

WATER REGIMES AND VEGETATION
OF
RHODE ISLAND FORESTED WETLANDS
BY
DENNIS J. LOWRY

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
IN
PLANT AND SOIL SCIENCE

UNIVERSITY OF RHODE ISLAND

1984

THESIS ABSTRACT

To quantitatively describe natural resource features which vary temporally, such as water levels in wetlands, data must be collected over a number of years to account for long-term variability. Unfortunately, studies conducted at the Master's degree level are often limited by the number of years over which data can be collected. This writer was fortunate to have been given access to such long-term data; this thesis is the culmination of more than 8 years of data collection and analysis by numerous individuals.

In 1975, Dr. Frank Golet of URI's Department of Forest and Wildlife Management initiated this study to gather baseline data on the water regimes of forested wetlands in Rhode Island. The objective of the study arose from the realization that, despite increasing awareness of the importance of hydrology to wetland ecology and functions, few data existed which adequately described long-term water regimes for any of the wetland types in this country.

Twelve forested wetlands, seven dominated by red maple (Acer rubrum) and seven by Atlantic white cedar (Chamaecyparis thyoides) were selected throughout southern Rhode Island. Water levels were monitored in all areas between March and December from 1976 through 1982; over 2800 individual measurements of water level were made. These are among the most extensive data available describing wetland water regimes.

In 1981, the tree, shrub, and herbaceous communities were sampled in each of these wetlands, and increment cores were obtained to measure radial growth of trees during each of six of the study years. Microrelief of the forest floors was quantified, the depth of the tree root zone determined, and soil profiles described in each area. The pH and specific conductance of the ground water and soils were also measured. Examining the relationship of these features to water regime formed the basis of much of the analyses.

This thesis is written in three main sections. Section I quantitatively describes the water regimes of the 12 swamps. Section II examines the influence of water regime on radial growth of the two principal tree species. Section III describes the shrub strata in these wetlands and discusses their relationship to environmental factors. The Appendices provide additional data on the tree and herbaceous communities, soils, and the use of the areas by birds during the study period. Models for predicting water levels at each site are also presented.