04 Resilient Plant and Animal Communities

Target Statement

By 2050, ecologically-significant natural plant and animal communities are more resilient to a variety of stressors, including climate change and invasion by non-native species. Such natural communities support ecosystem function and provide significant benefits to people. By 2030, existing occurrences and known pathways for harmful species invasions are mapped, prioritized, treated and monitored for success while critical habitats whose loss could perpetuate cascading effects are identified and prioritized for protection and restoration.

Summary

The biological communities of the Hudson River estuary—the assemblages of organisms that co-occur in space and time—include a diverse array of species ranging from microscopic to enormous, plant to animal, terrestrial to aquatic, freshwater to saltwater, obscure to iconic, and everywhere in between. Different communities can be distinguished in different major habitats of the river, such as in freshwater and brackish-water main channels, vegetated shallows, wetlands, tributary mouths, sandflats, mudflats and so forth. Although demarcation lines between habitats are useful, the movement of water, materials and organisms between these habitats blurs any sharp boundaries that we might draw between or among them. This collection of communities drive ecosystem function in the estuary, and are central to almost every way in which humans interact with the river—indeed, to a large extent they determine the value of the river to people. They influence nutrient cycles and energy flow, play a role in improving water quality, provide aesthetic, recreational and food benefits, and have intrinsic value that is closely tied to the scenic and cultural heritage of the Hudson Valley.

The biological communities of the estuary have varied appreciably over the past several decades, with large changes in the abundance and even the presence of some species. For instance, zebra mussels have fundamentally reshaped the estuary since they first appeared in 1991; Atlantic sturgeon populations have slowly begun to recover following substantial decreases, a fishing moratorium, and listing as a federally endangered species; and non-native genotypes of common reed have slowly been replacing native cattail and other high marsh species in the estuaries' wetlands. We know the most about the status and trends of species that are most directly important or interesting to people. For these high-profile species, data is often fragmented, with very little information before ~1980, and inadequate data on many groups remain a management challenge. For more obscure species, data is scarce or absent.

The overall picture is dynamic—with some species increasing and others decreasing, some by an order of magnitude or more—because of natural and anthropogenic forces. The most important stressors from an ecological perspective are probably those that limit or challenge the resilience and adaptability of natural communities, like habitat loss, fragmentation and degradation; toxic contaminants; shoreline hardening; high rates of biological invasions; and rapid climate change and sea level rise. Several additional stressors have significant effects on the ways that people interact with the biological communities of the estuary or with species. These include overharvest, pollution and the establishment of some non-native species.

There are several ways to ensure resilient plant and animal communities persist in the estuary. First, minimize the risk of future non-native species establishment through strengthening and enforcement of existing policy, infrastructure implementation and decision-making to align social and ecological interests. Second, invest in the development, feasibility and desirability of prudent controls (e.g., biological barriers), with limited side effects, to manage arriving or already present species. Third, protect and restore existing habitats, pathways to future habitats, and the anticipated locations of future habitats for common, rare and important species. Fourth, design and secure long-term funding to complete basic research around connectivity and modes of migration and monitor the status of species and status of habitats to inform adaptive management of these resources going forward. Fifth, enhance education of the public to improve their interactions with existing biological communities of interest and increase awareness of the values and services these communities provide; the general public is also an asset to the protection of existing resources as well as the detection of new invaders which can only improve with additional training.