

The Experts

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What is the most significant thing to have occurred in Great Bay over the last 25 years?

CS: It's not possible to pick out just one thing. Several things come to mind. First is the amazing success in land conservation that occurred around the Great Bay throughout the 1990s and 2000s, (and which continues today) led by organizations like the Great Bay Resource Protection Partnership, Southeast Land Trust, Strafford Rivers Conservancy, BearPaw, etc. The numbers are impressive: over 50,000 acres of land conserved in the watershed overall, over 6000 acres and 25 miles of shoreline protected specific to the Great Bay itself. Equally impressive was the approach: science-based determination of land protection priorities based on resource conservation needs and nimble responses to Federal funding opportunities, especially NAWCA. A second was the establishment of PREP (then NHEP) in the late 1990s as part of the National Estuaries Program and the establishment of a management plan for monitoring, maintaining and hopefully improving the health of the Great Bay. A third was its designation of the Great Bay as a National Estuarine Research Reserve and subsequent establishment of the Discovery Center – the focal point of the public interaction and education about the Bay.

DG: I truly believe that the development and maturation of the Great Bay National Estuarine Research Reserve has been the most significant thing to have occurred in the Bay during that period. From the preservation and stewardship of more than 3,700 acres around the Bay, to the tens of thousands of school children and adults that have participated in estuarine education programs at the Discovery Center, to science and water quality monitoring that have informed management and policy in the area, to the Coastal Resource Training Program that has educated and informed local community leaders about ways to address the impacts from climate change in their community, to the Great Bay Stewards that have worked tirelessly for the past 20 years to support the GBNERR and its programs. The impact GBNERR has had on Great Bay and the surrounding communities has been truly remarkable.

RL: I'm going to take the liberty to make this a two part answer. The massive die-off of oysters in 1994 caused by the oyster disease MSX is in my opinion the most significant ecological event that has occurred. Oyster populations are at 5-10% of their 1993 levels and I don't expect they will recover on their own anytime soon. The second part of my answer is not a single event, but awareness and appreciation of the Bay by the public and our knowledge of the Bay ecosystem have increased dramatically over the past 25 years. I attribute this largely to the Great Bay NERR and later the Piscataqua Region Estuaries Partnership.

SM: I believe that the establishment of the Great Bay Reserve and its Great Bay Discovery Center, and sharing its excellent programs over the years with students, teachers, and the general public is very significant in the struggle to gain knowledge and appreciation of the Great Bay Estuary.

How has public perception toward Great Bay changed over the last 25 years?

CS: The recognition of the Great Bay for the significant cultural and natural treasure that it is has grown tremendously and has been solidified in the public's mind over these years. A number of things have contributed to this including the education programs of the Great Bay Reserve, the Gundalow Project, the establishment of the Refuge, and the media coverage around water quality problems and treatment costs.

DG: In the 40 years that I have lived in coastal NH, there have always been members of the public that have been interested in protecting the Bay and enjoying or wisely using its many natural resources. What I have observed is a significant increase in the number of people in the community that understand the importance of a healthy Great Bay to them and the communities in which they live.

RL: As I stated in my response to question 1, there is a greater awareness of Great Bay as a resource to be both enjoyed and protected. Great Bay has been featured in local media over the past few years, which is a good thing, though I am concerned that there has often been a lot of misinformation put out there, so public perception may not be supported by the science.

SM: In the early 70's some of us became very concerned about an Olympic Refineries' proposal to build the largest oil refinery in the world on the shores of Great Bay. That proposal coupled with a tanker unloading facility at the Isles of Shoals and a pipeline which would bring crude oil to the refinery spurred people to action. Until this very real threat, many of us were content to acknowledge the presence of the Bay practically on our doorstep, but little was known about it and the rest of the estuary. Indeed, we hardly knew what an estuary was and certainly, we did not know much about its continuing significance to the region. When I learned that there would be an oil refinery just down the road from

my newly purchased house, my family and many others received a quick education about this largely unknown resource and joined with other people to “save the Bay,” our tiny coast, and a way of life that we were just becoming acquainted with. I believe that this struggle was instrumental in bringing support.

What are some trends that you are excited about, and some things that concern you?

CS: The growth and effectiveness of the Great Bay Stewards is exciting to see. There is growing regional pride in the Great Bay. There is a lot of innovative thinking going on around the region on understanding and managing water quality. Less positive is the designation of the Great Bay as an impaired waterbody under the Clean Water Act. This caught some of us by surprise, thinking that water quality in the Great Bay was at least stable if not slowly improving. Offsetting this is some of the exciting work going on though Jackson Labs on oyster restoration.

DG: I am excited about the efforts to reduce nitrogen loading into the Great Bay Estuary both at the community level with towns working on upgrades to sewage treatment plants and at the individual level with people installing rain gardens around their homes. All these efforts should have a positive impact on the various marine resources in Great Bay.

The thing that concerns me the most is what impact climate change will have on Great Bay. Warming ocean temperatures have already impacted some species in the Gulf of Maine like northern shrimp. It also may be reducing the abundance of rainbow smelt in Great Bay since we are near the southern limit of its historical range. How will sea level rise impact the expanses of salt marsh around Great Bay? What will the impact of increases in extreme weather events have on Great Bay’s marine resources. Following 100 year flood events in both 2006 and 2007, I personally observed via Scuba diving surveys numerous dead lobsters and a large bed of dead razor clams when salinities throughout the estuary dropped to zero for several days. For two years after these flood events, lobster harvesters reported very low catches of lobsters from Portsmouth Harbor to Great Bay.

RL: First the good trends. Towns and cities have become much more cognizant of the need to control stormwater runoff and many are adopting Low Impact Development (LID) practices for their treatment options. They also seem to be taking climate change seriously and a number of towns are developing adaptation plans. I also think the increase in oyster aquaculture is a good thing. Considering the high cost of oyster restoration and the unlikelihood of natural recovery, aquaculture is our best option for restoring the critical ecosystem services that oysters provide. Though the pace has slowed a bit in recent years, land protection has also been a very positive trend.

On the negative side, population growth, development and the rate of increase of impervious surface area continue to rise, which means more stormwater runoff and water quality impacts. I’m also concerned about the single-issue focus on nitrogen and the high

cost of wastewater treatment mandates that cities and towns are facing, which may or may not have much positive impact. We would be better off taking a more holistic approach to recovery and protection of the bay that includes rigorous cost-benefit analyses. I think we would have much greater buy-in from stakeholders than we do on the current course.

SM: I am excited about the addition of the study of the estuary by school children and their teachers. A field trip to the Great Bay Discovery Center is a regular part of the curriculum in most of the area schools. Hands-on educational activities at the Center and in the Reserve provide experiences that help to make appreciation and concern for the estuary an ongoing part of many children's and teachers' lives. Public programs ranging from fund-raisers like the annual race events, to a walk along the boardwalk that is being replaced by funding from the Great Bay Stewards, put a growing consciousness of the need for stewardship and economic support. The emergence of the Stewards as a significant part of those efforts are important indicators of a growing public's desire to protect what many of us worked so hard to save.

I am concerned about the growing distrust and discounting of science-based decision-making throughout the nation. We have had an example of that in the reaction of some towns in the area against the recent efforts by EPA to curtail pollution of the estuary. The economics of small towns needing to bear the expense of improving their wastewater treatment plants, which account for a significant part of pollution of the estuary, accounts for this scapegoating of the science which tells us that there are many indicators of increasing pollution of the Bay. Still attention to the ensuing controversy has made people aware that the main source of pollution is non-point --- run-off, septic systems some of which are failing, storm-water input into rivers, streams and the bay --- is increasing. But public awareness of the problems and their solutions (some of which lie within the individual's purview to alleviate) seems to lag somewhat in the face of denial of scientific evidence.

Another key issue, one that relates to the problem of non-point pollution, is the spreading of impervious surface area in the region Everything from rooftops and asphalted driveways and parking lots to erecting buildings near rivers and streams and bays contributes to the increasing lack of infiltration of water to resupply the groundwater that is threatened by human activity.

What is the greatest future threat to Great Bay?

CS: On the surface, the greatest threat is declining water quality. But beneath that is the cause: incremental growth of impervious surface and other dispersed sources of pollution in the watershed. These have become the dominant and hardest to manage sources of pollution. Challenges over managing water quality and allocating responsibility, and cost has caused tension between and among communities, conservation organizations and regulatory agencies that should be (and usually are) allies, not adversaries. Given the history of commitment to the Great Bay, and past successes, I'm confident we will find the

right path through.

DG: Along as there continues to be population growth in the NH seacoast, I believe the greatest future threat to Great Bay will be anthropogenic impacts. The good news is that over the past 25 years we have learned and implemented many ways to help reduce the impact of population growth on Great Bay. These include slowing the rate of development around water ways through public land purchases and conservation easements, best management practices to reduce siltation from construction projects, the development and use of porous pavement, reducing nitrogen in the Bay with rain gardens and oyster beds restoration to name but a few.

RL: I think the greatest threat to Great Bay is the combined effects of development in the watershed and climate change. We have seen an increase in the frequency and severity of storms and climate predictions indicate that this trend will continue. If we keep adding more impervious surface we will see more water quality impacts.

SM: While I have mentioned a growing education effort to increase stewardship of the estuary, I wonder if it is fast enough and enough in depth to move us to more significant action toward a sustainable future for Great Bay. What can we do to stimulate more action by adults to move more quickly on science-based actions? Do we need a wider range of educational programs that provide opportunities for adults to become involved in stewardship activities? Do we need more federal and state support to help provide funding and infrastructure for more emphasis on sustainability?

The answers to these and other more searching questions must be arrived at collectively, involving people at all levels of individual and governmental actions. Continued guidance and support from the Great Bay Reserve is an essential part of a program of sustainability for the Bay and Its estuary.