
Buffer Options *for the* Bay

EXECUTIVE SUMMARY

Overview

The Buffer Options for the Bay (BOB) project set out to address an ambitious goal, namely to leverage the capacity of buffers to protect water quality, guard against storm surge and sea level rise, and sustain fish and wildlife in New Hampshire's Great Bay Estuary region. As a part of this process, we sought to identify a menu of potential options, both regulatory and non-regulatory, that stakeholders can use to effectively protect and restore buffer zones. The project's intent was to synthesize the best available information regarding buffers in the Great Bay Estuary (GBE) watershed, not to provide specific recommendations for action. However, we hope the synthesis of our collective work offers a strong foundation for those looking to develop tactics aimed at effectively managing buffers and the services they provide in coastal New Hampshire.

As with many environmental issues, the challenges associated with buffer management stem from the complex interplay of natural systems, community perspectives and values, economics, and the regulatory environment. This complexity speaks to the need for a multi-disciplinary approach. To this end we assembled a diverse team of experts encompassing resource managers, social scientists, ecologists, hydrologists, and economists. This team produced a range of detailed and stand-alone products including a synthesis of buffer-related peer-reviewed literature in the fields of ecology and economics; an assessment of community attitudes and values towards buffers; an analysis of municipal and state policies relating to buffers; an economic valuation of water quality in the Great Bay ecosystem based on a meta-analysis approach, and maps identifying priorities for buffer protection and restoration within the watershed. The team also compiled a detailed list of potential actions that can be taken to advance the effectiveness of buffer management in the watershed. The nearly 50 items identified in this Action Plan encompass recommendations for community outreach and education, conservation, economic assessment, enforcement, mapping, policy, and further research. Some of these actions were met through the BOB project, however, many were beyond the scope of the project and remain possible future targets for collective action.

This summary harnesses the power of these products by identifying places where recurring and complementary themes span disciplines to build an integrated picture of the challenges and opportunities of buffer management in the GBE watershed. It is intended for practitioners familiar with the topic of buffers. Our goal is to capture the high-level findings and key take home points from the BOB project. This summary is not designed to provide a detailed synthesis of all the information covered by BOB, nor does it reiterate the full evidence base from which our conclusions are drawn. As such, we strongly encourage the reader to visit www.bufferoptionsnh.org and evaluate each of the BOB reports and maps individually.

Summary

The BOB project was driven by downward trends in key indicators of environmental health regularly measured in the GBE. These trends indicate an overall decline in the health of the GBE watershed as land conversion and human population growth have led to reduced habitat for wildlife and increased inputs of pollution, particularly non-point nutrients. Loss of natural habitat, particularly buffers, has also reduced the extent to which natural processes can help alleviate pollutant inputs before they impact freshwater and estuarine systems. While the extent to which the declining health of the GBE has directly impacted ecosystem services is not yet fully understood, evidence from other systems clearly shows that increased non-point pollutants leads to reduced water quality and affects related services such as provision of clean water for drinking and recreation. Importantly, we know that people in the GBE watershed, and in New Hampshire as a whole, value the provision of these services and are willing to invest resources to maintain and improve them: Previous statewide surveys have ranked water quality as the top environmental concern in New Hampshire, and the willingness to pay (WTP) meta-analyses undertaken for the BOB project reinforced and refined the likely value placed on this resource in the GBE watershed. Our synthesis of published ecological science relevant to the GBE watershed provides compelling evidence that buffers are an effective means of maintaining these valued services including water quality, wildlife habitat, and flood risk reduction. This science also provides specific recommendations for the widths and vegetative composition of buffers needed to maintain ecosystem services at a specified level.

Given this evidence base, i.e. the declining environmental health of the GBE linked to subsequent declines in ecosystem services that residents widely agree they care about, coupled with an effective tool (buffers) for addressing the challenge, this begs the question as to why there is not a greater focus on buffer conservation and/or restoration in the coastal watershed.

The answer to this question is found in the socio-economic analyses undertaken for the BOB project, which clearly demonstrate a suite of competing values and disincentives relating to buffer management. These analyses emphasize the importance of understanding the distribution of costs and benefits associated with maintaining buffers. A principle challenge is that the cost is primarily felt by the limited number of private landowners who own the buffered land; these landowners incur the potential costs associated with limitation of development potential or restriction in management for aesthetic appeal. Conversely, the benefits provided by buffers serve the populous at-large, including higher property values associated with better water quality, albeit with a decrease in this benefit for those living further from the resource. A similar decoupling of costs and benefits can occur when looking across communities. This is particularly true where a more tightly regulated community upstream provides water quality benefits to a downstream community with less regulation. This sense of “injustice” was also reflected in responses solicited from community members. The BOB economic analysis demonstrates that where these imbalances in costs and benefits occur, those with buffers may not be motivated to maintain them unless compelled by regulations or provided with an incentive, such as a conservation easement, that compensates for lost value.

The BOB community assessment, which was conducted in four towns in the Exeter-Squamscott watershed, brought to light the issue of competing values at the community scale. A common perspective shared by those interviewed for the BOB project was that there are inherent trade-offs between economic growth and buffer conservation, i.e. that one burgeons at the cost of the other. The theme of inherent trade-offs was also reflected in what were seen as competing

community values, such as the provision of places for outdoor recreation and conservation of rural community character versus the maintenance of private property rights and augmentation of the tax base through development. As the preferred balance of these values varied among respondents, towns have the difficult task of integrating competing values in any local rules and regulations. They are not alone: A survey that tested the prevalence of findings from this assessment in the wider watershed found that 94.5 percent of respondents agreed that buffer-related decisions are inherently complex, requiring municipalities to balance many factors including property rights, community character, natural resource protection, abutters' concerns and economic growth.

These often-competing values and disincentives relating to buffer management are critical factors in driving existing regulation of buffers in the GBE watershed and the state. Compared to many other northeastern states, New Hampshire has a decentralized approach to wetland buffer regulation. Federal- and state-level regulations are combined under the oversight of the New Hampshire Department of Environmental Services. These regulations restrict certain land use activities within shorelands and wetland areas. However, extension of these regulations to encompass buffer areas is limited to water bodies defined under the Shoreland Water Quality Protection Act, water bodies designated as Prime Wetlands, and Tidal Buffer zones. If a stream or river is not designated or is less than fourth order, buffer protection is not mandated by the state. As such, state regulations represent the minimum protection that communities can rely on to preserve natural resources and the ecosystem services they support. This relatively limited scope of state regulations cedes control to municipalities, which can choose to enact more restrictive buffer regulations. Some have taken the initiative to provide additional protection, however, many have not.

The existing buffer regulations in New Hampshire therefore represent a compromise between a suite of competing values. As with any compromise, there are trade-offs, and it is unreasonable to expect any or all of the competing values to be met to their fullest desired extent. However, this does not mean that current approaches (both regulatory and non-regulatory) for protecting buffers in the GBE watershed are optimal; evidence from the BOB project suggests otherwise. From a resource protection perspective, the lack of state- or local community-regulated buffers for many streams and wetlands in the GBE watershed contributes to poor water quality and potentially a loss of other valuable ecosystem services. Where buffers are regulated, their width and/or regulated vegetative composition may not meet recommended standards for reducing nutrient loading or supporting wildlife habitat. From a community standpoint, ceding control to the individual towns has led to a confusing mosaic of differing regulations, challenges for communities that do not have the resources to develop or enforce local buffer regulations, and uncertainty regarding how such ordinances intersect with state and federal rules. From an economic perspective, mechanisms for addressing the issue of unequal distribution of buffer maintenance costs and benefits are not typically in place. Furthermore, navigating differences among local ordinances can pose a costly challenge both to private landowners and local developers.

Identifying options for addressing these concerns necessitates revisiting the lessons learned from each aspect of the BOB project, as well as looking beyond New Hampshire's borders. A logical first step, given evidence of inadequate buffering for water quality, is to look at recommendations from the scientific literature for appropriate buffer widths and the situations for which buffers are most important to maintain water quality. Given the wide range of factors that can vary spatially and temporally in natural and built environments, it is not too surprising that

published science provides some nuance regarding the efficacy of any buffer. For example, different buffer widths may be needed to provide specific services at a given target level, and the extent to which a buffer can help promote a water quality target will be influenced by the amount of pollution (“loading”) entering the system and site characteristics such as soil type and slope. There are several approaches to assigning buffer widths based on available science. Perhaps the simplest approach is to implement a single buffer width that should maintain the majority of ecosystem services under most circumstances. For this purpose, scientists tend to agree that a 100-foot wide buffer is a good target. Or, different buffer widths can be assigned to specific groups of identified resource values. An example of this type of approach is provided by the BOB project’s prioritization maps, where we utilized 160-foot buffers for first- and second- order streams and their associated wetlands, 650-foot buffers for third-order and higher streams and their associated wetlands, and a 6-foot vertical buffer along with a 650-foot horizontal buffer for tidal areas. The most complex option involves assigning a buffer width based on fine-scale input factors such as slope, topography, pollutant loading, and soil type, allowing the buffer width to be tailored to site-specific circumstances.

Taking these scientifically-based buffer recommendations as a starting point, we can then consider how they intersect with our available socio-economic knowledge and how this informs regulatory and non-regulatory options to more effectively protect and restore buffer zones. From a regulatory standpoint, a solid case can be made for stronger statewide buffer regulations that encompass a wider range of riparian habitats in the GBE watershed and reduce the onus placed on local communities to develop and enforce their own suite of buffer regulations if they want to see these resources more fully protected. This case is built upon the scientific evidence of the inadequacy of current protection, evidence from the BOB policy analysis that the costs of local-level regulation outweigh the benefits, and support for statewide regulation expressed through our community assessment. However, any increase in statewide regulation will face barriers and come at costs. Strong state regulation is often seen as antithetical to the character of New Hampshire, thus there may be opposition to a proposed bill. Similarly, increased buffer regulation will almost certainly decrease the availability of land for development and agriculture, so these interest groups may also stand in opposition. For municipalities that have been progressive with buffer protection, there may be concerns that a statewide buffer policy would weaken their regulations.

Although it seems unlikely that increased state-regulated buffer policies can be enacted without shifting the balance towards resource protection and (at least in perception) away from maintenance of private property rights and less restrictive development opportunities, looking beyond New Hampshire’s borders may provide models that fit with the character of the state and its regulatory environment. Of particular interest is the path that Rhode Island has recently followed in revising its buffer regulation. Rhode Island is a state that shares at least some key characteristics with New Hampshire: Polling conducted as a component of evaluation of Rhode Island’s wetland rules showed that residents strongly value the protection of local communities’ interests and ecosystems. However, respondents felt that the state’s existing wetland regulation were in need of improvement to address challenges similar to those in New Hampshire, including inadequate protection of at-risk natural resources and lack of consistency among municipal regulations. In 2017, after a thorough analysis by a legislative task force, the decision was made to overhaul Rhode Island’s decentralized wetland policies, placing the sole authority to regulate wetlands and buffers with state agencies. Municipalities are, however, still able to petition state agencies involved in buffer protection to increase protection of a certain resource above what is protected by the state. Currently, Rhode Island is considering an innovative tiered approach to buffer and setback regulations that considers various environmental attributes and divides the

landscape into different regions. These classifications may be used to determine the buffer width enforced in a given area; this corresponds to the second approach to buffer width delineation described above.

While the regulatory path Rhode Island has followed may provide a framework worth considering in New Hampshire, if the only change made to managing buffers in the GBE watershed is increased state regulation, the issue of inadequate distribution of costs and benefits will not be addressed. There are a range of non-regulatory approaches that can help to more fully compensate private landowners for the economic cost of conserving and potentially restoring buffers. Conservation easements are an existing vehicle for compensating landowners for the cost of lost development potential. In New Hampshire, easements that include vegetated buffers are developed by both state agencies and non-governmental groups with public funding from sources such as the Natural Resources Conservation Service, the New Hampshire Land and Community Heritage Investment Program, and the Aquatic Resource Mitigation Fund administered by New Hampshire Department of Environmental Services. However, there is no statewide program in New Hampshire that specifically targets establishing easements for the purpose of maintaining buffers. A model for these targeted easements can be found in Vermont, which has established the incentives-based River Corridor Easement Program to purchase development and management rights from landowners for the portion of their property that falls within the meander belt of sensitive and erosive streams.

Easements offer an effective approach for protecting buffers in perpetuity, but establishing and monitoring easements is a costly endeavor and it seems unlikely that this vehicle can be used to protect enough buffers to be able to fully meet the needs of water quality protection and other key ecosystem services. There are other non-regulatory approaches that can be used to compensate landowners for lost value including offering tax credits or deductions. For example, King County in Washington State uses a point system to determine tax reductions based on maintenance of open space on private property. It is also possible to pair increased regulation of one natural resource with greater flexibility in managing another as a potential tool for achieving the desired outcomes of maintaining certain ecosystem services. For example, Maine has an approach for retaining larger buffers around vernal pools in exchange for allowing conversion of “less valuable” wetland resources.

In closing, a key deliverable from BOB was a menu of potential regulatory and non-regulatory options that could be used to effectively promote buffer protection and restoration in the GBE watershed. Due to the multifaceted approach taken by the project, we were able to provide wide-ranging guidance for this menu, spanning topics from ways to effectively frame and message buffer information with New Hampshire audiences, to ways to implement specific non-regulatory options for buffer management after taking into account lessons learned relevant to the character of New Hampshire from other states. Capturing the full breadth and critical nuance of this guidance is beyond the scope of this summary, but further information can be found at www.bufferoptionsnh.org. We hope this information assists in guiding those looking to increase the use of buffers as a tool for addressing issues related to water quality, wildlife habitat, and other critical ecosystem services in the GBE watershed.