Dear Reader:

Attached is a copy of the report of the research project entitled, " Creating Indicators of Wetland Status (Quantity and Quality): Freshwater Wetland Mitigation in New Jersey." The primary objectives of this study were to assess New Jersey's progress toward wetlands mitigation goals and develop indicators of progress toward these goals. The research was conducted by Amy S. Greene Environmental Consultants, Inc. (ASGECI), and co-managed by scientists from both the New Jersey Department of Environmental Protection's (NJDEP) Division of Science, Research and Technology (DSRT) and NJDEP's wetlands regulatory program (Land Use Regulation Program or LURP). This study was supported by NJDEP's Water Assessment and Environmental Indicators Research Programs. Relevant NJDEP managers were kept apprised of interim results and a peer review committee of leading state and national wetland scientists provided guidance throughout the duration of the study.

Background

Approximately 15% of New Jersey's land is freshwater wetlands, while 4% is tidal wetlands. Wetlands are critical natural resources because they perform a suite of important functions including: improvement of water quality through nutrient cycling; flood attenuation; groundwater recharge; prevention of shoreline erosion; critical habitat for a great diversity of plant and animal species; as well as providing aesthetic and recreational opportunities. It has been estimated that New Jersey lost 39% of its wetlands between the 1870s and 1970s and perhaps 20% between the 1950s and 1970s. The importance of tidal and freshwater wetlands was recognized when the New Jersey Legislature enacted the New Jersey Wetlands Act of 1970 and the New Jersey Freshwater Wetlands Protection Act of 1987 (considered to be one of the most stringent wetland laws in the United States). These state statutes provide additional protection beyond federal law by regulating more than dredge and fill activities, as well as providing protection in buffer areas for freshwater wetlands.

Yet, as the most densely populated state in the country, experiencing a population increase of approximately 1% annually over the last 10 years, New Jersey's wetland resources are subject to increasing stress. Recent data for New Jersey show a loss of approximately 1,755 acres of wetlands per year between 1986 and 1995, a period of time before the Freshwater Wetlands Protection Act had become fully operative. Even after that period, the implementation of the Act has still allowed for the disturbance of approximately 150 acres of freshwater wetlands per year. Recognizing their importance, as well as these challenging trends, NJDEP has established a strategic planning goal for wetlands: *"improve quality and function and achieve a net increase by 2005. Explore innovative techniques for creation, enhancement and maintenance of New Jersey wetlands*."

Techniques to mitigate the loss of wetlands from permitted activities include wetland creation, enhancement, restoration, preservation and banking. The attached report describes research that was specifically developed to measure progress toward the wetlands strategic planning goal with respect to mitigating wetland losses at freshwater sites. Freshwater sites were chosen as the study focus because these are the wetlands types with the most acreage in New Jersey, yet least studied in terms of mitigation. The research provides a standardized protocol to measure the quantity of wetlands constructed, compliance with approved plans and a means to evaluate the potential of the constructed wetland to evolve to a mature, functional system. In addition, a revised data management system was developed which enhanced NJDEP's mitigation database with a Geographic Information System.

Results, Recommendations and On-going NJDEP Adaptive Management Measures

The results of the ninety-site study indicate that on average, for each acre of wetland impact that required mitigation, 0.78 acres of wetlands were actually constructed. On average, 48% of the study sites concurred with their design specifications; some sites achieved no wetlands while others achieved in excess of 100% proposed. Field indicators of relative wetland quality found an average score of 0.51 out of an index of 1, demonstrating that about one-half of the criteria were met to indicate sites have the potential to function as natural wetlands system over time.

The study also provided LURP with recommendations that could be implemented to strengthen the existing wetland mitigation program. In addition, while inspecting the sites, ASGECI staff took field notes, which included

broad recommendations to improve success of each site. Hence, these results have not only helped to develop adaptive management measures within NJDEP, but also to reinforce the utility of recently revised wetland mitigation regulations (that had been under development concurrent with this study). These new regulations codify requirements for very detailed performance-based mitigation plans.

The investigators did identify created freshwater wetland projects that met the goals for acreage and/or demonstrated relatively high field indicators of quality. Prior to undertaking this study, LURP recognized problems within their mitigation program and began implementation of many of the recommendations echoed in this report. Some of the changes currently being implemented include:

- Assignment of experienced staff to work exclusively on mitigation related issues for recent proposed mitigation projects
- Development of checklists for mitigation proposals and monitoring reports
- Requirement of a water budget for all constructed mitigation projects
- Requirement of on-site meetings with construction contractors prior to implementation of the project
- Requirement of a post grading, on-site meeting to evaluate compliance with construction plans
- Aggregation of small mitigation projects to a single large site
- Directing small mitigation projects to available mitigation banks
- Requirement for invasive and nuisance species vegetative control and herbivore management plans
- Requirements for letter of credit or other form of financial surety.

DSRT is continuing its collaboration with LURP scientists, as well as other wetland scientists, throughout New Jersey via other wetland research studies (some of which build specifically upon this study). We would like to thank our colleagues in NJDEP's Land Use Regulation Program, Amy S. Greene Environmental Consultants, NJDEP staff participants in the National Environmental Performance Partnership System (NEPPS) Land and Natural Resources Workgroup, and members of our Peer Review Committee for their assistance with this research. For additional copies or technical information regarding this study, please contact the New Jersey Department of Environmental Protection, Division of Science, Research, and Technology at (609) 984-6071, or visit our website at www.state.nj.us/dep/dsr.

Sincerely,

Martin Rosen, Director
Division of Science, Research and Technology