement, whether it's formally, in public office, or as a private citizen. Thank you.

ASSEMBLYMAN ROONEY: Absolutely. Thank you.

SENATOR SMITH: Mr. Chairman, if I could interrupt for one second. I have a member who also feels that at this juncture he'd like to make a very brief comment.

ASSEMBLYMAN McKEON: All right.

SENATOR VAN DREW: Thank you, Mr. Chairman. Since we are closing this portion, just a brief comment.

I represent a highly densely populated district. The only beachfront is in the Meadowlands. And so when I came down today I thought I was really coming down to hear about a regional problem. But as I've sat here and listened to testimony that I consider very enlightening, I realize that we're talking about a symptom of a statewide problem, a problem that really is a dagger in the heart of New Jersey and has the potential of really compromising our future. And that is the issue of the way we do land use in New Jersey.

We can, based on what I've heard, impose regulations on fertilizers and change the nature of the fertilizers being applied; but if the population of this region is growing by a quarter of a million people, will those changes have any effect at all? What we have to do as a state is really get serious about smart growth. We should be reinvesting in our cities and

our older suburbs, and being very careful about how we develop the more fragile areas, whether they be the Highlands or the Barnegat Bay region. And that really, I think, is something that we, as a Legislature and as a State, need to address. (applause)

SENATOR SMITH: Thank you, Senator.

ASSEMBLYMAN McKEON: Thank you very much.

All right, let's move on to the next portion. I don't mean to say "just," but there are three witnesses that are-- Oh yes, sure Reed, I'm sorry. I thought you wanted to speak.

ASSEMBLYMAN GUSCIORA: I always do.

ASSEMBLYMAN McKEON: This is as it relates to our interpretive centers. We've not heard from Debbie Mans from New York/ New Jersey Baykeeper. Debbie, please come up. There are two other individuals who have testified already, but please join Ms. Mans -- Tom Fote and Bill deCamp -- and you guys can pass the microphone along. And then we will conclude that component and go into the fishing registry.

Debbie, please lead us off. How are you?

D E B O R A H A. M A N S: Hi, thanks. I'm Debbie Mans, Baykeeper and Executive Director, New York/New Jersey Baykeeper.

We have, for many years, been working to protect Liberty State Park from misguided development schemes. And now we've moved on to a great 250-acre interior restoration of tidal wetlands, freshwater wetlands. So we've come a long way at the Park and we think there are really great opportunities there.

I want to offer a larger picture about this bill. I think what needs to happen is -- we continue to support strong interpretive centers, but

it must be done through a stable, long-term source of funding for parks' sustainability, maintenance, operating expenses, and salaries. This particular bill does not address this larger problem and the long-term health of our State Parks.

The solution is not to offer short-term solutions, but to have longer, more strategic solutions. And I look toward the wonderful group, Friends of Liberty State Park, as a great example of not just a fierce advocate of the Park for many, many years to preserve it; but now moving more towards a Friends group, understanding their role towards the long-term viability of the Park.

The public has overwhelmingly supported parks, and unfortunately you're in tough budget times. This year and next year is going to get even worse for our State Parks. They're one of the hardest hit of our public services. So in conclusion, I don't think this bill is the solution that we need for our State Parks and the staffing levels that we're seeing. As you are aware, it's a much larger budgetary problem for the State Parks, and it needs a much more strategic, long-term solution.

Thank you.

ASSEMBLYMAN McKEON: Debbie, thank you very much.

MR. deCAMP: Thank you. Willie deCamp with Save Barnegat Bay.

I haven't read the bill, but I'd like to address the concept.

Our great interest in the interpretive program at Island Beach is best expressed by the fact that Save Barnegat Bay and the Friends of Island Beach privately funded and staffed the State of New Jersey's interpretive program at Island Beach this Winter. It was going to be closed for the

Winter, and we didn't like the drift of things, because everyone was saying, "Well, we don't know if the funds will come through in June; we don't know if they'll come through afterward." So we really did not want to see that program die, because come April 1 the corpse won't resurrect.

So we privately funded it. And we privately staffed it.

The Park really is in a great crisis. You can see it just when you drive there and look at the buildings. The interpretive center, you can almost see through the walls. So there's a great crisis there.

The major thing I would like to convey to the Committees -- maybe it's something you already know; I don't know, and I am hoping Tom Fote will enlighten us further. But in the 1990s, Senator Russo introduced a bill for stable funding for Island Beach. It was called the (indiscernible) Beach Buggy act. Anyway, it created a stable source of funding. And it wasn't just for the interpretive center. It was for maintenance and other aspects. So I'm hoping that you will consult the archives and mine that piece of proposed legislation for ideas that might be able to expand the concept.

And also guard against the possibility that you find the stable source of funding and then when the next budget is done, the Office of Management and Budget just takes an equivalent amount of money out of the Parks' budget. I think that the Russo bill had a way of approaching that possible problem.

And thank you.

ASSEMBLYMAN McKEON: Thank you very much.

Tom.

MR. FOTE: Island Beach State Park is one of the reasons I live where I live. It is the main reason that I live where I live.

Willie did not mention the fact that the Island Beach interpretive center wouldn't be as good as it is right now without Willie's family. Not only did they save our Barnegat Bay, but if you go in there and look at the fauna and the flowers that go from the dunes to the Bay -- dunes to the waterline -- it's Willie's family that basically paid for all of the display at the Island Beach State Park.

Island Beach State Park-- We did some interpretive *(sic)* things to get the interpretive center off the ground. We used oil spill money to actually build the interpretive center, which was never allowed. We looked in a different direction. And I think that's what's needed now. We have to look in all the avenues to help fund the park and do interpretive-- I grew up in Brooklyn; not densely populated at all (laughter). And my experience when it came to fishing was at Prospect Park, which some of you might have visited if you've ever been to Brooklyn. Fishing with my grandmother, who was the first person to take me fishing. That's how we learned about what was going on in the park.

Interpretive centers are-- Building from those twins that we keep using today -- those twins are going to go down there, learn about being stewards of the environment, and basically be the people testifying 30 or 40 years from now, when I'm not here any longer, and fighting for the same things we have all been fighting for. The only way you can do that is by teaching them, and that's what interpretive centers are for. So we need to invest in that future. And for those kids. And that's what they do.

Clean Ocean Action does a huge thing -- brings students to Island Beach State Park. So we need these things to show the kids, show them how to protect the environment, (indiscernible) Jersey Coast (indiscernible) Barnegat Youth Education Program, which are really steps to be stewards of the environment.

So I'll leave it at that, because I know time is running.

ASSEMBLYMAN McKEON: All right, Tom, thank you very much. Hold on to the microphone, if you don't mind. Thank you to the three of you.

SENATOR CONNORS: Just a quick question.

ASSEMBLYMAN McKEON: Oh, sure.

SENATOR CONNORS: Willie, do you support the bill?

MR. deCAMP: I haven't read the bill, so--

SENATOR CONNORS: I thought we had provided you a copy of the bill.

MR. deCAMP: Sometimes I don't read things I'm provided with (laughter), so I don't know whether you did or you didn't. (laughter)

SENATOR CONNORS: It's even more disconcerting that we sponsored it at your request. (laughter)

MR. FOTE: It's a great bill; that's what you're supposed to say, Willie. (laughter) It's a great bill.

MR. deCAMP: Yes, yes. We support the bill, and it would be even better if more aspects of the Park were funded. But yes, and thank you very much. We do support the bill.

SENATOR CONNORS: Thank you.

ASSEMBLYMAN McKEON: Thanks again to the three of you. Tom, stay there, because you also signed up because of your body of knowledge-- Thanks to the two of you very, very much.

We're now going to-- And we just have six witnesses left, so we're getting there.

This is going to be the component to speak about the fishing registry. Tom, stay there. I would also like to call up Jim Donofrio, as well as Edward Markowski

E D W A R D M A R K O W S K I: Markowski

ASSEMBLYMAN McKEON: Markowski, of NJOA. Sorry, Ed.

The three of you can come up and we'll do a panel again.

UNIDENTIFIED MEMBER OF AUDIENCE: Respectfully, Jim Donofrio had to head back for an appointment this afternoon. And out of respect to the schedule today, (indiscernible) a letter of written testimony to the committees.

ASSEMBLYMAN McKEON: We thank the RFA for that, and I appreciate that information.

And then, Ed and Tom, please go forward; and then we have three more witness I'll call up in a moment.

MR. FOTE: I'm not sitting here representing Jersey Coast, or any of those organizations. I'm sitting here as the Governor's appointee, looking at the budget of Fish and Wildlife, and looking at what's happened.

If I look today at agencies and State government, and looked at their budget 25 years ago -- even with these drastic cutbacks they would still be spending greater *(sic)* money than they were 25 years ago. The Bureau of

Marine Fisheries was basically getting $1.9 million 25 or 30 years ago. We are now getting-- They are now getting $1.77 million. So they are getting less money than they did 25 years ago. And how do you basically do a job with marine fisheries on that?

I don't see this legislation, the registry-- I put together a white paper for the Legislature, gave it to the Legislature, they looked at it. We need something in place; we need something in place by 2011, and I don't see the Federal-- The only thing I'll comment is, I don't see the Federal government is the best way of doing that. They take our money for our tuna permits, charge us $25, and does this give us anything in return? It goes into the General Fund. So it's up to you to come up with some -- a problem and a way of solving this. I'm not going to comment on any way of doing that.

But we also need you to do the proper appropriations to Fish and Wildlife. We need that money. I mean, the State's economy-- $1.3 billion is Marine Fisheries; $2 billion is boating; $600 million or more is commercial fishing; and that doesn't include the kayakers and everybody else that uses the bays and estuaries, which would probably add another $5 billion. You are only spending $1.7 million on it. You can't do that and protect the resource. If you looked at the programs, we're basically saying we're $2 million, $4 million -- that's more than the whole budget of Marine Fisheries.

Thank you.

ASSEMBLYMAN McKEON: Tom, thank you very much.

Ed, noticing your shirt's pretty sharp -- Smith got a plaque (laughter). It's okay.

MR. MARKOWSKI: He might want a shirt; and I'm sure that can be taken care of. (laughter)

ASSEMBLYMAN McKEON: That wasn't quite the signal I was sending. (laughter)

MR. MARKOWSKI: Ed Markowski, today on behalf of New Jersey Outdoor Alliance.

We support the registry concept as long as there is a funding base that goes with it, so it doesn't hamper the Division of Fish and Wildlife.

So whether it be an appropriation or whether it be a $2 fee, a minimal fee, the NJOA would support that.

In following up on Tom's a little bit, with the--

ASSEMBLYMAN McKEON: Sorry, I just want to -- for the record -- NJOA would be behind the $2 fee?

MR. MARKOWSKI: If there was, yes. If there was a $2 fee, they would be behind it. We would not behind a free registry, because we feel that would either take money away from the Division of Fish and Wildlife's current programs, or DEP would have to find the money within it.

ASSEMBLYMAN McKEON: I've heard other numbers, like $5 or $10, but at $2, you guys would be fine with that?

MR. MARKOWSKI: Yes, currently we would.

ASSEMBLYMAN McKEON: All right.

MR. MARKOWSKI: Getting back to what Tom said. Currently in New Jersey we have between 550 and 600,000 marine fisherman, saltwater anglers. And they pay, every year, about $124 million

just in the 7 percent tax in the stuff that we buy. If we look at what we pay overall, it's about $864 million to pursue our sport in New Jersey. It creates about 13,500 jobs. And if you'd use a multiplier, that probably generates to, overall, New Jersey about $1.7 billion.

If you look at what they get back from it -- from the State of New Jersey in the form of repropriation -- it's way, way less than 1 percent. You compare New Jersey to a state very, very similar, North Carolina, that has a budget of $27 million; and they get approximately $20 million of that from a general appropriation. So in going along with what Tom said, I think it's time. We've had five administrations that have underfunded the marine fisheries in New Jersey. It's such an important part of New Jersey's overall economic welfare that we've overlooked for so long; and they've done such a good job on so little. But now they're getting to a point where we can't compete against the other states. And I'll give you a good for instance: it's our fluke quota. Where New Jersey gets 23 percent of the coast-wide fluke quota, New York's looking to capture that so that they can decrease their size limit and allow their fishermen to take more. They want to take away our resource.

If we don't have the science to fight them, then we're going to lose something.

Thank you very much.

ASSEMBLYMAN McKEON: Thank you very much for that insightful testimony.

The last three witnesses who signed up on this topic are Rob Winkle of the New Jersey State Federation of Sportsmen; Mike Pisauro,

Mike you mentioned before you might not want to testify on this point, but if you do, you're welcome to.

MR. PISAURO: I'll waive it.

ASSEMBLYMAN McKEON: Okay, thanks.

And Bruce Smith from the Sandy Hook Bay Anglers.

R O B W I N K L E: Is this the one that works? (referring to microphone)

ASSEMBLYMAN McKEON: Yes, sir.

MR. WINKLE: My name is Rob Winkle. I'm a lifetime resident of Ocean County. And today I'm representing the New Jersey State Federation of Sportsmen's Clubs.

Our position on the registry is identical to the NJOA -- we believe the registry should be done by the State, and that there should be an administrative fee to cover the costs of implementing the registry. And we also are very, very concerned about the lack of funding that's provided to our marine fisheries administration. We are losing ground to our competitor states because they have a far better staff, far larger funding source to provide their own state data. And therefore, we're asking the Legislature and the Governor to significantly increase the appropriation to the Marine Fisheries Administration.

Thank you.

B R U C E B. S M I T H: My name is Bruce Smith. Thank you, Senator Smith and Senator Connors, and members of the panel for hosting this public hearing.

As I say, I'm Bruce Smith, I'm a resident of District 11, Monmouth County. I'm an environmentalist, a conservationist, and a

saltwater angler -- a member of Sandy Hook Bay Anglers and an associate of Jersey Coast Anglers Association.

I believe that it is imperative to pass legislation to implement a New Jersey Marine Angler Registry, to comply with the Magnuson-Stevens reauthorization. A New Jersey Marine Angler Registry, with a fee, will prevent undue burden on the anglers, with no benefit to them should New Jersey default to the Federal authority.

The funding of the DFW -- Fish and Wildlife -- is a larger and separate issue affecting recreational and commercial stakeholders. It is unconscionable that the State funding of DFW is less than $2 million, or about 1 percent of the tax revenue generated by sales of products and services related to recreational marine fishing. Marine anglers reside in all state districts; however, Legislators of coastal districts should lead the way to provide adequate, dedicated funding of the DFW in the neighborhood of about $10 million a year.

Some stakeholders advocate implementation of a saltwater fishing license. A Federally crafted saltwater fishing license can enhance DFW funding, but should not be expected to carry the entire burden.

In conclusion, an unintended but welcome consequence of the Saltwater Angler Registry will be a definitive head count of New Jersey marine anglers, mostly adult. Whether that number of recreational anglers is 600,000 or 1.2 million, it is a lot of boaters.

Thank you.

SENATOR SMITH: Thank you, gentlemen.

And thank you everyone. Thanks to all who participated today, I think the Committee is going to leave with some great ideas.

Any members on the Senate side who would like to say anything?

SENATOR GORDON: I'm at my quota.

SENATOR SMITH: He's at his quota. (laughter) And I'll get to the Assembly side, because Chairman McKeon is attending to something else. Is there anyone on the Assembly side who would like to say anything?

ASSEMBLYMAN GUSCIORA: Great hearing. This was a great opportunity for us to get out and hear from constituents in other regions of the state that we normally don't get to visit. But as Valerie said, we're going to work on getting a cooling tower for Oyster Creek. And I think that one message that we got out of here is to deal with the nitrogen that is leaking into the groundwater.

SENATOR SMITH: Fertilizers -- this Fall. Fertilizers in the Fall.

ASSEMBLYMAN GUSCIORA: Look forward to it.

SENATOR SMITH: Assemblyman Rooney.

ASSEMBLYMAN ROONEY: Just one closing comment.

I forgot to add that I consider myself a shore legislator, because about eight miles of my district borders the Hudson River. (laughter) So that is a shoreline.

SENATOR SMITH: Thank you, Assemblyman Rooney.

And thanks to all. Hearing adjourned. (applause)

(MEETING CONCLUDED)

APPENDIX

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Invited Statement Prepared for the New Jersey State Legislature's
Joint Committee on the Public Schools

How to Develop Internationally Benchmarked Mathematics Standards (as well as Standards for Other Subjects)

Sandra Stotsky, Ed.D.
Professor of Education Reform
21st Century Chair in Teacher Quality
University of Arkansas
June 3, 2009

To Assemblywoman Joan Voss, Senator Ronald L. Rice, and other members of the Joint Committee:

I appreciate the opportunity to speak with you today about procedures and resources I would recommend to the New Jersey Department of Education for developing sound and internationally benchmarked K-12 mathematics standards. The procedures I recommend reflect my experience in advising many states on how to develop strong academic standards, especially in the English language arts, and in directing the revision of the mathematics and science standards (and standards in other subjects) in Massachusetts, a state that is regarded as having one of the best sets of standards in the country. The resources whose use I recommend to the Commissioner of Education and her staff reflect my work on the National Mathematics Advisory Panel. Over 20 scholars and researchers met regularly over the course of two years, analyzed results of thousands of research studies, drew on the professional judgment of mathematicians for a list of the major topics of school algebra and a description of the mathematical content in the elementary grades that prepares students for beginning algebra, and produced a final report in March 2008 indicating what federal and state agencies, as well as textbook publishers, need to do to strengthen the K-12 mathematics curriculum and increase all students' achievement in mathematics. I first explain how the Bay State developed strong standards in mathematics (and science)—the basis for the "Massachusetts miracle."

The Position and the Charge: I was appointed a senior associate commissioner in the Massachusetts Department of Education by the then Commissioner of Education, David Driscoll, a Democrat, in March 1999, a choice that was enthusiastically supported by the then Chair of the Board of Education, James Peyser, a Republican. I worked in an authentic bipartisan environment, supported by the Board, the Governor's office, and the Legislature. As senior associate commissioner, I was in charge of revising all documents with an academic component—the state's K-12 standards, teacher licensing regulations, teacher tests, and professional development criteria.

The legal framework within which I worked was the Massachusetts Education Reform Act of 1993, a comprehensive piece of progressive legislation that linked clear measures of accountability to state funding in every component of K-12 and teacher education. The overall goal of this Act was to increase K-12 student academic achievement and the academic quality of the state's K-12 teaching force. I was

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hired to strengthen all of the Department's documents that had been developed in the mid-1990s to implement the Education Reform Act. To do so, I was expected to draw on the soundest scholarship or best research evidence I could find.

I began with the state's K-12 academic standards. Why are academic standards the beginning? Because they shape (or should shape) the academic content of all the other documents a department of education develops to guide K-12 education. These include student assessments; program guidelines for preschools, English Language Learners, and instructional technology; regulations for teacher preparation programs; teacher licensure tests; and professional development. State standards also influence directly the content of classroom curricula and course configurations, even though state departments of education cannot mandate specific curricula and instructional strategies, in theory the province of local school boards.

The Beginning: My first step was to review critically the Department's existing curriculum frameworks in mathematics and science and its first attempts at revision. I drew heavily on comments by nationally known mathematicians and scientists on the limitations of "reform" mathematics and science programs, on what needed to be in the K-12 mathematics and science curriculum for students to be successful in advanced high school and post-secondary courses in mathematics and science, and on how the content of the K-12 mathematics and science curriculum should be sequenced. The documents I reviewed suffered from a number of deficiencies. I highlight here the most serious problems in what I examined.

*Statements on skills, processes, and strategies cluttered the documents. The large, unrepresentative, and unwieldy committees that had developed them had spent much of their time trying to decide how teachers should teach and what skills students should learn. They had spent much less time on the specific content to be taught.

*Content standards were vague and organized poorly from a disciplinary perspective. Students were not prepared adequately for an authentic algebra I course in grade 8, nor for subsequent single-subject courses in algebra II and trigonometry or pre-calculus. The original mathematics framework provided only "integrated" standards at the high school level, teaching much less than had been taught in the customary single-subject course sequence. The original science framework also provided only "integrated" standards at the high school level, outlining courses that could not be taught by most high school science teachers.

*Essential mathematics or science content was often missing or not visible. Essential mathematics content was diluted by the presence of less important topics at each grade level. The original mathematics standards development committee had followed the standards document issued by the National Council of Teachers of Mathematics in 1989, thus creating a curriculum framework that was "a mile wide and an inch deep" in the elementary and middle grades. Essential science content was diluted by "standards" on non-content issues or process skills. Mathematicians and scientists had clearly played only a minor role in shaping the content of these documents.

My staff and I concentrated on six objectives in revising the state's original standards in mathematics and science (and other subjects):
*To make essential disciplinary content the central focus in each subject area
*To specify the disciplinary content to be taught by teachers in each subject area, grade by grade, or course by course in high school mathematics, science, or history
*To craft intelligible and assessable standards in a coherent sequence
*To organize the high school standards for each subject in ways that reflected the expertise, strength, and disciplinary training of teachers of that subject
*To make clear that acceptable teaching/learning strategies included teacher-directed as well as student-directed strategies

*To include as many examples as possible showing how a standard might be implemented in a classroom lesson so that teachers could see exactly what the standard meant and how critical thinking, problem solving, and other skills were naturally intertwined with the content being taught and developable when teachers taught to an intellectual objective

The Next Steps: After thanking and dismissing the unwieldy and unrepresentative committees that had been convened to revise the original mathematics and science standards, I arranged for academic experts in each area to work directly with staff on the revised standards or to review them. Teachers and their expertise were not ignored; they were regularly consulted on grade level placement, appropriateness, and teaching load (the number of objectives at a grade level). But, we relied on the expert judgment of mathematicians and scientists for the specificity, scope, and sequence of our mathematics and science standards. (For English and history, we drew on literary scholars, historians, economists, geographers, and political scientists, as well as experienced and well-trained high school English and history teachers.) I cannot stress strongly enough the importance of engaging nationally recognized academic experts to work on a regular basis with Department staff in the drafting of state mathematics and science standards.

Second, we eliminated so-called standards above the primary grades focusing on skills, processes, or strategies. They were not standards because they are generic in nature, content-free (or not sufficiently content-specific), and unassessable in isolation. That is why current attempts to add a layer of explicit skills, processes, or strategies to classroom instruction and state assessments, pretentiously called "21st century skills," will point teachers' efforts in the wrong direction and retard student acquisition of the knowledge base needed for their appropriate use. Academic content is foundational to critical thinking, problem solving, and effective oral or written communication as well as inseparably intertwined with the development of these skills. These skills cannot be effectively deployed until students have acquired the specific content that guides the choice of a specific skill to use in a specific context and how it is to be used. In other words, so-called 21st century skills are not a substitute for the conceptual and factual knowledge that governs their development and use.

Third, we informed elementary teachers that they were responsible for teaching the standard algorithms to their students, and we made "integrated" standards optional at the high school level so that high school teachers could continue to teach single-subject courses in science and mathematics (and in U.S. and world history) if they wished.

Empirical Results: What is the proof of the pudding in mathematics and science? On the 2007 tests given by the National Assessment of Educational Progress, Massachusetts students scored first in mathematics in grades 4 and 8. The Bay State's low-income students also made stunning gains. A comparison of the scores of low-income students *with the scores of low-income students in other states* revealed that the Bay State's low-income students were tied for first place in mathematics in grades 4 and 8. These dramatic gains by student subgroups also turned up in scores on our state tests. For example, in 2001, when the high school graduation requirement kicked in, only about 15% of black and Latino tenth graders scored at the proficient or advanced levels on the state's grade 10 mathematics test. In 2007, the percentage of black and Latino tenth graders who were proficient or advanced was about 45%, a three-fold increase. Over 50% of Massachusetts eighth graders now take Algebra I by grade 8.

Results on the international tests in mathematics and science given in 2007 were even more stunning. The Bay State had registered as a separate country, and its 4th graders ranked second worldwide in science achievement and tied for third in mathematics; its 8th graders tied for first in science and ranked sixth in mathematics. The Bay State also leads the nation today in the percent of its public high school students taking and passing Advanced Placement courses with a 3 or more--almost 21 percent--well above the national average of 15.2 percent.

These impressive results are due to more than world-class standards, however. Several other factors contributed to the so-called Massachusetts miracle. We fully embedded the academic knowledge base for teaching to the state's standards in mathematics and science (as well as in English language arts and reading, and history/social science) in the state's revised teacher licensing regulations, teacher licensure tests, and criteria for state-funded professional development. We weighted mathematics and science more heavily than before in the revised subject area licensure test for elementary and special education teachers, we eliminated all pedagogical items from all subject area tests, and we mandated a dedicated test of research-based reading instructional knowledge for all prospective early childhood, elementary, and special education teachers. All these changes in our licensure regulations and tests have led to stronger preparation programs and an academically stronger teacher corps in K-8 since 2002. We now hope that the requirement of a separate licensure test of mathematical knowledge for prospective elementary and special education teachers will lead to even stronger preparation programs. In the first administration of this test, in March 2009, three-fourths of over 600 test-takers failed, and it is very clear to our education schools that they need to strengthen the mathematics coursework they require of prospective teachers for K-8.

There is one more factor that is obvious to everyone in the Bay State--the state's generally acknowledged high quality student assessments, which are based clearly on our strong content standards. In other words, there would have no Massachusetts miracle without strong content standards as the central and overarching component of systematic educational reform.

Recommended Procedures for Revising New Jersey's Mathematics Standards: The following sequence of procedures can help to ensure that strong standards emerge from a revision of New Jersey's current K-12 mathematics standards. These procedures apply to the revision of other sets of standards as well.

*First, the Commissioner of Education and her team should prepare a **critical review** of their current mathematics standards, referring to the most highly regarded documents in the subject (national and international), as well as research reports. This review should point out the major features that the best documents share and differ on, as well as the strengths and weaknesses of the state's standards. Feedback on the state's document should also be solicited from the state's teachers, parents, and others by means of an extensive online survey. The review should be sent to the State Board of Education, the legislature, and the Governor's office detailing exactly what general changes the Commissioner and her staff recommend to strengthen their current mathematics standards, together with a rationale based squarely on the documents and reports that have been reviewed, as well as a synthesis of the solicited feedback. There must be an agreed-upon road map that indicates where the state wants the revision to go. Without this road map, one cannot begin drafting a revision of the current mathematics standards.

*Second, after approval or amendment by all relevant powers that be, the Commissioner of Education needs to designate no more than a few people to develop the first draft: one or more mathematicians (experts with a Ph.D. in mathematics), available on a regular basis to work with a staff member and critique the standards as they are written; a high school mathematics teacher; and a K-8 mathematics specialist. They should draw up the **first draft** in sections covering a span of several grade levels. The Department should be physically in charge of the draft document at all times. A first draft cannot and should not be written up by a large group of people at meetings, or by a staff member without a Ph.D. in mathematics.

*Third, the Commissioner of Education should establish a **review committee of about 15 teachers** for each educational level. District superintendents should be asked to recommend well-regarded and experienced elementary, middle, or secondary teachers of mathematics. In other words, 15 school districts should be represented, with equal numbers at each educational level on each committee. As

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each section of a document is drafted, the relevant committee should review them together to assure appropriateness of grade level placement and teaching load, and to raise or address questions about content and curricular sequence.

*Fourth, the revised draft should go out for **review by mathematicians** and relevant organizations (e.g., the Mathematical Association of America), who are asked to send back comments with their names attached to assure responsible feedback. All feedback should be made available to the public on the Department's website. Further changes to the draft should be agreed on by the drafting group and the Commissioner of Education.

*Fifth, the draft of the standards that goes out for **public comment** should also be sent to all relevant groups and stakeholders. After the public comment period, the Commissioner of Education and her staff should provide the State Board of Education, the legislature, and the governor with a summary of the feedback and a **rationale for the final shape of a the revised document**.

Recommended Resources for Ensuring 21st Century Mathematics Content: New Jersey should draw on the following resources to ensure 21st century mathematics standards. I will note key documents or reports in the other major subjects in the school curriculum as well.

For mathematics standards, there are no better resources to draw on than the standards for California, Singapore, Minnesota, Indiana, and Massachusetts. The standards document should follow as closely as possible the recommendations in the National Mathematics Advisory Panel's final report of 2008, as well as the recommendations in the report by the Panel's task group on Conceptual Knowledge and Skills. *Curriculum Focal Points*, issued by the National Council of Teachers of Mathematics in 2006, and the mathematics standards in Achieve's American Diploma Project should also be consulted. A set of mathematics standards that does not draw heavily on these documents will not be up-to-date or internationally benchmarked.

For English or reading, the best resources to draw on are the contents, examples, and reading lists in the curriculum frameworks for Massachusetts (2001), California, and Indiana. Texas's 2008 standards and their organization, as well as the English and Communication standards in Achieve's American Diploma Project and the examples for its backmapped benchmarks, can also be very useful.

For science standards, the best resources are those in California, New York, Indiana, New Mexico, and the 2006 Massachusetts science curriculum framework.

For history and the social sciences, the best documents for specific details are California's standards, the 2003 Massachusetts history and social science standards, and the National Civic Standards issued by the Center for Civic Education in California.

Concluding Remark: If the procedures and resources I have recommended are used by the New Jersey Department of Education, New Jersey will end up with academically strong mathematics standards. I am sure this is what Commissioner Lucille Davy and her staff want for the students and teachers in New Jersey's public schools. Thank you for this opportunity to speak with you today. I look forward to your questions and comments.

Information provided by Dr. Joseph Rosenstein

NJ Mathematics and Science Education Coalition

The attached document is one of eight draft documents that the Coalition has prepared, corresponding to the eight strands of the four math content standards. This one addresses the strand of "Numerical Operations" from PreKindergarten through Grade 12, one grade at a time.

The document has four columns. In the left-most column are the overview statements and indicators from the December 2008 version of the standards that was prepared by the DOE's writing team. The second column contains the overview statements and indicators from the version of the standards released by the DOE in February 2009. The two columns have been organized so that corresponding items in the two versions of the standards are in the same horizontal row.

The third column contains comments on the indicators that are in the December and the February versions, and the fourth column contains the Coalition's recommendations for how we can create a set of math standards that incorporates the best of both documents.

These eight documents were developed at a series of five full-day Sunday meetings attended by 15 dedicated math supervisors and teachers who have a thorough knowledge of the math curriculum, how all the different pieces of the curriculum fit together conceptually, and how well children at different ages are prepared for the different topics. (Only a few of the members of the DOE's task force had such expertise.)

In developing these documents, our only concern was quality. The February version of the math standards was unfortunately not a quality document and, as a result, it elicited widespread and strong opposition by New Jersey mathematics educators.

We developed these documents to assist the DOE in arriving at a strong set of math standards for New Jersey. We had hoped that the task force would have made greater use of these documents, but unfortunately the DOE did not encourage task force members to do this.

The DOE is now planning to constitute another writing team. We have strongly urged the DOE to build on the Coalition's efforts, and have offered to collaborate with the DOE so that we can end up with a quality document that contains the best possible math standards.

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade PreK – March 23, 2009

December version	February version	Comments	Recommended Indicators
Numerical operations are used to model the joining or separating of groups of objects in the real world.	Numerical operations are used to model the joining or separating of groups of objects in the real world.	This statement should be used for K, but not for PreK.	*Counting can be used to solve many mathematics problems.*
1. Explore the meanings of addition and subtraction by using concrete objects. ▪ Joining ▪ Separating	A1. Explore the meanings of addition and subtraction by using concrete objects. ▪ Joining ▪ Separating	A1. ok as is	*AA1. Explore the meanings of addition and subtraction by using concrete objects.* ▪ *Joining* ▪ *Separating*

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade K – March 23, 2009

December version	February version	Comments	Recommended Indicators
Numerical operations are used to model the joining or separating of groups of objects in the real world. • Part-part-whole relationships	Essential fluency in computation is facilitated by using numerical operations to model the joining or separating of groups of objects. • Simple additions and subtractions • Part-part-whole relationships	Content – change to:	*Numerical operations are used to model the joining or separating of groups of objects in the real world.* • *Modeling addition and subtraction* • *Part-part-whole relationships*
1. Explore the meanings of addition and subtraction by concretely modeling counting problems with at least 10 objects.	B4. Describe addition and subtraction situations (*for numbers less than 10*).	B4. Not sure what "describe addition & subtractions situations" means – change to BB4.	*BB4. Use objects to model situations involving addition and subtraction (for numbers through 10).*
2. Use part-part-whole relationships to compose and decompose numbers through 10. • Use numbers to describe how many objects will be needed for a second set, when given the first part and the whole.	B1. Use part-part-whole relationships to compose and decompose numbers through 10. B2. Use numbers to describe how many objects will be needed for a second set, when given the first part and the whole.	B1. Ok B2. This is just a clarification of B1 – need not be a separate indicator – could just show up in classroom applications.	*BB1. Use part-part-whole relationships (e.g., 3 and 4 make 7) to compose and decompose numbers through 10.* *BB2. Use numbers to describe how many objects will be needed for a second set, when given the first part and the whole.*

3. Explore "counting on" to solve addition problems with sums through 10.	B3. "Count on" to solve addition problems with sums through 10.	B3. Many kindergarten students are not developmentally ready for this step – it needs to be introduced here (see BB3) but will not be mastered until the next grade.	*BB3. Begin to use "counting on" to solve addition problems with sums through 10.*
		BB5 is moved here from Number Sense.	*BB5. Find the number that is one more than or one less than any whole number up to 10.*

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 1 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Numerical operations are used to model joining, separating, or comparing groups of objects in the real world. • Addition and subtraction fact strategies	Essential fluency in computation is facilitated by using numerical operations to model the joining or separating of groups of objects. • Strategies for adding and subtracting whole numbers • Commutative and associative properties of addition • Zero property of addition	Statement is too limited. Change as indicated.	*Numerical operations are used in situations involving joining, separating, and comparing groups of objects in the real world. Students begin to master basic facts and learn, understand, and apply:* • *Strategies for adding and subtracting whole numbers* • *Properties of addition*
1. Model addition and subtraction by joining, separating, and comparing sets of concrete objects.	B1. Demonstrate the meaning of addition (*putting together, increasing*) using objects. B2. Demonstrate the meaning of subtraction (*taking away, comparing and finding differences*) using objects.	B1 & B2. It is not clear what is to be gained by separating addition and subtraction, since the two are related and many situations can be modeled either way. They are combined here into BB1.	*BB1. Model addition and subtraction by joining, separating, and comparing sets of objects.*
2. Use part-part-whole relationships to compose and decompose numbers through 20.	B3. Show equivalent forms of the same number (*up to 20*) using objects, diagrams and numbers.	B3. Both indicators are combined into indicator BB2.	*BB2. Compose and decompose numbers through 20 to show part-part-whole relationships (e.g, 17 is made up out of 8 and 9, or 9 must be added to 8 to get 17) and equivalent forms of the same number (e.g., 8 and 9 is the same as 10 and 7).*
3. Use a variety of fact strategies with basic addition and subtraction	B4. Use the inverse operation relationship between addition and	B4. Facts deserve their own indicator, apart from the inverse relationship so	*BB3. Use counting strategies (e.g., "counting on") and recall for addition*

number facts (such as "counting on" and "near doubles"). • Identify one more than, one less than, 10 more than, and 10 less than a given number less than 100.	subtraction and demonstrate mastery of addition facts (*for totals up to 20*) and the corresponding subtraction facts.	this should be two separate indicators. Students do not generally master facts to 20 in grade 1 – they begin working on them and master them early in grade 2. (See BB3 and BB4.) The bulleted item belongs here as BB5 rather than under "Number Sense" where it appears in a more limited version as A6.	*and subtraction facts with sums to 20.* *BB4. Understand and use the inverse relation between addition and subtraction.* *BB5. Name the number that is one more than, one less than, 10 more than, or 10 less than a given number less than 100.*
4. Construct, use and explain procedures for performing simple addition and subtraction of 2-digit numbers with manipulatives.		Need to add addition & subtraction of 2-digit numbers using concrete objects; this is important to introduce in grade 1 – use B1 from grade 2 (see BB6 here).	*BB6. Model addition and subtraction of numbers less than 100 with objects and pictures.*
	B5. Use +, -, and = to write number sentences.	B5. It would be better to put this into a context. Note that B5 was in the Algebra standard in the December version.	*BB7. Use +, -, and = to write number sentences for story problems involving addition and subtraction facts.*
	B6. Use the commutative, associative and zero properties of addition.	B6. Writing the standard this way is not clear to teachers – we have received numerous complaints over the years. Change to BB8. The associative property will be added at Grade 2.	*BB8. Understand the commutative property of addition (not necessarily named) and zero as the identity for addition, and apply them to facilitate addition (e.g., 5 + 3 = 3 + 5, 7 + 0 = 7).*

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 2 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Numerical operations are used to model joining, separating, or comparing groups of objects in the real world. • Recall of addition and subtraction facts • Addition and subtraction of 2-digit numbers	Numerical operations are used to model the joining or separating of groups of objects in the essential development of computational fluency • Quick recall of basic addition and related subtraction facts • Addition and subtraction of 2-digit numbers	What is "essential development of computational fluency"? There is no indicator in the February version that stresses fluency.	*Numerical operations are used in situations involving joining, separating, and comparing groups of objects in the real world. The focus at this grade level is on:* • *Recall of addition and subtraction facts* • *Addition and subtraction of 2-digit numbers*

1. Understand and use the inverse relationship between addition and subtraction.	B1. Model addition of numbers less than 100 with objects and pictures.	B1. This indicator (including subtraction as well as addition) belongs at Grade 1 (see BB6 there).	
2. Recall basic addition and subtraction number facts.		Fluency is left out of the February version.	*BB1. Recall addition and subtraction facts with sums to 18.*
3. Construct, use, and explain efficient and accurate procedures (pencil-and-paper or mental math) for adding and subtracting 2-digit whole numbers.	B2. Add two whole numbers with and without regrouping. B3. Subtract two whole numbers less than 100 without regrouping. B5. Use mental arithmetic to add and subtract 0, 1, 2, 3, 4, 5, or 10 with numbers less than 100. B6. Develop fluency with efficient procedures, including standard algorithms, for adding and subtracting whole numbers, understand why they work and use them to solve problems.	B2 and B3 – combine these two into BB2 and include subtraction with regrouping in grade 2 – otherwise there is very limited content in grade 2 and too much gets done in grade 3 (which is already packed). Put discussion of regrouping in classroom applications document along with discussion about different algorithms and explaining process. Also mention there that we mean paper & pencil. Although B3 only discusses subtraction "without regrouping," subtraction with regrouping is always discussed at this grade. B5. This is too limited for grade 2 – mental math is mostly focused on facts but should also include problems like 20 + 27 or 70 + 20. This facilitates adding and subtracting with paper & pencil. Combine with B2 & B3. B6. Change the first part into BB3 (based on CFP) and incorporate the second part into BB4. There should be something here about number sentences – see 11/19 4.3.2.C.3 for additional pieces to put in classroom applications document..	*BB2. Add and subtract whole numbers less than 100 with and without regrouping (using both paper & pencil and mental math).* *BB3. Understand, use fluently, and explain efficient and accurate procedures, including standard algorithms, for adding and subtracting whole numbers.* *BB4. Write and solve number sentences for one- and two-step story problems involving addition and subtraction (e.g., how much change do you get from a $10 bill if you buy bread for $2 and milk for $4?).*
4. Select and apply the appropriate method of computation from among pencil-and-paper, mental math, or use of a calculator or computer to solve real	B7. Select and apply appropriate methods to estimate sums and differences or calculate them mentally, depending on the context	B7. Leaving calculators out of this makes no sense since children use calculators whether or not they are "officially" used in the classroom, and	*BB5. Select and use appropriate computational methods (e.g., estimation, mental math, calculators, and paper and pencil) to solve*

world problems.	and numbers involved.	they need to know how to use them appropriately. Use indicator from December version as modified (see BB5).	*problems involving addition and subtraction, depending on the context and numbers involved.*
5. Explore a variety of strategies for estimating results of computation.		Implied in previous indicator	
6. Determine the reasonableness of an answer by estimating the result of computations (e.g., 15 + 16 is not 211).	B4. Use estimation to decide whether answers are reasonable in addition problems.	B4. Put estimation after mental math - actually the best order would be mental math, then estimation, then paper & pencil. Include more content here –	*BB6. Determine the reasonableness of an answer by estimating the result of addition or subtraction for numbers less than 100.*
		Missing is the use of the associative property of addition (see BB7). This might better be placed in the Algebra standard.	*BB7. Understand the associative property of addition (without necessarily naming it) and apply it to facilitate addition (e.g., 7 + 3 + 2 can be found by first adding either 7 + 3 or 3 + 2 and 8+ 4 + 2 can be found, using also commutativity, by adding 8 and 2 and then adding 4 to 10).*

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 3 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Numerical operations are used to model joining, separating, or comparing groups of objects in the real world. • Multiplication and division fact strategies • Addition and subtraction of 3-digit numbers • Multiplication of 2 digits by 1 digit	Essential fluency in computation is facilitated by using numerical operations to model the joining or separating of groups of objects. • Multiplication and division fact strategies • Addition and subtraction of 3-digit numbers • Multiplication of 2 digits by 1 digit	The first sentence does not make sense – "essential fluency" is a strange phrase – change to the text at right (mostly from NCTM PSSM): Put the second bullet first – and add below an indicator for the last bullet	*Computational fluency involves using efficient and accurate methods for computing that are based on well-understood properties and number relationships. At this grade level, the focus should be on:* • *Addition and subtraction of 3-digit numbers* • *Multiplication and division fact strategies* • *Multiplication of 2 digits by 1 digit*
1. Develop the meanings of the four basic arithmetic operations by	B2. Represent the concept of multiplication as repeated addition.	B2 & B4 Combine these in BB2 – multiplication & division are related	*BB2. Model and discuss problems that involve multiplication (using*

modeling and discussing a large variety of problems. ▪ Multiplication: repeated addition, area/array ▪ Division: repeated subtraction, sharing	B4. Represent the concept of division as repeated subtraction, equal sharing and forming equal groups. B5. Use the inverse operation relationship between multiplication and division facts to develop meaning and problem solving strategies.	after all – and the same situation can be represented using either operation. Note that "forming equal groups" is the same as repeated subtraction. B5. This was in grade 4 but is ok in grade 3 – the mention of "facts" here belongs in the indicators below.	*repeated addition and area/array models) and division (using repeated subtraction and equal sharing).* *BB3. Understand and use the inverse relationship between multiplication and division.*
2. Use a variety of fact strategies with basic multiplication and division number facts (such as "skip counting" and "repeated subtraction"). 3. Construct, use, and explain efficient and accurate pencil-and-paper procedures for adding and subtracting 3-digit whole numbers and for multiplying 2-digit numbers by 1-digit numbers.	B1. Add and subtract whole numbers up to 1,000 with or without regrouping, using relevant properties of the number system. B10. Use mental arithmetic to add and subtract numbers less than 100. B6. Demonstrate mastery of multiplication facts for 2, 5, and 10 by instant recall. B7. Recall patterns of multiplication facts in the development of instant recall.	B1 & B10. Broaden to include more on concepts (see BB1). B6 & B7. Mastery of multiplication facts is in Grade 4, but to move toward mastery, students should study them all – the classroom applications document should note that most students should be able to recall at least 2s, 5s, and 10s. These two indicators are combined into BB4 An indicator for multiplication is added in BB5.	*BB1. Understand, use, and explain efficient and accurate procedures, including standard algorithms, to add and subtract whole numbers less than 1000 using paper & pencil and to add and subtract whole numbers less than 100 using mental math.* *BB4. Use various fact strategies and recall for multiplication and division through 10 x 10.* *BB5. Understand, use, and explain efficient and accurate procedures (for both paper & pencil and mental math), including standard algorithms, to multiply a 2-digit number by a 1-digit number.*
	B3. Use the commutative, associative and zero properties of multiplication.	B3. Broaden and make this clear for teachers – again, lots of complaints in the past. Omit associative until the next grade level, but include identity and zero property. (See BB6).	*BB6. Understand the commutative property for multiplication (e.g., 3 x 7 = 7 x 3), without necessarily naming it, and the special properties of 1 and 0 in multiplication, and apply them to facilitate multiplication.*
		Also need to add something re number sentences & story problems –	*BB7. Write and solve number sentences for one- and two-step story problems involving addition,*

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			subtraction, and multiplication (e.g.. how much change do you get from a $10 bill if you purchase two loaves of bread at $2?)
4. Select and apply the appropriate method of computation from among pencil-and-paper, mental math, or use of a calculator or computer to solve real world problems.		This can be omitted at this grade level, but will be reintroduced at the next grade level, as students become fluent with multiplication and division.	
5. Construct and use a variety of estimation strategies (e.g., rounding) for estimating the result of adding or subtracting whole numbers.			
6. Use estimation to determine whether the result of a computation (either by calculator or by hand) is reasonable.	B9. Use estimation to decide whether answers are reasonable in addition and subtraction.	B9. This indicator is too limited – it should also include multiplication – and should apply to calculations made with calculators (which students will be doing outside of class, if not in class).	*BB8. Use estimation to determine whether the result of a computation (either by pencil & paper, bu mental math, or by calculator) involving addition, subtraction, and/or multiplication is reasonable.*
▪	B8. Add and subtract simple fractions with the same denominator using objects or pictures.	B8. Postpone this to grade 4 – consistent with CFP and NMP	

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 4 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Numbers are used for counting, ordering, comparing and labeling objects in the physical world. • Recall of multiplication and division facts • Multiplication of 2-digit numbers • Division of 3-digit numbers by 1-digit numbers	Essential fluency in computation is facilitated by using numerical operations to model the joining or separating of groups of objects. • Recall of multiplication and related division facts • Multiplication of 2-digit numbers • Division of 3-digit numbers by 1-digit numbers • Addition and subtraction of simple fractions	Change first sentence as in grade 3. Note that indicators to match content in the second and third bullets are missing. Delete "addition and subtraction of fractions" (4th grade is too early & should be done only concretely)	*Computational fluency involves using efficient and accurate methods for computing that are based on well-understood properties and number relationships. At this grade level, the focus should be on:* • Recall of multiplication and related division facts • Multiplication of 2-digit numbers • Division of 3-digit numbers by 1-digit numbers

1. Use appropriate arithmetic operations with whole numbers in problem situations.	B1. Demonstrate understanding of standard algorithms for addition and subtraction. B2. Represent as multiplication any situation involving repeated addition.	B1. This was addressed with addition & subtraction in grade 3 and should be omitted here. B2. This was done in grade 3 and should be omitted here. Need to have an indicator about the use of arithmetic in problem situations. Classroom applications document should indicate that problems may be multistep.	*BB10. Write and solve number sentences for multi-step story problems involving addition, subtraction, multiplication,, and division of whole numbers (e.g., if you can make a gizmo for $6 and sell it for $10, how much profit will you make from selling 80 gizmos if your overhead costs are $50?).*
2. Explore and use procedures for performing decimal addition and subtraction.		Since making change is at this grade level, this indicator belongs here as well.	*BB11. Explore and use procedures for performing decimal addition and subtraction.*
3. Understand and use the inverse relationship between multiplication and division.	B3. Represent as division any situation involving the sharing of objects or number of groups of shared objects.	B3. This was done in Grade 3 and should be omitted here.	
4. Recall basic multiplication and division number facts through 12 x 12.	B4. Demonstrate mastery of multiplication tables for numbers between 1 and 10 and of the corresponding division facts. B7. Apply the special properties of 0 and 1 in multiplication and division.	B4. This is no different than the corresponding indicator in the December version, but should be extended here to 12 x 12 (see BB1). Note that in NMP, mastery of these facts is in Grade 5. B7. This is already included in grade 3 as written – it should be broadened here. Details should be included in the classroom applications document.	*BB1. Demonstrate mastery of multiplication and division facts through 12x12.* *BB2. Understand the commutative and associative properties for multiplication (without necessary naming them), zero as the identity in addition, and the special properties of 0 and 1 in multiplication and division, and apply them to facilitate multiplication (e.g., 25 x 7 x 4 = 7 x 100)..*
5. Use concrete models and pictures to add and subtract fractions.	B8. Add and subtract simple fractions with different denominators, using pictures and objects.	B8. Make more inclusive by adding mixed numbers. (See BB5)	*BB5. Add and subtract fractions (including mixed numbers) with different denominators, using pictures*

			and objects.
6. Construct, use, and explain efficient and accurate pencil-and-paper procedures for multiplying 2-digit whole numbers and for dividing 3-digit numbers by 1-digit numbers.	B5. Use a standard algorithm to multiply numbers up to 100 by numbers up to 10, using relevant properties of the number system. B6. Use a standard algorithm to divide numbers up to 100 by numbers up to 10 without remainders, using relevant properties of the number system.	B5. Requiring a standard algorithm is not based on research. And whose standard algorithm are we using? Other countries use different algorithms, so that requiring students from those countries to use ours is an equity issue. Many low-level students use other ways of writing the procedure that are more efficient and accurate for them – we should just focus on whether they can multiply and not on whether they can do it in a "standard" way. (Modify as BB3) The two important features of "standard algorithms" are that they are efficient and accurate. B6. Needs to go to 3-digit divided by 1-digit in grade 4 (grade 5 has too much already) Also should include remainders written in form r3 (Modify as BB4)	*BB3. Understand, use, and explain efficient and accurate procedures, including standard algorithms, to multiply two 2-digit whole numbers .* *BB4. Understand, use, and explain efficient and accurate procedures, including standard algorithms, to divide numbers up to 1000 by numbers less than 10, with and without remainders.*
7. Select and apply the appropriate method of computation from among pencil-and-paper, mental math, or use of a calculator or computer to solve real world problems.			*BB6. Select and apply the appropriate method of computation from among pencil-and-paper, mental math, or use of a calculator or computer to solve real world problems.*
8. Construct and use a variety of estimation strategies (e.g., rounding and mental math) for estimating the results of multiplying or dividing whole numbers.	B9. Use strategies to estimate results of whole number computations. B10. Use mental arithmetic to add or subtract numbers rounded to hundreds and thousands.	B9. Ok (see BB7) B10. Ok (see BB8)	*BB7. Use strategies to estimate results of whole number computations.* *BB8. Use mental arithmetic to add, subtract, and multiply numbers rounded to hundreds and thousands.*
9. Use estimation to determine whether the result of a computation (either by calculator or by hand) is reasonable.			*BB9. Recognize when an estimate is appropriate, and understand the usefulness of an estimate as distinct from an exact answer.*

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 5 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Numerical operations are used to model quantifiable real-world situations. • Addition and subtraction of decimals, fractions, and/or mixed numbers • Division of a 3-digit number by a 2-digit number representing remainders as fractions	Fluency in computation is essential as numerical operations are used to model quantifiable authentic situations. • Addition and subtraction of decimals, fractions, and mixed numbers • Division of a 3-digit number by a 2-digit number representing remainders as fractions	Change first sentence of February version as in grade 3.	*Computational fluency involves using efficient and accurate methods for computing that are based on well-understood properties and number relationships. At this grade level, the focus should be on:* • *Addition and subtraction of decimals, fractions, and mixed numbers* • *Division of a 3-digit number by a 2-digit number representing remainders as fractions*
1. Use appropriate arithmetic operations in problem situations. • Whole numbers – all four basic operations • Decimals, fractions, and/or mixed numbers – addition and subtraction			
2. Construct, use, and explain procedures (pencil-and-paper or mental math) for performing addition and subtraction with fractions, mixed numbers, and decimals.	B2. Add and subtract fractions (*including mixed numbers*) with different denominators. B3. Use models to show an understanding of multiplication and division of fractions. B4. Multiply and divide fractions to solve problems.	B2. Do not need to specify that the denominators need to be different – that is understood. B3. This has not been in Grade 5 although most teachers start this towards the end of the year – there is so much in Grade 5, though, that this should be omitted and place in Grade 6, as recommended in CFP. B4. This should also be postponed to grade 6 as recommended by CFP – there is too much in grade 5 and this topic is conceptually linked to multiplying decimals. However, solving multi-step problems involving addition and subtraction of	*BB2. Use and explain efficient and accurate procedures (modeling, paper & pencil, estimation, and mental math) to add and subtract fractions and mixed numbers.* *BB3. Write and solve number sentences for multi-step story problems involving addition and subtraction of fractions (e.g., if three*

	B5. Add and subtract decimals and estimate to verify the reasonableness of the results.	fractions should be expected at this grade level, as in indicator BB3. B5. Broaden this to include mental math.	*people ate 1/3, 1/4, and 1/5 of a pie, what portion of the pie remains?)* *BB4. Use and explain efficient and accurate procedures (modeling, paper & pencil, estimation, and mental math) to add and subtract decimals.*
3.Use an efficient and accurate pencil-and-paper procedure for division of a 3-digit number by a 2-digit number. • Represent remainders as fractions	B1. Solve problems involving multiplication and division of any whole numbers.	B1. "Any whole numbers" is too broad - we don't want every student to have to be able to multiply 4 digits by 5 digits or divide 8 digits by 2 digits. The "multiplication" part of B1 is addressed in indicator BB3 at Grade 4. The "problem solving" part of B1is addressed in indicator BB3.	*BB1. Use and explain efficient and accurate procedures (modeling, paper & pencil or mental math) to divide numbers up to 1000 by numbers less than 100, representing remainders as fractions.*
4. Select and apply the appropriate method of computation from among pencil-and-paper, mental math, or use of a calculator or computer to solve real world problems.		At each grade level, as students learn new operations or apply them to new numbers, they should be learning about how those operations might best be applied. BB7 here is parallel to BB5 at Grade 3.	*BB7. Select and use appropriate computational methods (e.g., estimation, mental math, calculators, or pencil-and-paper) to solve problems involving all operations on whole numbers. and addition and subtraction of fractions, depending on the context and numbers involved.*
5. Add or subtract fractions and decimals using estimation strategies.		Not needed	
6. Determine whether a given estimate is an overestimate or an underestimate.		This indicator should be included.	*BB5. Determine whether a given estimate is an overestimate or an underestimate.*
7. Determine the reasonableness of an answer by estimating the result of operations.	B6. Use estimation to decide whether answers are reasonable in addition, subtraction, multiplication and division problems.	B6. This is too limited – want students to use estimation with fractions & decimals too.	*BB6. Use estimation to decide whether answers are reasonable in problems involving computations with whole numbers,and addition and subtraction of decimals and fractions.*
	B7. Use mental arithmetic to add or subtract simple decimals.	B7. This is included in indicator BB4.	

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 6 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Computational algorithms use place value and equivalence to simplify calculations in real-world situations. • Multiplication and division of fractions • Squares of whole numbers • Algebraic order of operations including parentheses and other grouping symbols	Fluency in computation is essential as computational algorithms that use place value and equivalence are used to simplify calculations in authentic situations. • Addition, subtraction, multiplication and division of fractions, decimals and both positive and negative integers • Squares of whole numbers	The first bullet includes too much – this should highlight what is emphasized in Grade 6. Operations with integers should be postponed to Grade 7. Add a bullet for "algebraic order of operations, including parentheses and other grouping symbols." This is an important topic that should not be omitted.	*Computational fluency involves using efficient and accurate methods for computing that are based on well-understood properties and number relationships.* • *Multiplication and division of fractions, mixed numbers, and decimals* • *Squares of whole numbers* • *Algebraic order of operations including parentheses and other grouping symbols*
1. Use appropriate arithmetic operations involving fractions and/or decimals in problem situations.	B4. Solve problems involving addition, subtraction, multiplication, and division of positive fractions and explain why a particular operation was used for a given situation. B5. Use proportions to solve problems. B6. Calculate solutions given percentages of quantities and solve problems involving discounts, interest and tips.	B4. The December wording is more concise. B5 and B6. Proportional reasoning is a big idea in grade 7. There is a developmental component involved here that makes grade 6 just really too early. CFP & NMP put this in grade 7. Note that rates and ratios are included in number sense, so this topic belongs there as well (see indicator AA4 in Grade 7).	*BB2, Understand and use appropriate arithmetic operations involving fractions, mixed numbers, and/or decimals in problem situations.*
2. Find squares of whole numbers.		Rationale – This has been in grade 6 and relates to finding area, especially with respect to circles.	*BB3. Find squares of whole numbers.*
3. Construct, use, and explain procedures (pencil-and-paper, mental math, or calculator) for performing calculations with fractions and decimals.	B3 (Grade 5). Use models to show an understanding of multiplication and division of fractions. B4 (Grade 5). Multiply and divide fractions to solve problems.	B3 and B4 from Grade 5 are included in BB1 here. B2 & B3. These are included in the December version's indicator, which is broader; also included should be	*BB1. Use and explain efficient and accurate procedures (for both paper & pencil and mental math) to multiply and divide fractions, mixed numbers, and decimals.*

	B2. Multiply and divide decimals. B3. Explain how to multiply and divide positive fractions and perform the calculations. B8. Use mental arithmetic to add or subtract simple fractions and decimals.	mixed numbers. B8. This is included in indicator BB4 at Grade 5.	
4. Understand and apply the standard algebraic order of operations for the four basic operations, including appropriate use of parentheses and other grouping symbols.	Algebra B5. Apply the correct order of operations and properties of operations (e.g., identity, inverse, commutative, associative and distributive properties) to evaluate numerical expressions.	Since a number of indicators that relate to algebra have been moved into Numerical Operations, e.g., those involving commutativity and associativity, this indicator (Algebra B5) is moved here as well. This indicator needs to be included in preparation for algebra; its wording has been carefully developed with lots of feedback.	*BB7. Understand, name, and apply the properties of operations and numbers.* • *Distributive property* • *The product of a number and its reciprocal is 1* *BB4. Understand and apply the standard algebraic order of operations for the four basic operations, including appropriate use of parentheses and other grouping symbols.*
5. Select and apply the appropriate method of computation from among pencil-and-paper, mental math, or use of a calculator or computer to solve real world problems.		Selecting an appropriate method is important and difficult; students should not always use a calculator for computations nor should they always do paper and pencil.	*BB5. Select and use an appropriate computational method* from among pencil-and-paper, mental math, or use of a calculator or computer *to solve real-world problems.*
6. Apply estimation strategies to solve problems involving multiplication and division of fractions and decimals.	B7. Use estimation to determine whether answers are reasonable in decimal problems.	B7. Broaden as indicated	*BB6. Use estimation to determine whether answers are reasonable in problems involving fractions and decimals.*
7. Determine the reasonableness of an answer by estimating the result of operations.			
	B1. Add, subtract, multiply and divide positive and negative integers.	B1. Postpone to grade 7	

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 7 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Computational algorithms with rational numbers use place value and equivalence to simplify calculations in real-world situations. •Operations with integers •Operations with signed rational numbers	Fluency in computation is essential. Computational algorithms use place value and equivalence to simplify calculations in authentic situations. • Operations with integers • Operations with signed rational numbers	Note that rates, ratios, proportions, and percents have historically been included under Number Sense, since they are really not Numerical Operations.	*Computational fluency involves using efficient and accurate methods for computing that are based on well-understood properties and number relationships.* • *Operations with integers* • *Operations with signed rational numbers*
1. Use vectors (arrows) on a number line to represent arithmetic operations (e.g., "-3 + 6" is "left 3, right 6").		This December indicator should not have been deleted. This activity establishes an early use of vectors which will be built upon in geometry – it is also a standard model which is very widely used.	*BB3. Use vectors (arrows) on the number line to represent addition of signed numbers (e.g., "-3 + 6" is "left 3, right 6").*
2. Use exponentiation to find whole number powers of numbers.		This indicator appears as indicator AA7 in the Number Sense strand.	
3. Use and explain procedures (pencil-and-paper, mental math, or calculator) for performing calculations with integers and all number types referenced through grade 7.	B1 (Grade 6). Add, subtract, multiply and divide positive and negative integers. B1. Solve addition, subtraction, multiplication and division problems that use, integers, fractions, decimals and combinations of the four operations . B5. Use mental arithmetic to compute with simple fractions, decimals and exponents.	BB1 includes computations with integers and signed rational numbers, but deletes topics already included in Grade 6. B5. This is included in indicator BB1 at Grade 6.	*BB1. Understand, use, and explain efficient and accurate procedures (paper & pencil, estimation, and mental math) for computations with integers and signed rational numbers.* *BB2. Use appropriate arithmetic operations to solve problems involving integers and signed rational numbers.*
4. Recognize the difference between an exact answer and an approximated answer and know when an approximated answer is sufficient.		Need to add the following December indicator; it is a necessary understanding for success in algebra.	*BB4. Recognize the difference between an exact answer and an approximated answer and know when an approximated answer is sufficient.*
5. Determine the reasonableness of an answer by estimating the result of operations.	B4. Use estimation to decide whether answers are reasonable in problems involving fractions and decimals.	B4. As written, this is already included in Grade 6.	*BB5. Use equivalent representations of fractions, decimals, and percents to facilitate estimation.*

	B2. Calculate the percentage of increase and decrease of a quantity.	B2. This indicator is included in grade 8 under number sense (AA4).	
	B3. Solve problems that involve tips and commission.	B3. This indicator is included in grade 7 under number sense (AA4).	
		Since a number of indicators that relate to algebra have been moved into Numerical Operations, e.g., those involving commutativity and associativity, this indicator needs to be added here as well.	*BB6. Understand, name, and apply the properties of operations and numbers.* • *Additive inverse* • *Multiplicative inverse*

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade 8 – March 23, 2009

December version	February version	Comments	Recommended Indicators
Computational algorithms with rational numbers use place value and equivalence to simplify calculations in real-world situations. • Square and cube roots of numbers • Algebraic order of operations including use of exponents	Fluency in computation is essential. Computational algorithms use place value and equivalence to simplify calculations in authentic situations. • Square and cube roots of numbers	Add a bullet for "algebraic order of operations, including use of exponents"	*Computational fluency involves using efficient and accurate methods for computing that are based on well-understood properties and number relationships.* • *Square and cube roots of numbers* • *Algebraic order of operations, including use of exponents*
1. Find square and cube roots of numbers and understand the inverse nature of powers and roots.	A5 (Grade 7). Find the square roots of perfect squares by using the inverse operation relationship between squaring and finding the square root. B6. Find approximations of square root.	B6. This is just too general – how are students supposed to approximate square roots? The old algorithm that has not been taught for years? The writing team developed two indicators (BB1 and BB2) after much discussion.	*BB1. Find square and cube roots of numbers and understand the inverse nature of powers and roots.*
2. Recall squares of whole numbers through 15 and approximations for π, $\sqrt{2}$, and $\sqrt{3}$.		See B6 above. Also needed for algebra I AC test.	*BB2. Recall squares of whole numbers through 15 and approximations for π, $\sqrt{2}$, and $\sqrt{3}$.*

3. Use and explain procedures (pencil-and-paper, mental math, or calculator) for performing calculations involving the four basic operations and exponentiation with integers and all number types referenced through grade 8.	B1. Add, subtract, multiply, and divide rational numbers (*integers, fraction, and terminating* decimals) in multi-step problems. B4. Use mental arithmetic to compute fractions, decimals, powers, and percents.	B1. This makes it sound like we won't use any multistep problems until grade 8 – which is much too late – students should see multistep problems beginning in earlier grades B4. This is included in grade 7 (BB1).	*BB3. Solve problems involving rational and irrational numbers.*
4. Understand and apply the standard algebraic order of operations, including use of exponents.		Need to add an indicator discussing order of operations.	*BB4. Understand and apply the standard algebraic order of operations, including use of exponents.*
5. Estimate square and cube roots of numbers, using roots of perfect squares and cubes as benchmarks.		This tells what skill we mean for students to apply when approximating roots. This is needed in Algebra I (AC test)	*BB5. Estimate square and cube roots of numbers, using roots of perfect squares and cubes as benchmarks.*
6. Determine the reasonableness of an answer by estimating the result of operations.	B3. Use estimation techniques to decide whether answers to computations on a calculator are reasonable.	B3. Mentioning calculators for the first time here makes it seem as if students are not allowed to use them until now. The December indicator should be used here.	*BB6. Determine the reasonableness of an answer by estimating the result of operations.*
	B2. Solve problems by computing simple and compound interest.	B2. Simple interest is in Grade 7 (see AA4 under Number Sense) – compound interest is included under patterns in algebra. Omit here	
	B5. Solve problems involving operations with numbers in scientific notation.	B5. This is actually one of the AC algebra I test specifications - move to high school (see BB5), since scientific notation is already in number sense (see AA2)	

Standard 4.1 – Number and Numerical Operations, Strand B: Numerical Operations – Grade HS – March 23, 2009

December version	February version	Comments	Recommended Indicators

Operations with real numbers are used to explore relationships, to represent processes and equivalencies between quantities in real-world situations. • Addition and subtraction of matrices • Scalar multiplication • Laws of exponents • Properties of radicals	Fluency in computation is essential. Computational algorithms use place value and equivalence to simplify calculations in authentic situations. • Fractional and negative exponents • Operations with complex numbers	Both bullets are algebra II content – what happened to algebra I?	*Computational fluency involves using efficient and accurate methods for computing that are based on well-understood properties and number relationships. Operations with real numbers extend the procedures developed in earlier grades.* • *Laws of exponents* • *Operations with radicals* • *Operations with matrices*
1. Perform operations on matrices. • Addition and subtraction • Scalar multiplication		Need to add matrices back in – definitely 21st century!	*BB3. Add and subtract matrices; multiply a matrix by a scalar.*
2. Develop, apply, and explain methods for solving problems involving rational and negative exponents. • Laws of exponents • Equivalent expressions • Properties of radicals	B1. Simplify numerical expressions with powers and roots, including fractional and negative exponents. A5. Use the laws of exponents for rational expressions.	B1. Modify to match AC algebra I expectations plus what is currently in the standards. Indicator BB1 also includes indicator A5 from Number Sense.	*BB1. Solve problems involving finding equivalent expressions for rational and negative exponents, using the laws of exponents and properties of radicals.*
3. Use algebraic procedures to perform operations on real numbers.		Need to add something for operations with radicals – at least square roots (AC test for algebra I)	*BB2. Add, subtract, multiply, and divide square roots.*
4. Assess the amount of error resulting from estimation, and determine whether the error is within acceptable tolerance limits.	B4. Use estimation to judge the reasonableness of results of computations and solutions to problems involving real numbers.	B4. Needs to be more sophisticated for high school – the December indicator should be used.	*BB4. Assess the amount of error resulting from estimation, and determine whether the error is within acceptable tolerance limits.*
	B2. Add, subtract, multiply and divide complex numbers.	B2. This is algebra II content and is not appropriate for all students – the concept of complex numbers is in number sense – omit this.	
	B3. Find the approximate value for solutions to problems involving cube roots.	B3. Already included in grade 8 (see indicator BB5). Omit.	
	B5 (Grade 8). Solve problems involving operations with numbers in scientific notation.		*BB5. Solve problems involving operations with numbers in scientific notation.*

New Jersey Mathematics Standards and Remedial Education

Joint Committee on the Public Schools Meeting

June 3, 2009

Yvonne A. Greenbaun

June 3, 2009

A quarter of a century after the publication of *A Nation at Risk*, education in the United States has declined even farther from its 1983 state. Nowhere is this probably truer than in mathematics. As students continue to score poorly on various exams, it is clear that what has been going on in our schools has failed to produce students who are mathematically literate. Students may (and I emphasize MAY) know how to use a calculator but they have no number sense, ability to do mental arithmetic, or form basic problem-solving concepts.

New Jersey high school graduates believe that the diploma they hold proves that they are ready for college-level academic work. Parents believe it, too. The truth is that their public-school experience has lied to them about their level of competence in mathematics with the grades they received and the courses they took. These students have never learned what they should have, and probably could have, learned because the curricula to which they have been exposed are misguided.

The result of this shortcoming in basic arithmetic and algebra skills is disturbing. A state's standards and all that they imply, including teacher preparation, textbook selection, assessment methods, and more, should provide the foundation for students' success. A review of the standards and students' experiences upon entering college shows that this is not the case.

" Proof that high schools are failing is the number of first-year college students who take remedial classes", Education Commissioner Lucille Davy said. "In two-year colleges, 80 percent need remedial math or English classes; in four-year colleges, 40 percent to 50 percent need them."[1]

These numbers are expected to rise this coming fall as the placement score to test out of remedial (developmental) mathematics courses has been raised statewide. The cost in resources is staggering. Taxpayers have a right to be outraged, and colleges should be allowed to charge back school districts for every student who needs remediation. In a 1998 study by Breneman and Harlow, [2], the cost of remedial education in New Jersey was listed as 50 million dollars. Today, **on average**, a community college will run 70 remedial math courses per semester: 70 x 3 semesters x 25 (on average) students per class x 19 community colleges = 99,750 students taking remedial math over the course of a year. The most recent data from the U.S Department of Education (2004-2005) puts the cost of remediation at a two-year school at between $1607 and $2008 per student.[3] Assume $1800 per student (a little less than the average cost figure), and mathematics remediation is costing the community colleges somewhere around $179,550,000.

Our state standards have been graded poorly by the American Federation of Teachers, the Fordham Foundation, and others, based on clarity, content, and reasoning.[4]

Lack of clear standards adversely affects mathematical literacy, and also limits students' future educational and career opportunities. For a state purporting to prepare students for 21st century work skills in an increasingly technological society, the skills of our students simply do not measure up. Both standards and assessments become questionable as a large number of high school graduates enter college unprepared.[5]

The current standards do not recognize the link between skills and application of math facts. "Facts versus higher-order thinking" or "basic skills versus conceptual understanding", part of the debate we hear these days, is a false choice. In mathematics, skills and understanding are completely intertwined. It is an understanding of theory and technique that allows students to solve "real-world" problems. If there are gaps in students' knowledge, this process breaks down. Basic skills are absolutely indispensable for understanding more sophisticated processes. Many mathematics curricula are afraid to challenge students. Is it easier to distract students with open-ended games and activities with the goal of "discovery" rather than recognize that it is impossible to "do math" if you don't know any specific math? It should be pointed out that in other activities, students will work hard to excel, such as sports or music. In these areas there is no need for them to feel that they must create their own rules to perform well. They understand that there is a common language to the task at hand. So it is with mathematics. The starting point should be established concepts and algorithms. No one advocates mindless drills, but drills of important algorithms that enable mastery of a topic are essential. A teacher needs to provide clear and exact explanations, to be "an instructor, one who imparts knowledge, a director of learning."[6] To deskill teachers, to claim that they are facilitators only who will guide students to "discover" facts, is a denial of responsibility and accountability. The result of the existing mathematics programs is that students entering college do not have mastery of basic facts, have not learned study skills, and are confounded by the demands now being made of them.

Further, there is inconsistency among the New Jersey standards, New Jersey assessments, and students' academic performance.[7] Recent NAEP results show that the percent proficient in mathematics in grades 4 and 8 is about half of what is reported on state assessment results.

Mathematics Achievement: Percent Proficient

	State Assessment	NAEP
2005 Grade 4	80	45
2005 Grade 8	62	36
2007 Grade 4	84	52
2007 Grade 8	68	40

Table 1: Comparison of State Assessment and NAEP Data

The NJEA can brag about their graduation rate but those numbers are not valid. The state's official graduation rate does not take into consideration that approximately 15% of New Jersey graduates are not able to pass the HSPA, but instead graduate by passing an

even less rigorous exam, the Special Review Assessment (SRA) or are exempt from having to pass it at all.[8] This raises questions about the validity of the graduation data and the significance of the high school diploma as a sign of academic achievement. These are students who then show up at community colleges, expect to make up that gap, and add to the numbers of remedial students. It should be noted that students who enter college needing remediation are less likely to complete degree requirements. The potential economic benefit of improving students' academic outcomes should be a wake-up call to the importance of reforming school curricula. Dropouts from the class of 2008 will cost New Jersey almost 4.8 billion dollars in lost wages over their lifetimes.[9]

College remediation is a serious education issue facing our state. Solving the problem will require great effort and concentrated political push. As New Jersey already has the highest per pupil spending in the nation, it would seem a logical conclusion that throwing more money at the problem is not the answer. College readiness starts in kindergarten and, if the state standards are to be a guide, they must be aligned to the demands of college work. High standards improve teaching and learning. The time has come to stop treating standards, assessments, teacher recruitment, and accountability as separate silos, to stop taking a triage approach to education, to stop clamoring for more money as THE solution, and to work toward a response that provides a lasting solution.

1. The Press of Atlantic City, Friday, August 18, 2006

2. Breneman, D.W. and Harlow, W.N. (1998, July). *Fordham Report: Remediation in Higher Education: Costs and Consequences, 2*(9). Washington, D.C.: Thomas B. Fordham Foundation

3. http://www.deltacostproject.org

4. http://www.edexcellence.net/detail/news.cfm?news_id=338
http://www.edweek.org/ew/articles/1998/04/15/31stand.h17.html

5. See Appendix, Table 1

6. Webster's Unabridged Dictionary, Copyright 1979, Simon & Schuster, p.1871

7. **http://www.ed.gov/nclb/accountability/results/progress/newjersey.pdf**
See also Appendix, Tables 2 and 3

8. Gottlob, B., "The High Cost of High School Failure in New Jersey", *School Choice Issues in the State,* January 2008.

9. http://www.all4ed.org/files/NewJersey_wc.pdf

APPENDIX

Community College	Remediation Rate (%)		Four-Year College/University	Remediation Rate (%)
Atlantic Cape	77.6		Kean	70.0
Camden	81.0		Montclair	54.0
Cumberland C	80.0		New Jersey City	62.0
Gloucester	73.2		NJIT (estimated)	40.0
Salem	92.5		Ramapo	23.0
Bergen	81.8		Rowan	21.0
Essex	91.4		Rutgers	33.0
Hudson	67.9		Stockton	14.0
County College of Morris	76.0		The College of New Jersey	8.0
Passaic	96.3		William Patterson	72.0
Sussex	75.0			
Union	67.0			
Warren	75.0			
Brookdale	79.8			
Burlington	73.8			
Mercer	83.0			
Middlesex Community	78.5			
Ocean Community	67.7			
Raritan Valley Community	78.0			
STATEWIDE COMMUNITY COLLEGES	**77.8**		**STATEWIDE FOUR-YEAR**	**40.0**

Table 1 : Remediation Rates: Full-time students who graduated high school in Spring 2004 and enrolled in college in fall 2004

NAEP Grade 4 Scoring: <213 below basic
Range: 0-500 214-248 Basic
249-281 Proficient
>282 Advanced Proficient

State	Average Scale Score		State	Average Scale Score
Alabama	229		New Jersey	**249**
Alaska	237		New Mexico	228
Arizona	232		New York	243
Arkansas	238		North Carolina	242
California	230		North Dakota	245
Colorado	240		Ohio	245
Connecticut	243		Oklahoma	237
Delaware	242		Oregon	236
Florida	242		Pennsylvania	244
Georgia	235		Rhode Island	236
Hawaii	234		South Carolina	237
Idaho	241		South Dakota	241
Illinois	237		Tennessee	233
Indiana	245		Texas	242
Iowa	243		Utah	239
Kansas	248		Vermont	246
Kentucky	235		Virginia	244
Louisiana	230		Washington	243
Maine	242		West Virginia	236
Maryland	240		Wisconsin	244
Massachusetts	**252**		Wyoming	244
Michigan	238		DoDEA	240
Minnesota	247		District of Columbia	214
Mississippi	228			
Missouri	239		National	240
Montana	244		National Public	239
Nebraska	238			
Nevada	232			
New Hampshire	**249**			

Table 2: 2007 NAEP Average Scale Scores Mathematics Grade 4

NAEP Grade 8 Scoring: <261 below basic
Range: 0-500 262-298 Basic
299-332 Proficient
>333 Advanced Proficient

State	Average Scale Score		State	Average Scale Score
Alabama	266		New Jersey	**289**
Alaska	283		New Mexico	268
Arizona	276		New York	280
Arkansas	274		North Carolina	284
California	270		North Dakota	**292**
Colorado	286		Ohio	285
Connecticut	282		Oklahoma	275
Delaware	283		Oregon	284
Florida	277		Pennsylvania	286
Georgia	275		Rhode Island	275
Hawaii	269		South Carolina	282
Idaho	284		South Dakota	288
Illinois	280		Tennessee	274
Indiana	285		Texas	286
Iowa	285		Utah	281
Kansas	**290**		Vermont	291
Kentucky	279		Virginia	288
Louisiana	272		Washington	285
Maine	286		West Virginia	270
Maryland	286		Wisconsin	286
Massachusetts	**298**		Wyoming	287
Michigan	277		DoDEA	285
Minnesota	**292**		District of Columbia	248
Mississippi	265			
Missouri	281		National	281
Montana	287		National Public	280
Nebraska	284			
Nevada	271			
New Hampshire	**288**			

Table 3: 2007 NAEP Average Scale Scores Mathematics Grade 8

33x

Developmental Courses Offered in Spring, 2007 Semester New Jersey Community Colleges

College	Approx. Enrollment	Developmental Courses Sp'07	No. of Sections	% of Enrollment **
Atlantic Cape	6500	MA073 Intro Alg I MA074 Intro Alg II	13 22	13.5
Bergen	14,000	MA011 Basic Math MA031 Alg. A MA032 Alg. B MA035 Algebra MA045 Inter. Alg.	50 30 20 5 8	20.2
Brookdale	13,279	MATH015 Prealgebra MATH011 Prealgebra I MATH012 Prealgebra II MATH021 Intro to Alg	66 18 27 49	30.1
Burlington	7,797	MTH055 Prealgebra MTH075 Elem. Alg. MTH095 Inter. Alg.	13 30 11	17.3
Camden	22,321	MAT011 Math Fundamentals MAT029 Elem. Alg.	36 56	10.3
Cumberland	3,000	MAT086 Basic Math MAT091 Devel. Alg.	15 17	26.7
Essex	25,000	MTH086 Intro Alg MTH092 Elem Alg	68 54	14.8
Gloucester	5,400	MAT010 Intro Coll. Math MAT050 Elem. Alg	13 25	17.6
Hudson	6,000	MAT073 Basic Alg MAT071 Basic Math MAT076 Basic Alg II	28 42 3	30.4
Mercer	13,000	MAT033 Basic Math MAT 034 Intro Alg.	29 38	12.9
Middlesex	13,000	MAT010 Basic Math MAT013 Basic Alg MAT014 Intermed. Alg.	27 47 24	18.8
CC Morris	8,000	MAT011 Basic Math MAT014 Basic Alg.	16 27	13.4
Ocean	9,000	MAT011 Intro Alg. MAT012 Intro Alg II	25 34	16.4
Passaic	5,000	MA001 Basic Arithmetic MA004 Apps Basic Math MA005 Algebra MA006 Elem Alg I MA007 Elem Alg II	18 24 14 16 13	42.5
Raritan	6,200	MA013 Arithmetic MA021 Intro Alg MA022 Alg Mod I MA023 Alg Mod II MA024 Alg Mod III MA025 Alg Mod IV	20 3 21 22 23 20	44.0
Salem	1,200	MA90 Basic Math MA93 Elem Alg	6 6	25.0
Sussex	3,566	MATH010 Basic Math MATH015 Intro Alg MATH017 Intro Alg II MATH023 Basic Alg MATH040 Inter. Alg	6 7 7 5 3	19.6
Union	11,000	MAT011 Intro Math Concepts MAT015 Begin Alg I MAT016 Begin Alg II MAT022 Intro Alg	42 69 27 19	35.7
Warren	1,700	MAT050 Basic Math MAT051 Intro Alg MAT052 Inter Alg	7 9 3	27.9

** Assumes an enrollment of 25 students per section.

Table 4: Developmental Courses Spring 2007

I am here today to give testimony on a topic for which I am very passionate about Teacher Preparation. My involvement with teacher preparation has been with both pre-service and in-service teachers from developing courses, professional development, serving on the advisory board and teaching graduate courses for the Masters of Math Foundations at Fairleigh Dickerson. In addition I was instrumental in developing an AMATYC short course on the essential topics in math courses for pre-service teachers at the community college. I participated in a two week institute lead by Dr. Jim Lewis, chair of the Conference Board of the Mathematical Sciences Committee on the Mathematical Education of Teachers dealing with curriculum and activities affecting mathematics education of elementary teachers.

Contrary to belief elementary school mathematics is not just about the teaching of only prescribed facts and computational algorithms. The topics in the elementary mathematics curriculum are not just procedural facts, but rich interrelated concepts. Therefore it is important that in these formative years teachers lay a solid foundation upon which to build. When building a house if the foundation is weak it will eventually crumble. It is during the elementary years that children begin developing the reasoning skills upon which later achievement in mathematics relies on. So it is unrealistic to expect students who fail to develop early an understanding and appreciation how to manipulate arithmetic expressions to later manipulate algebraic expressions with confidence. Just look at how our student did on NAPE in fourth grade only 10% were below basic 38% at basic and 42% proficient as compared to 23%, 37% and 30% respectively in eight

Mathematics instruction in the elementary years can—should—be designed to cultivate curiosity. Encouraged to solve problems, children become aware of their ideas; and as they learn to analyze their own, their classmates, and their teachers thinking, these ideas become more refined and many-sided. It is during these early years that young students lay down those habits of reasoning upon which later achievement in mathematics will crucially depend. (CBMS).

Based on this premise it has become the belief that many practicing elementary teachers are not adequately prepared by the mathematics instruction they received to meet these challenges of effectively preparing our students. When rules and procedures taught are not conceptually anchored, memorization must pass for understanding, and mathematics

becomes an endless, senseless parade of disparate facts, definitions, and procedures thus not cultivating a child's curiosity.

Teaching elementary mathematics requires both considerable mathematical knowledge and a wide range of pedagogical skills. Teachers must have the patience to listen for, as well as the ability to hear, the sense—the logic—in children's mathematical ideas. They need to see the topics they teach as embedded in rich networks of interrelated concepts, know where, within those networks, to situate the tasks they set their students and the ideas these tasks elicit. In preparing a lesson, they must be able to appraise and select appropriate activities, and choose representations that will bring into focus the mathematics on the agenda. Then, in the flow of the lesson, they must instantly decide which among the alternative courses of action open to them will best sustain productive discussion. (CBMS)

The goal is not just *more* mathematics but the *right* mathematics and strategies that focus on developing a deep conceptual knowledge of the mathematics they will teach. In order for this to transpire these courses must be taught with integrity and rigor to develop a *deeper understanding of the fundamentals* needed to effectively teach. The teachers must be prepared to teach the standards with appreciation and understanding and enjoy the challenges of teaching everything from counting to algebraic thinking. Not only must the teachers have a grasp of the mathematical content they must possess the skills to engage students in the discovery and comprehension of the importance of mathematics. Therefore it is imperative that we not only provide elementary teachers with the right educational content but enough preparation to develop a mastery and genuine appreciation for the mathematics they are required to teach to be effective.

Summing up- It is in the formative years that we must develop and appreciation and understanding of the beauty of mathematics- having world class standards are essential, but we need the highly qualified elementary teachers in the area mathematics. If we are to continue to make educational progress in increasing the number of students who demonstrate proficient in mathematics it imperative that we have teachers with a solid foundation in conceptual knowledge and the pedagogical skill to teach our children.

The Challenge is how to achieve this goal - Recommendations:

The National Council of Teachers of Mathematics (NCTM) recommends at least three college math courses for elementary teachers, emphasizing mathematical structures essential to those grades. Also math specialist in grades k-5

The Conference Board of the Mathematical Sciences (CBMS) recommends at least three college math courses for K–4 teachers, seven courses for 5–8, and teaching by math specialists starting in grade 5; it also discusses at length the scope and depth of those courses.

A U.S. Department of Education (USDE/FIE) advisory committee recommends at least four college math courses for teachers in grades K–8.

Work more closely with the community colleges since 50% of the student attending college are at the community college

Reference:

Conference Board of the Mathematical Sciences. (2001). *The Mathematical Education of Teachers: Part 1*. Washington, DC: Mathematical Association of America.

National Council Teachers of Mathematics Position Statement on Highly Qualified Teachers, July 2005. http://www.nctm.org

National Council on Teacher Quality: (2008). *No Common Denominator: The Preparation of Elementary Teachers in Mathematics by America's Education.* http://www.nctq.org

New Jersey Coalition for World Class Math
www.njworldclassmath.webs.com
Testimony to the Joint Committee on the Public Schools, June 3, 2009
Presented by Terry Y. Fung, Ph.D., Mathematics

Good morning ladies and gentlemen of the Joint Committee on the Public Schools. I am pleased to have the opportunity to be here today to address a very important issue facing our schools today. I am aware that mathematical standards in our country are not high enough and many students need to take remedial courses as a result. Needless to say, taking so many remedial courses will greatly delay the student's college graduation, by at least one semester or more. The number of students needing remediation is 71% compared to 63% in 1999, as stated in an article by the University of Maryland. Barbara Sloan, vice president of Tallahassee Community College, says it this way, "Passing high-school requirements may not necessarily mean a student is prepared for college." According to Strong American Schools' Executive Summary, the total cost for all remedial courses in the country is about $2.89 billion for the Academic Year 2004-2005 alone. All this could have been avoided if students had been better prepared in high school. There are many reasons why so many remedial courses are needed.

First of all, the requirements for elementary school math teachers are too low. In some cases, the teacher may have only taken one college math course. The teacher may not have adequate knowledge of the math concepts they teach their students. If students do not get taught the math skills properly in elementary school, they will continue to struggle in middle and high school. Also, teachers themselves may have math anxiety and they may pass this onto their students. As a result, everyone hates math. If this continues, no one will know how to do math. They'll just accept that they can't do math and give up. Our society seems to accept this. This is unacceptable. Until we change our mentality and tell our children they *can* do it, we can't move forward.

Another problem is that some elementary schools are allowing children to use calculators. This makes them dependant on the calculator. But they must know the concept first before using the calculator. Otherwise, they won't be able to do the most basic math. We cannot allow this to happen. Calculators should only be used in middle and high school.

In addition, during high school, students may not even be required to take a math course, especially in their senior year. This almost guarantees a failure. A majority of the questions on the placement test is based on algebra, which most high school graduates haven't seen since 9th grade. This large time gap is contributing to the high failure rate in placement tests for college.

In the last ten years, our math standards have been supporting the hands-on approach and exploring math. While the intentions may have been good, students are not

learning the concepts. We spend so much time exploring the concept that they don't get to the basics. This doesn't mean we shouldn't use these methods. Teachers should start with the exploring math and hands-on activities and then teach the students the mathematical formulas.

All this is a vicious cycle. One reason why we have so many remedial students is that they may have been taught by teachers who were once remedial students. This must end. This can be changed if elementary school teacher requirements are increased and math standards go back to the basics. This means that instead of just talking about the reason behind the math, actually doing the math.

To achieve this, we must change our math standards. Current standards cover so many topics and each topic appears again and again in each grade. Well, I have seen my children learn the average, median, mode, range, and outlier from 2nd grade to 7th grade. I, as a mathematician, do not know what is the significance of learning these topics 6 times throughout elementary and middle school. In fact, they may have to see them in future courses. You should seriously consider changing our math standards so that our children will learn something meaningful in school.

The class time is limited. If we spend time to explore math again and again, we will have less time to learn basic skills. To make up for the lost time, teachers give students calculators to speed up the "tedious" calculation. This is not a sufficient solution.

In conclusion, all the reasons previously stated have been causing the high remedial rates in our country. The best way to lower the remedial rates is to go back to the basic way of teaching math. It is absolutely necessary that children learn the basics. We all know our math standards are not strong enough. But they can be improved and this will lower remedial rates. You have the power and responsibility to do just that!

NEW JERSEY COALITION FOR WORLD CLASS MATH

www.njworldclassmath.webs.com

Testimony to the Joint Committee on the Public Schools, June 3rd 2009
Presented by Sarah-Kate Maskin

Thank you Assemblywoman Joan Voss, Senator Ronald L. Rice and Committee members for this opportunity to speak with you.

It is clear that much progress has been made and we are grateful to Commissioner Davy for leading this tremendous undertaking.

At the Math Task Force meetings that took place less than two months ago, Ms. Flax asked if NJ could partner with MA in revising our math standards. She was told that was not an option.

I have one question. What has changed over these past two months regarding partnering or modeling highly ranked state math standards such as Massachusetts which has a proven record of success and effectiveness both nationally and internationally. Why was this not an option?

But, NJ is now willing to participate in a movement with 45 other states whose majority of standards is mediocre at best and none of us knows what the end product will be nor do we have any idea of the results these national standards will produce.

Why is NJ willing to participate in the unknown when we could have simply modeled proven success?

What can your committee do to make this process and its result the best for NJ's students?

In the long term, our coalition believes that legislation is necessary to set forth the process by which NJ writes, revises and reviews all of its core curriculum content standards. Presently NO PROCESS exists. This absence of protocols allows the process to be overwhelmingly impacted by those who may have either power, connections or ideological biases. We need to turn a new chapter that removes such impediments to establishing education standards.

. The fact that Mr. Chairman has to ask for an update from the Commissioner points to no process and outlined procedures.

. The fact the Dr. Rosenstein offered his own standards document to the DOE points to no process and outlined procedures.

. The fact that there is no voice from our community college points to no process and outlined procedures.

4/7x

In the short term, these are our three recommendations to your committee --

1) require that NJ's new math standards meet world-class levels, modeling after the success of Massachusetts, California, and Indiana; using the NMAP as its guiding framework;
2) require that NJ's standards process be free of financial and research-based conflicts of interests;
3) require that NJ's math standards be reviewed by an eminent panel of non-NJ-affiliated mathematicians to preserve objectivity.

Just because New Jersey has agreed to participate in the Common Core State Standards Initiative does not guarantee that what is presented will necessarily be adopted by our State. The ultimate decision rests in the State Board of Education's vote.

The Governor, the Commissioner, the legislators and the State Board of Education must be given an objective, unbiased and critical review of any set of standards set before them. It is absolutely necessary to establish, as Dr. Stotsky has recommended, our own internal review and validation committee, independent of the national validation committee, to discern if the national standards will provide the necessary framework to prepare our students mathematically.

We must ensure that all of our core curriculum content standards are written, revised and reviewed to include and deliver objectivity, content area experts, transparency, and modeling after proven success.

Simply, the citizens of NJ expect and the children deserve a DOE that is both accountable and transparent when providing the components of public education.

Again, thank you for your time and the great degree of thoughtful consideration you bring to the oversight of our public schools.

Statement Prepared for the New Jersey State Legislature's Joint Committee on the Public Schools

By Jerome Dancis
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To Assemblywoman Joan Voss, Senator Ronald L. Rice, and other members of the Joint Committee:

I appreciate the opportunity to speak with you today about K-12 mathematics education.

We, college math professors are *distressed* by the poor and decreasing level of understanding of arithmetic and Algebra of large numbers of college students. This is placing Science, Technology, Engineering and Mathematics (STEM) majors at-risk. It is also relegating increasing numbers of college freshmen into remedial math (Arithmetic and Algebra) courses; far too many of these college students do *not* complete college. [i] Two major reasons for students learning less Arithmetic are the overuse of calculators and the marginalization of Arithmetic in state math standards and in textbooks. [ii]

Before developing math standards, it will be desirable for the New Jersey Department of Education to develop and publish a list of goals for math education. [iii] I will suggest a few goals below and indicate some of what is required to achieve them.

Suggested Goal #1. Reverse the current upward trend of more and more students needing remediation in Arithmetic and Algebra I when they enter college. [iv]

To achieve this goal will require greatly increasing the time allotted to Arithmetic in Grades 1-7 and greatly decreasing, (better yet eliminating) the Grade 1-7 standards on Patterns, Statistics and Probability and Discrete math.

Supporting Subgoal 1A. All middle school math teachers and all elementary school teachers will be fluent in Arithmetic. This is far from the current situation. [v] To achieve this will require New Jersey to raise the standards for certification of teachers and will require New Jersey school districts to redirect professional development toward providing content knowledge.

As U.S. Secretary of Education Duncan said: [vi]
You all well know that it is hard to teach what you don't know. When we get to 6th, 7th, and 8th grades, we see a lot of students start to lose interests in math and science, and guess why, because their teachers don't know math and science so it is hard to really instill passion and a love for learning if you are struggling with the content yourself. So I agree we can use a ton of these [stimulus package] resources to send teachers back to

schools and universities to get the endorsement, to get the content and the knowledge they need to be able to teach.

[For teachers to] know the content is a step in the right direction. A great great use of one-time money is to give teachers content knowledge they need that will stay with them forever. And we will have a huge opportunity to do that in the next couple of years.

Yes, the U.S. Sec. of Education said "great" twice. Stimulus package money, including the $5 Billion education Race to the Top money is one-time money.

Suggested Goal #2. Raise the average score on the Math SATs from about 500 (about 30 correct answers out of 60 questions) to 600.

A Problem on Speed. (A medium level SAT problem) [vii] "How many minutes are required for a car to go 10 miles at a constant speed of 60 miles per hour?"
(A) 600; (B) 100; (C) 60; (D) 10; (E) 6.
(Solution. {60 miles per hour} is {a mile a minute}, so ten minutes needed to go 10 miles.)

A good way to try to achieve Goal #2 is to include the Arithmetic and Pre-Algebra Math SAT and PSAT questions in the middle school Math curriculum, and to include the Algebra and Geometry Math SAT and PSAT questions in the high school Math curriculum.

Problems like this Problem on Speed are measurement problems, the type of which is not hinted at in the Strand on Measurement of the Feb. draft curriculum. This type of problem falls thru the cracks in the Math curriculum; many students do not receive instruction on how to do it in Grades K-12. Being able to do this Problem on Speed is also needed for high school physics.

Suggested Goal #3. [a national (NSF financed) goal] Significantly increase the number of students ready for Science, Technology, Engineering and Mathematics (STEM) majors when they enter college.

To major in STEM, students need to be fluent in Pre-Calculus and to have taken a high school physics course. Both of these require fluency in arithmetic and Algebra – What is *not* required: These four strands in the Feb. draft curriculum: Patterns, Statistics and Probability and Discrete math. [viii]

Increasing the number of STEM majors in college requires more students taking significantly increase the numbers of students taking rigorous physics courses in high school. These courses, in turn require fluency in algebra and Arithmetic. The basic measurement needed for rigorous high school chemistry and physics courses should be included in middle school math (and science) courses.

4.3.

Suggested Goal #4. Replace the incoherent hard-to-teach curriculum with a coherent reasonable-to-teach curriculum.
The Feb. draft New Jersey Curriculum *floods* each grade with Arithmetic, Geometry and Measurement, Pattern, Functions and Relationships, Data analysis, Statistics and Probability and Discrete math and Problem solving. With so many topics to teach each year (in K-8), there is no way to have a coherent curriculum. Also, soon after a topic is started, it is time to move on to the next topic; this occurs before the learning is moved into long-term memory. This makes it easy for students to forget a Math topic within a month. As such, the draft New Jersey Curriculum will be difficult for teachers to teach and difficult for students to learn. [ix] Also all these topics squeeze out the time needed to properly learn Arithmetic.

New Jersey would be wise to follow the carefully researched *Final Report of the National Math Advisory Panel* (NMAP) [x] and the *Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics* published by the
(NCTM), both of which call for a K-8 curriculum focusing on Arithmetic.

What is the rush? Yes, it is important that students gain proficiency in Geometry, Data Analysis, Statistics, and Probability [xi] and Discrete math. But there is no need for them to gain this proficiency in elementary school or even in middle school. Most of the Geometric Properties [xii], Data Analysis, Statistics, and Probability and Discrete math should be postponed until high school.

Goal; #5. Attain students fluency in solving "Two Step" word problems. A big *deficiency* in the draft New Jersey Curriculum for Grades 1-6 is the *avoidance* of "Two Step" word problems. For example:

Problem on Change. Sally buys a loaf of bread for two dollars and a quart of milk, for one dollar; she gives the clerk a five dollar bill. What is the change?

The "difficulty" with this Problem on Change is that its solution requires *both* addition and subtraction. As such, it is a "Two Operation" word problem, better known as a "Two Step" word problem. "Two Operation" word problems such as this Problem on Change, are not required by the draft New Jersey Curriculum in Grades 1-6. They are required in Grades 7 and 8 in CPI #4.3.7.B.7 and #4.3.8.B.7.

Here is another "Two Operation" word problem:

NAEP Problem [xiii]. There were 90 employees in a company last year. This year the number of employees increased by 10 percent. How many employees are in the company this year?
A) 9 B) 81 C) 91 D) 99 E) 100

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The correct answer is D. Ten percent of 90 is 9. Add that to 90 and you get 99.

But, nationally, only half (49%) of eighth-grade Algebra students answered this NAEP Problem correctly. [xiv]

Suggested solution: Adapt my suggested "Grade by Grade Description of Appropriate Arithmetic Word Problems", which provides increasing complexity of Math content in "Two Operation" word problems. It appears as Appendix B at
www.ed.gov/about/bdscomm/list/mathpanel/5th-meeting/presentations/dancis-jerome.pdf

Good news: An inner-city, Title I school, using the rare good Singapore math textbooks, together with a college math professor as math coach, can make dramatic gains in one year. See table on last page.

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[i] If students took a remedial course and then went on to graduate, the remedial course would have been merely an inconvenience. But less than 3 in 10 (29%) of college students, who take one or two remedial courses, graduate (within 8 years). [Data for high school graduates of 1992 in New York Times May 27, 2009
www.nytimes.com/2009/05/28/education/28remedial.html?_r=1]
This does not count the really math phobic, who enter college, avoid remedial math and then drop out.

[ii] This is why the MD/DC/VA SECTION of the Mathematical Association of America (MAA) has broken tradition by issuing its first statement ever on the College Professors' Concerns on Mathematical Preparedness of Incoming College Freshmen. I paraphrase its key recommendation as: Students should be able to perform basic calculations in Arithmetic and in Algebra, *without* the assistance of calculators. .

This report, "College Professors' Concerns on Mathematical Preparedness of Incoming College Freshmen" is at [Dec. 2008]
http://faculty.salisbury.edu/~despickler/mddcvamaa/HS_students.html
The MAA is the Mathematical Association of America, the professional association for college math instruction, of college and community college professors of mathematics.
Also see my reports "Comments on Statement on Mathematical Preparedness" as well as my "Notes on Remedial Math Problem" on my Math Education Website:
www.math.umd.edu\~jnd

[iii] "My [1999] Goals for high school math education" is at
www.math.umd.edu/~jnd/Goals-for-high-school.html
Adopting and/or adapting some of these goals would be appropriate.

[iv] Hopefully, the following type of data is available in New Jersey. If not, it should be.

Fewer Maryland Students Learning Arithmetic and Algebra
My Analysis based on data by Maryland Higher Education Commission (MHEC)
Student Outcome and Achievement Report (SOAR).

The following data describes students who entered college at least minimally prepared in Math -- not requiring remedial Algebra or Arithmetic -- vs. those who needed remedial Arithmetic or remedial Algebra before being allowed to take college level math courses. In reviewing the numbers, they reveal that **the situation went from bad in 1998 to worse in 2005 for all ethnic groups,** but there were more dramatic downturns for African-American and Hispanic students.

Caveat. *This particular data counted only students who graduated from Maryland (MD) high schools in 1998 and 2005 and then entered a college in Maryland the same year. (Not counted* were graduates who went to college outside MD or did not go to college the same year.)

Decline in Percent of MD HS Graduates Minimally Ready for College Math when they entered a College in MD.

	1998	2005
Whites	67%	60%
African-Americans	44%	33%
Asian-Americans	79%	74%
Hispanics	56%	42%

[v] 1.This report documents the inadequate preparation in Mathematics of future elementary school teachers by 67 of the 77 colleges surveyed:
"No Common Denominator: The Preparation of Elementary Teachers in Mathematics by America's Education Schools" [NOT], June 2008. It is at www.nctq.org/p/publications/reports.jsp

2. "Racial Equity Requires Teaching Elementary School Teachers More Mathematics", is the title of Montclair (NJ) State University Mathematics Professor Emeritus, Patricia Clark Kenschaft's excellent article in the Notices of the AMS, February, 2005, Volume 52, Number 2 and on the web at
www.ams.org/notices/200502/fea-kenschaft.pdf

Kenschaft wrote: An obvious remedy exists for the amazingly poor academic preparation of elementary school teachers in two of the "three R's." Will Rodgers said long ago, "You can't teach what you don't know any more than you can come back from where you ain't been." If our children's foundation is destroyed in elementary school, it is very difficult for remedial teachers to fix it in secondary schools or colleges. (Most

colleges run remedial courses on arithmetic that should have been learned by fifth grade.) I have interacted with hundreds of elementary school teachers. They can all read. ... Almost none of them know mathematics at the level they will be expected to teach. The good news is that I have found them eager and quick to learn. It is not their fault that most don't know fractions, division, and multiplication. Some are shaky on subtraction and even addition.

[vi] Please watch between the 19th and 22 minutes for the question from me and the answer from U.S. Sec. of Education.
www.cspan.org/Watch/Media/2009/05/11/HP/R/18423/Sec+Duncan+Advises+Use+of+Stimulus+Funds.aspx

[vii] This was Item#5 of Section 7 of the May 2000 SAT Math test. The SAT underlined the word, "minutes". This is a medium level SAT Math problem, one that the SAT rated as Level #3 on its scale of 1 to 5. [The book, "10 Real SATs " copyright 2000] It is "difficult" for many twelfth graders because it is not in the curriculum.

[viii] College freshmen, not fluent in Pre-Calculus, who enroll in college as Statistics majors, will be *at-risk* students even if they have scored a 5 on the AP statistics exam.

[ix] Relatedly: the crucial paragraph in a Maryland school Math Specialist's presentation to the Maryland State Board of Education:
"I love Mathematics but I hate how we are forced to teach it because of the Voluntary State Curriculum. I thought for many years that I was one of the only teachers who felt that teaching Math in this manner did not make sense. Why are we hopping from one skill or concept to another like a rabbit looking for greener pasture? Are we hoping to find something our students are successful at doing within Math so we keep changing topics? These are questions that I have heard from other teachers and they echo my own feelings. In order to meet all the requirements of the VSC, our students never fully have an opportunity to understand any one concept or skill. One moment they are having to understand what a fraction is and the next they are adding decimals. August may be solving algebraic equations and January is multiplying decimals. There are natural progressions that can occur amongst these concepts but those progressions have to be sacrificed in order to teach all of the required indicators." [on the web at www.math.umd.edu/~jnd/Math.inPG.htm -- next to last paragraph.]

[x] www.ed.gov/about/bdscomm/list/mathpanel/report/final-report.pdf

[xi] **4.4 Data Analysis, Statistics, and Probability** What is the rush?
Data Analysis, Statistics, and Probability can be tricky. Common for textbooks to contain many misconceptions on Data Analysis, Statistics, and Probability.
See, for example, my report, "Misleading math statistics" at
http://groups.yahoo.com/group/Parents_Coalition/files/Math%20Forum%20February%2C%202009/

[xii] **4.2 A. Geometric Properties** What is the rush? Most of the Geometric Properties should be postponed until a high school geometry course, where they could be presented as a coherent topic and where appropriate justifications for statements of Geometric Properties could be presented.

There are several good Geometric Properties CPIs; but many of them belong in English vocabulary and/or Art class. For example:
4.2.1.A.6 Arrange and describe objects in space by position and direction: *near, far, under, over, up, down, behind, in front of, next to, to the left or right of.*

4.2.P.A.2 Explore and talk about basic shapes in the environment (e.g., circle, square, triangle, rectangle, rhombus).

[xiii] This NAEP example from "Recalculating The 8th-Grade Algebra Rush" Washington Post, September 22, 2008; B02
www.washingtonpost.com/wp-dyn/content/article/2008/09/21/AR2008092101813.html

[xiv] This is a multiple choice problem; hence it is likely that only three in eight of eighth-graders in Algebra I answered this NAEP Problem correctly, with another one in eight luckily guessing the correct answer.

California Standards Test

Total Number of Proficient and Advanced Students at
Ramona Elementary
2002-2008

CST Mathematics

Years Using Singapore Primary Mathematics Texts under the Guidance of Professor Yoram Sagher .

	2nd Grade	3rd Grade	4th Grade	5th Grade
2008	70%	77%	64%	71%
2007	66%	61%	66%	76%
2006	67%	74%	63%	76%

The layout of these scores reflects that our work with Dr. Sagher began in 2006. This is also the year when the Singapore Primary Math US Edition books were purchased for the entire school.

2005	53%	52%	59%	45%
2004	52%	58%	48%	56%
2003	58%	53%	65%	43%
2002	45%	52%	51%	18%

Margaret Bennett

June 3, 2009

Statement to be read on my behalf at the June 3rd meeting of The Joint Committee on Public Schools regarding the N.J. state standards for math and the current revision process:

Dear Assemblywoman Voss and The Joint Committee on Public Schools:

Please accept this written testimony from a parent and taxpayer as equal to in delivery and intent as if I were there in person. Unfortunately our new daughter's schedule prevents me from attending this meeting. I am a board member of the New Jersey Coalition for World Class Math and a board member of the Franklin Lakes Board of Education. This statement represents my personal plea to you to help the children in the state of New Jersey who are caught in the middle of a flawed standards revision process.

New Jersey's current math standards give us bragging rights for our inclusion in a small group of states that have the lowest standards in the nation. As a result our DOE has not only gypped our children of the opportunities they deserve of a math education but also failed to properly represent the best interest of the taxpayers whose money is spent on the sub-par reform math programs, the curricula that represent the standards.

The N.J. DOE has failed to open the writing of our standards process to the right people: top research mathematicians from around our nation who have been involved in the writing of some of our country's best state standards. In fact, the recent Math Task Force designed under the guise of analyzing best practices and the best interests of the children of our state has been a ruse. Most of the Math Task Force's participants represent reform math ideology. Many of those participants have a direct or indirect financial interest in ensuring that reform math programs continue to be purchased. This obvious conflict of interest renders the analysis of the Math Task Force flawed and questions the good faith of the purpose of the Task Force.

We need your help to ensure that our DOE does what it needs to do. The National Math Panel March 2008 Findings provide explicit guidance for our country's educators as to what needs to happen to ensure that our children will remain competitive. It defines guidelines for K-8 math curriculum that need to be in place to make certain children are prepared to achieve in algebra, an important prerequisite for future academic success.

Parents and taxpayers need your help. Districts around the state are embroiled in the so-called "math wars." These frustrating, expensive and emotionally taxing struggles between parents seeking the best for their children and reform educators married to a philosophy are an unfair consequence of our current poor math standards. The research is clear, and the pattern of change in other states to move their math standards to provide more rigor is more evidence of how imperative it is that New Jersey children not be left behind nationwide, or globally.

I have been front and center in my home district's "math war." The resolution of this issue should not be on the shoulders of passionate parents in their locality but rather it should be spearheaded by our DOE. If the N.J. DOE does not take up its role in absolute good faith then the burden passes to you, our legislature, to make sure that our children have equal access to math education as the children of Indiana, California and Massachusetts to just name a few.

Thank you for your time and I hope your serious consideration of this issue will keep the interests of the children of New Jersey at the center of your decision on this matter.

Sincerely,
Margaret Bennett

TESTIMONY TO THE JOINT COMMITTEE ON PUBLIC SCHOOLS, JUNE 3, 2009

Thank you for the opportunity to speak today regarding NJ's public schools. My name is Nancy Lewen, and I am an analytical chemist and a member of the NJ Coalition for World Class Math.

More than twenty years ago, poor performance by American students on international math tests caused the National Council of Teachers of Mathematics (NCTM) to issue guidelines for math curricula, with the goal of improving student performance by reforming mathematics instruction. The National Science Foundation (NSF) and other granting agencies responded with millions of taxpayer dollars to fund the development of reform math curricula and math education programs throughout the country. What has been the result of this? Despite the best efforts of math educators and nearly a blank check from American taxpayers, performance of American students on international tests continues to be mediocre. How can this be?

Insight into the cause of the poor performance of American students may be gained by examining the early stages of reform math curricula in the United States, from which college and university professors, as well as the industrial research community, was largely excluded. For instance, a 1999 letter sent to then Sec. of Education Riley by 200 professors, raised concerns about the omission of input from practicing mathematicians in the development process. This letter, signed by mathematicians and scientists from around the country, including winners of the Nobel Prize, the Wolf Prize, and the National Medal of Science, went largely ignored by the math education

community. One might be tempted to conclude that such objections on the part of colleges and universities are a result of some sort of "turf war" regarding math instruction, but it is really a conflict between how to teach and what is to be taught.

The ultimate assessment of the quality of NJ's K-12 education is done by the colleges, universities, and businesses to which our children apply when they complete their education. Though these institutions should be determining what is taught in public schools, they have been historically excluded from the process of curriculum development by math educators.

As at the national level, NJ also confronts the conflict between how to teach and what to teach. According to a November, 2004 statement by Eric Milou, a mathematics educator at Rowan University, "People hate the way (math) was taught. It was boring. It was about skill and drill. We have to talk about how math should be taught."

Dr. Milou is correct—mathematics education should be concerned with "how math should be taught." Instead, NJ's math educators have dictated the composition of our core curriculum content standards, using many of the reform curricula that were criticized by the 200 professors in 1999. These standards yielded declining math performance among NJ's students, based on the outcomes decided by post-secondary school institutions.

The absence of scientists, engineers and practicing mathematicians is embarrassing, as is the apparent desire of NJ's math educators to control the process. Of the nearly 30 individuals listed as members of the current Task Force only three are neither math educators, consultants in math education or governmental employees.

NJ's math educators would have us believe that the input of practicing mathematicians, scientists and engineers is of no value. When those outside of the NJ math education community expressed concern regarding NJ's math core curriculum content standards, and asked to be involved in the process of developing them, the NJ math education community responded with disdain, rancor and outright ridicule.

In NJ, curriculum has been developed by people who know how to teach, but who lack an adequate grasp on what is to be taught. The university and business communities are the best judges of the outcomes of NJ's K-12 math education. They have spoken. Students are not learning what they need to learn. Driven by math educators, NJ continues to waste money on curriculum development that does not succeed in its stated goals.

I implore you to enact legislation requiring the significant and direct involvement of college, university and industrial research professionals in science, engineering and mathematics in the curriculum development process. NJ's math education community has had more than twenty years to "get it right." They have failed. It makes no sense to continue doing the same thing and letting the math educators develop standards in a vacuum. Albert Einstein once said, "The definition of insanity is doing the same thing over and over again and expecting a different result." NJ's students deserve better than insanity.

NEW JERSEY COALITION FOR WORLD CLASS MATH

www.njworldclassmath.webs.com

Testimony to the Joint Committee on the Public Schools, June 3rd 2009
Presented by Jill Gladstone

Good afternoon members of the Joint Committee on the Public Schools and thank you for the opportunity to provide testimony regarding New Jersey's Math Standards. My name is Jill Gladstone and I am a Board of Education member in the Bridgewater-Raritan Regional School District. I am not here today as a representative of my Board of Education, but as co-founder of the New Jersey Coalition for World Class Math.

My goal today is to provide a picture of the sequence of events that has transpired since October 2008 and has ultimately led to our meeting today.

The New Jersey Coalition for World Class Math seeks excellence in K to Grade 12 mathematics education for the students of New Jersey. The starting point is having world class curriculum standards which are used drive a district's choice of programs, textbooks, and the assessments used to measure student achievement. That can be a very good thing if the standards are excellent. But if they're not, kids may not be well-prepared to achieve success in college, or the workplace in a global economy.

Last November, after reviewing the Department of Education's initial math standards revisions, we recognized the need to mobilize statewide and form our Coalition. We were literally shocked to see a math standards revisions draft that had essentially...no revisions!

In December, we shared our concerns with the draft directly with DOE staff, the Deputy Commissioner of Education, and individual State Board Members. We then presented public testimony at the January Board of Education meeting.

We expressed that the December revisions draft:

- were poorly written, lacked clarity, were not well-organized, and do not match those of our high-performing international peers or high ranking "A" states' standards, such as Indiana, California, and Massachusetts.

- ignored major recommendations of the 2008 National Mathematics Advisory Panel's Final Report and the 2006 NCTM's Curricular Focal Points.

- were not written or reviewed by nearly enough research mathematicians as recommended by the National Mathematical Advisory Panel (NMAP).

- had too many topics covered.

- Still encouraged calculators use in early grades.

- Did not expect fluency in all standard algorithms; fluency in computation of fractions, decimals, negative numbers; quick/automatic recall of number facts.

To her credit, Commissioner Davy recognized the necessity to move away from standards draft that resembled the current failed ones. The Commissioner announced in her Report that they are re-conceptualizing the math standards revisions draft. She further stated that they are looking at "best practices" in other states and of the top performing nations like Singapore, the National Math Panel Report, and the NCTM's Curricular Focal Points. She said that they will bring the final proposal to the Board in April and then look for adoption in June.

In early February, a re-conceptualized draft was produced by the DOE and offered for public review. However a final proposal was never brought before the Board. Why didn't this happen?

I'll tell you why this didn't happen.

This improved document ignited debate between those who want to remain in the status quo and those who seek necessary changes to provide a world class mathematics education to New Jersey's children. Those lobbying for this status quo could not produce any evidence from any credible source to support what they want and yet refuse to look at the evidence in the National Math Panel's Final Report. The original writers, and those who support them, criticized the DOE in their effort to revise the standards towards world class.

In response to this criticism and debate, the DOE assembled the Math Task Force. In fact, the invitation sent by the DOE to its task force participants stated, "As you are aware, the latest draft of the 2009 math standards has prompted significant debate among math educators and others across the state."

Later today you will hear from Amy Flax who will provide details regarding this math task force and where we stand today.

Since December, we provided the DOE with a list of outside objective, research mathematicians and education researchers who are willing to be included in the writing and reviewing of standards revisions. Many of whom have experience in writing world class math standards and none who would be motivated by grant money or other financial interests in our state.

We also suggested that we model success. Let New Jersey simply use the standards of Massachusetts, which is currently in the process of incorporating the findings of the National Math Panel into their already highly-ranked standards. This would save the New Jersey taxpayers an enormous amount of money. To date, the DOE has refused to bring in outside research mathematicians or education researchers or to consider using the Massachusetts standards.

What else did our Coalition do in an effort reach world class standards in an inclusive and transparent process? We e-mailed 800 math professors and every district superintendent throughout New Jersey asking them to review the latest draft and send their feedback to the DOE. We also collected objective feedback from several mathematicians across the country, some of whom were National Mathematics Advisory Panelists.

The starting point for change is the revision of our state K – 12 standards and our state representatives writing legislation to ensure the process is effective.

We are asking for your help to ensure that the state's new math standards provide a world class blue print for all local districts to follow when implementing mathematics curricula.

- The revision and review process must include research mathematicians with proven experience writing successful, world class standards.

- The new math standards must be streamlined, easy to use, and written with clarity, focus. They must expect fluency in all standard algorithms; fluency in computation of fractions, decimals, negative numbers; quick/automatic recall of number facts. They must be organized by grade and include all high school courses.

- The new math standards must follow the recommendations of the March 2008 National Mathematics Advisory Panel's Final Report http://njworldclassmath.webs.com/NMAPFinal%20Report.pdf and the

NCTM's Curricular Focal Points
http://www.nctm.org/standards/focalpoints.aspx?id=260 .

- The new math standards must align with those of states that are recognized as being significantly higher than ours and be based on international benchmarks of the global leaders of countries that outperform the U.S. on international tests.

- They must have fewer topics covered with mastery of topic required for great depth of learning.

- They must limit calculator use in early grades and have no calculators used in state tests in early grades.

Earlier today, we heard about the state-led initiative to write national standards. Our State board will eventually vote to adopt them or not. Remember, we have no idea what the final draft of the national math standards will look like. We have no idea if they would meet a high enough bar expected by New Jersey citizens. Will they still put calculators in the hands of 2nd graders? Will they not expect mastery of traditional algorithms? Will they reflect the findings of the National Math Panel? Will there still be too many topics without enough depth?

We are asking our elected representatives to ensure that there are effective policies and procedures in place in order for New Jersey's children to be mathematically prepared by world class standards.

Thank you again for your time today.