

An Ecological Paradox



Snake Hill, a geologic landmark in the Meadowlands

Photographs USFWS / Gene Nieminen

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The Hackensack Meadowlands District is a 32-square mile area covering portions of 14 municipalities in northeastern New Jersey. Of the 21,000 acres which comprise the District, approximately 17,000 were originally wetlands and waters, and comprised a diverse array of wetland cover types, including tidal marsh, hardwood forest, and Atlantic white-cedar swamp. From the beginning of European colonization up until the present, the District's wetlands have been logged, diked, drained, farmed, filled, and contaminated, with the result that half of the wetlands and waters have been lost to fill and/or degradation. Today, the District's landscape is surrounded by urban development, and its once diverse plant communities have been succeeded by what is essentially a monoculture of invasive *Phragmites australis*, better known as common reed.

In spite of a history of abusive land-use practices, however, there has been a remarkable renaissance of fish and wildlife use in the District. The passage of the Clean Water Act in 1972 along with aggressive local enforcement by the New Jersey Meadowlands Commission resulted in dramatic increases in water quality, air quality, and surface land quality in the last 30 years. The result: the number of species of both migratory and resident birds which use the Meadowlands has more than tripled during this time, and the numbers of fish and invertebrate species have shown similar increases. Crackdowns on illegal dumping, as well as ongoing clean closure of some of the District's landfills, are reducing the volume of leachate which enters the Hackensack River and adjacent wetlands. In addition, the Meadowlands Environmental Research Institute (MERI) has intensively begun to study the myriad environmental problems which still face this urban wetlands ecosystem.

What is it that makes the Meadowlands so significant? First, despite loss of about half of its original wetland and open water areas, the Meadowlands is still a large system, comprising about 8,500 acres of wetlands and open water. Second, it is located within the Atlantic flyway, a significant coastal pathway for migratory birds, for which the Meadowlands represents a significant resource. Finally, because it is surrounded by intense urban development, the Meadowlands is an important island of wetlands in a landscape that has lost most of its coastal wetlands. The only other large estuarine wetland in the New York metropolitan area is the Jamaica Bay National Wildlife Refuge; consequently, the Meadowlands becomes especially important for its ability to provide food and resting habitat for hundreds of migratory bird species, as well as breeding habitat for more than 60 resident bird species. Additionally, a variety of estuarine fish species such as blueback herring depend on the Meadowlands for nursery habitat as juvenile fish make their way to coastal waters.

Apart from the obvious human pressures on this ecosystem, however, there are serious ecological problems facing the Meadowlands. Aerial photographs from over a period of 30 years show that some marshes which were not filled or altered have lost half of their open water. The cause of this loss appears to be from sediment accretion and overgrowth resulting from colonization by invasive forms of *Phragmites australis*. This variant of *P. australis* is probably a recently identified non-native genotype, dubbed haplotype M, which seems to be responsible for the aggressive colonization of northeastern marshes and concomitant displacement of other plant and animal species from those systems. This variant is highly aggressive, forming dense root

mats and clonal populations of stems which remain standing for several years after dying. Ecosystem fragmentation promotes the spread of *Phragmites*; the plant reproduces through rhizomes and seed germination and is able to tolerate fairly high levels of salinity (in the range of 15 ppt). While type M *Phragmites* can provide benefits to the urban environment, such as sediment stabilization and toxicant immobilization, it changes marsh dynamics dramatically. Over time this monoculture is much less likely to support larval fishes and causes loss of open water/marsh complexes, rendering less habitat available to wading birds, waterfowl, shorebirds and other species. Consequently, the choice of what to do to save the Meadowlands' remaining marshes will need to balance a variety of considerations.

The Meadowlands is likely to experience considerable change over the upcoming decades as hazardous waste sites are remediated, brownfields are redeveloped, and the estuary's watershed responds to development pressures. As resilient as the Meadowlands has shown itself to be, it is now in an urban landscape setting which places enormous stress on the ecosystem. One thing seems certain: if the Meadowlands is not managed, it is likely to experience an overall decline in wetland quality and estuarine life support. Ongoing research, such as the studies being performed by MERI, can help fill the information gap that currently exists on urban ecosystems, and hopefully, allow for better informed decisions.

