

Outer Coastal Plain/Pinelands Research Symposium Monograph

**Richard Stockton College of New Jersey
New Jersey Department of Environmental Protection
Pinelands Commission
Sponsors**

**The New Jersey Ecological Research Partnership
Co-Sponsors**

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The New Jersey Ecological Research Partnership

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Membership is open to organizations and individuals interested in environmental research and data for New Jersey and related ecosystems.

Introduction

On May 20, 1995 scientists, data gatherers, decisionmakers, and other interested parties came together at Richard Stockton College of New Jersey for a symposium to discuss research and data related to the Outer Coastal Plain/Pinelands Ecosystem. The meeting was co-sponsored by the Richard Stockton College of New Jersey, The New Jersey Department of Environmental Protection (NJDEP), and the Pinelands Commission, under the auspices of the New Jersey Ecological Research Partnership. This meeting was a pilot for a series of meetings on New Jersey ecosystems and environmental issues specific to New Jersey centering on research, data gathering, information exchange, and collaborations. In addition to these goals, the partnership hopes to establish a geospatially-referenced electronic directory of environmental information for New Jersey.

Thoughtful opening remarks were given by Dr. Barbara Byrne, Dean, Natural Sciences and Mathematics, Richard Stockton College of New Jersey; Dr. Robert Tucker, Director, Division of Science and Research, NJDEP; and Richard Sullivan, Chairman, Pinelands Commission.

Three focus areas were the basis for discussion: experimental research; ecosystem monitoring, indicators, surveys, and data; and management and policy research including applications of research for system management and policy. Overviews of these areas were given by the session leaders (Dr. John Dighton, Director, Pinelands Research Center, Rutgers University; Dr. Edmund Stiles, Professor, Department of Biological Sciences, Rutgers University; and Dr. John Sinton, Professor of Environmental Studies, Richard Stockton College of New Jersey) prior to concurrent breakout sessions. Discussions in breakout sessions centered on current knowledge, needs, priorities, possible collaborations, and recommendations in each of the focus areas. Upon reconvening, an overview of New Jersey's Geographic Information System was given to all participants. Session leaders then reported on their individual group discussions followed by an open forum.

This document is a summary of the May 20th Outer Coastal Plain/Pinelands Symposium discussions. A companion to this monograph, *Outer Coastal Plain/Pinelands Research Symposium Sourcebook*, contains information provided by 22 researchers related to areas of expertise, research needs, and equipment. The sourcebook is available in hard copy, database format, or via Richard Stockton College's World Wide Web Home Page.

The Partnership would like to thank all participants in the May 20th meeting. We would also like to thank Mr. Henry Garie of New Jersey's Geographic Information System for a most informative presentation.

Collective Recommendations

- Identify who is doing what research specific to the Outer Coastal Plain/New Jersey Pinelands.
- Convene a (series of) workshop(s) to define research needs clearly based on that already referenced in Forman (1979) and subsequent meetings.
- Initiate a format or administrative structure, such as a research consortium, for collaborative, interdisciplinary Outer Coastal Plain/Pinelands research integrating research with policy, planning, and end users.
- Include a Geographic Information System into the format or administrative structure that integrates human and biological resources as a tool to maintain and analyze the Outer Coastal Plain/Pinelands ecosystem including land use and land cover changes.
- Create CD-ROM of all low-level aerial photos for New Jersey.
- Create ready access to water quality data (STORET) for all levels of users.
- Train groups, who are interested in providing monitoring data to a central repository, in quality assurance/quality control and appropriate sampling methods to ensure data consistency and integrity.
- Determine and develop appropriate indicators of habitat loss in the Outer Coastal Plain/Pinelands.
- Data should be geospatially-referenced and documented including context and approach.
- Address risk of takings and cost-benefit analysis through the history and utility of common property resources in New Jersey and economic analyses communicated via mainstream media.
- Media are important in focusing decision-makers on importance of data.
- Policy and management funding priorities for the Pinelands system include: scientific collaboration on impact of water withdrawals from Kirkwood-Cohansey aquifer (current data, data needs, and funding arrangements); economic analysis; and research on perceptions of the essential character of the Pinelands (including education and public input; further delegation of decisionmaking, and interagency cooperation and outreach).

Experimental Research Projects
Dr. John Dighton, Session Leader

Overview

Dr. John Dighton, Director of the Pinelands Research Station, Rutgers University, provided an overview of the types of research pertinent to the Outer Coastal Plain/Pinelands ecosystem. Such research includes: an historical analysis of the ecosystem; population studies (genetics, life history, evolutionary strategies, community interactions, current mosaic, etc.); ecosystem and landscape level research (succession, fire, nutrients, etc.); research on management practices for rare and endangered species; water quality; economics; and pollutant interactions. Dr. Dighton described the challenges of interactions in terms of: the system and the scientist; the soil and microbial communities; and continuity in the research (including security of equipment). Dr. Dighton posed numerous questions for the group to consider, including whether the system should be managed through various degrees of controlled burning?

Breakout Session Discussion Summary

It was suggested that research should interface between natural history and policy making. In this way the quantitative and qualitative aspects of biotic communities and processes would form a platform from which management decisions could be made.

The main areas identified for future research were discussed in general, rather than specific terms. The following areas were deemed important:

- **Autecology of both rare and endangered and common plants and animals** - it was thought that there were still lack of understanding of the basic ecology of many species and the effects of change in the ecosystem could not be assessed if the basic ecology of these species were still unknown. From these studies it may be possible to identify indicator species. In addition there is a threat imposed by the introduction of exotic species. The interactions and competition between native and introduced species is needed to assess the degree of threat from these introductions. The science of native species landscaping and gardening was identified as a possible need to examine other methods of conserving endangered species (in addition to other potential environmental benefits).
- **Processes** - the functional ecology of species and communities needs to be examined on a dynamic basis. Pollution has been measured in terms of concentrations of elements in different components of the ecosystem, particularly in waters. The biotic and abiotic control of fluxes of pollutants is an important part of the understanding of the potential threat of pollutants in ecosystems.

- **Heterogeneity-** imposes problems for all studies and the importance of scale was suggested as an area for research. Mosaics need to be studied on the small scale of patches of vegetational change within defined communities (especially in relation to functionality), at medium scales of resolution to look at community fractionation within the Pinelands and finally the large scale of comparison between like ecosystems within the USA. Within these studies there is a need to look at size, quality and degree of connectivity of patches in relation to community structure and functioning. This area of research needs to address both temporal and spatial scales and requires the establishment of long-term study sites.

- **Human impactation** - the effect of pollution, disturbance, etc. needs to be addressed from the point of the end user. For example studies of the chemistry and biology of the Mullica River in relation to oyster production. Within these studies, there is a need to understand the processes involved in order to find indicator species and potential remediation processes. Pollution areas for study are acidifying pollutants, sewage, fertilizers (particularly N) and physical disturbance (recreation, fire).

- **The economics of development within the Pinelands-** was identified as a research area which needed more work. How do the guidelines of the Comprehensive Management Plan affect the economy of the area? What are the economics of recreation, conservation and management?

Breakout Session Conclusions and Recommendations

Three Specific Steps To Take:

1. To identify 'who is who in the zoo and what they do'. What research is being done in the area and who is doing it.
2. Convene a (or series of) workshop(s) to clearly define research needs based on that already referenced in Forman (1979) and subsequent meetings.
3. Initiate a format for collaborative, interdisciplinary research including policy makers and end users.

Ecosystem Monitoring, Indicators, Surveys, Data Management
Dr. Edmund W. Stiles, Session Leader

Overview

Dr. Edmund Stiles, Professor at Rutgers University is an ecologist, Pinelands research scientist, and Director of the Hutcheson Memorial Forest Center. Dr. Stiles described the importance of ecosystem data in providing one with the ability to fuse together ideas from seemingly disparate sources; individually one might not immediately recognize the utility of such data in developing hypotheses or providing critical information pertinent to relationships within the environment. Dr. Stiles explained that environmental monitoring, indicator, and survey data are used to: describe a system; show patterns of change over time; and direct change toward some perceived goal.

A system can be described from species lists, maps, inventories, collections, etc. Some examples of the utility of descriptive data include: community structure analysis; identification of lands for preservation; process and mechanism evaluation including further generation of hypotheses and research; industrial product development (e.g., fiber and pharmaceutical manufacturing). Important aspects of descriptive data are identification of not only those species or characteristics that are present, but also, identification of those parameters that might be expected in a system but not present or yet identified.

Although the Hutcheson Memorial Forest is a mixed oak hickory forest in the Piedmont Region of New Jersey, it dates back to precolonial times and therefore, the vegetation provides an important example of how data can be used to identify patterns of change over time. Dr. Stiles explained that tree ring patterns show that prior to European settlers, the forest experienced fires every 10-12 years. With colonization in the region, no fires have occurred since 1701.

Limitations to monitoring, indicator, and survey data include problems of data consistency; observer measuring and identification differences; and changes in technology that affect sampling, analysis, and other observational methods.

Dr. Stiles identified that inherent in using data directed at achieving some perceived goal is the problem of determining a starting point; where do you begin?

Breakout Session Discussion Summary

1. Importance of the media in focusing decision makers on the importance of any data collected.
 - a. Many decisions being made without full appreciation of long-term quality-of-life issues.

- b. Importance of watershed-based decision-making rather than political division-based decision-making.
 - c. Making problems "visible" leads to action (e.g., dolphins or syringes washing up on beaches).
- 2. Economic and social data are necessary for a realistic picture to emerge.
- 3. Problem with "Ecological Attrition", the loss of quality-of-life expectation on the part of citizens. It is hard to imagine what to work toward if you don't have any experience with it.
- 4. Why monitor? - Need for tracking these quality-of-life issues.
- 5. How do we manage data?
 - a. Importance of Quality Assurance-Quality Control and the value for decision-making.
 - b. Value of data that may not be of that high quality to serve as a watchdog for large changes in environmental quality and help identify directions for research.
- 6. What types of data should we collect?
 - a. Data that answer specific, current questions.
 - b. Data that can be compared with future similar data collections. Make it simple and low cost.
 - c. Water quality information, land use, air quality, plant species distributions, faunal populations (identify key species).
 - d. Explore the variance and the trajectory of change.
- 7. Identification of information sources.
 - a. Importance of research partnerships.
 - b. Importance of central repositories and quality controls, such as Delaware Estuary Program Regional Information Management Service (RIMS).
 - c. Importance of early education in developing awareness of the need and the value of our environment.
 - d. Access by law enforcement so detrimental changes can be evaluated.

Breakout Session Conclusions and Recommendations

Three specific recommendations:

1. Create CD-ROM of all low-level aerial photos for the State of New Jersey.
2. Create a means for access to STORET information on water quality information. Develop Quality Assurance-Quality Control seminars for groups interested in providing data to a central storage system, and provide a "cookbook" access to the database for all levels of users.
3. Determine appropriate habitat-loss indicators. Which plants or animals can serve as indicators of significant habitat loss? Is the use of indicators appropriate for this determination or should we use soils and landforms to address the habitat preservation issue?

Ecosystem Management and Policy
Dr. John Sinton, Session Leader

Overview

Dr. John Sinton, Professor of Environmental Studies, Richard Stockton College of New Jersey, identified the phrase "essential character of the Pinelands" as pivotal for focusing discussion. What does preserving, protecting, or enhancing the Pinelands mean within the context of "essential character of the Pinelands"? Does this mean a strict dichotomy between preservation and development? Should there be wildfires? Pristine water quality? Should there be a uniform standard for water quality in the Pinelands? How can we measure the success of the Pinelands Commission? Should decisionmaking regarding the Pinelands be regionalized?

Breakout Session Discussion Summary

The participants identified the following issues for further discussion:

1. Different perceptions of the "essential character" of the Pinelands
2. The "takings" issue and "risk assessment"
3. Regionalization of decision making
4. Economic impacts
5. Public outreach and education

1. There are clearly different opinions about the "essential character" of the Pinelands. Decision makers and researchers need to join with the public to more clearly describe and discuss the region's essential character because policy is based on it. Education and outreach is necessary here, and specific management plans are also tied to this concept.

2. The "takings" issue (or, as Pinelands Commission Chairman Sullivan suggested, the "takings and givings" issue) also requires close work with the affected public. Working definitions of "takings" and of "risk assessment" need public airing to help avoid misunderstanding; the same is true of the complex arrangements of common property resources and private property in New Jersey.

a. The ongoing analysis of financial impacts of Pinelands policies should also account for takings and givings.

3. After a more rigorous analysis of the "essential character" of the Pinelands is completed, specific management plans for development, preservation, and mixed uses should be reconsidered, including, but not limited to:

- a. Kirkwood and Cohansey aquifer recharge regions
- b. Fire, particularly wild fire
- c. Regeneration of Atlantic white-cedar
- d. Scientific sites both large and small
- e. Other land uses (e.g. mining) and zoning issues

4. Regionalization of decision making is a particularly difficult subject to approach because there is the risk of misunderstanding on both the part of decision makers and the public concerning expectations of how power might or might not be shared in different areas of decision making from application review to enforcement procedures. Nonetheless there needs to be further policy discussions on the extent to which local units or agencies in the Pinelands can take on more decision-making responsibilities.

Breakout Session Conclusions and Recommendations

1. The risk of takings and cost-benefit analysis needs to be addressed through the media, economic analysis, and the history and utility of common property resources in New Jersey.
2. An administrative structure is needed to integrate research, policy, and planning. Included in this structure is a Geographic Information System that integrates human and biological resources as a tool to maintain and analyze the Pinelands ecosystem including land use and land cover changes.
3. Policy and Management Funding Priorities include:
 - a. Science-driven priorities: check with the scientific community for their input.
 - b. Policy/Management-driven priorities:
 - i) Impacts of water withdrawals from Kirkwood-Cohansey aquifer with the cooperation of the scientific community to ascertain what data exist, what are still needed, and whether funding arrangements can be identified.
 - ii) Economic analyses -- decide what kinds of economic analyses are needed, e.g. on the impacts of recent or proposed land-use changes? on the impacts of takings and givings?
 - iii) Discussions with the public on perceptions of the "essential character" of the Pinelands.
 - iv) Further emphasis and funding on public input/educational outreach.

v) There needs to be greater emphasis on inter-agency cooperation and outreach.
How can this best be accomplished?

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