



New Jersey Pinelands Commission

Press Release

October 10, 2014

Contact: Paul Leakan, NJ Pinelands Commission

Phone: (609) 894-7300, ext. 124

E-mail: info@njpines.state.nj.us

For Immediate Release:

Pinelands Commission Issues 4th In-depth Report on the Implementation of the Pinelands Comprehensive Management Plan

NEW LISBON, N.J. – During its meeting today, the Pinelands Commission issued its fourth, in-depth report on the agency’s implementation of the Pinelands Comprehensive Management Plan (CMP), the rules that govern land use and natural resource protection in the 938,000-acre Pinelands Area of southern New Jersey.

The 183-page report charts the Commission’s projects, programs and efforts to advance the goals and requirements of the CMP from July 1, 2001 through June 30, 2012, the period since the last progress report was issued.

“The Commission’s success in safeguarding the Pinelands is clearly evident in this report,” said Nancy Wittenberg, the Commission’s Executive Director. “During this review period, the Commission bolstered its rules through 19 amendments, preserved thousands of acres of land, conducted critical scientific research, and implemented a permitting program that channeled 97% of all residential development toward designated growth areas.”

“This report will be invaluable as we consider future actions that will strengthen the Plan and advance our mission to preserve the Pinelands,” Wittenberg added.

The issuance of the report marks the culmination of the Commission’s fourth review of the CMP. The Commission embarked on the review in June 2012. Since that time, the Commission formed a Plan Review Committee composed of five Commission members. The Committee met regularly and provided a forum for discussing measures aimed at improving the CMP. It gathered comments from 109 groups and individuals during two public hearings and a 2½-month public comment period.

The review is required by law, and it provides a key opportunity for the Commission to chart and evaluate its implementation of the CMP. Previous reviews of the CMP resulted in changes such as simplified permitting for the development of single-family dwellings, a ban on new mining operations in Pinelands-designated Forest Areas and waste management facility siting policies, among many other initiatives.

(MORE)

Pinelands Press Release

Page 2 ...

The *Fourth Progress Report on Plan Implementation* features chapters on land use and planning, regulatory programs, permanent land protection, memorandums of agreement or understanding, public information and outreach, economics and science. It also includes a section that lists a series of recommendations for strengthening the Plan, including numerous recommendations that were suggested by the public.

Among other findings in the report, the Commission:

- Approved 32 adjustments to Pinelands Management Areas in 21 municipalities between January 2002 and June 2012. More than half of the approved changes were relatively small, affecting less than 100 acres of land. The boundaries of all nine management areas were affected, with the Rural Development Area (RDA) involved in the majority of changes.

As a whole, the conservation-oriented management areas – the Preservation Area District (PAD), Special Agricultural Production Area (SAPA), Forest Area (FA) and Agricultural Production Area (APA) – have increased steadily since 1991. Approximately 13,000 acres were added to the conservation areas between 1991 and 2012, including 4,000 acres in the Oyster Creek watershed that were redesignated from the RDA to the FA via a CMP amendment adopted by the Commission in 2005.

As a result, the conservation areas now include more acreage than when the CMP was adopted in 1980. By contrast, the development-oriented management areas as a whole (Regional Growth Areas, Pinelands Villages and Towns) have seen a 3.25% decrease (4,200 acres) over the last two decades;

- Continued to ensure that development is channeled toward designated growth areas and away from conservation areas. Approximately 97% of all approved residential units and 87% of all approved nonresidential developments were located in the Regional Growth Areas, Towns, Villages and Rural Development Areas during the reporting period;

- Worked to permanently preserve thousands of acres of land by continuing several long-established programs and instituting a new acquisition program made possible by the creation of the Pinelands Conservation Fund (PCF).

Between 2007 and June 30, 2013, the Commission approved the allocation of \$9.6 million from the PCF to 34 projects in the Pinelands Area. Of these 34 projects, 31 proceeded to closing within the plan review time period, resulting in the permanent protection of 6,763 acres.

The Pinelands Development Credit (PDC) program continued to be one of the most successful transfer of development rights programs in the country. Nearly 24,000 acres in the Preservation Area District, Agricultural Production Area and Special Agricultural Production Area were permanently protected through the PDC Program between July 2001 and June 2013, bringing the total amount of protected land to 51,685 acres.

(MORE)

Pinelands Press Release

Page 3 ...

In September 2011, the Pinelands Commission assumed responsibility for the operation and administration of the Pinelands Development Credit Bank;

- Conducted important research on the status of the Pinelands ecology. Much of the research details the connection between land-use and its effect on water quality and quantity, and it provides the basis for future policies and initiatives aimed at further preserving Pinelands natural resources.

The Commission completed five studies of the Kirkwood-Cohansey aquifer system. The studies focused on swamp pink, pond vegetation, wetland forests, frog development and stream habitat. Results from the studies, and those completed by other project cooperators, can be used to develop water-supply policies for the Kirkwood-Cohansey aquifer.

The Commission also completed a landscape, watershed and wetland assessment for the entire Pinelands Area. Results of the assessment indicated that Pinelands habitat and non-habitat covered 82% and 18% of the Pinelands Area, respectively. Fifty-one percent of the Pinelands Area fell within the highest ecological-integrity class;

- Was a signatory to 20 Memorandums of Agreement (MOAs) with a variety of public agencies, including municipalities, counties and other state agencies. As a result of the agreements, approximately 8,500 acres of land in the Pinelands Area were permanently preserved;

- Continued to monitor the economy in the Pinelands Area. Overall, the Pinelands economy either mirrored, or in some cases outperformed, the non-Pinelands portions of southern New Jersey in a number of economic indicators. For example, the average residential property tax bill in the Pinelands continued to be significantly lower than the state and the rest of southern New Jersey. At \$4,884, the average tax bill in the Pinelands is 36.8% lower than the average bill in the state and 14.2% lower than the average bill in the non-Pinelands portions of southern New Jersey; and

- Educated thousands of people by delivering presentations at school districts, libraries and during festivals. The Commission also raised awareness and appreciation of the Pinelands by organizing new educational programs such as the Pinelands Research Series and Pinelands-themed World Water Monitoring Day, and by creating new materials such as the first-ever, National Park Service brochure for the Pinelands National Reserve.

A copy of the report has been posted on the Commission's website (www.nj.gov/pinelands). It is also attached to this release.

***** ATTENTION REPORTERS/EDITORS:** A high-resolution .jpeg of the image below (and many other Pinelands images) can be obtained via e-mail by contacting Paul Leakan at (609) 894-7300.

(MORE)

Pinelands Press Release

Page 4 ...



Above: The Commission has preserved thousands of acres in the Pinelands Area in recent years, including the 2,800-acre Lenape Farms property in Estell Manor, Atlantic County. Photo/Paul Leakan

#####

New Jersey Pinelands Commission

Comprehensive Management Plan



The Fourth Progress Report on Plan Implementation

September 2014

Nancy Wittenberg, Executive Director



Chris Christie
Governor

Kim Guadagno
Lt. Governor

State of New Jersey

THE PINELANDS COMMISSION

PO Box 359

NEW LISBON, NJ 08064

(609) 894-7300

www.nj.gov/pinelands

General Information: Info@njpines.state.nj.us
Application Specific Information: AppInfo@njpines.state.nj.us



Mark S. Lohbauer
Chairman

Nancy Wittenberg
Executive Director

September 8, 2014

Mark S. Lohbauer, Chair
New Jersey Pinelands Commission
P.O. Box 359
New Lisbon, NJ 08064

Dear Chairman Lohbauer:

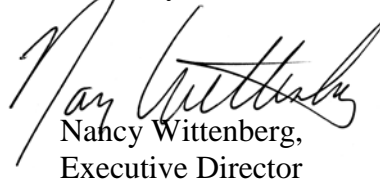
I am proud to present to you and members of the Pinelands Commission the *Fourth Progress Report on Plan Implementation*. This report was prepared by your staff, and it charts the Commission's efforts to advance the goals and requirements of the Pinelands Comprehensive Management Plan (CMP) from July 1, 2001 through June 30, 2012, the period since the last review of the CMP was completed.

This Plan Review was designed to be a very public process. The input from interested parties, advocacy groups and the general public demonstrated the continuing widespread interest in the Pinelands Commission and the Pinelands. We received dozens of suggestions on the best ways to improve the CMP and accomplish our mission "to preserve, protect and enhance the natural and cultural resources of the Pinelands National Reserve, and to encourage compatible economic and other human activities consistent with that purpose."

This report features a series of recommendations that were identified by the public, Commissioners and members of your staff, along with detailed information about the Commission's implementation of the Plan through various projects, programs and initiatives.

While much work lies ahead, I am confident that the issuance of this report will serve as the starting point for future actions that will strengthen the CMP and establish programs that will provide a clear path to meeting our mission and ensuring the future protection of the Pinelands.

Sincerely,



Nancy Wittenberg,
Executive Director

Pinelands Comprehensive Management Plan The Fourth Progress Report on Plan Implementation

September 2014

New Jersey Pinelands Commission

Mark S. Lohbauer, Chairman

Alan W. Avery, Jr., Vice Chairman

Candace McKee Ashmun

Joseph DiBello

Paul E. Galletta

Jane Jannarone

Edward McGlinchey

Gary Quinn

Francis Witt

William J. Brown

Sean W. Earlen

Robert Jackson

Edward Lloyd

Richard H. Prickett

D'Arcy Rohan Green

Nancy Wittenberg,

Executive Director

P.O. Box 359

New Lisbon, NJ 08064

Phone: (609) 894-7300

Fax: (609) 894-7330

www.nj.gov/pinelands

Table of Contents

Introduction and Executive Summary	Pages 1-7
Chapter 1: Land Use & Planning	Pages 8-45
Chapter 2: Regulatory Programs	Pages 46-80
Chapter 3: Permanent Land Protection	Pages 81-96
Chapter 4: Memorandums of Agreement	Pages 97-110
Chapter 5: Public Information and Outreach	Pages 111-115
Chapter 6: Economic Monitoring	Pages 116-127
Chapter 7: Science Program	Pages 128-155
Chapter 8: Recommendations	Pages 156-164

Index of Tables, Figures and Charts

Tables:

1.1: Pinelands Management Areas	Page 9
3.1: PDC Program Municipal Acres Preserved through June 2013	Page 87
3.2: SADC and County Farmland Preservation Programs Acres Preserved in PDC Sending Areas ...	Page 89
6.1: Core Indicators of Economic Monitoring	Page 117

Figures:

1.1: Pinelands Land Capability Map	Page 10
1.2: Change in Preservation Area District Acreage	Page 11
1.3: Change in Special Agricultural Production Area Acreage	Page 12
1.4: Change in Forest Area Acreage	Page 13
1.5: Change in Agricultural Production Area Acreage	Page 14
1.6: Change in Rural Development Area Acreage	Page 15
1.7: Change in Regional Growth Area Acreage	Page 16
1.8: Change in Pinelands Village Acreage	Page 17
1.9: Change in Pinelands Town Acreage	Page 18
1.10: Change in Military/Federal Installation Area Acreage	Page 19
1.11: Change in Conservation-Oriented Management Areas	Page 20
1.12: Change in Transition and Development-Oriented Areas	Page 20
1.13: Installed Pilot Program Technologies 2004-2012	Page 28
1.14: Location of Pilot Program Systems 2004-2012	Page 29
1.15: Map of Southern Medford and Evesham	Page 35
1.16: Map of the Pine Barrens Byway	Page 40
2.1: New Applications Received (2001-2012)	Page 47
2.2: New Applications Received (1980-2012)	Page 48
2.3: Incomplete Letters (2001-2012)	Page 49
2.4: Applications Completed (2001-2012)	Page 50
2.5: Letters of No Further Review (2001-2012)	Page 51
2.6: Approval Inconsistency Issues (2005-2012)	Page 52
2.7: Approved Residential Units (2001-2012)	Page 54
2.8: Approved Commercial Development (2001-2012)	Page 55
2.9: Approved Residential Units (1980-2012)	Page 55
2.10: Approved Commercial Development (1980-2012)	Page 56
2.11: Ten Municipalities with Most Approved Residential Units (2001-2012)	Page 57
2.12: Ten Municipalities with Most Commercial Approvals (2001-2012)	Page 57
2.13: Cultural Housing and Grandfather Provision (2001-2012)	Page 60
2.14: Distribution of Cultural Housing & Grandfather Provision Approvals (2001-2012)	Page 61

2.15: Density Transfer Certificates of Filing (2001-2012)	Page 62
2.16: Forestry Applications (2001-2012)	Page 63
2.17: Recreation Permits Issued (1981-2012)	Page 64
2.18: Recreation Permits by Management Area (2001-2012)	Page 65
2.19: Public Development Approvals (2001-2012)	Page 66
2.20: Waiver Approvals Granted (2001-2012)	Page 68
2.21: Approved Residential Waivers (2001-2012)	Page 69
2.22: Waiver Denials (2001-2012)	Page 70
2.23: Residential Waiver Denials (2001-2012)	Page 71
2.24: Letters of Interpretation (2001-2012)	Page 72
2.25: Letter of Interpretation Topic (2001-2012)	Page 72
2.26: Certificates of Appropriateness (2001-2012)	Page 74
2.27: Violations Reported to the Commission (2001-2012)	Page 76
2.28: Reported Violation Issues (2001-2012)	Page 77
2.29: Violations Resolved with Commission (2001-2012)	Page 78
2.30: Resolved Violation Issues (2001-2012)	Page 79
3.1: Permanently Protected Land Map	Page 82
3.2: PDC Allocations by Fiscal Year	Page 85
3.3: PDC Lands Preserved by Management Area (1980-2013)	Page 86
3.4: Pinelands Conservation Fund Land Protected by Management Areas	Page 92
3.5: CCMUA/TNC Acquisition Program Lands Protected by Management Areas	Page 93
4.1: MOAs: Land Preserved by Management Area (2002-2012)	Page 98
6.1: Residential Building Permits Issued in 2011	Page 119
6.2: Population Change from 2000-2013	Page 123
7.1: Location of Watershed-assessment Stream and Impoundment Sites	Page 129
7.2: Changes in Land-cover Area in the Mullica River Watershed	Page 130
7.3: Water-quality Characteristics for 25 Mullica River Stream Sites	Page 132
7.4: Percentage of Native and Non-native Species Found in the Mullica River Sites	Page 134
7.5: Frequency of Native Carpenter Frog and Non-Native Bullfrogs at Impoundments	Page 135
7.6: Trends in pH, Specific Conductance and Impervious Cover at 30 Impoundments	Page 136
7.7: Average Flooding Frequency for Each Year for Active-cranberry and others	Page 137
7.8: Average Fish Abundance and Biomass in Active-Cranberry and others	Page 138
7.9: Estimated Change in Area of Vegetation-Patch Types Under Various Scenarios	Page 139
7.10: Metamorph Survival Estimated Under Various Scenarios	Page 140
7.11: Estimated Reduction in Stream Velocity for Streamflow Reduction Scenarios	Page 140
7.12: Overall Activity Range for Nine Timber Rattlesnakes in the Sanctuary	Page 141
7.13: Ecological-integrity-class Composition of Pinelands Habitat and Acres	Page 143
7.14: Major Electric-Transmission-line Rights-of Way in the Pinelands Area	Page 144

Charts:

6.1: Unemployment Rate Page 120
6.2: Average Residential Tax Bill (in 2011 USD) Page 122

Introduction

The Pinelands Commission embarked on its fourth in-depth review of the Pinelands Comprehensive Management Plan (CMP) in June 2012. The review is required by law, and it provides a key opportunity for the Commission to chart and evaluate its efforts to advance the goals of the CMP.

The CMP contains the rules that govern land use, development and natural resource protection in the Pinelands Area, a 938,000-acre region that spans portions of seven counties in southern New Jersey. Previous reviews of the CMP resulted in changes such as simplified permitting for the development of single-family dwellings, a ban on new mining operations in Pinelands-designated Forest Areas and waste management facility siting policies, among many other initiatives.

Shortly after launching its fourth Plan Review, the Commission formed a Plan Review Committee. The Committee is composed of five Commission members, and it generally meets each month, providing a forum to identify and discuss measures aimed at strengthening the CMP.

Public participation has been a critical part of the Plan Review process. The Plan Review Committee garnered public feedback during hearings on August 22, 2012 in Hamilton Township, Atlantic County and on September 24, 2012 at the Commission's headquarters in New Lisbon, Burlington County. Both meetings were held in the evening to expand the scope of outreach. Additionally, the Commission held multiple meetings with various stakeholders to garner more feedback.

The Commission received comments from 109 groups or individuals during the official written comment period, which was open from July 16, 2012 until September 28, 2012. All of the public comments have been scanned and can be accessed on the Commission's website (<http://www.nj.gov/pinelands/cmp/planreview/>). Many of the public's suggested changes to the CMP have been included in this *Fourth Progress Report on Plan Implementation*.

Executive Summary

The Commission's success in administering the CMP is evident in this *Fourth Progress Report on Plan Implementation*. This report describes actions the Commission has taken to further the goals of the Pinelands protection program from July 1, 2001 through June 30, 2012, the period since the last progress report was issued.

During the period covered by this report, the Commission focused on bolstering the protection of Pinelands resources through a series of CMP amendments, scientific research and a robust effort to permanently preserve land. It also sought to heighten awareness of the Pinelands Area by focusing on in-class educational presentations and by creating new outreach programs and materials.

Land Use and Planning

The Commission amended the CMP 19 times during the period covered by this report. Notable changes include the mandatory clustering of residential development in the Forest Area (FA) and Rural Development Area (RDA) on one-acre lots, the establishment of fees to review development applications and the creation and implementation of the Alternate Design Wastewater Treatment Systems Pilot Program.

The Commission approved the clustering provisions in 2009 in an effort to better protect Pinelands resources. The amendment requires municipalities to incorporate the clustering provisions into their zoning ordinances, and it seeks to preserve and maintain the essential character of the Pinelands environment while preventing the proliferation of homes on large lots scattered throughout the FA and RDA. Clustering is a style of development that allows reduced minimum lot sizes in exchange for the preservation of open space or other desirable features of a property. The open space created as a result of clustering must be permanently protected through deed restriction.

The Commission amended the CMP in 2004 to require fees that partially underwrite the Commission's costs to review development applications. Amendments to the fee schedule were later adopted in 2006 and 2008 to establish minimum and maximum application fees and to achieve a more equitable distribution of the review costs amongst the many different types of development applications that the Commission is obligated to review.

The Commission established the Alternate Design Wastewater Treatment Systems Pilot Program through an amendment to the CMP in 2002. The Pilot Program identified five alternate septic system technologies that are designed to better meet the water quality standards of the CMP for residential development on lots smaller than 3.2 acres. The program was implemented to provide a means to test whether the technologies could be maintained and operated so as to meet the CMP water quality standards in a manner that a homeowner can be reasonably expected to follow. Two of the original five systems proved to be so successful that they are now permitted on one acre lots on a permanent basis, without the need for further monitoring. An additional four technologies were added to the pilot program in 2011. A total of 220 Pilot Program systems were installed in the Pinelands Area through July 2012.

Aside from CMP amendments, the Commission approved 32 adjustments to Pinelands Management Areas in 21 municipalities between January 2002 and June 2012.

More than half of the approved changes were relatively small, affecting less than 100 acres of land. The boundaries of all nine management areas were affected, with the RDA involved in the majority of changes.

As a whole, the conservation-oriented management areas, the Preservation Area District (PAD), Special Agricultural Production Area (SAPA), Forest Area (FA) and Agricultural Production Area (APA), have increased steadily since 1991. Approximately 13,000 acres were added to the conservation areas

between 1991 and 2012, including 4,000 acres in the Oyster Creek watershed that were redesignated from the RDA to the FA via a CMP amendment adopted by the Commission in 2005. As a result, the conservation areas now include more acreage than when the CMP was adopted in 1980. In contrast, the development-oriented management areas as a whole (Regional Growth Areas, Pinelands Villages and Towns) have seen a 3.25% decrease (4,200 acres) over the last two decades.

Science Program

Commission scientists continued to conduct important research on the status of the Pinelands ecology. Much of the research details the connection between land-use and its effect on water quality and quantity, and it provides the basis for future policies and initiatives aimed at further preserving Pinelands natural resources.

Through its assessments of Pinelands watersheds and a 2006 study of cranberry agriculture, the Commission found that:

- Streams that drain forested watersheds with little to no developed land or upland agriculture exhibit characteristic Pinelands acidic water-quality conditions and support native plant and animal communities;
- Streams that drain watersheds with developed land and upland agriculture display altered water-quality conditions and support mixed native and non-native plants and animals; and
- Streams that drain active and abandoned cranberry farms were more similar to streams in forested watersheds than to streams that drain developed land and upland agriculture.



Kim Laidig, a Principal Research Scientist with the Commission, surveys purple bladderwort as part of the Commission's watershed assessments.

Photo/John Bunnell

The Commission completed five studies as part of the Kirkwood-Cohansey Project, a research effort that was led by Commission scientists, in cooperation with the New Jersey Department of Environmental Protection, Rutgers University, the U. S. Fish and Wildlife Service (USFWS), and the U.S. Geological Survey. The project addressed two major research questions. First, what are the probable hydrologic effects of groundwater diversions from the Kirkwood-Cohansey aquifer on stream flows and wetland water levels? Second, what are the probable ecological effects of induced stream-flow and groundwater-level changes on aquatic and wetland communities?

The Commission's five studies of the aquifer system focused on swamp pink, pond vegetation, wetland forests, frog development and stream habitat. Results from the studies, and those completed by other project cooperators, can be used to develop water-supply policies for the Kirkwood-Cohansey aquifer.

The Commission also completed a landscape, watershed and wetland assessment for the entire Pinelands Area. The project, known as the Ecological-integrity Assessment, employed the use of GIS-based tools to evaluate the current ecological status of the Pinelands Area and the ecosystem it represents.

Results of the assessment indicated that Pinelands habitat and non-habitat covered 82% and 18% of the Pinelands Area, respectively. Fifty-one percent of the Pinelands Area fell within the highest ecological-integrity class.

The GIS-based tool used in the assessment is repeatable and able to be updated as new land-use data become available. Results can be used to evaluate current Pinelands management-area designations. It can also be used to identify areas best suited for clustering development and for targeting important areas for land acquisition.

Permanent Land Protection

The Commission was especially active in permanently preserving land during the plan review time period, continuing several long-established programs and instituting a new acquisition program made possible by the Pinelands Conservation Fund (PCF).

Between 2007 and June 30, 2013, the Commission approved the allocation of \$9.6 million from the PCF to 34 projects in the Pinelands Area. Of these 34 projects, 31 proceeded to closing within the plan review time period, resulting in the permanent protection of 6,763 acres. The

majority of preserved land is located in the Forest Area, including the 2,800-acre Lenape Farms project in the City of Estell Manor, Atlantic County.



Stephen Lake (above) is one of the many picturesque sites featured at Lenape Farms, a 2,800-acre property that was permanently preserved in 2013 with funds from the Pinelands Commission.

Photo/Paul Leakan

The Pinelands Development Credit (PDC) program continued to be one of the most successful transfer of development rights programs in the country. Nearly 24,000 acres in the Preservation Area District, Agricultural Production Area and Special Agricultural Production Area were permanently protected through the PDC Program between July 2001 and June 2013, bringing the total amount of protected land to 51,685 acres. In September 2011, the Pinelands Commission assumed responsibility for the operation and administration of the Pinelands Development Credit Bank.

As of June 30, 2013, nearly half of the Pinelands Area (446,000 acres) has been permanently protected. Importantly, 418,000 acres or 94% of the protected land is located within the Preservation Area District, Special Agricultural Production Area, Forest Area and Agricultural Production Area, the conservation areas of the Pinelands that the Commission is charged with protecting. The majority of protected land was protected through federal, state and local land protection initiatives, with a relatively small percentage (3% or 13,000 acres) protected by non-profit conservation organizations. Programs administered or funded by the Pinelands Commission have protected approximately 84,000 acres through June 2013, accounting for approximately 19% of the total.

Regulatory Programs

The Commission continued to ensure that development is channeled toward designated growth areas and away from conservation areas. Approximately 97% of all approved residential units and 87% of all approved nonresidential developments were located in the Regional Growth Areas, Towns, Villages and Rural Development Areas during the reporting period.

The number of development applications dropped sharply amid the economic recession.

Between July 1, 2001 and June 30, 2012, the Commission received 8,812 private development applications and 1,626 public development applications, for a total of 10,438 applications. The yearly average is 950 new applications, which is significantly lower than the previous plan review periods.

The rate of new applications received during this 11-year period was the lowest in Commission history. Since its inception in 1980, the Commission has received an average of 1,344 new applications each calendar year. Only one year of the current review period – 2004 – exceeded the overall annual average with 1,375 new applications received.

Economic Monitoring

Overall, the Pinelands economy either mirrored, or in some cases outperformed, the non-Pinelands portions of southern New Jersey in a number of economic indicators.

For example, the average residential property tax bill in the Pinelands continued to be significantly lower than the state and the rest of southern New Jersey. At \$4,884, the average tax bill in the Pinelands

is 36.8% lower than the average bill in the state and 14.2% lower than the average bill in the non-Pinelands portions of southern New Jersey.

The Pinelands population is growing faster than the non-Pinelands portions of southern New Jersey. The 2010 block-group census data revealed that the Pinelands population increased 13% from 276,889 residents in 2000 to 312,840 residents in 2010. Meanwhile, the non-Pinelands grew by 10.9% in the same time period, reaching a population of 556,933 residents. Egg Harbor Township now has the largest population in the Pinelands, after having only the 4th largest population in the Pinelands in 2010.

The national recession took its toll on New Jersey, with the Pinelands experiencing similar economic hardships as the rest of the state. From 2006 to 2010, the Pinelands posted negative employment growth, declining 6.2% to 135,357 people employed. During the same period, employment in the state and non-Pinelands decreased similarly (5.5% and 6.8%, respectively). Meanwhile, as of 2011, the Pinelands unemployment rate stood at 10.6% (0.2% lower than its high point in 2010), compared to 10.8% in southern New Jersey and 9.5% in the state.

Memorandums of Agreement and Understanding

The Commission was a signatory to 20 Memorandums of Agreement (MOA) with a variety of public agencies, including municipalities, counties and other state agencies. Many of these agreements dealt exclusively with permit streamlining while others allowed for deviations from CMP standards in order to ensure the long-term viability of existing public facilities and provide for electrical power access to South Jersey through a new transmission line.

All MOAs involving deviations from CMP standards must include measures to achieve at least an equivalent level of protection of Pinelands resources as that afforded by a strict application of CMP land use and development standards. The eight MOAs approved during the Plan Review time period that involved deviations from CMP standards all relied on the permanent protection of land in the Pinelands Area to meet this requirement. As a result, approximately 8,500 acres in the Pinelands Area were permanently protected, primarily in the Pinelands Forest and Rural Development Areas.

Public Information and Outreach

The Commission revamped its education and outreach efforts by placing a greater emphasis on providing educational programs for schools and the general public. Prior to this shift in philosophy, the Commission participated in fewer education and outreach events and relied more heavily on arranging for outside experts to deliver presentations.

Commission staff members educated thousands of people by delivering presentations at school districts, libraries and during festivals in the Pinelands Area and beyond. The Commission launched several new education programs, including the Pinelands-themed World Water Monitoring Day event that has been held at Batsto Lake each year since 2007. The Commission also began using its headquarters, the

Richard J. Sullivan Center for Environmental Policy and Education, as a site for a series of educational and scientific presentations. This includes the “Pinelands Speaker Series” and the “Pinelands Research Series.” Meanwhile, attendance at the Commission’s annual Pinelands Short Course soared to an average of 600 per year as new courses and field trips were offered.

The Commission redesigned its website to make it more user-friendly and to add new content, including an online version of the Pinelands Comprehensive Management Plan and a library of digital Pinelands images.

Lastly, the Commission sought to raise appreciation of the Pinelands by completing several projects with the National Park Service (NPS) and the New Jersey Division of Parks and Forestry. This included the creation and distribution of the first-ever unigrad brochure for the Pinelands National Reserve and the completion of a project that resulted in the installation of Pinelands National Reserve Road signs in 22 locations in the Reserve.



Attendance at the annual Pinelands Short Course soared to a high of more than 800 as the Commission expanded the program to include more presentations and field trips, such as the one at the Franklin Parker Preserve (above).

Photo/Ed Wengrowski

CHAPTER 1: LAND USE & PLANNING

The Pinelands protection program is a regional-land use program that protects important resources in the Pinelands through a series of planning and zoning measures.

Conformance

The Pinelands Protection Act requires that all municipalities and counties with land in the Pinelands Area revise their master plan and land use ordinances to implement the objectives and standards of the Pinelands Comprehensive Management Plan (CMP). As of October 2013, the master plans and ordinances of all 53 Pinelands municipalities and all seven Pinelands counties were certified by the Commission as being in conformance with the CMP.

The conformance process is ongoing, as all amendments to municipal master plans and land use ordinances affecting the Pinelands Area must be reviewed by the Commission before they are considered to be in effect. More than 1,500 such amendments were submitted to, and reviewed by, the Commission between January 2002 and June 2012. Many of these amendments were minor revisions to existing municipal standards, zoning districts or procedures, with little relationship to, or impact on, Pinelands regulations. Others related directly to CMP standards and required the Commission's formal review and approval. The most significant of this latter category were changes in Pinelands management area boundaries and decreases in residential zoning capacity within designated development areas.

Pinelands Management Area Adjustments

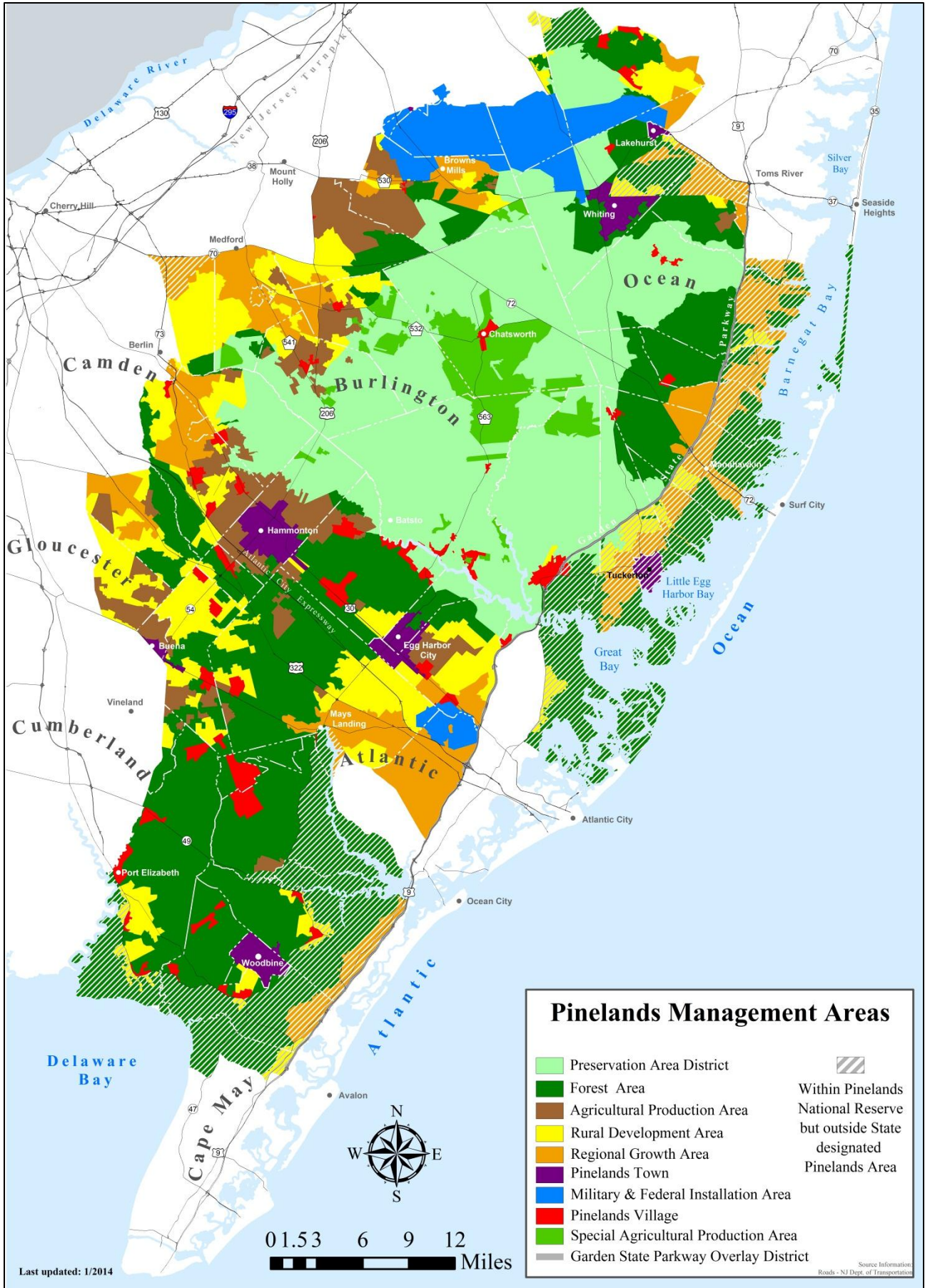
Subchapter 5, Minimum Standards for Land Uses and Intensities, of the CMP establishes requirements that govern the type, location and intensity of land uses permitted throughout the Pinelands. These requirements are primarily implemented through the establishment of nine management areas with varying objectives, permitted uses and development intensities. A summary of the management areas is provided on Table 1.1.

The Commission originally established the boundaries of the management areas upon adoption of the CMP in 1981. Part II of subchapter 5 provides municipalities with the ability to refine and adjust the boundaries of Pinelands management areas, provided such refinements and adjustments serve to implement the goals and objectives of the CMP. Numerous such adjustments have been approved by the Commission over time, including 32 between January 2002 and June 2012. The 32 certified management area changes occurred in 21 different municipalities. More than half (53%) of the approved changes were relatively small, affecting less than 100 acres of land. The boundaries of all nine management areas were affected, with the Rural Development Area (RDA) involved in the majority of changes (56%). The current boundaries of the nine management areas are depicted on the Pinelands Land Capability Map (see Figure 1.1).

**Table 1.1:
Pinelands Management Areas**

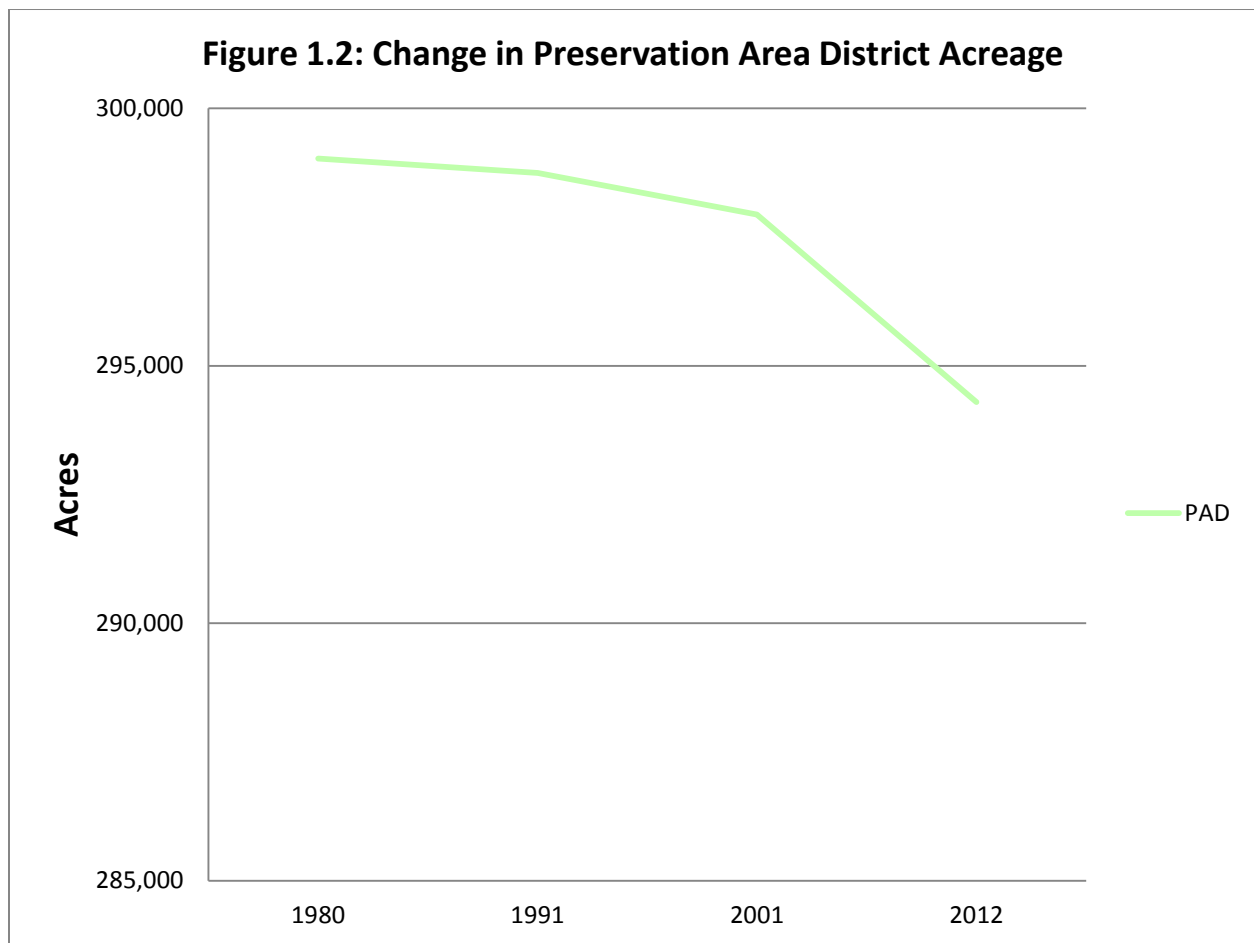
Management Areas	Description	Permitted Uses	
		Residential	Non-residential
Preservation Area District (PAD)	Heart of the Pinelands environment and the most critical ecological region; a large, contiguous wilderness-like area of forest that supports diverse plant and animal communities and is home to many threatened and endangered species	Cultural housing on 3.2 acres	Expansion of existing uses only; low intensity recreation
Special Agricultural Production Area (SAPA)	Discrete areas within the Preservation Area District primarily used for berry agriculture and horticulture of native Pinelands plants	Farm-related housing on 40 acres	Expansion of existing uses only
Forest Area (FA)	Similar to the Preservation Area District in terms of ecological value; a largely undeveloped area that is an essential element of the Pinelands environment, contains high quality water resources and wetlands and provides suitable habitat for many threatened and endangered species	Clustered housing on one acre lots at an average density of 1 home per 28 acres	Roadside retail sales and services within 300 feet of preexisting use; low intensity recreation
Agricultural Production Area (APA)	Areas of active agricultural use, generally upland field agriculture and row crops, together with adjacent areas with soils suitable for expansion of agricultural operations	Farm-related housing on 10 acres; non-farm housing at a density of 1 home per 40 acres	Agricultural commercial and industrial uses
Rural Development Area (RDA)	Areas that are slightly modified and suitable for limited future development; represents a balance of environmental and development values that is intermediate between the pristine Forest Area and existing growth areas	Clustered housing on one acre lots at an average density of 1 home per 5 acres	Community commercial and light industrial uses on septic; intensive recreation
Regional Growth Area (RGA)	Areas of existing growth and adjacent lands capable of accommodating regional growth influences while protecting the essential character and environment of the Pinelands	2 to 6 homes per acre with sewers	Sewered commercial and industrial uses
Pinelands Village	Small, existing, spatially discrete settlements that are appropriate for infill residential, commercial, and industrial development compatible with existing character	1 to 5 acre lots	Commercial and industrial uses compatible with existing character
Pinelands Town	Large, existing, spatially discrete settlements, generally with wastewater or water supply systems	2 to 4 homes per acre with sewers	Sewered commercial and industrial uses
Military and Federal Installation Area (M/F)	Federal enclaves within the Pinelands	Not Applicable	Any use associated with the function of the installation or other public purpose use

Figure 1.1: Pinelands Land Capability Map



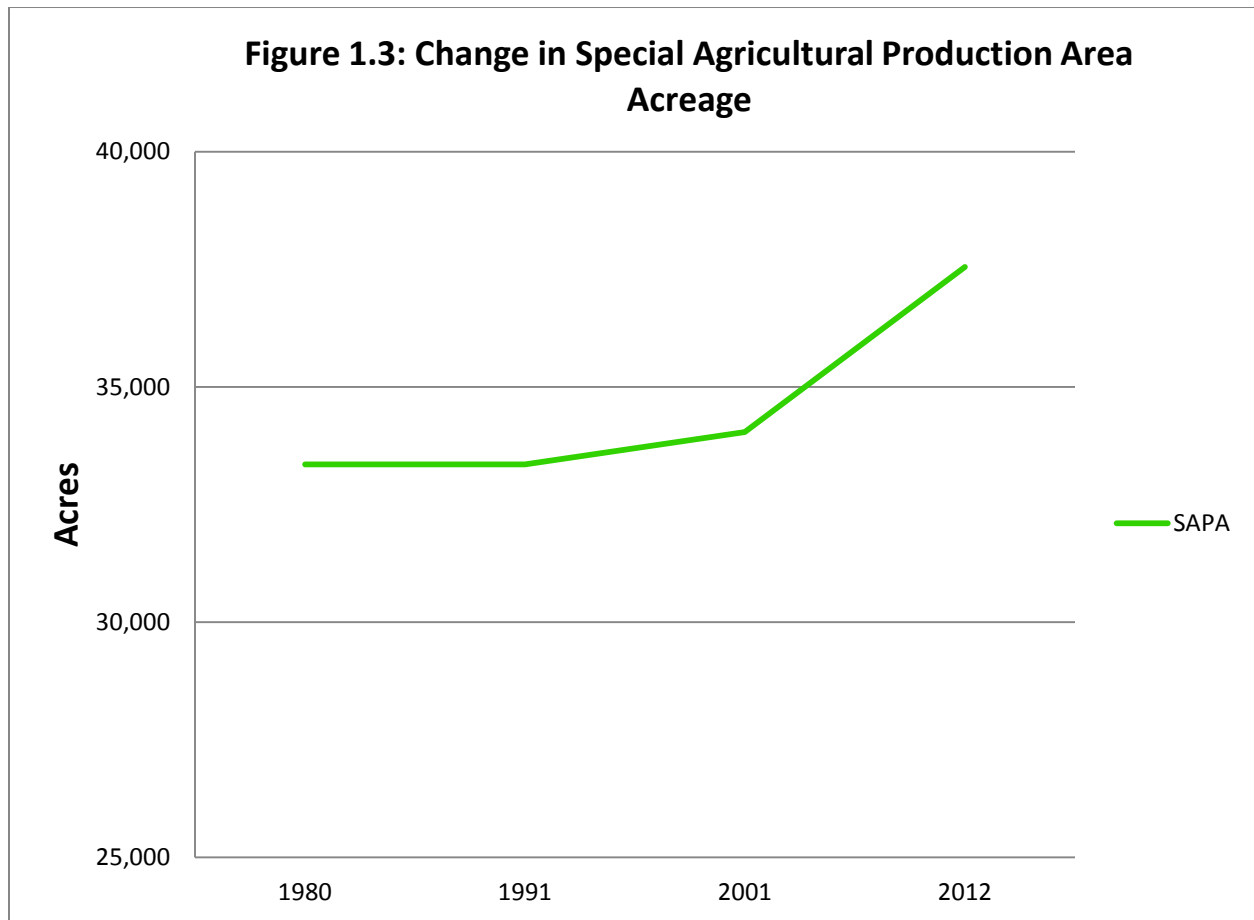
Preservation Area District

Between January 2002 and June 2012, the Commission certified five management area changes that affected the PAD. Of most significance was the redesignation of 3,510 acres in Bass River Township from the PAD to a new SAPA to recognize an existing cranberry operation. Also, 195 acres in Shamong Township were redesignated from the PAD to the APA to recognize an existing turf farm. Small additions were made to the PAD in Bass River and Lacey townships when lands were removed from the Pinelands Villages of New Gretna and Bamber Lake to reflect public ownership and environmental limitations. The net effect of these approved changes was a reduction in PAD acreage of 3,645 acres.



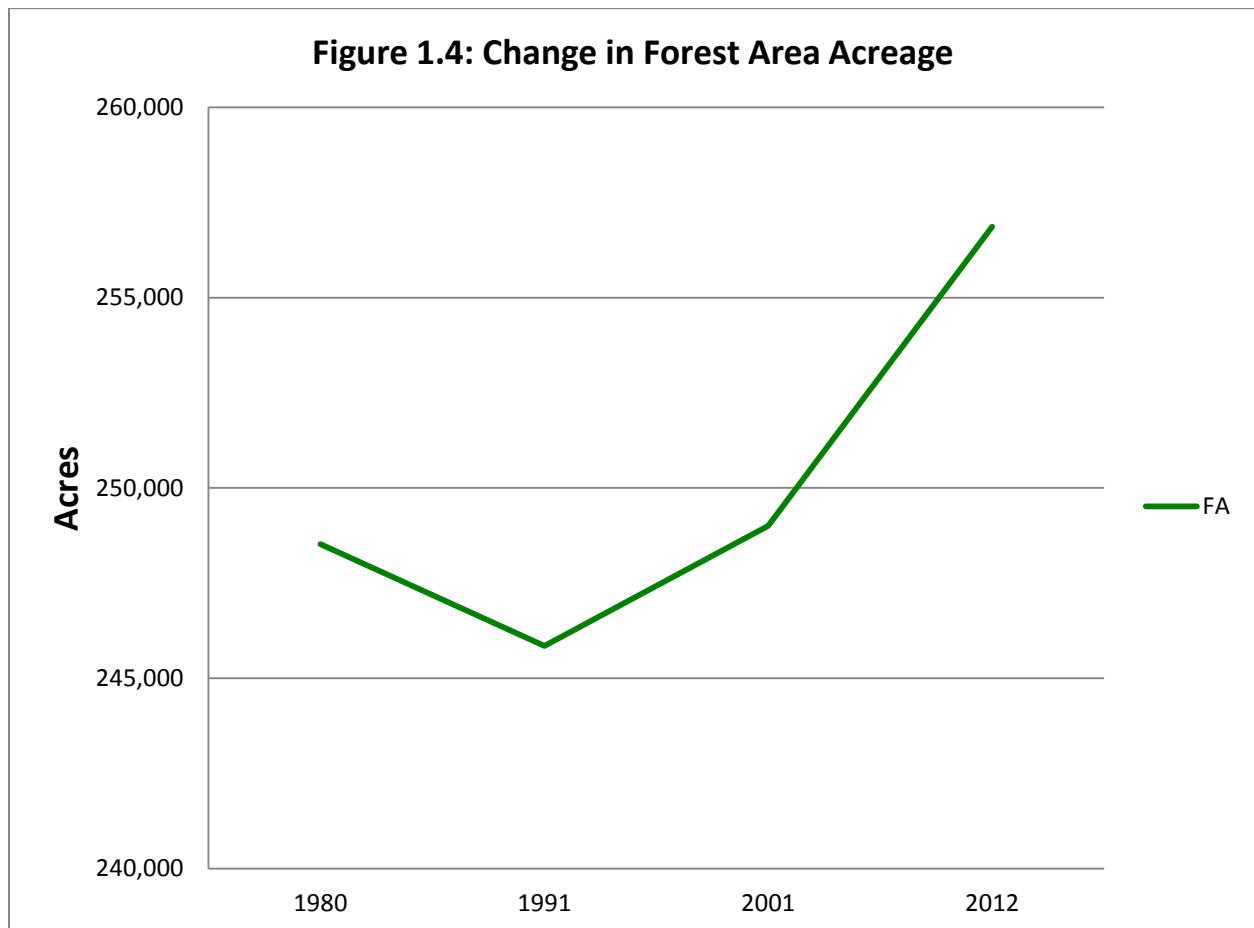
Special Agricultural Production Area

As noted above, the Commission approved the establishment of a new SAPA in Bass River Township to recognize an existing 3,510-acre cranberry operation. The new management area designation qualified the affected lands for an increased PDC allocation based on the formula contained in the CMP. In 2006, PDCs were severed from a large portion of the redesignated lands, resulting in the permanent protection of approximately 2,500 acres. No other changes to the boundaries of the SAPA were approved by the Commission.



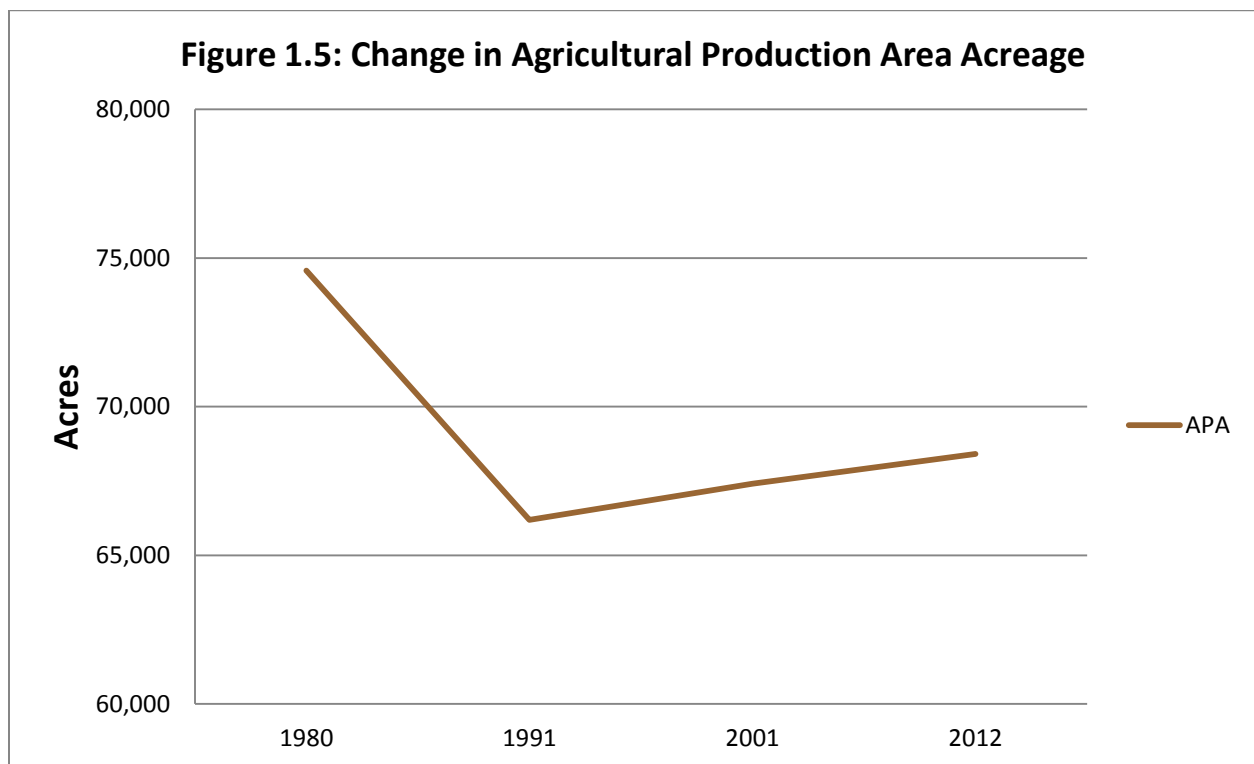
Forest Area

The Commission certified 13 management area changes affecting the FA, the net result of which was a nearly 8,000-acre increase in the size of the FA. Large increases occurred in Ocean and Lacey townships, where approximately 4,000 acres in the pristine Oyster Creek watershed were redesignated from the RDA to the FA as a result of an amendment to the Pinelands Land Capability Map. Close to 2,800 acres of state-owned and other environmentally-sensitive lands in Monroe Township were redesignated from RDA to FA to provide an offset for a small expansion of the RGA along the Black Horse Pike. In Jackson Township, the FA increased by nearly 1,500 acres when lands were redesignated from the RDA and various Pinelands Villages in order to implement the recommendations of the Toms River Corridor Plan. Upper Township saw a net increase in its FA of 770 acres as the result of a comprehensive master plan reexamination designed to facilitate the development of a proposed golf course on lands in the RDA. Berkeley Township redesignated 135 acres within the Jake's Branch watershed from the RGA to the FA in order to reduce development potential in recognition of threatened and endangered species issues and to continue an open space corridor. The redesignated lands in Berkeley were subsequently acquired and protected by Ocean County. The only notable decreases in the Forest Area occurred in Buena Vista Township and the Town of Hammonton, where a total of 965 acres were redesignated as APA to reflect existing agricultural uses, and in Maurice River Township, where 325 acres were redesignated as RDA to facilitate creation of a new planned highway business zone on Route 347.



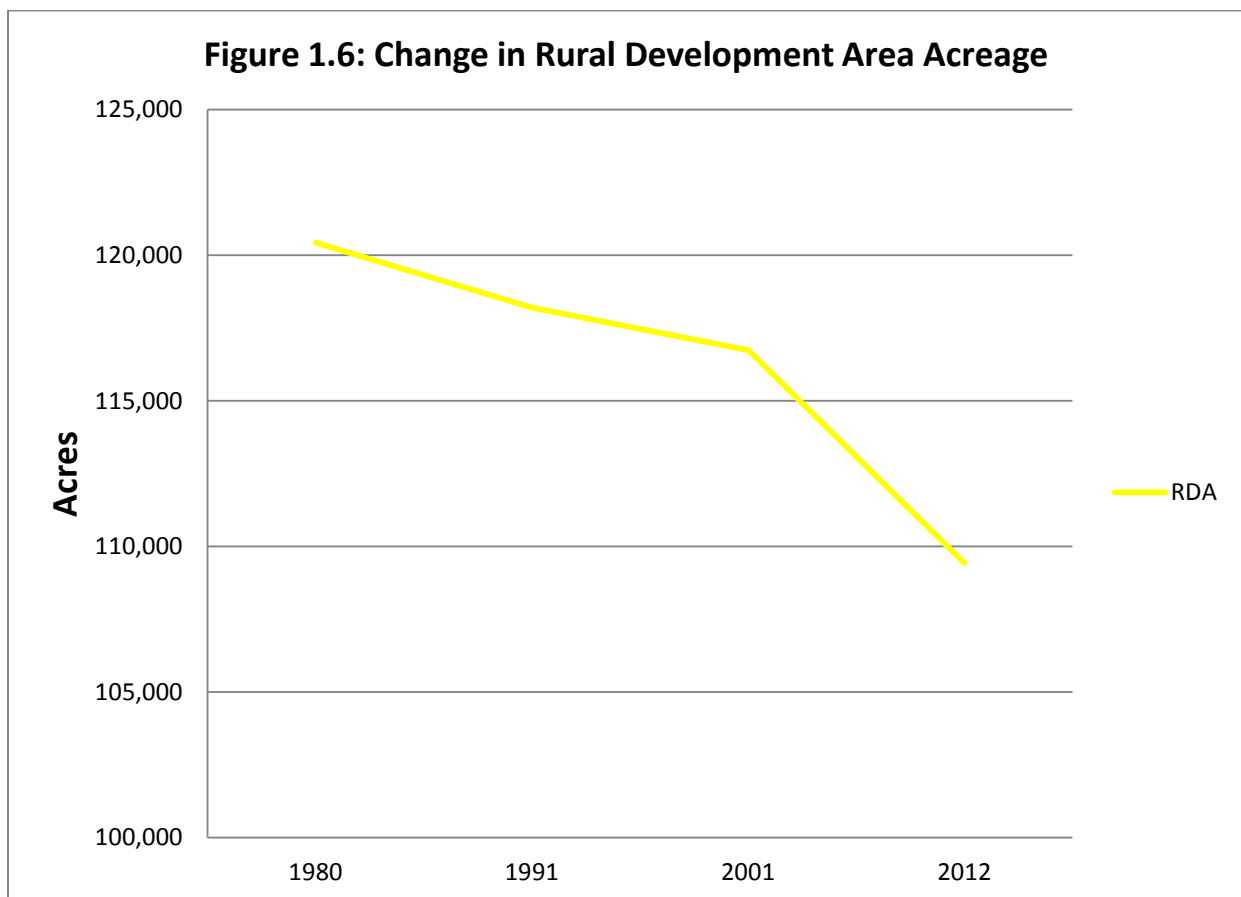
Agricultural Production Area

The Commission certified 11 management area changes that involved the APA during this reporting period, resulting in a net increase of nearly 1,000 acres. Five of these changes involved the redesignation of actively-farmed lands from the FA, RDA and one Pinelands Village to the APA in order to qualify the affected parcels for allocations of PDCs and ultimately allow the landowners to take advantage of the State Agricultural Development Committee's program to purchase farmland easements in the Pinelands APA. A total of 1,055 acres in four municipalities (Buena Vista Township, Franklin Township, the Town of Hammonton and Mullica Township) were redesignated to the APA for these purposes. Another 195 acres in Shamong Township were redesignated from the PAD to the APA to recognize an existing turf farm. The only significant reduction in APA acreage occurred in Monroe Township, where 263 acres were redesignated from APA to RDA to recognize existing uses and facilitate development of an active recreation complex on municipally-owned land. Other small decreases occurred in Buena Borough, where 16 acres were redesignated to the Pinelands Town of Buena, and Tabernacle Township, where 22 acres were redesignated to the Pinelands Village of Tabernacle, to recognize existing development.



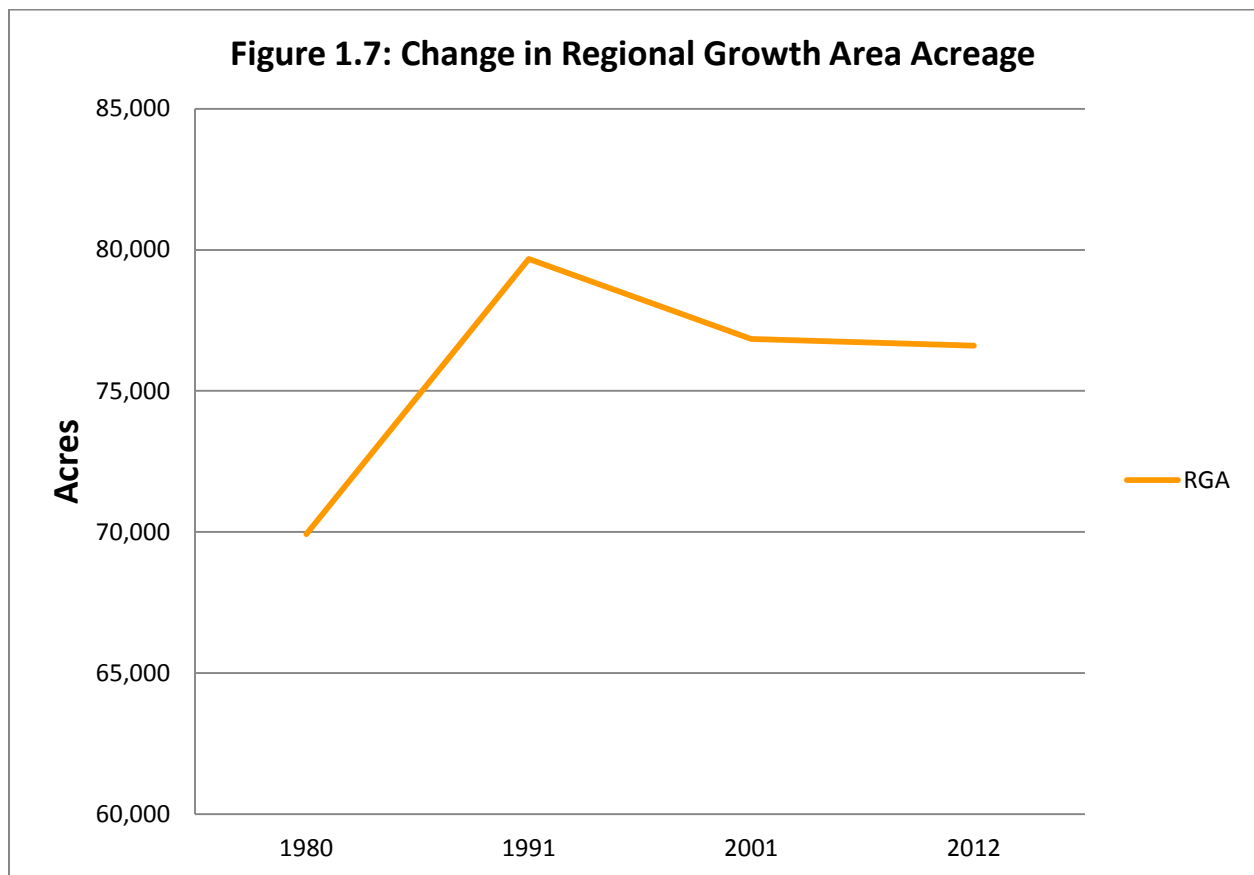
Rural Development Area

The Commission approved management area changes affecting the RDAs of 14 municipalities during this reporting period. Significant increases in RDA acreage occurred in Jackson Township (760 acres) and Manchester Township (153 acres) when the two municipalities implemented downzoning recommendations made in the Toms River Corridor Report. Maurice River Township also increased the size of its RDA by redesignating 322 acres along County Route 347 from the FA to the RDA to facilitate planned highway business development. Significant decreases also occurred. In Lacey and Ocean townships, 4,000 acres in the Oyster Creek basin were redesignated from the RDA to the FA in response to the Commission’s adoption of an amendment to the CMP. In Upper Township, the RDA saw a 702-acre net decrease as the result of revisions to the municipality’s zoning plan. The plan was designed to accommodate a new golf course while providing additional protection to more environmentally-sensitive lands. In Monroe Township, 2,785 acres of mostly forested land featuring exceptional habitat were redesignated from the RDA to the FA to serve as an offset for the redesignation of 128 acres to the RGA along the Black Horse Pike. The RDA in Galloway Township was reduced by 470 acres when lands on the campus of Stockton College were redesignated to the RGA in accordance with an overall master plan for the campus. Finally, 272 acres in Hamilton’s RDA that were previously included in a municipal reserve area were redesignated as RGA to recognize their proximity to existing infrastructure and ultimate suitability for residential development. The approved changes resulted in a 7,300-acre decrease in the RDA.



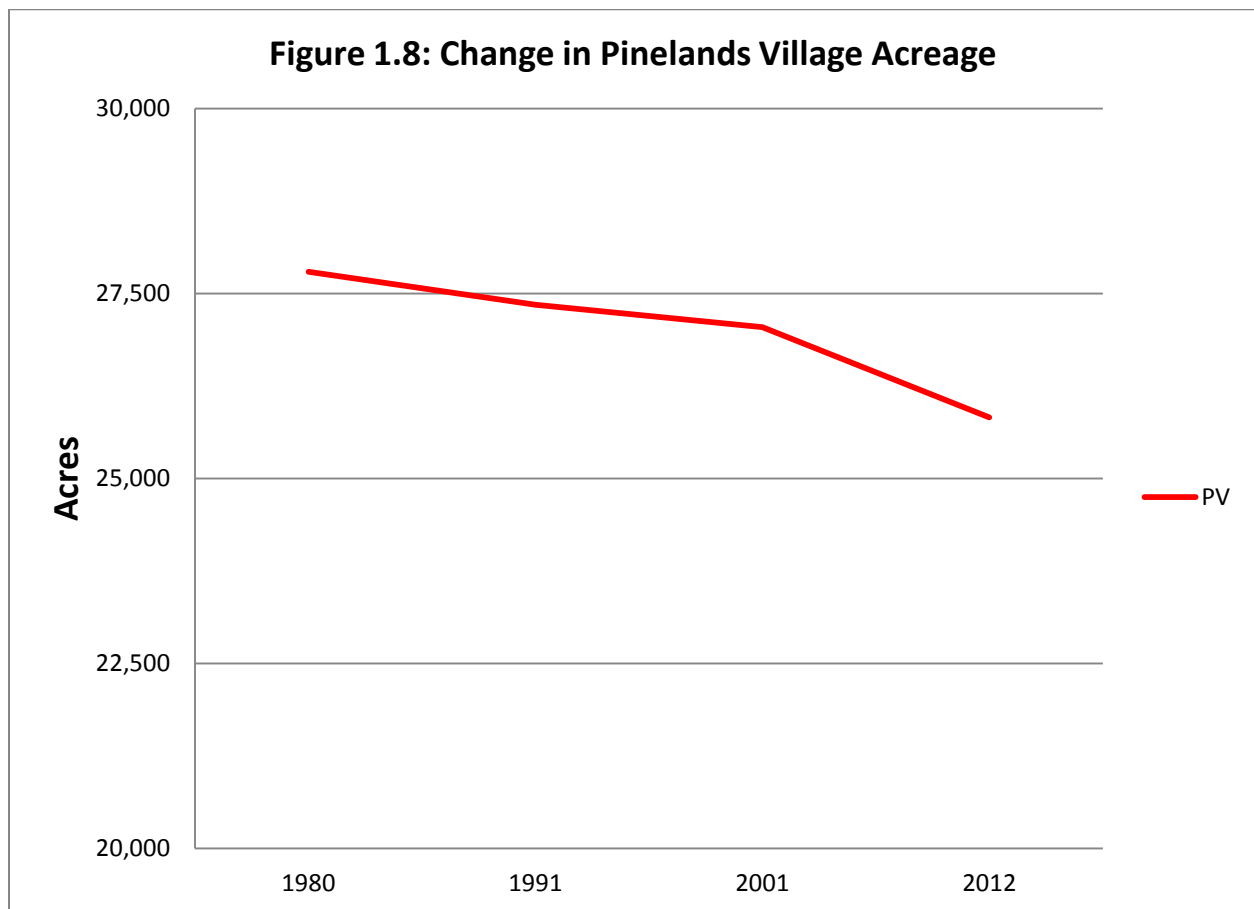
Regional Growth Area

The RGA decreased in size by 242 acres during this reporting period as a result of management area changes that the Commission approved in six municipalities. The most significant increase occurred in Galloway Township, where the Commission approved the redesignation of 470 acres on the campus of The Richard Stockton College of New Jersey from the RDA to the RGA as part of a comprehensive master plan for the campus. In Hamilton Township, 272 acres previously included within a municipal reserve area were permanently converted to the RGA. The only other increases of note occurred in Monroe Township, where 128 acres along the Black Horse Pike were redesignated from the RDA to the RGA to allow for the establishment of a high-density, mixed-use zoning district on already disturbed lands and 44 acres along Corkery Lane were redesignated from the RDA to the RGA to recognize existing uses. Decreases in RGA acreage occurred in Jackson and Manchester townships, where a total of 725 acres were redesignated to the RDA and downzoned to recognize environmentally-sensitive lands identified in the Toms River Corridor Plan. In Berkeley Township, 135 acres were redesignated to the FA largely to recognize limited development potential due to threatened and endangered species issues. Finally, RGA lands in Monroe Township were redesignated to the RDA (187 acres) and APA (43 acres) to offset several increases the Township requested.



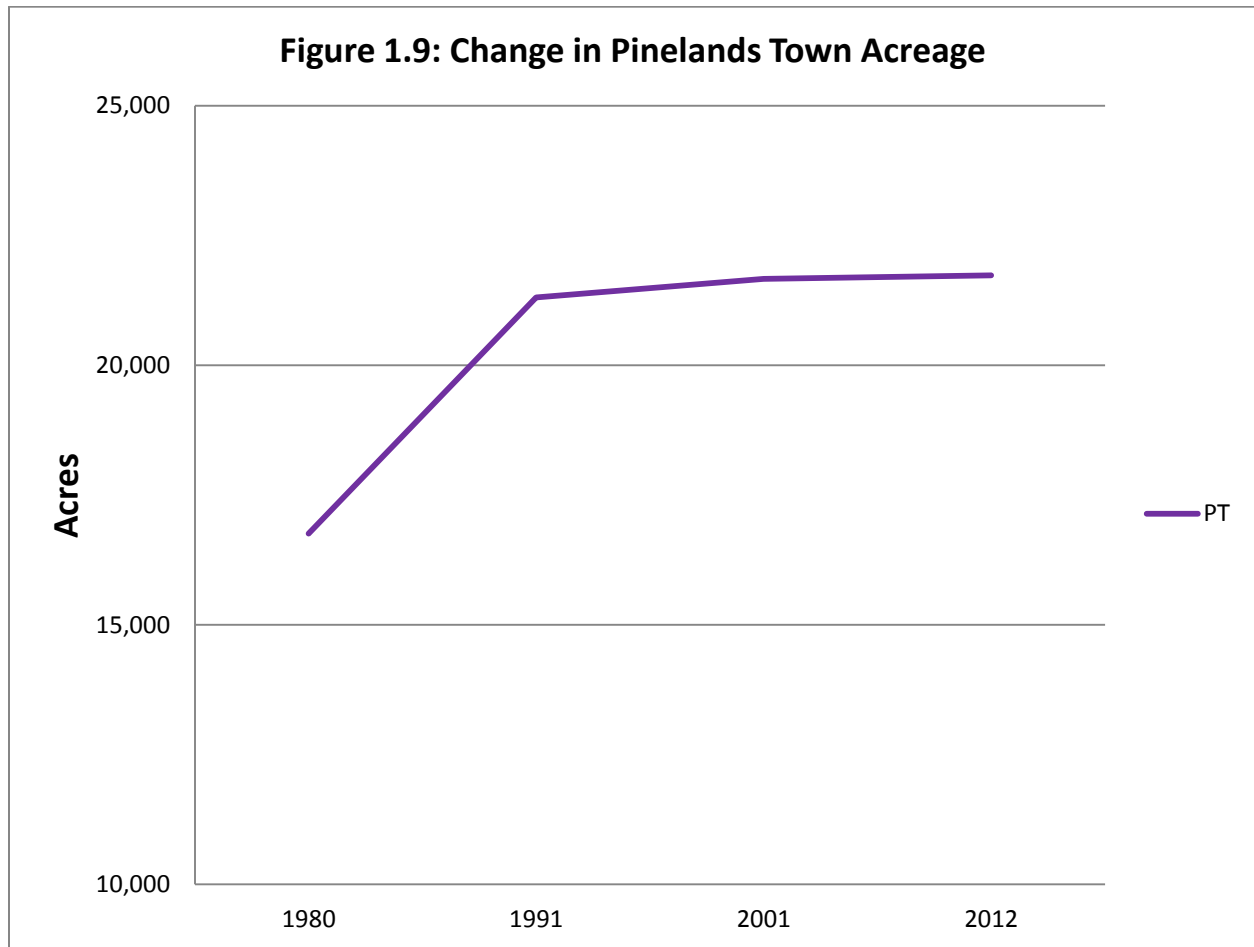
Pinelands Villages

The Commission approved management area changes affecting 10 Pinelands Villages during this reporting period. In Jackson Township, the Pinelands Villages of Cassville, Legler and Van Hiseville were decreased by 400, 600 and 100 acres, respectively, in order to reduce development potential in accordance with the recommendations of the Toms River Corridor Plan. Other Pinelands Villages were also decreased in size: Bamber Lake in Lacey Township by 33 acres; New Gretna in Bass River Township by 22 acres; and Tuckahoe in Upper Township by 67 acres. All four of Mullica Township's Pinelands Villages also shrunk in size, Elwood by one acre, Nesco by seven acres, Sweetwater by five acres and Weekstown by five acres. The only Pinelands Village to see an increase in acreage was Tabernacle, where 23 acres were redesignated from the APA to recognize existing residential and institutional uses. These changes resulted in an overall decrease in the size of Pinelands Villages of 1,218 acres.



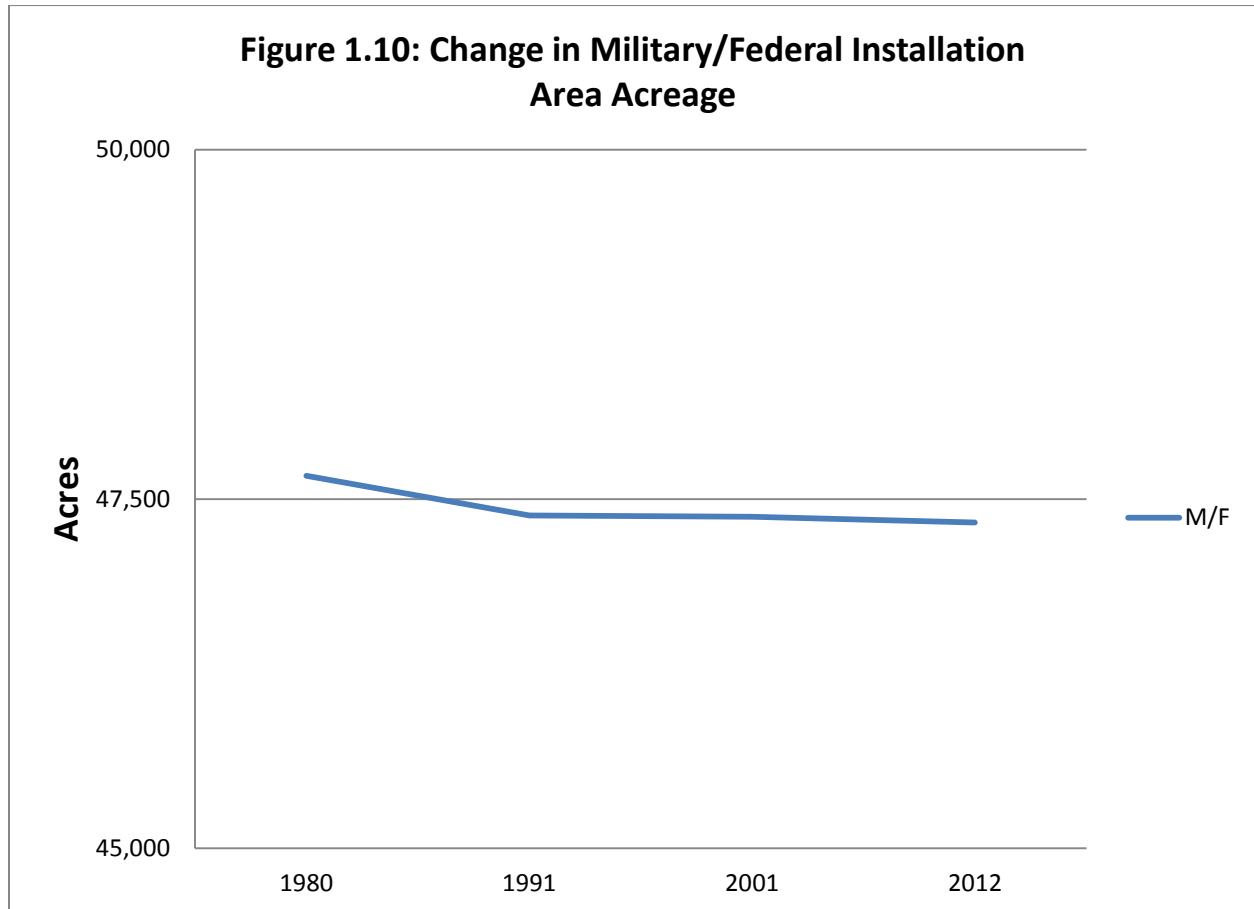
Pinelands Towns

Five changes involving the boundaries of Pinelands Towns were approved during this reporting period, resulting in an overall increase of 69 acres. The approved changes include small increases in Buena Borough and Mullica Township to recognize existing development and a small decrease in Egg Harbor City to reflect the environmental limitations of several parcels. Of most significance was the Commission's creation of a new Pinelands Town area in the Borough of Wrightstown to recognize that municipality's acquisition of 40 acres in the Pinelands Area previously owned by the Federal government as part of what is now Joint Base McGuire-Dix-Lakehurst.



Military and Federal Installation Area

The M/F Area decreased by 40 acres when the Commission amended the Land Capability Map to reflect the transfer of federally-owned land to the Borough of Wrightstown. The Commission designated the 40 acres as a new Pinelands Town area. Soon thereafter, Wrightstown Borough adopted a redevelopment plan encompassing the 40 acres with the goal of facilitating mixed use development. No other changes to this management area were made during the reporting period.

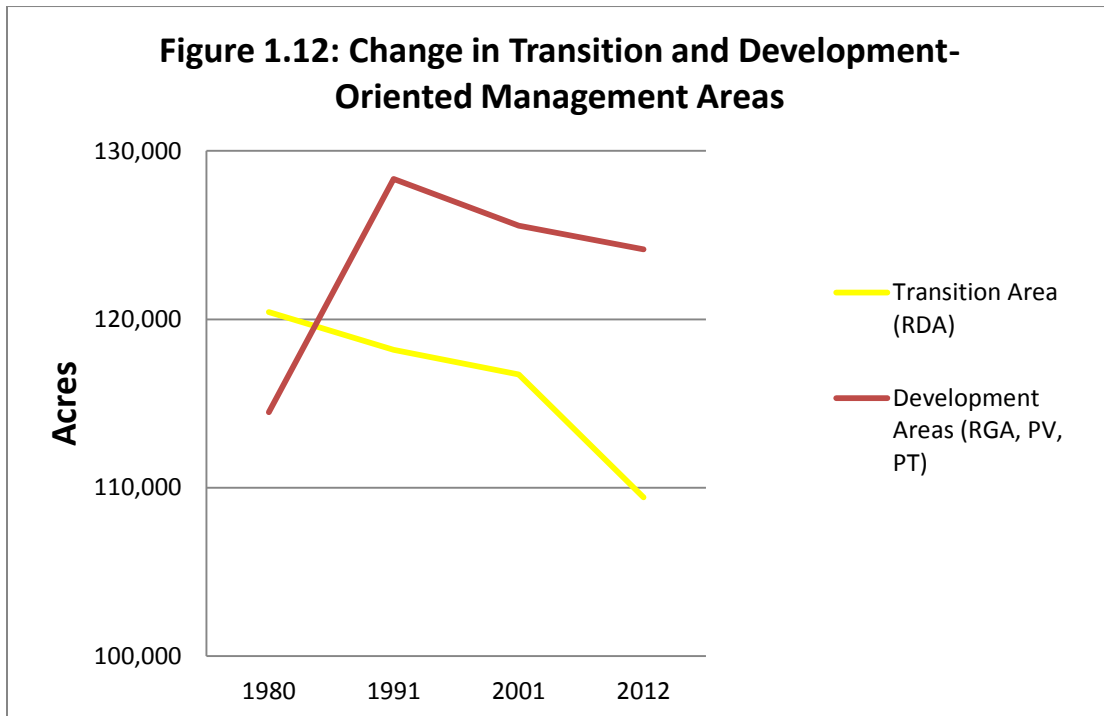
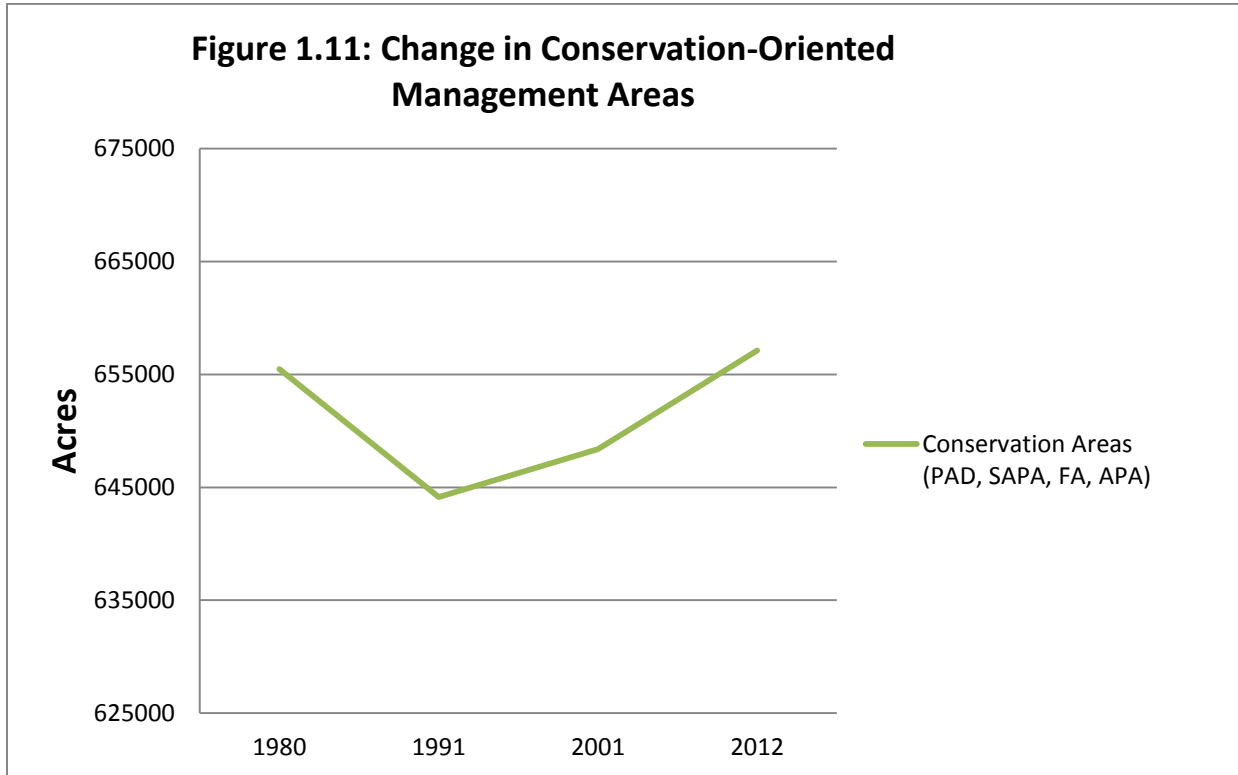


Management Area Summary

Continuing the trend from the last Plan Review Report, the SAPA, FA, APA and Pinelands Town management areas increased in size between 2002 and 2012 and the PAD, RDA, Pinelands Villages, RGA and M/F Area decreased. The most significant changes in terms of acreage occurred in the FA and RDA: the FA increased by nearly 8,000 acres while the RDA decreased by over 7,000 acres.

As a whole, the conservation-oriented management areas (PAD, SAPA, FA and APA) have increased steadily since 1991, as is shown on Figure 1.11. Approximately 13,000 acres were added to the conservation areas between 1991 and 2012 so that they now include more acreage than when the CMP was adopted in 1980. In contrast, the development-oriented management areas as a whole (RGA, Pinelands Villages and Towns) have seen a 3.25% decrease (4,200 acres) over the last two decades, as

shown on Figure 1.12. Perhaps most striking is the decrease in size of the RDA over time. Between 1980 and 2012, the RDA shrunk by 9% (11,000 acres). This relatively large change reflects the fact that the RDA serves as a transition or intermediate area between the more conservation-oriented management areas and existing growth areas. It contains a mixture of existing uses (agriculture, residential and commercial development) as well as areas of environmental sensitivity. Therefore, adjustments to the RDA’s boundaries to better reflect existing land use and environmental constraints are not uncommon.



Other Notable Zoning Changes

In 2001, the Commission adopted a set of CMP amendments that provides those municipalities with assigned RGA densities of 3.0 or 3.5 units per developable acre an opportunity to reduce those densities to as low as 2.5 units per developable acre, if certain conditions are met. These conditions include a requirement to provide appropriate opportunities for using Pinelands Development Credits (PDCs). They also require municipalities to provide the Commission with a description of those ongoing and future efforts, projects and other measures they intend to implement or recommend be implemented by other agencies to address needs and objectives related to infrastructure, utility service, recreation, conservation, economic development, housing and community development. After these CMP amendments took effect in 2002, three municipalities adopted revised zoning plans to implement the permitted reduction in residential density. Hamilton Township revised its RGA zoning plan to accommodate reduced densities for conventional single-family detached residential development as well as for planned adult communities. Egg Harbor Township adopted an entirely new RGA zoning plan that combined various residential zones, established new nonresidential zones and reduced densities throughout the RGA. Manchester Township revised its RGA zoning plan through the creation of new zoning districts designed to implement a number of affordable housing settlements as well as the Toms River Corridor Plan. The Commission approved Hamilton and Egg Harbor Township's density reductions in 2002. Manchester Township's revised zoning plan was approved in 2007. In total, the three municipalities reduced their residential zoning capacities by approximately 11,000 units.

In 2004, the Commission approved ordinances in Barnegat Township that establish a new zoning plan for an existing 810-acre subdivision within the municipality's RGA known as Ocean Acres. The revised zoning plan created a new conservation zone, the boundaries of which were drawn to encompass wetlands and wetlands buffer areas, as well as areas that were determined to constitute critical habitat for one or more local populations of threatened or endangered species. An attempt was also made to link the conservation zone with surrounding areas in public or non-profit ownership, as well as with adjacent lands already set aside or proposed to be set aside as open space in other adjacent development projects due to the existence of critical habitat. In recognition of the environmental sensitivity of lands in the conservation zone, permitted uses were limited to fish and wildlife management, low intensity recreation and the maintenance of existing infrastructure. New residential development was allowed in Ocean Acres only outside the new conservation zone. Within the designated development zone, new homes were allowed to be constructed on lots that normally would be viewed as "undersized," provided lands in the new conservation zone were permanently protected or PDCs were purchased and redeemed. At the time the Township's ordinances were adopted, it was estimated there were 350 acres and 730 existing lots in the conservation zone in need of protection and 567 "undersized" lots in the development zone. Several years later, the Commission approved an additional ordinance that expanded the development zone to include an additional 135 lots after surveys determined that the area did not contain habitat critical for the survival of a local population of Northern pine snakes. It is estimated that approximately 155 acres of land and 85 individual lots in the conservation zone have been permanently protected as a result of Barnegat's revised zoning plan.

In 2010, the Commission approved a new master plan for The Richard Stockton College of New Jersey in Galloway Township. The master plan sets forth a comprehensive blueprint for the future development

and expansion of the College's campus in recognition of increased enrollment and projections of future growth. The master plan calls for the permanent protection of 1,257 acres of land on and near the college's campus. It also increases the size of the College's development area by approximately 450 acres and the amount of developable land by 151 acres. The College agreed to use low-impact design and construction principles by minimizing disturbance of forested areas, clustering development away from wetlands and deed-restricted areas, and minimizing turf. Soon after the Commission's approval of the master plan, the College executed deed restrictions on the 1,257 acres identified in the master plan for permanent protection.



The land shown above was permanently preserved at The Richard Stockton College of New Jersey as part of the college's new Master Plan. Photo/Paul Leakan

Throughout the reporting period, the Commission also approved a number of ordinances designed to meet municipal affordable housing obligations within the RGA. Many of these ordinances involved the creation of new zoning districts in areas that had previously been zoned for low-density residential development or nonresidential development. Higher densities were necessary to facilitate the production of low- and moderate-income housing; however, PDC obligations still needed to be accommodated. To ensure that both public purposes could be met, the Commission relied on a creative approach that allowed higher residential densities with a mandatory PDC obligation applicable only to the market rate units developed within one of the new zones. No PDC obligation was applied to the affordable units constructed within the zones. This approach was implemented in the RGAs of Egg Harbor, Hamilton, Manchester, Medford, Monroe, and Stafford townships.

Finally, the Commission approved ordinances that adopted 21 redevelopment plans in 13 municipalities. The redevelopment areas governed by these plans range from very small (five acre) areas targeted for high-density residential or mixed-use development to large areas containing closed landfills now proposed for industrial use. The majority (11) are located in the RGA, with eight in Pinelands Towns, one in the RDA and one in the Pinelands Village of Richland. While the Commission does not have the authority under the CMP to review municipal determinations of whether a particular area is in need of redevelopment, the Commission does review municipal redevelopment plans to ensure their consistency with the land use and environmental standards of the CMP. It is worth noting that three of the approved redevelopment plans were adopted by Hamilton Township to implement recommendations made in that municipality's Livable Community Plan, prepared through the Pinelands Excellence Program (please see pages 31-33). These plans addressed the reuse of historic buildings in Mays Landing as well as redevelopment of the Atlantic City Racetrack property.

CMP Amendments

The Commission periodically amends the CMP to address new or changing conditions, recognize new technologies, resolve conflicts and respond to recommendations developed during the comprehensive plan review process. Following is a summary of the CMP amendments adopted by the Commission between January of 2002 and June of 2012.

Changes to Application Procedures

Fees and Escrows: In 2004, the Commission implemented the first application fees since the enactment of the Pinelands protection program. The fees were established to partially underwrite the direct costs associated with reviewing development applications and related services that support the development application process. Amendments to the fee schedule were later adopted in 2006 and 2008 to establish minimum and maximum application fees and achieve a more equitable distribution of the review costs amongst the many different types of development applications that the Commission is obligated to review. The 2004 amendments to the CMP also provided the Commission with the ability to require escrows for development applications involving complex issues that necessitate the hiring of consultants with specialized expertise. In 2008, these escrow requirements were expanded beyond development applications to include other matters pending before the Commission.

Withdrawal of Applications for Development: In 2007, the CMP was amended to better address situations where development applications submitted to the Commission for review remain incomplete for lengthy periods of time. Specifically, the CMP was revised to indicate that direct activity in furtherance of a development application must occur within two years of the Commission's request for information, or that application will be deemed withdrawn.

Changes to the Land Capability Map

Wrightstown: In 2003, the CMP was amended to designate a 40-acre portion of Wrightstown Borough in Burlington County as a Pinelands Town. Previously, the area in question had been located in a Military and Federal Installation Area. To recognize the Borough's acquisition of the 40 acres from the Federal government and its plans to make the land available for private, mixed use development, the Commission redesignated the 40 acres to a management area where such development is permitted. The Borough of Wrightstown thus joined Buena, Egg Harbor City, Hammonton, Lakehurst, Whiting and Woodbine as the seven Pinelands Towns in the Pinelands Area.

Oyster Creek Downzoning: In 2005, the CMP was amended to redesignate 4,000 acres of land in Lacey and Ocean townships from a Pinelands RDA to the more protective Pinelands FA. The change was prompted by a report issued by the Pinelands Commission's Science Office in March 2004. The report showed that the Oyster Creek and Waretown Creek watersheds displayed the essential ecological character of the Pinelands. Upon adoption of the CMP in 1980, more than half of the watershed was designated as a RDA. The designation at that time was due largely to the presence of the Southern Ocean Landfill and its anticipated impacts on water quality. Since that time, significant adverse impacts from the landfill have not occurred. The Commission's analysis determined the new FA designation

would result in less land disturbance, nonpoint source pollution and fragmentation of the Oyster Creek landscape. Lacey and Ocean townships subsequently implemented this redesignation by amending their zoning plans to include the 4,000 acres within low-density FA zoning districts.

Garden State Parkway: In 2006, the CMP was amended to establish an overlay district along the entire length of the Garden State Parkway, which traverses the Pinelands. The Garden State Parkway, which forms the eastern boundary of the Pinelands Area in the north and the Pinelands National Reserve in the south, is a limited access highway that was constructed by the State prior to the adoption of the CMP. The Parkway traverses multiple Pinelands management areas, serving as a major tourism roadway, the only north-south evacuation route in the southern New Jersey region, a commuter roadway and an interstate travel roadway. In establishing the overlay district, the Commission noted that is appropriate for the CMP to recognize this existing and important transportation corridor by developing a land use policy that may be applied consistently along the Parkway. Under the changes to the CMP, permitted uses in the Garden State Parkway Overlay District are primarily limited to the roadways, bridges, and accessory facilities associated with the operation and maintenance of the highway. Public service infrastructure, both underground and above-ground, is permitted, including communications and data transfer utilities. Local telecommunications towers also are permitted. New interchanges are not permitted; however, existing interchanges within the overlay district can be improved and expanded, provided that they do not stimulate inappropriate development in the conservation-oriented, agricultural or transitional areas of the Pinelands. The Garden State Parkway Overlay District is depicted on the Pinelands Land Capability Map (see Figure 1.1).

Changes to Permitted Uses

Municipal Reserves: The CMP allows municipalities to designate municipal reserves in Pinelands RGAs as a means to phase and plan for growth. The reserve areas are downzoned until other appropriately zoned districts that already have access to infrastructure are developed. The CMP was amended in 2006 to encourage more municipalities to use municipal reserves to better control the pace of residential development.

Local Communications Facilities: The CMP was amended in 2006 to clarify that an applicant must site a new wireless communications facility, such as an antenna or a new tower, on an existing structure or a site that would have the least visual impact on important Pinelands resources. A second change in the CMP set forth the type of sites where new local communications facilities may be located in the PAD, FA, SAPA and RDA. A third amendment was approved to provide the wireless communications industry and the Pinelands Commission with the flexibility to propose or require innovative ways to reduce the overall visual impact of such facilities.

Cumulative Cost of Waivers and Lot Size Variances: Amendments to the CMP adopted in 2006 cut in half the number of PDCs required for the development of undersized lots in Pinelands Villages, Pinelands Towns and RGAs in cases where a municipal variance and a waiver of strict compliance are required. Prior to the amendment, the development of such lots required the purchase of one-half of a PDC, or two development rights. In many cases, the use of an alternate design wastewater treatment system was also required, adding to the cost of development. An amendment to the CMP changed the requirement to one-quarter of a PDC, which significantly reduces the costs for those applicants who

require relief from CMP standards and municipal requirements in order to develop undersized lots in these development areas. At the time the CMP amendments were adopted, the Commission anticipated that a very limited number of applications would be affected by the reduction in PDC obligations over time. This assumption proved to be correct. Of the 34 waivers of strict compliance approved by the Commission since the amendment took effect, only six saw their PDC obligations reduced as a result of the amendment.

Nonconforming Uses: The CMP was amended in 2007 to stipulate that a nonconforming use will be considered abandoned if it is voluntarily ceased or discontinued for a period of two years. In general, the Commission's goal has been, and will continue to be, the ultimate cessation of nonconforming uses throughout the Pinelands. The amendment also defines "nonconforming use" and "abandonment" as it relates to nonconforming uses. The amendment makes clear that it is the applicant's responsibility to demonstrate that a nonconforming use has not been abandoned by providing objective proof of intent to continue the use.

Accessory Recycling Centers: Amendments to the CMP adopted in 2007 clarify that accessory recycling centers should be permitted in the PAD and FA only at those existing resource extraction sites and manufacturing sites that are within one mile of a RGA or Pinelands Town. The restriction is in keeping with the Commission's longstanding policy of locating waste management facilities in or near those areas from which the wastes, or in this case, recyclable materials, are generated.

Clustering: In an effort to better protect Pinelands resources, the CMP was amended in 2009 to require the clustering of residential development in the FA and RDA. The amendment requires municipalities to incorporate the clustering provisions into their zoning ordinances, and it seeks to preserve and maintain the essential character of the Pinelands environment while preventing the proliferation of homes on large lots scattered throughout the FA and RDA. Clustering is a style of development that allows reduced minimum lot sizes in exchange for the preservation of open space or other desirable features of a property. Clustering does not necessarily change the number of homes, but the individual lot sizes are smaller than that which would occur under a conventional lot layout. Development can be directed toward appropriate locations of a property, such as areas close to roads and other infrastructure, while natural resources such as critical habitat for rare plant and animal species can be protected.

The amendment requires the clustering of residential development in the FA and RDA on one acre lots. The open space created as a result of clustering must be permanently protected through deed restriction. Generally, the protected land will be owned by a homeowners association, a nonprofit organization or the municipality. The amendment also establishes bonus density provisions for clustered development in the FA and RDA in order to encourage the consolidation of small lots and the protection of larger areas of open space. In those rare cases where agricultural lands exist within that portion of the property to be protected through clustering, an agricultural easement may provide for continued agricultural use and expansion of that use up to 50 percent if certain conditions are met.

Solar Energy Facilities: The CMP was amended in 2011 to encourage the development of solar energy facilities in the Pinelands, while safeguarding the region's environment. The installation of accessory solar energy facilities on existing structures is now exempt from the need to file a development

application with the Commission. Pinelands municipalities are now authorized to permit solar energy facilities as a principal use in all management areas, provided all Pinelands environmental standards are met. Special limitations apply to solar energy facilities installed as a principal use in the PAD, SAPA, FA, APA and RDA.

Changes to Environmental Standards

Stormwater Management: In 2006, the Commission adopted a set of amendments to the CMP that require stormwater runoff to be managed in accordance with both NJDEP stormwater regulations and CMP regulations. These amendments were adopted to address stormwater-related water quality, groundwater recharge and water quantity impacts of major developments and to integrate the NJDEP requirements and current stormwater engineering practices into the CMP. These include requirements for pre-treatment and recharge of stormwater from high pollutant loading areas, specific site assessment protocols for major development, low-impact site design, standards for permanent stormwater facility maintenance and management of onsite soil resources, particularly in the post-construction period to test as-built field conditions against design assumptions. To assist Pinelands municipalities with the adoption of the new stormwater requirements, the Commission developed a model ordinance that integrated NJDEP and Pinelands regulations.

Rare Plants: In 2005, the CMP was amended to bolster the protection of rare plant species by incorporating the official State promulgated list of endangered plants. The change expanded the number of protected native Pinelands plants from 54 to 92. The State list, which is maintained by the New Jersey Division of Parks and Forestry, stands at 339 plants. It was adopted pursuant to legislation passed in 1989, or nine years after the adoption of the CMP. The State list includes only the most vulnerable plants, such as globally rare plants and species with five or fewer occurrences statewide.

Expansion of the Cape May Landfill: The CMP was amended in 2006 to allow landfill operations to occur on an additional 74 acres of disturbed land on the 486-acre property owned by the Cape May County Municipal Utilities Authority (CMCMUA) within the Pinelands Town management area in Upper Township and Woodbine Borough. Landfilling was previously authorized on 93 acres of the property. In exchange, the CMCMUA was required to deed-restrict the remaining portions of its land to protect it from future landfill activities while prohibiting any development on a roughly 90-acre portion of the property. The amendments also required the CMCMUA provide \$4.6 million to the Commission, an amount equal to one-half of the host community payments received by Upper Township and Woodbine Borough. These funds were placed within the Pinelands Conservation Fund and used to support land acquisition and other Pinelands protection initiatives. In terms of acquisition, the CMCMUA funds were used to permanently protect over 1,800 acres in the Pinelands Area, with an additional 270 acres in Cape May County pending.



The Sessile-leaf tick-trefoil, shown above, is one of the plants that gained additional protection under a CMP amendment.

Photo: Thomas G. Barnes, USDA, Natural Resource Conservation Service.

Forestry: In 2004, then Pinelands Commission Chairman James J. Florio reconstituted the Pinelands Forestry Advisory Committee as part of a new initiative aimed at ensuring that harvesting, land preparation and re-vegetation practices conducted in the Pinelands are consistent with the Commission's mandate to protect and maintain the Pinelands environment while ensuring that forestry is a viable economic and cultural resource. Chaired by Michael Catania, the Forestry Advisory Committee was composed of leading experts in the fields of forestry, forest ecology and conservation biology. The Committee presented a detailed report to the Commission in 2006 entitled "Recommended Forestry Management Practices." This report describes broad goals for forestry activity in the Pinelands, suggests methods to improve forest management planning on private and public lands and recommends silvicultural practices for the Pinelands. The report was used to guide the drafting of amendments to the CMP that were adopted by the Commission in 2009 and 2010. These amendments incorporate new forestry application requirements and environmental standards designed to encourage specific practices that can be used to sustain and improve the overall health of Pinelands forests. Fourteen different forestry techniques are now defined, and the CMP indicates where and how a particular practice should be conducted, and what controls should be applied to avoid potentially negative environmental impacts.

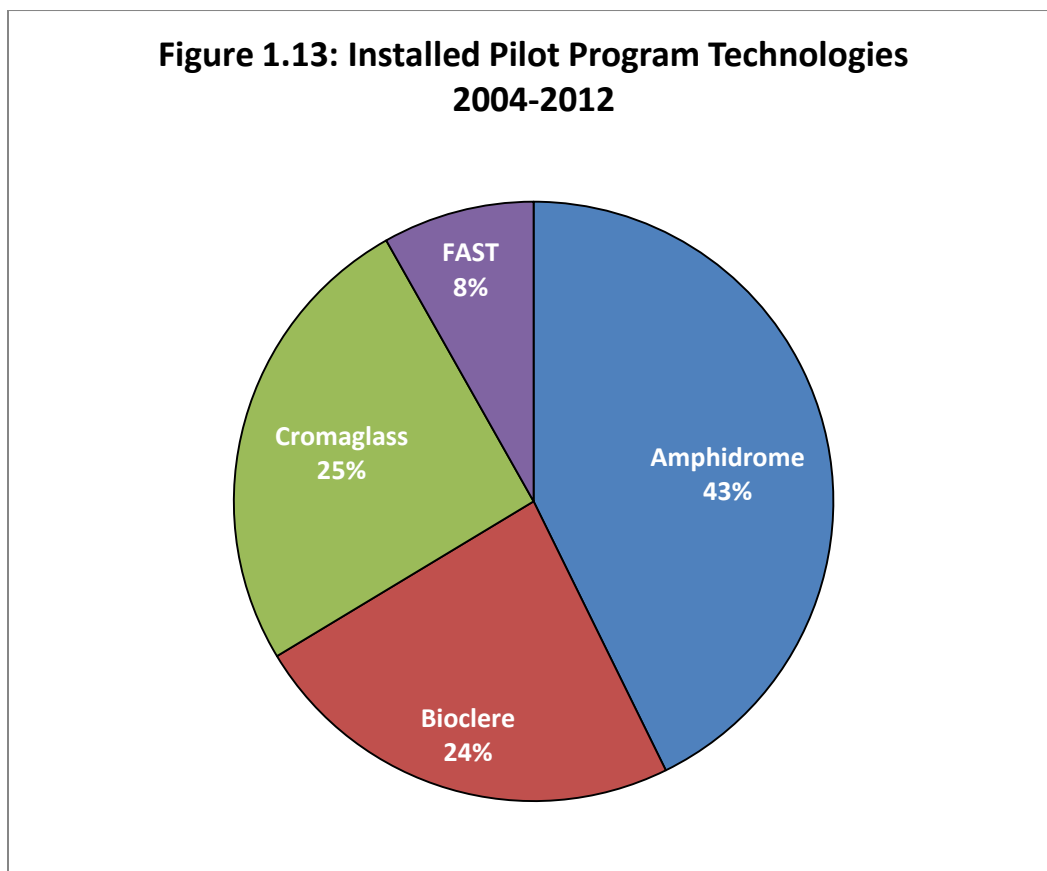
Wetlands Restoration: The CMP was amended in 2009 to facilitate the restoration of wetlands systems in the Pinelands. Wetlands are an essential element of the Pinelands' ecology because they provide critical habitat for many rare plant and animal species and they maintain ground and surface water quality. They also provide critical stormwater storage capacity that helps control flooding. Development is generally prohibited within all wetlands in the Pinelands, and activities that have an irreversible effect on wetlands' ecological integrity are strictly prohibited. However, these limitations posed a dilemma when the Commission received proposals to restore wetland communities that have been impacted or altered due to human activities such as agriculture or urban development. These restoration projects might be viewed as inconsistent with Pinelands rules despite the beneficial effects they might provide to these wetlands. In an effort to solve this dilemma, the CMP was amended to permit certain management activities in wetlands. Examples of these activities include allowing the establishment of characteristic wetlands on inactive farmland, the removal of exotic plant species or Phragmites from a wetland and activities that achieve ecological goals such as preventing the loss of a rare wetland community through succession, expanding a rare type of wetland community or creating more favorable conditions for the viability of rare plant or animal populations.

Pilot Programs

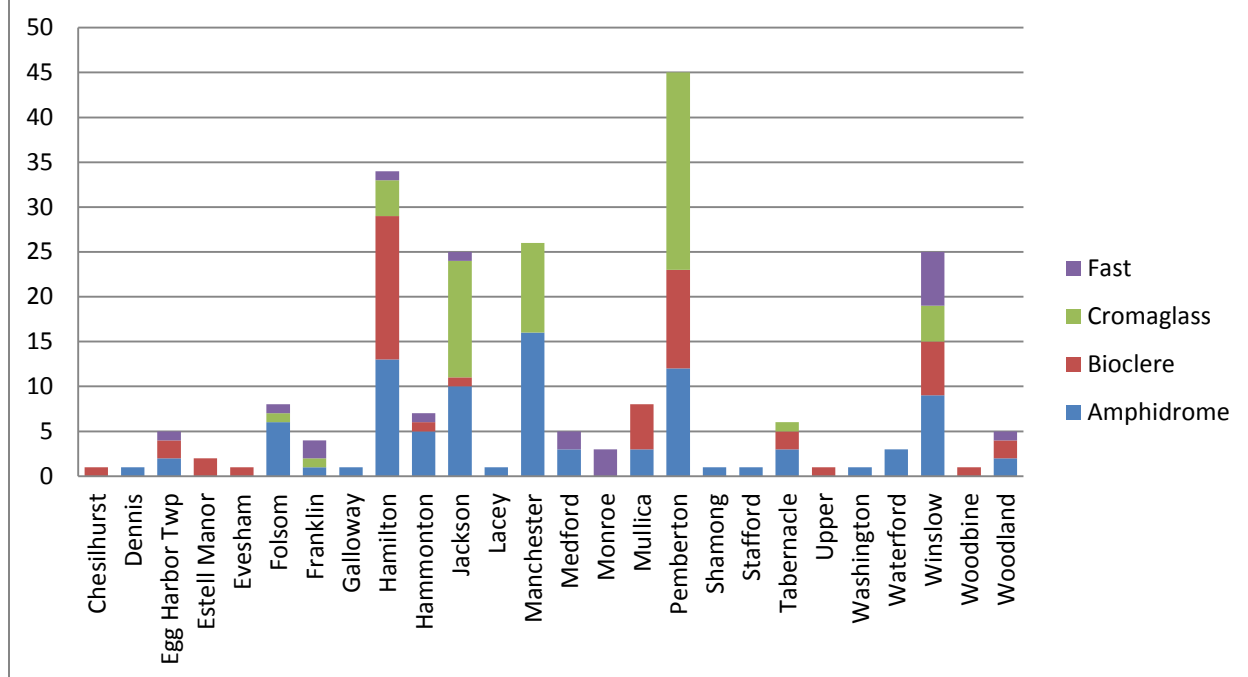
Alternate Design Wastewater Treatment Systems: In 2000, the Commission formed a special Ad Hoc Septic System Committee to research alternate septic system technologies that might better meet the water quality standards of the CMP for residential development on lots smaller than 3.2 acres, where such lots were already authorized. In its research efforts, the Committee consulted wastewater engineering professionals, state and regional on-site technology demonstration projects, alternate treatment system technology manufacturers, Pinelands Area county health departments and other state and local agencies. Based on this research, the Committee identified five technologies that it determined could be expected to meet Pinelands water quality standards for residential development on lots smaller than 3.2 acres in size. The identified technologies were the Amphidrome, Ashco RFS^{III}, Cromaglass, Bioclere and FAST treatment systems. Based upon nitrogen removal expectations and the Pinelands Septic Dilution Model, the Committee concluded the Amphidrome, Cromaglass, Bioclere and FAST

systems could be permitted on lots of at least one acre and that the Ashco RFS^{III} system could be allowed on residential lots of at least 1.5 acres. All of the identified systems utilize proven biological nutrient removal processes to reduce nitrogen levels in treated wastewater. The water quality requirements of the CMP include provisions that are aimed at controlling the amount of nitrogen that enters the environment because nitrogen itself is a significant pollutant and because it often serves as an indicator of changes in overall water quality.

The Ad Hoc Septic System Committee unanimously recommended that an interim program be developed for the approval, installation and monitoring of the five identified wastewater treatment technologies and that the interim program include conditions and safeguards to govern their use. To implement these recommendations, the Commission amended the CMP in 2002 to establish the Alternate Design Treatment Systems Pilot Program. The Pilot Program was implemented to provide a means to test whether the five identified technologies could be maintained and operated so as to meet the water quality standards of the CMP in a manner that a homeowner can be reasonably expected to follow. Implementation of the Pilot Program commenced in August of 2002, with the first pilot program treatment system installed and brought on line in April of 2004. A total of 220 Pilot Program systems were installed in the Pinelands Area through July, 2012. Figures 1.13 and 1.14 provide further details on technology type and location of the installed systems.



**Figure 1.14: Location of Pilot Program Systems
2004-2012**



Three implementation reports have been completed since the establishment of the Pilot Program. In the 2006 report, the Executive Director determined that one of the technologies (Ashco RFS^{III}) should be removed from the pilot program and that insufficient data was available to render a determination regarding the four other treatment technologies. The Executive Director recommended that the pilot program be extended by an additional three years (through August 2010) to allow for the collection of additional data. The Commission adopted amendments to the CMP to implement these recommendations in 2007.

In the November 2009 implementation report, the Executive Director recommended that the Amphidrome and Bioclere treatment technologies be granted permanent approval status, that the Pilot Program be extended for the Cromaglass and FAST treatment technologies by an additional three years (through August 2013) to allow for the collection and analysis of additional data, and that the Pilot Program be expanded to permit additional prescreened technologies to participate in the pilot program through August 2016. The Commission adopted amendments to the CMP to implement these recommendations in 2010. In accordance with these amendments, four new technologies, Hoot ANR, SeptiTech, BioBarrier and Busse Green MBR, were approved for participation in the Pilot Program in September of 2011.

In the November 2012 implementation report, the Executive Director recommended that the Pilot Program once again be extended for two of the original five pilot program systems, Cromaglass and FAST, in order to provide an opportunity for continued installation of the systems and further evaluation of the systems through an ongoing assessment of monitoring and retrofits. The Executive Director later recommended that the Cromaglass technology be removed from the Pilot Program entirely, with no further installations permitted. A temporary suspension barring new installations of the Cromaglass technology has been in place since November 15, 2006. This suspension was imposed as a result of the

Commission's prior finding that the Cromaglass technology had not met CMP groundwater quality standards. The Cromaglass technology produced a grand median total nitrogen concentration of 31.5 mg/l, failing to meet the CMP's 14.0 mg/l total nitrogen standard for unsewered residential development on a minimum one acre parcel. Amendments to the CMP to implement these recommendations are pending.

Because the Pilot Program systems are technologically sophisticated, care must also be taken to properly operate and maintain them on a long-term basis. With help from a DEP grant, in November 2006, the Pinelands Commission retained a consultant with expertise in septic system management to investigate options for their management in the Pinelands. The consultant analyzed the existing regulatory framework pertaining to the operation and management of onsite wastewater systems. This included a review of State statutes and regulations, local ordinances and practices, and regional and sub-regional institutional entities (utility authorities, environmental health agencies, etc.) that could play a role in the long-term management of septic systems. Based on this review, the CMP was amended in 2009 to establish new management standards for advanced wastewater treatment systems in the Pinelands. The rules set forth a series of measures that provide for the long-term maintenance of "alternative" or advanced treatment systems, including certification that these systems are in good repair and are functioning properly.

Fort Dix Consumer Electronics Recycling: The Fort Dix Consumer Electronics Recycling Center was established under the auspices of a program developed by the NJDEP following the Department's reclassification of certain hazardous wastes, including those defined as consumer electronics, as "Class D Recyclables." The intent of this reclassification was to allow for the reclamation of certain electronic components, specifically those that incorporate circuitry, and their removal from the waste stream in favor of reuse in new or renovated consumer products. However, the provisions of the CMP that were in effect when the center began operating prohibited the recycling of hazardous materials anywhere within the Pinelands Area and the materials being processed at the center, while determined to be recyclable by the Department, were still classified as hazardous waste. Nevertheless, the Commission was sympathetic to the Department's efforts to reduce the volume of the waste stream in New Jersey by instituting an innovative recycling pilot program and to return hazardous electronic components to a useful life. Consequently, in 2005, the Commission amended the CMP to establish a parallel program permitting continued operation of the Fort Dix consumer electronics recycling center until June 6, 2010, provided that functions at the recycling center were otherwise consistent with Pinelands standards and that certain benchmarks were met. After the Commission monitored and evaluated the program, it chose to amend the CMP in 2010 by permitting the recycling center to continue its operations in the M/F Area on a permanent basis.

Right of Way Maintenance: The CMP was amended in 2009 to authorize a detailed plan to carry out ecologically based maintenance practices for electric transmission rights-of-way in the Pinelands. The plan sets forth a variety of vegetation management practices for each of the roughly 3,000 spans along approximately 233 miles of right-of-way. The primary objectives of the plan are to create and maintain early successional (low-growth) habitats that are characteristic of the Pinelands, provide habitat for

native and rare plant and animal species and ensure the reliability and safety of the electric transmission system in the Pinelands. The CMP was amended to permit utility companies to carry out these prescriptions without prior approval by the Commission for 10 years. This period will allow for the Commission to undertake an extensive monitoring program to evaluate the effectiveness of the prescriptions and to determine whether the goals are being met. The utility companies are required to remit annual payments to the Commission to help finance these monitoring responsibilities. At the end of the 10-year period, the Commission's Executive Director will recommend whether to permanently incorporate the plan into the CMP, extend the pilot program or propose other measures.



The Commission amended the CMP to authorize a plan to maintain electric transmission rights-of-way such as the one above. Photo/John Bunnell

Other Land Use Planning Programs

The Commission continued its involvement in a large number of land use planning initiatives on a wide variety of topics during the reporting period. The majority of these initiatives stemmed from recommendations made during the last Plan Review process, particularly those related to permanent land protection, RGAs and the PDC program. Others were an outgrowth of the Commission's ongoing administration of the CMP or desire to assist Pinelands municipalities with their planning efforts. A brief summary of notable planning programs is presented below.

Pinelands Excellence Program

In 2002, the Commission instituted a project to assist RGA communities in the Pinelands with addressing planning and development challenges. Funded by a \$187,000 grant from the Geraldine R. Dodge Foundation, the Pinelands Excellence Program was a pilot program to develop prototypical approaches that could enable Pinelands RGA communities to effectively absorb growth while maintaining and enhancing a high quality of life. The grant funds were used to retain professional consultants tasked with completion of strategic visioning processes for the selected communities, resulting in the identification of issues and potential solutions in areas such as zoning, community facility needs, infrastructure improvements and site planning. The intent was to develop innovative community design plans that encourage sustainable, mixed-use development. Two municipalities, Hamilton and Winslow townships, were selected to participate in 2002. A third municipality, Egg Harbor Township, was selected in 2005, upon the Commission's receipt of a second grant from the Dodge Foundation. A brief summary of the plans developed for the three selected municipalities follows.

Hamilton: The planning effort in Hamilton Township began with an analysis of existing conditions in the RGA, including land use, street networks, environmental constraints and zoning, supplemented by interviews with various stakeholders. With the help of the consultants hired by the Commission, the Township formed a visioning team representative of the community to guide the preparation of a community action plan. Hamilton Township's Livable Community Plan, completed in 2004, identifies the following priorities:

- Revitalization of historic Mays Landing, emphasizing the reconnection of the village to its waterfront and conversion of historic buildings to contemporary uses
- Redevelopment of the Atlantic City Race Track property as a mixed-use, new town center
- Improved circulation throughout the Township, especially along the Route 40 and Route 322 corridors by complementing the existing street network with new roadways and connectivity of new developments
- Development and implementation of Township-wide livable street and block design guidelines, particularly for intensive residential zoning districts in the RGA

Winslow: The planning effort in Winslow Township followed the same path as that in Hamilton, with an analysis of existing conditions in the RGA, including land use, street networks, environmental constraints and zoning, supplemented by interviews with various stakeholders. With the help of the consultants hired by the Commission, the Township formed a visioning team representative of the community to guide the preparation of a community action plan. Winslow Township's Livable Community Plan, completed in 2004, had as its guiding principle respect for the rural heritage of the municipality and open space by encouraging the development of pedestrian-oriented town and village centers with a strong sense of place along the Route 73 corridor. The following strategies were identified:

- Development and implementation of a conceptual development framework for the Pinelands Town Center Zone and other mixed-use centers along Route 73;
- Development and implementation of innovative stormwater management practices that serve as passive open space or parks;
- Development and implementation of pedestrian-oriented building and site design guidelines;
- Development and implementation of livable street and block design guidelines; and
- Expansion of the existing public street network and construction of complementary new roads to encourage multi-modal transportation (driving, transit, biking, and walking).

Egg Harbor Township: The planning effort in Egg Harbor Township was designed to respond to the consequences of growth and provide the municipality with the tools it needed to affirmatively shape its community. The Township was asked to involve its residents in a collaborative and inclusive process to

identify a vision for its future and, with assistance from a professional planning team, to define, formulate and “fit” a series of implementation strategies that specifically respond to the particular needs of the community. The Township appointed a visioning team to guide the year-long process, which culminated in the completion of the Township’s Livable Community Plan in 2007. The major conclusions described in this plan include the following:

- Egg Harbor Township’s community “form” could be better managed by establishing mixed-use, pedestrian oriented centers and conserving areas that still retain woodland character. Centers should be the primary method to create a commercial core for the Township and to create a community identity as the Township continues to grow.
- The community’s environmental character should be protected by conserving areas within, or adjacent to, freshwater wetlands, limiting maximum site coverage, promoting clustering techniques and conserving existing trees and vegetation during the development process.
- Pedestrian, equestrian and biking trails should be established to link open spaces and recreation facilities to residential areas, schools, public-gathering areas and shopping areas.
- Schools should be sited so that they contribute to nearby neighborhoods and help to create a “community” where students who live in the immediate area can walk to school.
- Alternatives to automobile use should be promoted by enhancing transit and expanding pedestrian facilities to offer more recreation and safe pedestrian transportation opportunities. A system of on-road bike paths connecting interior residential areas to the arterial roadway bike paths could also reduce automobile demand.

Toms River Corridor Plan

In 2003, the Commission established a special task force to develop a plan for protecting critical natural resources in the Toms River watershed of Jackson and Manchester Townships in the face of growing concerns over the potential for development conflicts in the region. The area is home to a wealth of important land and water resources, including more than a dozen plant and animal species that are classified as threatened or endangered. At the same time, the area features significant swaths of developed land with a population of several thousand people. The project area covered nearly 17,000 acres in the northern Pinelands of Ocean County. Of that land area, approximately 15,000 acres lie in Jackson, with the remaining acreage in Manchester. The area includes six Pinelands management areas ranging from the ecologically critical PAD to areas designated for growth such as the RGA. The area also includes three Pinelands Villages: Cassville, Legler and Vanhiseville.

The Toms River Corridor Task Force was comprised of 19 representatives from government planning and environmental agencies, non-profit conservation groups, and others. In addition, a group of technical advisors on botany, herpetology, geology, hydrology and other key fields provided ongoing expert guidance to the Task Force. Pinelands Commission staff provided support to both the Task Force and its technical advisors. In 2004, Commission staff authored a report that the Task Force then

submitted to the Pinelands Commission, Ocean County and both townships to consider for implementation.

In its report, the Task Force set forth three key findings:

- Development pressures exist and are growing, with approximately 1,500 residential units currently proposed for construction within the corridor and more expected;
- Water resources are threatened, with both water quality and quantity in jeopardy from the inter-basin transfer of wastewater and proposed development near high-quality waterways and groundwater recharge areas; and
- Clusters of threatened and endangered species exist within and around the Corridor in large, relatively undisturbed landscapes.

The Toms River Corridor Plan proposed to utilize a combination of planning, zoning and resource protection tools in the area. A series of Pinelands management area changes were proposed to provide greater protection of water quality and critical wildlife habitat; enhance habitat buffers, and establish connectors between large areas of undeveloped and protected habitat. These management area changes were to be supported by reductions in permitted housing densities and implementation of stronger clustering provisions in a number of areas. On-site clustering standards were to be developed to help to minimize impacts on environmentally sensitive land while allowing for appropriate residential development. The Plan also called for enhanced use of conservation easements as well as stepping up



Wetlands cover the southwestern portion of a 163-acre parcel located off Route 571 in the Toms River Corridor that was permanently preserved with funds administered by the Commission.

Photo/Paul Leakan

efforts to acquire land for permanent protection.

The Task Force also developed a systematic approach for establishing, up-front, the type and scope of endangered and threatened species surveys that would be required of potential developers. This included a set of criteria tailoring survey procedures to zoning districts and the type of development being proposed. The goal was to recognize habitat conservation measures already set forth in the overall plan and simplify the survey process to provide greater predictability of regulatory requirements.

The Pinelands Commission endorsed the Toms River Corridor Report in March 2004. Manchester and

Jackson townships subsequently adopted amendments to their master plans and ordinances to implement the management area and zoning changes recommended in the Report, resulting in significant decreases in permitted development intensities throughout the region. In total, 1,100 acres were redesignated from Jackson's Pinelands Villages to the FA and RDA, 760 acres in Jackson were redesignated from the RDA to the FA and 725 acres in Jackson and Manchester townships were redesignated from the RGA to the RDA. Mandatory clustering provisions were also adopted by both municipalities for their FA and RDAs. To further increase protection of sensitive areas, both municipalities established an expanded wildlife habitat buffer along the main stem of the Toms River. Finally, the Commission helped to fund the permanent protection of nearly 700 acres within the Toms River Corridor.

Southern Medford & Evesham Conservation Plan

In July 2006, the Commission formally endorsed a Sub-Regional Natural Resources Protection Plan for an ecologically sensitive area of southern Medford and Evesham townships. The plan was a collaborative effort between the Commission, Evesham Township, Medford Township and the New Jersey Department of Environmental Protection (NJDEP).

The Plan's study area encompasses the 22-square-mile southern portion of Medford and Evesham Townships shown on Figure 1.15. Although primarily rural in character,

almost 75% of this area is designated for modest amounts of residential development under local zoning. However, data compiled in recent years showed that this area has significant natural resources, including undisturbed sub-watersheds, as well as rare plants and animals. The Pinelands Commission received a \$73,000 grant from the William Penn Foundation in 2004 to fund efforts to develop the plan. Shortly after receiving the grant, the Commission organized a Steering Committee composed of officials from the two townships as well as a representative from the NJDEP and the Commission. The Steering Committee appointed an 18-person Project Advisory Committee and a 17-person Technical Support Group to help guide the Steering Committee's decisions. With the support of Commission staff, the three committees met regularly throughout 2004 to discuss and formulate a series of recommended regulatory and non-regulatory protection strategies. These strategies were detailed in the Sub-Regional Natural Resources Protection Plan authored by Commission staff and issued in 2006.

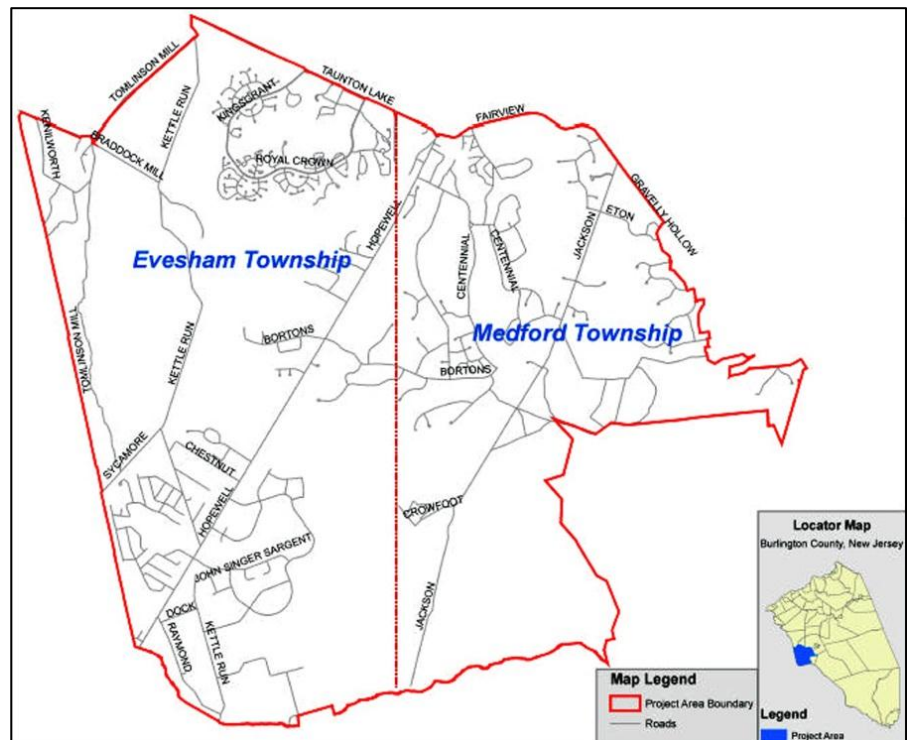
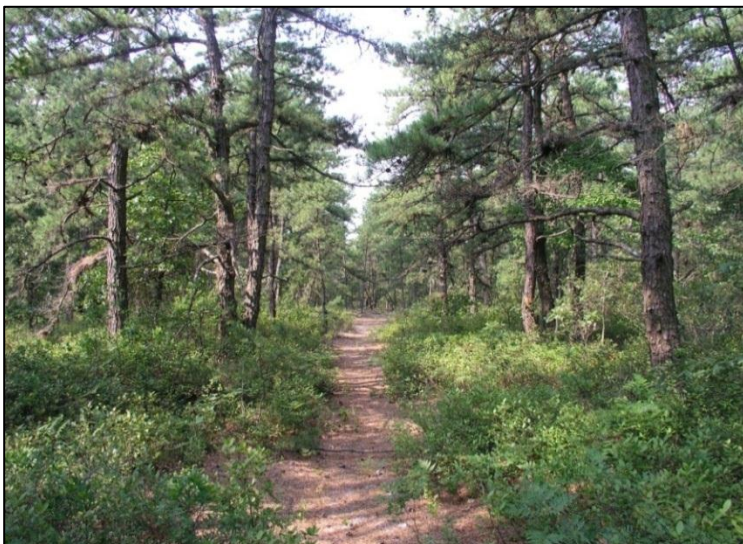


Figure 1.15: Map of the southern Medford and Evesham Project area

The recommended regulatory strategies call for a number of zoning changes devised to reduce development and disturbance levels in high-quality natural resource areas. These strategies would reduce the project area's future zone capacity by 53%. Additional zoning strategies call for creating incentives to transfer all development out of high-value natural resource areas to areas more capable of accommodating it. Development that does occur would be clustered, resulting in the conservation of more than 80% of the properties being developed. Also, a green belt consisting of public lands, preservation areas and low-density zoning districts would be created through the mid-section of the area, which would help to protect the area's water quality and maintain biodiversity.

The recommended non-regulatory strategies include: land acquisition; promoting land stewardship efforts through public education for homeowners, builders, planning and zoning boards; reducing water consumption through programs such as the beneficial re-use of wastewater for golf courses; and conducting surveys to identify the area's rare plants with the intent of helping public landowners, homeowner's associations and the municipalities to protect, manage and recover native plant populations.

The Plan concludes with a specific implementation strategy that identifies the various tasks that need to be undertaken and which parties or organizations are responsible for carrying out those tasks. By endorsing the plan in 2006, the Commission agreed to play a prominent role in helping the two municipalities and other involved organizations to accomplish the tasks and meet the objectives of the Plan.



This 10-acre property in Medford Township, which features habitat for endangered timber rattlesnakes, was permanently preserved with funds administered by the Commission.

Photo/Paul Leakan

In 2007, the Commission received a grant from the William Penn Foundation to help implement the Southern Medford & Evesham Sub-regional Resource Protection Plan. This grant was used to draft land use regulations and procedures for administering programs to transfer growth and reduce development intensities in the most environmentally-sensitive areas of both communities. These land use regulations were also designed to implement the mandatory clustering amendments to the CMP that were adopted in 2009. Ultimately, both Medford and Evesham townships adopted ordinances to implement mandatory clustering in their FA and RDAs. Evesham

Township designed its clustering provisions in such a way as to offer greater protection to the Black Run Watershed, one of the goals of the plan. Neither municipality has proceeded with the zoning changes recommended in the plan. Therefore, the Commission has begun to consider implementing the recommended map changes itself through establishment of a pilot program or amendment to the Land Capability Map.

In terms of the recommended non-regulatory strategies, the Commission partnered with non-profit organizations to fund acquisition of several small parcels in the project area, resulting in the permanent protection of 120 acres. Significant acquisition efforts were also undertaken by other governmental entities. Most notably, a 1,100-acre parcel in Medford Township's PAD and SAPA was jointly protected by Burlington County and the NJDEP in 2011 and 2012, using both Farmland Preservation and Green Acres funding.



The Pinelands Commission co-sponsored the “Pinelands-friendly Yard & Garden Fair,” which featured a sale of native Pinelands plants, as part of a Backyard Habitat Protection Program.

Photo/Paul Leakan

Additionally, the Commission worked with the New Jersey Audubon Society and the Pinelands Preservation Alliance to develop a “*Back Yard Habitat Protection Program*” for residents of the Pinelands, targeted to the Medford/Evesham project area. The objective of this effort was to promote public awareness of the Pinelands’ unique botanical heritage and provide information about native plants and practices that homeowners can use to preserve and protect that heritage. To that end, an informational brochure was developed and a native plant sale was held in 2008 at the Woodford Cedar Run Wildlife Preserve, a wildlife rehabilitation hospital and environmental education and nature center located in the center of the Medford/Evesham project area. More than 70 different species of Pinelands plants were available for purchase at the “Pinelands-friendly Yard & Garden Fair.” The event also featured guided nature walks, live animals and numerous gardening seminars and talks. Mike McGrath, host of the nationally-syndicated public radio show, “You Bet Your Garden,” discussed the many benefits of planting during the fall season and fielded questions from attendees.

Pinelands Housing Task Force

The Commission created the Pinelands Housing Task Force in 2004 to review and update projections of housing demand within the Pinelands and to determine whether zoning capacities within and outside the Pinelands Area were in keeping with the demand. The 20-person Task Force was composed of governmental and non-governmental organizations, including state, county and municipal officials, as well as representatives from the Coalition for Housing and the Environment, the New Jersey Builders Association and the Pinelands Preservation Alliance. The Task Force undertook a rigorous examination of development demand for all of southern New Jersey and development capacity in the Pinelands. The objective of the group’s housing demand analysis was to project the future demand for housing within

the Pinelands and determine whether sufficient developable land was available in the designated growth areas of the Pinelands to accommodate that projected future demand.

The Pinelands Housing Task Force released its final report in January 2007, presenting 13 major conclusions and recommendations. Among them were findings that areas within the Pinelands that are targeted for residential development (RGAs, Pinelands Towns and certain Pinelands Villages) can readily accommodate housing demands well beyond 2020. Specifically, the Task Force's Report shows that, as of 2000, there were 41,460 acres of vacant developable land within Pinelands RGAs, Towns and sewerred Villages and a projected housing demand of 37,530 dwelling units for the period of 2000 to 2020. The Task Force also recommended that zoning policies in these areas should promote greater land development efficiency to reduce sprawl, meet the diverse housing needs of the population and protect Pinelands resources. To accomplish this objective, the Task Force recommended that average net residential densities be set at a minimum of 4.5 units per acre in areas with sewer service and that an average gross density of 1.5 dwelling units per acre would be appropriate in those portions of RGAs, Pinelands Towns or Pinelands Villages where sewer service is unlikely. The Task Force also recommended that mixed-use centers be encouraged and that a range of residential densities should be promoted to encourage a diversity of housing types. The Commission concurred with these recommendations and directed staff to incorporate them in ongoing efforts to enhance the PDC program.

PDC Enhancements

In 2004, the Commission identified two initiatives dealing with the PDC program: redesign of the program to expand the number and type of opportunities to use PDCs in development areas; and expansion of the program in order to protect important lands outside of the current sending areas. The Commission had become increasingly concerned that historical use of PDCs within RGAs had not been occurring at a high enough rate to accommodate all of the rights that might be potentially transferred from sending areas in future years. Analysis of supply and demand opportunities led to a finding in 2006 that the 6,600 rights likely to be allocated to sending properties in future years would exceed the likely number of rights (5,100) to be used in RGAs if current trends continued. This led to a series of specific policy recommendations that were developed in consultation with the CMP Policy & Implementation Committee and interested stakeholders in late 2007.

Three fundamental changes to the PDC program were recommended. First, the PDC Program should apply not only in RGAs but also to Pinelands Towns. Second, instead of operating as a bonus program to allow higher-than-normal residential development densities, PDC use should be mandatory for virtually all residential development within RGAs and Pinelands Towns, based on a sliding scale tied to project density. Third, municipalities should be required to afford non-residential development proposals an opportunity to increase the intensity of the proposed use through the PDC program. The net effect of these proposed changes was a projected increase in the estimated number of opportunities to redeem (use) PDCs from 5,100 rights to 9,800 rights.

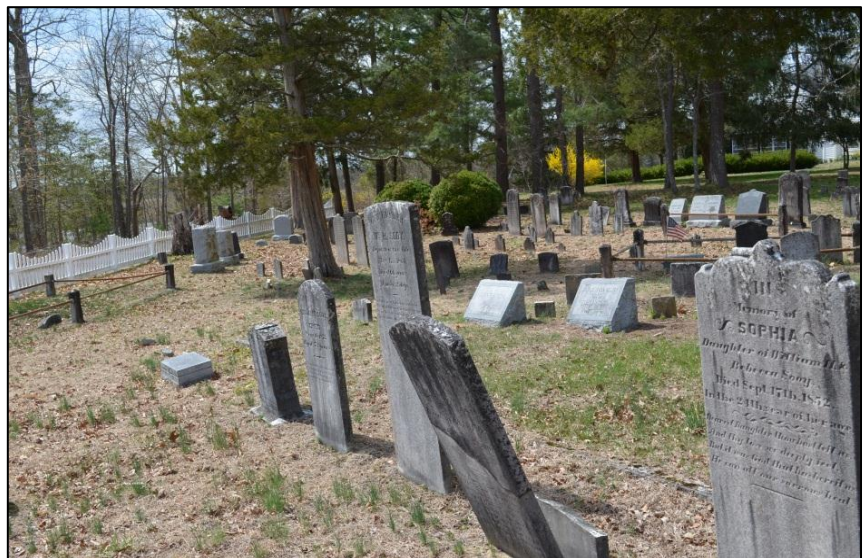
Also recommended was the expansion of PDC sending areas to include particularly critical portions of the FA. Finally, to facilitate the construction of affordable housing, it was recommended that no PDC use be required for affordable housing units.

Before the Commission took any action on the proposed changes to the PDC Program, it sought advice from the State Ethics Commission to ensure that no Commission members would inadvertently participate in rulemaking deliberations when state ethics policies required that they recuse themselves. The State Ethics Commission's advice was received in 2009. A full rule proposal, including implementing regulatory amendments, was then drafted and endorsed by the Policy & Implementation Committee. Ultimately, the Commission was unable to proceed with formal proposal of the amendments; however, discussions of the proposed changes to the PDC Program continue to be the focus of discussions with the Commission, municipalities and other interested groups.

Pine Barrens Byway

Beginning in 2001, the Commission worked with 16 municipalities and five counties to develop a state- and federally-designated scenic byway through the southern portion of the Pine Barrens. The impetus for the byway designation was the Pinelands Rural Economic Development Program, which examined economic conditions in several Pinelands towns and recommended measures to stimulate environmentally-suitable economic growth through various planning initiatives, incentives, public improvements, and redevelopment. One suggestion was for a New Jersey and National Scenic Byway that would bring widespread awareness of, and interest in, the natural assets of the Pinelands. The Commission set up an organizing committee of municipal representatives to oversee the nomination process. An inventory of the many natural and cultural attractions along the byway was also prepared and all municipalities and counties through which the byway passes adopted resolutions supporting its designation. On behalf of the organizing committee,

Commission staff prepared a nomination document that was formally submitted to the State Byway Committee in early 2005. Later that same year, the Pine Barrens Byway, formerly known as the Southern Pinelands Natural Heritage Trail, was designated as an official New Jersey State Scenic Byway. This designation enables the byway sponsors to apply for program-affiliated grants and provides access to a variety of promotional and marketing opportunities, including development of visitor centers, wayside exhibits, and self-guided tours.



There are numerous historic sites along the Pine Barrens Byway, including the Green Bank Methodist Church Cemetery. This cemetery dates back to the mid-18th century.

Photo/Paul Leakan

As depicted on Figure 1.16, the 130-mile byway travels along existing roadways through Atlantic, Burlington, Cape May, Cumberland and Ocean Counties, including portions of 16 municipalities. It meanders through areas of striking natural beauty and rich historic heritage. With a focus on maritime portions of the Pinelands, the route takes particular advantage of the scenic qualities and historic hamlets of the Mullica, Maurice and Tuckahoe River Corridors.

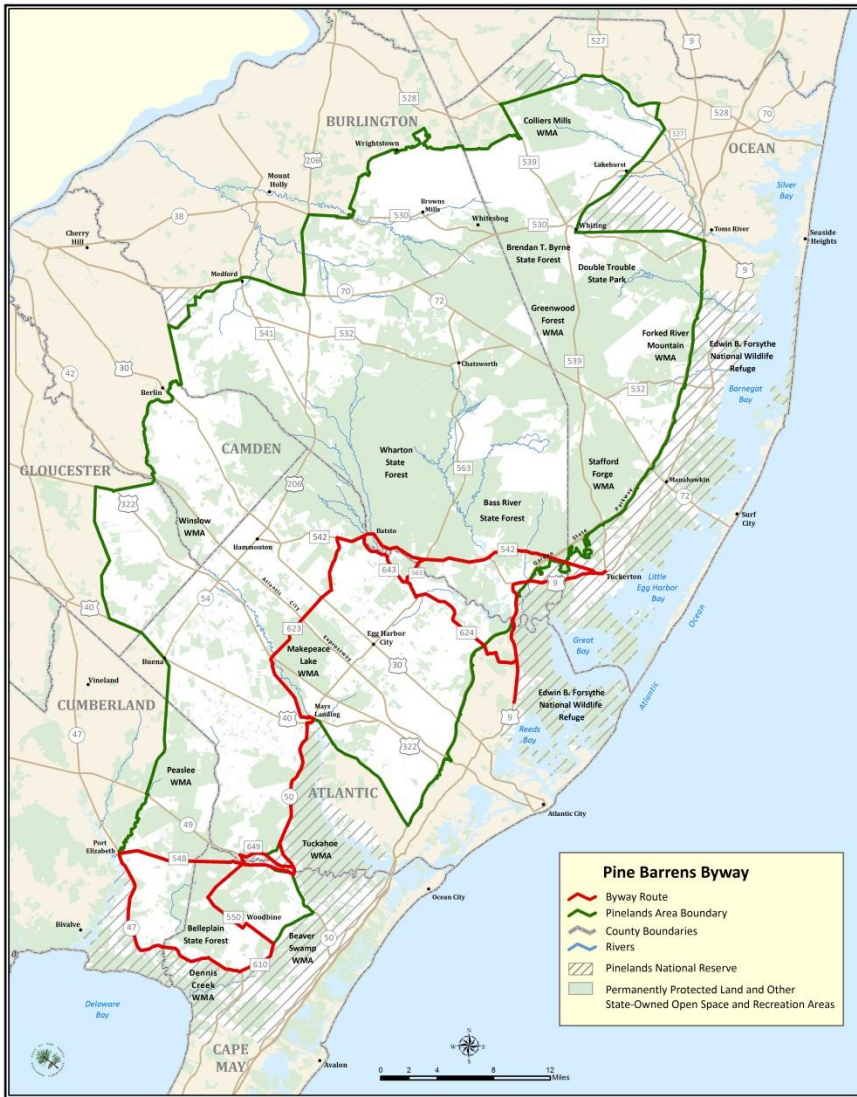


Figure 1.16: Map of the Pine Barrens Byway

Following the State designation, the Commission was awarded a Federal grant to continue the process to obtain National Scenic Byway designation. The Commission used the funds to hire a consulting team that issued a comprehensive Corridor Management Plan for the Byway in 2009. The Plan sets forth a vision statement and includes specific recommendations and measures that can be undertaken to accomplish a series of Byway goals. For example, the Plan urges the identification and prioritization of conservation lands for acquisition and the use of smart growth policies and strategies. Additionally, the Plan calls for increasing local and visitor awareness and appreciation of the Pinelands' fragile environment. It also recommends the implementation of numerous measures aimed at improving the visitor experience. Examples include the creation of better

signage, branding and marketing to increase tourism and enhancing access to appropriate resources. The Commission officially endorsed the Plan in 2009 and it was then formally approved by the New Jersey Department of Transportation (NJDOT).

Once formal designation as a New Jersey Scenic Byway was achieved, a byway task force comprising municipal and county representatives and private citizens was formed to begin formation of a permanent operating body for the byway that would implement the recommendations in the corridor management plan. The task force also developed a website for the byway that has been visited more than 7,000 times. Commission staff played a vital role in the task force and drafted an organizational structure for a managing entity to be known as the Pine Barrens Byway Association, which came into being in 2010. The Association includes an oversight board, which has final decision making powers and consists of representatives from all the counties and municipalities along the byway, and an executive committee, whose five members are appointed by the counties. The Association has since been incorporated and joined the Center for Non-Profits and is currently soliciting donations from the local governments along the byway route. The funds will be used initially for printed materials and other outreach efforts to increase public knowledge of, and appreciation for, the byway and for the Pine Barrens generally.

The NJDOT has provided significant support for this effort by developing signage that will help visitors identify the byway and navigate their way through it. The Pine Barrens Byway is one of seven such byways formally designated by the state, and the NJDOT has designed signage that ties them all together through the use of similar color schemes, typefaces and other visual elements embedded in the "personalized" logos for each byway. Installation of the signage has begun along certain of the byway routes and their approaches and should begin in the Pine Barrens in 2014.



The Association is discussing an expansion of the byway northwards into the Preservation Area in Burlington and Ocean counties as well as seeking national scenic byway status from the U.S. Department of the Interior. However, both of these efforts are being postponed for the time being in favor of increasing public awareness of the currently defined byway and putting the Association on a firm financial and management footing.

Joint Base McGuire-Dix-Lakehurst Land Use Study

In 2009, the Commission passed a resolution to endorse the April 2009 Final Report of the Joint Land Use Study for Joint Base McGuire-Dix-Lakehurst, which is located in parts of 10 municipalities in the Pinelands. The report includes a series of recommended strategies designed to resolve land compatibility issues, strengthen base and local government relationships and provide a footprint for future Joint Base and community growth.

The Commission participated in the development of the study by serving on a Policy Committee that was comprised of representatives from Ocean and Burlington Counties, Jackson Township, Lakehurst Borough, Manchester Township, Plumsted Township, New Hanover Township, North Hanover Township, Pemberton Borough, Pemberton Township, Springfield Township and Wrightstown Borough, Lakehurst Naval Air Engineering Station, McGuire Air Force Base, Fort Dix Army Base, the relevant congressional delegations and a wide variety of State agencies. The study calls for the Commission to work with the affected Pinelands counties and municipalities to implement the recommended strategies contained in the study, recognizing that any municipal master plan and ordinance revisions that result from such implementation will require formal review and certification by the Commission pursuant to the CMP.

Pinelands Wildfire Safety Planning Project

In 2008, the Commission and New Jersey Forest Fire Service joined forces to undertake a new initiative to identify and help implement specific measures to mitigate wildfire hazards and risks in Barnegat and Stafford Townships in Ocean County. Barnegat and Stafford townships have an extensive history of wildfires, and have high-risk “wildland urban interfaces,” defined as areas or zones where structures and development meet undeveloped wildland or vegetative fuels. In addition, the two municipalities are located within close proximity to the Warren Grove Gunnery Range, which was the site of a 2007 wildfire that burned 15,550 acres and prompted thousands of evacuations. As part of the project, a working committee appointed by both municipalities held numerous meetings with representatives of the Commission and Forest Fire Service to assess known wildfire hazards and risks in their communities and to identify specific measures to mitigate those hazards and risks.

The measures identified by the committee include the creation and maintenance of fuel breaks, development of model zoning and subdivision regulations based on wildfire hazard management practices, appointment of Firewise Committees for each municipality, development of comprehensive wildfire protection plans for each municipality and various education and outreach initiatives, including



Barnegat and Stafford townships have an extensive history of wildfires. Both municipalities were affected by the May 2007 wildfire (shown in an aerial photo above) that burned 15,550 acres near the Warren Grove Gunnery Range. Photo/Paul Leakan

homeowner education programs, local officials training sessions and updated elementary school fire safety curricula.

In October 2008, officials in Barnegat and Stafford unanimously passed resolutions endorsing the measures. Staff from the Commission and Forest Fire Service then met regularly with members of a group of local officials to implement many of the strategies, including carrying out education and outreach

programs and appointing Firewise committees in both municipalities. It is the Commission’s hope that the project will serve as a model for improving forest fire management and fire safety in communities throughout the Pinelands.

Local Communications Facilities Planning

In 1995, the Commission amended the CMP's height restrictions in recognition of what had, at that time, already become a legitimate need: the provision of wireless communications services throughout the United States and within the Pinelands. Accordingly, local communications facilities, which provide wireless communication services, were permitted to exceed the CMP's normal 35-foot height limit where a comprehensive plan for the installation of such facilities throughout the entire Pinelands Area has been approved by the Commission. The CMP's amended regulations recognized that well-designed and integrated wireless communications networks can greatly reduce the unnecessary proliferation of wireless communications structures throughout the Pinelands Area, and, most importantly, in its most conservation-oriented areas. To that end, the amendments adopted by the Commission included requirements for the use of existing structures wherever feasible, co-location on existing structures and new towers by all local communications facility providers and minimization of visual impacts from roads, recreation facilities, existing residential development, river corridors and special Pinelands resources such as the Forked River Mountains and the Pine Plains pygmy forests. Notably, the amendments also required that facilities proposed in the more ecologically-important management areas be the least number necessary to provide adequate service. Based on the 1995 regulations, the Commission approved the Comprehensive Plan for Wireless Communications Facilities in the Pinelands in 1998 and a subsequent amendment, the Comprehensive Plan for PCS Facilities in the Pinelands, in 2000. Together, these two plans proposed 22 new towers in the million-acre Pinelands region and the installation of antenna on approximately 75 existing towers or other structures.



The Commission has adopted numerous CMP amendments regarding the placement of wireless communications facilities in the Pinelands. The amendments include provisions that require the use of existing structures such as water towers (above), if feasible.

Photo/Paul Leakan

The Commission has since approved three additional amendments: the AT&T Wireless amendment in 2003; the T-Mobile Amendment in 2011; and the Office of Information Technology amendment in 2012. The Office of Information Technology amendment was a comprehensive plan for public safety towers, meant to eliminate critical gaps in public safety communications coverage areas. In total, the three approved amendments proposed the construction of 40 new towers.

Timed Growth Assessment

Since 1994, the CMP has provided growth-oriented communities with a zoning and planning tool to better manage growth. The municipal reserve provisions of the CMP allow towns to set aside land as

off-limits to major development for five-year periods, while other parts of the community are developing. This phased-growth mechanism ensures orderly growth, helps prevent piecemeal development and allows efficient infrastructure planning and development. To further address concerns over the pace of growth in certain communities, the Commission decided in 2004 to examine alternatives to better align a community's growth rate with its ability to accommodate new residents. Commission staff prepared a *White Paper on Timed-Growth Options in the Pinelands* in October of that year, detailing the need for additional relief in certain Pinelands growth communities, providing a comparative evaluation of the municipal reserve provisions and other "rate-of-growth" approaches in use nationwide, and making recommendations for enhancing the municipal reserve standards of the CMP. The white paper also provided an analysis of eight RGA municipalities that could most benefit from participation in the program. The Commission decided to pursue changes to enhance the municipal reserve provisions of the CMP while at the same time exploring the possibility of establishing a broader rate-of-growth program. To that end, the Commission consulted with several nationally recognized experts in the field, before discontinuing its efforts due to the lack of enabling legislation for such a program. Amendments to the CMP's municipal reserve standards were adopted in 2006 (please see description on page 24); however, they have yet to be utilized by any Pinelands municipality.

Off-Site Clustering Pilot Program

In 1996, the Commission adopted a set of amendments to the CMP authorizing the Township of Galloway and City of Egg Harbor City Pilot Off-Site Clustering Program. The intent of this pilot program was to determine whether the land conservation and protection goals of the CMP could be accomplished, and perhaps even advanced, by allowing more intensive development in a newly designated development corridor to occur if it were balanced by the permanent conservation of lands outside the corridor. The municipalities of Galloway Township and Egg Harbor City were selected as the location for the pilot program based on the fact that both contained existing Pinelands Town areas that could logically be extended into a new growth corridor and based on the location of an existing, long standing nonconforming use of significant size, the Renault Winery, within a short distance of the existing Pinelands Town areas as well as the designated sewer service area.

The CMP requires that the Executive Director review the Off-Site Clustering Pilot Program and periodically report to the Commission as to its implementation. Reports were completed in 2000 and 2003, with a final update presented to the Commission in 2008. The 2008 report found that:

- Two projects were approved under the pilot program. The first, a 53,960 square foot, 37-unit hotel known as the Tuscany House, is located in the Pinelands Town area of Egg Harbor City. It is situated on approximately four acres of land within the Commercial Resort and Recreation Overlay Zone, a special zoning district established by the City in its implementation of the Pilot Program. The second approved project is an 18-hole golf course with associated improvements (cart barn, maintenance building and maintenance yard) located on approximately 220 acres in the Pinelands Town and RDA of Galloway Township.
- The pilot program requires the provision of "complementary open space" in association with the development of commercial and recreational uses. Specifically, 1.9 acres of land must be permanently protected for each acre developed for outdoor intensive recreation use and 0.24

acres of land must be permanently protected for each 100 square feet of existing or proposed floor area. A total of 503 acres of “complementary open space” were required and provided in association with two projects approved under the pilot program. All 503 acres are located in the FA.

- Aside from some administrative issues, there were no substantive issues with implementation of the Pilot Program. Rather, the Program clearly functioned as originally envisioned when adopted by the Commission in 1996. An existing nonresidential use of note in the Pinelands Area, the Renault Winery, was able to expand and thrive. An attractive hotel and golf course were developed in areas targeted and appropriate for growth. Sewer service was provided to an existing use (the winery complex) that had previously experienced problems with its septic systems. More than 500 acres of



The Tuscany House, a 37-unit hotel at the Renault Winery, was approved under the Commission’s Off-site Clustering Program.

Photo/Paul Leakan

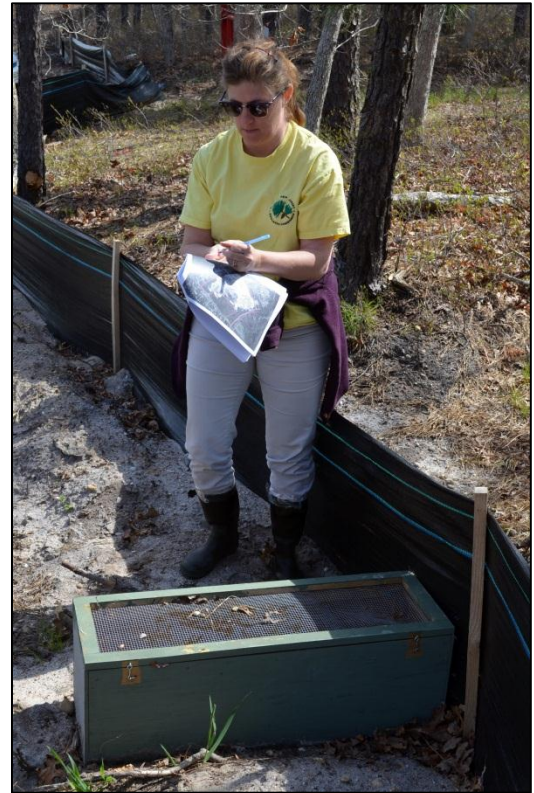
environmentally sensitive land in the FA were permanently protected, thereby eliminating the potential for scattered low-density residential development. Absent the Pilot Program, a modest expansion of the Renault Winery complex might have been feasible based on its status as a nonconforming use in the APA. Sewer service, however, would not have been permitted and there would have been no requirement for the protection of off-site lands. The pilot program therefore provided a greater level of protection to Pinelands resources than would have been afforded by the normal land use and environmental standards of the CMP.

CHAPTER 2: REGULATORY PROGRAMS

The Commission's Regulatory Programs office implements the application requirements and land use and environmental standards of the Pinelands Comprehensive Management Plan (CMP). Applications to the Commission are required for most types of development in the Pinelands Area. Regulatory Programs staff reviews development applications beginning with the initial pre-application meeting (when requested), through the completion of the application process with the Commission, ending with the review of any issued local agency (municipal and county) permits and approvals. Local agency approvals and permits may not take effect until the Regulatory Programs staff has determined that they are consistent with the CMP's standards. The Regulatory Programs office also reviews applications for interpretations of Commission regulations such as requests for allocations of Pinelands Development Credits (PDCs) and determinations of the presence or absence of wetlands on a parcel.

Regulatory Programs staff is responsible for the investigation of, and response to, reports of development that has occurred in violation of one or more CMP standard. Such activities often require the coordination with local agency officials, and occasionally result in legal action through the Office of the Attorney General.

Prior to April 2003, two offices performed the work currently handled by the Regulatory Programs staff: the Project Review office reviewed development applications, while the Regulatory Programs office focused on addressing and resolving violations of the CMP's standards. In April 2003, the two offices were combined during a Commission-wide reorganization, resulting in one office – Regulatory Programs – which encompasses all development-related review work.



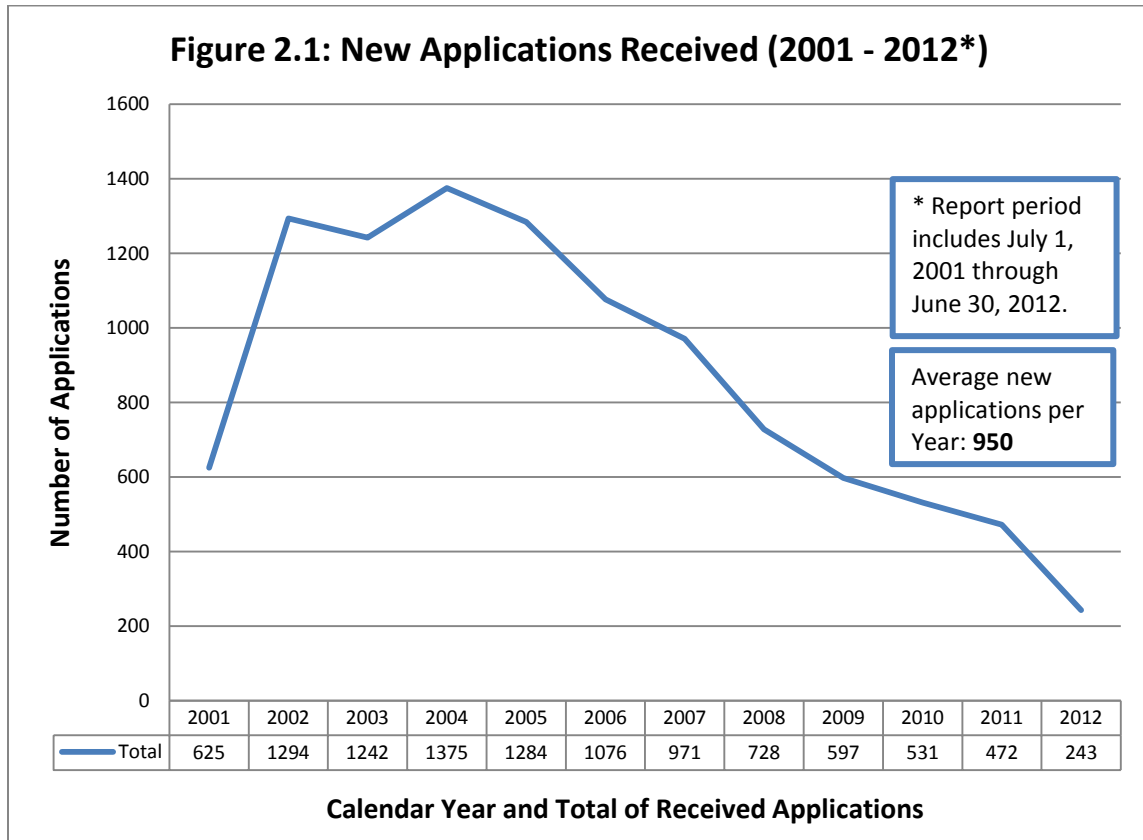
Jean Montgomerie, an Environmental Specialist with the Commission, checks snake survey fencing to ensure that all protocols are being followed.

Photo/Paul Leakan

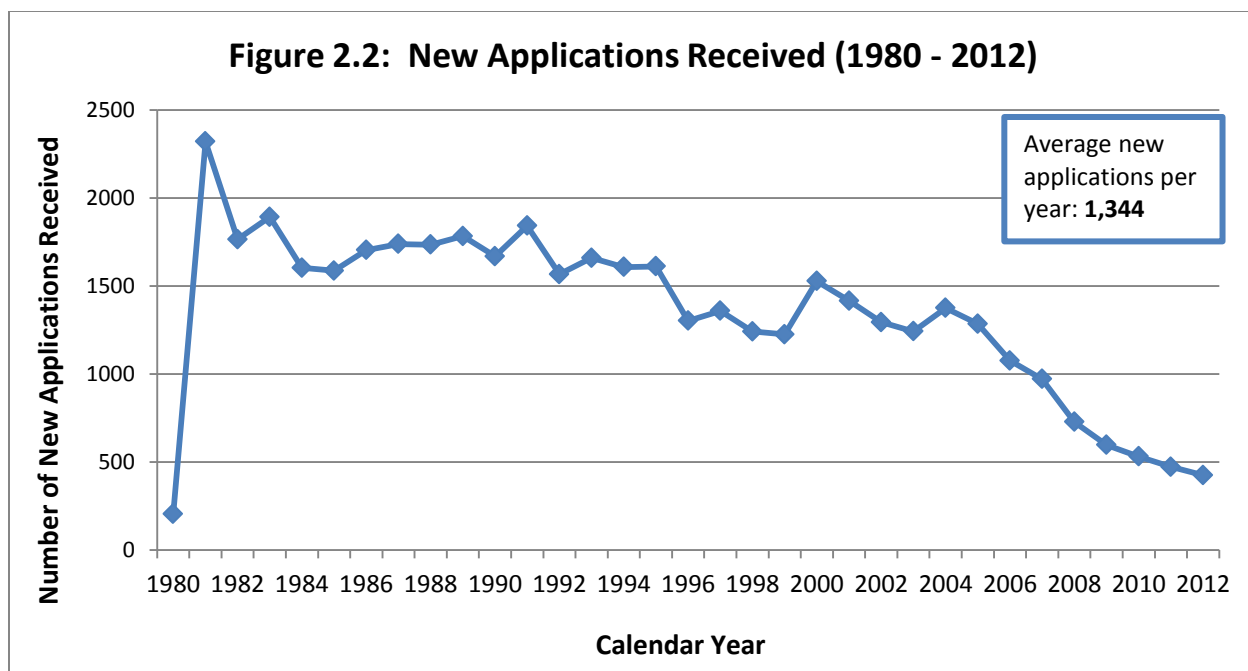
Actions on Development Applications

Between July 1, 2001 and June 30, 2012, the Commission received 8,812 private development applications and 1,626 public development applications, for a total of 10,438 applications. Public development applications are those applications for development that are submitted by federal, state, county, municipal and other governmental agencies and institutions. Private development applications are applications submitted to the Commission by the general public. The overall yearly average was 950 new applications; as noted by Figure 2.1, new applications declined significantly beginning in 2005 and continuing through to 2012. Because applications for building permits are considered to be leading

indicators of impending economic downturns, this trend is consistent with the national recession that began in 2007.



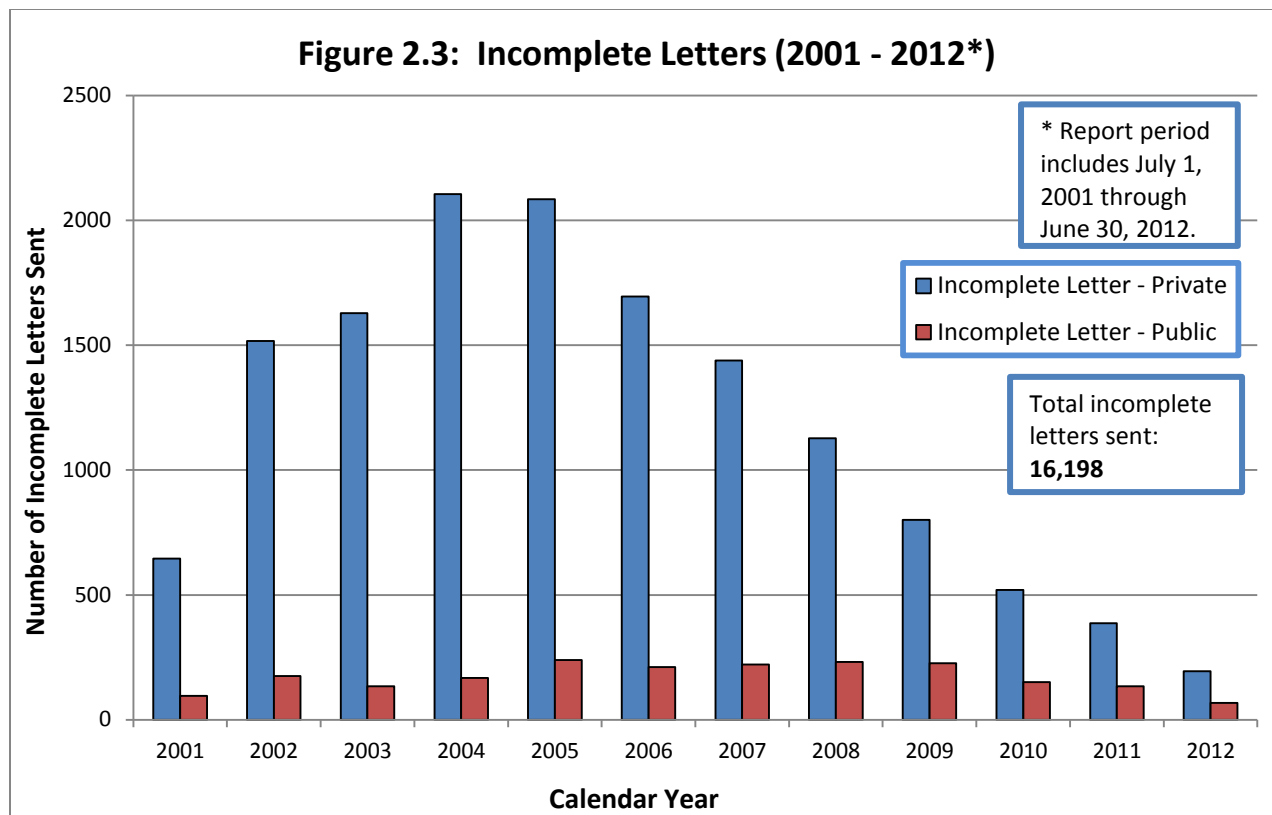
In addition, the rate of new applications received during this 11-year period was the lowest in Commission history. Since its inception in 1980, the Commission has received an average of 1,344 new applications each calendar year. As displayed in Figure 2.2, the overall decline in new applications is evident. Only one year of the current review period – 2004 – exceeded the overall annual average with 1,375 new applications received. The reported numbers exclude any previously-existing, ongoing or re-opened applications, which are more difficult to track, so the true annual counts may be slightly higher. However, the trend of much lower than average application activity is clear.



Once an application or inquiry has been received by the Regulatory Programs staff, it is reviewed for compliance with the application review fee regulations. The Pinelands Commission first amended the CMP to include an application review fee requirement in April 2004. Initially, single-family dwellings and public development (among other types of development) were exempt from submitting a review fee, but upon additional CMP amendments in 2005, 2006, 2007 and 2008, almost all applications and inquiries now require submission of a fee. The application fees help to recoup a portion of the costs for the staff’s time to review projects.

The satisfaction of the application review fee requirement releases an application to be reviewed for completeness and consistency with the CMP. Regulatory Programs staff is generally assigned work based on location. Thus each reviewer is assigned several municipalities, often within the same county or geographical area, to encourage familiarity with each municipality and its ordinances. In addition, by handling all applications in a certain area, the Regulatory Programs staff member is able to conduct site inspections more efficiently and maintain a current working knowledge of his or her area.

Applications lacking necessary details or accompanying information are often submitted to the Commission; for example, an application form and review fee may be submitted for a two-lot subdivision, but a subdivision plan that is also needed is not submitted. Regulatory Programs staff reviews the submitted information and issues a letter detailing the needed items. During the current Plan Review period, 16,198 such documents (“incomplete letters”) were issued to applicants; 14,145 incomplete letters were issued for private development applications and 2,053 for public development applications. As depicted by Figure 2.3, the volume of incomplete letters declined from 2006 through 2012. This is consistent with the overall trend of application activity for that time.

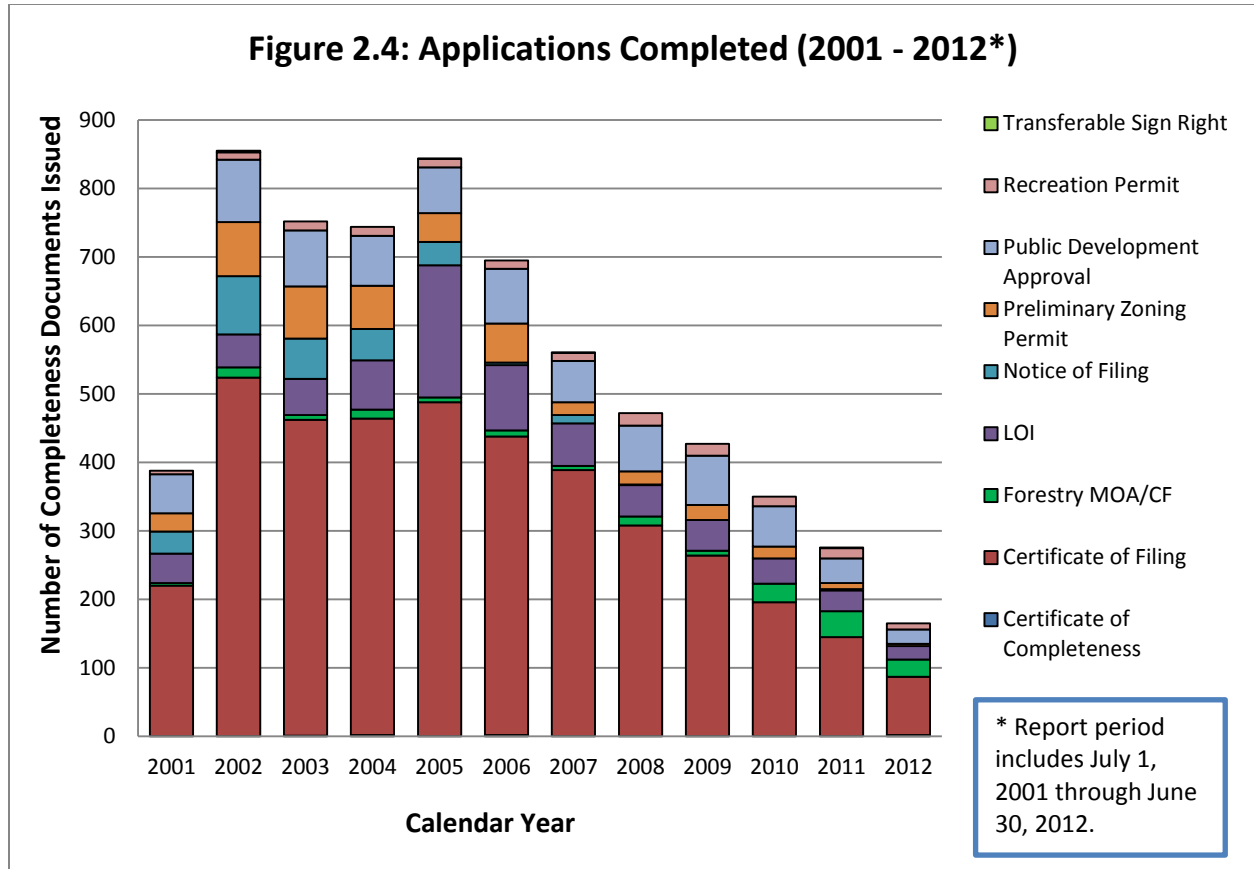


Once an application is complete, the type of document issued by the Commission differs, depending on the type of application. Upon the completion of a private development application, the Commission staff issues a document authorizing an applicant to pursue any necessary local permits and approvals. For development applications in certified municipalities, this document is referred to as a Certificate of Filing. In uncertified municipalities, the Commission staff issues Certificates of Completeness. Both documents specify whether an application is consistent or inconsistent with CMP standards. There are other documents for private applications that are issued less frequently. These include letters allocating transferrable sign rights, recreational event permits, and letters of interpretation.

The completion of a public development application results in Commission issuance of a Public Development Approval.

Of the 10,438 applications received over the past 11 years, 5,020 private development applications proceeded to receive a completeness document while 765 public development applications proceeded to receive a Public Development Approval. Figure 2.4 depicts the number of each type of completeness document issued by year.

Figure 2.4: Applications Completed (2001 - 2012*)

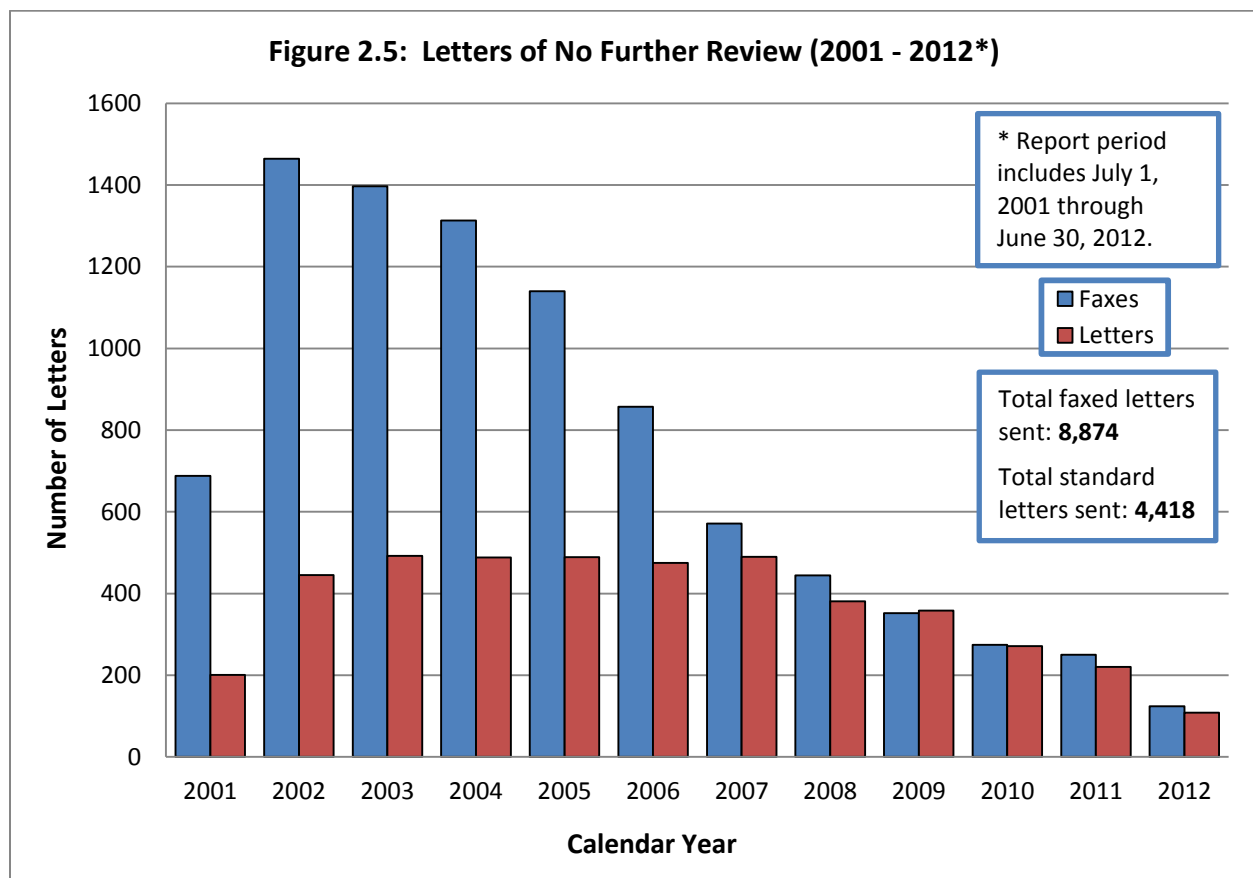


While completion of an application with the Commission and receipt of a Public Development Approval is the final step for most public agencies, the CMP requires private applicants to submit all local permits and approvals for Commission review before such approvals may take effect. Once these permits and approvals are submitted to the Commission, they are reviewed to determine if they are consistent with the CMP and the previously issued Certificate of Filing (or other completeness document). A permit or approval that is determined to be consistent with the CMP receives a “no further review” letter stating that the permit or approval may take effect.

A typical private development application may involve multiple local agency approvals, from municipal and county subdivision and site plan approvals to septic and construction permits. Commission staff reviews all such approvals closely to determine whether any changes to the proposed development have been made that might result in a conflict with CMP standards or serve to resolve issues identified in an Inconsistent Certificate of Filing. Once a “no further review” letter is issued for a subdivision or site plan approval, the applicant may proceed to obtain any necessary septic and construction permits for individual residential lots or portions of the approved non-residential development.

While some septic and construction permits do raise issues with the Commission, the majority are consistent with the CMP by this stage in the application process. To streamline the process for applicants and reduce the workload for Commission staff, the Commission has coordinated an advance notification process that many county health departments and municipal construction offices employ prior to issuing septic and construction permits. The participating county health departments and municipal construction offices fax a form to the Commission indicating that a permit application has

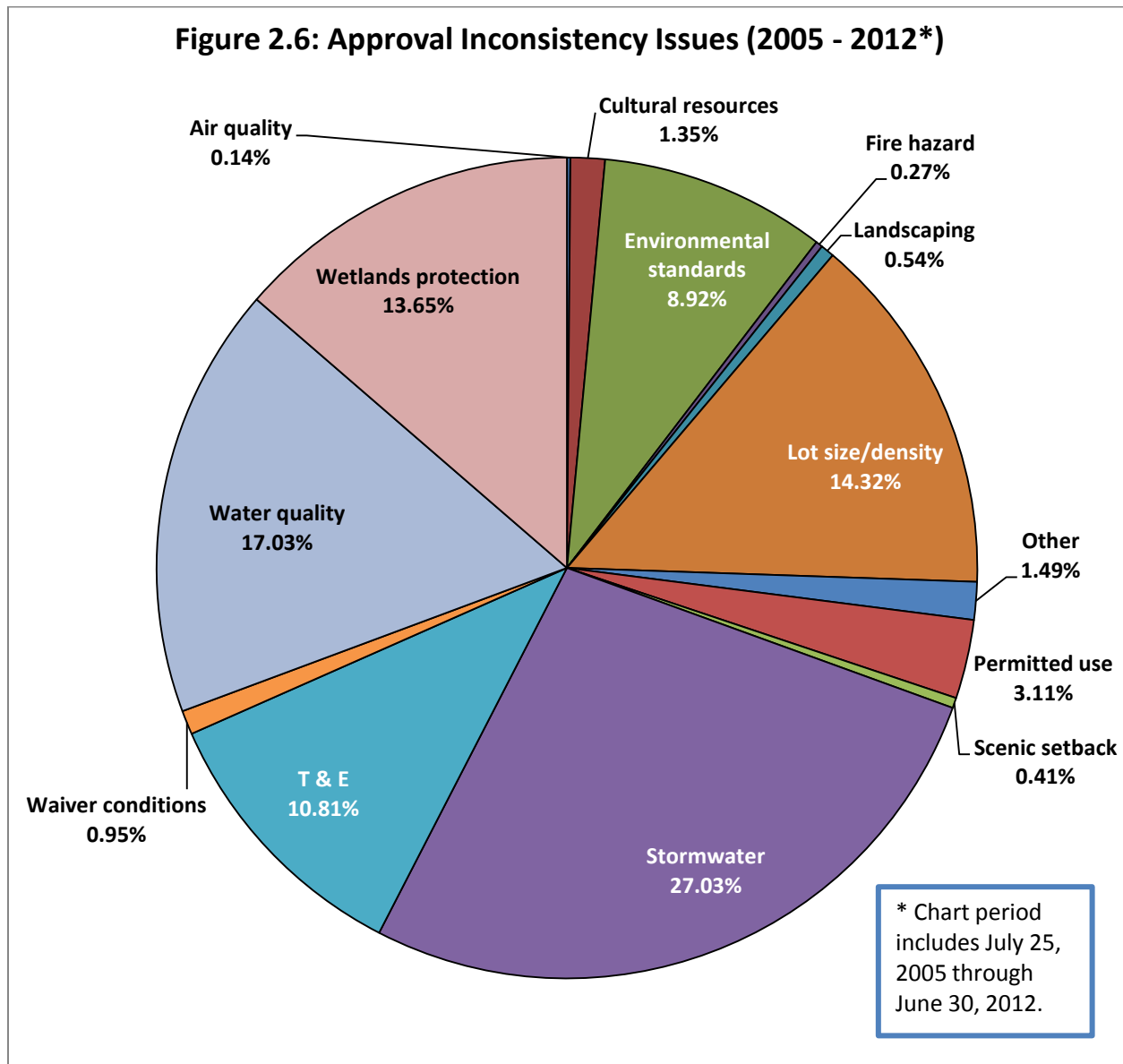
been received and inquiring whether the Commission has any issue with the application. Commission staff reviews the Commission application file, determines whether all necessary steps have been completed, indicates on the form whether the permit may or may not be issued, and faxes the form back to the sender. While the CMP provides for a 15-day review period of most permits and approvals, faxed “approval to be issued” forms are returned within a matter of days and eliminate standard-mail lag time. The intended goal of this fax process is to avoid county health department and municipal construction office issuance of a permit that will immediately raise issues for the Commission and to streamline the process for applicants. As shown in Figure 2.5, about twice as many of the Commission’s “no further review” determinations are sent via fax than via standard mail, resulting in significant time savings for applicants.



A permit or approval that is determined to be inconsistent with the CMP receives a letter calling up the permit or approval for further review. The letter identifies the issue(s) of concern and informs the applicant that a public hearing has been scheduled to address the matter. The applicant then has the option of resolving the identified issue(s) to the Commission’s satisfaction or attending the public hearing to discuss the issue(s) and the application as currently proposed.

Between July 2001 and June 2012, 1,172 applications received approvals that were called up for review. Prior to July 2005, the Commission’s application information system simply recorded an approval’s status as called up for review. However, with the introduction of an upgraded application information system on July 25, 2005, the reason(s) for an approval’s inconsistency was also recorded. The relative

frequency of inconsistency with different CMP standards is depicted by Figure 2.6 below for the 721 applications with inconsistencies between July 25, 2005 and June 30, 2012.



Compliance with the CMP’s stormwater standards represents the most common issue for inconsistent approvals, and may be indicative of the complexity of the 2006 stormwater rule amendments. Examples of inconsistency with the CMP’s water quality standards include lack of sewer availability and inability of proposed development served by an onsite septic system to meet the CMP’s 2 parts per million nitrate/nitrogen standard. Lot size and density issues typically include the need to redeem Pinelands Development Credits or record a deed of consolidation or density transfer.

The vast majority of permits and approvals that are called up for review are ultimately resolved by the applicant, at which time a letter of no further review is issued, allowing the permit or approval to take effect. Between July 1, 2001 and June 30, 2012, 1,044 applications that had previously been called up for review were revised to resolve the inconsistency issue(s) and were permitted to take effect.

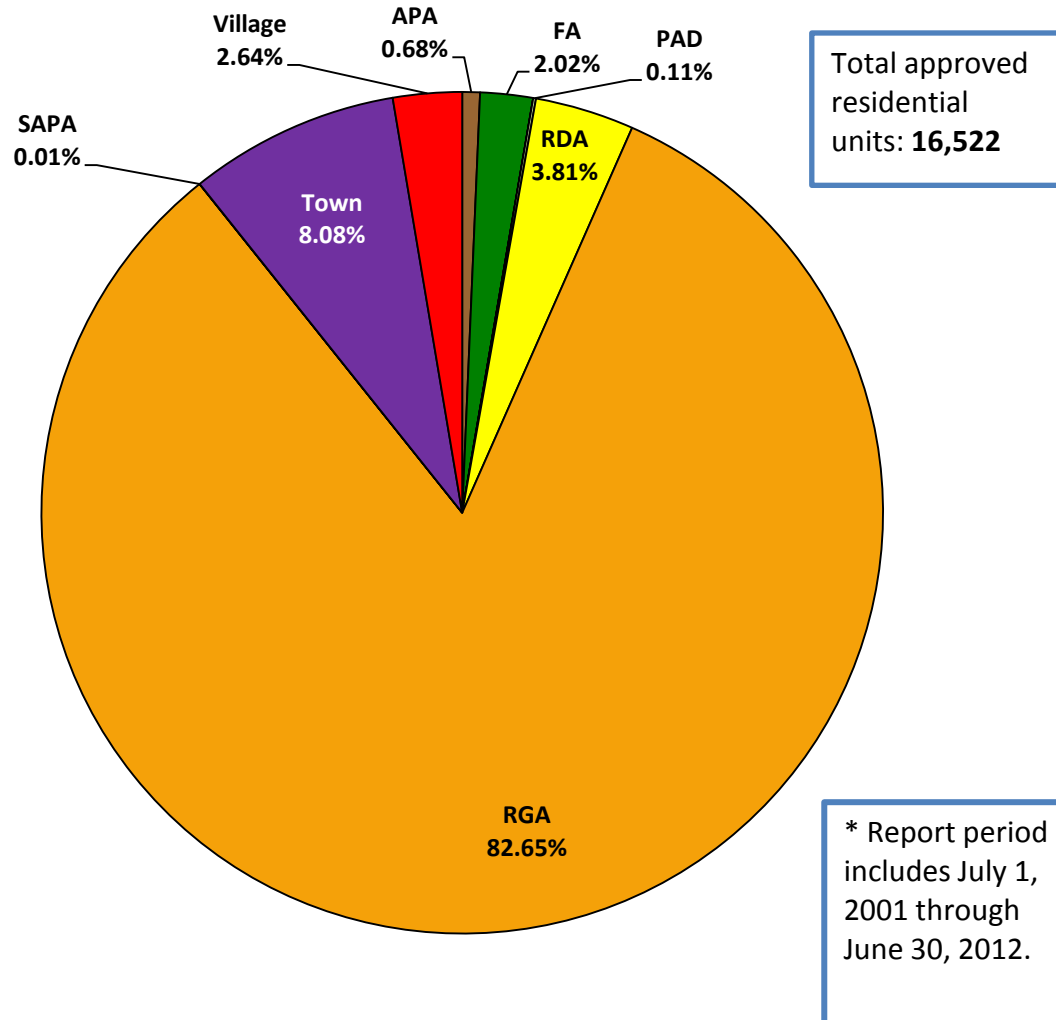
Private Development

Between July 1, 2001 and June 30, 2012, 16,522 residential units were approved and 614 commercial approvals were granted in the Pinelands Area as part of 3,558 different development applications. While a higher number of residential units was approved between September 1980 and June 1991, the overall number of approvals granted between July 2001 and June 2012 is roughly consistent with those granted between July 1, 1991 and June 30, 2001, which saw 16,354 residential units approved and 714 commercial approvals granted. However, the total number of applications resulting in these approvals dropped by almost 50% during the current reporting period – 6,803 applications receiving approvals from 1991 to 2001 as compared with 3,558 from 2001 to 2012. The reduction in overall applications receiving approvals is likely correlated with the afore-mentioned drop in development applications during the current period. That trend is masked in the overall number of approvals by the completion of several applications for large (hundred- and thousand-plus residential unit) subdivisions in the 1990s and early 2000s that continue to receive construction permits.

While the figures pertaining to the number of applications and approvals illustrate the trends of numbers and types of applications in the Pinelands Area, they provide little insight into how the CMP's land use and environmental standards are being implemented. The CMP designates management areas based on natural, cultural and physical characteristics. The management areas were designed to direct development to areas appropriate for growth and away from ecologically- and culturally-significant areas. Management areas designated for residential and commercial growth include Regional Growth Areas (RGAs), Pinelands Villages and Pinelands Towns. Military and Federal Installation Areas (M/Fs) encompass discrete locations of existing military and federal uses. Agricultural Production Areas (APAs) and Special Agricultural Production Areas (SAPAs) are intended primarily for continued agricultural and horticultural uses. The Preservation Area District (PAD) and Forest Areas (FAs) encompass largely undeveloped areas and are designated to remain relatively undisturbed in order to protect the long-term ecological integrity of the region. Rural Development Areas (RDAs) are intended as areas of intermediate development acting as buffers between the more and less restrictive areas. Further details on the types and intensities of permitted development in these management areas can be found in Table 1.1 on page 9.

As depicted by Figures 2.7 and 2.8, the intensity of development in each management area is generally consistent with the intensities designated by the CMP, with the RGAs, Towns, Villages and RDAs receiving 97.2% of all approved residential units and 86.7% of all commercial approvals in the Pinelands Area during the reporting period. Further, as illustrated by Figures 2.9 and 2.10, development occurred more frequently in these areas during this period compared to the overall distribution of development since inception of the CMP, indicating an improvement in the implementation of the goals of the CMP.

Figure 2.7: Approved Residential Units (2001 - 2012*)



**Figure 2.8: Approved Commercial Development
(2001 - 2012*)**

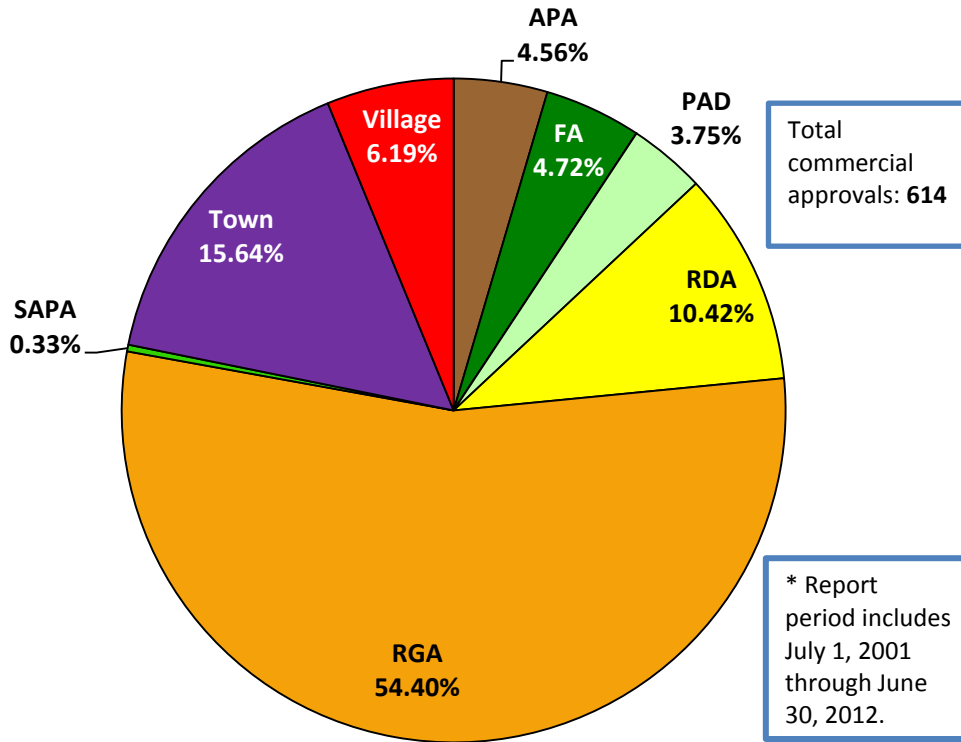
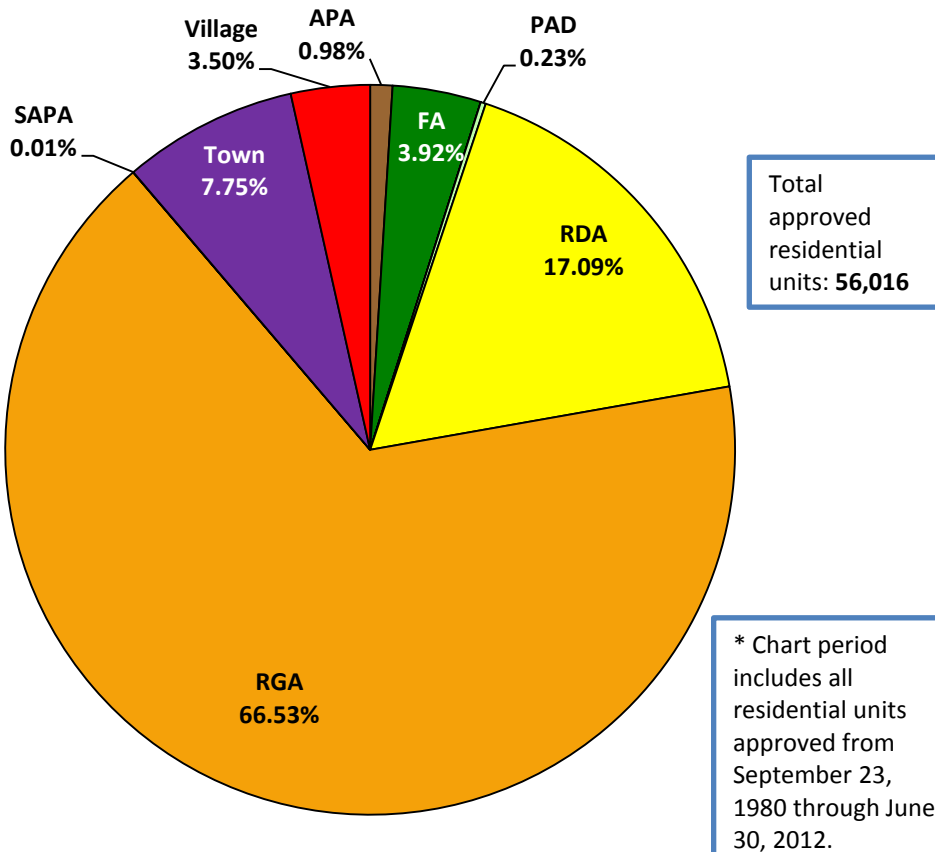
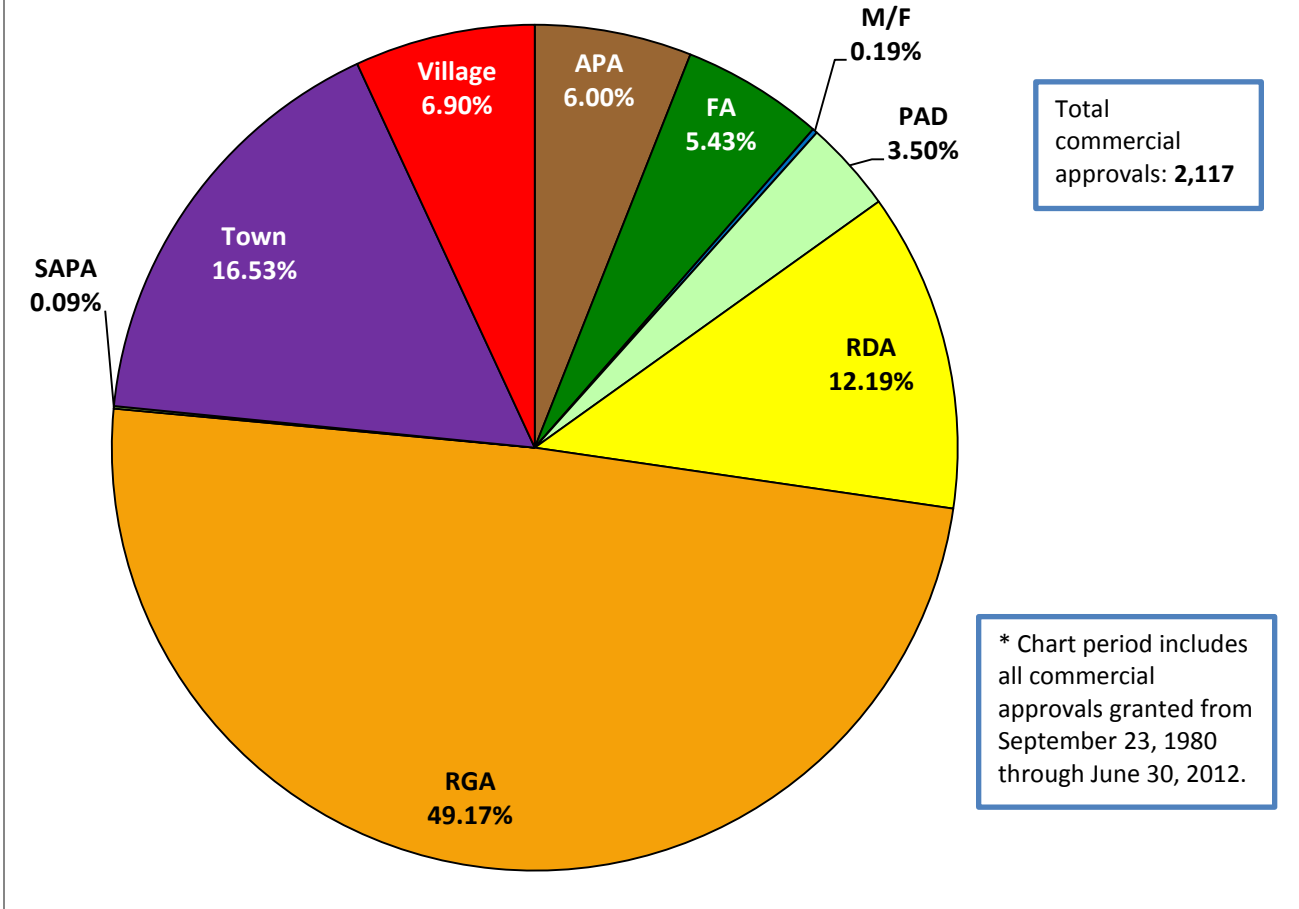


Figure 2.9: Approved Residential Units (1980 - 2012*)



**Figure 2.10: Approved Commercial Development
(1980 - 2012*)**



In addition to management area distribution, it is useful to understand which municipalities in the Pinelands have seen the most development. Figure 2.11 depicts the 10 municipalities in which the highest numbers of residential units were approved during the review period. On average, about 40 % of each of these 10 municipalities is comprised of RDAs, RGAs, Towns and Villages – the areas to which most development is intended to be directed.

Figure 2.11: Ten Municipalities with Most Approved Residential Units (2001 - 2012*)

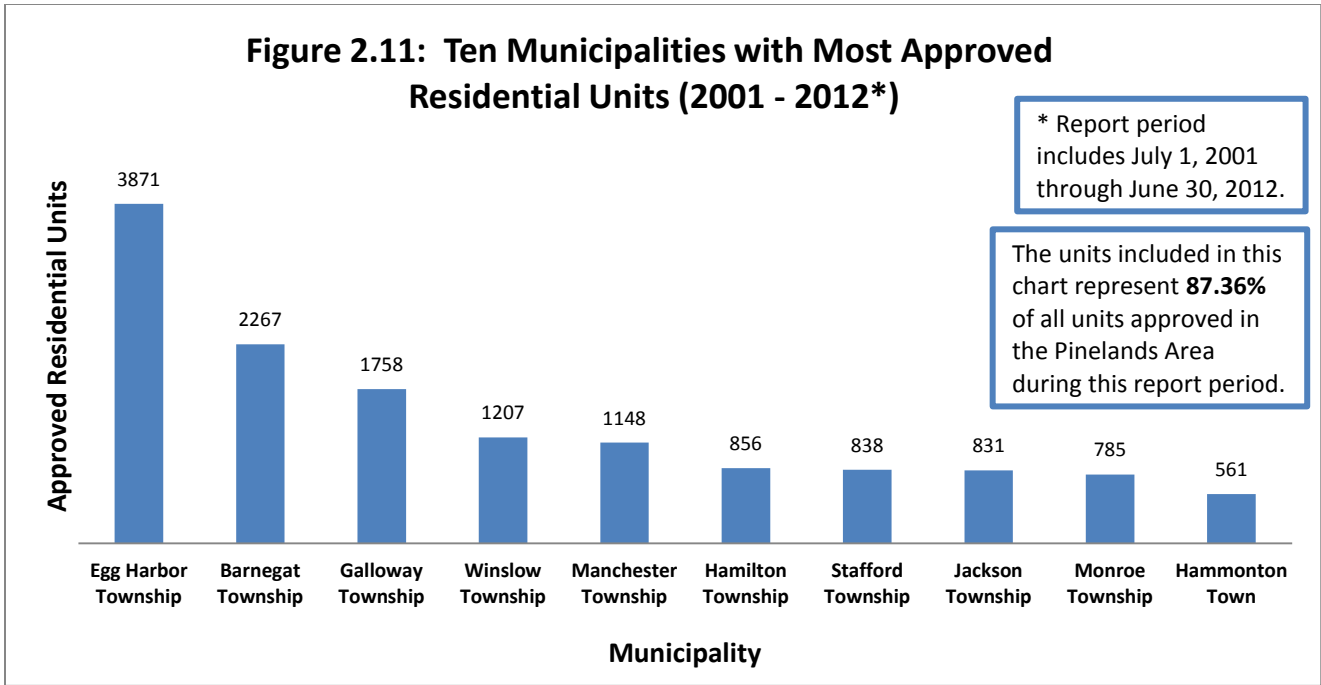
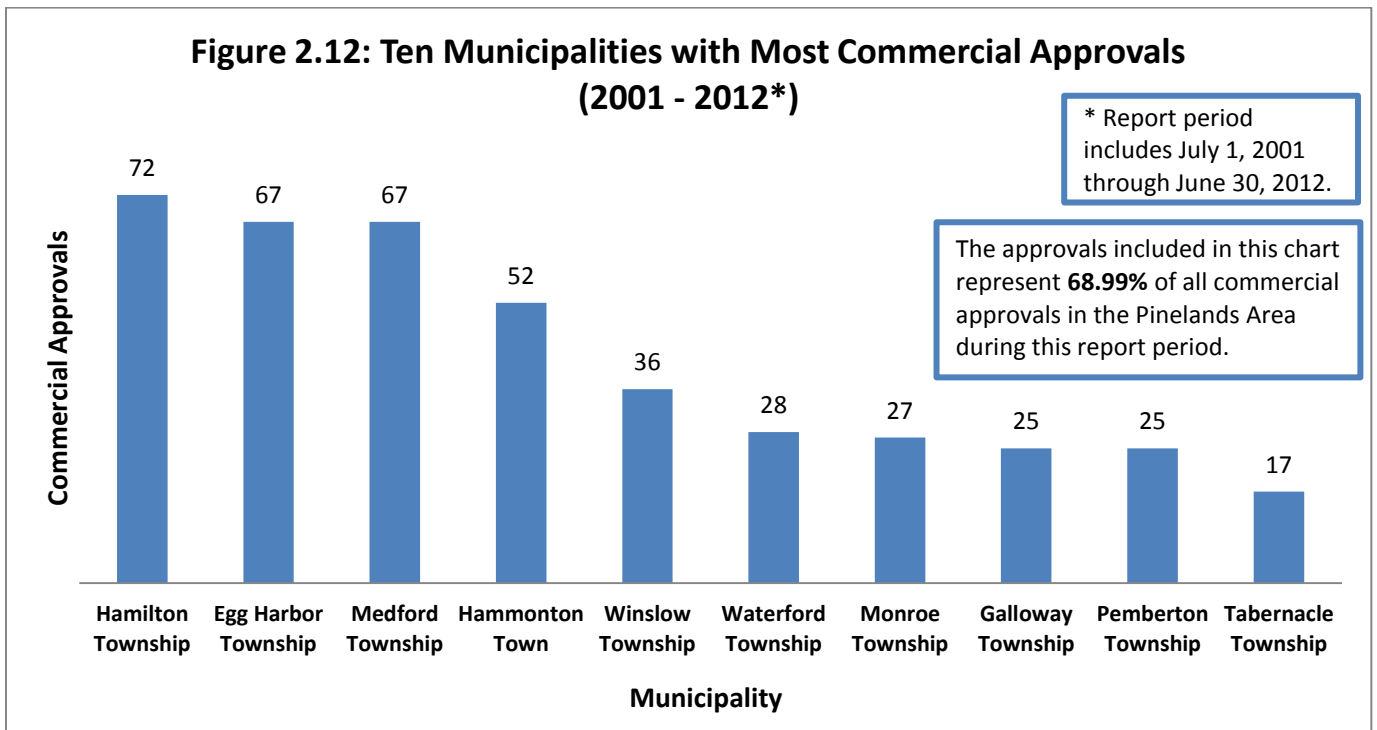


Figure 2.12 depicts the 10 Pinelands Area municipalities in which the highest numbers of commercial development approvals were granted during the review period. Like the municipalities with the highest amounts of residential growth, an average of about 46% of each of these municipalities are located within RDAs, RGAs, Towns and Villages, suggesting that commercial uses are also being directed to the appropriate management areas for development.

Figure 2.12: Ten Municipalities with Most Commercial Approvals (2001 - 2012*)



Local Review Officer Program

All private development applications, such as those resulting in the approval numbers cited above, proceed through the application process as highlighted in the first section of this chapter, with some minor exceptions.

The Local Review Officer (LRO) program was adopted in 1995 to streamline the application process for the development of one single-family dwelling. This voluntary program authorizes a municipal official (typically, the zoning officer) to review an application for one single-family dwelling on an existing lot. Upon determining that the application is complete and consistent with the Pinelands CMP and the certified municipal land use ordinance, the LRO typically issues a Preliminary Zoning Permit signed by both the LRO and a Commission environmental specialist. The Preliminary Zoning Permit serves as a Pinelands Certificate of Filing and is usually valid for two years.

The overall percentage of applications for one single-family dwelling reviewed by LROs decreased slightly in the past 10 years compared to the previous Plan Review period. From December 1991 through June 2001, just over 40% of applications for one single-family dwelling were processed through the LRO program. Between July 2001 and June 2012, almost 36% of all applications for one single-family dwelling were processed by LROs.

The LRO program has produced mixed results. Since the LRO program was established, 20 municipalities have adopted certified land use ordinances authorizing them to select an LRO and participate in the program, but the number of applications seen by each municipality varies greatly. Some municipalities process dozens of LRO applications each year. For example, Stafford Township made an early effort with the Commission to identify parcels in the Ocean Acres subdivision that met the lot size requirement and were free of environmental constraints. For this subset of lots, Commission review is considered to be complete, allowing applicants to proceed directly to Stafford Township for a construction permit without any additional application requirements. Two-hundred and seventy-four such permits – approximately 27 per year – were issued between July 1, 2001 and June 30, 2012.

However, many municipalities receive fewer than two LRO applications per year, making familiarity with the LRO application review process a challenge. The LROs in these municipalities tend to defer the majority of the review back to the Commission's Regulatory Programs staff, which eliminates the intended efficiency of having the municipal official handle the review. In addition, several municipalities have appointed LROs who are in the office on a part-time basis only, often only available to applicants during a small window on a weekday evening. Applicants in these municipalities have expressed frustration with the lengthy application review delays faced as a result of meeting once a week with the LRO. Some municipalities, after trying to work with the LRO program for several years, unofficially opted out of the program by leaving the LRO position vacant. The result of these and other factors is an extremely variable success rate for the LRO program from town to town.

The Commission's Director of Regulatory Programs issued a memorandum dated April 14, 2009 that evaluated the LRO program for the Commission's Public and Governmental Programs Committee.

Among the recommendations at that time were expanding the LRO-eligible applications in municipalities experiencing success with the program, reducing oversight to an annual review instead of application by application in successful municipalities, eliminating the LRO program for municipalities averaging fewer than two LRO applications per year, and ending the LRO program in municipalities where the LRO is not available on a full-time basis. Most of these actions, especially those focused on reducing the LRO program in less active municipalities, have not occurred.

Some program changes have been implemented on a smaller scale. In October of 2010, the Commission certified a Medford Township ordinance establishing an LRO program to streamline applications for single family dwellings on existing lots, home occupations and changes of an existing non-residential use to another non-residential use (provided the use is served by public sanitary sewer and no other development is proposed). Between October 2010 and June 30, 2012, the Medford Township LRO processed two complete applications, both for non-residential changes of use served by public sewer.

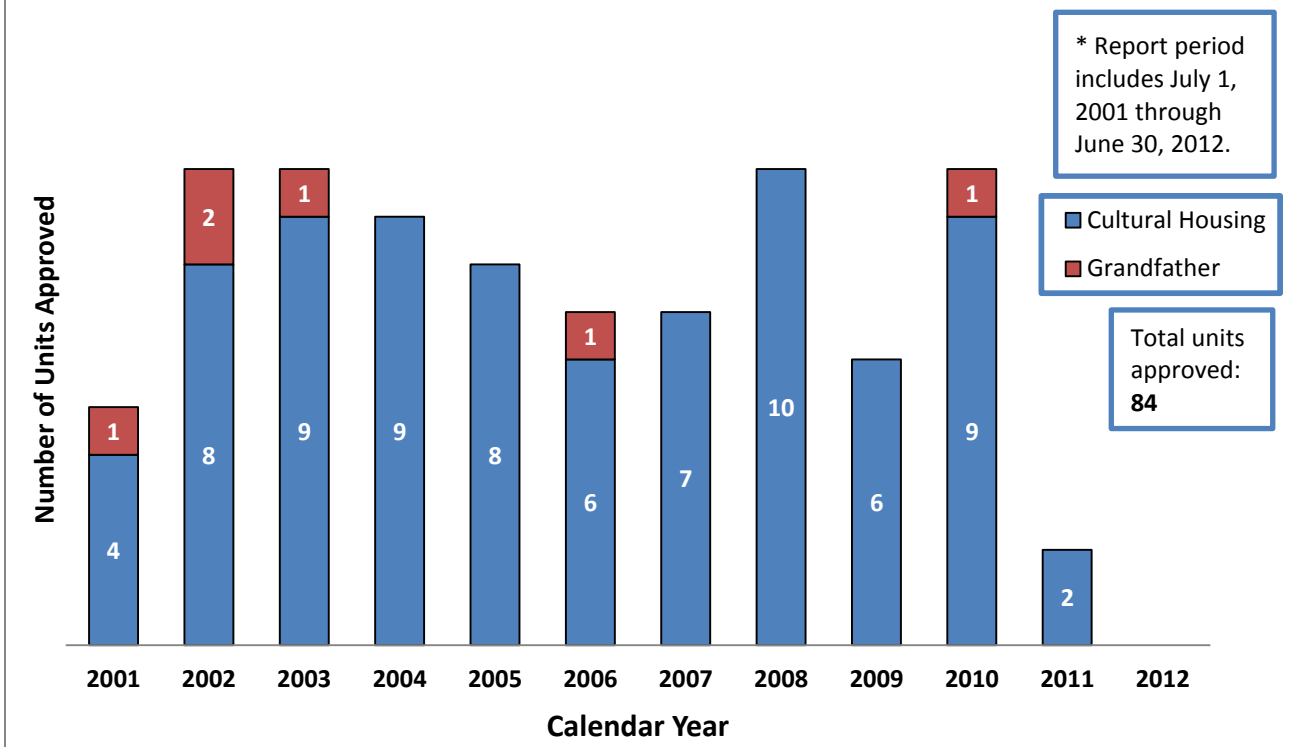
The alternate permitting program ordinance certified by the Commission in February of 2012 for the Haines Boulevard Environs Redevelopment Area in Waterford Township's RGA was also noteworthy. Commission Regulatory Programs staff completed preliminary environmental and cultural resource reviews for the entire Redevelopment Area, which was already substantially developed but has been unoccupied for some time. The preliminary evaluation demonstrated that the 110-acre site, located in a non-residential, sewered zone, does not encompass wetlands, threatened or endangered species habitat, or cultural resources (aside from one specific structure which is not exempt from cultural resource standards). In recognition of the Township's ongoing redevelopment efforts and the suitability of this redevelopment area for development, the Commission determined it would be appropriate to relieve applicants of certain submission requirements as a means of increasing the efficiency of the application process in this important area. Under the new program, applicants are permitted to apply directly to the Township and are not required to obtain Certificates of Filing from the Commission or complete wetlands delineations, cultural resource surveys or threatened and endangered species surveys, provided that their proposed projects will be served by public sewer and are consistent with the redevelopment plan and other environmental standards (such as stormwater management).

Cultural Housing and Substandard Lot Provisions

The cultural housing provision and substandard lot provision (known more commonly as the grandfather provision) are mechanisms in the CMP that allow flexibility for long-time property owners who wish to build a dwelling for themselves or immediate family members on undersized lots.

Though the two provisions are fairly similar, the conditions of the cultural housing provision are more challenging to meet than those of the grandfather provision. However, the cultural housing provision allows for the creation of subdivided lots, while the grandfather provision does not. As a likely result of this flexibility of the cultural housing provision, the vast majority – 92.9% – of the approved new dwelling units using one of the two provisions were proposed under the cultural housing provision. Figure 2.13 illustrates the distribution of dwelling units approved under the two provisions.

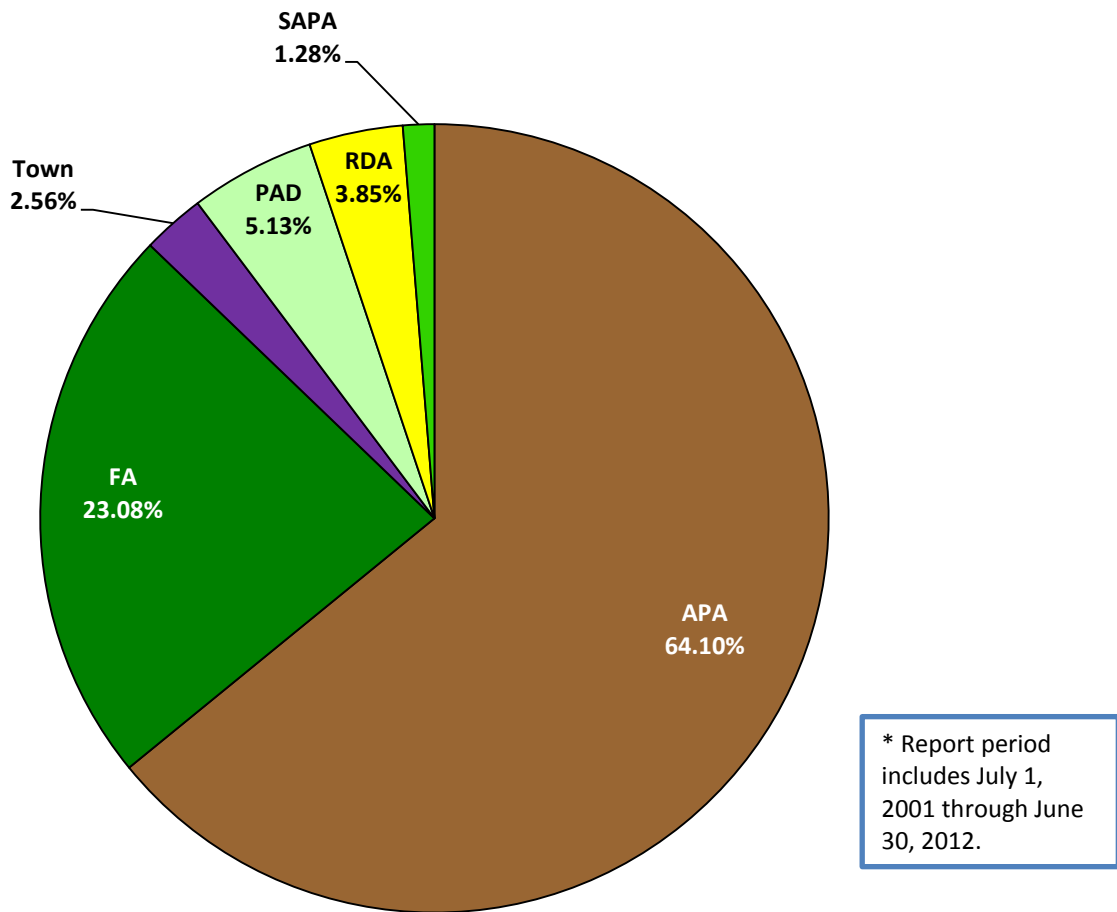
**Figure 2.13: Cultural Housing and Grandfather Provisions
(2001 - 2012*)**



Most often, undersized lots whose owners meet the eligibility requirements for the cultural housing or grandfather provisions are located in conservation- or agriculture-oriented management areas with larger lot size requirements and/or more challenging permitted use standards. The APAs and SAPAs require ten acres for one single family dwelling when the future resident of the dwelling commits to farming the parcel and a full 40 acres when the future resident of the dwelling does not propose to farm. On average, residential development in the FA requires at least 28 acres per dwelling unit. In addition, residential development in the PAD is limited to property owners who meet the cultural housing provision.

Given that the cultural housing provision is available as an option to property owners anywhere in the Pinelands Area and the grandfather provision is available as an option to property owners in the entire Pinelands Protection Area (which excludes the PAD and SAPAs), it is interesting to note that the distribution of dwelling units approved under these provisions falls almost entirely within the more restricted areas – 93.6% in APAs, FAs, the PAD, and SAPAs – as depicted by Figure 2.14. This would seem to support the intent of the CMP to enable property owners with true family and cultural ties to the Pinelands to develop dwellings for themselves and their immediate family, as many long-time Pinelands residents and property owners are associated with a family farm or more rural, isolated areas.

Figure 2.14: Distribution of Cultural Housing and Grandfather Provision Approvals (2001 - 2012*)

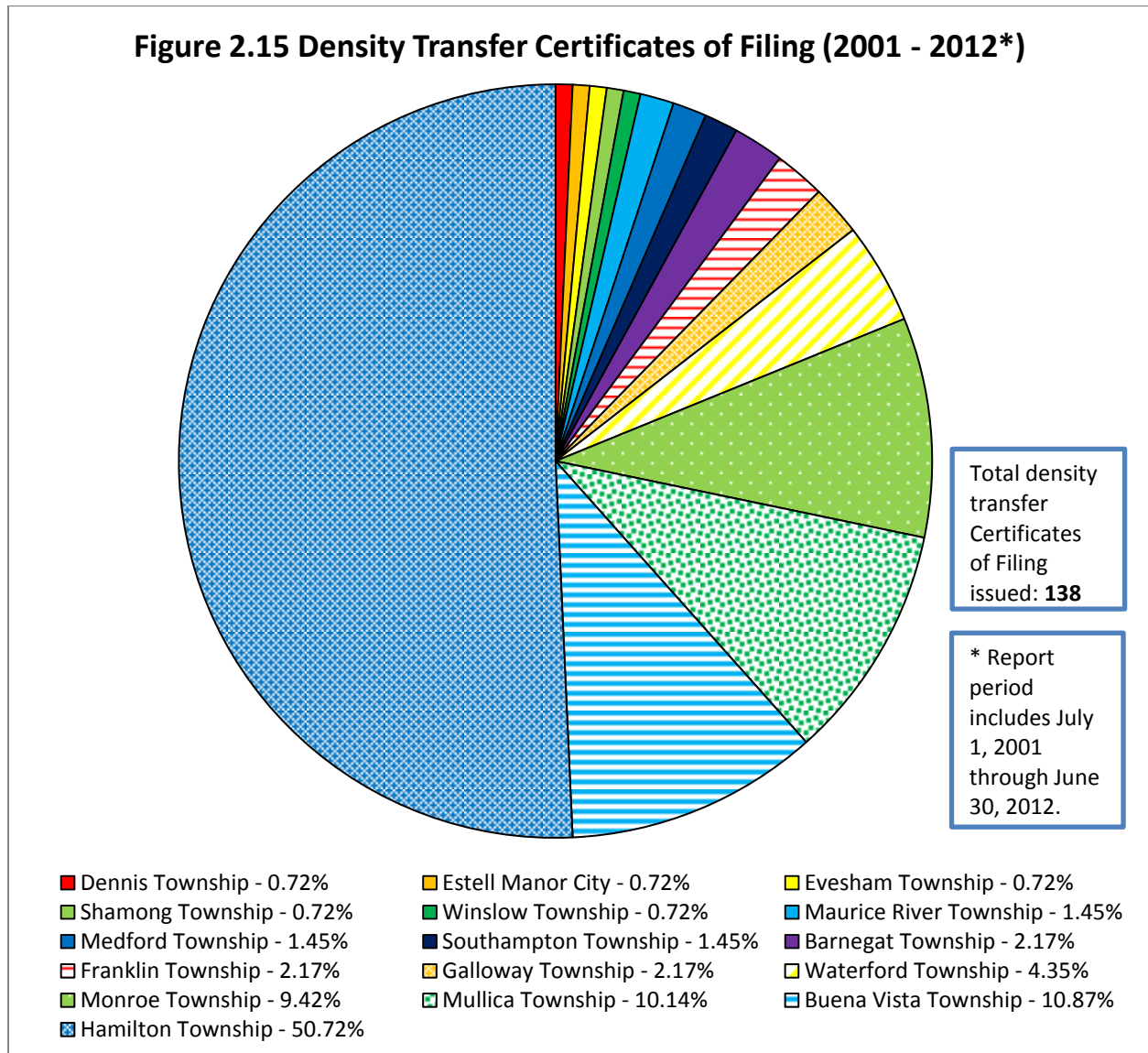


Density Transfer Provision

The CMP was amended to include the density transfer provision in 1992. This option allows property owners in RDAs and FAs to develop houses on undersized lots, provided the balance of the required acreage is acquired and deed restricted elsewhere in the same zoning district within the same municipality. In a few instances, municipalities have designated different zoning districts in the same management area as sending and receiving areas. Both methods result in preservation of the overall density standards for the management areas.

Between July 1, 2001 and June 30, 2012, 137 applications utilizing the density transfer provision were completed for Certificates of Filing and Preliminary Zoning Permits (LRO program). The majority of applications were in RDAs (84 applications in RDAs, 53 in FAs). The applications were distributed across municipalities as illustrated by Figure 2.15, with the majority of applications in Hamilton Township, Atlantic County.

Figure 2.15 Density Transfer Certificates of Filing (2001 - 2012*)



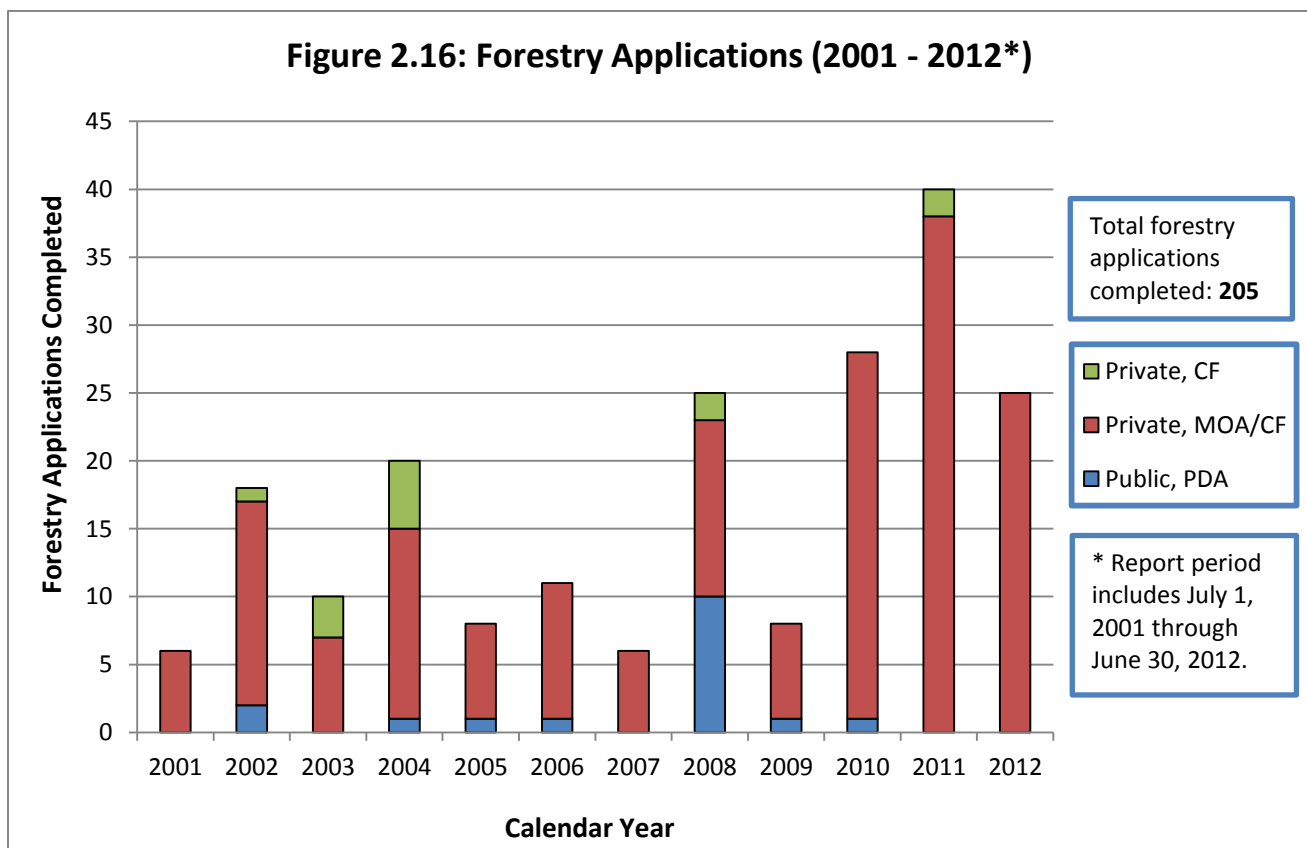
In addition to the 138 Certificates of Filing issued pursuant to the density transfer provision, 117 density transfer applications were granted local agency approvals (septic and/or construction permits, typically) and received Commission “no further review” letters. In order to issue the letter of no further review, the Commission staff ensures that the requisite density transfer deed restriction has been recorded (or submitted for recordation). As a result, between July 1, 2001 and June 30, 2012, about 618 acres were permanently protected from future development in RDAs and FAs.

Forestry

While public forestry applications require the same public development approval process as all other public development applications, private forestry applications have two options. Private applicants may submit an application for a forestry operation to the Pinelands Commission, as they would for any other development. The completion of such an application results in a Certificate of Filing for the proposal, and subsequent Commission review of local permits and approvals (i.e. municipal forestry permits) remains necessary.

However, pursuant to a 1996 streamlining MOA between the Commission and the New Jersey Department of Environmental Protection (NJDEP), an applicant who wants to participate in the New Jersey Forest Service’s Forest Stewardship Program may submit a proposed Forest Stewardship Plan directly to the NJDEP. Pinelands Commission Regulatory Programs staff and a Regional forester each review the proposed Forest Stewardship Plan for consistency with their respective regulations and expertise. Once all entities agree that the Plan is complete and consistent, the NJDEP Forest Service (which resides in the NJDEP Division of Parks and Forestry) issues a letter welcoming the applicant to the NJ Forest Stewardship Program. This letter also serves as a Pinelands Commission Certificate of Filing. The applicant must still receive a Commission “no further review” letter for any local permits and approvals (i.e. municipal forestry permits), but the streamlined process itself is simpler, more time efficient and less costly; the Commission’s application review fee does not apply to proposals submitted pursuant to a streamlining MOA.

During this reporting period, 175 private forestry applications were completed through the streamlined process with the New Jersey Forest Service’s Forest Stewardship Program. Thirteen private forestry applications proceeded to receive a Certificate of Filing from the Pinelands Commission. An additional 17 public forestry applications were approved by the Pinelands Commission, for a total of 205 completed forestry applications between July 1, 2001 and June 30, 2012 (see Figure 2.16).

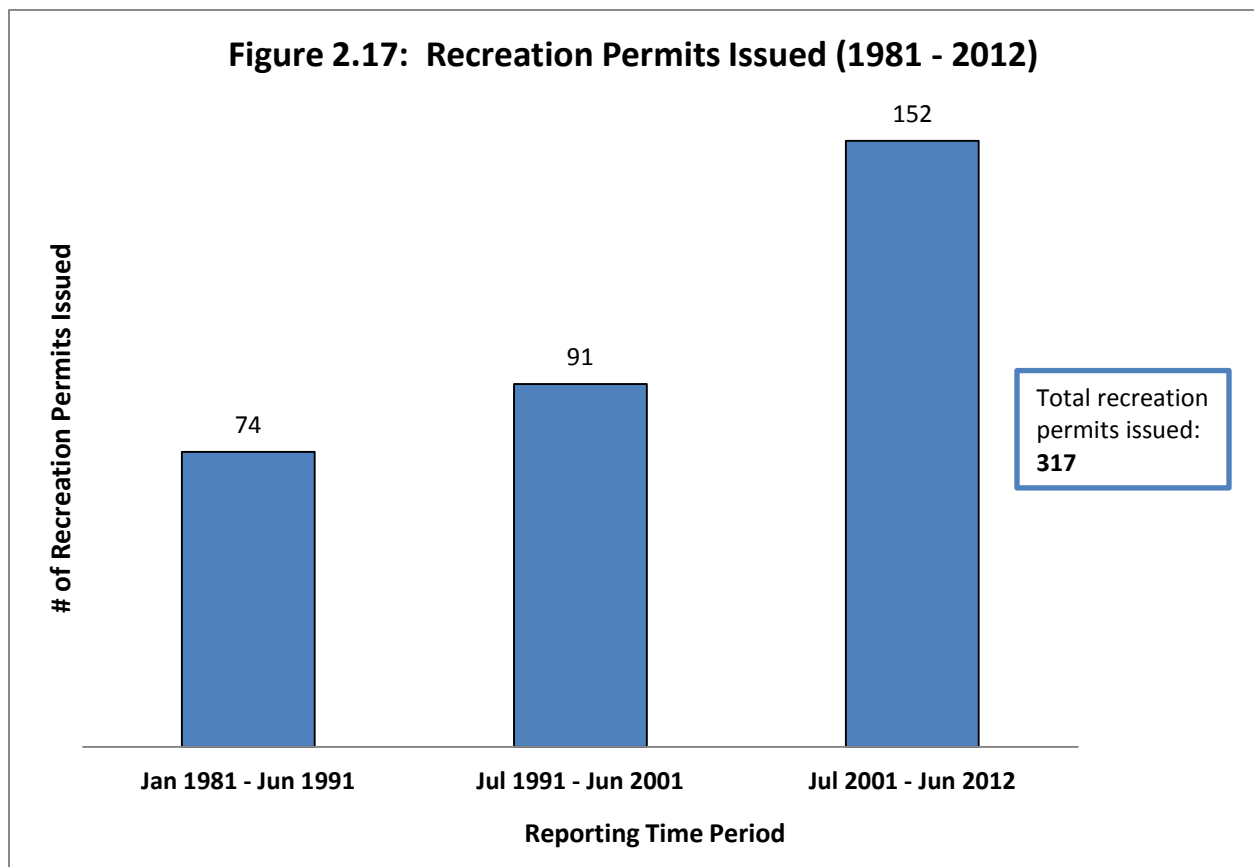


Prior Plan Review reports indicated that private forestry applications averaged 9.6 per year between January 14, 1981 and June 30, 1991 and 18.6 annually between July 1, 1991 and June 30, 2001. The annual average of 18.8 private forestry applications between July 1, 2001 and July 1, 2012 is consistent

with the higher rate of private forestry applications following the implementation of the streamlined Forest Stewardship Program process in 1996 and the appeal of the tax reduction benefits available to property owners with land in the Forest Stewardship Program. Provided that certain conditions are met, woodlands managed as part of the Forest Stewardship Program can qualify for reduced property taxes under the State’s Farmland Assessment Program.

Recreation Permits

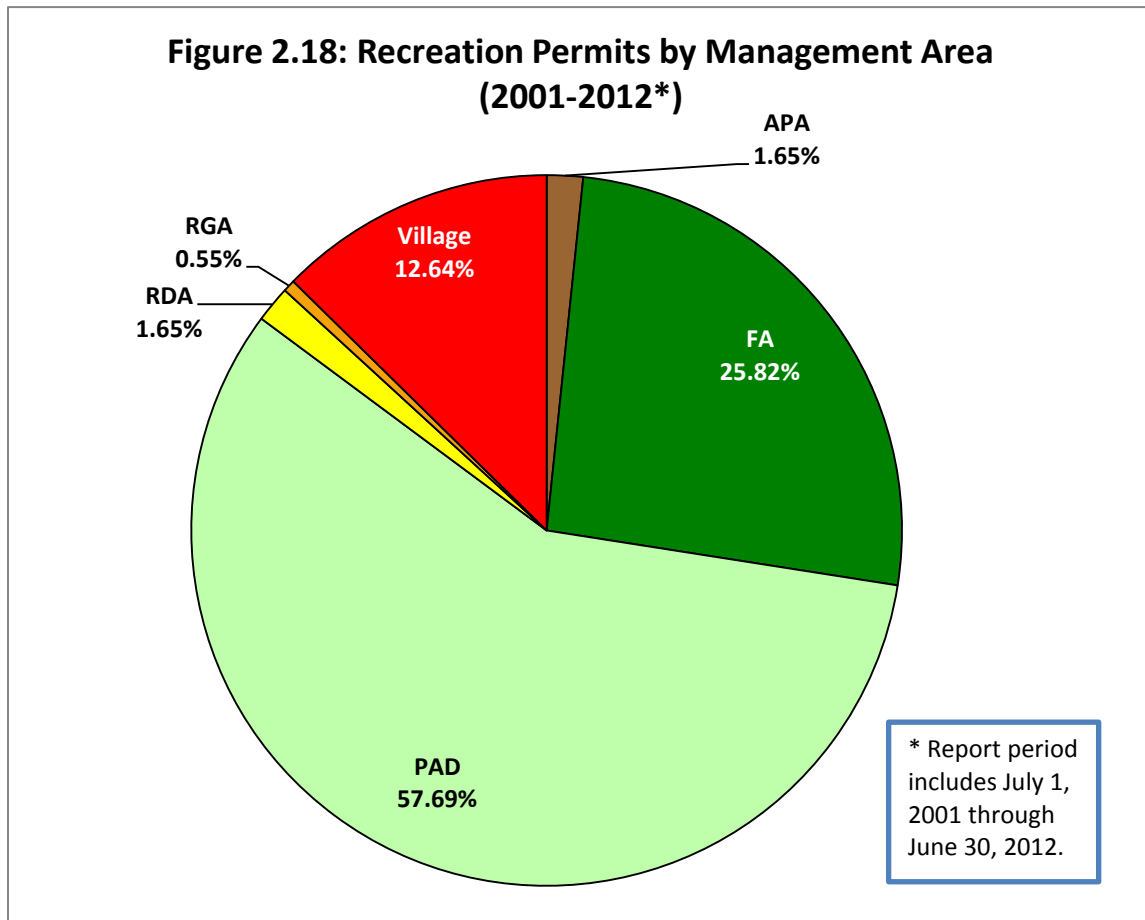
The Commission issues recreation permits for organized recreation events, primarily enduros and other off-road vehicle events using existing roads, trails and fire cuts on public and private lands. The number of recreation permits issued in the Pinelands Area has increased over time, as depicted in Figure 2.17. This represents a more than 200% increase in the number of organized off-road vehicle events from the early years of the CMP to current day.



The original CMP makes reference to enduros as historical trail-users in the Pinelands. Enduros are included in the CMP as a permitted use – provided all environmental standards are met – but limited detail is provided in terms of application requirements. Perhaps consistent with the increase in the number of permitted events, conflicts between organized off-road vehicle events and low-intensity recreational uses have become more apparent in recent years.

The majority of organized recreation events that received permits between July 1, 2001 and June 30, 2012 were routed through the more development-restricted areas of the Pinelands; 85.16% of the events

occurred in APAs, FAs and the PAD (Figure 2.18). This is consistent with historic enduro use of state parks and forests and open, undeveloped private lands, all of which tend to be located in the conservation-oriented management areas. However, the focused use of these areas for motorized recreation also illustrates a main source of user conflicts: low-intensity recreation uses such as hiking, bicycling, fishing, hunting and canoeing are often incompatible with the noise and large groups of people generated by organized off-road vehicle uses.

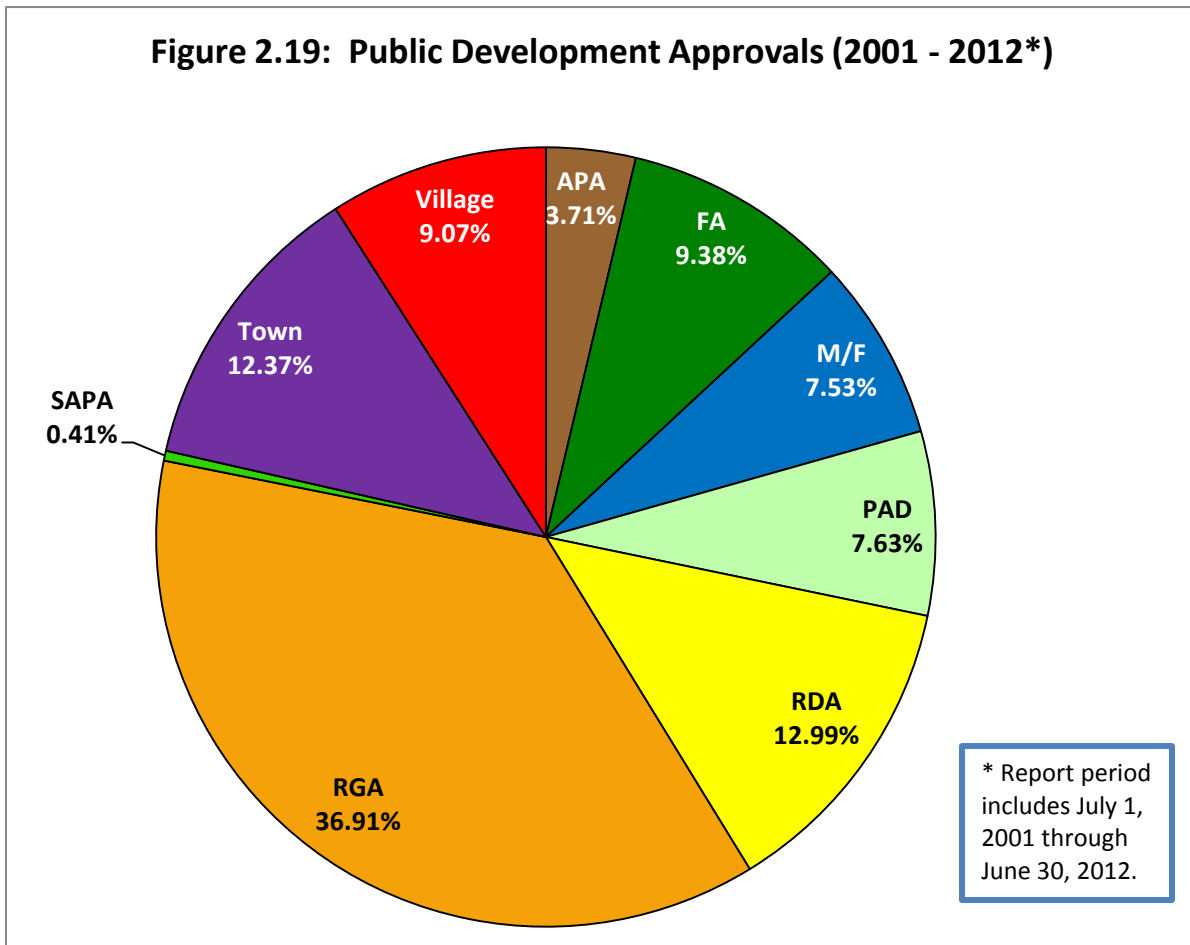


Public Development

Applications submitted by public agencies must generally meet the same standards as private applications, but the process is somewhat different. Instead of receiving the Certificate of Filing that allows a private application to proceed to local agency approval, municipalities, counties and state and federal agencies receive approval from the Commission and do not generally require local agency approval.

Public development applications cover a broad range of activities, from infrastructure (roads, bridges and sanitary sewer mains) to institutional buildings (schools, parks, government structures). Between July 1, 2001 and June 30, 2012, a total of 725 public development applications were approved by the Commission.

As depicted by Figure 2.19, public development approvals were more evenly distributed across Pinelands management areas than were private development applications. Public agencies' responsibility to maintain and improve publicly-owned land and infrastructure that pre-dated the Pinelands Commission often results in submission of applications in more restrictive management areas. Even so, 78.9% of public development occurred in the development-oriented and transition areas of the Pinelands (RGAs, Towns, Villages, M/F and RDAs).



It is important to note that around 2009, the Joint Base McGuire-Dix-Lakehurst began notifying the Commission of development activities that would be undertaken without application to the Commission due to incompatibility with the military's national defense mission, as permitted by the CMP. While public development approvals had been issued for decades for development on the Joint Base, the military recently determined that most applications for development with the Pinelands Commission are incompatible with its mission. Of the 12 public development approvals granted in an M/F area (where the Joint Base is located) between late 2009 and June 2012, the military was represented by only three applications submitted by the Department of the Navy.

The Federal Aviation Administration (FAA) continues to submit applications for approval for development at the FAA Technical Center, which is the other military/federal installation in the Pinelands Area. Six of the 12 public development approvals granted between 2009 and 2012 in an M/F area were for FAA applications at the FAA Technical Center.

The remaining three public development applications in an M/F area between 2009 and 2012 were submitted by the Pemberton Township Board of Education for construction of a gymnasium at the Fort Dix Elementary School, the New Jersey Department of Military and Veterans Affairs for building additions to the Consolidated Logic and Training Facility at the Lakehurst Naval Air Engineering Station, and the New Jersey Department of Transportation for improvements to the intersection of U.S. Route 30 and Pomona Road in Galloway Township. The M/F area reaches to the center line of U.S. Route 30 near the southeast end of the project area for the latter application.

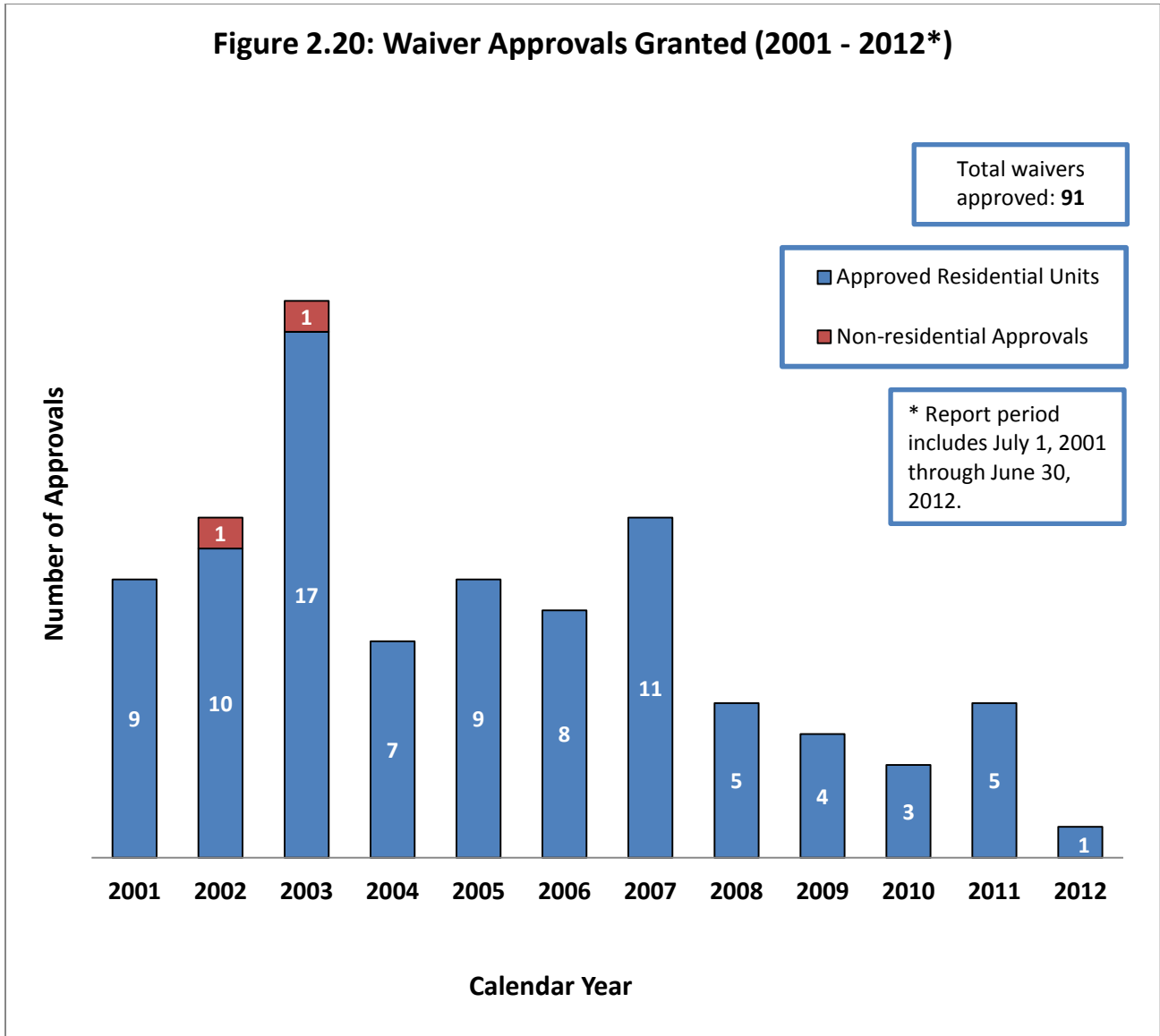
Waivers of Strict Compliance

The Pinelands Protection Act gave the Commission the exclusive authority to grant waivers from CMP standards. The Commission is authorized to do so only upon a finding that such a waiver is necessary to relieve an extraordinary hardship or satisfy a compelling public need. The Commission must also determine that the issuance of a waiver will not result in substantial impairment of Pinelands resources. If such findings can be made, a waiver of strict compliance may be approved, allowing development to occur on a parcel that does not meet all CMP standards.

In 1992, the Commission amended the CMP to include new waiver rules designed to reduce the number of extraordinary hardship waivers granted on undersized lots in the more restrictive Pinelands management areas. The amendments also simplified application procedures, defined substantial impairment and balanced the environmental impacts of granting waivers from CMP environmental standards. The new rules established 12 categories of development that are presumed to have an extraordinary hardship. Nine of the 12 categories involve residential development. All constitute permitted uses based on the land use standards contained in subchapter 5 of the CMP. Based on these new rules, the Commission approved waivers for 139 residential units between 1992 and 2001. This equates to an average of 15 units per year, significantly lower than the 90 units per year that were approved between 1980 and 1992 under the prior waiver rules. The decrease in approved waivers continued during the current report period, when the Commission approved waivers for just 89 residential units, or an average of only eight per year, as depicted by Figure 2.20.

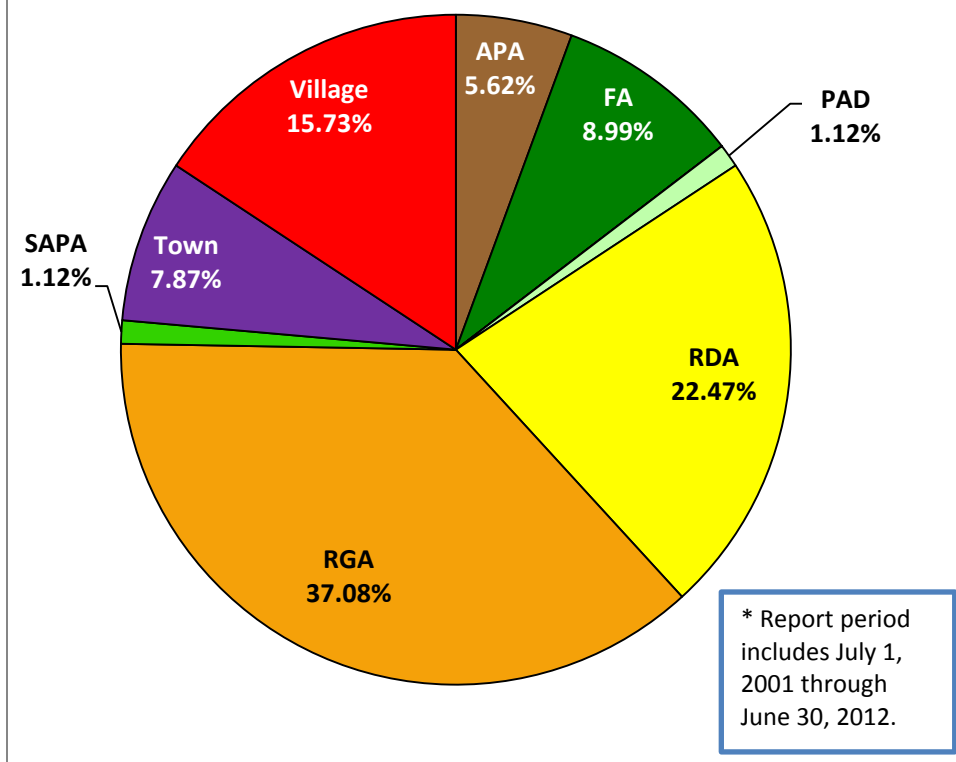
In addition to residential waivers, the Commission also approved a comparatively low number of waivers involving non-residential development. Prior to the 1992 CMP amendments, the Commission granted waivers for 30 non-residential projects. Between 1992 and 2001, 14 non-residential waiver approvals were granted, the majority for activities proposed as part of hazardous waste cleanups. The trend continued with only two non-residential waiver approvals granted during the current reporting period, as shown by Figure 2.20. These two approvals were compelling public need waivers, one for a waste management facility essential for the remediation of a contaminated site in the PAD (not a permitted use) and the second development and operation of a treatment system to remediate contaminated soil and groundwater (with an impact to wetlands).

Figure 2.20: Waiver Approvals Granted (2001 - 2012*)



The distribution of approved waivers for residential units in the Pinelands Area is largely consistent with the intended land use intensities of the CMP, as illustrated by Figure 2.21. Given the stricter limitations on permitted uses and development intensities in the PAD, FA, APA and SAPA, it is appropriate that only 16% of the approved residential waiver units between July 2001 and June 2012 were proposed to be located in these areas.

**Figure 2.21: Approved Residential Waivers
(2001 - 2012*)**



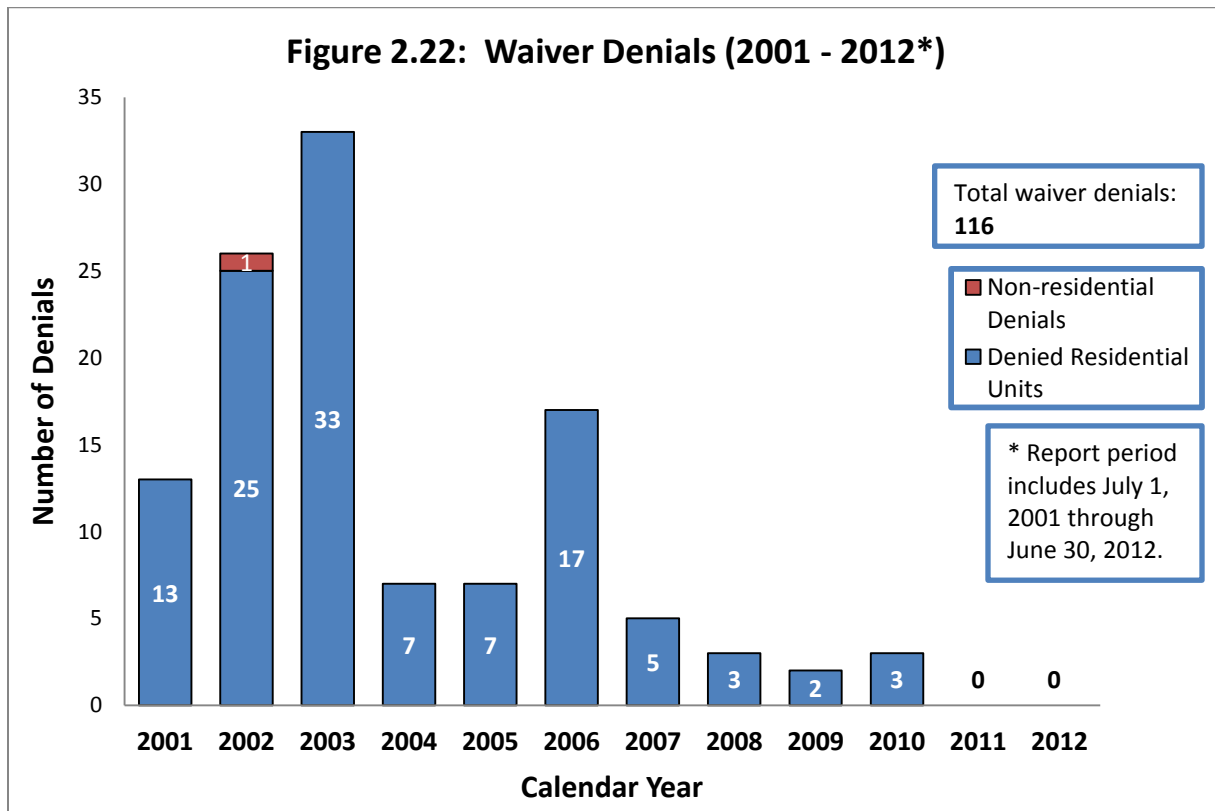
Lastly, all extraordinary hardship waivers approved under the 1992 waiver rules contain a condition requiring the acquisition and redemption of PDCs to balance the environmental impacts of the proposed development. Between July 1, 2001 and June 30, 2012, 75 applications with approved waivers proceeded to the point in the application process in which the redemption of PDCs was required. Those 75 applications resulted in the permanent protection of nearly 900 acres in PDC sending areas (PAD, SAPA and APA).

Waiver Denials

In general, waiver denials are less common than they were in the past, similar to the decline in waiver approvals. The 1992 CMP amendments explicitly defined substantial impairment and clearly set forth the categories of development likely to be approved through the waiver process. This may have resulted in applicants having a better understanding of the waiver requirements and submitting fewer waiver applications that were unlikely to be approved. The 115 residential waiver denials issued between July 1, 2001 and June 30, 2012 were for one single family dwelling only.

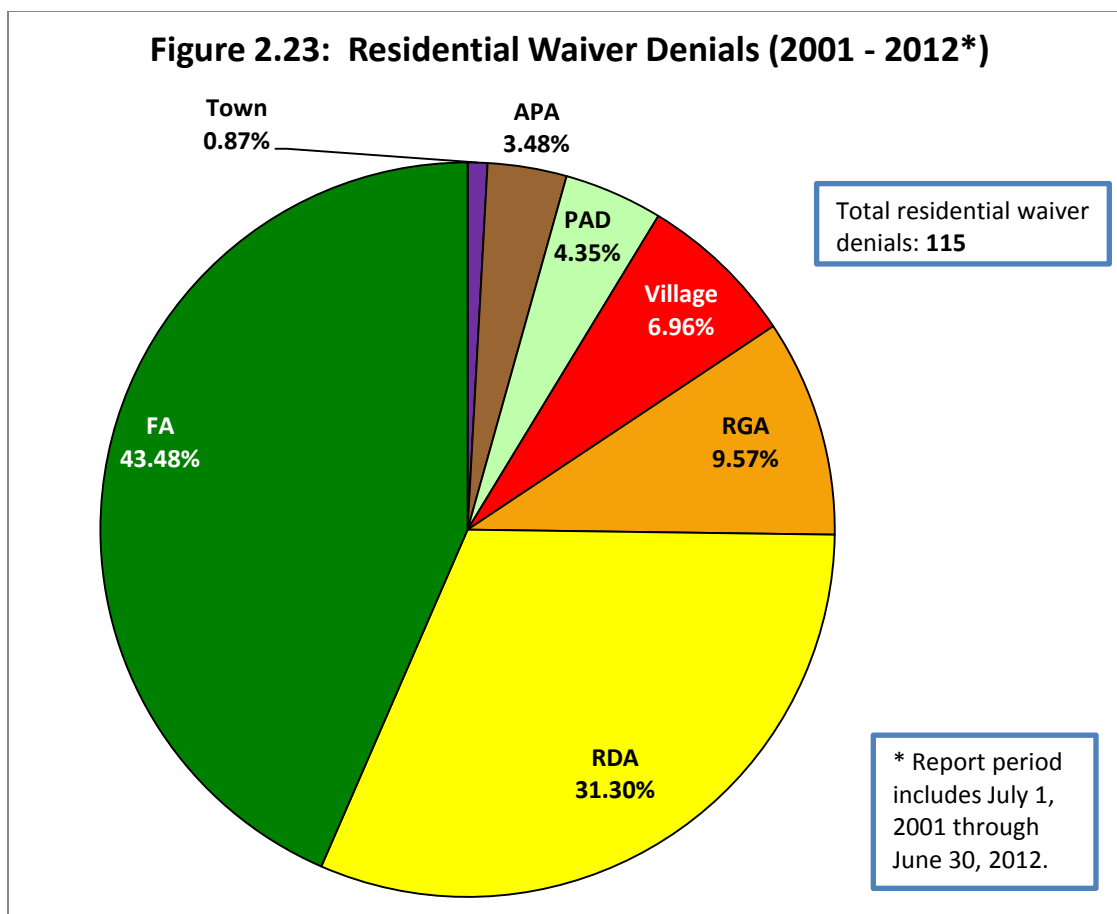
On the other hand, the 1995 establishment of the Limited Practical Use (LPU) Program as part of the NJDEP's Green Acres Program introduced a process in which the Commission's denial of a waiver of strict compliance became a prerequisite for certain state- and federally-funded land acquisitions. This would seem to have caused an increase in waiver denials. However, the funding available for

acquisitions under the LPU Program dipped significantly between 2001 and 2012. In addition, during this time the NJDEP’s Green Acres Quick Action Program was identified as a more efficient method of acquiring property because it did not require the Commission’s issuance of a waiver denial. As a result, even with the incentive of the LPU prerequisite for eligibility, the number of residential units receiving a waiver denial (115 from July 1, 2001 to June 30, 2012) was far fewer than in the preceding 10 years (712 from April 1992 to June 30, 2001). Figure 2.22 illustrates the trend in waiver denials during the current reporting period.



The Commission denied only one waiver application for a nonresidential use during the report period. That application, for a 33,000 linear-foot gas main, was proposed to transverse five management areas, including the PAD, FA, SAPA, RDA and RGA, and required a waiver from the permitted use limitations that apply in the PAD and SAPA. This application also crossed plan review reporting periods, as the Commissioners initially voted to deny the waiver in 2000 (based on substantial impairment to threatened and endangered species and wetlands) but formalized the denial in 2002 following an appeal to the Office of Administrative Law. The proposed gas main was subsequently rerouted so that a waiver was no longer required, and the application received a Certificate of Filing in 2004.

As depicted in Figure 2.23, the vast majority of residential waiver denials were for parcels located in FAs and RDAs.



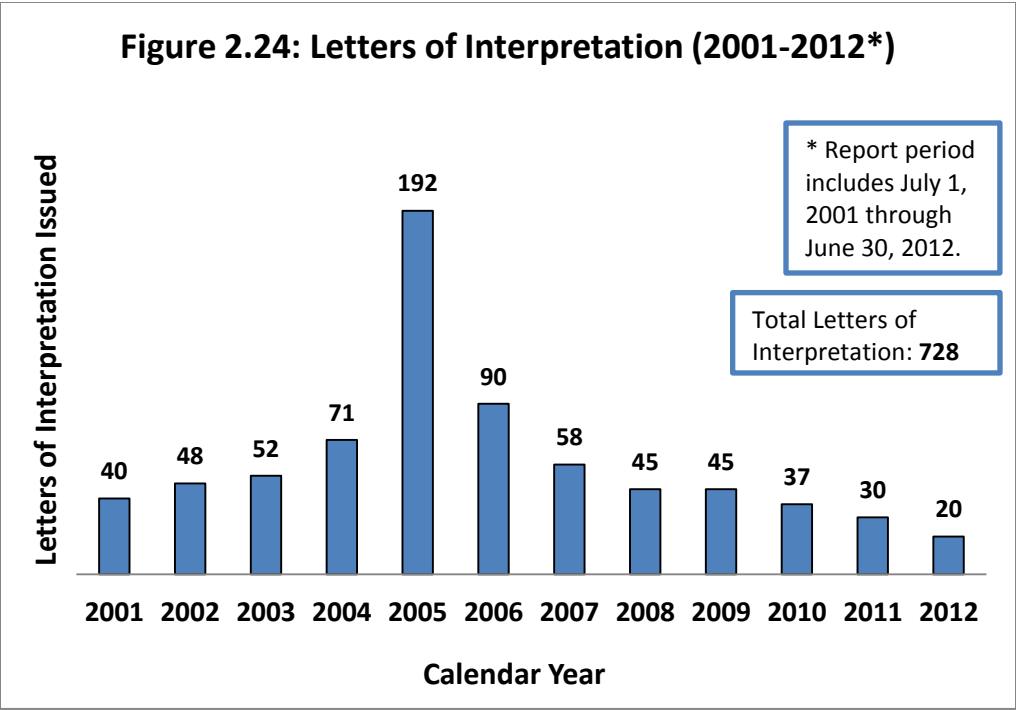
Letters of Interpretation

Letters of Interpretation (LOIs) are most commonly issued in response to an applicant’s request for an allocation of PDCs or a determination regarding the extent of wetlands. Wetland LOIs include applications submitted for wetlands presence/absence determinations and verification of wetland boundaries and buffers. Applicants may also request Commission interpretation of any of the CMP’s standards.

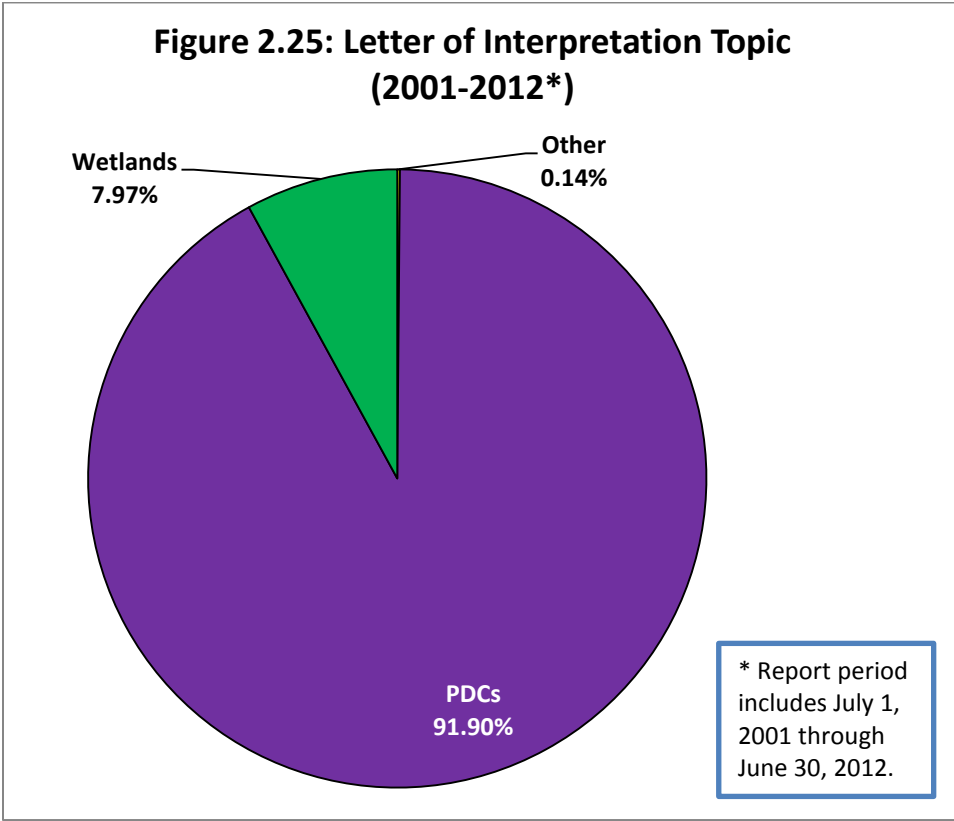
A total of 728 LOIs were issued between July 1, 2001 and June 30, 2012. Compared with the 691 LOIs issued between 1981 and 1991 and 1,098 LOIs issued between 1991 and 2001, this indicates a reduction in the number of LOI applications following a steep increase between 1991 and 2001. The highest number of LOIs was issued in 2005 (192 LOIs); the lowest number of LOIs was issued in 2011 (30 LOIs), given that the LOI count for 2012 (20 LOIs) includes only the first six months of that year.

It is important to note that LOIs expire after two years. Therefore, of the total 728 LOIs issued during this period, 535 were original LOIs issued for the first time on a given parcel, while 193 LOIs were amendments or renewals of previously issued LOIs that had expired.

Figure 2.24 below depicts the distribution of LOIs issued per year during the current review period.



As illustrated by Figure 2.25, the vast majority of LOIs issued during this report period were either for PDCs or wetlands. Two “other” LOIs were issued to clarify whether continuation of a resource extraction operation constituted a permitted use on a specific parcel and whether cultural resource and threatened and endangered species surveys would be required as part of a future development application.



Cultural Resource Surveys and Certificates of Appropriateness

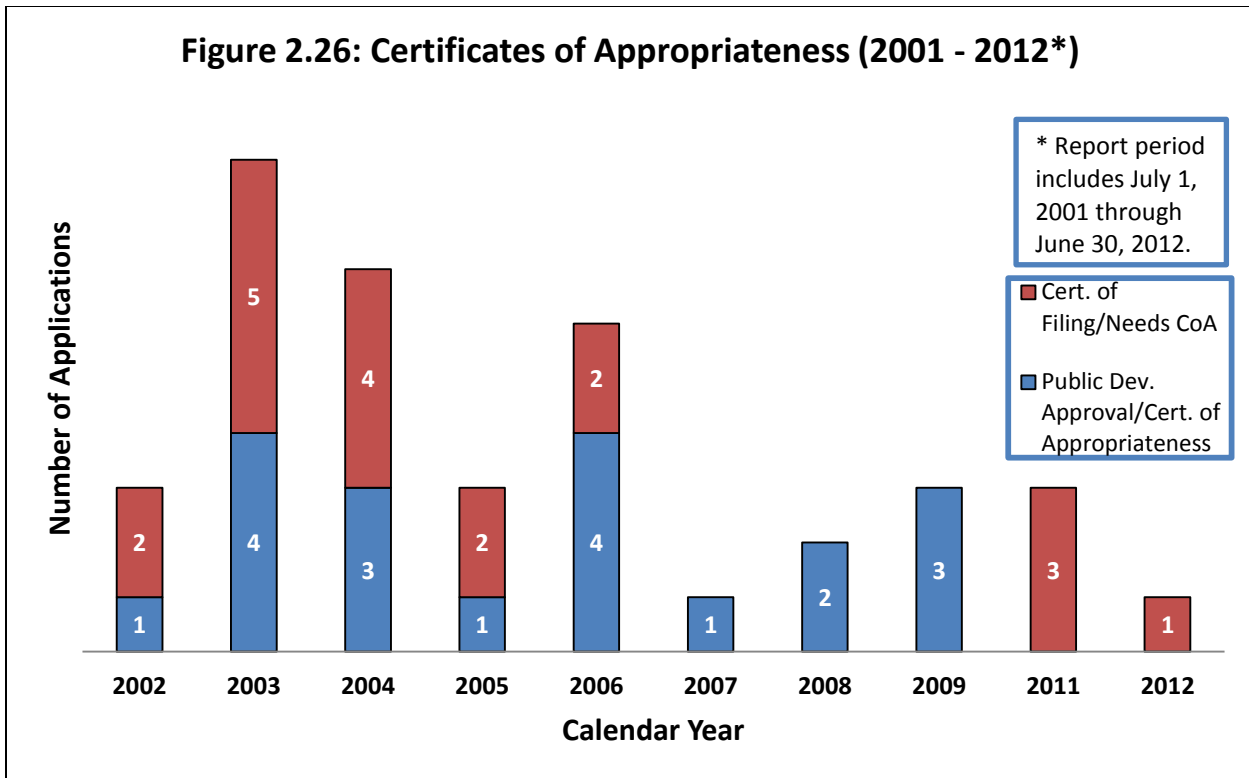
The original CMP dedicated an entire chapter to cultural resources, noting the documented presence of humans in the Pinelands for over 10,000 years and the need to protect the irreplaceable value of prehistoric and historic archaeological sites for future understanding of the story of the land. Cultural resources are divided into the prehistoric period (Native American culture and earlier) and the historic period (European settlement to present day). As part of the review process for both public and private applications, Regulatory Programs staff consults with the Commission staff archaeologist to determine whether the site is likely to contain any cultural resources. If the potential for the presence of cultural resources exists, an applicant may be required to complete a cultural resource survey and submit the results to the Commission.

During this reporting period, the Regulatory Programs staff consulted with the Commission's archaeologist on just under 2,000 applications to determine whether there is the potential for the existence of a cultural resource onsite. Of those submitted to the archaeologist for preliminary review, approximately 275 applications (about 14%) were required to address the potential for cultural resources by completing and submitting a cultural resource survey. Ultimately, approximately 260 cultural resource survey reports were submitted to and reviewed by the Commission's staff archaeologist during this reporting period.

When a cultural resource is identified as the result of a cultural resource survey required by the Commission, the application may only move forward if the cultural resource protection standards of the CMP are met. The CMP requires that a Certificate of Appropriateness be issued for the proposed development. The Certificate of Appropriateness must identify the appropriate treatment of the cultural resource from among three alternatives: preservation of the resource in place, if possible; preservation of the resource at another location, if preservation in place is not possible; or recordation, if neither of the other alternatives is possible.

Because public development applications that are complete and consistent with the CMP's requirements are approved by the Commission itself, the Commission issues a joint Public Development Approval/Certificate of Appropriateness for those applications involving identified cultural resources. Private development applications that are otherwise complete receive the typical Certificate of Filing, which notes a condition that the municipality must issue a Certificate of Appropriateness before any other approvals or permits can take effect for the proposed development. Figure 2.26 shows the number of public and private development applications requiring a Certificate of Appropriateness, either to be issued by the Commission or by the municipality. There were 19 total such applications for both the public and private development categories, for a total of 38 during the plan review period.

Figure 2.26: Certificates of Appropriateness (2001 - 2012*)



Threatened and Endangered Species Surveys

The CMP mandates the protection of local populations of threatened and endangered plant species and habitats that are critical to the survival of any local populations of threatened and endangered animal species. For an individual development application, this generally involves Commission staff review of the current site characteristics for potential habitat, examination of GIS records of documented threatened and endangered species sitings in the vicinity of the proposed project, and determination of whether the potential for presence of a threatened or endangered species exists for the subject site.

When the Commission staff determines that sufficient information indicates the likelihood of a threatened or endangered species on a site, the applicant is required to have a qualified consultant conduct a threatened and endangered species survey. During the current reporting period, 382 applications (about 3.7% of all new applications) were subject to a threatened and endangered species survey requirement. Of these applications, 123 were required to submit a habitat assessment, 116 were required to submit the results of a visual survey limited to the proposed area of disturbance for the proposed development, and 143 were required to complete a full survey of the entire subject property. The varying levels of threatened and endangered species surveys are typically a factor of the availability of information to the Pinelands Commission and the intensity and area of proposed disturbance.

Southern Pine Beetle

There were several actions taken by the Commission during the reporting period to address the infestation of southern pine beetles in the Pinelands Area.

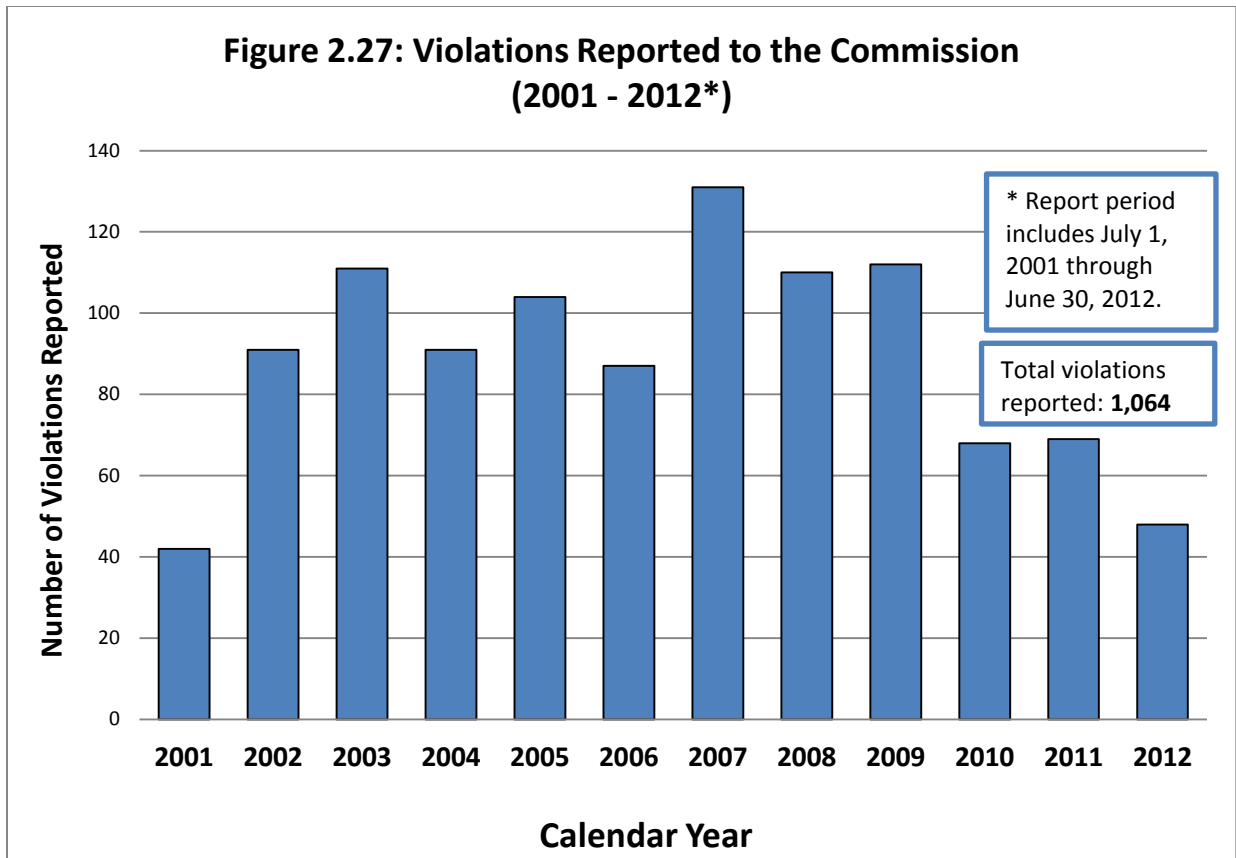
In June 2011 the NJDEP requested that the Commission allow for the initiation of southern pine beetle (SPB) suppression activities in the Pinelands Area to prevent a condition that was dangerous to life, health or safety. At that time, the NJDEP identified the need for suppression efforts on 300 acres of forested land in the Pinelands Area. Commission staff, along with several Commissioners, met with NJDEP staff in the field to observe the results of the infestation and the suppression actions taken to date. The authorization to treat 300 acres was granted. This approval was for a limited time period extending from June 28, 2011 to September 30, 2011. That authorization was extended to December 31, 2011.

The NJDEP also worked with the Commission to establish an expedited permitting process for SPB suppression actions taken on private lands in the Pinelands Area. This expedited process was developed to encourage private land owners to take the necessary steps to address SPB infestation on their land. From January 2011 through June 2012, Commission staff prioritized the review of four such applications submitted through the Forest Stewardship Program (discussed on page 63) for immediate SPB suppression activities on a total of about 50 acres of privately owned woodlands.

Violations

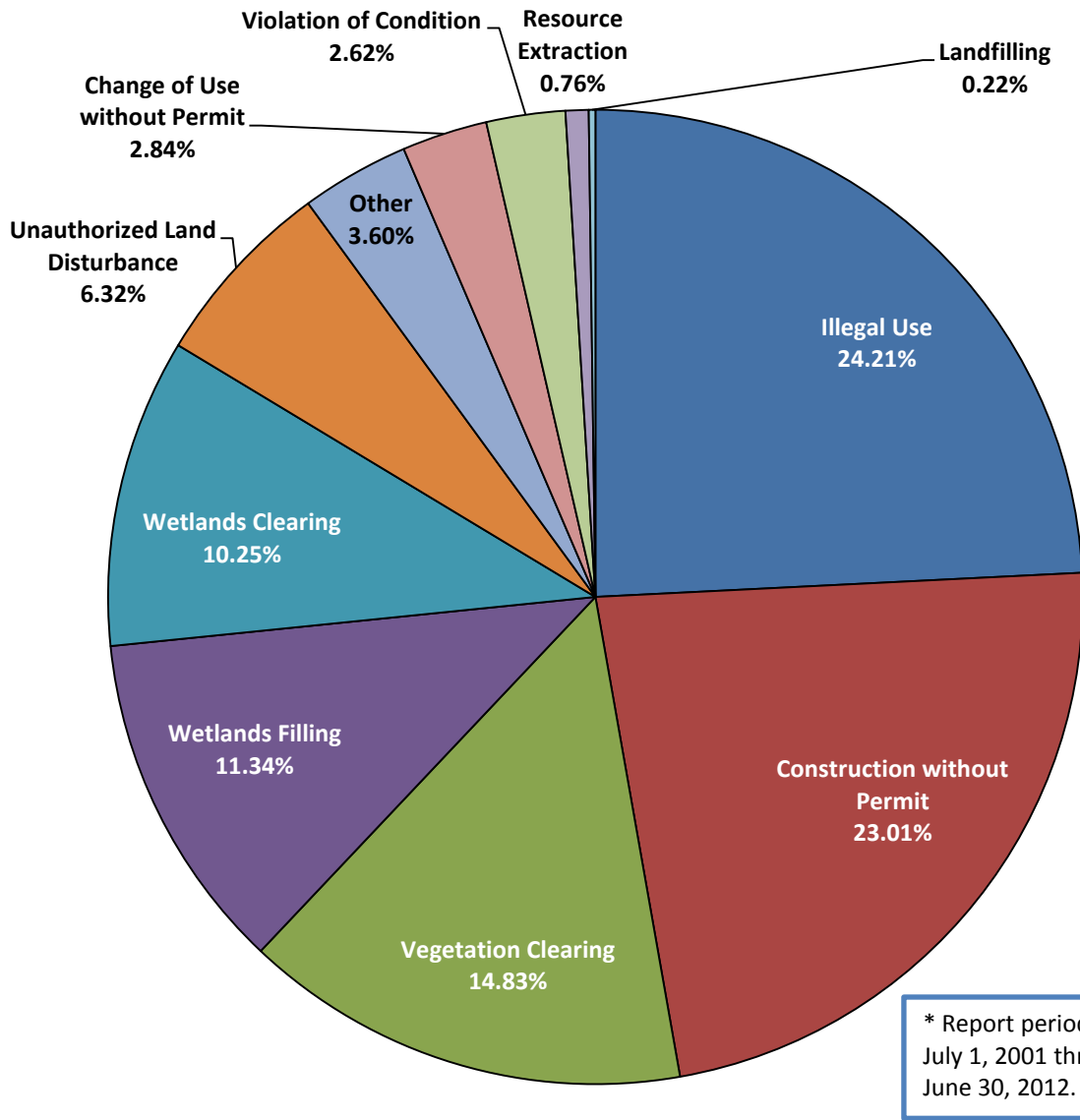
The Commission receives reports of violations from many sources, including members of the public, other state and local agencies, and Commission staff. Each report is reviewed to determine whether a violation of the CMP's standards has occurred. The Commission typically seeks to resolve CMP violations by working with the municipality where the violation has occurred. The staff also works with the NJDEP, whose rules contain enforcement options, to address certain types of violations. Occasionally, the assistance of the Attorney General's office is sought to resolve particularly significant violations or when the responsible party is not responding to either the municipality or the Commission. Although the Commission occasionally receives reports of violations on publicly-owned land, the majority of violations are caused by private property owners on privately-held land.

As illustrated by Figure 2.27, there is no particular trend to the number of violation reports received by the Commission during the current reporting period. With a yearly average of 96 new reports received, this reporting period is by far the most active compared with an annual average of 81 violations reported between January 1991 and December 2001 and 78 between January 1986 and December 1990.



The main types of CMP violations reported to the Commission from 2001 to 2012 are consistent with the most commonly reported violations in the past. Of the 917 reported violations determined to relate to CMP standards, construction of a structure without application to the Commission and receiving all appropriate permits and approvals, illegal establishment of a use in an existing structure, clearing in wetlands, wetland buffers and uplands, and filling in wetlands represent 83.64% of the reported issues (Figure 2.28). These categories of reported violations tend to be easier for the public to identify as inconsistent with Pinelands regulatory standards.

**Figure 2.28: Reported Violation Issues
(2001 - 2012*)**



Most CMP violations are resolved through a cooperative effort between the Commission, the municipality where the violation occurred, and the property owner. The Commission typically issues a letter to the property owner, indicating that the concerned development constitutes a violation of the CMP and the municipality’s certified land use ordinance. The correspondence usually offers available options to resolve the violation, such as restoring a disturbed area or submitting and completing an application for illegal construction. The appropriate municipal official receives a copy of the Commission’s letter, as well as any other local or state agency officials, depending on the type of violation. Municipal officials often offer support in the way of violation notices, fines or municipal court procedures if necessary, although occasionally the violation is not of size or substance to elicit much of a municipal response.

As depicted in Figure 2.29, 650 open violation records were resolved and closed between July 2001 and June 2012.

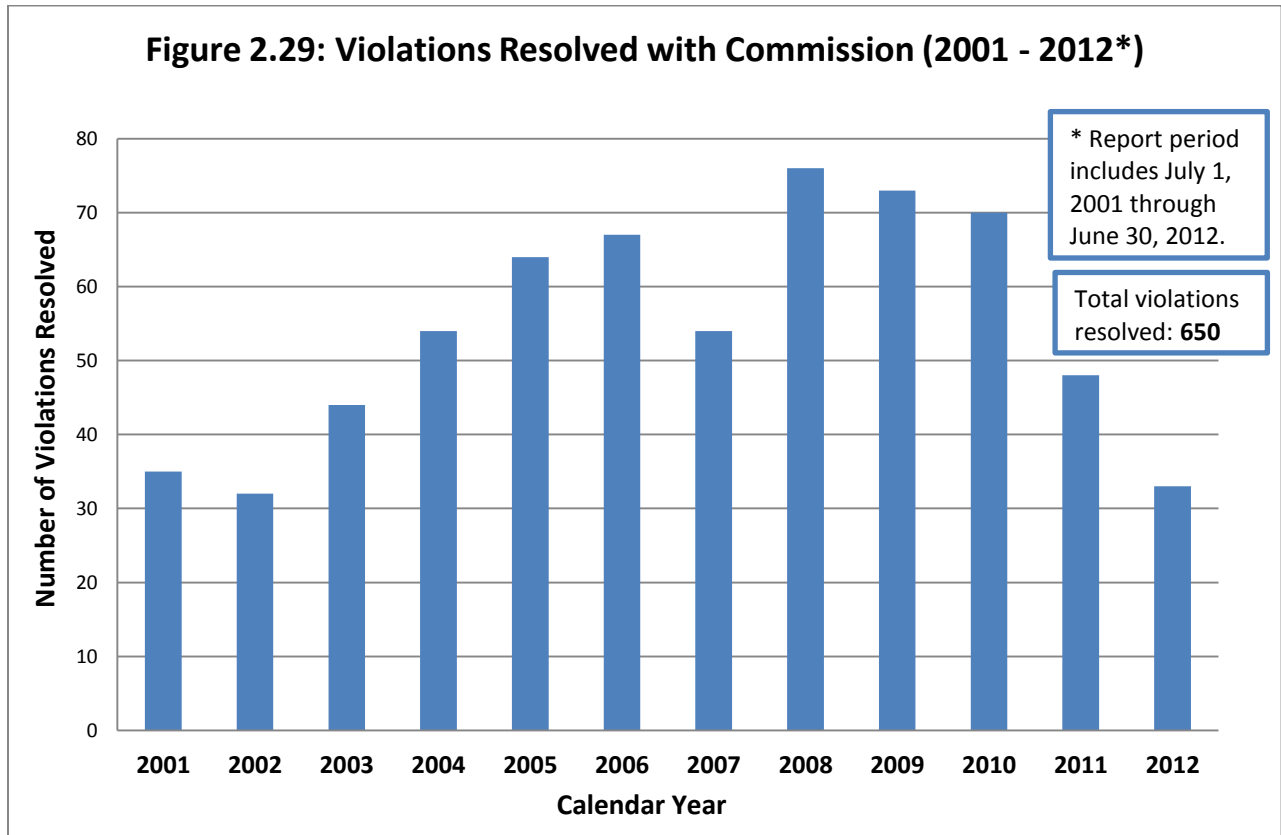
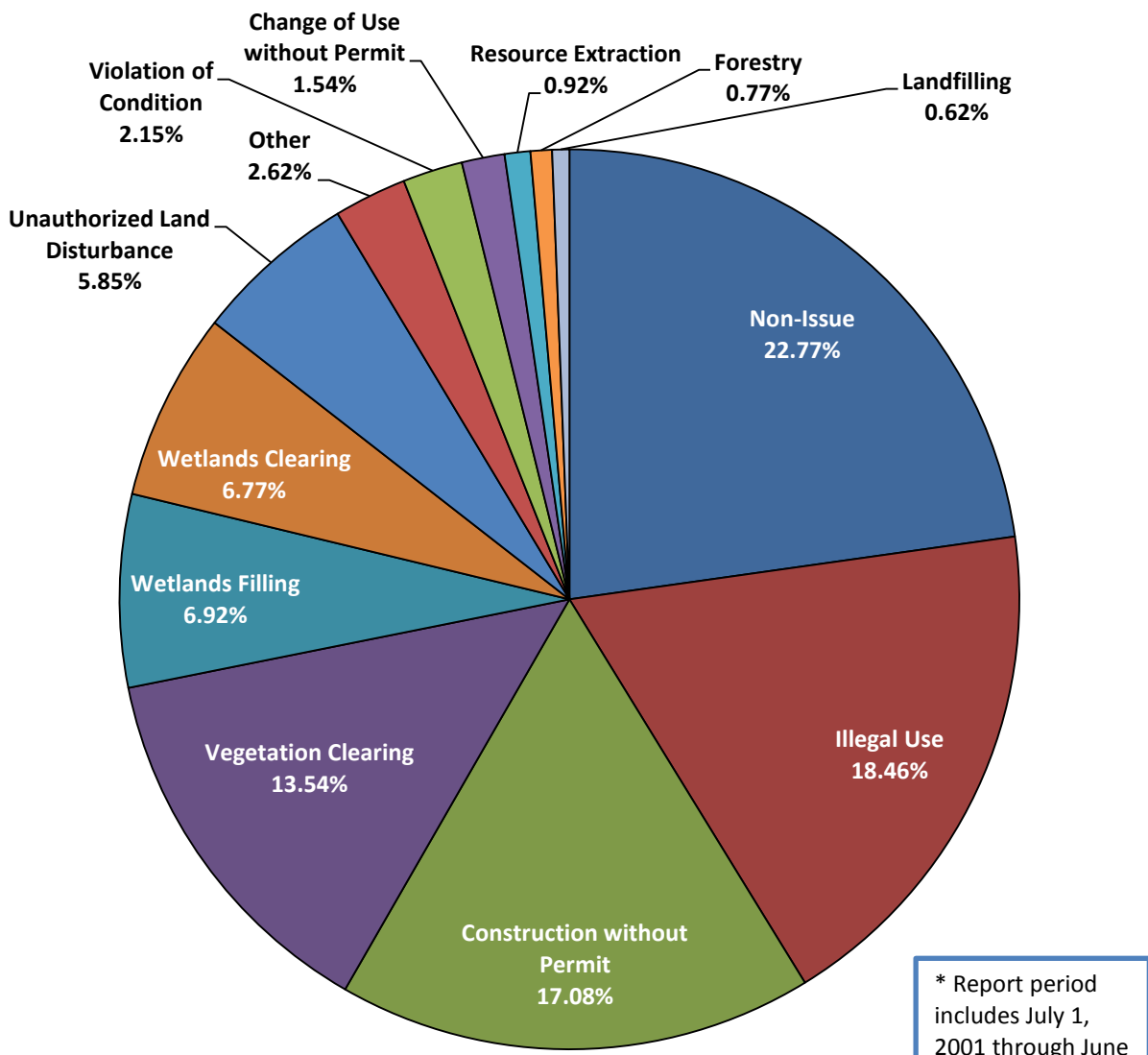


Figure 2.30 shows the distribution of violation issues that were resolved between July 2001 and June 2012. While 22.77% of the violations closed during this period were determined to be non-CMP-related issues, the major categories of resolved CMP violations coincide with the most commonly reported violations.

Figure 2.30: Resolved Violation Issues (2001 - 2012*)



* Report period includes July 1, 2001 through June 30, 2012.

In spite of these significant efforts to identify and resolve CMP violations in the Pinelands Area, the Commission’s capacity to do so is not fully adequate. The Commission does not have the resources to monitor almost a quarter of New Jersey’s land area; nor does the Commission possess any direct enforcement authority itself. The Commission will continue to encourage the participation of municipal, county and state agencies with appropriate enforcement authority in resolving CMP violations.

Other Activity

Pinelands Commission Information Systems (PCIS)

The Commission contracted with a private GIS consulting firm in 2003 to design and create a Pinelands Commission Information Systems (PCIS) database that would integrate four different record-keeping

systems into one. PCIS was released to Commission staff in July 2005 and has been enhanced over the years by both the original consultants and Commission staff. The database provides a much more efficient means of accessing and cross-referencing information from the various systems, reducing review time and increasing application review accuracy. Much of the data entered into PCIS was of significant use in developing this report and others. However, in generating the numbers for this report, certain deficiencies became clear and should be improved upon moving forward. These improvements include recordation of the results of cultural resource and threatened and endangered species surveys.

Efficiency

In 2008, the Commission took steps to maximize the efficiency of its staff, in light of reduced staffing levels. For example, the Commission began using aerial surveys instead of site visits to review development applications involving cultural resources. It also eliminated in-house cultural resource surveys for municipalities and limited its review of structure demolitions to designated historic structures only. These measures reduced the amount of staff time needed to review these types of applications.

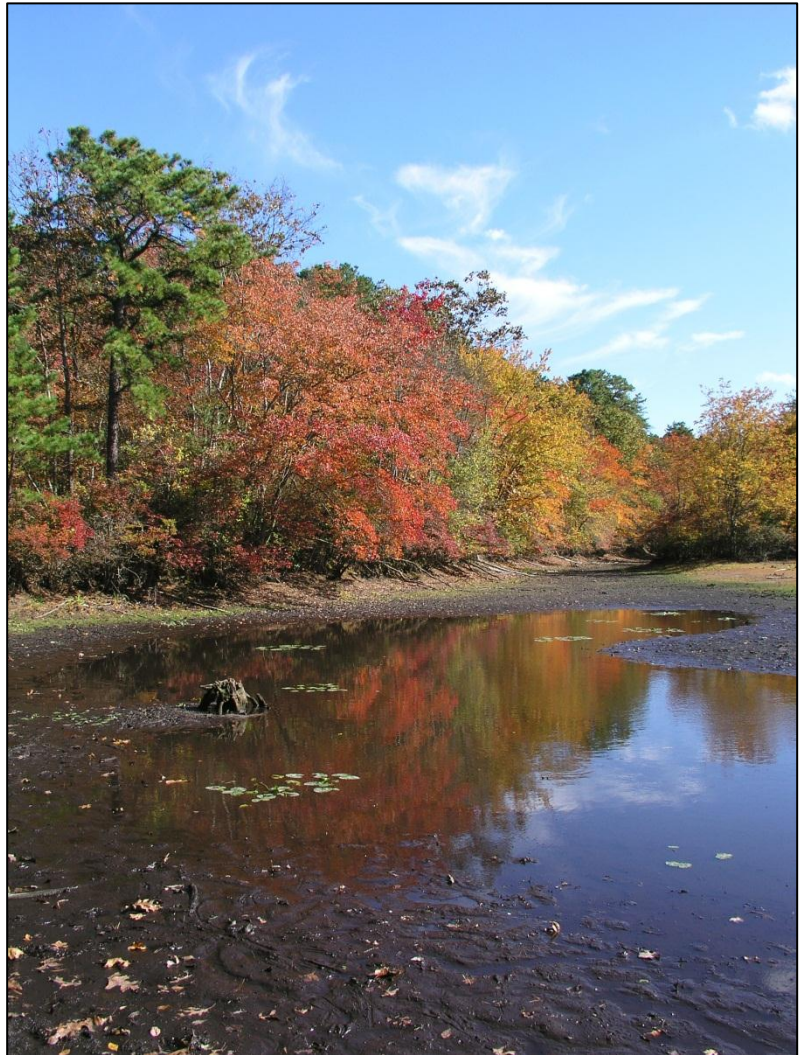
Also in 2008, the Commission began exploring measures to streamline its review of certain types of public development applications. These measures attempted to reduce the amount of paperwork required to process certain public development applications, while also ensuring that these applications meet all applicable CMP standards. One outcome of this review was the 2010 county streamlining MOA that allows certain limited development on county-owned roads and properties either without application to the Commission or with reduced application requirements. This streamlining MOA does not waive the CMP's environmental standards, all of which must still be met by the counties when undertaking development under the agreement. (Please see Chapter 4: Memorandums of Agreement, page 103.)

CHAPTER 3: PERMANENT LAND PROTECTION

Permanent preservation of environmentally, historically and agriculturally significant tracts of land in the Pinelands Area has long been recognized as one of the keys to the success of the Pinelands protection effort. Over the years, permanent land protection has been accomplished through the efforts of many state and local agencies, non-profit conservation organizations, farmland protection programs and other regulatory initiatives. The Commission itself was particularly active in land protection efforts during the plan review time period, continuing several long-established programs and instituting a new acquisition program made possible by the Pinelands Conservation Fund.

As of June 30, 2013, nearly half of the Pinelands Area (446,000 acres) has been permanently protected. Importantly, 418,000 acres or 94% of the protected land is located within the Preservation Area District, Special Agricultural Production Area, Forest Area and Agricultural Production Area, the conservation areas of the Pinelands that the Commission is charged with preserving and enhancing. The majority of protected land was protected through federal, state and local land protection initiatives, with a relatively small percentage (3% or 13,000 acres) protected by non-profit conservation organizations. Programs administered or funded by the Pinelands Commission have protected approximately 84,000 acres through June 2013, accounting for approximately 19% of the total, and are the focus of this chapter.

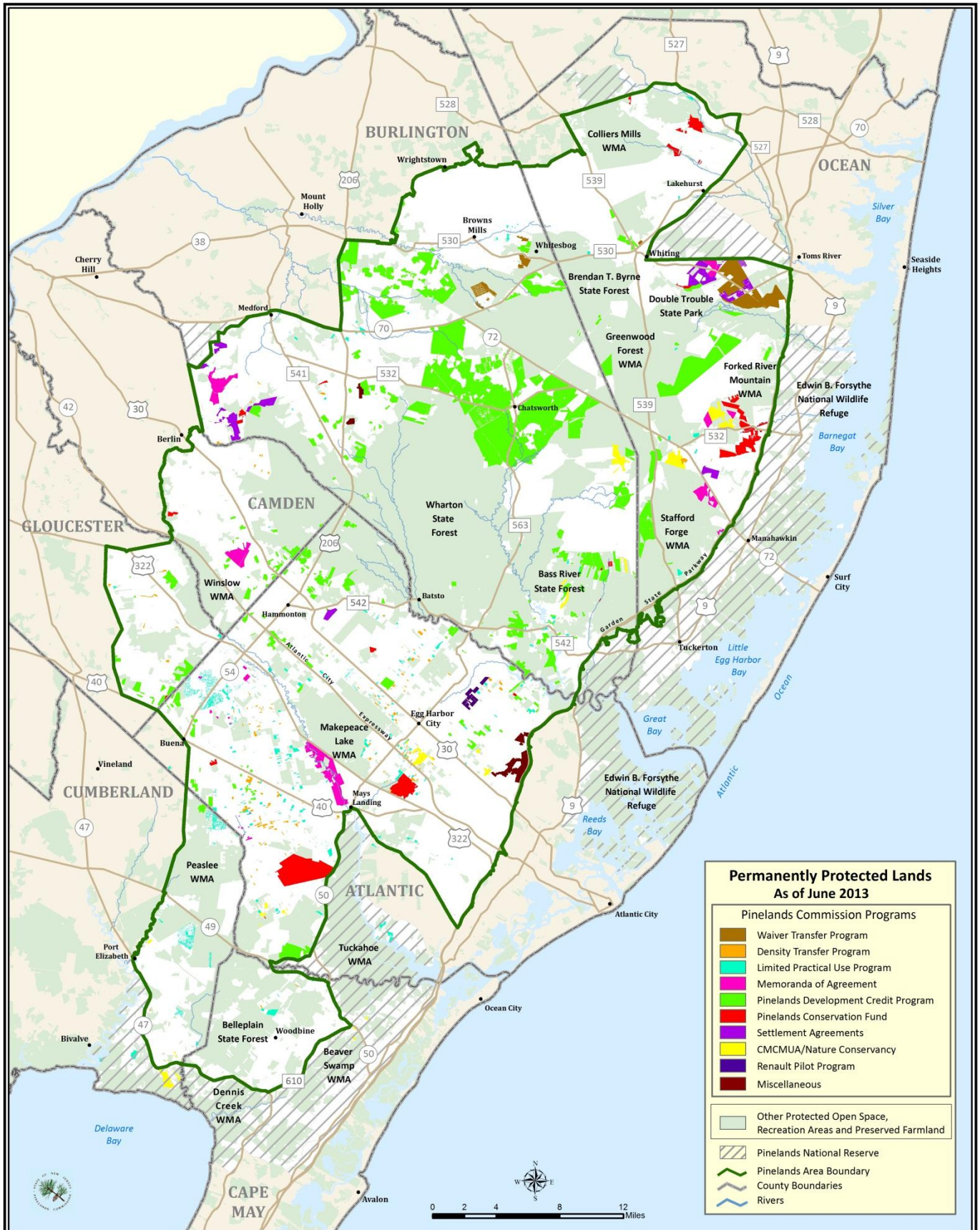
Due to the Commission's data-collection and tracking procedures, the permanent land protection figures are reported as of June 30, 2013.



This 200-acre parcel in Shamong and Medford townships was permanently preserved through a Pinelands Conservation Fund grant in 2012.

Photo/Paul Leakan

Figure 3.1: Permanently Protected Land



Permanent Land Protection Committee

The Pinelands Commission's Permanent Land Protection Committee was formed in 2002 to oversee one of the most critical aspects of ecological preservation within the Pinelands: the long-term protection of environmentally, historically, or agriculturally significant tracts of land.

At the direction of the Committee, Pinelands Commission staff investigated the Pinelands Area as a whole in an effort to identify the most sensitive environmental regions not yet permanently protected. As a result of this investigation, 20 Planning Areas were identified that warranted close examination and protection due to the presence of sensitive ground and surface water resources, threatened and endangered species habitat and contiguous forest cover. Following the identification of the 20 Planning Areas, the Commission initiated detailed studies of two of these planning areas: the Southern Medford/Evesham and Toms River Corridor areas. A multi-agency task force appointed for each area guided these initiatives, and the studies resulted in the identification of resource protection strategies that involved a range of land use zoning changes, stewardship, and acquisition recommendations. Details on the two sub-regional planning efforts are provided in Chapter 1 of this report.

The Permanent Land Protection Committee also administered the Cape May County Municipal Utilities Authority acquisition program in conjunction with The Nature Conservancy and oversaw the establishment of the Pinelands Conservation Fund acquisition program. In addition, the Committee met regularly with a variety of state and local agencies and nonprofit conservation organizations interested in permanent land protection in the Pinelands Area to review priorities and discuss concerns with funding and the long-term monitoring of easements.

The Permanent Land Protection Committee continued meeting until 2012, when its functions were absorbed first by the Commission's Public & Governmental Committee and ultimately by the Committee's CMP Policy & Implementation Committee.

Pinelands Development Credit Program

The Pinelands Development Credit (PDC) Program is a regional transfer of development rights program that preserves important agricultural and ecological land. PDCs are allocated by the Commission to landowners in the Preservation Area District (PAD), Special Agricultural Production Area (SAPA) and Agricultural Production Area (APA), which are the sending areas. These credits can be purchased by property owners and developers who are interested in developing land in Pinelands Regional Growth Areas (RGA), which serve as the receiving areas. Typically, PDCs are used to increase residential densities in RGAs. They may also be used in association with municipal variances in RGAs, Pinelands Villages and Pinelands Towns, as well as for waivers of strict compliance approved by the Commission in any Pinelands management area. Once PDCs are "severed" from a sending area property, that property is permanently protected by a conservation or agricultural deed restriction. The credits associated with that property can then be sold. Credits are bought and sold in one-quarter credit units called "rights."



Located along Route 563 in Woodland Township, in the most pristine area of the Pinelands, these lands were permanently preserved through the PDC Program.

Photo/Paul Leakan

The Pinelands CMP sets forth the regulations that govern the PDC Program, including credit allocation formulas and zoning requirements for RGAs. The Commission is responsible for issuing Letters of Interpretation (LOI) allocating PDCs to individual parcels, determining how many PDCs are required for proposed development projects and ensuring that the necessary PDCs are redeemed before such projects proceed. A separate entity, the Pinelands Development Credit Bank, is responsible for issuing PDC Certificates, ensuring the recording of required deed restrictions on sending area parcels, maintaining a registry of PDCs available for sale and processing all PDC transactions. The PDC Bank is also authorized to buy and sell PDCs in limited circumstances, when doing so will not impair the private market.

During the plan review time period, the PDC Bank contracted with the Commission to design a unified database system to track, analyze, and report on all facets of the PDC Program. Completed in 2006, this system has improved the scope and accuracy of data

records and also helped to improve data management, which had previously suffered from the use of multiple databases by many users.

In September 2011, the Pinelands Commission assumed responsibility for the operation and administration of the Pinelands Development Credit Bank. Although the PDC Bank is now physically located at the Pinelands Commission office, it remains a separate entity, governed by its own Board of Directors.

At the end of each fiscal year, the PDC Bank publishes an annual report summarizing all PDC-related activity, including allocations, severances, sales and redemptions. This chapter of the Plan Review Report focuses only on sending area activity and land preservation resulting from the PDC Program.

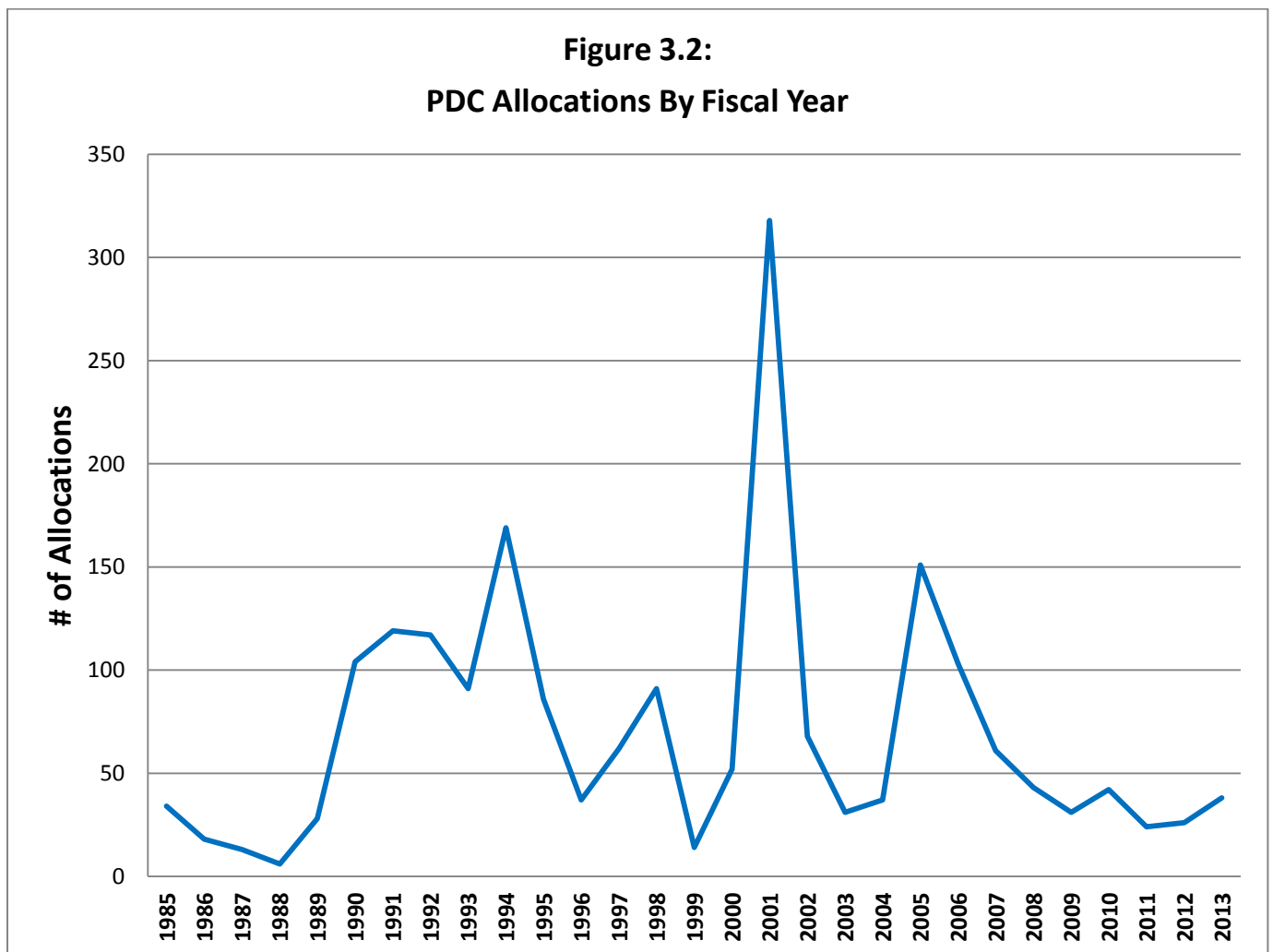
Sending Area Activity

PDCs are allocated to properties in PDC sending areas on the basis of land characteristics. For example, uplands in the PAD receive an allocation of one credit for every 39 acres. In the APA and SAPA, all uplands and areas of active agriculture, including berry agricultural bogs and fields, are allocated two credits per 39 acres. Properties approved for resource extraction, but as yet not mined, also receive two

credits per 39 acres. Wetlands not in agricultural use are generally allocated 0.2 credits per 39 acres, a ratio based on the comparative sale prices of uplands and wetlands. Finally, those who owned lots at least 0.1 acre in size as of February 7, 1979, are allocated at least 0.25 PDCs if the property is vacant and not in common ownership with contiguous land, subject to certain limitations.

PDCs are formally allocated when a landowner applies for and receives a Letter of Interpretation (LOI) from the Commission establishing the exact number of PDCs attributed to a particular property. Figure 3.2 below illustrates trends in PDC allocation activity between 1985 and 2013.

As is evident from the chart, requests for LOIs rose dramatically in 2001. This increase in activity coincided with the institution of the Pinelands Direct Easement Purchase Program, a joint effort of the Commission and SADC to purchase development easements on Pinelands farms. In order to participate in the program, landowners were required to obtain from the Commission an LOI in order to identify the number of PDCs allocated to their farms. Another, less dramatic, increase in requests for LOIs occurred in 2005, likely due to the sharp rise in the average sales price of PDCs (from \$15,594 in 2004 to \$30,470 in 2005) at that time.



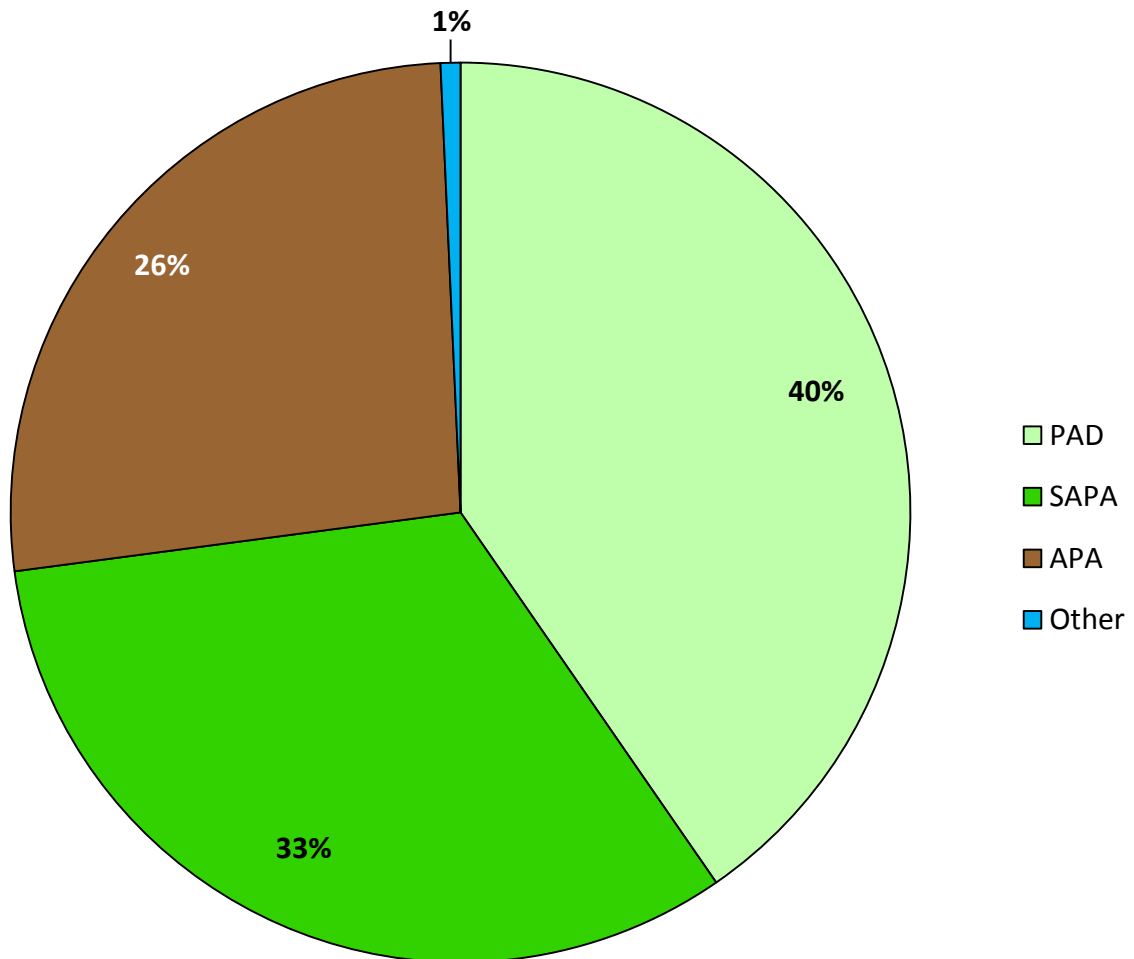
Upon formal allocation, a landowner may choose to “sever” PDCs from the land by recording a

conservation or agricultural easement with the PDC Bank to permanently protect the property. Once the

PDCs have been severed from the sending area property, they may be sold to a private buyer or, when funds are available, to the State. As of June 30, 2013, 11,117 rights (2,779.25 PDCs) had been formally allocated by the Commission. Of these, 5,984 rights (1,496 PDCs) were severed, resulting in the permanent protection of 51,685 acres. Nearly half of this total, 24,000 acres, were preserved between July 2001 and June 2013. Figure 3.3 and Table 3.1 describe the location of the preserved lands by Pinelands management area and by municipality, respectively. It is estimated that there are approximately 85,000 acres in the PDC sending areas left to be preserved.

Of the 5,984 rights that were severed, 3,353 were redeemed for use in various residential and nonresidential projects, the vast majority of which are located in the RGA. Another 1,432 rights were proposed for use in projects that had received municipal approvals as of June 30, 2013 but had not yet commenced construction or progressed to the point where redemption of PDCs is necessary.

**Figure 3.3: Pinelands Development Credit Program
Lands Preserved by Pinelands Management Area
January 1980 - June 2013**



Total: 51,685 acres

**Table 3.1: PDC Program
Municipal Acres Preserved through June 30, 2013**

MUNICIPALITY	TOTAL ACRES PRESERVED
Barnegat Township	165
Bass River Township	3,014
Buena Borough	272
Buena Vista Township	453
Estell Manor City	709
Folsom Borough	26
Franklin Township	1,135
Galloway Township	561
Hamilton Township	288
Hammonton Town	1,899
Lacey Township	3,857
Little Egg Harbor Township	1,459
Manchester Township	428
Medford Township	291
Monroe Township	320
Mullica Township	554
Pemberton Township	4,072
Shamong Township	955
Southampton Township	3,131
Stafford Township	265
Tabernacle Township	4,470
Vineland City	166
Washington Township	1,606
Waterford Township	371
Winslow Township	719
Woodland Township	20,508
TOTAL ACRES PRESERVED*	51,685

*Includes 6,798 acres preserved through the Special PDC Purchase Program.

Special PDC Purchase Program

The Special PDC Purchase Program was created by CMP amendment and legislative funding in 1999 to increase the amount of agricultural and undeveloped forested lands permanently protected in the PAD, APA and SAPA, and, coincidentally, reducing growth pressure in the RGAs. In fiscal year 2000, the Pinelands Commission, the PDC Bank, and the NJDEP established a joint program authorizing the PDC Bank to purchase rights at a fixed, formula-based price of \$5,562.50 per right. Once purchased by the PDC Bank, these rights had to be retired and could not be resold or used for density bonuses in RGAs, or, in fact, for any other development activities authorized in the CMP. An increase in price to \$6,000 per right in April 2001 helped promote interest; however, as prices offered on the private market rose to as much as \$10,000 per right, the direct Special PDC Purchase Program struggled to remain competitive. Nevertheless, by the end of the program in 2002, 1,001 rights (250.25 PDCs) had been purchased and retired by the PDC Bank, permanently preserving 6,798 acres. Most of the preserved land (6,200 acres or 91 percent of the total) is located in the SAPA in Burlington County.



The 9,400-acre Franklin Parker Preserve in Woodland Township was permanently preserved, in part, through the Special PDC Purchase Program.

Photo/Paul Leakan

Pinelands Direct Easement Purchase Program

In 2001, the Commission entered into a Memorandum of Agreement with the State Agricultural Development Committee (SADC) to share the costs of purchasing development easements on Pinelands farms. This agreement complimented a revised valuation formula developed by the SADC that changed the way farmland easement values were calculated in the Pinelands. Under the Pinelands Direct Easement Purchase Program, the SADC purchased the development rights - including Pinelands Development Credits - on farmland in the Pinelands Area. Because those credits were then permanently retired, the program helped to reduce potential development in Pinelands RGA communities – areas where developers can redeem credits to increase housing densities. The SADC originally allocated \$9 million toward the purchase of development rights on farms through this program and the Commission provided \$2.1 million in Pinelands Development Credit Special Purchase Program funding.

To begin the program, the SADC instituted an application round dedicated solely to Pinelands farmers in 2001 and the Commission and the SADC jointly conducted informational meetings and outreach activities. Ultimately, 84 Pinelands farms applied to the program and were prioritized for acquisition.

The SADC completed the first purchases of development easements under the Pinelands program in 2003. Acquisition continued through 2006. By the end of the program, a total of 36 farms covering approximately 3,250 acres were preserved through the purchase of development easements. Most of the preserved land (nearly 2,400 acres) was located in an APA. The notable exception was the nearly 600-acre Joseph J. White Cranberry Farm in the SAPA and PAD in Pemberton and Manchester townships. Dating back to 1857, the White family pioneered berry agriculture in the Pinelands. Elizabeth White, eldest daughter of the farm’s founder, is credited with helping to develop the first cultivated blueberry crops there in 1916.

In addition to preserving 3,250 acres, the Pinelands Direct Easement Purchase Program also resulted in the retirement of 137 Pinelands Development Credits associated with the 36 preserved farms. This reduced potential development in Regional Growth Areas by some 548 housing units.

Table 3.2 below provides a summary of SADC and County farmland preservation efforts in PDC sending areas, including those undertaken through the Pinelands Direct Easement Purchase Program. As might be expected, the majority of farmland preservation activity has occurred in the APA.

Table 3.2:
SADC and County Farmland Preservation Programs
Acres Preserved in PDC Sending Areas through Fiscal Year 2013

MUNICIPALITY	ACRES PRESERVED				PDCs EXTINGUISHED
	TOTAL	PAD	APA	SAPA	
Buena Borough	206		206		10.25
Folsom Borough	66		66		2.75
Franklin Township	339		339		13.25
Galloway Township	15		15		0.75
Hamilton Township	1,564		1,564		34.75
Hammonton Town	1,503		1,186	317	73.75
Manchester Township	56	56			0.50
Medford Township	1,343	4	675	664	25.25
Monroe Township	137		137		4.00
Mullica Township	969		969		53.00
Pemberton Township	1,412	47	873	492	53.25
Shamong Township	336		270	66	12.25
Southampton Township	906		906		41.75
Tabernacle Township	159		159		7.75
Washington Township	1,243			1,243	47.75
Waterford Township	314		314		15.50
Winslow Township	529		529		26.25
TOTAL	11,097	107	8,208	2,782	422.75

Pinelands Conservation Fund Acquisition Program

The Pinelands Conservation Fund was created in 2004 as part of an agreement with the New Jersey Board of Public Utilities to permit the construction and upgrade of an electric transmission line through eastern portions of the Pinelands. Under the agreement, the special fund was established to further the Pinelands protection program and ensure a greater level of protection of the unique resources of the Pinelands Area. The utility that built the transmission lines, Atlantic City Electric (formerly Conectiv), provided \$13 million to establish the Fund. An additional \$3,415,000 was added to the Fund in 2009 as a result of an amendment to the



Ferns line the sand road that meanders through the center of the 700-acre parcel in Hamilton Township that was permanently preserved in 2009 through a grant from the Pinelands Conservation Fund.

Photo/Paul Leakan

Comprehensive Management Plan that authorized expansion of the Cape May landfill and through a 2008 Memorandum of Agreement with the New Jersey Turnpike Authority that authorized improvements to the Garden State Parkway.

The Pinelands Conservation Fund is dedicated to three types of projects: permanent land protection; conservation planning and research projects and community planning and design initiatives. Of the original \$13 million, \$6 million was allocated by the Commission to permanent land protection. Additional monies were subsequently allocated to the land acquisition component of the Pinelands Conservation Fund, including \$2.5 million from the Cape May County Municipal Utilities Authority. Eight percent of those funds, or \$200,000, was earmarked for projects in Cape May County. An additional \$915,000 was added to the Pinelands Conservation Fund in 2008 as the result of a memorandum of agreement between the Commission and the New Jersey Turnpike Authority that allowed for the widening of the Garden State Parkway. In order to avoid secondary impacts associated with this transportation project, the Turnpike Authority provided the Commission with funds to purchase lands in the immediate vicinity of two Parkway interchanges as a means of limiting development potential that might be inconsistent with the CMP.

In 2006, the Commission's Permanent Land Protection Committee established priorities for distribution of the PCF acquisition money, with a focus on lands within the Toms River Corridor and Southern Medford/Evesham sub-regional planning areas and the 18 other Planning Areas previously identified by Commission staff. Equal priority was given to lands within the priority acquisition areas identified by the Commission in the 1980s and early 1990s. Known as the "502" Target Areas (a reference to Section 502 of the 1978 National Parks and Recreation Act that created the Pinelands National Reserve), these

acquisition areas total approximately 100,000 acres in size and encompass ecologically and culturally critical areas within the Pinelands Area. In 2006, it was estimated that approximately 30,000 acres remained to be preserved within the 502 Target Areas. A small portion of the available PCF funds were made available for parcels outside the 502 Target and Planning Areas, with priority given to those in the PAD, SAPA, FA and APA. The Committee further determined that PCF dollars would be best spent by contributing a maximum of one-third of a project's fair market value, as a means of closing gaps in funding and providing the last piece of the puzzle need to complete a project. The Commission then



The Commission helped to preserve this property in the Toms River Corridor with money from the Pinelands Conservation Fund.

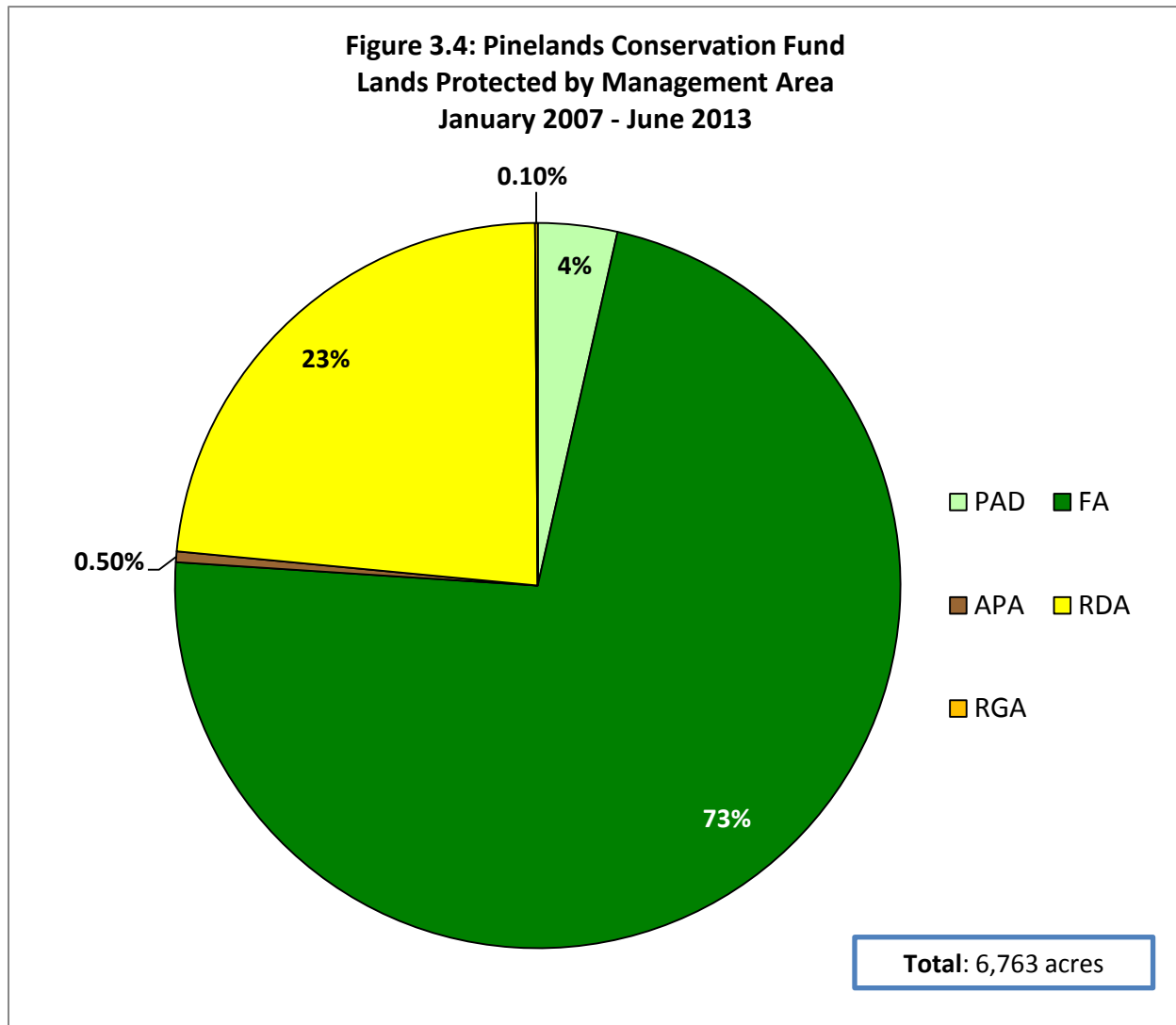
Photo/Paul Leakan

hired a program facilitator, Conservation Resources Inc. of Chester, N.J., to assist in the land acquisition program by identifying and completing land preservation projects with a variety of state, county and conservation organizations.

Between 2007 and June 30, 2013, the Commission approved the allocation of \$9.6 million from the PCF to 34 projects in the Pinelands Area. Of these 34 projects, 31 proceeded to closing within the plan review time period, resulting in the permanent protection of 6,763 acres. The completed projects varied widely in size, from one to 2,800 acres. Seven projects (680 acres) were located in the Toms River Corridor planning area and three projects (120 acres) were located in the Southern Medford/Evesham planning area. Ten projects within other Planning Areas were completed, accounting for approximately 5,600 acres of the preserved lands. Within the

“502” target areas, 180 acres were preserved, all but five of which are located in the PAD. Four projects located outside the identified planning and target areas were determined by the Commission to be worthy of protection, resulting in the protection of 187 acres.

As indicated on Figure 3.4, the majority of land protected through the PCF is located in the Pinelands FA.



The Commission partnered with ten different organizations to complete the 31 projects. These partners included three counties (Atlantic, Camden and Ocean), one municipality (Buena Vista Township) and six non-profit organizations (the Rancocas Conservancy, the New Jersey Conservation Foundation, the Unexpected Wildlife Refuge, the Nature Conservancy, the Trust for Public Land and YMCA Camp Ockanickon). To complete acquisition and protection of the largest PCF property, 2,800 acres in the City of Estell Manor, referred to as the Lenape Farms project, the Commission partnered with not only the Nature Conservancy but also the New Jersey Department of Environmental Protection (NJDEP).

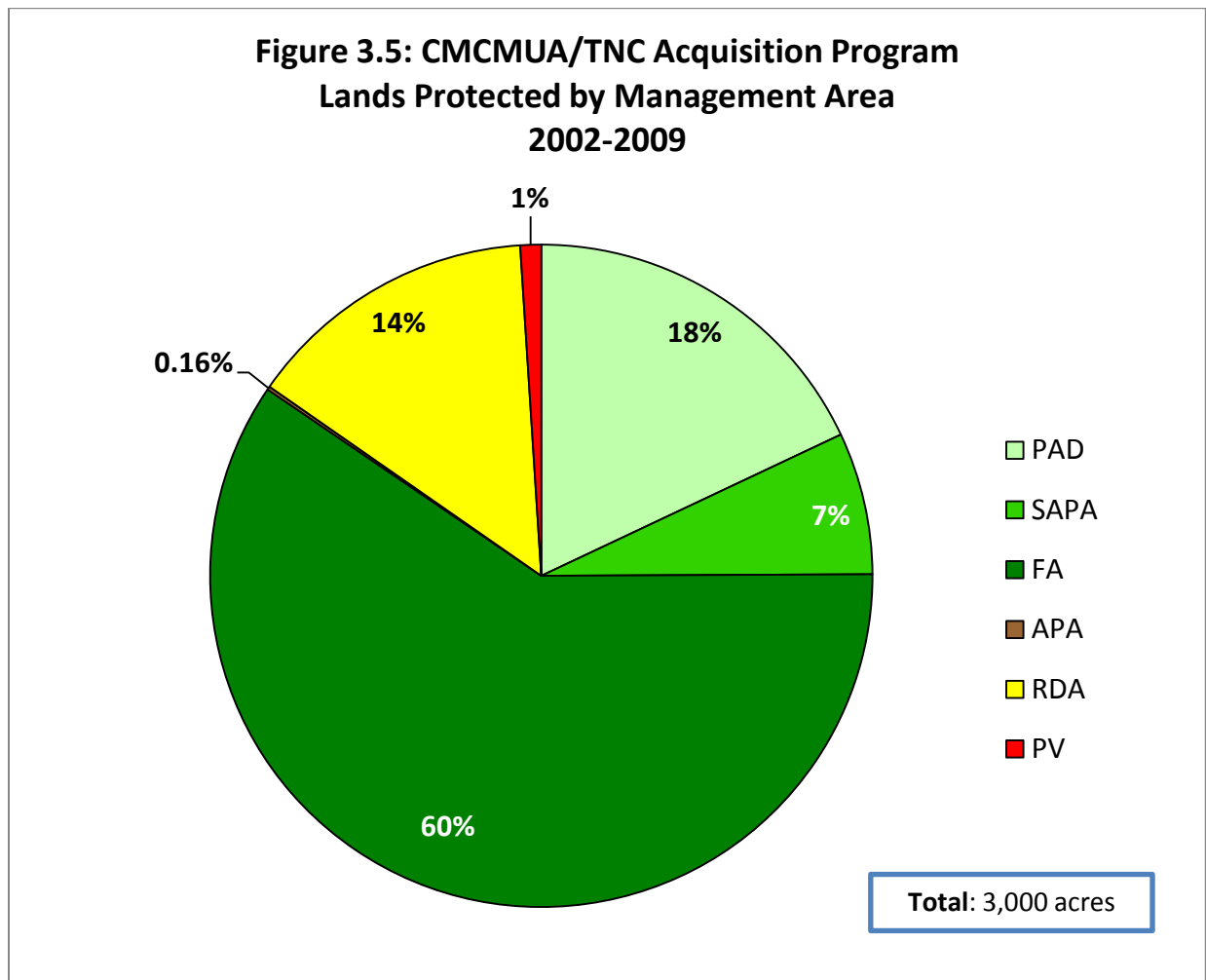
Cape May County MUA/Nature Conservancy Acquisition Program

The Cape May County Municipal Utilities Authority (CMCMUA) fund was established under a 1999 agreement between the Commission and the CMCMUA whereby the CMCMUA pledged \$2.25 million to fund up to 50 percent of the fair market value of land acquisitions in the Pinelands National Reserve. Eight percent of the fund (\$180,000) was set aside for land acquisition in Cape May County. In June

1999, the Commission entered into a 10-year agreement with The Nature Conservancy (TNC) to administer this fund.

In 2002, the Commission and TNC initiated a \$400,000 land acquisition grant program for local and county governments and non-profit organizations, also funded by the CMCMUA agreement. A grant board consisting of Commission, TNC and NJDEP Green Acres representatives reviewed and approved applications from qualifying non-profit and local government organizations. Land acquisition grants were awarded to four projects: the 384-acre Franklin Township Piney Hollow Natural Area; the 80-acre Galloway Township Heron Rookery Preservation Project; the 82-acre Ocean County Forked River Mountain South Project; and the 97-acre Woodford Cedar Run Wildlife Refuge of the Rancocas Headwaters Greenway. The Galloway Township and Ocean County projects were completed. The Franklin Township and Cedar Run Wildlife Refuge projects did not proceed under the CMCMUA acquisition program but were ultimately preserved through other Commission programs.

All of the CMCMUA acquisition fund has been expended, with the final acquisition occurring in 2009. A total of \$2.25 million was used to facilitate the permanent protection of approximately 3,000 acres in the Pinelands. Of this total, 534 acres are located in Atlantic County, 643 acres are in Burlington County, 70 acres are in Cape May County, 491 acres are in Cumberland County and 1,243 acres are in Ocean County. Figure 3.5 depicts the location of the preserved lands by Pinelands management area.



Limited Practical Use Program

Established in 1995 through federal and state funding, the Pinelands Limited Practical Use (LPU) Program offers the owners of properties less than 50 acres in size, and whose application for a waiver of strict compliance (a variance from normal Pinelands zoning or environmental standards) has been denied by the Commission, an opportunity to sell their land to the State of New Jersey. Initially, acquisition was advertised and conducted in discrete rounds, with landowners filling out questionnaires to aid in determinations of eligibility. The Commission deemed properties to be eligible for acquisition based on the criteria set forth in the CMP and provided a list of the eligible properties to the NJDEP. The NJDEP then worked with interested landowners to complete state acquisition of the properties. Once acquired by the state, the parcels were either retained by the NJDEP or transferred to Pinelands municipalities, other government agencies or conservation organizations. All of the purchased parcels are permanently deed restricted to ensure they remain undeveloped, regardless of ownership.

The Commission completed 45 rounds of acquisition under the above-described “formal” LPU program, the last in 2010. A total of 478 properties were deemed eligible for acquisition by the Commission. Of that total, 354 properties were purchased by the NJDEP through the formal LPU program as of May 2013, protecting a total of 1,260 acres. The majority of acquired properties are very small (one-third of an acre), and most are located in the Pinelands FA.

By 2010, federal funding had been exhausted. The formal LPU program was discontinued at that time and Pinelands landowners were instead encouraged to work directly with the NJDEP under what is referred to as the Quick Action program. The Quick Action program is voluntary and follows the same purchase procedures as those established under the formal LPU program, with greater flexibility. Property owners with an interest in selling their properties to the State go directly to the NJDEP, avoiding the need to apply for and obtain a waiver from the Commission. Instead, property owners must simply acknowledge that their lands have limited development potential. Only State funds are used for acquisition and the NJDEP only acquires those properties in which it has an interest in managing as part of a state forest, wildlife management area or other state holding.

For a number of years, the NJDEP also acquired properties under a third LPU sub-program, known as the Community Assistance (CAP) program. The CAP program was a reimbursement program to participating municipalities whereby an area was delineated as a future consolidated municipal open space and recreation area. Using only state funds, the NJDEP reimbursed municipalities for properties located in this area at the rate of \$400 per parcel or \$1,000 per acre, whichever was less. The CAP program operated in only two municipalities (Buena Vista and Maurice River townships) before it was discontinued by the NJDEP in 2005.

Between 1995 and June 2013, the LPU program preserved a total of 5,568 acres – 1,260 acres through the formal LPU program, 3,011 acres through the Quick Action program and 1,297 acres through the CAP program.

Other Pinelands Land Protection Initiatives

Waiver Transfer Program

The waiver transfer program was established by the Commission through an amendment to the CMP in 1996. It allowed the reactivation of certain expired waiver projects through the transfer of development rights from the conservation areas of the Pinelands to the waiver project site. Before its expiration in 2007, the waiver transfer program was used to reactivate two partially completed waiver projects, one in Southampton Township and the other in Pemberton Township. More than 5,000 acres were permanently protected as a result of the two transfers, including 670 acres in the Preservation Area District, 3,500 acres in the Forest Area and 835 acres in the Rural Development Area. Permanent protection of these lands facilitated the completion of 235 homes previously approved by the Commission through waivers of strict compliance.

Development Transfer Program

Amendments to the CMP adopted by the Commission in 1991 created a development transfer program within the Pinelands Forest and Rural Development Areas. Under this program, houses may be developed on existing lots that would otherwise be considered “undersized” if sufficient noncontiguous lands elsewhere in the same municipal zoning district are permanently protected. As required by the CMP, 37 Pinelands municipalities amended their land use ordinances to permit density transfer within their Forest and Rural Development Areas. In 2009, the CMP was amended to allow transfers of density from the FA and RDA to Pinelands Villages. This optional program has yet to be implemented by any Pinelands municipality.

During the plan review time period, 137 applications utilizing the density transfer provision were completed. The majority of applications were in the RDA (84 applications in the RDA, 53 in the FA). Between July 1, 2001 and June 30, 2012, approximately 618 acres were permanently protected from future development in the FA and RDA, bringing the total to just over 1,000 acres protected since 1992.

Off-Site Clustering Pilot Program

In 1996, the Commission adopted a set of amendments to the CMP authorizing the Township of Galloway and City of Egg Harbor City Pilot Off-Site Clustering Program. The intent of this pilot program was to determine whether the land conservation and protection goals of the CMP could be accomplished, and perhaps even advanced, by allowing more intensive development in a newly designated development corridor to occur if it were balanced by the permanent conservation of lands outside the corridor. Under this program, a 37-unit hotel and 18-hole golf course were constructed and 503 acres of land in the Pinelands FA were protected. Further details on this pilot program are provided in Chapter 1 of this report.

Memorandums of Agreement (MOA)

The CMP authorizes the Commission to enter into MOAs with other public agencies that allow and compensate for deviations from the CMP. Such MOAs are only undertaken when they include measures that will, at a minimum, afford an equivalent level of protection of resources of the Pinelands as would be provided through a strict application of the CMP's standards. An equivalent level of protection is most often secured through permanent preservation of lands in the Pinelands.

Between 2002 and 2012, the Commission executed seven MOAs that required the permanent preservation of lands. Described in detail in Chapter 4, these MOAs resulted in the protection of approximately 8,500 acres in the Pinelands Area.

Settlement Agreements

The Commission infrequently enters into settlement agreements with private parties that result in the permanent protection of land in the Pinelands Area. Two such agreements were executed during the plan review time period. The first, with a developer in Barnegat and Stafford townships, resulted in the permanent preservation of a conservation area to protect habitat critical to the survival of a local population of Northern Pine Snake. The conservation area encompassed just over 100 acres in the FA and RGA. Permanent preservation of the conservation area allowed the Commission to approve over 100 residential units on nearby parcels in Barnegat and Stafford Township's RGAs. The second agreement also required the permanent protection of Northern Pine Snake habitat, in the case in Evesham Township. Under that agreement, the preservation of one relatively small lot and a portion of a second lot was required before the Commission allowed the development of 21 residential units to proceed.

Miscellaneous

On occasion, the Commission approves state agency plans or other public development projects that involve a land preservation component. A notable example is The Richard Stockton College of New Jersey's new master plan. Approved by the Commission in 2010, this master plan identified an expanded development area on the College's campus and called for the permanent protection of a significant amount of land on and near the campus. Soon after the Commission's approval of the master plan in 2010, the College executed deed restrictions on the 1,257 acres identified in the plan for permanent protection. The protected acreage is located in Galloway Township, in the Pinelands RDA and RGA.

CHAPTER 4: MEMORANDUMS OF AGREEMENT AND UNDERSTANDING

The Pinelands Comprehensive Management Plan (CMP) authorizes the Commission to enter into Memorandums of Agreement (MOAs) with other public agencies. Two types of MOAs are authorized: those that enable permit streamlining and those that allow and compensate for deviations from the CMP.

Permit streamlining MOAs allow governments to perform minor, routine operations, such as modest road maintenance and improvements, without requiring the applicant to submit an application each time, so long as certain conditions are met. These MOAs hasten the completion of necessary public projects while freeing up Commission staff to concentrate on other types of development that are more likely to have an effect on Pinelands resources.

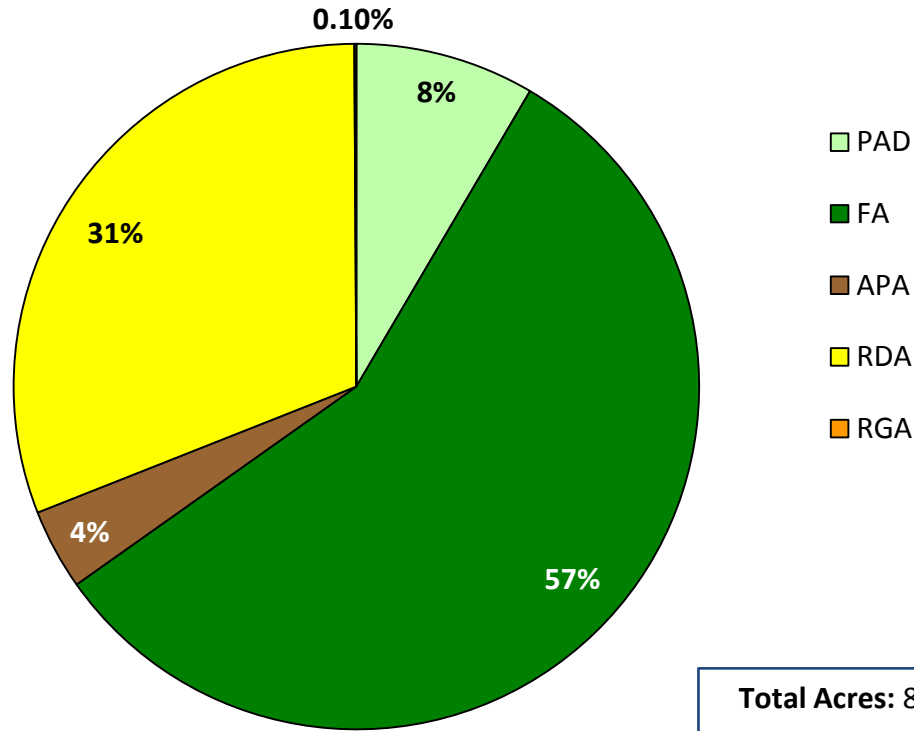
MOAs that involve deviations from CMP standards generally address more substantial, and mostly pre-existing, situations that involve a current or looming problem. Such MOAs allow for the advancement of development projects that may not be fully consistent with the CMP. In all cases, these MOAs must include measures to achieve at least an equivalent level of protection of Pinelands resources as that afforded by a strict application of CMP land use and development standards.

During the reporting period, the Commission was a signatory to 20 MOAs with a variety of public agencies, including municipalities, counties and other state agencies. Twelve of these agreements dealt exclusively with permit streamlining and two were limited to deviations from CMP standards. The other six allowed for both expedited permitting procedures and departures from CMP standards.

Coupled with previously executed streamlining MOAs on such matters as lake treatment, forestry and hazardous materials, the 12 municipal and county permit streamlining MOAs signed during the reporting period allowed the Commission staff to issue consistency determinations on approximately 225 submissions by both public and private applicants. Under the terms of the MOAs, formal approval from the Commission was not required.

The eight approved MOAs involving deviations from CMP standards all involved the permanent protection of land in the Pinelands Area as the primary means of providing the required equivalent level of protection to Pinelands resources. Approximately 8,500 acres in the Pinelands Area have been permanently protected as a result of these MOAs. The majority of protected land is located in the Pinelands Forest and Rural Development Areas, as depicted on Figure 4.1. In addition, seven of the eight deviation MOAs dealt with existing public facilities and helped ensure their long-term viability. The eighth helped ensure electrical power access to South Jersey through a new transmission line.

**Figure 4.1: Memorandums of Agreement:
Lands Preserved by Management Area
2002-2012**



MOAs with Municipalities

Permit Streamlining

Beginning in the late 1990s, the Commission entered into MOAs with a number of Pinelands municipalities designed to permit public road work projects and other minor public development projects without the need to submit an application for development to the Commission. These projects include such activities as the resurfacing or reconstruction of roads that already have an impervious cover, construction of certain drainage structures and other projects that involve grading, clearance or disturbance of less than 5,000 square feet of land. During this plan review period, the Commission executed such MOAs with six municipalities (Berkeley Township, the City of Estell Manor, Folsom Borough, Jackson Township, Maurice River Township and Southampton Township), bringing the total number of such agreements to 19.

Evesham Township and the Evesham Municipal Utilities Authority (MUA)

In 2006, the Commission, Evesham Township and the Evesham MUA entered into an agreement that permitted the construction of groundwater discharge basins in a Pinelands Rural Development Area (RDA).

The MOA was necessitated by conditions that existed at Kings Grant, a large housing development in the RDA that was approved by the Commission in 1981 through a waiver of strict compliance. The developers of Kings Grant built a centralized wastewater treatment facility to serve the residential/commercial community. The facility included two recharge basins and, after it was acquired by the Evesham MUA, a spray irrigation system. Evesham Township subsequently purchased a 192-acre parcel known locally as the Aerohaven Airport, which is contiguous with Kings Grant, and proposed abandoning the spray irrigation field in favor of three recharge basins to be built on the Aerohaven site. Both properties were within an RDA, where construction of the recharge basins was not permitted by the CMP. Consequently, the Township and the Evesham MUA entered into negotiations with the Commission to allow the recharge basins to be built in lieu of the existing, less desirable spray irrigation field while also including other measures that would ensure equivalent protection of Pinelands resources.

The MOA allowed recharge basins to be built in an appropriate area of the Aerohaven parcel and ensured preservation of the remainder of land through a conservation easement that allows only low-intensity recreational uses. The Township also agreed to enact a conservation easement on an approximately 300-acre parcel that it had acquired from the owners of Kings Grant. In all, these provisions preserved close to 500 acres of land that would otherwise have been developed with a total of 265 dwelling units. The Evesham MUA further agreed to enact a conservation easement on an approximately 400-acre tract that is located next to Kings Grant.

Moreover, the MOA calls for treated wastewater from the Kings Grant sewage treatment plant to be applied on two local golf courses as part of a pilot program to evaluate the efficacy of such practices. Although the Commission designed a pilot program to test the beneficial reuse of wastewater on several golf courses in the Pinelands Area, including the two mentioned in the MOA, the program was ultimately not pursued for a number of reasons.

A later amendment to this MOA was signed by all parties in 2007. This amendment extended the deadline for execution of the conservation easements from November 2007 to May 2008.

Status: The recharge basins were constructed and a total of 908 acres in the Pinelands have been permanently preserved.

Buena Vista Township and Buena Borough Municipal Utilities Authority (BBMUA)

In 1968, Buena Borough built a sewage treatment plant that discharged treated effluent directly to Deep Run, a method of disposal that met the environmental standards in place at the time. The Commission and the NJDEP subsequently adopted stricter standards, and the BBMUA responded in 1990 by agreeing to install a force main that would pipe the effluent to a location where it would be discharged to groundwater instead of a surface stream. However, despite several years of testing by the BBMUA, no method of injecting the treated water into the ground was found to be acceptable by the NJDEP.

In 2007, the Commission, Buena Vista Township and the BBMUA entered into an agreement that permitted the BBMUA to build a wastewater infiltration-percolation facility on a 61-acre parcel in Buena Borough, upon which the BBMUA would land apply treated wastewater and ultimately cease discharge of treated wastewater into the Deep Run.

The 61-acre property is located in a Pinelands Agricultural Production Area, where such a facility normally would not be permitted under the CMP. Therefore, the MOA was required to include measures that would ensure an equivalent level of protection of Pinelands resources. Specifically, the Township agreed to permanently deed-restrict 232 acres of sensitive Forest Area (FA) and Rural Development Area (RDA) lands within its borders as an offset for the wastewater facility and recharge basins. In return, the BBMUA agreed to allow the Township to use a portion of the facility's wastewater flow allocation to provide sewerage to the Pinelands Town area along U.S. Route 40. Any and all discharge of treated wastewater to Deep Run was to cease by 2014.

After acquiring the land intended for building the infiltration/percolation facility and the recharge basins, the BBMUA discovered through more rigorous testing procedures that the parcel could not absorb the projected effluent flows. As a result, in 2011, the BBMUA, Buena Vista Township and the Commission entered into an agreement that substantially altered the provisions of the 2007 MOA.

The new agreement calls for using Membrane Bioreactor treatment technology (or a functional equivalent), which is deemed to be a superior process for the removal of noxious waste and by-products from sewage. The amended MOA also provides for additional efforts to protect Pinelands resources through the construction of sewer infrastructure along Route 40 (to provide service to the municipal building, a local campground facility and a number of residences) and through the adoption of measures to reduce runoff from a local country club. The requirement to deed-restrict land in the Forest Area and Rural Development Area remains unchanged.

The Membrane Bioreactor treatment system has been installed, and BBMUA staff is being trained in its operation. As of yet, however, there has been no progress in installing sewer lines along Route 40 or in reducing the country club runoff.

Status: A total of 231 acres in the Pinelands have been permanently preserved, and the treatment system is in place.

Stafford Township Landfill Closure

In 2006, the Commission, Stafford Township and Ocean County entered into an MOA that enabled the Township to proceed with a plan to redevelop its Business Park as a means to pay for the environmentally-safe closure of landfills onsite.

The Stafford Business Park is situated on a 363-acre site located just south of Route 72. It is located within a Regional Growth Area, and it is home to a 55-acre licensed landfill and three unlicensed landfills. The landfills were generating leachate that raised concerns about environmental impacts on local groundwater and a nearby stream.

Under the MOA, a redeveloper, chosen by Stafford, paid to close the Township's landfills. In return, the redeveloper was granted the opportunity to redevelop the Business Park for residential, office and commercial use.

Because the landfill closure plan was inconsistent with CMP standards regarding threatened and endangered species and wetland buffers, an MOA was deemed necessary and numerous offsets were required. Among other things, the Township was required to buy and permanently protect 570 acres of land in the Forest Area and Ocean County was required to purchase and permanently protect 75 acres of land that constitutes suitable habitat for Northern pine snake. The MOA also required that low impact and "green building" design measures be incorporated in the redevelopment plan and that Pinelands Development Credits be utilized for a specific portion of the residential units proposed on the site. Implementation of a Species Management Plan to help mitigate impacts on threatened and endangered plant and animal species was also required.

In 2010, the Township requested that the Landfill Closure Plan adopted in 2006 be revisited to allow for the development of renewable energy facilities on one of the closed municipal landfills in the Business Park. The 2006 MOA had required the site to be deed-restricted as open space. Stafford submitted supporting information indicating that the proposed facilities would have no impact on threatened and endangered species of the Pinelands and that NJDEP had approved construction of the



In 2010, the Commission approved an amended agreement that allowed solar panels to be built on the Stafford landfill.

Photo/Paul Leakan

Renewable Energy Facilities on the landfill site subject to conditions. Consequently, in an amendment to the MOA that was approved in December 2010, the Commission agreed to allow the installation of Renewable Energy Facilities and to do so without the need to submit a formal development application. In order to permit a solar facility on a closed, deed-restricted landfill, the Township agreed to obligate its redeveloper to make a monetary contribution to the Commission totaling \$152,900 to fund a study of landfill closure issues Pinelands-wide. The Commission subsequently contracted with the United States Geological Survey (USGS) to conduct this study.

Status: A total of 1,033 acres in the Pinelands have been permanently preserved; 65 PDC rights protecting approximately 500 acres have been redeemed for the residential units to date; all construction to date has earned LEED Green Building certifications; Species Management Plans have been implemented; stormwater management has been accomplished through retrofits of the collection system along Route 72 to reroute runoff; and \$152,900 was provided for a rapid landfill assessment that is being undertaken by USGS.

MOAs with Counties

Permit Streamlining

In 2010, the Commission and Atlantic, Burlington, Camden, Gloucester and Ocean counties entered into agreements that include a list of development activities that are subject to an expedited review process. These activities are limited to public projects with minor impacts, including improvements to traffic safety, potable water delivery and change of uses. The projects must still meet all the environmental standards of the CMP. Upon the county's submission of certain, specified information about the proposed development, the Commission agreed to an expedited review process to be completed within a 21-day period.

The Commission and the counties further agreed to a very similar review process by Commission staff, to be completed within a 30-day period, for somewhat more complex activities. These projects include some categories of road work, enhancements to existing uses, changes to approved development, utility installations in disturbed roadways, the demolition of older structures and excavation of potable water test wells. All proposed development that qualifies for this 30-day review period must still meet all CMP environmental standards.

This MOA contained a unique agreement between the Commission and counties to implement Mowing and Maintenance Best Management Practices for Pine Barrens Roadside Plant Communities (BMPs), which were developed by the Commission in collaboration with the Pinelands Preservation Alliance and based on a report prepared by a private biological sciences consultant. The BMPs are intended to better protect and promote native Pinelands habitat by allowing most roadside vegetation, including rare species, to complete a full life cycle from March through November.

Robert J. Miller Airpark

In 2012, the Commission and Ocean County entered into an MOA that allows the county to build a crosswind runway and undertake other improvements at the Robert Miller Airpark in Berkeley and Lacey townships.

The county deemed the crosswind runway and other upgrades as important safety improvements that will bring the 822-acre airpark into conformance with current Federal Aviation Administration standards. However, the proposed development projects were expected to impact habitat critical to the survival of several threatened and endangered animal species. In addition, activities were proposed within wetlands and wetlands buffer areas that were inconsistent with the CMP's wetlands protection standards. An MOA was therefore necessary to allow the project to proceed.

Under the MOA, the County was required to acquire and deed restrict against future development 485 acres of upland threatened or endangered species habitat located in the vicinity of airpark. These uplands will contain a minimum of 354 acres of suitable, characteristic Pine snake, Corn snake or Timber rattlesnake habitat and 60 acres of suitable, characteristic Pine Barrens tree frog habitat.

Additionally, the county was required to create an additional 20 acres of grassland bird habitat to offset the project's impact on such habitat onsite. The county will also carry out numerous other measures, such as the construction of two reptile habitat management areas, monitoring by qualified environmental personnel, installation of snake exclusion fencing, the implementation of a grassland management and mowing plan and a plan for protecting the local population of Sickle-leaved golden aster.

As a result of this MOA, a minimum of 485 acres in the Pinelands will be permanently preserved. The County has identified a suitable parcel and is currently negotiating its acquisition. Progress has also been made on the other conditions of the MOA. The County transplanted certain flora on its own initiative and created grassland bird habitat as part of the design for the crosswinds runway. Environmental monitoring and relocation of snakes was conducted during construction, and snake hibernacula have been built.



In 2008, the Commission approved an agreement that allowed the construction of a crosswind runway and other improvements at the Robert J. Miller Airpark.

Photo/Paul Leakan

Status: The permanent land protection efforts are underway; environmental monitoring was undertaken during construction and habitat improvements have been completed.

MOAs with State Agencies

Southern Pine Beetle

In 2003, the Commission and the New Jersey Department of Environmental Protection (NJDEP) entered into an MOA that allows for an expedited review of measures intended to contain and suppress populations of the highly-destructive southern pine beetle.

Under the MOA, the NJDEP could forgo the submission of individual development applications for pine-beetle suppression activities in 11 priority areas. Instead, it was allowed to submit a single application that included locational information for the proposed activities, a description of the removal process for trees infected by beetles, threatened and endangered species information for the immediate vicinity and a cultural resource survey, if significant ground disturbance was anticipated.

The MOA specified that all activities permitted by the MOA be completed in a manner consistent with the CMP. Finally, the agreement established a monitoring process to evaluate the effectiveness of the suppression program and required the NJDEP to submit a report on its efficacy to the Commission.



In 2003, the Commission entered into an agreement to combat the southern pine beetle, shown to the right of the dime above.
Photo/Paul Leakan

New Jersey Board of Public Utilities and the New Electric Transmission Line

In the early 2000s, Atlantic City Electric commissioned studies that indicated a severe problem was anticipated for its southern New Jersey customers if no action were taken to enhance the existing power distribution system along its 55-mile long trunk line from Oyster Creek to Cardiff. The studies predicted outages during peak usage times by 2004 if the system were not upgraded, specifically through the construction of new 230 kV transmission lines. The New Jersey Board of Public Utilities (BPU) concurred with Atlantic City Electric's opinion, issuing a finding in April 2004 that the 230 kV lines were necessary for the service, convenience and welfare of the public. Interim measures were taken that extended the 2004 deadline, but did not address the underlying infrastructure shortfall.

The project required the construction of new power lines along a 33-mile corridor within the Pinelands Area adjacent to the Garden State Parkway, of which a little more than half would cross the Preservation Area District and the Forest Area. Such development is not permitted within these two Management



In 2004, the Commission entered into an agreement that permitted the construction of new power lines (as shown above) along a 33-mile corridor in the Pinelands Area.

Photo/Paul Leakan

Areas. Moreover, the proposed project was not fully consistent with CMP standards for the protection of wetlands. For these reasons, the development could not proceed without an MOA that contained measures that would ensure a level of protection for the resources of the Pinelands at least equivalent to that which would result from strict enforcement of the standards.

In 2004, the Commission and Board of Public Utilities entered into an agreement that allowed the power line to be built, with conditions that would lessen the effect it would have on the surrounding environment.

The impact on the most sensitive management areas in the Pinelands was reduced by routing the line within an existing electric transmission right-of-way (ROW) and an alignment to be established within the Garden State Parkway right-of-way. Furthermore, the width of the transmission line ROW was limited to 50 feet, and the power company was required to cooperate with the Commission in developing an ecologically-based ROW maintenance plan. The line was also routed around a significant wetland complex in the Stafford Forge Area.

Through the MOA, the Commission agreed to consider whether amendments to the CMP were warranted to refine land use and environmental standards applicable to development in the Parkway ROW. The Commission ultimately decided to address this provision by amending the CMP to create the Garden State Parkway Overlay District in 2006 (please see Chapter 1, page 24 for details).

Finally, the utility company responsible for the project contributed \$13 million to the Pinelands Commission to promote activities for the preservation, protection and enhancement of the unique resources of the Pinelands. This contribution led to the creation of the Pinelands Conservation Fund.

Status: The transmission line was built in accordance with the agreement. In 2009, the Commission prepared and adopted a comprehensive, ecologically based maintenance plan for electric transmission ROWs throughout the Pinelands (please see Chapter 1, pages 30-31 for details). Finally, the Pinelands Conservation Fund was created. The \$13 million contribution has been used to permanently preserve 5,000 acres thus far, as well as numerous conservation planning, research and community planning and design projects in the Pinelands.

South Jersey Transportation Authority (SJTA) and the Atlantic City International Airport

The SJTA owns the Atlantic City International Airport and developed a long-term plan for its expansion in 2003. This plan covered the 86-acre site of the Airport and a larger tract of land (approximately 2,100-acres) controlled by SJTA in Egg Harbor Township's Regional Growth Area and Military and Federal Installation Area. It identified a host of short- and long-term projects, including terminal modifications, runway upgrades, expansion of aviation related light industry and the development of a hotel/conference center.

As required by federal law, the Federal Aviation Administration (FAA) drafted an environmental-impact statement that focused on the ecological impacts of the proposed short-term improvements and recommended measures to address them. These recommendations formed the basis for an MOA that was reached between the Commission and SJTA in 2004. The agreement called for SJTA's creation of a Grassland Conservation and Management Plan to compensate for loss of habitat for certain grassland species, and development of a Stormwater Management Plan and a Soil Erosion and Sediment Control Plan. These plans have been submitted to and approved by the Commission. Additionally, SJTA agreed to enact a Forest Preservation Plan to protect a wetland community in the North Branch of the Absecon Creek watershed.

Implementation of the plan is contingent on FAA acceptance of a pending Airport Layout Plan. The MOA further required SJTA to submit specific information regarding anticipated impacts of the short-term projects for Commission review and authorization prior to the beginning of construction. Because of the detailed submission requirements prior to initiation of airport enhancements that were incorporated into the MOA, SJTA was not required to submit a standard development application to the Commission.

Status: The Grassland Conservation and Management Plan has been approved, providing protection to 290 acres. The Stormwater Management Plan and Soil Erosion and Sediment Control Plan have also been approved. The Forest Preservation Plan, addressing two sites totaling 407 acres, has been prepared and is awaiting acceptance by the FAA as part of the Airport Layout Plan. Since the MOA was executed, the facility has changed hands and is now being managed by the Port Authority of NJ and NY.

Ancora Psychiatric Hospital

In 2007, the Commission, New Jersey Department of Human Services (DHS), NJDEP and the Camden County Municipal Utilities Authority (CCMUA) entered into an agreement that allowed the extension of public sanitary sewer service to the Ancora Psychiatric Hospital in Winslow Township, Camden County, enabling the facility to decommission a failing wastewater treatment plant onsite. The Ancora facility is located in a Pinelands RDA, where sewer service is not permitted by the CMP. An MOA was therefore deemed necessary to allow for the provision of sewer service to accommodate the wastewater disposal needs of existing and future patient and inmate populations at Ancora, as well as future development of the parcel.

Under the MOA, the DHS was permitted to decommission the existing wastewater treatment facilities and build a sanitary sewer main to the CCMUA's Cedar Brook Pump Station, where wastewater would be sent to the county treatment plant in Camden. The main would have the capacity to accommodate both the present and the anticipated future flow from the Ancora facility and closure of the existing plant on the hospital grounds would follow its completion.

Future hospital expansion was limited to a specified 330-acre development area. The MOA also designated an adjacent open space area on the campus, totaling approximately 350 acres, in which most development would be precluded by a deed restriction.

In 2010, the Commission approved a minor amendment to the MOA that allowed the hospital to continue drawing water from the Kirkwood-Cohansey Aquifer for a short period after it had abandoned its treatment plant and begun piping sewage to Camden. The 2008 agreement had prohibited this so as to ensure that the hospital would secure an alternative source for its drinking water and avoid an interbasin transfer of water. Originally, DHS intended to comply by tapping the deep waters of the Piney Point Aquifer, but eventually chose instead to purchase (non-Kirkwood-Cohansey Aquifer) water from the New Jersey American Water Company. This required installing water mains to the hospital complex, which could not be accomplished until mid-2011. The Commission determined that the overall environmental impacts of continuing withdrawals from the Kirkwood-Cohansey water supply for that period were offset by the benefits bestowed by immediate closure of the failed on-site wastewater disposal system. Moreover, DHS agreed to transfer an additional 89 acres of the designated development area to the deed-restricted open space area created in the earlier MOA.

Status: Stormwater management improvements have been undertaken; New Jersey American Water from the Delaware River now serves the site; and approximately 440 acres in the Pinelands RDA have been permanently preserved.

Garden State Parkway Widening

In 2008, the Commission and the New Jersey Turnpike Authority entered into an MOA that authorized the widening of the Garden State Parkway in the Pinelands, between Interchanges 30 and 80.

The 50-mile widening project was approved mostly within the existing median and primarily within the Parkway's existing right-of-way. All but approximately one mile of the project is located in the Pinelands. It includes the addition of a third traffic lane and wider shoulders in the northbound and southbound directions. The project also included the construction of new parallel spans and rehabilitation of existing bridges over the Mullica and Bass rivers, as well as widening the existing bridge over Patcong Creek.

The Commission determined that the project would not be fully consistent with the CMP, including standards regarding the protection of threatened and endangered wildlife species.

In order to provide an equivalent level of protection of Pinelands resources, the Turnpike Authority agreed to purchase and deed restrict against future development at least 142.76 acres of land to offset potential threatened and endangered plant and animal species habitat impacts associated with the project. A portion of this obligation was to be met through preservation of a 259-acre site known as Turtle Creek in Washington Township, Burlington County. Located in the PAD, the site contains expanses of Atlantic white cedar forest that have substantially recovered from historical logging. The site has been studied over the years and has



In 2008, the Commission approved an agreement that authorized the widening of the Garden State Parkway (above).

Photo/Paul Leakan

been documented to contain numerous State threatened and endangered species, including Pine Barrens tree frog, various bird species, timber rattlesnake, New Jersey rush and Pine Barrens boneset.

The Commission further determined that expansion of the Parkway could result in unanticipated secondary impacts on the resources of the Pinelands by encouraging inappropriate intensities of growth near two of the interchanges proposed for improvement. The Commission's determination was based on an analysis completed by the Delaware Valley Regional Planning Commission. A separate agreement between the Commission and the Turnpike Authority was executed to specifically address secondary impacts by requiring the protection of certain lands in environmentally-sensitive management areas. The details of this agreement were kept confidential to avoid compromising negotiations and providing an unfair advantage to land speculators.

Because the Parkway is a historic resource that was determined by the New Jersey State Historic Preservation Office (HPO) to be eligible for the New Jersey and the National Registers of Historic Places, the impacts of the project on the roadway's historic characteristics was a subject of concern. A cultural resource survey, required by HPO pursuant to the National Historic Preservation Act of 1966, determined that the project would adversely affect those qualities that contributed to the historic significance of the Parkway. These consequences were mitigated through a Programmatic Agreement signed by HPO and the federal agencies involved. This agreement contained stipulations providing for more sympathetic design features, recordation of existing conditions prior to construction, curation of historic documents relating to the Parkway's original 1950 design and appearance and interpretive measures for the general public.

Status: The Parkway expansion project is ongoing. Three-hundred and sixty acres in the PAD and FA have been permanently protected to offset potential impacts to threatened and endangered plant and animal species habitat. An additional 1,040 acres in the FA that were identified in the secondary impact agreement have also been permanently protected to date, using a variety of funding sources. Efforts to complete the acquisitions outlined in the secondary impact agreement are ongoing.

Memorandums of Understanding/Cooperative Agreements

In addition to MOAs, the Commission also entered into a series of Memorandums of Understanding (MOU) with various public agencies and governmental bodies. MOUs do not address streamlined permitting procedures or adjustments to regulatory requirements as do MOAs. To that degree, they tend to be less specific in defining a detailed outcome. They do, however, signal intent on the part of the signers to undertake a certain joint course of action in pursuit of a desired objective and identify the duties of each signatory.

Between 2001 and 2012, the Commission became a party to five such MOUs as well as one Cooperative Agreement, engaging with Pinelands municipalities and counties and diverse agencies such as the NJDEP, Rutgers University, the Atlantic County Utilities Authority, CCMUA, the US Fish and Wildlife Service and the military.

In 2012, the Commission and NJDEP signed an MOU that clarified and memorialized their ongoing responsibilities concerning the review of water quality management plans (WQMP). WQMPs are comprehensive water resource planning documents. In the 2012 MOU, NJDEP agreed to abide by the Commission's management area designations in defining appropriate sewer service. The Commission agreed to provide comments to NJDEP on any WQMP involving lands within the Pinelands Area and notify NJDEP of any contemplated management area changes.

Another MOU was developed in 2009 among Rutgers University, US Fish and Wildlife, NJDEP and the Commission to advance public understanding and appreciation of the Jacques Cousteau National Estuarine Research Reserve and to encourage proper stewardship of its fragile ecosystem. The signatories jointly agreed to coordinate programs and cooperate in research and education efforts in promotion of the Reserve. The Commission specifically agreed to provide, as its budget allowed, personnel and facilities to support the initiative.

In an MOU from 2009 among Buena Vista Township, the Atlantic County Utilities Authority and the Commission, the three parties agreed to undertake initial studies in hopes of providing Richland Village with a community on-site wastewater treatment system. The joint effort called for a phased approach that included: a feasibility analysis to assess the future projected need for the facility as well as suitable locations; development of a preliminary design of the treatment system that would identify preferred locations for its components and explore potential funding sources; and final design and construction. However, the MOU was later rendered moot when the Township decided not to pursue the project.

The Commission entered into an MOU in 2009 with the Joint Base McGuire-Dix-Lakehurst as well as with Ocean and Burlington counties and 10 Pinelands municipalities to examine potential uses for lands within and adjacent to the military bases. The MOU recognized and made permanent an *ad hoc* committee known as the Joint Land Use Implementation Policy Committee. The purposes of this committee include promoting compatible development in and around the military installations while maintaining the joint base missions and keeping the public abreast of those missions.

The Commission entered into an MOU in 2006 with Winslow Township and the CCMUA. This MOU was necessitated by concerns over the Winslow Township Wastewater Treatment Plant's Infiltration/Percolation Facility, which contributed to the stream flow in the Great Egg Harbor River, but was also a potential source of pollution into the headwaters of the river basin. Without expansion, the treatment plant was unable to take additional wastewater. This prompted CCMUA to propose closing the treatment plant altogether and transferring its 2.5 million gallon a day flow to its Delaware No. 1 Water Pollution Control Facility in Camden. This remedy would, however, result in an interbasin transfer of waters drawn from the Great Egg Harbor River basin to the Delaware River basin, which is discouraged by the CMP.

The MOU called for Winslow to purchase a specified amount of water from a provider that does not draw from the Kirkwood-Cohansey Aquifer, thus neutralizing any impact of the transfer of effluent to the Camden treatment facility. Further prescriptions in the MOU required the CCMUA to construct two parallel sewer service pipelines from the treatment plant for phased transmissions to its Camden treatment facility and to upgrade its well monitoring gauges in the Sicklerville/Blue Anchor area so as to ensure that continued usage of existing Kirkwood-Cohansey wells in Winslow are within specified, acceptable limits and can be better managed during low flow/drought conditions.

Pursuant to the MOU, Winslow Township agreed to engage USGS in the conduct of an Aquifer Study that would establish certain hydrological conditions that were present in the headwaters of the Great Egg Harbor River basin and estimate the impacts that any changes in water withdrawal patterns would have. The MOU also contained other, quite detailed provisions for analyzing the monitoring data that was collected and for sequencing the activities involved in diverting the wastewater flows to Camden, decommissioning the treatment plant, managing well withdrawals and assessing the impacts of the project on groundwater levels and quality.

In 2006, the Commission also signed on to a Cooperative Agreement, which functions like a Memorandum of Understanding, with the National Park Service and the NJDEP regarding the implementation of the Pinelands Interpretative Plan. The agreement established a Steering Committee and a Project Team to oversee the achievement of a series of short- and long-term goals. In contributing to the ultimate goal of interpreting the natural resources and cultural history of the region for the general public, the Commission agreed to appoint a representative to the Project Team and to undertake a number of tasks. Among other things, the Commission would inventory its educational resources, help develop interpretive programs, provide detailed mapping, coordinate with local governments and take the lead in planning, designing, siting and building a regional road sign system.

CHAPTER 5: PUBLIC INFORMATION & OUTREACH

Since its inception, the Pinelands Commission has demonstrated a commitment to advance its mission of protecting the Pinelands by raising awareness and appreciation of the region's natural, cultural and historic resources. During the period of July 1, 2001 to June 30, 2012, the Commission educated thousands of people about the Pinelands through a multi-faceted approach of presentations and the production of interpretive materials.

Education and Outreach

During this review period, the Commission's Public Programs staff revamped its education and outreach efforts by placing a greater emphasis on providing educational programs for schools and the general



Joel Mott, a Public Programs Specialist with the Commission, uses a model to explain the Kirkwood-Cohansey Aquifer system. Photo/Paul Leakan

public. Prior to this shift in philosophy, the Commission participated in fewer education and outreach events and relied more heavily on arranging for outside experts to deliver presentations.

Recognizing that fewer school districts are in a position financially to take field trips into Pinelands, the Commission brought the Pinelands to the classroom. Staff delivered hundreds of presentations in school districts, libraries and during festivals in the Pinelands Area and beyond.

In 2007, the Commission organized and carried out the first Pinelands-themed World Water Monitoring Day event. Held each October at Batsto Lake, the event has educated more than 800 students about Pinelands water quality and the Commission's mission to safeguard the Pinelands. The students conduct water quality tests and use nets to catch and survey Pinelands fish while interacting with, and receiving guidance from, staff with the Commission and the Wharton State Forest (please see photo on page 112.)

The Commission also began organizing and hosting numerous educational programs at the Richard J. Sullivan Center for Environmental Policy and Education (RJS Center), which opened in December 2001. The nearly 12,500-square-foot facility is located on the grounds of the historic Fenwick Manor farmstead that houses the Commission's offices. Although the Commission uses the RJS Center mostly as office space and for meetings, it has taken major steps to use the facility for public education.

With that goal in mind, the Commission in 2007 launched the “Pinelands Speaker Series,” a program that features free presentations that are held in the conference room in the RJS Center. Thus far, the Speaker Series has hosted 15 presentations, including several with live animals such as owls and snakes.

In 2012, the Commission began using the RJS Center to host more technical presentations as part of the new “Pinelands Research Series.” The free talks included presentations on the Southern Pine Beetle, research on fence lizards, the effects of invasive insects and fire on carbon and hydrologic cycling in the Pinelands, parasites in food webs in the Pinelands, spatial ecology of the northern pine snake at the Warren Grove Gunnery Range and a landscape perspective of human-induced ecological change in the Pinelands.

In 2009, the Commission started a new project to develop and design Pinelands-themed, interpretive exhibits in the lobby and other space in the RJS Center.

Using a \$50,000 grant from the National Park Service, the Commission hired the NPS to perform an assessment of the RJS Center as a destination for a Visitor’s and Welcome Center with educational exhibits. After completing the assessment, the Commission used the remaining funds to hire Content Design Collaborative LLC of Scituate, Mass., to design the exhibits.

The Commission worked with the firm from early 2011 through summer 2012 to finalize the design plan, including the graphics, text and interpretive themes. The proposed exhibits would enhance the Commission’s educational programs, and they would educate visitors about the region’s special resources, while highlighting recreational opportunities. The design plan calls for relocating the existing receptionist/front desk in the lobby of the RJS Center to make room for a large map of recreation sites and other exhibits.



John Bunnell (center), the Commission’s Chief Scientist, speaks during the annual Pinelands-themed World Water Monitoring Day event at Batsto Lake.
Photo/Paul Leakan



The exhibits shown above feature sculptures and interactive displays that highlight the region’s geology, uplands, wetlands and surface waters.

Illustration/Content Design Collaborative

cranberry agriculture. A large aquarium of native Pinelands fish would be featured in the “surface waters” section of the exhibit.

With the design plan now completed, the Commission will begin efforts to secure funding to fabricate and install the exhibits, followed by a marketing campaign to draw more visitors to the RJS Center.

Pinelands Short Course

The annual Pinelands Short Course has grown considerably in popularity and course offerings since its creation as the Commission’s signature educational event in 1990.

From March 2002 through March 2012, the event has averaged 600 participants, bringing together thousands of people who want to learn more about the Pinelands. The increased popularity of the event can be attributed, in large part, to the expanded roster of course offerings. The daylong series of congruent lecture sessions now features roughly 40 programs that cover a multitude of Pinelands topics, including plants, animals, history, culture and conservation.

The Pinelands Short Course is sponsored by the Pinelands Commission and Burlington County College’s (BCC) Pinelands Institute for Natural and Environmental Studies. The event was originally held at Rutgers University, then was moved to Richard Stockton College of New Jersey before finding a home at BCC in 2004.

The main exhibit room would be housed in the 320-square-foot technical center. There, visitors would be able to feel the grains of sand and gravel that make up the Kirkwood-Cohansey aquifer system. The “uplands” section of the room would detail the vital role of fire in shaping the Pinelands landscape, while exploring the dwarf pine and oak trees found in the Pine Plains, as well as the story of Elizabeth White and her efforts to cultivate the blueberry.

The “wetlands” section would focus on rare plants and animals, such as the Pine Barrens treefrog, as well as

Re-designed Commission Web site

In June 2005, the Commission launched a new and improved version of its official Web site. The Commission worked with the New Jersey Office of Information Technology to redesign and enhance the



Above: The Home page of the Commission's redesigned Website.

site (www.nj.gov/pinelands). The main goal of the joint project was to upgrade the Commission's Web site to meet the State of New Jersey's Internet standards, technology and branding. The Web site was designed to provide easier navigation, including 13 main sections and an internal search engine that allows users to locate content on the Web site by keyword.

Since 2005, the Commission has added new features and content, including the posting of an online version of the Pinelands Protection Act and the Pinelands Comprehensive Management Plan. In addition, the Commission created new pages that offer a library of Pinelands images, additional educational resources, new maps and all of the

Commission's Memorandums of Agreement.

In 2011, the Commission also began hosting and maintaining the Web site for the Pinelands Development Credit Bank (www.nj.gov/pinelands/pdcbank/).

The Home Page of the Web site (please see photo above) receives approximately 6,000 hits or views each month.

Pinelands Road Signs

In 2008, Commission staff completed a project that resulted in the installation of Pinelands National Reserve road signs in 22 locations in the 1.1-million-acre reserve.

Posted in early March 2008, the road signs carry the Pinelands National Reserve logo, which features a pitch pine cone bough, as well as the message, "Keep it Clean and Green." The signs measure 4-feet high and 6-feet wide. They complement existing Pinelands National Reserve road signs that were posted on the Garden State Parkway and Atlantic City Expressway in 2006.

The regional road sign project was funded by a federal transportation enhancement grant. The grant also funded the creation of Pinelands-themed wayside exhibits and kiosks that have been installed at six state forest areas in the Pinelands and other locations.

Pinelands National Reserve Brochure

In May 2008, the Commission, the National Park Service (NPS) and the state Division of Parks and Forestry unveiled a new brochure detailing the natural, cultural and historic treasures found in the Pinelands National Reserve.



In 2008, the Commission completed a project to install new Pinelands National Reserve road signs such as the one above. Photo/Paul Leakan

The three agencies teamed up with a writer and designer from the NPS' Harpers Ferry Center to produce the brochure. Commission staff members took dozens of photographs of Pinelands plants, animals and landscape scenes, providing mapping data and helped to draft and edit the text and graphic design of the brochure. The project was funded through a cooperative agreement between the partners, including \$25,000 from the NPS Pinelands Interpretive Office and a \$13,000 NPS Challenge Cost Share Program grant that the Commission matched with in-kind services.



Above: The Commission unveiled the Pinelands National Reserve brochure in 2009.

The front side of the brochure features a colorful, photographic collage of Pinelands landscapes, as well images of plants and animals such as the Pine Barrens tree frog, a common yellowthroat (bird), an insect-eating pitcher plant and the rare Pine Barrens gentian (plant). It also explores the close relationship between the Pinelands' natural resources and its culture. A chronology of human activity in the region, and a diagram of the 17-trillion gallon Kirkwood-Cohansey aquifer system are also displayed.

The other side of the brochure features a large map that details the Pinelands National Reserve boundary, and charts the location of major roads, state parks, forests, wildlife management areas and wildlife refuges. The map also provides information about recreational opportunities offered at popular Pinelands destinations, including addresses, phone numbers and web sites for those locations.

A total of 250,000 copies of the brochure were printed. The brochure can be obtained at Bass River State Forest, Belleplain State Forest, Brendan T. Byrne State Forest, Double Trouble State Park, the Forest Resource Education Center, and Wharton State Forest, or by contacting the Pinelands Commission.

CHAPTER 6: ECONOMIC MONITORING

The Pinelands economic monitoring program was established as a result of the Commission's second review of the Comprehensive Management Plan (CMP). A panel of economic experts was convened in 1992 to review prior economic studies and develop recommendations for future Commission action. The Pinelands Commission endorsed the panel's recommendation to monitor the region's economy on a continuing basis. In 1994, the Commission entered into an agreement with the National Park Service (NPS) to fund the economic monitoring program and the environmental monitoring program. The NPS has continued to provide funding each year to sustain both programs.

With detailed planning for the monitoring program underway, scoping meetings were conducted with interested parties, a technical committee of the NPS, Pinelands Commissioners and another panel of independent experts. The detailed program design was completed in 1996 and the first economic report was issued in 1997. Subsequent reports have been issued annually; most recently the 2012 report, covering data from 2010 to 2011.

The goal of the Long-Term Economic Monitoring Program is to continually evaluate the economic health of the Pinelands region in an objective and reliable way. The economic monitoring program, in conjunction with the Commission's ongoing environmental monitoring program, provides essential information to the Pinelands Commission as it seeks to meet the mandates set forth in federal and state legislation. The program is designed to accomplish the following principal objectives:

1. Address key segments of the region's economy while being flexible enough to allow for the analysis of special topics that are identified periodically;
2. Establish a means for comparing Pinelands economic segments with similar areas in the state not located within Pinelands-designated boundaries;
3. Establish a means for evaluating economic segments over time so that Pinelands-related trends can be distinguished from general trends;
4. Provide for analyses to be conducted in an impartial and objective manner; and
5. Be designed and implemented in a cost-effective manner so that the program's financial requirements can be sustained over time.

Economic Indicators

The Commission's staff monitors economic conditions by compiling data for key indicators (also referred to as variables) in the areas of property values, economic growth, and municipal finance. To the

extent possible, data for the variables are gathered from 1980 (the year the CMP was adopted) to the present, and updated on an annual basis. Analysis relies on municipal-level data for most economic indicators and county- or state-level data for the remaining indicators. To understand the larger context of Pinelands economic trends, the program provides comparisons between four different areas, including Pinelands, non-Pinelands areas in southern New Jersey, all of southern New Jersey, and all of New Jersey.

A total of 21 indicators are tracked and analyzed. Table 6.1 shows the indicators tracked, the frequency of data collection and the method of analysis.

Table 6.1: Core Indicators of Economic Monitoring

Core Indicator	Frequency Collected	Method of Analysis
Municipal Population	Decennial	Inside/Outside Pinelands (I/O)
Census Block Population	Decennial	I/OP, Census Block
Age Demographics	Decennial	I/OP
Population Estimates	Annual	I/OP
Building Permits	Annual	I/OP
Median Selling Prices of Homes	Annual	I/OP
Volume of Real Estate Transactions	Annual	I/OP
Retail Sales & Establishments	Quintennial	County, Place
Income	Decennial	I/OP
Unemployment	Annual	I/OP
Employment	Annual	I/OP (93-99, County (91-02)
Number of Establishments	Annual	I/OP (93-99, County (91-02)
Payroll by Major Industry Sector	Annual	I/OP (93-99, County (91-02)
Farmland Assessment Acreage	Annual	I/OP
Agricultural Census Data	Quintennial	County
Blueberry and Cranberry Production	Annual	State
Avg. Residential Property Tax Bill	Annual	I/OP
Equalized Property Value	Annual	I/OP
Effective Tax Rate	Annual	I/OP
Assessment Class Proportions in Municipal Evaluation	Annual	I/OP
Local Municipal Purpose Revenues	Annual	I/OP

In addition to ongoing data compilation, the Long-Term Economic Monitoring Program is designed to provide in-depth analysis of certain issues based on indications observed in the data. For example, a study on municipalities straddling the Pinelands border is discussed later in this chapter.

Summary of Findings

A full discussion of the findings is contained in the 2012 report, which is available from the Pinelands Commission's website (www.nj.gov/pinelands). The following sections highlight some of the more significant findings.

Property Values and Residential Developments

Three variables are tracked annually to monitor residential development activity and the vitality of property values: the average number of dwelling units authorized by building permits, median selling prices of homes, and volume of residential real estate transactions.

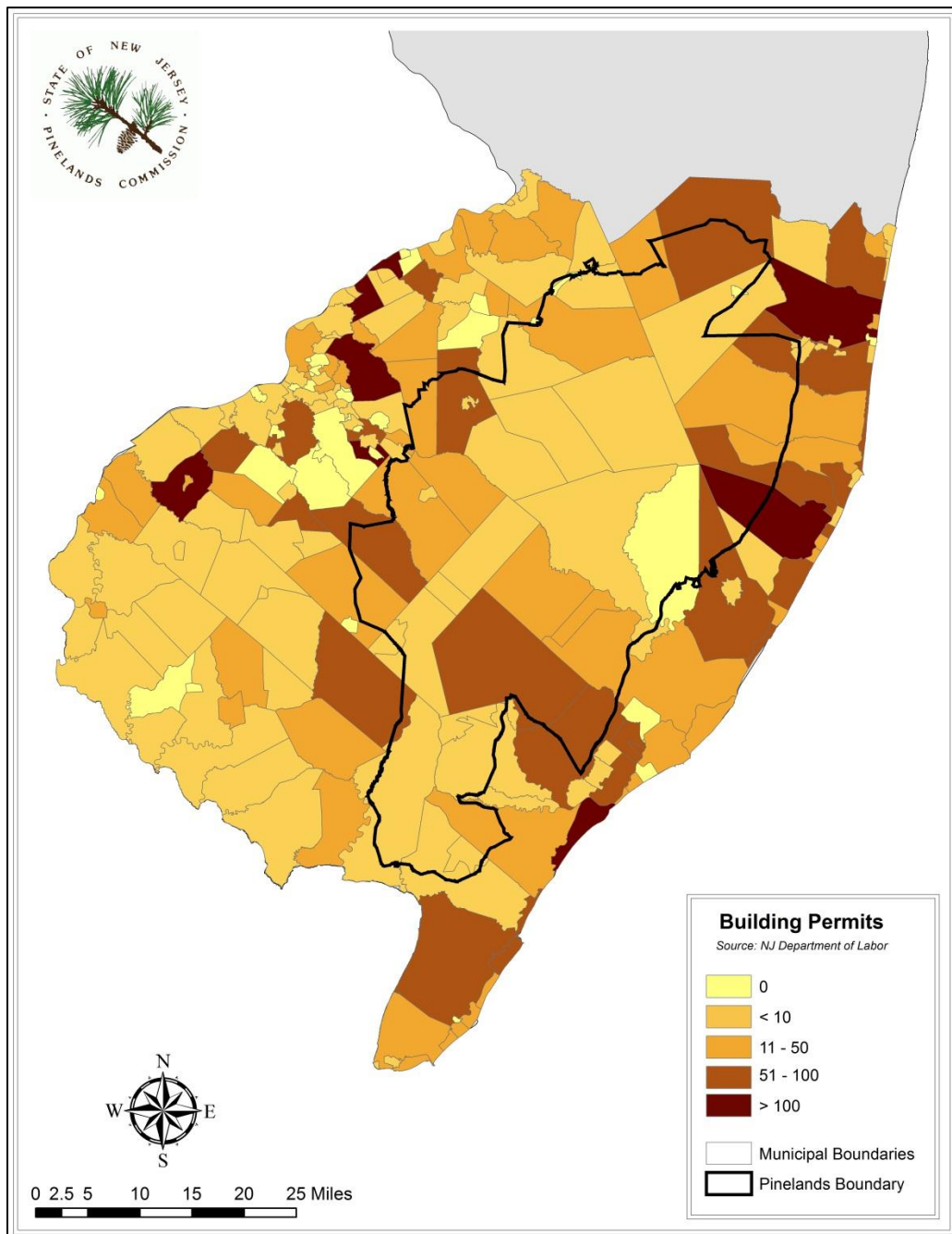
The overall trend in permits for dwelling units in the Pinelands roughly followed that of the rest of New Jersey. Since 1980, the average number of residential building permits issued in the Pinelands has been consistently higher than all other regions in the state as well as higher than the entire state itself. The mid-1980s saw a boom in residential construction followed by recession in the late 1980's, recovery through the mid-2000s, and a subsequent recession into the 2010s. The years 2007 and 2011 represent the only time since 1980 when another region (northern New Jersey) issued, on average, more permits at the municipal level. Data from 2011 shows permit issuances at an average of 23 building permits per municipality in the Pinelands, 23 statewide, 20 in southern New Jersey, and 19 in the non-Pinelands. This is an 80.9% decrease from 2002 in the Pinelands, -57.3% change statewide, -68.9% change in southern New Jersey, and a -59.7% change in the non-Pinelands. The Pinelands municipalities, generally issuing a far greater number of permits than the rest of the state, had further to fall in the recession; thus the greater relative decrease in permits issued.

Spatially, the bulk of the residential building permits being issued are located just inside and outside the northern, eastern, and western Pinelands boundaries, as illustrated in Figure 6.1.

Median home values continued their recent decline across New Jersey through 2011; the Pinelands not excluded. The median sale prices of homes in the Pinelands was relatively flat from 1989 through the early 2000s, when prices began to rise significantly and reached their peak in 2007. Home values in the Pinelands in 2011, when adjusted for inflation, dropped nearly 20.9% from their 2007 high, yet still show a 23.8% increase over their 1989 values. The 2011 median home sale price in the state was \$312,143, \$222,213 in the non-Pinelands, \$223,219 in southern New Jersey, and \$224,408 in the Pinelands.

Since 2002, residential property transactions in the Pinelands, non-Pinelands, southern New Jersey, and the state have been increasing until 2004 and 2005. The year 2006 saw a dramatic decline in residential property transactions in all regions, and they have continued to decrease. Transactions showed a slight increase in 2010, but again declined in 2011. The number of residential property transactions from 2007 to 2011 fell 63.9% to 3,212 transactions in the Pinelands, -60.8% to 11,960 in southern New Jersey, -59.5% to 8,748 in the non-Pinelands, and -55.7% to 39,663 transactions in the state. As seen in prior years, much of the transactions are occurring along and outside the Pinelands' northern, eastern, and western boundaries.

Figure 6.1: Residential Building Permits Issued in 2011:



Economic Growth

Using data from the Economic Census (conducted by the U.S. Census Bureau), per capita retail sales showed an increase statewide from 1997 to 2007. Increases varied, with the Pinelands showing a 20% increase during the 10-year period (the highest among the four regions, growing to \$11,501/capita) and the non-Pinelands showing only a 5.3% increase (to \$15,150/capita). Despite the overall gain from 1997 to 2007 in the Pinelands, the most recent five-year change from 2002 to 2007 shows a 0.7% decrease in per capita retail sales. Meanwhile, southern New Jersey showed a 1997 to 2007 increase of 12.1% and a 2002 to 2007 increase of 4.9% to \$14,407/capita in 2007. At the state level, the 1997-2007 period showed a 9.2% increase with a 2002 to 2007 decrease of 1.8%, leaving per capita income sales at \$13,753. These all show that most of the increase in per capita retail sales occurred pre-2002, after which the early 2000s recession occurred.

In 2010, the Pinelands had the lowest per capita income (\$29,198). However, it also posted the greatest percentage increase from 1999 (3.9%) relative to the non-Pinelands (\$32,839; 2.3% increase from 1999), southern New Jersey (\$32,312; 3.7% increase), and the state (\$34,858; 1.4% decrease). Per capita income in the Pinelands still trails the non-Pinelands and southern New Jersey by about \$3,400; likewise, the area trails the state by about \$5,700. This demonstrates that there is still a significant difference between the Pinelands and its counterparts.

Unemployment in the Pinelands has closely followed non-Pinelands and state unemployment trends since the beginning of the Long-Term Economic Monitoring program. This continues today, as unemployment rates for all three entities posted their lowest rates in 2000 and their highest rates in 2010.

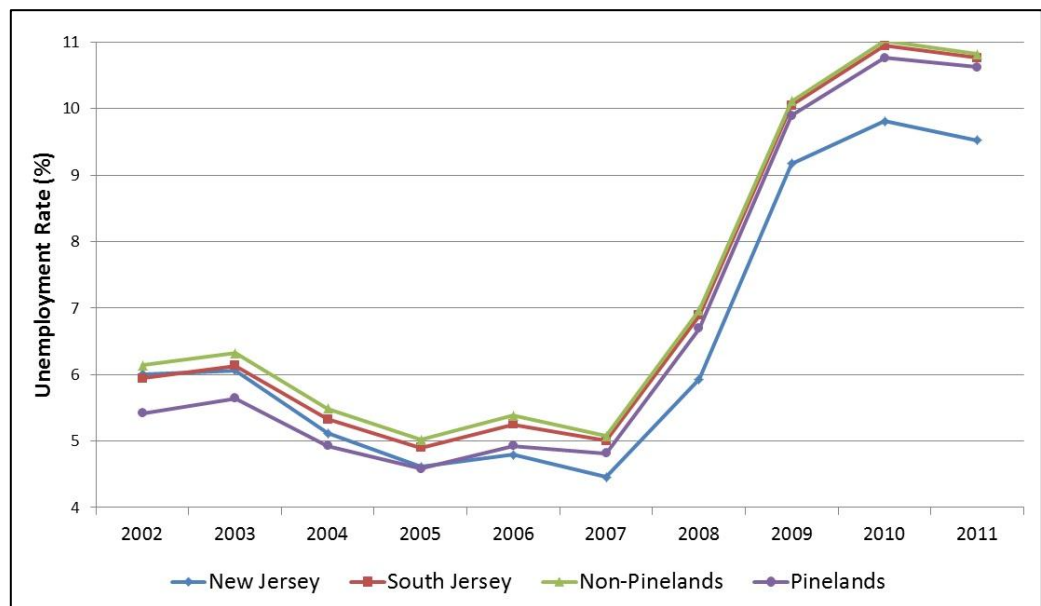


Chart 6.1: Unemployment Rate

As of 2011, the Pinelands unemployment rate stood at 10.6% (0.2% lower than its high point in 2010), while the non-Pinelands and southern New Jersey were 10.8% and the state was 9.5%. Spatially, municipalities in the south-central Pinelands have been the hardest hit among all of the Pinelands since 2006. Additionally, 29 Pinelands municipalities are posting unemployment rates exceeding that of state and national rates (9.5% and 9.6%, respectively).

Employment, business establishments and wage data became available at the municipal level beginning in 1993; however, due to data suppression, trends can sometimes be difficult to identify, especially inside the Pinelands. Data is suppressed when there are relatively few employers in a given sector, a much more likely event in rural municipalities such as those in the Pinelands.

From 2006 to 2010, the Pinelands posted negative employment growth, declining 6.2% to 135,357 people employed. During the same period, state and non-Pinelands employment similarly decreased (5.5% and 6.8%, respectively). Establishments in the Pinelands saw gains of 32.3% during the 1993 to 2003 monitoring periods. Figures from 2010 showed 13,303 establishments in the Pinelands (a 6.3% decrease), 42,730 in the non-Pinelands (a decrease of 4.7% from 2006), and 259,893 in the state (a decrease of 4%). Wages, in contrast, decreased during the 1993 to 1998 period, rose from 1999 to 2003, and then fell again to \$37,003 in 2010 in the Pinelands (a 0.8% decrease from 2006). Likewise, the non-Pinelands had a 2010 average annual wage of \$36,558 (down 2.5% from 2006) and the state's average annual wage was \$44,847 (down 2%).

Farmland assessed acreage in the Pinelands counties increased from 286,975 acres in 1992 to 295,959 acres in 2002 (a 3.1% increase). However, the following period (2002 to 2007) saw farmland decline sharply to 258,882 acres (a 9.8% drop from 1992). Despite this, more than a third of New Jersey's farmland is in the Pinelands counties (35.3%), with about 100,000 acres protected by agricultural zoning. Additionally, the Pinelands counties' total agricultural sales of \$529,707 in 2007 (up 14.3% from 2002) constituted 51.7% of the state's total agricultural sales (a slight decrease of -1.1% from 2002). Of those sales from the Pinelands counties, net cash returns equaled \$137,119.

Cranberries and blueberries, staples of New Jersey, continue to be important agricultural products. Adjusted for inflation, cranberry prices remained fairly stable between 1980 and 1997, ranging from \$0.71 to \$1.03 per pound. As a result of advances in cranberry production, supply substantially increased while demand held steady, causing prices to plummet a year later in 1998 and reach their lowest price in 1999 at \$0.14 per pound. Since then, prices generally have been increasing and, as of 2011, have rebounded to \$0.52 per pound.

Blueberry prices, conversely, have fluctuated greatly during the entire 31-year period. With a 1980 price of \$1.61 per pound (adjusted for inflation), blueberries hit a high of \$1.94 per pound in 1988 and a low of \$1.09 in 1998. After a recent decline in 2008 and 2009, blueberry prices rose to \$1.53 per pound in 2011. Counter-intuitively, as blueberry production has risen since 1980, the value of the utilized production has also increased; typically, as supply increases, prices fall.

Municipal Finances

Average residential property tax bills are rising in the Pinelands, non-Pinelands, and across the state. The state average bill continues to be higher than that of southern New Jersey, the non-Pinelands, and

the Pinelands, with the Pinelands consistently being the lowest overall. At \$4,884, the Pinelands average tax bill is 36.8% lower than the state's and 14.2% lower than the average tax bill in the non-Pinelands (Chart 6.2).

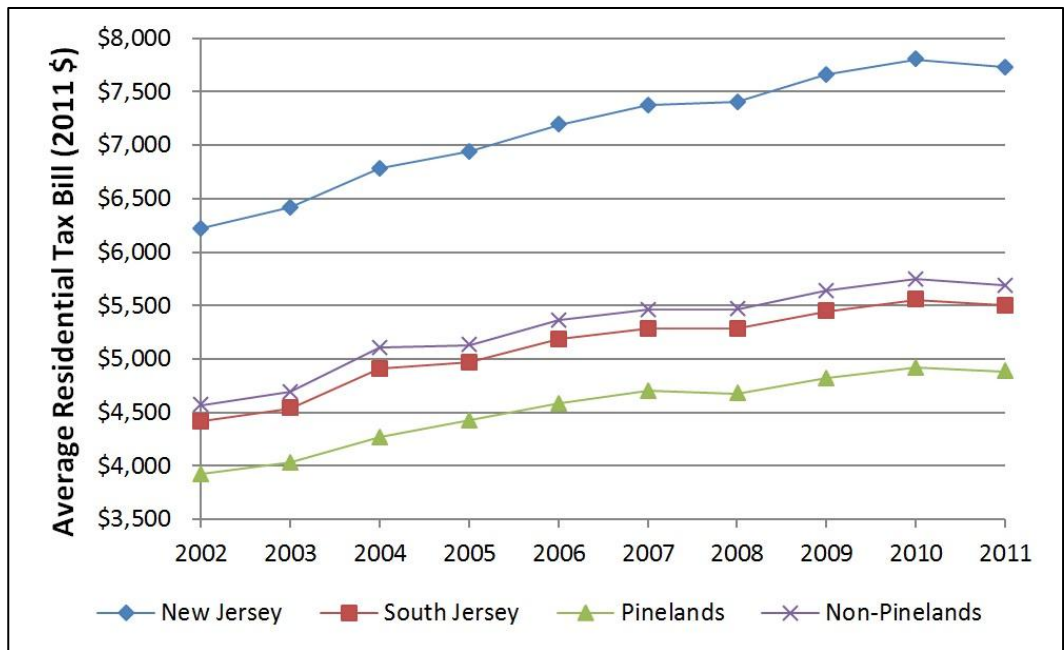


Chart 6.2: Average Residential Tax Bill (in 2011 USD)

Spatially, the municipalities in southern New Jersey (both Pinelands and Non-Pinelands) that are closest to Philadelphia experienced higher average residential property tax bills than those closer to the Atlantic shoreline.

Average municipal state equalized valuation (a way of making property values throughout the state comparable) in the Pinelands increased from 2002 by 48.7% to \$1,586,793,615. This is relatively on par with that of the non-Pinelands' state equalized valuation of \$1,658,331,648 (a 58.6% increase since 2002). Meanwhile, due to a stronger valuation in northern New Jersey, the state totaled \$2,189,544,718 (a 37.4% increase since 2002). Valuation reached its peak in 2007 and now appears to be decreasing at an increasing rate across all levels. Meanwhile, average effective tax rates (a rate at which the municipality taxes the equalized, assessed value of property) were lowest in the Pinelands municipalities, except for 2003 when they exceeded that of the state. Trends across all regions showed a decreasing rate from 2002 to their low points in 2007, followed by a gradual increase to current rates. The average effective tax rate of the Pinelands is 2.06 (0.27 less than that of 2002 levels). The state, southern New Jersey, and the non-Pinelands have noticed similar trends, with the state rate at 2.2 (down 0.16 from 2002), southern New Jersey down 0.29 to 2.25, and the non-Pinelands down 0.3 to 2.31.

Based on property assessments, residential taxes in the Pinelands make up the majority of tax revenues of Pinelands municipalities (an overwhelming 84%). Commercial taxes follow at 10%, then vacant at 3%, and apartments at 2%. Industrial and agricultural make up the smallest portions at 1% and 0.1%, respectively. Per capita municipal budgets in the Pinelands have increased 8.0% to \$836 since 2000. Comparatively, the non-Pinelands municipal budgets, since 2000, have seen a 16.1% increase to \$1,329 per capita. Per capita state-aid has dropped by about 43% in both areas, down to \$119 in the Pinelands and \$133 in the non-Pinelands during the same period.

Population

The 2010 block-group census data revealed that the Pinelands population increased 13% from 276,889 residents in 2000 to 312,840 residents in 2010.

Meanwhile, the non-Pinelands grew by 10.9% in the same time period, reaching a population of 556,933 residents. Egg Harbor Township now has the largest population in the Pinelands, after having only the 4th largest population in the Pinelands in 2010. (Figure 6.2)

Demographically, the Pinelands and the rest of the state continue to age. According to the 2010 census, 21.9% of the population is under the age of 18, down by 2.6% from 2000. Further, the population aged 65 and older constitutes 18.0% of the Pinelands residents; a figure that has increased by 1.2% since 2000. Meanwhile, the non-Pinelands saw both age groups shrink (18 and under decreased by 1.2% to 24.2% and 65 and over decreased by 0.1% to 14.4%).

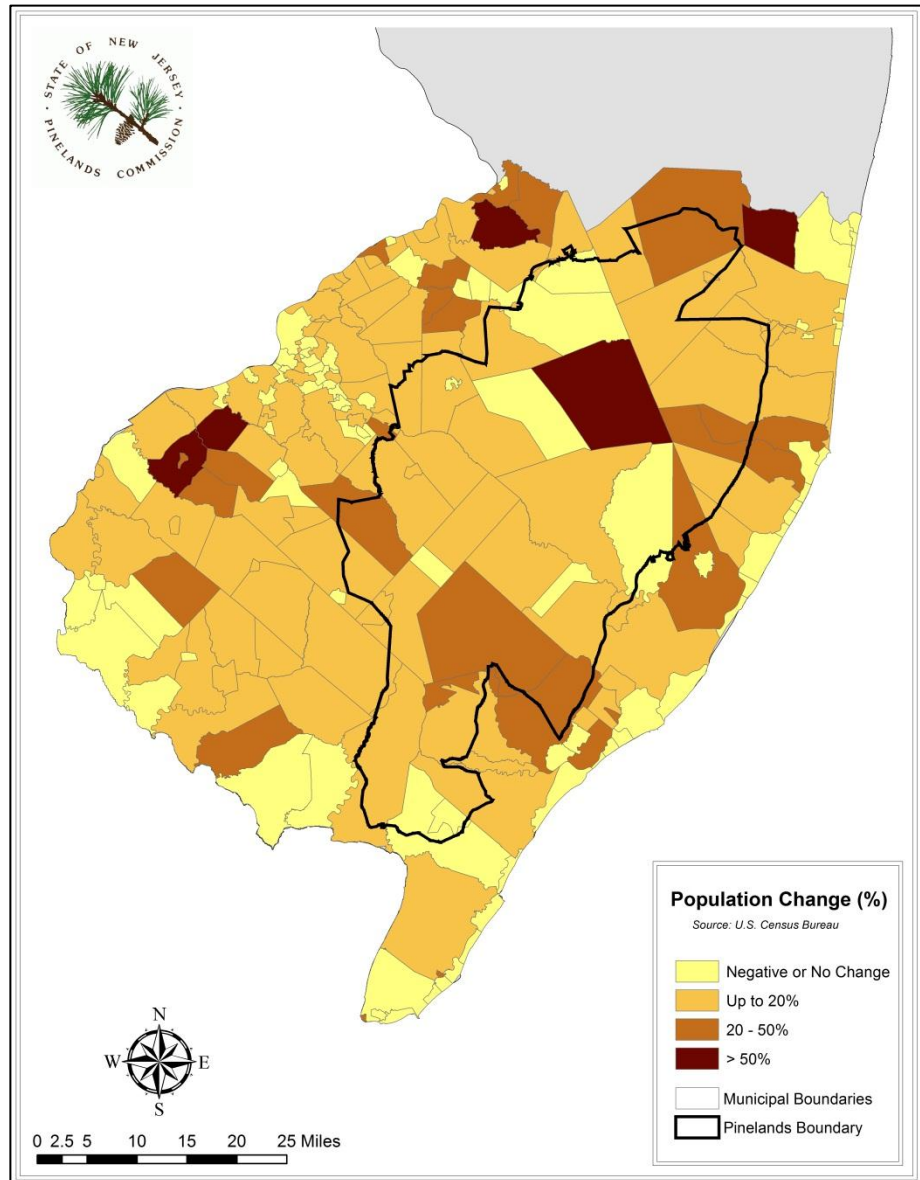


Figure 6.2: Population Change from 2000-2013

Special Studies 2002 - Present

Split Town Study

In 2012, the Pinelands Commission began a study on “split towns” to determine possible alternatives to the current methods of monitoring. A split town is a municipality whose land area straddles the Pinelands boundary; part of the municipality’s land is within the Pinelands’ borders, and part is outside.

Fifty-three municipalities have borders within the Pinelands Area. Of those, only 11 are completely contained by the Pinelands Area. The remaining municipalities are considered split towns.

Ideally, when evaluating a split town, data in small scale units (such as census blocks) is used to isolate the municipal areas in the Pinelands Area from those outside. When this is not possible due to the lack of small scale data (as is often the case) a 10% rule is applied to the municipal data that is available.

Those municipalities that have at least 10% of their land area within the Pinelands are considered to be “Pinelands” municipalities and their statistical data is included in the Commission’s studies, including the annual Long-Term Economic Monitoring Report. This can create problems in producing representative reports, as data can be skewed if a municipality has a higher concentration of development and/or residents outside the Pinelands boundary. For example, 20% of Eagleswood is located within the Pinelands Area boundary, yet all of its residents are located outside the boundary. Beachwood has 28% of its land area within the Pinelands boundary and has a population of more than 11,000, yet only four of its residents are actually located inside the Pinelands Area.

In an effort to reduce the effects of skewed results, an analysis was carried out to determine if a larger land area should be used for determining whether a municipality is in the Pinelands. Analysis has shown that simply altering the 10% rule in favor of a 20%, 25%, or even 30% rule yields no significant difference in the value of the aggregates. As a result, other methods of obtaining sub-municipal data will be explored. One possible method is through the use of a geographic information system (GIS), where it may be possible to attribute certain data to relatively precise geographic locations. This could allow the Commission to more accurately attribute data within those municipalities split by the Pinelands Area boundary than would otherwise have been possible using the 10% rule. Doing so would enable the Commission to more accurately evaluate the impact of its policies upon those areas within the Pinelands and to better compare portions of southern New Jersey within the Pinelands to those outside. The Commission intends to examine only a select number of core variables as part of this special study. It is hoped that the results of this study will either buttress the Commission’s use of the 10% rule, revise it, or eschew it in favor of more precise methods.

Indicators of Municipal Health

During its September 1999 meeting, the Pinelands Municipal Council unanimously recommended that the Long-Term Economic Monitoring Program conduct a special project to identify and characterize municipalities experiencing poor health. Although difficult to define, poor municipal health can generally be described as being below a given standard with respect to municipalities’ social, economic, physical, and fiscal conditions. Pinelands Commission staff is administering the project, in consultation with the Pinelands Municipal Council.

In November 1999, the Pinelands Commission authorized the project. The goals of the project are to: 1) produce a database of indicators that are reflective of municipalities’ social, economic, physical, and

fiscal conditions; 2) produce an objective, systematic and repeatable model identifying municipalities that are experiencing poor health using the database of indicators; 3) select economically-challenged communities using the results from the model; and 4) develop methods to calculate financial aid and/or other resources that may alleviate the degree of strain in the identified municipalities.

In January 2001, a short questionnaire was administered to municipal officials (i.e., mayors, CFO's, administrators, council members, etc.) in 36 municipalities. The questionnaire was designed to reveal municipal officials' opinions on indicators of fiscal health and on ways to measure and compare fiscal health among municipalities. In general, the results of the questionnaire suggest that the most pressing municipal health concerns of the Pinelands municipalities relate to a healthy tax base (i.e., a mix of commercial, industrial, and residential land), tax rates, and school costs. These themes are being examined more closely during the course of this project.

The preliminary design of the study consists of two parts. The first part focuses on a Pinelands and non-Pinelands analysis of fiscal indicators. Based on responses from the questionnaires and the availability of data, a number of variables were examined, including unemployment rates, tax rates, income levels, and the level of commercial and industrial ratables. The second part of the study identifies Pinelands towns that are most in need of fiscal assistance, and the Commission will explore corresponding funding models.

A preliminary draft for this study was presented to a Commission subcommittee in July 2008. A copy of this draft is available for public review on the Pinelands Commission's web site. This project is ongoing, and the Commission's staff intends to resume its work. The final model to measure fiscal stress may use principal-components analysis to arrive at a single fiscal stress number for all 566 municipalities in New Jersey. Principal-components analysis is an objective, statistical approach that combines several different variables into a single measurement (in this case, overall fiscal health). This method has been legally challenged and upheld in New Jersey courts and is the basis upon which the New Jersey Department of Education assigns district factor groups that are used in state-testing analysis. Preliminary findings show that the most severely-stressed municipalities in the Pinelands region rank among the top 10% of municipalities statewide in regards to fiscal stress.

It is anticipated that the findings from this study may act as a guideline for more efficiently channeling state aid to those municipalities who may have been shortchanged in the past. It can and has been used as a guide to provide different CMP standards for distressed municipalities in rulemaking. The municipal fiscal health study will be updated with the most current data available and be recirculated.

Vacant Land Value Study

The vacant land value project was an extension of the property value and real estate monitoring aspect of the annual report. In September 1999, Pinelands Commission staff obtained data from the New Jersey Department of Treasury on all New Jersey land and housing transactions dating back to 1989.

Vacant land transactions were supplemented with additional information in order to enhance the usefulness of the data in determining the value of vacant land. For example, Pinelands Commission staff gathered supplemental data for each vacant land transaction (i.e., acreage, zoning, management area, and more) from tax maps and other available data sources. The data collection process culminated in 2003, and a formal database was created and cleansed in order to reconcile errors and fill in missing data. The database contains approximately 5,700 records of transactions inside the Pinelands boundary and 16,000 records outside the Pinelands boundary from the years 1989 through 2002.

Staff, with support of advisors, explored hedonic regression, a method of evaluating value by examining an object of interest's individual components, to compare land values inside and outside the Pinelands. Substantial data was gathered, but it was only sufficient in the growth areas. In those areas, no significant differences in values between the Pinelands and Non-Pinelands were found. A Delphi approach, a method for gaining opinions from a panel of experts in a field, was then investigated to see if further comparisons in non-growth areas could be evaluated. However, the complexities of local land market values rising in adjacent counties quickly overwhelmed the study's feasibility.

Pinelands Development Credit Supply and Demand Study

In 2005, Pinelands Commission staff began a reexamination of the Pinelands Development Credit (PDC) program and its effectiveness. The PDC program is an integral tool in the implementation of the Comprehensive Management Plan. In order to facilitate the process of directing growth to appropriate areas in the Pinelands region, the PDC program was established to create a market for development rights in the Pinelands. Owners of properties in designated sending areas (APA, SAPA and PAD) are afforded the opportunity to “sever” their development interests in their properties and sell those rights to land developers in receiving areas. The developers then use these rights to expand their allowable development densities in Regional Growth Areas, thus directing growth from preservation and agricultural areas to areas that are more capable of accommodating development. The owners of land in preservation and agricultural areas are thus compensated monetarily in exchange for deed-restricting their land from future development.

Since the PDC program is private market-driven, its ultimate success depends on a healthy balance between supply and demand pressures in the land-development market in the Pinelands. Initially, the PDC program was slow to be utilized by both developers and land owners in the region. However, in recent years there has been quite a bit of activity in the PDC market, with the price of a development right rising from an initial value of \$2,500 in 1981 to a high of \$40,000 in 2006. Prices have fallen during the recession; the mean sales price of a development right in 2008 stood at \$19,000 but fell to approximately \$9,000 to \$10,000 in 2013.

This study is a comprehensive review of what has worked well to this point, in addition to examining new ideas on how to further stimulate use of PDCs in the coming years. A preliminary package of recommendations was submitted to the Commission's Policy and Implementation Committee during the

summer of 2007. After further review, a final set of policies and rules will be presented to the Commission for its consideration.

Housing Task Force

In October 2003, the Pinelands Commission formed a Housing Task Force in order to update housing demand estimates for consideration in reviewing the Comprehensive Management Plan. The Economic Monitoring Program has been an integral part of the process, through analysis of population data, the collection and evaluation of population projections, estimating future housing units, defining and calculating vacant developable land using land-use and land-cover data, and allocating future population and housing to Pinelands development areas based on vacant land. The Task Force issued its final report in January 2007. The results of the report were used in the initial PDC enhancement submission to the Commission in 2007.

As part of this process, the Commission created a Pinelands Population Reference Guide to gather population and housing data in the region. The guide includes a range of geographic scales from 1970 to 2000.

Kirkwood-Cohansey Build-out

Water usage in the Pinelands totals approximately 100 million gallons a day. Residential land uses consume about 60% of that amount, while agriculture activities use about 17% and the rest is used by used by industries, institutions, system “loss,” etc. Much of the water used in the Pinelands is sourced from the Kirkwood-Cohansey aquifer; a large aquifer nearly the size of southern New Jersey.

In 2002, the Pinelands Commission undertook a study to determine potential future well needs based on the potential build-out of three land uses: residential, non-residential, and agriculture. For each of these land uses, three scenarios were run: low development, constrained development, and maximum development. The low development model used current development trends to gauge future uses, and the maximum development model considered water usage should all vacant land (barring protected lands) be developed to maximum densities allowed by zoning. The constrained development model used the same basis as the maximum development model, except that it factored in the constraints that wetlands, infrastructure, and design inefficiencies might have on development.

Currently, Commission staff members are refining the model so that updated data can be utilized in other projects and programs. Once completed, the resulting data can be analyzed to determine future well needs in the Pinelands and compared to models for the surface Kirkwood-Cohansey. Should the situation arise where projected future demand outweighs supply, service providers can be notified, so they can respond appropriately.

CHAPTER 7: SCIENCE PROGRAM

Research, monitoring, and assessments by Commission scientists and others have played a fundamental role in the development and implementation of the CMP. The primary goal of the Commission Science Program is to provide information that may be used to develop and evaluate environmental policies and programs. The Science Advisory Committee, which is composed of university and government researchers, and the Commission's Policy and Implementation Committee provide oversight and guidance on Science Program activities.

This chapter includes the following three sections: 1) Science Office Funding, 2) Studies Conducted Since July 2001, and 3) Current Research and Monitoring Projects. Policy implications of the Science Office's research are described when applicable.

Science Office Funding

The Science Office is supported largely by outside funding sources. In 1990, the Commission began to design a long-term environmental-monitoring program and, in 1992, staff scientists initiated components of the program (Zampella 1992). Two main objectives of the environmental-monitoring program are to characterize the effect of existing land use patterns on aquatic and wetland resources and to monitor long-term changes in these resources. In 1994, a formal agreement was executed with the National Park Service (NPS) to help fund the environmental-monitoring program (Zampella and others 1994). Since that time, federal funding has been provided annually. Additional funding has been provided for individual projects from the U. S. Environmental Protection Agency (EPA), the NJ Water Supply Fund, and the Pinelands Conservation Fund (PCF). The 25% contribution required for EPA grants has been provided through the Commission General Fund or, more recently, the PCF.

Studies Conducted Since July 2001

In this section, studies that have been completed or published by Science staff since July 2001 are briefly summarized and organized into the following nine categories: 1) Watershed Assessments, 2) Landscape Assessment, 3) Water Quality, 4) Aquatic and Wetland Assemblages, 5) Cranberry Agriculture Study, 6) Kirkwood-Cohansey Project, 7) Sanctuary Development, 8) Ecological-integrity Assessment, and 9) Right-of-way Vegetation-management Plan.

Watershed Assessments

From 1992 through 2003, Commission scientists completed surveys to assess aquatic and wetland conditions in the four major Pinelands watersheds: the Mullica River, Rancocas Creek, Great Egg Harbor River, and Barnegat Bay watersheds (Zampella and others 2001, 2003, 2005, 2006a,

respectively). This work was primarily funded by the NPS. Vegetation and fish surveys were completed in streams, and fish and anuran (frog and toad) surveys were conducted in on-stream impoundments (Figure 7.1). Specific conductance and pH were measured at or near the plant and animal survey sites in all four watersheds. Specific conductance reflects the amount of dissolved substances in the water (e.g., calcium, magnesium, sodium, chloride, etc.), and pH indicates whether the water is acidic, neutral, or alkaline.

In general, results of the surveys demonstrated that stream sites and impoundments in forested watersheds with little to no development and upland agriculture were characterized by low pH (more acidic water), low specific conductance (few dissolved substances), and native-Pinelands plant and animal assemblages. In contrast, stream sites and impoundments located downstream from developed land and upland agriculture displayed elevated pH and specific conductance and supported mixed native and non-native plant and animal assemblages. The strength of the relationships among land use, water quality, and species composition varied among the four watersheds.

From 2007 - 2011, Commission scientists completed a second round of water-quality and plant and animal surveys in the four watersheds (please see Current Research and Monitoring Projects section below on page 145).

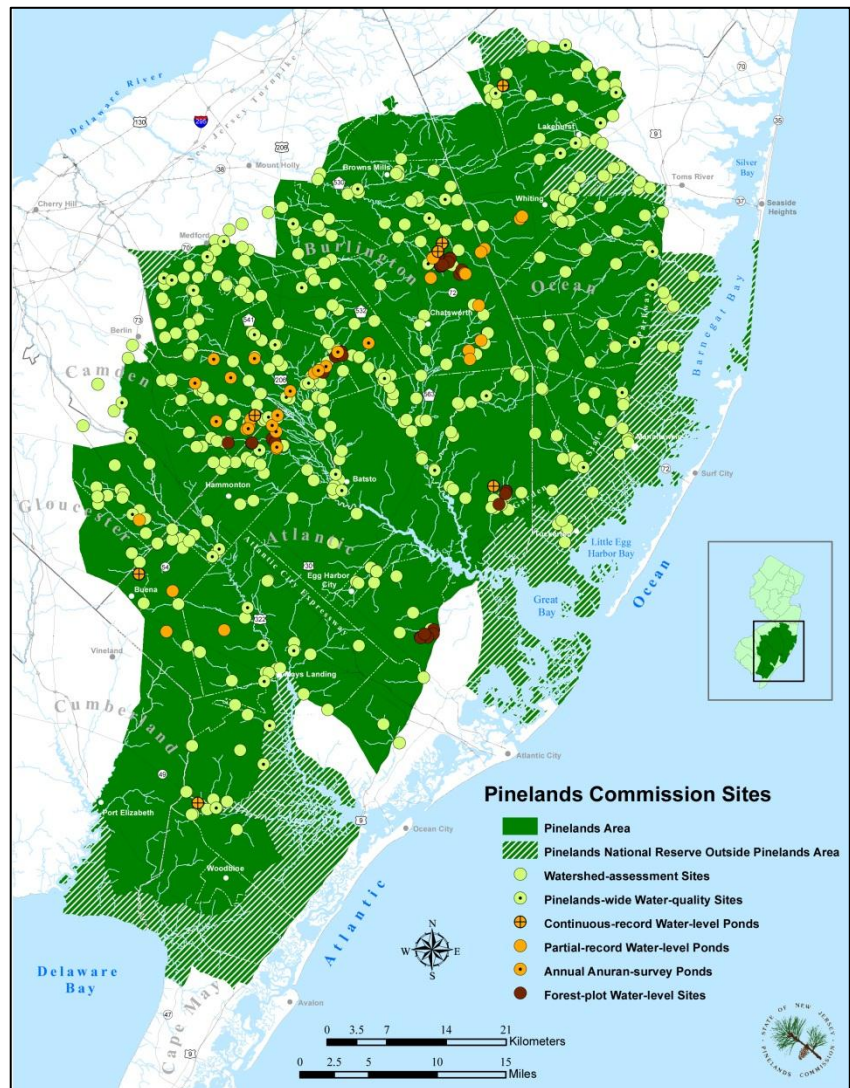


Figure 7.1: Location of watershed-assessment stream and impoundment sites, Pinelands-wide water-quality sites (all of which are also watershed-assessment sites), partial-record and continuous-record water-level monitoring ponds, annual anuran-survey ponds (some of which are also partial-record and continuous-record water-level monitoring ponds), and forest-plot water-level monitoring sites in the Pinelands National Reserve.

Policy Implications. Information obtained through the watershed assessments has been used for several Commission projects. The assessment data and other natural-resource data were compiled to demonstrate that the Oyster Creek watershed and portions of the Waretown Creek watershed displayed the essential character of the Pinelands environment (Zampella and others 2004). These findings led to the re-zoning of the Oyster Creek watershed and portions of the Waretown Creek watershed to a more protective management-area designation.

The connection between land use, water quality, and aquatic and wetland plant and animal assemblages established through the watershed assessments was also incorporated into the Commission Ecological-integrity Assessment (please see the Ecological-integrity Assessment section below on page 143). Information from the watershed assessments was also used to develop two sub-regional resource-protection plans: the Medford-Evesham Plan (Pinelands Commission 2006) and the Toms River Corridor Plan (Pinelands Commission 2004). In these plans, some management areas designated for growth were reduced in size, sending and receiving areas were established to better direct development, and landscapes of high ecological integrity were slated for less development or targeted for acquisition. (Please see Chapter 1 for more information on the Oyster Creek re-zoning and the two resource-protection plans.)

Because the survey sites are distributed throughout the Pinelands Area, the New Jersey Department of Environmental Protection (NJDEP) has used Commission watershed-assessment data to evaluate Pinelands stream conditions as part of their biennial state-wide Integrated Water Quality Monitoring and Assessment Reports. In 2011, the Science Office became a state certified laboratory for pH, specific conductance, dissolved oxygen, and temperature, which was a requirement by the NJDEP for using Commission water-quality data for their assessment reports.

Landscape Assessment

Landscape changes in the Mullica River Basin of the New Jersey Pinelands, USA (Bunnell and others 2003). As part of the initial Mullica River Watershed assessment, an NPS-funded analysis of landscape changes was completed in the basin using detailed land-cover maps that were drawn from 1979 and 1991 aerial photographs. Changes in landscape composition and structure were quantified between the two periods, and the relationship between land-cover changes and Commission management-area

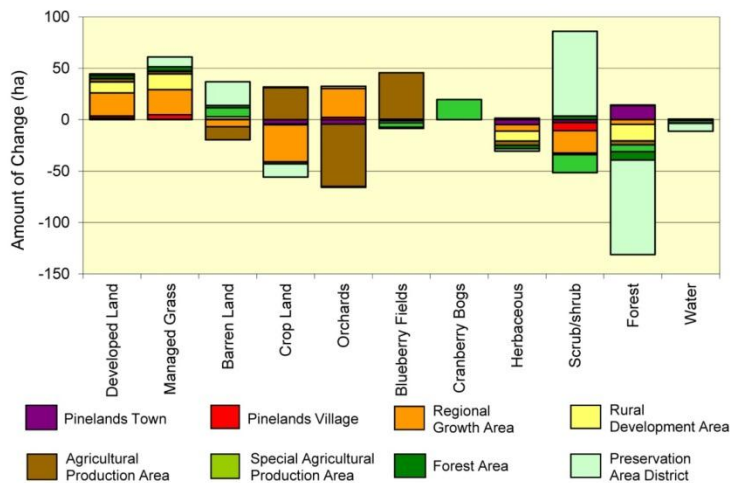


Figure 7.2: Changes in land-cover area by Pinelands Management Area between 1979 and 1991 in 72 photoplots in the Mullica River Watershed.

designations was determined. The results of this study showed that, although the landscape composition was similar in both years, there was an increase in the total area and number of development-related patches. An increase in the number of patches and a decrease in the total area and patch size for forest land indicated that fragmentation of forest land also occurred during the study period. The major land-cover changes that occurred during the period were the loss of forest land to development-related cover types and the conversion of one agricultural type to another. Overall, the land-cover changes were found to be consistent with the Commission management-area designations (Figure 7.2).

Policy Implications. Although development-related cover types increased and fragmentation of forest land occurred during the study period, the agreement between these and other land-cover changes and the Commission management areas demonstrated that the regional-planning effort has been successful in directing human activities to appropriate areas of the watershed.

Water Quality

Relationship of land-use/land-cover patterns and surface-water quality in the Mullica River Basin (Zampella and others 2007a). Results of this study (which used data from an EPA-funded project, Zampella and others 2002) demonstrated that pH, specific conductance, calcium, magnesium, chloride, sulfate, and nitrogen increased with increasing amounts of developed land and upland agriculture in the watersheds of 25 Mullica River stream sites (Figure 7.3). Statistical models that included both developed land and upland agriculture best described the relationship between land use and water quality, and this relationship did not improve when including the proximity of the land use to the water-quality sampling site. A value of 10% combined developed land and upland agriculture in a watershed was identified as the threshold at which a significant deviation from Pinelands reference-site water-quality conditions occurred. Reference sites are sites minimally impacted by human activities and can be used to assess the integrity of other sites.

Policy Implications. Land-use-water-quality relationships from this and similar studies were used in the development of the Medford-Evesham Plan (Pinelands Commission 2006) and the Toms River Corridor Plan (Pinelands Commission 2004), which are summarized on page 131 in the Watershed Assessment section above. The 10% threshold concept was applied specifically to protect the Black Run Watershed in the Medford-Evesham Plan.

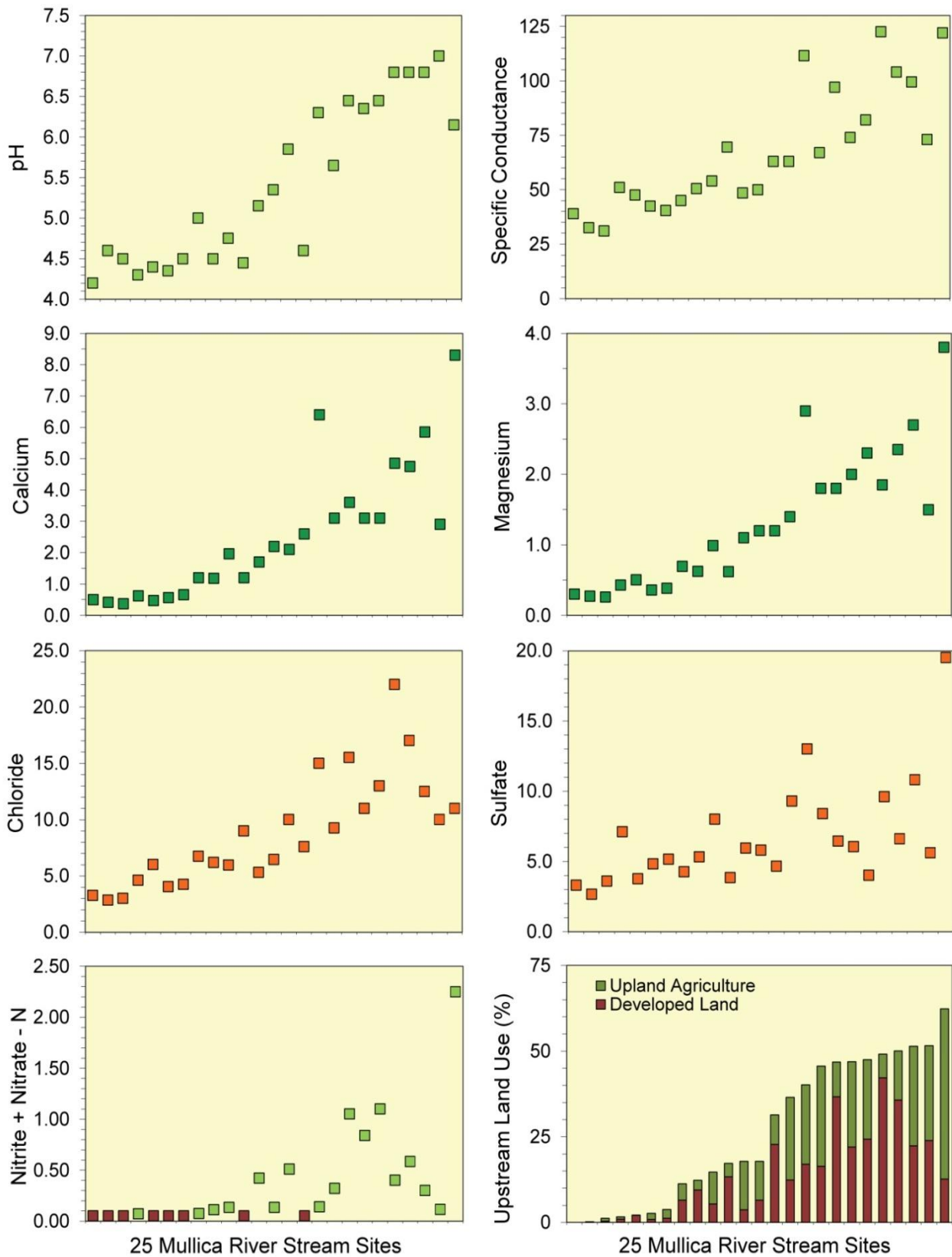


Figure 7.3: Water-quality characteristics for 25 Mullica River stream sites ordered by increasing percentage of watershed land use. Water-quality values are medians. Eight nitrite + nitrate-N values were below the 0.05 mg/l detection limit and are shown as dark squares. All values except pH and specific conductance ($\mu\text{S}/\text{cm}$) are in mg/l.

Aquatic and Wetland Assemblages

Preserving characteristic Pinelands water-quality conditions is essential for maintaining the ecological integrity of aquatic and wetland plant and animal communities in the region. This highlights the importance of understanding the link between land use, water quality, and aquatic and wetland community composition. Since 2002, Commission scientists completed the following five NPS-funded studies in which aquatic and wetland assemblages were evaluated at sites that differed with respect to land use or habitat type.

Functional equivalency of natural and excavated coastal plain ponds (Zampella and Laidig 2003). In this study, the functional equivalency of natural and created wetlands was assessed by comparing hydrologic, water-quality, and vegetation functions of four excavated ponds that were well-established and greater than 50 years old to nine natural Pinelands ponds. Hydrologic functions were similar between natural and excavated ponds, but water-quality and vegetation functions differed between pond types. Excavated ponds displayed higher pH values, lower specific conductance values, and lower total organic carbon concentrations. The total number of plant species and the number of herbaceous-plant species was higher in excavated ponds, and vegetation zonation typical of natural ponds was absent in excavated ponds due to steeper shoreline slopes. However, plant assemblages at both pond types were composed only of native Pinelands species, thus preserving regional diversity.

Policy Implications. To mimic natural ponds, created ponds should be constructed with shallow shoreline slopes that are comparable to natural ponds to encourage plant zonation typically found in natural ponds. Because the transitional-upland location of the excavated ponds is a likely setting for a mitigation wetland, excavated ponds may exhibit water-quality conditions that are different from natural ponds, especially if located in landscapes with extensive developed and upland agricultural lands.

Using multiple indicators to evaluate the ecological integrity of a coastal plain stream system (Zampella and others 2006b). For this study, pH, specific conductance, stream-vegetation, stream-fish, impoundment-fish, and impoundment-anuran data collected at 88 Mullica River sites were used to assess the ecological integrity of Pinelands waters. Combined watershed-wide developed land and upland agriculture was related to increases in pH and specific conductance, and all three environmental variables were correlated with the composition of stream-vegetation, stream-fish, impoundment-fish, and impoundment-anuran assemblages (Figure 7.4). The utility of individual and multiple environmental and biological indicators was compared and a relatively straightforward method for ranking sites was developed. With the exception of impoundment fish, the relationship between land use and the multiple-indicator scores composed of both water-quality indicators and all four biological indicators was stronger than that shown by any of the individual indicators.

Policy Implications.

Although individual environmental and biological indicators are useful for assessing the effects of land use on stream integrity, a multiple-indicator approach is best for ranking the ecological integrity of Pinelands waters. A similar multiple-indicator approach was applied to rank survey sites for the Rancocas Creek and Barnegat Bay watershed assessments.

Composition and diversity patterns in metazoan parasite communities and anthropogenic disturbance in stream ecosystems (Hernandez and others 2006).

This study was a collaborative effort with a Rutgers University graduate student who identified fish parasites from the Commission fish-specimen collection obtained during the watershed-assessment surveys. The composition and diversity of fish-parasite communities was compared between six Pinelands streams that differed with respect to land use. Parasite diversity was found to be greater in streams that drained upland agriculture and developed land compared to streams that drained forest land.

Policy Implications. This work represented the first attempt to describe the fish-parasite communities in the Pinelands and showed that differences in parasite assemblages were related to land use.

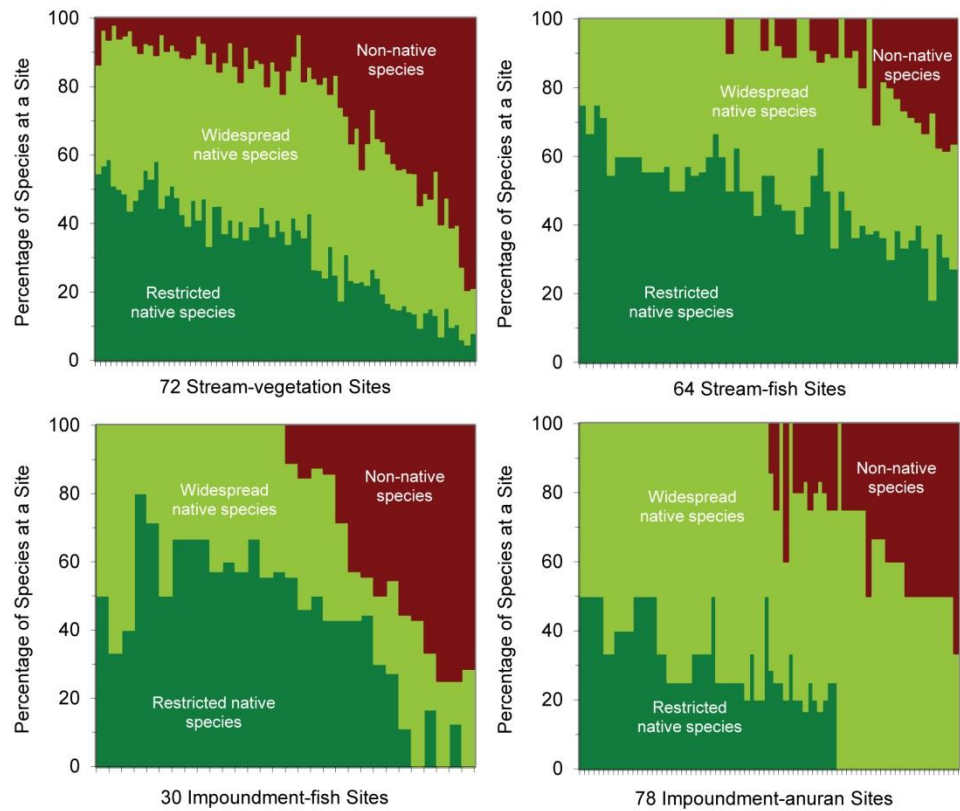


Figure 7.4: Percentage of native and non-native species found at Mullica River stream and impoundment sites. Restricted-native species are species whose distribution is generally limited to the Pinelands, wide-ranging-native species are native to both the Pinelands and other areas of New Jersey, and non-native species are native to regions outside the Pinelands. Sites on the left side of each diagram are high-quality Pinelands sites that support mostly native species, whereas those on the right side of each diagram are heavily impacted by developed land and upland agriculture and support a mix of native and non-native species.

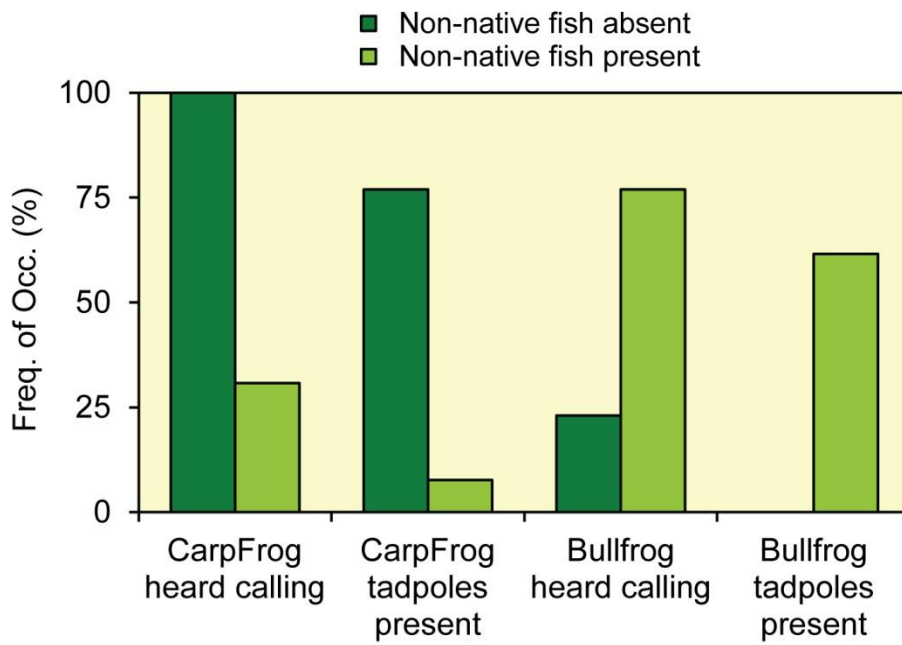


Figure 7.5: Frequency of occurrence of native carpenter frog and non-native bullfrog adults and tadpoles at impoundments with and without non-native fish.

Native fish and anuran assemblages differ between impoundments with and without non-native centrarchids and Bullfrogs (Bunnell and Zampella 2008).

Mullica River watershed-assessment data were used to compare native fish and anuran assemblages between 13 impoundments with and 13 impoundments without non-native fishes.

Impoundments with non-native fish displayed elevated pH and specific conductance values and had greater percentages of

upstream developed land and upland agriculture. Three non-native frog species, including bullfrogs, were associated with degraded impoundments that supported non-native fish (Figure 7.5). The results demonstrated that watershed conditions and native fish and anuran assemblages differed between impoundments with and without non-native fishes, and suggested that some native fish and anuran species may be especially vulnerable to impacts from land-use-related watershed disturbance and non-native species.

Policy Implications. Because the findings supported the idea that the environmental resistance associated with intact Pinelands water-quality conditions (e.g., very low pH) may help prevent the invasion of non-native fish and anurans, it was recommended in the paper that land-use activities that degrade water quality and reduce invasion resistance be avoided in unaltered watersheds to conserve native-fish and native-anuran community integrity.

Aquatic degradation in shallow Coastal Plain lakes: gradients or thresholds? (Zampella and others 2010). In this study, 30 Pinelands stream impoundments were surveyed to determine whether or not the presence of non-native herbaceous-plant, woody-plant, fish, and anuran species were associated with land-use gradients (i.e., an incremental effect of land use on species composition) or specific land-use thresholds (i.e., some level above which land use has an obvious effect on species composition). The combined percentage of upland agriculture and developed land was related to increasing pH, specific conductance, and the amount of impervious surface in a watershed (Figure 7.6). The number of non-native species and the proportion of all species that were non-native increased with the percentage of developed land and upland agriculture in the watershed, but the various measures of non-native species exhibited gradient responses to land use rather than specific threshold responses to land use.

Policy Implications. In contrast to the water-quality study described previously where 10% developed and upland-agricultural land was identified as the threshold at which a significant deviation from reference water-quality conditions occurred, no obvious land-use degradation threshold was revealed in this impoundment study. Instead, degradation of stream impoundments was shown to occur along a gradient of increasing land-use impacts.

Cranberry Agriculture Study

During the watershed assessments described previously, some Pinelands stream sites with active and abandoned cranberry agriculture were considered high quality because the sites were in largely forested watersheds, displayed characteristic water-quality conditions, and supported native-Pinelands aquatic and wetland assemblages. To obtain a better understanding of the potential differences among cranberry and forest streams, Commission scientists conducted an EPA-funded study to compare stream-drainage patterns, wetland-landscape structure, streamflow regimes, diatoms, stream vegetation, macroinvertebrates, and fish in streams that drained active-cranberry farms, abandoned-cranberry bogs, and forest land (Zampella and others 2006c). The following six studies resulted from this work.

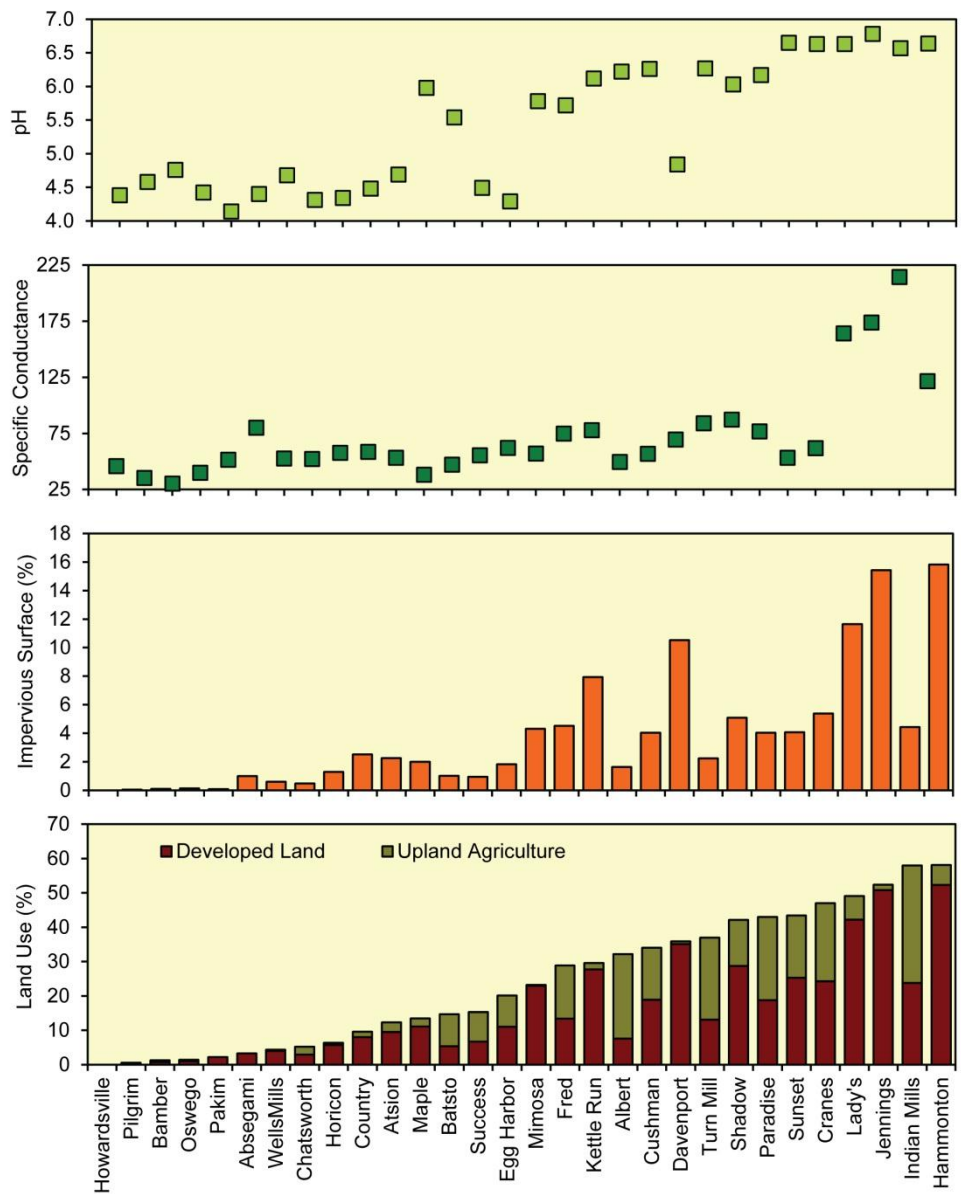


Figure 7.6: Trends in pH, specific conductance, and impervious-surface cover with increasing watershed land-use for 30 Pinelands impoundments.

Stream and wetland landscape patterns in watersheds with different cranberry agriculture histories, southern New Jersey, USA (Procopio and Bunnell 2008). The results of the stream-pattern analysis indicated that a greater number, density, median length, and total length of ditches were observed in cranberry and abandoned-bog basins compared to forest basins, but drainage density and sinuosity

(curviness) of the remaining non-ditched stream segments did not differ between the three stream types. Excluding areas of active-cranberry bogs where the native vegetation was removed, there was no difference in the relative number, size, shape, and composition of the remaining vegetation-cover types between the three stream types. The exact type and extent of vegetation removed to establish bogs in the active and abandoned basins are not known, but based on soil type and vegetation class associations, it was estimated that the largest losses were of pitch pine lowlands and cedar swamps.

Hydrologic and morphologic variability in streams with different cranberry agriculture histories

(Procopio 2010). No significant differences were found between the three stream types for low-flow, median-flow, and bankfull stream discharge; two measures of streamflow variability; stream-bank slope; and stream-bankfull width, depth, width-to-depth ratio, and area. Although forest streams displayed a lower frequency of over-bank flooding than active-cranberry and abandoned-bog streams, these results were also not significant (Figure 7.7).

Macroinvertebrate assemblages in blackwater streams draining forest land and active and abandoned cranberry bogs (Zampella and others 2008a).

Macroinvertebrate (e.g., aquatic insects, crayfish, clams, snails, worms, etc.) composition differed between the active-cranberry streams and the other two stream types and was associated with a complex environmental gradient represented by variations in dissolved oxygen, temperature, specific conductance, stream width, and woody debris. The relationship between reduced tree-canopy cover and both lower woody-debris cover and higher stream temperatures, which can influence dissolved-oxygen levels, was most likely related to forest-canopy removal associated with historic- and active-cranberry agriculture.

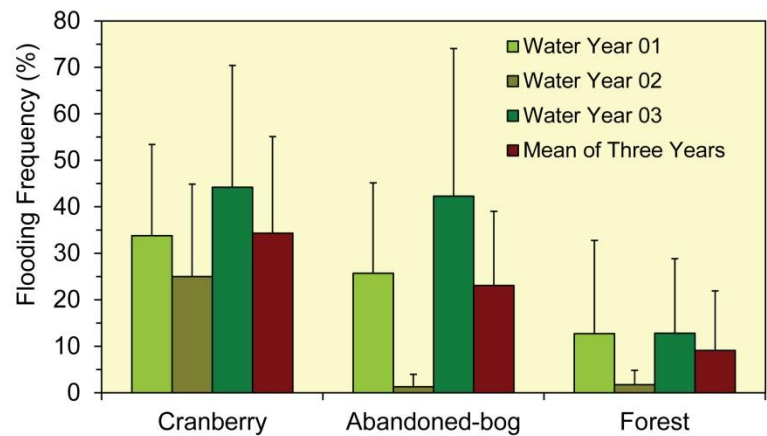


Figure 7.7: Average flooding frequency (± 1 standard deviation) for each water year and for the mean of the three years for active-cranberry, abandoned-bog, and forest sites.

Distribution of diatoms in relation to land use and pH in blackwater Coastal Plain streams (Zampella and others 2007b).

Unlike the other cranberry studies, the diatom study also included stream sites that drained developed/upland agricultural land. Although neither the number of diatom species nor the number of diatom genera (next level up from species) differed between stream types, clear diatom-community patterns were evident. The greatest difference in species composition existed between the developed/agricultural sites and the active-cranberry, abandoned-bog, and forest sites; whereas more subtle differences were observed between the active-cranberry sites and the abandoned-bog and forest sites.

Vegetation in Pinelands streams draining active-cranberry bogs, abandoned-cranberry bogs, and forest land (Laidig 2006).

No difference in the number of channel and bank plant species or cover was

found between the three stream types, but analysis of channel and bank plant presence-absence data revealed differences among the stream types that appeared to be related to variations in tree-canopy type among stream types. Whether canopy type was determined by land use is not known. Although most species found in this study were native-Pinelands plants, two species, which are considered indicators of land-use-related watershed disturbance, were each found at a single active-cranberry site.

Fish assemblages in Pinelands streams draining active-cranberry bogs, abandoned-cranberry bogs, and forest land (Bunnell 2006).

Although no difference in the number of fish species was found among the three stream types and fish-assemblage composition was not related to land

use, cranberry and abandoned-bog streams generally supported greater fish abundance (total number of all fish collected) and biomass (represented by the weight of the six target species) compared to forest streams (Figure 7.8). This was primarily due to the higher abundance of banded sunfish and eastern mudminnows in cranberry and abandoned-bog streams. Non-native fish were absent from the three stream types.

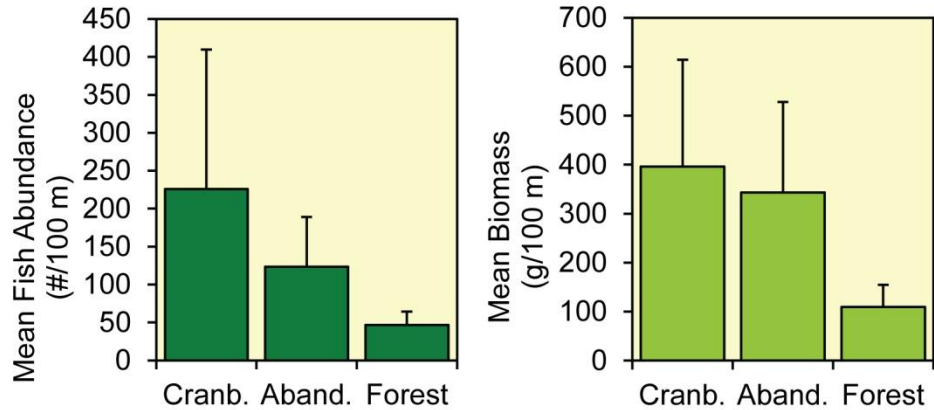


Figure 7.8: Average (± 1 standard deviation) fish abundance and biomass (weight of six target species) per 100-m of stream length for active-cranberry, abandoned-bog, and forest sites.

Policy Implications. Although differences in some of the parameters studied were observed between active-cranberry, abandoned-bog, and forest streams, this study and other Commission research shows that streams that drain active and abandoned-bogs support characteristic Pinelands acid-water communities and are more similar to forest streams than streams that drain development and upland agriculture.

Kirkwood-Cohansey Project

New Jersey Public Law 2001, Chapter 165 directed the Pinelands Commission to assess and prepare a report on the key hydrologic and ecological information needed to determine how the current and future water-supply needs within the Pinelands area may be met while protecting the Kirkwood-Cohansey aquifer system and avoiding any adverse ecological impact on the Pinelands area. The legislation appropriated \$5,500,000 from the Water Supply Fund for the preparation of the assessment by the Pinelands Commission, which was to be implemented in cooperation with the NJDEP, Rutgers University, the U. S. Fish and Wildlife Service (USFWS), and the USGS.

Scientists from the cooperating agencies and institutions completed a work plan for the Kirkwood-Cohansey Project that underwent peer review (Pinelands Commission 2003). The work plan, which was approved by the Commission in October 2003, addressed two major research questions. First, what are the probable hydrologic effects of groundwater diversions from the Kirkwood-Cohansey aquifer on stream flows and wetland water levels? Second, what are the probable ecological effects of induced stream-flow and groundwater-level changes on aquatic and wetland communities?

The component studies from all cooperators have been completed. The five studies completed by Commission scientists are briefly summarized below.

Hydrologic regimes associated with *Helonias bullata* (swamp pink) and the potential impact of simulated water-level reductions (Laidig and others 2009). Swamp pink is a federally endangered perennial-herbaceous-plant species. Site hydrology, substrate, topography, tree-canopy cover, and hydrology associated with 958 swamp pink clusters from two colonies located along small streams in the Pinelands were characterized and the potential impact of simulated water-level reductions on the species and its habitat were assessed.

Simulating the effect of groundwater withdrawals on intermittent-pond vegetation communities (Laidig 2012).

Pond hydrology was monitored and pond bathymetry (pond basin shape) and vegetation patches were mapped in 15 Pinelands ponds. Five dominant vegetation-patch types occurred at the ponds, including aquatic-herbaceous, wetland-herbaceous, Walter’s sedge, leatherleaf, and high-bush blueberry. Ground water withdrawals were simulated by reducing pond-water depth and the resulting changes in vegetation were estimated (Figure 7.9).

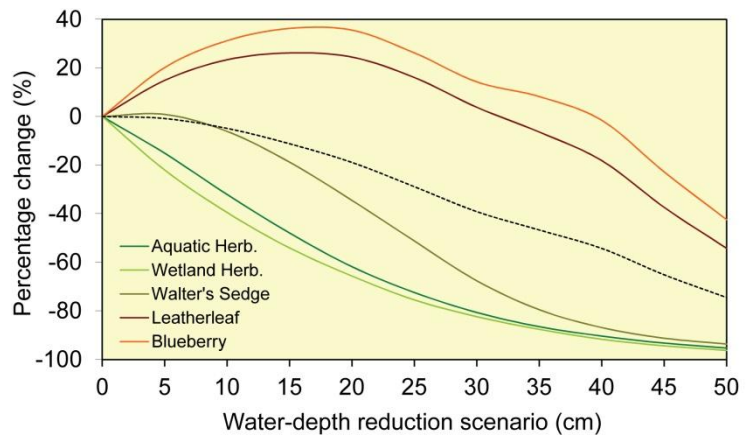


Figure 7.9: Estimated change in area of five vegetation-patch types under various simulated water-depth reduction scenarios. The dashed line represents the percentage reduction in all pond-vegetation types combined.

Development of vegetation models to predict the potential effect of groundwater withdrawals on forested wetlands (Laidig and others 2010). Woody and herbaceous vegetation, soil characteristics, and groundwater levels were characterized in 201 plots located in forests classified as either upland pine oak, pitch pine lowland, pine-hardwood lowland, hardwood swamp, or cedar swamp. Groundwater levels in several of the forest plots, which were established in 1987, have been monitored regularly as part of the Commission long-term environmental-monitoring program. Vegetation models were developed that can be used to predict the potential effect of groundwater-level declines on the distribution of wetland-forest communities, individual wetland species, and wetland-indicator groups.

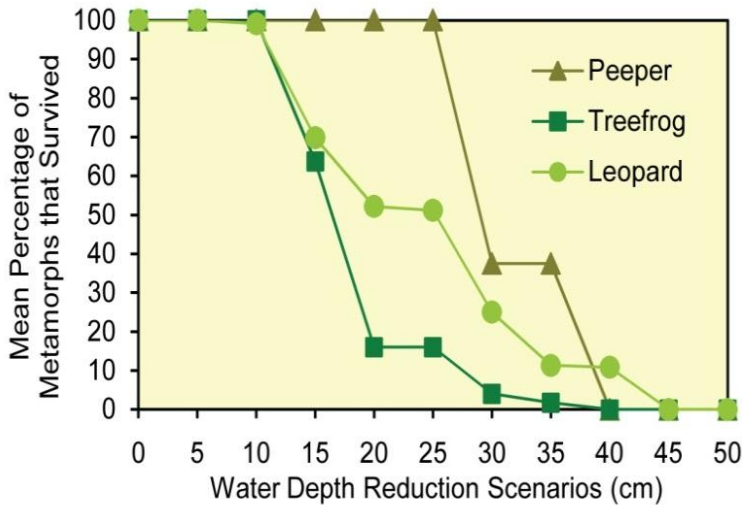


Figure 7.10: Metamorph survival estimated under various simulated water-depth reduction scenarios for the spring peeper, Pine Barrens treefrog, and southern leopard frog.

The potential impact of simulated groundwater withdrawals on the oviposition, larval development, and metamorphosis of pond-breeding frogs (Bunnell and Ciralo 2010). Pond hydrology and egg deposition, larval development, and metamorphosis for three frog species were tracked over a two-year period in three ponds. The three ponds have been part of the Commission long-term monitoring program since 1993 and were included in two other previously published studies (Bunnell and Zampella 1999, Zampella and Laidig 2003). The three frog species studied were the spring peeper, the

southern leopard frog, and the state threatened Pine Barrens treefrog. Simulated groundwater withdrawals were imposed on each pond and the potential impacts of withdrawals were estimated for the various life stages of the frogs. Simulation results for metamorphs (i.e., the life stage after a tadpole completes metamorphosis) are shown in Figure 7.10.

The effect of streamflow reductions on aquatic habitat availability and fish and macroinvertebrate assemblages in coastal plain streams (Procopio 2012). Reductions of 5, 10, 20 and 30 percent of average annual streamflow and the seven-day low-flow were simulated for 14 stream sites and the percentage reduction to average stream width, depth, area, volume, and velocity were estimated. Results for stream velocity are shown in Figure 7.11. Models derived from a separate fish and macroinvertebrate study were used to estimate assemblage responses based on simulated reductions in average annual streamflow.

Policy Implications. The results of these five Commission studies, and related studies completed by other project cooperators, can be used to estimate the potential impact of groundwater withdrawals on swamp pink, wetland-forest vegetation, intermittent-pond vegetation, frog development and metamorphosis, and streamflow and aquatic habitat,

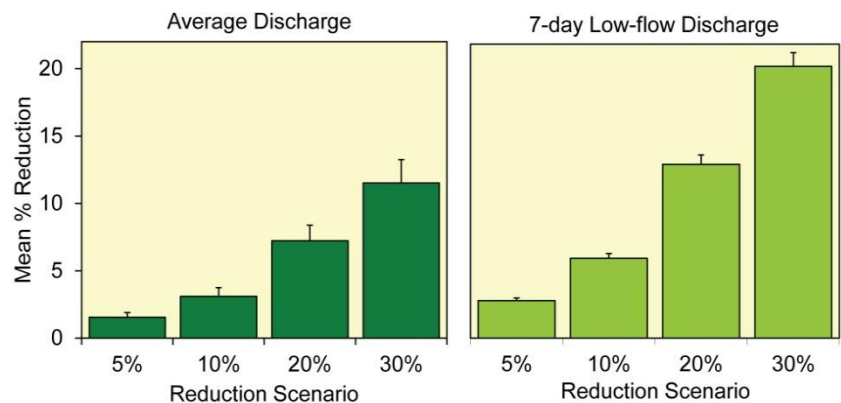


Figure 7.11: Estimated reduction in stream velocity for four simulated streamflow reduction scenarios of average and 7-day low-flow stream discharge.

which can provide the foundation for developing sound water-supply policies for the Kirkwood-Cohansey aquifer.

Sanctuary Development

Assessing timber rattlesnake movements near a residential development and locating new hibernacula in the New Jersey Pinelands (Laidig and Golden 2004). In 2004, Commission and NJDEP Endangered and Nongame Species Program (ENSP) scientists completed a three-year study partly funded by Main Line Realty Group in which they monitored the movements of timber rattlesnakes in the vicinity of a partially constructed residential development in Evesham Township called the Sanctuary. Using radio transmitters, five male and four female timber rattlesnakes were tracked for various time periods during the three-year study period. The location of each snake was recorded using a global positioning system every other day until it reentered a wintering den, or hibernaculum, in the fall. A major focus of the study was to assess the effectiveness of a 2.7-km fence and culvert system intended to direct timber rattlesnakes away from the development and toward forested areas.

Results of the study showed that rattlesnakes used extensive areas of forested uplands and wetlands within a 1,500-ha area in and around the Sanctuary development (Figure 7.12). Core activity areas for

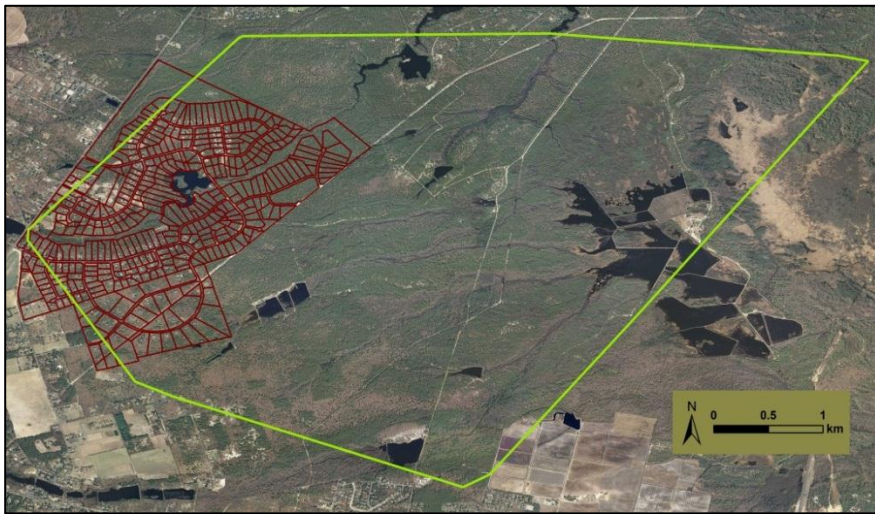


Figure 7.12: Overall activity range (green line) for nine timber rattlesnakes during 2001-2003 in the vicinity of the Sanctuary development, Evesham Township, Burlington County.

several timber rattlesnakes, including a rookery used by gravid (pregnant) snakes, were located on portions of the Sanctuary that may be developed in the future. The fences did not prevent any of the transmitter-equipped timber rattlesnakes from entering constructed portions of the development. Two timber rattlesnakes used culverts to move beneath a sand road within the development to forested lands east of the development.

Policy Implications. Although this study represents the first documented use of culverts by timber rattlesnakes to travel beneath a roadway, for several reasons the fencing and culvert system was inadequate to successfully direct the snakes away from development and toward forested areas.

Ecological-integrity Assessment

Although the CMP was based on an ecosystem approach to protecting natural resources, implementation of the CMP over the past three decades has involved more local and site-specific approaches. The broader goal of ensuring the long-term preservation of a unique ecosystem was sometimes overshadowed by single issues. In 2005, the Commission focused on the big picture again by evaluating the current ecological status of the Pinelands Area and the ecosystem it represents. The resulting PCF-funded ecological-integrity assessment is an adaptive GIS-based tool developed to evaluate the landscape, aquatic, wetland-drainage, and composite ecological integrity of all Pinelands habitat for any time period in which appropriate land-use data are available. The links between land use, water quality, and aquatic and wetland assemblages revealed through the watershed assessments and long-term environmental-monitoring program were incorporated into the integrity assessment.

An ecological-integrity assessment of the New Jersey Pinelands: A comprehensive assessment of the landscape, aquatic, and wetlands systems of the region (Zampella and others 2008b). Results of the assessment indicated that Pinelands habitat and non-habitat covered 82% and 18% of the Pinelands Area, respectively. Fifty-one percent of the Pinelands Area fell within the highest ecological-integrity class. Pinelands Towns, Agricultural Production Areas, and Regional Growth Areas displayed the lowest overall ecological integrity, whereas the Preservation Area District, Special Agricultural Production Areas, and Forest Areas displayed the highest ecological integrity (Figure 7.13). Almost all of the highest ecological-integrity class and about 40% of the second-highest class were composed of contiguous habitat patches greater than 1,000 acres in size.

The NJDEP Office of Natural Lands Management priority sites represent important areas of biological diversity, especially with respect to rare plants and ecological communities, and are categorized as either standard sites or macrosites. Standard sites are usually smaller in size than macrosites and can be found within the boundaries of a macrosite. Eighty-nine percent of the area designated as macrosites and 82% of the area designated as standard sites fell within the highest ecological-integrity class. Similar results were found for rare animal data provided by the NJDEP Endangered and Nongame Species Program. With the exception of the red-headed woodpecker and red-shouldered hawk, the majority of rare-animal records fell within the two highest ecological-integrity classes.

Policy Implications. The Ecological Integrity Assessment can be used to better ensure that important Pinelands natural areas are protected, including those that provide habitat for threatened and endangered plant and animal populations. The assessment can be used to evaluate current Pinelands management-area and zoning designations, identify areas best suited for clustering development, provide a regional basis for reviewing individual development projects, develop habitat-conservation plans, identify important areas for acquisition, prepare cumulative-watershed-impact assessments, and assess wetland integrity throughout the Pinelands. The Pinelands-wide wetland-integrity assessment could be used in lieu of the current wetland-buffer model to determine the distance to buffer wetlands from development.

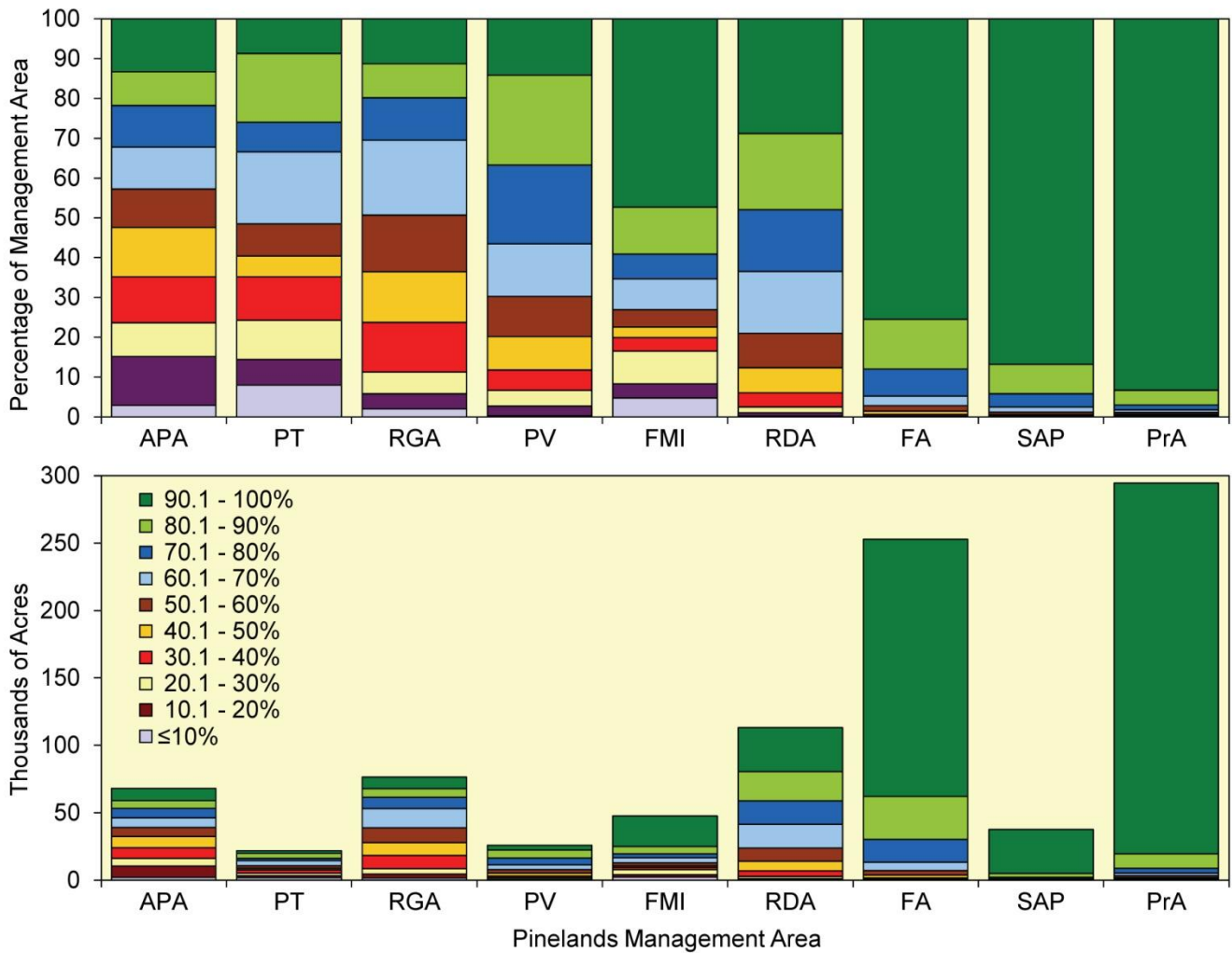


Figure 7.13: Ecological-integrity-class composition of Pinelands habitat and the acres of Pinelands habitat and non-habitat in each class in each Pinelands Management Area. PT = Pinelands Town, APA = Agricultural Production Area, RGA = Regional Growth Area, PV = Pinelands Village, RDA = Rural Development Area, FMI = Federal and Military Installation Area, FA = Forest Area, SAP = Special Agricultural Production Area, PrA = Preservation Area District.

Right-of-way Vegetation-management Plan

In 2006, Pinelands Commission and Rutgers University scientists collaborated to develop an ecologically based right-of-way maintenance plan in cooperation with representatives of the Board of Public Utilities, Public Service Electric and Gas, Jersey Central Power and Light, Atlantic City Electric, and the NJDEP ENSP. The goal of this PCF-funded project was to prepare a right-of-way maintenance plan that creates and maintains relatively stable and sustainable, early successional habitats that reflect characteristic Pinelands habitats, require minimal management, ensure transmission reliability and safety, and minimize the need for individual Pinelands permit reviews.

New Jersey Pinelands electric-transmission right-of-way vegetation-management plan (Lathrop and Bunnell 2009). The vegetation-management plan, which was completed in March 2009, included the methods for creating the GIS layer of electric-transmission lines in the region (Figure 7.14), a comparison of managed right-of-way and other early successional Pinelands habitats, a summary of vegetation-management strategies used by utility companies inside and outside the Pinelands, and a GIS layer of vegetation-management prescriptions for each of the 3,041 spans in the region. A rule to implement the plan was adopted by the Commission in December 2009 and the plan was implemented in 2010. A pilot program was established as part of the right-of-way rule adoption (please see Right-of-way Pilot Program in the Current Research and Monitoring Projects section on pages 148-149 for details on the pilot program).

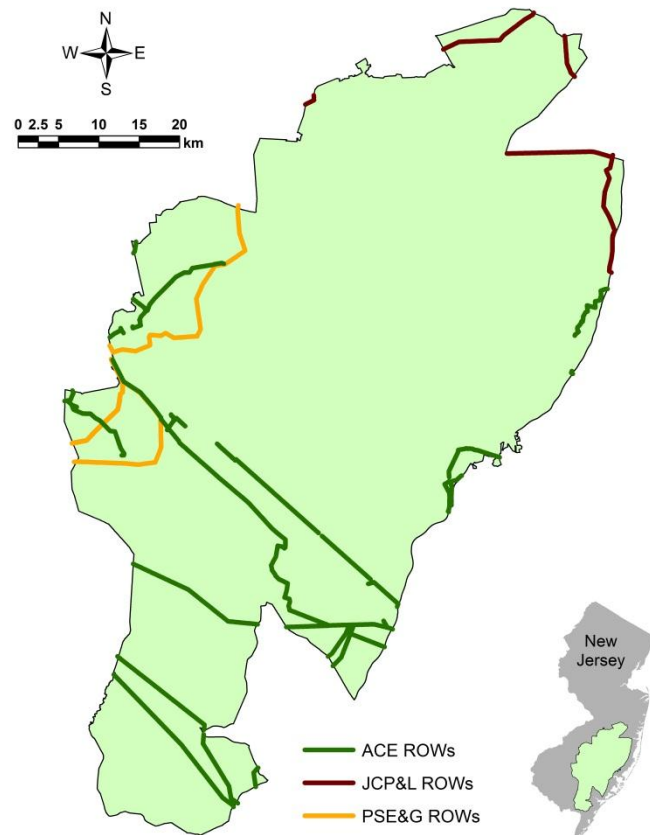


Figure 7.14: Major electric-transmission-line rights-of-way (ROWs) for Atlantic City Electric (ACE), Jersey Central Power and Light (JCP&L), and Public Service Electric and Gas (PSE&G) in the Pinelands Area.

Policy Implications. The plan is currently guiding vegetation management within the major electric-transmission line rights-of-way in the Pinelands.

Current Research and Monitoring Projects

Research and monitoring projects that are currently being implemented are described in this section. Some of the monitoring activities were initiated as early as the late 1980s and early 1990s, and measurements are still being collected today. Other projects were launched more recently and have not yet been completed.

Watershed Assessments

The first two rounds of surveys conducted in the Mullica River, Rancocas Creek, Great Egg Harbor River, and Barnegat Bay watersheds were designed primarily to address the first goal of the environmental-monitoring program of characterizing the effect of existing land use patterns on aquatic and wetland resources. Results of the first round of surveys are described on pages 129-130 (Studies Conducted Since July 2001: Watershed Assessments). In 2012, the water-quality, vegetation, fish, and

anuran data collected during the second round of watershed surveys was prepared for analysis. A report that describes the results of the second round of surveys will be initiated in 2014. Because the other goal of the environmental-monitoring program is to monitor long-term changes in aquatic and wetland resources, permanent stream and impoundment monitoring sites will be established in all four watersheds and a plan for future long-term monitoring of water-quality and vegetation, fish, and anuran assemblages will be developed.

Policy Implications. The establishment of permanent sites for long-term monitoring will provide a means to evaluate changes in water quality and plant and animal communities in the future.

Pinelands-wide Water-quality Monitoring

In 2005, a network of 47 stream sites was selected from the entire pool of sites monitored during the initial four watershed-assessment surveys (Figure 7.1). The 47 sites are distributed throughout the Pinelands, represent a range of pH and specific conductance values, and, with a few exceptions, have been monitored monthly during the growing season of each year since 2005, using NPS funding. Because the water-quality sampling associated with individual watershed surveys is completed on different years, this separate network, which is monitored each year, was designed for calibrating water-quality conditions to a single year for the comprehensive assessment of all four watersheds. A preliminary analysis completed using Pinelands-wide data is summarized below.

Technique to normalize water-quality data to a single time period and an evaluation of the efficacy of reduced water-quality sampling (Procopio 2011). The two objectives of this analysis were to determine if the monthly growing season sampling frequency could be reduced and if standardizing water-quality data collected in different watersheds during different years to a single time period was necessary. Results of the analysis demonstrated that standardizing water-quality data to a single time period would not be necessary and that sampling frequency could be reduced from monthly sampling from March through October to bimonthly sampling during that same period without sacrificing the ability to adequately summarize water-quality conditions at the sites.

Policy Implications. In 2011, sampling frequency was reduced from eight to four visits per year, which cut the time spent annually on this component of the monitoring program in half. The reduced sampling frequency will be maintained in future years. Another goal for the Pinelands-wide network of sites is to monitor long-term trends in pH and specific conductance throughout the region. In 2012 and early 2013, samples were collected from each site for the analysis of nitrogen and phosphorus to more fully describe water-quality conditions at these sites. Nutrient analyses were completed by the Rutgers University Division of Pinelands Research.

Intermittent-pond Water-level Monitoring

Funded primarily by the NPS, water levels have been monitored monthly in a group of 14 ponds since 1996 and in a group of 15 ponds since 2004 (Figure 7.1). Beginning in 2011, the pond water-level-

monitoring network was expanded to include a group of five ponds in the southern part of the Pinelands that were originally surveyed as part of the Wetland-buffer Study described below. Continuous water-level recorders were installed in a total of seven ponds, including one pond each in 2004, 2005, and 2010 and four ponds in 2012 (Figure 7.1).

Policy Implications. Ponds with continuous recorders can be used to estimate continuous hydrographs for ponds with only monthly measurements, which is one of the tasks to be completed as part of the Pond Vulnerability Study described below. The entire pond network allows for long-term monitoring of pond water levels throughout the Pinelands. Some of these ponds have also been used in a previous Commission hydrologic study that was described in the Aquatic and Wetland Assemblages section above (Zampella and Laidig 2003). The group of 15 ponds was used for the pond-vegetation study as part of the Kirkwood-Cohansey Project described above (Laidig 2010). The results of this study can be utilized for the development of a water-supply policy for the Kirkwood-Cohansey aquifer.

Annual Anuran Surveys

Since 1996, nighttime anuran-vocalization surveys have been conducted with NPS funding from March through June at the group of 14 ponds, along with six additional ponds (Figure 7.1). These 20 ponds were selected as long-term monitoring stations because they are located on the western side of the Mullica River watershed along the interface between forest land and developed/agricultural landscapes.



Commission scientists have conducted anuran-vocalization surveys at 20 ponds since 1996. Eighteen of those ponds serve as a breeding habitat for the Pine Barrens treefrog (above).

Photo/John Bunnell

Eleven frog species and one toad species have been heard calling from the 20 ponds, and 18 of the ponds serve as breeding habitat for the state-threatened Pine Barrens treefrog.

Policy Implications. Anuran-vocalization surveys can be useful for assessing long-term trends in which frog and toad species are heard calling at sites. Some of these ponds have also been used for other anuran projects, including a study of acid-water anuran assemblages (Bunnell and Zampella 1999) and the frog-development study completed as part of the Kirkwood-Cohansey Project described above (Bunnell and Ciraolo 2010). As with the Kirkwood-

Cohansey pond-vegetation study, the frog-development study can be used to create a water-supply policy for the Kirkwood-Cohansey aquifer.

Forest-plot Water-level Monitoring

Using NPS funding, water levels are monitored monthly in shallow-observation wells in 35 forest plots that represent an upland-to-wetland gradient characterized as upland pine-oak, pitch pine lowland, pine-hardwood lowland, hardwood swamp, or cedar swamp (Figure 7.1). Five of the forest plots represent long-term reference sites and, with the exception of one year, have been monitored continuously since 1987. Water levels at the remaining 30 forest plots have been monitored since 2004.

Policy Implications. Based on the results of an earlier study (Zampella and others 1992), the 35 forest plots were part of a pool of 201 forest plots that were recently used to develop vegetation models for the Kirkwood-Cohansey Project (Laidig and others 2010). The forest-vegetation models can be used to predict the potential effect of groundwater withdrawals on the distribution of wetland-forest communities, individual wetland species, and wetland-indicator groups. Similar to the results of the pond-vegetation and frog-development studies, results from the wetland-forest study can also be utilized for the development of water-supply policy. This network of sites can also be used to assess long-term changes in water levels associated with these forest communities.

Streamflow Monitoring

The Commission and the USGS continued to implement two cooperative stream-gaging programs. The Camden County Municipal Utilities Authority funded project is designed to determine whether wastewater transfers from the southern Camden County area are affecting stream discharge in portions of the Mullica River watershed. An initial trend analysis of streams in the study area revealed no changes in streamflow during the 1991-1998 period. Commission scientists completed a second trend analysis for the 1991 through 2002 period, which resulted in ambiguous findings (Procopio 2003). Subsequent analyses were completed annually from 2005 through 2011 and all resulted in no significant detectable impacts of water withdrawals on streamflows. With funding from the Monroe Municipal Utilities Authority, the Commission and the USGS are also conducting a similar stream-gaging project at five stream stations in the Upper Great Egg Harbor River watershed. Streamflow trend analyses completed annually from 2005 through 2011 have also resulted in no significant detectable impacts of water withdrawals on streamflows.

Policy Implications. These two projects provide a direct measure of the impact of water withdrawals on streamflow, which can help the Land-use and Planning Office assess the potential effect of exporting water from one watershed to another. USGS is currently evaluating the streamflow-monitoring program to determine if changes should be made to the sampling or analysis methods.

Right-of-way Pilot Program

The Right-of-way Pilot Program, which is funded by Public Service Electric and Gas, Jersey Central Power and Light, and Atlantic City Electric, was established as part of the rule adopted in 2009 for implementing the Right-of-way Vegetation-management Plan. The goals of the pilot program are to

determine if the: 1) vegetation-management prescriptions have been implemented in a reliable and predictable way, 2) vegetation-management prescriptions have resulted in relatively stable and sustainable early successional habitats that are characteristic of the Pinelands and which provide habitat for native Pinelands plants and animals, including threatened and endangered species, 3) vegetation-management prescriptions contributed to the reliability and safety of the electric-transmission system in the Pinelands by creating and maintaining low-growth vegetation communities, and 4) notification and inspection system authorized in the pilot program has simplified Pinelands permitting procedures for the utility companies and Commission staff.

Because the Science Office is responsible for addressing the second question, staff scientists selected four replicate spans in each of six different vegetation type/vegetation-management prescription combinations. In all 24 spans, two plots were established to monitor long-term changes in the managed vegetation. To determine what the right-of-way plot vegetation may have been like prior to being managed and if the right-of-way plot vegetation is native to that region of the Pinelands, two vegetation plots were also sampled in the forest areas adjacent to the right-of-way study spans. Although the forest plots were only surveyed once, the right-of-way vegetation plots will be monitored annually through the end of the pilot program in 2019.



In 2009, the Commission established a pilot program to evaluate a plan for managing vegetation in electric-transmission line rights-of-way, such as the one above. Photo/John Bunnell

Policy Implications. Evaluation of the pilot program in 2019 will determine how future vegetation management occurs in electric-transmission line rights-of-way in the Pinelands.

Forest-characterization Project

Although wetland-forest communities have been studied for a variety of reasons, such as to track changes in landscape patches through time (Zampella and Lathrop 1997), describe forest stand characteristics (Zampella and others 1999), and explore the link between watershed degradation and plant invasion (Laidig and Zampella 1999), there has been no coordinated effort to fully describe the landscape-level and stand-level characteristics of both upland and wetland forests across the Pinelands. Therefore, the Commission initiated the PFC-funded Forest Characterization Project. In 2008, the Commission Science Committee provided support for the project, which was scheduled to begin in late 2009. In 2010, a representative sample of upland and wetland forest polygons was selected from the 2007 NJDEP land-use data set. Unfortunately, due to a reduction in Science Office staff in 2010, the

project was delayed. In 2012, the representative sample of polygons was re-sampled because the NJDEP released a new land-use data set for 2010 conditions. However, the project was delayed a second time when Science Office staff was re-directed to work on other projects. The project will continue when staff resources allow.

Policy Implications. Results from this project can be used to refine the current broad NJDEP forest categories, assess tree densities for various forest types, characterize the spatial distribution of forest types, evaluate forestry proposals and large-scale thinning for firebreaks, and, because the study can be repeated in the future, determine how Pinelands forests might be changing over time.

Wetland-buffer Study

In 2008, the Commission received an EPA grant to quantify the relationship between the proximity of developed lands and the ecological integrity of forested wetlands and frog-breeding ponds. In 2009 and 2010, 52 breeding ponds were surveyed, water quality was sampled in 42 of the ponds, and the month that each of the 42 ponds dried was recorded. In 2010, vegetation surveys were completed at 37 wetland-forest study sites and vegetation-survey transect locations were recorded with a global-positioning system. Progress on the project stopped due to the loss of Science staff and the time spent subsequently working to obtain two new EPA grants, which were necessary for re-building the Science staff. The project will continue in 2014.

Policy Implications. Although research conducted by Commission scientists and others has demonstrated that watershed-wide land uses can significantly affect Pinelands stream chemistry and aquatic communities, the impact of adjacent development on Pinelands wetlands and the buffer distance needed to protect wetland integrity has not been well documented. This project should contribute to our understanding of the distance needed to protect the ecological integrity of wetlands from upland development.

Pond-vulnerability Study

In 2011, the Commission received a grant from the EPA to evaluate the vulnerability of natural Pinelands ponds to the impacts of land use. The study was initiated in 2012. All Pinelands ponds that contain open-water or herbaceous-vegetation communities will be identified, the boundary of the pond will be delineated, and a land-use profile for the area surrounding each pond will be determined. Ponds will be visited to distinguish natural and artificial ponds, measure pond-vegetation structure, and record the occurrence of off-road vehicle activity and other stressors in or adjacent to the pond. Water-quality and hydrologic monitoring and vegetation, anuran, and odonate (dragonfly and damselfly) surveys will be completed for



In 2012, the Commission launched a study to evaluate the vulnerability of natural ponds, such as the one above, to the impacts of land use.

Photo/John Bunnell

100 ponds that represent the range of pond sizes, vegetation structure, and land-use conditions from reference to degraded ponds. Models linking land use to water-quality, hydrologic, and biological indicator-based metrics will be developed that can be used to predict the integrity of the other un-surveyed ponds in the region.

Policy Implications. Results of this study can be used by the Commission to prioritize ponds for increased protection through re-zoning, clustering development, larger wetland buffers, or acquisition. Rare plant and animal locations will be used by the Commission and provided to the NJDEP Office of Natural Lands Management (ONLM) and ENSP. Off-road vehicle damage will be reported to the NJDEP Division of Parks and Forestry for enforcement.

Created-wetland Study

In 2012, the Commission received a grant from the EPA to compare the functional equivalency of natural ponds and two types of created wetlands: excavated ponds and stormwater basins. Natural Pinelands ponds are being investigated as part of the Pond-vulnerability Study described above. For created wetlands, all excavated ponds and stormwater basins throughout the Pinelands will be identified and the age, size, structure, and surrounding forest, soil, and land-use composition will be determined. Water-quality and hydrologic conditions and vegetation, anuran, and fish assemblages will be surveyed at a sample of 50 excavated ponds and 50 stormwater basins that represent a range of land-use conditions. Four degraded and four reference sites each from the pool of natural ponds, excavated ponds, and stormwater basins will be selected to analyze for emerging-amphibian pathogens in larval anurans and current-use pesticides in the water, sediments, larval-anuran food, and larval anurans. USGS and Montclair University scientists are completing the pathogen and pesticide component of the study. The functional equivalency of natural and created wetlands will be assessed by comparing all of the biotic and abiotic factors between the three wetland types.



The Commission has initiated a study to compare attributes of natural ponds and created wetlands, such as this one. Photo/John Bunnell

Policy Implications. This study will provide information on the water quality, hydrology, and plant and animal assemblages that excavated ponds and stormwater basins support. Data collected on stormwater basin location and function will indicate which basins are malfunctioning. Pesticide and amphibian pathogen screening will show the potential effects of land use and which wetland type and ecological receptor might be more vulnerable. Off-road vehicle data for excavated ponds will be provided to the

NJDEP Division of Parks and Forestry for enforcement and rare plant and animal data will be used by the Commission and the NJDEP ONLM and ENSP.

Literature Cited

Bunnell, J. F. and R. A. Zampella. 1999. Acid water anuran pond communities along a regional forest to agro-urban ecotone. *Copeia* 1999:614-627.

Bunnell, J. F. 2006. Fish assemblages in Pinelands streams draining active-cranberry bogs, abandoned-cranberry bogs, and forest land in Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2006. Monitoring the ecological integrity of Pinelands wetlands: A comparison of wetland landscapes, hydrology, and stream communities in Pinelands watersheds draining active-cranberry bogs, abandoned-cranberry bogs, and forest land. Final report submitted to the U.S. Environmental Protection Agency. Pinelands Commission, New Lisbon, New Jersey, USA.

Bunnell, J. F. and J. L. Ciruolo. 2010. The potential impact of simulated ground-water withdrawals on the oviposition, larval development, and metamorphosis of pond-breeding frogs. *Wetlands Ecology and Management* 18:495-509.

Bunnell, J. F. and R. A. Zampella. 2008. Native fish and anuran assemblages differ between impoundments with and without non-native centrarchids and Bullfrogs. *Copeia* 2008:931-939.

Bunnell, J. F., R. A. Zampella, R. G. Lathrop, and J. A. Bogner. 2003. Landscape changes in the Mullica River Basin of the New Jersey Pinelands, USA. *Environmental Management* 31:696-708.

Hernandez, A. D., J. F. Bunnell, M. V. K. Sukhdeo. 2006. Composition and diversity patterns in metazoan parasite communities and anthropogenic disturbance in stream ecosystems. *Parasitology* 134: 91-102.

Laidig, K. J. 2006. Vegetation in Pinelands streams draining active-cranberry bogs, abandoned-cranberry bogs, and forest land in Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2006. Monitoring the ecological integrity of Pinelands wetlands: A comparison of wetland landscapes, hydrology, and stream communities in Pinelands watersheds draining active-cranberry bogs, abandoned-cranberry bogs, and forest land. Final report submitted to the U.S. Environmental Protection Agency. Pinelands Commission, New Lisbon, New Jersey, USA.

Laidig, K. J. 2012. Simulating the effect of groundwater withdrawals on intermittent-pond vegetation communities. *Ecohydrology* 5: 841-852.

Laidig, K. J. and D. M. Golden. 2004. Assessing timber rattlesnake movements near a residential development and locating new hibernacula in the New Jersey Pinelands. Pinelands Commission, New Lisbon, New Jersey, USA.

Laidig, K. J. and R. A. Zampella. 1999. Community attributes of Atlantic white cedar (*Chamaecyparis thyoides*) swamps in disturbed and undisturbed Pinelands watersheds. *Wetlands* 19:35-49.

- Laidig, K. J., R. A. Zampella and C. A. Popolizio. 2009. Hydrologic regimes associated with *Helonias bullata* (swamp pink) and the potential impact of simulated water-level reductions. *Journal of the Torrey Botanical Society* 136: 221-232.
- Laidig, K. J., R. A. Zampella, A. M. Brown, and N. A. Procopio. 2010. Development of vegetation models to predict the potential effect of groundwater withdrawals on forested wetlands. *Wetlands* 30:489-500.
- Lathrop, R. G. and J. F. Bunnell. 2009. New Jersey Pinelands electric-transmission right-of-way vegetation-management plan. Pinelands Commission, New Lisbon, New Jersey, USA.
- Pinelands Commission 2003. The Kirkwood-Cohansey Project Work Plan. Pinelands Commission, New Lisbon, New Jersey, USA.
- Pinelands Commission. 2004. A regional natural resources protection plan for the Toms River Corridor, Jackson and Manchester Townships, Ocean County, New Jersey. Pinelands Commission, New Lisbon, New Jersey, USA.
- Pinelands Commission. 2006. A sub-regional resource protection plan for southern Medford/Evesham Townships. Pinelands Commission, New Lisbon, New Jersey, USA.
- Procopio, N. A. 2003. Streamflow trend analysis of Upper Mullica River Basin streams. Pinelands Commission, New Lisbon, New Jersey, USA.
- Procopio, N. A. 2010. Hydrologic and morphologic variability in streams with different cranberry agriculture histories. *Journal of the American Water Resources Association* 46:527-540.
- Procopio, N. A. 2011. Technique to normalize water-quality data to a single time period and an evaluation of the efficacy of reduced water-quality sampling. Pinelands Commission, New Lisbon, New Jersey, USA.
- Procopio, N. A. 2012. The effect of streamflow reductions on aquatic habitat availability and fish and macroinvertebrate assemblages in coastal plain streams. *Ecohydrology* 5:306-315.
- Procopio, N. A. and J. F. Bunnell. 2008. Stream and wetland landscape patterns in watersheds with different cranberry agriculture histories, southern New Jersey, USA. *Landscape Ecology* 23:771-786.
- Zampella, R.A. 1992. Long term Pinelands monitoring program, Task 1: Study area selection. Pinelands Commission, New Lisbon, New Jersey, USA.

- Zampella, R. A. and K. J. Laidig. 2003. Functional equivalency of natural and excavated coastal plain ponds. *Wetlands* 23:860-876.
- Zampella, R. A. and R. G. Lathrop. 1997. Landscape changes in Atlantic white cedar (*Chamaecyparis thyoides*) wetlands of the New Jersey Pinelands. *Landscape Ecology* 12:397-408.
- Zampella, R. A. and N. A. Procopio. 2009. Landscape patterns and water-quality relationships in New Jersey Pinelands streams. Pinelands Commission, New Lisbon, New Jersey, USA.
- Zampella, R. A., G. A. Moore, and R. E. Good. 1992. Gradient analysis of pitch pine (*Pinus rigida* Mill.) lowland communities in the New Jersey Pinelands. *Bulletin of the Torrey Botanical Club* 119:253-261.
- Zampella, R.A., J.F. Bunnell, L.J. Craig, and K. J. Laidig. 1994. Long-term Pinelands Monitoring Program. Pinelands Commission, New Lisbon, New Jersey, USA.
- Zampella, R. A., K. J. Laidig, R. G. Lathrop, and J. A. Bognar. 1999. Size-class structure and hardwood recruitment in Atlantic white cedar swamps of the New Jersey Pinelands. *Journal of the Torrey Botanical Society* 126:268-275.
- Zampella, R. A., J. F. Bunnell, K. J. Laidig, and C. L. Dow. 2001. The Mullica River Basin: A report to the Pinelands Commission on the status of the landscape and selected aquatic and wetland resources. Pinelands Commission, New Lisbon, New Jersey, USA.
- Zampella, R. A., C. L. Dow, R. G. Lathrop, J. A. Bognar, J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2002. Using multiple regression to quantify the effect of land use on surface-water quality and aquatic communities in the New Jersey Pinelands. Pinelands Commission, New Lisbon, New Jersey, USA.
- Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2003. The Rancocas Creek Basin: A report to the Pinelands Commission on the status of selected aquatic and wetland resources. Pinelands Commission, New Lisbon, New Jersey, USA.
- Zampella, R. A., N. A. Procopio, K. J. Laidig, and J. F. Bunnell. 2004. The essential character of the Oyster Creek watershed. Pinelands Commission, New Lisbon, New Jersey, USA.
- Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2005. The Great Egg Harbor River Watershed Management Area: A report to the Pinelands Commission on the status of selected aquatic and wetland resources. Pinelands Commission, New Lisbon, New Jersey, USA.
- Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2006a. The Barnegat Bay Watershed: a report to the Pinelands Commission on the status of selected aquatic and wetland resources. Pinelands Commission, New Lisbon, New Jersey, USA.

Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2006b. Using multiple indicators to evaluate the ecological integrity of a coastal plain stream system. *Ecological Indicators* 6:644-663.

Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio. 2006c. Monitoring the ecological integrity of Pinelands wetlands: A comparison of wetland landscapes, hydrology, and stream communities in Pinelands watersheds draining active-cranberry bogs, abandoned-cranberry bogs, and forest land. Final report submitted to the U.S. Environmental Protection Agency. Pinelands Commission, New Lisbon, New Jersey, USA.

Zampella, R. A., N. A. Procopio, R. G. Lathrop, and C. L. Dow. 2007a. Relationship of land-use/land-cover patterns and surface-water quality in the Mullica River Basin. *Journal of the American Water Resources Association* 43:594-604.

Zampella, R. A., K. J. Laidig, and R. L. Lowe. 2007b. Distribution of diatoms in relation to land use and pH in blackwater Coastal Plain streams. *Environmental Management* 39:369-384.

Zampella, R. A., J. F. Bunnell, N. A. Procopio, D. E. Bryson. 2008a. Macroinvertebrate assemblages in blackwater streams draining forest land and active and abandoned cranberry bogs. *Wetlands* 28:2 390-400.

Zampella, R. A., N. A. Procopio III, M. U. Du Brul, and J. F. Bunnell. 2008b. An ecological-integrity assessment of the New Jersey Pinelands: a comprehensive assessment of the landscape and aquatic and wetland systems of the region. Pinelands Commission, New Lisbon, New Jersey, USA.

Zampella, R. A., J. F. Bunnell, K. J. Laidig, and N. A. Procopio III. 2010. Aquatic degradation in shallow Coastal Plain lakes: gradients or thresholds? *Ecological Indicators* 10:303-310.

CHAPTER 8: RECOMMENDATIONS

The Plan Review Committee accepted public comment at all of its meetings, at numerous stakeholder meetings, and during two specially-designated public hearings. The comments provided the Committee with an understanding of the public's positions and ideas regarding the implementation of the Pinelands Comprehensive Management Plan (CMP). The Plan Review Committee evaluated those ideas, long-term Commission initiatives, Commission staff suggestions and Commissioner input over the two years of Committee meetings and developed a list of recommendations for the Commission staff's focus in the coming years. The complete list of recommended topics and initiatives is appended to this report. It includes brief synopses of Committee discussions, including those resulting in a determination not to address an item, in order to reflect the Committee's overall deliberation process. Eight recommendations from the list are described in greater detail – and in no particular order – based upon the amount of work already completed by Commission staff, prioritization by Commissioners, and the amount of public interest.

Commission staff will use the Committee's discussions and completed list of recommendations as guidance in developing its work program for the next five years. In some cases, sufficient research and analysis of an issue and its potential solutions have already been completed, such that implementation of the chosen action is all that remains to be done. Other topics have been demonstrated to merit action, but further stakeholder meetings, internal discussions, research and evaluation are needed to determine what that action should be. While some CMP amendments will likely result from these recommendations, the establishment of special projects and pilot programs may be appropriate to address certain issues without or prior to a rule-making effort.

Organized Off-Road Vehicle Events

Organized off-road vehicle (ORV) events have a long history in the Pinelands as cultural recreation events. The original CMP listed enduros, organized motorcycle-based events, as one of the many types of established recreational trail opportunities making use of the existing trails in the Pinelands. Then, as now, chartered groups under the East Coast Enduro Association's umbrella used the trails on both private and public lands, often concentrated in the Preservation Area, for seasonal events. In spring and fall, these groups host carefully coordinated races that vary widely in length and objective, from 80-mile time-regulated enduros to 9-mile speed-focused hare scrambles. Many organized ORV event participants and organizers are responsible stewards of both public and private land, coordinating and participating in litter cleanups after events and during different times of the year. However, ORV event riders who deviate from approved courses and unregulated ORV use in prohibited areas may cause environmental damage, resulting in public opposition to ORV use in general.

The original CMP noted that “a common example of conflicts among user groups is the demand for trail space by day and wilderness hikers, horseback riders, and off-road vehicle drivers (p. 153).” That source of conflict has not eased over time. Although confirmed instances of property damage by organized ORV events are fairly infrequent, the extensive damage being caused to public lands by illegal ORV

users has resulted in anger and frustration for regulators, forest managers, the public, and environmental advocacy groups. Illegal users leave roads designated for motorized traffic and ride in undeveloped areas, causing damage to uplands and wetlands alike and destroying native and rare plant populations and wildlife habitat. As such, the Plan Review Committee received many comments from environmental advocates urging the adoption of more stringent rules for the organized ORV community – the only ORV group that the CMP expressly addresses.

The organized ORV community submitted many comments of its own, noting its record as stewards of private and public land. Many enduro enthusiasts stated that they appreciate the beauty and natural resources of the Pinelands and felt they were being unjustly blamed for destruction caused by illegal riders who are unaffiliated with the organized ORV groups. Enduro participants and organizers pointed to increasingly strict New Jersey Department of Environmental Protection (NJDEP) rules designed to limit motorized access to sensitive areas of publicly-owned lands. The “element of surprise” nature of organized ORV events like enduros requires a large network of available trails from which to plan a unique route each time – one of the reasons the Pinelands, with its multitude of winding sand roads and trails through near wilderness, has endured as a popular event locale. Enduro organizers regularly choose courses on trails through public state parks and forests as well as private lands in order to create novel routes, and the reduction in public lands available for use makes a successful event harder to plan. They expressed concern that further restriction on the organized event community would result in even more illegal use by riders frustrated by the lack of legal opportunities. Indeed, the options for an individual ORV rider wishing to ride legally in the state of New Jersey are few. The New Jersey Department of Environmental Protection’s 2009 *NJ Trails Plan Update* recognized motorized trail users as being significantly underserved by existing motorized-trail-use facilities.

While progress has been made in recent years to establish state-run ORV parks for legal use by motorized trail users, organized ORV events remain a part of the recreational fabric of the Pinelands and require adequate options for trail use as well. Commission staff met with representatives of the organized ORV community in November 2013 and February 2014 to better understand their sport and their concerns.

Generally, the Committee felt that it was desirable to clarify the organized ORV event regulations. The Pinelands Commission’s approval of event route maps has been required since the adoption of the original CMP. However, no specific standards have ever been established regarding application submissions, and so at a minimum the Commission could codify the existing application practices (e.g., information to be submitted, parties notified, proposed route map, proof of liability insurance, etc.). The Committee was also supportive of ensuring that documented instances of rider or entire event course deviations are dealt with appropriately. However, several Committee members also noted the importance of protecting enduros and other legal organized ORV events as cultural recreational uses and safeguarding them from extinction by overregulation.

The Commission staff will continue to meet with representatives of the organized ORV event community and other stakeholders to work toward a solution to the Committee’s and public’s concerns without unjustly affecting the success of law-abiding ORV groups and events.

Pinelands Development Credit Program

The Pinelands Development Credit (PDC) program has long been recognized as a model for transferable development rights programs throughout the country. Since the inception of the original CMP, PDCs have offered financial incentives to landowners to permanently protect lands in areas of high natural resource values. To date, nearly 52,000 acres in the Preservation Area District, Special Agricultural Production Area and Agricultural Production Area have been permanently protected through the PDC program.

As a means to maintain a steady demand for PDCs and to keep prices and inventory at moderate levels, the PDC program provides the prospect for higher density development by using PDCs in areas designated for growth. However, over time the demand for PDCs has not reached anticipated levels, often due to developers choosing not to exceed non-PDC densities or municipalities looking unfavorably upon high density multi-family residential developments that would trigger a PDC obligation. Because PDC sale prices are based on fair market negotiations between purchaser and seller, market fluctuations also have an impact on the use of PDCs. Both PDC demand and PDC sales prices fell significantly during the latter part of this Plan Review period. Market comparisons continue to show an imbalance between the supply of PDCs and future opportunities for the use of PDCs. The original CMP goal for a successful PDC program was set at 2 or more PDC rights of demand opportunities for every one PDC supply right. In 2006, the actual ratio was estimated at 0.64 PDC rights of demand for each PDC supply right. All of these factors reinforce an assertion made during the previous Plan Review period that PDC program enhancements may be necessary.

The previous Plan Review report (2002) included a recommendation that the Pinelands Commission work to advance land protection goals by continuing to consider PDC program enhancements proposed in 1999 and by pursuing new innovations to increase the program's efficacy. To that end, the Policy and Implementation Committee approved a series of policy recommendations in 2007 that involved fundamental changes to the PDC program. First, the PDC program would be expanded to include Pinelands Towns as receiving areas. Second, PDC use would be mandatory for virtually all residential development within RGAs and Pinelands Towns, based on a sliding scale tied to project density. Third, PDCs would be required for non-residential development in RGAs and Pinelands Towns that exceeded certain intensity thresholds. Fourth, to facilitate the construction of affordable housing in the receiving areas, no PDC use would be required for affordable housing units. Finally, particularly critical portions of the FA would be designated as new PDC sending areas. These policies were incorporated into a formal rule proposal, which was endorsed by the Policy and Implementation Committee in 2009 but was ultimately not acted upon by the Commission.

In preparation for and throughout the current Plan Review process, Commission staff met with groups of PDC stakeholders (i.e., builders, PDC holders, municipal officials, environmental advocacy groups and agricultural interest groups) to discuss the 2009 PDC program enhancement proposal and determine the major issues influencing the position of each group. For example, builders are concerned with the proposal to establish a sliding scale that would require a higher percentage of PDCs for lower density development, because they say municipalities are often unwilling to approve higher density

development. Municipal officials worry that adding a PDC obligation for non-residential development based on impervious surface coverage would negatively affect new and existing businesses. The agricultural community is concerned with the potential allocation of PDCs to portions of the Pinelands Forest Area. The various interest groups made clear their opposition to different aspects of the proposal, leaving it to the Commission to develop a compromise proposal that might garner a measure of support from all.

The Plan Review Committee shared the staff's concern regarding the future success of the PDC program and agreed that CMP amendments are necessary. Commission staff will continue to work with the stakeholder groups and plans to present a simplified version of the 2009 rule proposal to the Commission that will help to stabilize the PDC market.

Kirkwood-Cohansey Aquifer

The Kirkwood-Cohansey Aquifer study involved several research components completed in cooperation with several state and federal agencies and institutions. The Gibson Bill (N.J.P.L. 2001 c. 165), which allocated \$5.5 million in funding for the study, directed researchers from the Pinelands Commission, NJDEP, Rutgers University, the United States Fish and Wildlife Service and the United States Geological Survey to “assess and prepare a report on the key hydrologic and ecological information necessary to determine how the current and future water supply needs within the pinelands area may be met while protecting the Kirkwood-Cohansey aquifer system and while avoiding any adverse ecological impact on the pinelands area.” Twelve study topics were selected: hydrology, wetland-forest community gradients, swamp pink, intermittent pond vegetation, anuran-larval development and recruitment success, stream fish and macroinvertebrates, ecological processes: nitrogen, ecological processes: indicators of physiological stress, landscape models, build-out and water-demand scenarios, data management and data-analysis coordination, and public information and final Kirkwood-Cohansey assessment.

One of the Commission's desired goals from this study is to determine the probable hydrologic effects of groundwater diversions from the aquifer on stream flows and wetland water levels and the probable ecological effects of induced stream flow and groundwater level changes on aquatic and wetland communities. The answers to these questions are expected to clarify and guide the Commission's implementation of its water management standards by identifying water supply needs and quantifying the level at which groundwater diversions become irreversibly problematic.

The CMP currently stipulates that water use shall not have an adverse ecological impact on the Pinelands Area, though “adverse ecological impact” itself is not defined. The Kirkwood-Cohansey aquifer research can help to define such regional impact by, for example, using a low-flow margin approach, which would determine how much water can be withdrawn from the aquifer during stream “low-flow” periods. Although all Kirkwood-Cohansey sourced water withdrawals have an ecological impact, the results of the study can help to better predict those impacts and identify an acceptable regional threshold.

The CMP also requires that wells must “minimize impacts on wetlands and surface waters,” and similarly lacks a sufficient definition of minimized impacts. Minimized impacts may be expressed as a certain amount of water fluctuation that is deemed to be acceptable, such as a 5-, 10- or 15-inch drawdown of the water table; withdrawals projected to result in drawdown in excess of that amount would not be permitted. The results of the Kirkwood-Cohansey aquifer study can guide the creation of enhanced well impact modeling to determine a reliable drawdown threshold that minimizes the local effects to wetlands and surface waters. The CMP would need to be amended to establish a regional threshold and to develop a concrete definition for minimized impacts to wetlands and surface waters.

The Committee and many public commenters have expressed support for using the extensive data collected and analyzed as part of the Kirkwood-Cohansey study to guide the creation of improved water management standards.

Native Pinelands Vegetation

The 1980 CMP notes the importance of native flora in the Pinelands, stating that “more than any other natural feature, the unique vegetation of the Pinelands gives the region its distinctive, essential character (p. 58).” The relatively unbroken tracts of forested uplands and swamps, bogs and marshes are comprised of more than 850 plant species, almost 600 of which are considered to be indigenous to the area and 92 of which are currently listed as threatened or endangered by the CMP. The geographic location of the New Jersey Pinelands is such that more than 100 southern plant species reach the northern limit of their ranges and about a dozen northern plant species reach the southernmost extent of their ranges within the Pinelands. Several plants are considered endemic to the Pinelands, meaning they are found in a small region including or entirely within the Pinelands and nowhere else. A few other species are described as relict populations, because they were once widespread but are now found in relatively small populations in a handful of areas.

The Pinelands’ unique ecology is responsible for the striking contrast between inner coastal plain vegetation (west of the Pinelands) and outer coastal plain pine-oak dominated habitats. The Pinelands, located within the outer coastal plain, features sandy, porous soils that are low in nutrients and pH. The scarcity of nutrients, acidity of the environment and dry, permeable substrate provide challenging growing conditions for plants – except for those plants that have developed here over thousands of years.

Given the ecologic and economic value of native species documented in scientific literature, and the aesthetic value of vegetation that is truly representative of the uniqueness of the Pinelands, interest has increased in ensuring the protection of native, rare, threatened and endangered plant species. Several options to improve the CMP’s protection of native, rare, threatened and endangered plants have been introduced over the years as well as during the Plan Review public comment period. One recommendation involves the expansion of the Commission’s Roadside Mowing and Maintenance Best Management Practices (BMP) program from the counties to other Pinelands area road managers,

including municipalities, the New Jersey Department of Transportation, the New Jersey Turnpike Authority and the South Jersey Transportation Authority. Other options include strengthening the CMP's language from permissive guidelines to mandatory standards requiring the use of native plant species in restoration and landscaping, evaluating whether certain construction materials have a deleterious impact on the native qualities of surrounding soils, expanding the CMP's list of protected plant species to include the NJDEP's Plant Species of Concern, and considering a prescribed fire program for areas that could benefit ecologically without risking human life or property.

The Committee expressed interest in improving upon the CMP's existing protections for native, threatened and endangered plant species. The members were most supportive of expanding the Roadside Mowing and Management BMP program and strengthening the CMP's requirements regarding the use of native Pinelands species for post-development stabilization, landscaping and restoration.

Black Run Watershed

The southern portions of Evesham and Medford Townships in Burlington County include large areas designated under the Pinelands CMP for modest amounts of residential development. However, studies have documented that this area has a high concentration of protected plants and animals. This conflict led to several high-profile legal disputes between the Commission and local developers. Monitoring data from the Commission's Mullica River and Rancocas Creek watershed studies show that the Black Run, a tributary to the Rancocas Creek located in the northwesterly portion of the southern Evesham project area, exhibits minimally-disturbed Pinelands water quality, while portions of many of the other streams in the Mullica River and Rancocas Creek watersheds show signs of water degradation.

In June 2004, with the help of a \$73,000 grant from the William Penn Foundation, the Pinelands Commission undertook an innovative natural resource conservation planning project for the southern portions of Evesham and Medford. Under this project, the Commission organized a steering committee comprised of representatives from the NJDEP and the two municipalities to oversee development of a conservation plan for a 22-square-mile project area. In April 2006, the steering committee produced "A Sub-regional Natural Resource Protection Plan for Southern Medford/Evesham Townships," which included innovative zoning, land preservation, resource management, and community design recommendations. The report consistently identified the Black Run watershed as having high ecological values based on water quality data, rare plant and animal documentation, and landscape, wetland and watershed integrity assessments. It also noted that less than 10% of the land in the Black Run drainage area is disturbed. Because disturbance in excess of 10% of land area is considered to be a tipping point for ecological impacts, the report urged that this area be protected through a series of regulatory and land preservation strategies. The recommendations contained in this report were endorsed by the Commission but required municipal implementation, which has not occurred to any great extent.

In November 2009, the Policy and Implementation Committee recommended a CMP amendment for Pinelands-wide management area adjustments, including specific management area changes in the Southern Medford/Evesham Township area, to the full Commission for approval. Proposed changes in

Evesham and Medford included the redesignation of 3,700 acres from the Rural Development Area to the Forest Area, including the Black Run headwaters. Also included was the creation of a small Regional Growth Area along Evesham Township's border with Voorhees Township. The proposal recommended that Evesham Township consider establishment of a development transfer program whereby residential density would be transferred from the new Forest Area to the new Regional Growth Area. Ultimately, the Commission elected not to proceed with the recommended CMP amendments.

The Plan Review Committee and general public expressed strong support for the continued pursuit of the initiative to protect the Black Run headwaters area of southern Evesham. Commission staff will continue to work toward refining and implementing the proposed protections through management area redesignations, establishment of a new pilot program, or both.

Efficiency and Administrative Improvements

In 2013, the Committee determined that a "first-round" rule proposal under Plan Review should move forward immediately to address minor changes intended to increase the Commission's efficiency. While numerous efficiency measures were identified, the proposal focused on a few key measures. These include extending the duration of Letters of Interpretation (LOIs) from two to five years, adding to the list of activities that are exempt from Commission review, extending the deadline for use of an alternate design technology in the Commission's pilot program, and correcting typographical errors. The Commission voted to adopt the proposal on June 12, 2014.

In the meantime, many of the efficiency measures identified but not included in the rule proposal remain important to the Commission and staff. These include changes to the application review fee requirements to better recognize specific types of development applications, address the additional staff time required to review an application that involves a violation of the CMP standards, codify current practices, clarify existing fee requirements and eliminate inefficiencies in the application review process. By and large, the proposed changes will either reduce application fees or keep them the same, with the exception of fees for applications to resolve a violation of CMP standards.

Other efficiency measures to be considered include amending the definitions of "interested person" and "mail," and a change to notice and mailing requirements. The use of email to transmit official documents and notices is a more efficient, less expensive method of communication. In addition, changes to the Administrative Procedures Act (APA) approved in January 2014 "require State agencies to use various electronic technologies in rule-making procedures." These requirements include posting a wide variety of information on agency websites, including hearing notices and final reports, decisions and opinions. The APA amendments also require state agencies to codify these new requirements.

The Commission remains supportive of the CMP changes needed to implement these measures.

Outdoor Advertising Signs (Billboards)

The writers of the 1980 CMP likely could not have anticipated the advent of digital technology in signs and billboards. Since that initial rule-making, the CMP has prohibited the use of motion and changing lights in on- and off-site signs. Of course, digital technology is now commonly used in signage and typically features video (motion), changing text, and flashing lights and text. In 2014, the Commission received ordinances for certification from two municipalities, authorizing the use of digital technology in signs.

In addition, the CMP's sign rules specify that on-site signage is exempt from application to the Pinelands Commission (with the exception of those associated with an historic resource). However, the sign standards at N.J.A.C. 7:50-6.106 et seq. include extensive provisions that apply to on- and off-site signs alike. When development is exempt from application to the Commission, the municipality's review of a zoning or construction permit application is still expected to ensure compliance with its certified land use ordinances, which include all required CMP standards. Having standards in the CMP for activities that don't otherwise constitute development creates challenges for the Commission staff in terms of enforcement.

The Committee discussed outdoor advertising and signage when the aforementioned municipal ordinances were submitted to the Commission for certification. Although these were the first instances of ordinances being submitted for certification regarding digital signage, several instances of digital signs that seem to violate the CMP's standards are known to exist. Thus, the questions of whether and where to permit digital signs and whether to regulate on-site signs were raised. The Committee generally agreed that digital signage may be acceptable in certain limited circumstances in the Pinelands Area, such as along the Atlantic City Expressway or Garden State Parkway, but that the region's protected areas should remain so for both aesthetic and ecological reasons.

Commission staff will continue to evaluate municipal ordinances that are submitted based on current CMP standards, while drafting CMP amendments to specifically address digital sign technology.

Memorandums of Agreement

Memorandums of Agreement (MOAs) provide public agencies with a mechanism to streamline the Commission's application process for relatively minor and routine activities and to obtain development approval for necessary projects that are not strictly permitted under the CMP. Streamlining MOAs specify types of development to which the agreement applies, such as repaving a road without any proposed widening of the paved area or disturbance of wetlands. Deviation MOAs waive one or more of the CMP's land use or environmental standards for a specific project. All deviation MOAs must include measures designed to achieve at least an equivalent level of protection of Pinelands resources as that afforded by a strict application of CMP standards.

Over time and during this Plan Review period, Commissioners, staff and the public alike have raised concerns with the MOA process for varying reasons. Some perceive the MOA deviation option as implemented too frequently to avoid strict compliance with the CMP, without sufficient subsequent monitoring and follow-up to ensure that conditions are being met. Commissioners have requested clarification of the MOA rules, including the entities eligible for such agreements, how an equivalent level of protection of Pinelands resources can be quantified, and what types of development activities qualify for an MOA. In reviewing the past ten years of MOA history for this report, Commission staff agreed that better tracking of the obligations imposed by previously approved MOAs was critical to the integrity of the MOA process and had been a challenge.

The Committee expressed support for improvements to the MOA process. Commission staff will continue to evaluate the process and is planning to assign staff to the specific task of coordinating the development of new MOAs and monitoring previously-approved MOAs to ensure that all required conditions and protection measures are completed. The Commission may also proceed with discussion of CMP amendments to clarify or revise the standards by which MOAs are reviewed.

Master List of Plan Review 4 Action Items

The following list identifies the broad range of topics raised by Commissioners, the public and Commission staff and discussed at length during Plan Review Committee meetings from 2012 through 2014.

CMP Topic	Description	Summary of Discussions/Status
1. Application review fees and escrows	<ul style="list-style-type: none"> • Reduce fees for solar energy facilities • Require higher fees for applications submitted to resolve violations • Establish fees specific to general development plan applications • Eliminate requirement for sworn statements of construction costs • Allow for escrow funds to be used for purchase of software or specialized equipment • Minor clarifications 	<ul style="list-style-type: none"> • These items will be included in a future CMP amendment advancing initiatives identified as part of this Plan Review.
2. Administration and efficiency	<ul style="list-style-type: none"> • <u>Public comment</u>: The Commission should work to streamline and simplify its application procedures 	<ul style="list-style-type: none"> • The Commission staff's current efficiency study and first plan review rule proposal were both intended to streamline and simplify many aspects of Commission operations, including application procedures. Efficiency efforts are ongoing.
3. Black Run watershed	<ul style="list-style-type: none"> • <u>Public comment</u>: Changes to the CMP are necessary to better protect the headwaters of the Black Run watershed • Establish a program to better protect the headwaters of the Black Run watershed (ex. zoning/management area change; local transferable development rights program) 	<ul style="list-style-type: none"> • Protection of the headwaters of the Black Run watershed continues to be one of the topics under consideration for inclusion in a future Plan Review rule proposal.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
4. Climate change	<ul style="list-style-type: none"> • <u>Public comment</u>: The CMP should include a standard to address greenhouse gas emissions • Develop rules and strategies to reduce contributions to climate change and adapt to climate change impacts 	<ul style="list-style-type: none"> • The Commission will evaluate what options are available to address climate change through the CMP and in cooperation with other agencies.
5. Interested party	<ul style="list-style-type: none"> • Change definition of “interested person” to “interested party” • Revise numerous references throughout CMP to clarify who has the right to formally participate in the decision-making process, request hearings or appeal the Commission’s decisions 	<ul style="list-style-type: none"> • These items will be included in a future CMP amendment advancing initiatives identified as part of this Plan Review.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
<p>6. Memoranda of agreement (MOA) and state agency plans</p>	<ul style="list-style-type: none"> • <u>Public comment</u>: MOAs are perceived as being used too frequently to avoid strict compliance with the CMP, with little follow-up to ensure conditions are met • Clarify which entities are eligible to enter into MOAs and state agency plans • Integrate MOAs and state agency plans into one option • Clarify what MOAs are intended to be used for and what they can and cannot do • Establish clear guidelines/standards for determining appropriate mitigation and/or offsets • Develop clear policy and procedure for monitoring during and after development and for ensuring satisfaction of conditions • Determine whether to amend language to (1) specifically allow MOAs with regulated public utilities and/or in conjunction with public regulatory agencies or authorities, or (2) specifically prohibit MOAs with governmental agencies that regulate development but do not undertake it, and perhaps even prohibit all deviation MOAs 	<ul style="list-style-type: none"> • The Committee has directed Commission staff to evaluate the use of MOAs and to review past analyses of the MOA process.
<p>7. Notification procedures and requirements</p>	<ul style="list-style-type: none"> • Add definition of “mail” to include email • Eliminate certified mailing requirements for the Commission and municipalities (allow for use of email or regular mail instead) • Require posting of public hearing notices on the Commission’s website • Eliminate requirement for advertising public hearings in the newspaper 	<ul style="list-style-type: none"> • Some of these items are required by recent amendments to the Administrative Procedure Act (N.J.S.A. 52:14B-1 et seq.; P.L. 2013, c.259 (Assembly Bill 3321)). • These items will be included in a future CMP amendment advancing initiatives identified as part of this Plan Review.

^x Topics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
8. Open Public Records Act (OPRA)	<ul style="list-style-type: none"> • Add a specific statement excluding threatened and endangered species survey results and cultural resource survey results that identify specific site locations from OPRA responses 	<ul style="list-style-type: none"> • Staff is currently evaluating whether such clarification is necessary.
9. Organized off-road vehicle events	<ul style="list-style-type: none"> • <u>Public comment</u>: Environmental advocates suggested that there is a need to address damage caused by motor vehicles on public lands, including the posting of a bond • Codify existing application review requirements • Identify means to address deviations from approved event route when necessary 	<ul style="list-style-type: none"> • Staff has held and will continue to hold meetings with the regulated community to work toward meaningful and appropriate standards. • Staff has developed clear, new application forms and approval documents to improve the application process for organized off-road vehicle events for all involved.
10. Outdoor advertising signs (billboards)	<ul style="list-style-type: none"> • <u>Public comment</u>: The Commission could defer to the requirements of the Department of Transportation and local zoning ordinances; specifically, the elimination of the CMP’s “transferrable sign right” requirement was requested • Digital signs, including billboards, are becoming more common and are currently universally prohibited by the CMP 	<ul style="list-style-type: none"> • The Commission’s rules concerning billboards, including limits on the permitted height, location and total number of billboards in the Pinelands, protect the character of the Pinelands. • The Commission will evaluate whether digital signs, including billboards, are appropriate for use in certain areas of the Pinelands.

^x Topics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
11. Pinelands Development Credits (PDCs)	<ul style="list-style-type: none"> • <u>Public comment</u>: Revise the current provisions to increase demand for PDCs by ensuring that adequate opportunities exist for their use • Establish a provision that allows replacement of a residential PDC program with a non-residential PDC program • Revise the current provisions to increase compliance with the CMP's intended development intensities in Regional Growth Areas 	<ul style="list-style-type: none"> • There is a need to increase demand for PDCs by ensuring that adequate opportunities exist for their use. • The requirement to acquire PDCs for “bonus density” units in Regional Growth Areas often results in development at a lower density than intended. • PDC program enhancements continue to be one of the topics under consideration for inclusion in a future Plan Review rule proposal.
12. Preliminary and final local agency permits and approvals	<ul style="list-style-type: none"> • Clarify that the approving agency shall provide the Commission with the requested information • Clarify that Municipal Land Use Law time limits run regardless of whether and when the Commission issues a letter indicating that a local agency approval or permit can take effect • Add a requirement that applicants must first receive a letter from the Pinelands Commission indicating that their preliminary subdivision/site plan approval can take effect before they may proceed to obtain a final subdivision/site plan approval • Consider amendment to deal with local agency permits and approvals that have been called up for Commission review for an overly extended period of time • Eliminate the requirement that the Pinelands Commission be provided with the names and addresses of persons participating in local agency proceedings regarding preliminary approval of an application for development 	<ul style="list-style-type: none"> • These items will be included in a future CMP amendment advancing initiatives identified as part of this Plan Review.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
13. Public comment process	<ul style="list-style-type: none"> • <u>Public comment</u>: Some Commission meetings should be held during evening hours and more advance notice (30 days) should be provided prior to the public comment period for Commission meetings, public development applications and MOAs 	<ul style="list-style-type: none"> • The Commission scheduled two night meetings for 2014. • The Commission revised its public comment policies in 2011 to allow the public more time to review and comment on applications.
14. Soils	<ul style="list-style-type: none"> • <u>Public comment</u>: Protect existing roadside habitat for native and rare plants, and prevent the creation of turf areas in place of native vegetation • Add a provision to require the use of clean fill from a soil formation matching pre-development conditions and/or the stockpiling and reuse of native soils excavated from the site for landscaping and backfill outside of permanent lawn and turf areas • Reference the amended Standard for Permanent Vegetative Cover for Soil Stabilization subsection for the Pinelands National Reserve adopted February 2014 by the New Jersey State Soil Conservation Committee 	<ul style="list-style-type: none"> • Soils and vegetation are intimately linked. Unless soil disturbance and amendments are minimized, native Pinelands vegetation will continue to lose available habitat meeting its requirements, and non-native vegetation will continue to colonize the Pinelands. • Because of the close relationship between soils and vegetation, Commission staff will consider both in developing a proposal to better protect native and rare Pinelands flora.
15. Stormwater management	<ul style="list-style-type: none"> • <u>Public comment</u>: Concerns ranged from failing basins and pollutant loading to the disparities among the regulations of various agencies with jurisdiction over stormwater review 	<ul style="list-style-type: none"> • Commission staff continues to have ongoing discussions with other agencies regarding improved coordination and implementation of stormwater management standards.

^x Topics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
16. Threatened and endangered species (T&E)	<ul style="list-style-type: none"> • <u>Public comment</u>: Reduce or eliminate T&E survey requirements in growth areas • <u>Public comment</u>: Add NJDEP’s “species of concern” that are found in the Pinelands to the Commission’s list of protected T&E plants • <u>Public comment</u>: Establish standardized protocols for threatened and endangered plant surveys 	<ul style="list-style-type: none"> • Applying the T&E protection standards to each unique application is challenging. Guidance for both Commission staff and applicants regarding what is required and what is ultimately “consistent” is necessary and desirable. • Commission staff has met with the Partnerships for New Jersey Plant Conservation and continues to discuss and evaluate the need for increased protections of T&E plant species. As part of this process, staff continues to work toward executing a plant data-sharing agreement with NJDEP.
17. Native vegetation	<ul style="list-style-type: none"> • <u>Public comment</u>: Strengthen current “guideline” provisions to requirements • <u>Public comment</u>: Require the use of native vegetation in restoration and landscaping • <u>Public comment</u>: Revise the list of recommended grass types for use in landscaping and revegetation to include native species and exclude non-native and invasive species • Add a provision to address post-construction work, requiring: use of native plant and seed material; use of native, clean fill from a comparable soil formation; stockpiling and reuse of excavated native soils; etc. • Conduct monitoring studies of the impacts of road construction materials on surrounding soils and vegetation 	<ul style="list-style-type: none"> • Commission staff has delivered presentations on the protection of native and rare Pinelands vegetation. At the Committee’s direction, Commission staff is working to develop a proposal to better preserve, protect and enhance native and rare Pinelands vegetation.

^x Topics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
18. Water quantity and quality	<ul style="list-style-type: none"> • <u>Public comment</u>: The Commission should use the results of its years-long collaborative study of the Kirkwood-Cohansey aquifer to improve the CMP’s protection of the Pinelands’ water supply and water quality 	<ul style="list-style-type: none"> • Such use of the Kirkwood-Cohansey aquifer study results continues to be one of the topics under consideration for inclusion in a future Plan Review rule proposal.
19. Agriculture ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: Local vintners and farmers suggested that the Labrusca grape is native to the Pinelands. Such a finding would enable the production of Labrusca grapevines in sensitive areas such as wetlands and the Preservation Area 	<ul style="list-style-type: none"> • The Commission’s Chief Scientist has confirmed that the Labrusca grape is not native to the Pinelands.
20. Commission ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: The Science Committee should be expanded and a state-appointed agricultural representative to the Commission should be established 	<ul style="list-style-type: none"> • The Commission’s Science Committee was dissolved and its responsibilities were absorbed by the Policy and Implementation Committee. The Science Advisory Committee continues to meet periodically. • The primary interested parties, industries and communities in the Pinelands, including agriculture, are represented by the various Commissioners, although the balance may shift from time to time.
21. Forestry ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: Forestry should be considered to be “agriculture” and as such, exempt from application to the Commission 	<ul style="list-style-type: none"> • The Commission does not consider forestry to qualify as agriculture. It adopted amended forestry standards in 2009 as the result of a comprehensive review of current industry-accepted best practices by the Forestry Advisory Committee.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
22. Herbicide use ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: The selective use of herbicides for right-of-way vegetative maintenance may be helpful 	<ul style="list-style-type: none"> • The Commission does not consider herbicide use necessary for right-of-way vegetation maintenance. It adopted the 2009 New Jersey Pinelands Electric-Transmission Right-of-Way Vegetation-Management Plan amendment to explicitly prescribe appropriate and effective methods for non-chemical vegetative maintenance.
23. Landfills ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: Impermeable caps may not be necessary or adequate to protect groundwater from contamination. They also tend to present a significant expense to the landowner, often a municipality • <u>Public comment</u>: “Contaminated” soil may be useful as landfill cover 	<ul style="list-style-type: none"> • The “rapid landfill assessment” currently in progress will help provide standards to demonstrate that an impermeable cap is not needed. The CMP already contains the flexibility to waive a cap should such demonstration be made. • Use of “contaminated” soil has been discussed at length in previous years and is considered to be inappropriate for landfill cover in the Pinelands.
24. Mining ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: Siting restrictions for Class B recycling facilities in the Preservation and Forest Areas should be reduced and the requisite 300-foot wetland buffer should be replaced with a graduated wetland buffer for mining operations • <u>Public comment</u>: Increased enforcement of post-operation restoration is needed 	<ul style="list-style-type: none"> • Staff met with industry representatives and was unable to identify sufficient rationale for reducing recycling facility siting restrictions. • Restoration is not required until the entire mining operation has been completed. Most sites remain active, so little restoration is currently occurring. Commissioners did not consider action necessary.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

CMP Topic	Description	Summary of Discussions/Status
25. Planning ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: The CMP does not explicitly address redevelopment 	<ul style="list-style-type: none"> • Commission staff reviewed the implications of the state redevelopment statute and determined that the CMP addresses <u>all</u> development.
26. Route 70 ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: Numerous fatal motor vehicle accidents have occurred along certain sections of Route 70, possibly due to poor lighting and the lack of a median barrier 	<ul style="list-style-type: none"> • This issue has been referred to the DOT, which has jurisdiction over the requested improvements. There is no action for the Commission to take.
27. Stream restoration ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: The removal of in-stream structures should be permitted for limited restoration purposes in which the natural hydrology is restored 	<ul style="list-style-type: none"> • It is difficult to determine whether a structure (ex., dam) should be removed to allow a stream to return to its natural flow, because threatened or endangered plant or animal species may be living in the pond created by the impoundment. The Commission does not consider this to be a necessary change.
28. Wastewater treatment ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: Comments ranged from reducing the “depth to seasonal high water table” requirement to allowing direct discharge from existing wastewater treatment facilities to surface water with enhanced treatment 	<ul style="list-style-type: none"> • The septic and wastewater regulations are functioning well and are not in need of major revisions at this time.
29. Wetlands ^x	<ul style="list-style-type: none"> • <u>Public comment</u>: Wetlands protection standards should be consistent with current scientifically-accepted best practices and should be easy to understand and apply. The currently used Buffer Delineation Model has not been updated or revised in decades 	<ul style="list-style-type: none"> • While the Commission Science Office’s Ecological Integrity Assessment (EIA) results may ultimately be useful in guiding more scientific, objective wetlands protection standards, application of the data for such a use has not been completed satisfactorily.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

Additional Action Items for Future Consideration

- (a) Consider a remedy for “gentlemen’s horse farms” qualifying under farm housing (1 house/10 acres) that may be eroding true farming areas in Agricultural Production Management Areas.
- (b) Consider eliminating the residential cluster provision (1 house/40 acres) in Agricultural Production Management Areas and permitting a wider variety of uses on a limited portion of a farm with the remainder of the farm being deed-restricted.
- (c) Designate the approximately 20 cultural resource districts (CRDs) that have been identified but not yet designated by the Commission.
- (d) Designate any undesignated significant resource for which a Certificate of Appropriateness has been required. Without designation, the protection afforded by a Certificate of Appropriateness expires after two years.
- (e) Consider whether the application exemption for the demolition of structures that are less than 50 years old should be expanded to a longer time period (less than 100 years old?).
- (f) Establish a termination date for validity of Certificates of Filing, public development approvals, and letters advising applicants that local agency permits and approvals may take effect. Renewals may be granted if no CMP or zoning changes have occurred in the interim. Should this be retroactive?
- (g) Consider incorporating a “time of application” standard.
- (h) Eliminate the limitation of one principal use per parcel in certain situations or entirely, leaving such determination up to municipalities.
- (i) Clarify that all public development applications must comply with certified municipal master plans and ordinances (ex. management area/zoning boundaries and PDC obligations, at a minimum).
- (j) Incorporate sustainable land use planning and development standards (ex. LEED; mixed-use and walkability planning; clustering in RGA, Towns and Villages).
- (k) Amend the CMP to expressly authorize Pinelands municipalities to require in-lieu recreation fees for residential development.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.

Master List of Plan Review 4 Action Items

- (l) Adopt requirements regarding municipalities' open space and recreational facility ordinances in association with residential development.
- (m) Consider establishing a maximum limit to the extent of paved roads permitted in Preservation Area District and Forest Areas.
- (n) Identify ways to better protect wildlife from vehicular impacts.
- (o) Establish a low-cost program to provide incentives for road project applicants to use native plantings and soils voluntarily (ex. press release, public presentation, competition amongst municipalities/counties for highest volume/percentage of natives per year, etc.).
- (p) Clarify in which management areas public sanitary sewer service may be used regularly and in which management areas public sanitary sewer service may not be used without special circumstances.
- (q) Clarify that the CMP's water quality standard is 2 ppm total nitrogen, which is intended standard and current practice.
- (r) Consider requiring the use of alternate design septic systems for all applications that are granted a Waiver of Strict Compliance from the 5' to seasonal high water table standard for septic systems.
- (s) Review the newest wastewater treatment standards provided by NJDEP's wastewater treatment rules (N.J.A.C. 7:9A) and consider whether CMP revisions are needed to clarify our policies and comply with NJDEP's.
- (t) Consider adding specific habitat restoration standards to the forestry rules to ensure that lands managed for forestry are successfully creating and/or maintaining appropriate habitat conditions to support rare and native species.

^xTopics **not** to be addressed as part of Plan Review as a result of Committee discussion.