



Forest Action Plan Five-year review



Addendum to
NEW JERSEY
Forest Action Plan

November 2015



State Forestry Services
Department of Environmental Protection
State of New Jersey

Addendum to the New Jersey Forest Action Plan:

SYNOPSIS OF NATIONAL PRIORITIES

&

FIVE-YEAR REVIEW OF STATUS

The 2008 reauthorization of the Federal farm bill established the requirement at 16 U.S.C. §2101a that, to continue to be eligible for Federal forestry grant funding, a state must develop a document that provides a state-wide “assessment” of forest resource conditions and offers long-term State-wide forest resource “strategies,” including strategies for addressing threats to forest resources in the State. In conformance with this requirement the State Forestry Services (SFS) in the New Jersey Department of Environmental Protection (NJDEP) submitted to the United States Department of Agriculture (USDA), Forest Service a document entitled “New Jersey Statewide Forest Resource Assessment & Strategies 2010.” This document has come to be known as New Jersey’s Forest Action Plan.

Pursuant to Federal guidance, the Forest Action Plan is a ten-year plan. The current year 2015 is the mid-point of New Jersey’s Forest Action Plan, and the USDA Forest Service requires a “five-year review,” both within the state and with the USDA Forest Service, of actions taken and contributions made toward plan implementation over the past five years. The “Accomplishments” table below has been prepared to provide implementation highlights. It is intended to be a broadly indicative, but by no means comprehensive, overview of work undertaken by many parties that contributes to the strategies set forth in the plan.

The 2008 farm bill and supplemental Federal guidance called for State Action Plans to be consistent with three national priorities identified by the USDA Forest Service, State and Private Forestry (S&PF). These national priorities are:

- Conserve and Manage Working Forest Landscapes for Multiple Values and Uses
- Protect Forests from Threats
- Enhance Public Benefits from Trees and Forests

The national priorities have come to be referred to as the “National S&PF Priorities for State Forest Action Plans,” but in New Jersey’s Forest Action Plan they are called “National Themes.”

The “strategies” portion of New Jersey’s Forest Action Plan starts on page 64 of the plan and begins with identification of the three national priorities. This initial identification is followed by three sections, each of which in turn addresses one of the national priorities. Within each section, strategies that address the respective priority are offered. The first of these sections begins on page 64, the second on page 89, and the third on page 99.

The National Priorities are broad goal statements. Under each “National Theme,” the plan identifies sub-themes that serve as the plan’s objectives. The intent is that by pursuing each of the objectives listed under a National Theme, progress can be achieved toward the broader goal. The sub-themes in New Jersey’s Forest Action Plan are those recommended in the guidance developed jointly by the USDA Forest Service, State and Private Forestry, Northeastern Area and the Northeastern Area Association of State Foresters.

New Jersey's Forest Action Plan identifies strategies to be carried out to make progress toward the sub-themes (objectives). The "Accomplishments" tables that follow are organized by National Theme and, within each National Theme, by sub-theme. The strategies given in the plan are presented for each sub-theme. Then, to provide a status report at this mid-point of plan implementation, a bullet-point list is provided for each strategy of actions taken and other contributions made over the past five years toward carrying out the strategy. The actions listed often, in fact, contribute to more than one strategy and across themes, but may be reported only under one strategy to minimize repetition. This "five-year review" listing has been prepared as an addendum to New Jersey's Forest Action Plan.

NJDEP's implementation of Forest Action Plan strategies is carried out in coordination with the implementation of the National Wildfire Cohesive Strategy established by the Wildland Fire Leadership Council. This strategy provides a national vision for wildfire management. It focuses on three goals:

- Restore and maintain landscapes
- Fire adaptive communities
- Response to Fire

The "restore and maintain landscapes" goal is addressed through the SFS's on-going prescribed burning and mechanical fuel mitigation programs cited in the "Accomplishments" table below under Sub-theme 2.1. The "fire adaptive communities" goal is addressed through the SFS's Firewise Communities, Community Wildfire Planning and Mitigation and Wildfire Awareness programs. The effort to engage communities in becoming more resilient to impact by wildfire is cited in the table below under Sub-theme 3.3. The "response to fire" goal is addressed in the table below under Sub-theme 2.2 where the SFS's wildfire control accomplishments are cited.

Acknowledgements

The State Forestry Services wishes to acknowledge and express its appreciation for the contributions made by the following programs and organizations to this five-year review status report.

State agency contributors:

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Division of Fire Safety

New Jersey Department of Environmental Protection:

Division of Air Quality

Division of Fish & Wildlife

Green Acres Program

Office of Coastal & Land Use Planning

Office of Environmental Restoration

Office of Natural Resource Restoration

Office of Science

State Park Service

Water Monitoring and Standards

New Jersey Highlands Council

New Jersey Natural Lands Trust

New Jersey Pinelands Commission

Federal contributors:

National Park Service:

Delaware Water Gap National Recreation Area
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USDA Farm Service Agency:

New Jersey State Office

USDA Forest Service:

Northeastern Area, State & Private Forestry
Northern Research Station/Silas Little Experimental Forest

Other contributors:

Drexel University-Laboratory of Pinelands Research

Duke Farms

Forest Stewards Guild

New Jersey Audubon Society

New Jersey Conservation Foundation

New Jersey Highlands Coalition

New Jersey Invasive Species Strike Team

New Jersey Shade Tree Federation

New Jersey Tree Foundation

Rutgers University

The Land Conservancy of New Jersey

The Nature Conservancy

INDEX to Accomplishments Table (2010 – 2015):

National Theme: Conserve And Manage Working Landscapes For Multiple Values And Uses		
Sub-Theme 1.1: Identify and conserve high priority forest ecosystems and landscapes		
Strategy 1:	Work with partners, stakeholders, and communities to identify and protect priority forest landscapes through land acquisition and conservation easements	7
Strategy 2:	Work with partners, stakeholders, and communities to identify and protect priority forest landscapes through land use policies	10
Strategy 3:	Provide technical assistance to communities...	12
Strategy 4:	Highlands Region...	13
Strategy 5:	Pinelands National Reserve...	14
Strategy 6:	Delaware River Watershed...	16
Strategy 7:	Suppress advance of southern pine beetle infestation	17
Strategy 8:	Atlantic white-cedar resource...	20
Strategy 9:	The State Forest Nursery will collect, produce and store seeds of tree species of special concern...	23
Sub-Theme 1.2: Actively and sustainably managed forests		
Strategy 1:	Continue to support the Department of the Treasury's Farmland Assessment Program...	24
Strategy 2:	Continue to support the implementation of the Forest Stewardship Program...	25
Strategy 3:	Encourage landowners to prepare dual FLA / FSP Plans so they can qualify for both programs	26
Strategy 4:	Forestation program of the State Forest Nursery...	26
Strategy 5:	The State Forest Nursery will continue to maintain several tree seed orchards...	27
Strategy 6:	Urban and Community Forestry goal...	28
Strategy 7:	Citizen Action Goal...	30
Strategy 8:	Community Partnerships and Special Projects Goal...	30
Strategy 9:	Program Monitoring and Evaluation Goal...	32
Strategy 10:	Information, Research, and Public Awareness Goal...	32

National Theme: Protect Forests From Threats		
Sub-Theme 2.1: Restore fire-adapted lands and reduce risk of wildfire impacts		
Strategy 1:	Maintain an active prescribed burning program...	35
Strategy 2:	Initiate and participate in multi-agency forest management activities	35
Sub-Theme 2.2: Identify, manage and reduce threats to forest and ecosystem health		
Strategy 1:	Address threats from insects and disease...	38
Strategy 2:	Address threats from invasive plant and animal species	39
Strategy 3:	Address threats from air pollution	42
Strategy 4:	Address threats from wildfire	42
Strategy 5:	Address overabundant deer	43
Strategy 6:	Address other threats	44

National theme: Enhance public benefits from trees and forests		
Sub-Theme 3.1: Protect and enhance water quality and quantity		
Strategy 1:	To avoid discouraging forest management that is compatible with protection of water resources, revise procedures...	46
Strategy 2:	Protect water resources in streamside management zones and filter strips, at stream crossings, and during timber harvesting	46
Sub-Theme 3.2: Improve air quality and conserve energy		
Strategy 1:	Improve air quality, reduce energy consumption and produce biomass...	48
Strategy 2:	Consider human population characteristics and trends	48
Sub-Theme 3.3: Assist communities in planning for and reducing forest health risks		
Strategy 1:	Assist communities in identifying wildfire risks...	49
Strategy 2:	... support counties' required development of a Wildfire Response Plan...	51
Strategy 3:	Measure and map hazardous fuel loads	52
Sub-Theme 3.4: Identify, manage and reduce threats to forest and ecosystem health		
Strategy 1:	Identify forest landscape areas where there is a real, near term potential to access and supply traditional, non-timber, and/or emerging markets...	53
Strategy 2:	Recognize that forestry in New Jersey tends not to be driven by direct economic return...	53
Strategy 3:	Improve State lands and private lands under a forest stewardship or woodland management plan...	54
Sub-Theme 3.5: Protect, conserve and enhance wildlife and fish habitat		
Strategy 1:	Protect, conserve, and restore forested wildlife habitat...	55
Strategy 2:	... actively coordinate forest management with habitat improvement projects...	56
Strategy 3:	The continued decline and corresponding mortality of hemlock...	57
Strategy 4:	...enhance habitat for a range of other species, including ruffed grouse...	57
Strategy 5:	The Berkeley Triangle Project's objective...	57
Sub-Theme 3.6: Connect people to trees and forests, and engage them in environmental stewardship activities		
Strategy 1:	Find opportunities to educate the people on the value of natural resources...	58
Strategy 2:	Engage people in environmental stewardship activities	60
Sub-Theme 3.7: Manage trees and forests to mitigate and adapt to global climate change		
Strategy 1:	Manage trees and forests to mitigate and adapt to global climate change	62

ACCOMPLISHMENTS TABLE (2010 – 2015):

Strategy 1	
<p style="text-align: center;">NATIONAL THEME: CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES</p>	<p style="text-align: center;">Sub-Theme 1.1: Identify and conserve high priority forest ecosystems and landscapes</p>
<p>Work with partners, stakeholders, and communities to identify and protect priority forest landscapes through land acquisition and conservation easements</p>	
<ul style="list-style-type: none"> • In the period from January, 2010, to May, 2015, NJDEP’s Green Acres program has acquired or participated in the acquisition of 36,248 acres. Of this 24,324 acres were assigned and administered as State lands, 8,526 acres were acquired by local governments with Green Acres funding assistance, and 3,398 were acquired by non-profits with Green Acres funding assistance. About 55 percent of this acquired land is forested. Land acquired as State land is assigned internally to a program responsible for its management, such as the State Park Service or the Division of Fish and Wildlife. As an example, over the past five years, the lands assigned to Bass River State Forest for management has increased by about 500 acres. • Acquisitions have been made through NJDEP’s Green Acres Program to connect forest corridors in Warren County. These parcels are managed by Spruce Run Recreation Area and other State Park Service units to provide for recreational trail use. • NJDEP’s Office of Natural Resource Restoration has assisted in funding numerous land acquisition projects in the past five years. Many were acquired in partnership with NJDEP’s Green Acres Program, local governments and land trusts (identified below). These include the following projects, some of which are entirely forested and others of which include both forest and other habitat types. <ul style="list-style-type: none"> – The Reinhardt property, 60 acres in Cranbury Township, Middlesex County – The Cider Mill property, 89 acres in East Amwell Township, Hunterdon County with the Delaware and Raritan Greenway Land Trust – Additions to the NJ Conservation Foundation’s Horseshoe Bend Preserve in Kingwood Township, Hunterdon County – The Rothpletz property, 160 acres in Tewksbury Township, Hunterdon County within the NJ Conservation Foundation’s Hill and Dale Farm Preserve – The Hauser Farm property, 22 acres bordering Matawan Creek in Aberdeen Township, Monmouth County – The Ashland Wood acquisition, 19 acres in Voorhees Township, Camden County – The Sullivan property, 26 acres in Tewksbury Township, Hunterdon County, with the Tewksbury Land Trust – The Wilson property acquisition, 89 acres of forested land in Monmouth County – The Ponderosa property, 50 acres in Ringwood Township, Passaic County, with the Passaic River Coalition 	

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 1 continued)

- NJDEP actively participates in two Federal programs, the Forest Legacy Program and the Highlands Conservation Act Program, that protect land in the Highlands. NJ's Forest Legacy Committee, in applying the eligibility criteria to the state's forests, determined that NJ's Forest Legacy Area would be the Highlands Region. Also the Highlands Region has been identified as one of the Green Acres Program's 22 project areas. Since 2010, New Jersey has acquired approximately 780 acres under the Highlands Conservation Act and 305 acres under the Forest Legacy program. With the endorsement of the Forest Stewardship Coordinating Committee, the State is working toward a conservation easement over approximately 3,300 additional acres of forested land in the Highlands through the Forest Legacy Program and a fee acquisition of approximately 70 acres under the Highlands Conservation Act.
- NJDEP consults with the Forest Stewardship Coordinating Committee on the criteria for forest areas to be considered under the Federal Forest Legacy Program and votes on whether to endorse the acquisition of proposed tracts in the NJ Highlands Region. Under Forest Legacy tracts may be purchased outright (fee simple) or an easement may be established. Between 2010 and 2015, the Forest Stewardship Coordinating Committee voted twice on new projects, which became the subject of NJDEP's FY12 and FY13 Forest Legacy Program applications. The Committee also voted to amend the FY08 project and then later to amend the FY08, FY10 and FY12 projects.
- The protection of 305-acres through a Forest Legacy project in Hopatcong Borough, completed in February 2014, represents a cooperative land conservation effort by the landowner, The Land Conservancy of New Jersey, the NJDEP's Green Acres program and the New York-New Jersey Trail Conference. A goal was to prevent forest fragmentation and maintain a natural corridor that begins in Sparta and continues south through Byram and Hopatcong. The NY-NJ Trail Conference has since realigned 1.4 miles of the Highlands Trail onto the property, rerouting a former road walk along County Route 605. The Highlands Trail continues west toward the Byram Bike Trail and Lubbers Run Preserve and north through Hopatcong's Natural Lands Preserve. The heavily forested property, once slated for massive, multi-unit development, has a hilly terrain, with rock outcrops, boulders, steep slopes covered with mature forest, and vernal pools. Cowboy Creek runs through the property and is a tributary to Lubbers Run, which flows to the Musconetcong River.
- NJ's Highlands Water Protection and Planning Council's Forest Stewardship Program is under construction.

- In the 2010 to 2015 period, the NJ Conservation Foundation acquired land in fee for conservation: 2,500 acres in the Pinelands Area, 700 acres in Highlands Preservation Area and 400 acres in the Highlands Planning Area. It has additionally acquired conservation easements, almost entirely on farmland, using Federal Farmland Ranchland Protection funds.
- The Land Conservancy of New Jersey (TLC-NJ) in the summer of 2010, with support from the Morris County Preservation Trust Fund, the Morris County Municipal Utilities Authority, and NJDEP's Green Acres Program, acquired for conservation a 135-acre, partially-developed tract near the headwaters of the South Branch Watershed in Mount Olive. The former owner had built more than a mile of gravel roads, channelized streams with seven concrete culverts, and constructed two large detention basins and a home foundation, while stockpiling massive piles of construction debris, boulders, and soil throughout the property. The result was the destruction of wetlands, the diversion and siltation of streams, the fragmentation of a healthy mature interior forest, the destruction of plants and trees, and the disruption of the property's hydrology. TLC-NJ removed the detention basins, demolished the concrete headwalls and the home foundation, and removed the stream culverts. Each of the streams was painstakingly reconstructed with rocks and boulders from the site, and more than 1,000 native trees and shrubs were planted. The entire site was seeded with native grasses to hold the soil and allow the planted trees and shrubs time to become established. A fence was built around more than 100 acres of the site, to a height of seven and a half feet, to restrict White-tailed deer (*Odocoileus virginianus*) (deer) and provide protection from over-browsing by deer.
- From 2010-2015 the New Jersey Chapter of The Nature Conservancy has protected more than 6,600 acres in high priority forest ecosystems including:
 - More than 5,400 acres of Pine Barrens forest, wetlands, and tidal streams in Atlantic and Cumberland Counties
 - Nearly 400 acres of mixed forest types and freshwater wetlands along the Kittatinny Ridge and Upper Delaware River watershed within Montague, Sandyston and Stillwater Townships, Sussex County
 - Over 140 acres of limestone forest and freshwater wetlands within the Highlands Planning Area in Frelinghuysen Township, Warren County
 - Almost 600 acres of forests and freshwater and tidal wetlands within the Delaware Bay/Cumberland Forest in Cumberland County
 - 30 acres of Cape May Forest along the peninsula in Middle Township, Cape May County

Strategy 2

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

Work with partners, stakeholders, and communities to identify and protect priority forest landscapes through land use policies

- The SFS developed a prioritization protocol for inventory and planning for management of State-owned forest lands. Approximately 320,000 acres of State-owned forest across 31 properties has been prioritized for inventory and planning over next 10 years.
- The SFS has issued a contract for the inventorying of approximately 31,378 acres of priority forests in the first year (2015) of the 10-year inventory process.
- In October 2012 the Division of Fish and Wildlife formed a multi-partner, multi-disciplinary working group, made up of representatives from over 40 agencies across the state, including NJ DOT, and several other state, Federal and local agencies and academic and non-profit organizations for the development of a statewide habitat connectivity plan. The Connecting Habitat Across New Jersey – or CHANJ - project represents a strategic plan for wildlife conservation that will identify key areas and the actions needed for preserving and restoring habitat connectivity for terrestrial wildlife in New Jersey. This initiative is designed to help 1) prioritize land protection, 2) inform habitat restoration and management, and 3) guide mitigation of road impacts on wildlife/habitats. Core teams (Mapping, Guidance Document, and Communication) from within the larger working group have been meeting and communicating regularly to further the project.
- The Division of Fish and Wildlife has engaged in preparing a new State Wildlife Action Plan (SWAP) to replace the current SWAP which expires this year. The new plan will incorporate Landscape Project findings directly into the plan as a guide and reference for conservation. It will also take into consideration species of special concern and species of greatest conservation need that are not captured by T&E rankings. This includes a multitude of incredibly rare forest insects, in particular forest moths and a couple of bees (*Apoidea: Anthophila*) and tiger beetles in the Pinelands (*Cicindela dorsalis dorsalis*).
- The Homeowner Firewood Program and the Slash Harvest Program administered through permits issued by the State Park Service, promote use and public awareness of forest products. For example, Bass River State Forest implemented the Homeowner Firewood Program each year between 2008 and 2014. Under this program homeowners were permitted, at a cost of \$25 per cord, to fell and harvest for firewood trees that had been marked for removal by the SFS. The trees were selected for removal in accordance with a Forestry plan that is designed to thin the forest to create habitat for red-headed woodpeckers (*Melanerpes erythrocephalus*). A total of 275 cords were removed.

- Under internal policy, NJDEP land managers submit projects for “land management review” to obtain approval to proceed with the project. The manager proposing the project prepares an Activity Review Form describing the project. Reviewers in the Division of Fish and Wildlife, Historic Preservation, and SFS consider the project and verify that its impact is not inconsistent with safeguarding the resources it is their program’s responsibility to protect. Since 2010 close to 400 projects have undergone this review, including nine projects proposed to be carried out in Bass River State Forest.
- To protect the natural resources on its lands, Bass River State Forest created and established an Off-Road Motorcycle Event Policy. This policy prohibits the use or creation of user-created single track trails.
- In 2014, the New Jersey Invasive Species Strike Team analyzed 100% of New Jersey and then selected 25 priority forest focal areas to prioritize its early detection/rapid response (“ED/RR”) efforts. The Strike Team utilized the Landscape Project (version 3.1, product of the NJDEP’s Division of Fish & Wildlife Endangered and Nongame Species Program (ENSP)) as the basis of the forest analyses. ENSP provided spatial data for all contiguous forest patches (including upland and wetland types). Attributes included: patch size, core patch size, core area index, Landscape Project patch rank, and Landscape Project rare animal species richness. In addition, ENSP performed analyses to incorporate additional data sources including NJDEP’s Natural Heritage Program, NJ Audubon Society and The Nature Conservancy. For each of these sources, analyses were performed to determine the percentage of overlap with each forest patch. For Natural Heritage Program data, the percentage overlap of named Priority Sites was determined. In addition, rare plant species richness per forest patch was calculated utilizing their grid data. For NJ Audubon Society, the percentage overlap of Important Bird Areas (“IBA”) with each forest patch was calculated. For The Nature Conservancy, the percentage overlap of resilience category hexagons categorized as ‘Far Above Average’ and ‘Above Average’ with each. Based upon this, the Strike Team selected the ten largest forest patches from each of NJ’s five Landscape Regions (i.e., Atlantic Coastal, Delaware Bay, Piedmont Plains, Pinelands and Skylands) for comparison within their respective Landscape. For each forest patch, each measured attribute value was converted to the relative percentage of the maximum value across all 50 forest patches. The sum of each relative attribute value was summed across all attributes to provide each forest patch with an overall score. For simplicity, each attribute was provided equal weight. The forest patches with the top five overall scores within each Landscape Region were designated as the core of each priority forest focal area.

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 2 continued)

- NJ's Highlands Water Protection and Planning Council, through the implementation of the Regional Master Plan adopted pursuant to the Highlands Water Protection and Planning Act of 2004 and the Plan Conformance process, is working with communities in the Highlands Region to modify land use ordinances with regard to forest resources.
- NJ's Farmland Assessment Program, administered under rules promulgated by the Department of the Treasury, promote conservation of forest land by enabling private landowners to qualify their forest lands for reduced property taxes. In 2009 the Legislature enacted a Forest Stewardship Law that will enable landowners to qualify forest land for this tax status without selling forest products, provided the land is managed under a Forest Stewardship Plan approved under rules to be promulgated by NJDEP. Over the past five years SFS has worked to draft these rules. Multiple stakeholders, including the NJ Conservation Foundation, have participated in the stakeholder process for this rulemaking and have offered comments and recommendations to the SFS staff.

Strategy 3

Provide technical assistance to communities to help them strategically plan for and conserve forests and other open space

- NJDEP's Green Acres Program works with local governments and nonprofit conservation organizations by providing technical assistance on conserving forests and open space, participating in Green Tables and reviewing open space plans.
- New Jersey Pinelands Commission staff routinely discusses forestry application requirements and standards with municipal officials in the Pinelands Area.
- NJ's Highlands Water Protection and Planning Council is currently drafting a forest technical guidance manual, model ordinances and a model stewardship program for Highlands municipalities.
- The Shortleaf Pine Initiative held a stakeholder workshop in Waretown in March 2014 to discuss restoration strategies. In addition to the USDA Forest Service and the SFS, participants included the Division of Fish and Wildlife, forestry consultants, the Natural Resources Conservation Service, representatives of non-profits, and private landowners. Shortleaf pine seedlings produced annually by the State Forest Nursery are available to support restoration initiatives on both public and private lands.

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 3 continued)

- The New Jersey Invasive Species Strike Team initiated outreach to landowners within priority forest focal areas and developed new partnerships with the following landowners and organizations working in/near the areas during 2014: two tree farmers in northern New Jersey, the State Park Service, the Great Egg Harbor Watershed Association, the American Littoral Association, East Amwell Township, the Cape Island Habitat Restoration Task Force, the Northeast Exotic Plant Management Team, Roosevelt Borough, the Raritan-Piedmont Survey Citizen Science program of NJ Audubon, Fox Farm, Rutgers' Environmental Stewards program, the Hunterdon Land Trust, Friends of Wallisch Homestead, the Rancocas Nature Center Chapter of the Native Plant Society of New Jersey, and the NJ Woodland Stewards Program.
- The Rutgers University Urban Forestry Program partnered with SFS to provide an 11 credit hour inventory training workshop at the NJ Shade Tree Federation's Annual Conference in October 2014. This workshop was developed to encourage municipal shade tree program volunteers to conduct and utilize street tree inventories in the management of their public tree resource, and was attended by representatives from 22 municipalities throughout New Jersey. Many attendees began the inventory process in their communities in spring 2015.

Strategy 4

Highlands Region: Work with landowners currently enrolled in the Farmland Assessment and Forest Stewardship Programs to encourage sustainable forest management for healthy forests, water quality and supply, and wildlife habitat. Conduct outreach to enroll new participants into these programs and encourage those already enrolled to manage in accordance with their approved plans. Support other ecosystem conservation

- In the 2010 to 2015 period the SFS approved over 3,000 Forest Stewardship and Farmland Assessment plans; approximately 40 percent of these were for properties in the Highlands Region. Consultant foresters on NJDEP's Approved Forester List prepare these plans for private landowners. To qualify for approval a plan must meet the required criteria and be designed to minimize disturbance to and avoid degradation of freshwater wetlands, their associated transition areas, and riparian flood hazard areas. Conformance with the "New Jersey Forestry and Wetlands Best Practices Manual," 1995, is recommended. This manual recommends practices for a range of resource protection goals in addition to protection of water quality, such as protection of threatened and endangered (T&E) species, insect and disease suppression, and prescribed burning for prevention and control of wildfires.

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 4 continued)

- ENSP has partnered with the Natural Resources Conservation Service, nonprofit conservation organizations, and consultant foresters to enroll private landowners within the focal area for golden-winged warblers (*Vermivora chrysoptera*) in northwestern NJ in an incentive program to manage forests for golden-winged warblers. As a result, several landowners have agreed to submit new or modify the existing forest stewardship plans for their property. Since its launch in 2012, six landowners representing almost 3,500 acres have enrolled in the incentive program and are actively managing portions their forests for wildlife in the Highlands Region.
- NJ's Highlands Water Protection and Planning Council has mapped priority core forests (i.e., forest that is more than 300 feet from altered land or a road) for the Highlands Region, by HUC14 subwatershed, in 88 municipalities, covering greater than 850,000 acres.
- The Land Conservancy of New Jersey, during the period from fall 2013 to spring 2015, carried out a forest restoration initiative in the NJ Highlands Region, along the south branch of the Raritan River. Thirty-four volunteers and 14 staff, aided by a professional landscaper, planted 8,270 trees and shrubs over a 37 acre area in Mt. Olive Township.
- NJ's Highlands Water Protection and Planning Council's Forest Stewardship Program is under construction.

Strategy 5

Pinelands National Reserve: In cooperation with Pinelands Commission, coordinate efforts to develop forest resource management plans that will maintain and enhance the ecological integrity of the Pinelands Region. Proper natural resource management will insure that the unique characteristics of this area will remain for generations to come

- Pursuant to the Pinelands Protection Act at N.J.S.A.13:18A-1 et seq., forestry activity proposed for the Pinelands Area must meet the regulations and standards contained in the Pinelands Comprehensive Management Plan (CMP). During the 2010-2015 period, the Pinelands Commission reviewed approximately 200 Forest Stewardship Plans (i.e. development applications) proposing the management of more than 30,000 acres of private lands in the Pinelands Area. Nearly half of these lands are located in the central most ecologically pristine region of the Pinelands. Approximately 25 of the 200 plans submitted for review were determined not to require application to the Pinelands Commission (i.e., were found to be "exempt" from Pinelands CMP approval requirements), based upon the minimal quantity of the proposed annual harvest, and approximately 175 of the 200 applications were deemed "complete" and ready for submission to obtain municipal permit approval. This review process allows active management of forest resources, but ensures that hundreds of acres of some of the most sensitive ecosystems in the region are conserved and protected.

(Strategy 5 continued)

- In 2015, the SFS prepared a forest management plan for the forest lands in Double Trouble State Park (approx. 8,500 acres) with the participation of the NJDEP's Natural Heritage Review Group, which includes the Division of Fish and Wildlife, the Historic Preservation Office, and the State Park Service, as well as the SFS. The plan is currently under review by the Pinelands Commission.
- In the five-year period between 2010 and 2015, the Pinelands Commission has approved public development forestry applications for the management of approximately 2,700 acres of public lands, including the Richard Stockton College of New Jersey Forest Stewardship Plan.
- For the protection of endangered and/or threatened animal species or endangered plant species or plant species of concern, NJDEP's rules at N.J.A.C. 7:1D-3.2(a) prohibit public disclosure of their precise location. To conform with this, but also to preserve its review of Forest Stewardship Plans as an open public process, the Pinelands Commission has developed a "dual map" protocol for its Forest Stewardship Plan review that is used when a "stand map" submitted with a plan contains sensitive information. Members of the public are provided access to the maps included in a proposed Forest Stewardship Plan, but the version they are allowed to see provides only generalized locations of the sensitive information. Stand maps showing the exact locations of sensitive information is available only for staff review and reference.
- The NJ Pinelands Commission is coordinating with SFS to streamline the review process for forestry applications for both private and State-owned public lands.

--For private lands, the two programs have adopted a joint SFS/Pinelands Commission review procedure for forestry activity proposed to be carried out under a Forest Stewardship Plan. The procedure is designed to ensure that the criteria of both the USDA Forest Service's "Forest Stewardship Program National Standards and Guidelines" and the Pinelands CMP are met. The review is performed by a joint Pinelands Stewardship Technical Subcommittee. Since 2010, these private lands forestry reviews have been conducted and coordinated electronically, with weekly communication by telephone or email. In-person subcommittee meetings may be still be scheduled if needed to resolve issues. The capacity to share GIS data and maps electronically for these joint reviews continues to improve.

--For public lands managed by the NJDEP, discussions were begun in 2014 toward the development of an agreement which would streamline the review/approval process for SFS applications for forestry projects in the Pinelands Area. The drafting of a pre-application checklist for forestry applications associated with development of this draft agreement is nearing completion.

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 5 continued)

- The SFS is implementing a 64-acre management project to allow regeneration of native Pinelands species in Brendan T. Byrne State Forest in the NJ Pinelands. The project began in 2014. The project plan was reviewed and as applicable its implementation supported by NJDEP’s Natural Heritage Review Group.
- Through the USDA Forest Service’s North Atlantic Fire Science Exchange, the Forest Guild helped organize a stakeholder meeting held April 7, 2014, at the Rutgers EcoComplex in Columbus, NJ, on the management of fire-adapted ecosystems such as that found in the Pinelands. Topics included discussion of silvicultural treatments. Federal, State, and local government representatives attended, including the SFS, as well as non-profit and private sector participants.
- The Pinelands CMP requires landowners proposing to carry out forestry in the Pinelands Area to observe Streamside Management Zones (SMZ) at least 25 feet in width, as a buffer to protect both water quality and threatened/endangered plant and animal habitat. Many of the Forest Stewardship Plans reviewed by the New Jersey Pinelands Commission during the 2010 to 2015 period included such zones. The Pinelands Commission required expanded SMZs, ranging from 100 feet to 300 feet, to be included in some Forest Stewardship Plans to protect T&E species.
- Since 2010 the Drexel University Laboratory of Pinelands Research has been conducting a comprehensive insect survey (CIS) on Warren Grove Range (WGR), an active air-to-ground located gunnery range operated by the 177th Fighter Wing of the New Jersey Air National Guard. A key focus of the research is to examine the effect of fire on suites of insects pre- and post-fire within different fire stands. Insects can provide a wide range of benefits, especially the pollination of native plants and local agricultural crops (e.g., blueberries and cranberries). In contrast, some insect pests (e.g., the southern pine beetle (*Dendroctonus frontalis*) (SPB)) can disrupt ecosystems by killing trees, thus increasing standing fuel loads and increasing risk of intense wildfire. Our preliminary data suggests that insect assemblages follow a successional pattern as forest stands recover from fire over time.

Strategy 6

Delaware River Watershed:

Under the Common Waters Program of the Pinchot Institute, coordinate forest stewardship activities of landowners currently enrolled in the Farmland Assessment and Forest Stewardship Programs. Conduct outreach to enroll new participants into these programs

- The National Park Service’s Delaware Water Gap National Recreation Area participates in and supports the Common Waters Program.

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 6 continued)

- The Common Waters Partnership, led by the Pinchot Institute for Conservation and launched in 2011, aims at supporting the link between healthy, abundant forests in the Upper Delaware River watershed and clean drinking water downstream. In NJ, in addition to collaborating with the SFS, Common Waters works with municipalities, soil conservations districts, water utilities and county planners. Upstream it provides financial incentives for landowners to sustainably manage and conserve forest land in order to protect sources of high-quality drinking water. Downstream, it offers educational programs for local governments and the general public on the connections between forests and the faucet.
- The New Jersey Chapter of The Nature Conservancy (TNC) conducted outreach to 20 landowners in Common Waters priority landscapes in Sussex County. As a result of that outreach:
 - TNC in partnership with the Wallkill River Watershed Management Group utilized Common Waters funding to complete a riparian tree planting project on private land that consisted of more than three thousand tree materials covering 40 acres along 1 mile of river frontage on the Paulins Kill in Lafayette Township, Sussex County; and
 - In partnership with NJ Audubon, enrolled a landowner in Sandyston Township, Sussex County to conduct 10 acres of invasive species management to restore forest health.

Strategy 7

Suppress advance of Southern pine beetle infestation

- The SFS conducted aerial monitoring surveys each year, including for SPB. The purpose of the flights was to identify canopy discoloration that may be caused by SPB infestations. SFS ground crews follow up with on-ground site inspections on State lands to verify SPB infestation and develop control recommendations.
- In 2011, the SFS applied for and was awarded a \$600,000 National Fire Plan grant from the USDA Forest Service for the mitigation of SPB in the Pinelands Region (“An integrated approach to SPB control and mitigation in the Pinelands Region, 2011”). The grant provided monies for SPB suppression on State lands (\$60,000) and monies to be awarded as sub-grants for reimbursement by the SFS to Firewise communities and associations (\$200,000) and to counties and municipalities (\$200,000) that carry out suppression activities. There was also “pass through” funding provided to the NJ Forestry Association for it to use to award SPB suppression sub-grants to private landowners (\$90,000).

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 7 continued)

- Since 2011 SFS has supported direct SPB suppression efforts on State lands with an average annual expenditure in excess of \$100,000 of State funds.
- Since receiving the 2011 Federal grant, SFS has actively communicated the availability of sub-grant funds and the reasons suppression and proactive forest management are necessary to deter the spread of SPB. This communication has been carried out via FSP newsletters, NJ Forestry Association newsletters, conferences, training meetings, development of press releases, Rutgers Cooperative Extension educational programs, fact sheets that stress the need for an integrated approach to controlling SPB, and our website http://www.state.nj.us/dep/parksandforests/forest/njfs_spb.html.
- In the Pinelands Area, forestry is a regulated activity under the Pinelands Comprehensive Management Plan, promulgated at N.J.A.C. 7:50. For private lands two months is a typical period between application submission and approval. This is too time-consuming to address a rapidly advancing infestation. Therefore, in 2011, the SFS and the NJ Pinelands Commission entered into an agreement for expedited review and approval of plans for SPB suppression on private lands in the Pinelands Area. The expedited review is completed in one to three days and has worked well for private lands applicants.
- Pinelands Commission approval times for SFS's forestry plans for public lands in the Pinelands varies, but several months would not be uncommon. Therefore, in 2011, the NJ Pinelands Commission and SFS also developed a procedure for expediting Commission approval of SFS's forestry management activities to address SPB infestation on public lands. This procedure provides Commission authorization, with conditions, for the SFS to address infestations on State lands in the Pinelands Area.
- Because expediting approval procedures were allowed, it has been possible to secure approval and carry out, within the 2010-2015 five-year time period, SPB suppression activities on over 6,000 acres of public land in the Pinelands Area and on about 475 acres of private land.
- In 2012 SFS established a SPB science advisory committee. Membership included researchers from Dartmouth College, Rutgers and Stockton universities, an experienced private consulting forester, and representatives of the SFS, the USDA Forest Service, the Division of Fish and Wildlife, the NJ Pinelands Commission, and the State Park Service. The committee coordinated research initiatives, commented on the prioritization of control efforts, and promoted public outreach. Meetings of the full committee are held each year in May and October. Until July 2015, a subgroup has additionally met biweekly throughout the summer months.

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 7 continued)

- In 2012, at the recommendation of the SPB science advisory committee, the SFS developed a SPB Landscape Prioritization System. The system utilizes a Geographical Information System (GIS) model that prioritizes and ranks infestations for suppression. It is also used for post-control monitoring.
- In 2012 SFS controlled an aggressive SPB infestation in an historic Civilian Conservation Corps (CCC) old growth pine plantation located in Green Bank. Regeneration of this 12-acre site was promoted by selectively conserving a sample of representative seed trees to preserve the original CCC stand composition. The subsequent emergence of invasive Japanese stiltgrass (*Microstegium vimineum*) on site has been addressed by repeated applications of herbicide. The regenerating stand currently supports a documented population of the endangered red-headed woodpecker species (*Melanerpes erythrocephalus*).
- In 2013 SFS secured an additional Federal grant, a USDA Forest Health grant totaling \$940,000 for SPB suppression and prevention efforts on State lands. The grant included \$60,000 administered through Firewise to support SPB suppression and prevention efforts through cost share sub-grant reimbursements in Firewise municipalities and associations.
- With the funding provided for SBP suppression on State lands in the 2011 and 2013 grants, the SFS has minimized the impact of SPB on the heart of the globally-rare Pinelands habitat by controlling over 78 large infestations with mechanical cut and chip removal operations. An additional 212 smaller infestations have been controlled by the SFS's hand sawyer crews implementing the cut and leave control methods supported by the science advisory committee. Active forest management for control of SPB has ancillary benefits such as mitigation of wildfire hazard and wildlife habitat enhancement.
- Researchers at the Silas Little Experimental Forest of the USDA Forest Service and Dartmouth College have recently received a \$85,000 grant from the USFS Forest Health and Monitoring Program to measure changes in forest structure and fuel loading associated with the four treatment alternatives for SPB in southern New Jersey (No Action, Cut-and-Remove, Cut-and-Leave, Pile-and-Burn). Live basal area of trees and saplings of pines is reduced by approximately 90% in all treatment types, while oaks and mesic hardwoods are nearly unaffected. Initial fuel loading is high following needle abscission, but then understory and hardwood fuels dominate. Coarse woody fuels are much greater in cutting treatments, but these contribute little to the rapidly moving wildfires characterizing southern New Jersey. Measurements are continuing through 2015 and 2016, and will lead to a better understanding of the impacts of SPB on forest structure and composition. In addition, Duke Farms is modifying a fuel moisture dynamics model to evaluate the interactive effects of fuel characteristics and forest microclimate on wildfire risk in stands impacted by SPB.

Strategy 8

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

Address the decline, fragmentation, and restoration of the Atlantic white-cedar (*Chamaecyparis thyoides*) (AWC) resource within the State with an active cedar management program that includes planning, restoration, monitoring, data collection and analysis, and reporting methods and through engagement with partners. Priorities are:

- i. Forest Protection and Health - protection against damage causing agents**
- ii. State Forest Nursery and Tree Improvement - documented local seed source and supply**
- iii. State Forest and Tidal Marsh Restoration - reclaiming and restoring to ideal conditions**
- iv. Forest Stewardship Planning and Resource Certification- stewardship plan development and third party certification**
(each of these priorities addressed separately below)

i. Forest Protection and Health - protection against damage causing agents

- The SFS assisted Stockton University with a study of impacts of saltwater intrusion on AWC post Hurricane Sandy. Some findings were incorporated into a report issued by NJDEP's Office of Science assessing the damage to natural resources on State lands resulting from Hurricane Sandy. (Report cited below under Sub-Theme 1.2, Strategy 9).
- A few forestry-related violations in the Pinelands Area have been discovered and investigated during the past 2010-2015 five year period, including harvest and sale without State or municipal approvals. For example, an AWC harvest was discovered in Bass River in April 2014 and was jointly investigated by the Pinelands Commission, NJDEP, and municipal officials. Pinelands Commission staff has worked and will continue to work with SFS staff and municipal officials to resolve private land forestry violations. High Point State Park is continuing to carry out the Dryden Kuser Natural Area Plan, initially issued in 1995. The Dryden Kuser Natural Area, situated at 1,500 feet above sea level, contains an AWC swamp that is the highest white cedar swamp in the world. The Plan includes protection measures for the AWC population.

ii. State Forest Nursery and Tree Improvement - documented local seed source and supply

- Every year, from 2012 on, the State Forest Nursery has undertaken collection of AWC seed from Bass River State Forest and from stock plants at the Nursery grown from seed that originally came from Bass River. In 2012, 16 ounces of seed was collected; in 2013, two ounces, and in 2014, seven ounces.
- Since 2012, the State Forest Nursery has grown and sold AWC seedlings for reforestation projects: 13,550 seedlings sold in 2012; 4,500 in 2013; 1,800 in 2014; and 3,725 in 2015.

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 8 continued)

iii. State Forest and Tidal Marsh Restoration - reclaiming and restoring to ideal conditions

- While AWC is one of New Jersey’s characteristic native forest ecosystems, NJ’s AWC resource has declined to less than 30 percent of its extent before European settlement. Restoration of the AWC resource, particularly in the coastal areas of the southern half of the state, continues to be a priority. Private forest landowners and state entities that want to manage and / or restore AWC are encouraged do so in accordance with the AWC Best Management Practices Manual, 2003, and in conformance with NJDEP’s Freshwater Wetlands Protection Act rules and Flood Hazard Area Control Act rules and the Pinelands Comprehensive Management Plan.
- Under a USDA Forest Service Federal grant for the Northeast Corridor, Boston to DC project, the SFS completed restoration in 2012 of an approximately 21 acre AWC site in Double Trouble State Park that had been impacted by wildfire. As a part of the SFS’s AWC restoration initiative, the grant was also used to fund the re-introduction of prescribed fire to approximately 400 acres in order to protect the AWC resources in Double Trouble State Park from future wildfires.
- During the 2010-2015 period, the Pinelands Commission approved public-lands forestry applications for over 160 acres of AWC regeneration projects and private-land forest applications for a 250 acres AWC regeneration project.
- In 2012 the Pinelands Commission also approved an application submitted by a private landowner with an approved Forest Stewardship Plan because of Hurricane Sandy damage. It provided for AWC salvage and restoration on 26 acres in Woodland Township. The Commission also approved a public application for 25 acres of AWC salvage due to Hurricane Sandy in Double Trouble State Park.
- In the fall of 2014, the SFS filled its Utilization & Marketing position. One aim is to support the marketing of AWC which will help as an incentive for the re-planting and sustainable management of AWC.
- Since 2010 NJDEP’s Green Acres program has acquired several properties (over 5,287 acres) throughout the Pinelands region of the State that include AWC areas. These properties are being managed by the Division of Fish and Wildlife, the State Park Service, and/or the New Jersey Natural Lands Trust. Acquiring properties containing AWC areas supports the SFS’s goal of sustaining this tree species through planning, restoration, monitoring, data collection and analysis. The acquisition in 2012 of Lenape Farms (5049 acres) in Estell Manor City, Atlantic County, is one example of a land acquisition that contains large areas of forest resources including stands of AWC.

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.1:
Identify and conserve high priority forest ecosystems and landscapes

(Strategy 8 continued)

iii. State Forest and Tidal Marsh Restoration - reclaiming and restoring to ideal conditions *(continued)*

- Since 2010, the NJ Conservation Foundation has restored approximately 25 acres of wetlands that was previously used for cranberry agriculture; and about 110 acres total since 2005. The restoration includes a planted AWC component. All of this acreage has the capability to become more akin to cedar savanna, as the hydrology will not support dense stands of large, tall cedar. Numerous other acres (approximately 50 acres) within the nearly 1000 acre former cranberry agriculture restoration area at the Franklin Parker Preserve are reverting naturally to AWC in sinuous strands where the hydrology allows.

iv. Forest Stewardship Planning and Resource Certification-stewardship plan development and third party certification

- The New Jersey Legislature enacted legislation, signed by the Governor in January, 2010, that directed NJDEP to establish, by regulation, a Forest Stewardship Program and that amended the State's Farmland Assessment Act to allow landowners who manage their lands under a plan approved under those rules to qualify for taxation under Farmland Assessment, without having to harvest forest products. The SFS has since been engaged in drafting a proposal of Forest Stewardship Program rules.
- The SFS encourages private landowners to manage their forest lands under a Forest Stewardship Plan approved by the SFS as meeting the Federal forest stewardship program guidance issued by the USDA Forest Service (available at www.fs.fed.us/spf/coop/programs/loa/fsp.shtml) and/or a Woodland Management Plan approved by the SFS are satisfying the criteria for such plans set forth in the NJ Department of the Treasury's Farmland Assessment Act rules at N.J.A.C. 18:15-2.10 (available at <http://www.state.nj.us/treasury/taxation/pdf/lpt/regs/reg1815.pdf>).
- A bill (S2034/A1775) pertaining to management of State forest lands passed both houses of the New Jersey legislature in 2015, but was vetoed by the Governor. The bill would have required the Department to have its forestry plans for State lands be reviewed and approved by the nonprofit Forest Stewardship Council. Several environmental organizations, including the New Jersey Conservation Foundation supported the legislation, but others raised concerns that the bill would open State forests to commercial logging. A primary reason for the veto was that the third-party plan approval requirement would cause the Department of Environmental Protection to abdicate to the Forest Stewardship Council its responsibility to serve as the State's environmental steward. To address some of the concerns raised in the discussion of this legislation, the SFS has developed a process for developing forestry plans for State lands that follows international standards, ensures internal and external stakeholders are engaged, and encourages public comment.

NATIONAL THEME: CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES Sub-Theme 1.1: Identify and conserve high priority forest ecosystems and landscapes	<i>(Strategy 8 continued)</i>
	iv. Forest Stewardship Planning and Resource Certification-stewardship plan development and third party certification <i>(continued)</i>
	<ul style="list-style-type: none"> For properties with 10 acres or more of woodlands, Tree Farm Certification is affordable. Over 300 properties in New Jersey, covering over 54,000 acres of woodland, are certified under the NJ Tree Farm Program. Participating landowners manage their properties sustainably under a management plan that addresses air, water, soil quality, wildlife, special sites, invasive species and integrated pest management and is approved by the SFS.
	Strategy 9
	The State Forest Nursery will collect, produce and store seeds of tree species of special concern with the State to preserve the capability for artificial regeneration of tree species under threat
	<ul style="list-style-type: none"> Emerald ash borer (<i>Agrilus planipennis</i>) (EAB) was first documented to be present in New Jersey in 2014. To preserve locally-sourced seed, the State Forest Nursery has scheduled the collection of green ash seed from a Central New Jersey location in September of 2015. This seed will be banked until the threat of EAB-caused mortality has passed. If there is a good seed crop in future years, more ash seed will be collected and banked. To support the American Chestnut Foundation’s initiative to bring back the American chestnut (<i>Castanea dentate</i>), the SFS allowed the Foundation to establish a chestnut research orchard on approximately two acres of State Forest Nursery land in 2010. The first year, voles caused extensive mortality. Some trees were replanted in 2015. Nursery staff supports the effort with watering and mowing. In the fall of 2013 SFS forest health staff collected Eastern Hemlock (<i>Tsuga canadensis</i>) seed from three NJ State Parks (Stokes, Swartswood and Ringwood). Two ounces of clean seed were seed-banked at the State Forest Nursery. Some of the hemlock cones were sent to Camcore, the non-profit, international tree breeding organization headquartered at North Carolina State University. That seed will be used for long term preservation and genetic testing. NJ Natural Lands Trust has collaborated with the State Forest Nursery in the collection of seed and propagation of State-endangered Table Mountain pine (<i>Pinus pungens</i>) at the Nursery for later re-establishment at the Trust’s Abraities Table Mountain Pine Preserve in Delaware Township, Hunterdon County.

Strategy 1

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.2:
Actively and sustainably managed forests

Continue to support the Department of the Treasury's Farmland Assessment Program (FLA) which helps 'Keep Forests as Forests' and 'Working Forests Working' by offering landowners the opportunity to qualify forest lands for differential property taxation. Landowners qualify by enrolling in the program, managing their forests under SFS-approved plans, and satisfying requirements in Treasury's FLA rules. The intent of the preferential tax treatment is to serve as an incentive for sustaining land as forest land

- Landowner eligibility to qualify for the FLA program is contingent upon having a SFS-approved Woodland Management Plan. No plan can be approved if it entails unnecessary and excessive cutting. The number of properties whose owners have approved plans has gradually increased. However this primarily reflects a trend of subdividing ownership, rather than an increase in the number of woodland acres being covered by plans:
2010: 4,680 plans
2011: 4,825 plans
2012: 4,965 plans
2013: 5,227 plans
2014: 5,700 plans
- Owners annually apply for FLA taxation. Application approval is contingent upon the SFS finding compliance with the Woodland Management Plan. The SFS reviews applications and reports their findings to local tax assessors. In tax year 2014, NJ landowners qualified 385,653 acres for differential taxation through compliance with approved Woodland Management Plans.
- The FLA law requires, in addition to annual SFS review of applications for plan compliance, periodic on-site inspections to verify the plan implementation reported in the applications. In cases where a SFS inspection finds non-compliance, the SFS issues a non-compliance letter to the local tax assessor which jeopardizes the owner's eligibility for FLA tax privileges. The following figures show the number of inspections that the SFS has performed each year compared to the number of findings of non-compliance:
2010 – 231 / 46
2011 – 170 / 27
2012 – 269 / 25
2013 – 553 / 15
2014 – 814 / 84
2015 – 1,230 / --

Strategy 2

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.2:
Actively and sustainably managed forests

Continue to support the implementation of the Forest Stewardship Program (FSP) in order to assist landowners in actively managing their forest resources, keeping their lands in a productive and healthy condition for present and future generations, and increasing the economic benefits and environmental services that these lands provide. The FSP is a voluntary program, administered by the SFS under USDA Forest Service guidance, which encourages long-term stewardship of nonindustrial private forest lands. It promotes active management of forest and related resources to enhance and sustain the long term productivity of multiple forest resources

- The SFS reviews and approves FSP plans prepared by landowners and their consulting foresters. As of June, 2015, a total of 2,379 landowners held FSP plans approved as meeting the USDA Forest Service’s “Forest Stewardship Program National Standards and Guidelines.”
- Between 2010 and 2015 the total number of acres throughout the State that are covered by FSP Plans increased each year as follows: 2010--130,177 acres; 2011--122,136 acres; 2012--139,712 acres; 2013--139,712 acres; and 2014--157,921 acres, for a four-year increase of 27,744 acres.
- In 2013, the USDA Forest Service required that each state migrate its Forest Stewardship Program data, e.g. plans / acreage and activity metrics, to the Stewardship Mapping and Reporting Tool (SMART) and SMARTar, respectively. This is a spatial representation of properties participating in the FSP that enables locating the gaps between properties where connectivity to landscape management can be achieved by contacting and enrolling those non-participating woodland owners observed. The Spatial Analysis Project (SAP) is also employed to assist with forest and potential forest resource values are medium and high respectively. NJ’s migration was completed by October 2013.
- The Land Conservancy of NJ works with towns throughout the northern part of the state which are actively implementing forest stewardship programs. Specifically over the past five years, the Land Conservancy has worked with Madison Borough in Morris County on a reforestation project, with Frelinghuysen Township in Warren County on a forest and park management plan for land they have conserved which connects to the Paulinskill Trail, and with the Borough of Peapack and Gladstone in Somerset County on a stewardship program to better manage habitat to control invasive plant species.
- NJ’s Highlands Water Protection and Planning Council has a Forest Stewardship Plan under construction.

Sub-Theme 1.2:
Actively and sustainably managed forests

(Strategy 2 continued)

- The NJ Chapter of The Nature Conservancy (TNC) completed a Forest Stewardship Plan for 500 acres at TNC’s Manumuskin River Preserve. The management objectives are to restore, sustain, or enhance habitat diversity for a wide range of local wildlife like the red-headed woodpecker (*Melanerpes erythrocephalus*); and to sustain a diversity of age and size class stand structures across areas of the forest and enhance conditions for natural tree regeneration.

Strategy 3

Encourage landowners to prepare dual FLA / FSP Plans so they can qualify for both programs. Dual plans result in a more comprehensive management scheme and qualify landowners for both State FLA tax incentives and Federal cost-share opportunities. This makes forest management more economically feasible thereby encourages the practice of sustainable forest management

- As of June 2015, NJ landowners held plans approved as “dual” plans for 2,300 properties.

Strategy 4

Forestation program of the State Forest Nursery: The Nursery will provide seedlings to woodland owners, state, county and other agencies for reforestation or afforestation purposes

- The State Forest Nursery distributes seedlings to over 500 communities, schools or private landowners each year. Technical assistance on seedling care and planting is given verbally or in writing through planting instructions provided with the stock, in the seedling catalog, and/or on the website.

- The number of bare-root seedlings produced at the State Forest Nursery in 2010 was 289,000. With some year-to-year variation this level of production was sustained over the following five years:

	<u># of seedlings</u>
2011 -	357,000
2012 -	128,000
2013 -	250,000
2014 -	195,000
2015 -	<u>280,000</u>
TOTAL-	1,210,000

(Strategy 4 continued)

- The State Forest Nursery produces tube-seedlings for distribution at educational, Arbor Day and Earth Day programs:

	<u># of orders</u>	<u># of tube-seedlings</u>
2011	155	28,812
2012	164	39,102
2013	177	35,378
2014	184	38,220
2015	<u>166</u>	<u>37,436</u>
TOTAL	846	178,948
- The SFS and the Arbor Day Foundation entered in to a partnership in the spring of 2014 to provide 500,000 seedlings over five years to NJ communities and home owners who lost trees to Hurricane Sandy in October 2012. The Foundation and its corporate sponsors are buying the seedlings from the State Forest Nursery. This tree recovery program will continue to distribute seedlings annually until 2018.
 - 2014: 99,800 seedlings distributed to home owners in 120 communities.
 - 2015: 130,000 seedlings distributed to home owners in 162 communities.
- Worthington State Forest staff utilizes stock from the State Forest Nursery to reforest its campground area. Tree seedlings are planted annually in April. Park staff have planted 1,000 seedlings since 2010.

Strategy 5

The State Forest Nursery will continue to maintain several tree seed orchards, including ones for pitch pine (*Pinus rigida*), shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), and a pitch x loblolly hybrid. In addition to these seed orchards, much of the Nursery’s stock is grown from seed gathered from identified collection areas for many native tree species

- In its improved pine seed orchards, grown from clones selected by Rutgers and the USDA Forest Service, the State Forest Nursery has produced the following weights, for all pine species combined, of clean seed:

2011 - 7 pounds 5 ounces	2013 - 5 pounds 5 ounce
2012 - 1 pound 14 ounces	2014 - 3 pounds 1 ounce
- Besides the improved pine seeds orchards, stock plants of other species are established and continue to be maintained on State Forest Nursery property for use as a source in seed collection. The species include silky dogwood (*Cornus amomum*), AWC, and persimmon (*Diospyros virginiana*) on the property. Additionally, in the spring of 2015, buttonbush (*Cephalanthus occidentalis*) and black chokeberry (*Aronia melanocarpa*) stock plants were planted. Most stock plants at the Nursery have been grown from locally-sourced seed collected in the central New Jersey area.

Strategy 6

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.2:
Actively and sustainably managed forests

Urban and Community Forestry goal: Provide New Jersey communities with technical assistance, support, and training necessary to maintain effective community forestry operations at both the municipal and county level

- SFS encourages local governments to develop and manage the trees on their lands under a Community Forestry Management Plan (CFMP). A CFMP takes into account local priorities and conditions and is designed to be a guide to successfully achieving a healthy, safe, and sustainable community forest. Since 2010 the SFS has reviewed and approved 228 such plans.
- In some years the SFS is able to award Community Stewardship Incentive Program (CSIP) grant funding to local governments with approved CFMPs to help them implement the management goals and practices in their CFMPs. In the 2010 to 2013 period 27 such grants were awarded.
- Under the NJ Shade Tree and Community Forestry Assistance Act (N.J.S.A. 13:1L-17.1 et seq.), liability protection is afforded to a shade tree commission, or a member of a shade tree commission, or a volunteer participating in the community forestry program if the local government has an approved CFMP and at least one employee and one shade tree commission member or other volunteer participate in the State’s training program. In the period from 2010 to 2015, 602 individuals completed CORE training and 3,216 individuals throughout the State earned continuing education units (CEUs).
- The NJ Tree Foundation’s urban & community forestry programs have been responsible for the planting of over 7,600 trees in Newark, Camden and elsewhere throughout NJ, which has many ancillary benefits including creating and enhancing wildlife habitat.
- The NJ Tree Foundation has annually offered a series of four TreeKeepers Workshops to the city of Camden residents. The series focuses on forest management plans, reducing forest health risks, and tree care. From 2010 to 2015 approximately 500 residents participated.
- The NJ Tree Foundation has annually offered a series of four TreeKeepers Workshops to Newark residents. The series focuses on tree biology, tree maintenance, and how trees affect the urban landscape. From 2010 to 2015 approximately 322 residents participated. In addition, three hands-on pruning workshops were held on proper pruning techniques. Twenty-nine individuals attended.
- The “Restoration and Resilience of New Jersey Forests” workshop, co-organized by the Forest Guild, SFS, and others and held in November 2013 at Merrill Creek Reservoir in Warren County, featured a session on urban and community forestry needs in the changing climate.

(Strategy 6 continued)

- The NJ Shade Tree Federation is a non-profit 501(c)(3) organization celebrating its 90th year of assisting municipalities throughout New Jersey. Its mission is to educate municipal officials and volunteers in order to enhance the care of shade trees. Each year the Federation holds a two-day conference attended by more than 650 people for the dissemination of educational materials and technical information pertaining to the care and maintenance of municipal shade trees. The Federation enlists well-qualified presenters for the conference. SFS provides funding support through its Federally-allocated Urban and Community Forest funding.
 - The Rutgers University Urban Forestry Program has provided outreach presentations on various topics including i-Tree, Storm Response, Tree Selection & Climate Change, and Integrating Trees and Pavement at the general sessions of the NJ Shade Tree Federation Annual Conference over the last five years, addressing hundreds of shade tree program representatives from municipalities throughout NJ each year;
 - At the NJ Shade Tree Federation held in October 2014 Dr. Jason Grabosky of Rutgers University provided training in how to implement the development of a tree inventory. Preparing a tree inventory is one of the tasks involved in developing a Community Forestry Management Plan. Dr. Kevin Smith of the USDA Forest Service spoke on mature trees in a healthy urban and community forest, Dr. Frank Gallagher of Rutgers University addressed pollution remediation and tree contamination, and Dr. Geoffrey Donovan of the USDA Forest Service talked about the relationship between trees and human health; and
 - Concurrently with the NJ Shade Tree Federation’s annual conference, CORE training sessions are held to train local government officials and volunteers in topics pertinent to establishing a municipal tree program. Increased liability protections are afforded to communities that have an approved Community Forestry Management Plan and have completed the required training programs. Offering local governments the opportunity access the training necessary for a local government to attain “approved status” promotes local tree care programs and maintenance of trees on local public lands.

- The Rutgers University Urban Forestry Program expanded academic programing for an updated undergraduate certificate and a four-year program curriculum option in Urban Forestry through the School of Environmental and Biological Sciences. To date four students have declared a major with an Urban Forestry concentration, with the first graduates expected in 2016.

- The Rutgers Urban Forestry Program has provided a representative on the NJ Community Forestry Council in each year (2010 – 2015), participating on several sub-committees including Education, Storm Readiness, Response & Recovery, Shade Tree Act Guidelines Updates, and i-Tree Inventories to provide technical assistance and to facilitate meetings and actions.

Strategy 7

Citizen Action Goal: develop a strong base of individuals throughout the state who will serve in a volunteer capacity, coordinate events, and act as a conduit for the flow of information to and from the served constituencies

- Rutgers Cooperative Extension, the SFS, and the NJ Forestry Association cooperate to offer the NJ Woodlands Stewards Program. Every year over the past five years, except in 2013, a three-and-a-half-day residential training program has been held for participating volunteers. The training addresses sustainable stewardship of natural resources, with a focus on sound, scientifically-based forest and wildlife management practices. Participants are encouraged to apply the principles to their own property and to actively encourage, teach and motivate others to adopt these forest resource stewardship practices too.
- Rutgers University has annually offered an Environmental Steward program, in which up to 30 participants receive intensive training during a three-day weekend designed to equip them to contribute effectively to the process of finding solutions for environmental problems in their communities. The training is followed by internships at non-profit and governmental environmental organizations to which the Environmental Stewards contribute at least 30 volunteer hours.
- In November 2013, the Forest Guild and the NJ Audubon, together with NJDEP and others from academia, non-profit organizations, and the private sector, organized a two-day “Restoration and Resilience of New Jersey Forests” workshop at Merrill Creek Reservoir in Warren County on forest restoration and resilience strategies. A year prior, in October 2012, Hurricane Sandy had blown down significant portions of stands on Reservoir lands. The agenda included a field examination of the impact of the storm on Reservoir lands and the effect of forest management strategies employed in the wake of the storm. The workshop facilitated interaction and collaboration between 80 members of NJ’s conservation community with a focus on forest restoration and management in the face of the changing climate.

Strategy 8

Community Partnerships and Special Projects Goal: Build bridges between community groups and leaders who share common interests

- Since 2010, over 600 trees have been planted throughout Liberty State Park. Approximately, 125 trees are planted each year. The trees are made possible mainly through the generous donations and assistance of the Friends of Liberty State Park and the NJ Tree Foundation.
- During the past five years the NJ Audubon Society has developed management plans for over 20,000 acres of public land (municipal, county, non-profit & state properties not enrolled in farmland assessment) that propose harvesting forest products as a mechanism to sustainably manage for multiple objectives.
- In 2011, the New Jersey *Empty Sky* 9/11 Memorial at Liberty State Park opened to the public. This memorial site includes about 75 trees.

- On October 28, 2012, Hurricane Sandy made landfall at Liberty State Park. The high winds and floodwaters caused significant damage to the built and natural environments in the park, including its trees. An appraisal of wind-damaged trees was conducted by a certified forester. In total, 80 trees, with an average trunk diameter of 9.7 inches, were significantly damaged by wind with a replacement value of \$112,850. An additional, 25 trees were damaged from salt water flooding. All damaged trees were removed.
- In 2013, through the assistance of the Student Conservation Association over 3,800 "landscape" trees were inventoried and geospatially mapped in Liberty State Park. Data collected included species, height, diameter, overall health condition, and any special conditions were noted. This inventory will assist the park leadership in the proper management of the trees over time. Over 70 different species of trees were inventoried in the park.
- Hurricane Sandy toppled many trees at Stokes State Forest. Parks and SFS staff worked to remove the storm damage and restore the Park for recreational use.
- On October 31, 2013, acorns were collected from Swamp White Oak trees lining the walkways in the plaza of the 9/11 Memorial at the World Trade Center. The acorns were planted in the greenhouse at the State Forest Nursery. About 3,900 tube seedlings were produced. These tube seedlings will be distributed to the victims' families at a future memorial service.
- The NJ Farm Service Agency (FSA) began implementing the Emergency Forest Restoration Program (EFRP) in January 2013, to commence emergency measures for restoring nonindustrial private forest (NIPF) land damaged by Hurricane Sandy. New Jersey received \$5.1 million of EFRP financial assistance funding to undertake the clean-up from this violent storm. Owners of NIPF land were encouraged to visit their local FSA County Office to sign-up for cost-share assistance to complete approved emergency forest restoration practices, 214 EFRP applications were received and obligated funds surpassed \$4 million. Approved applicants are concluding their restoration work.
- In 2012 the Natural Heritage Committee of the NJ Highlands Coalition released a Forest Stewardship Position Paper, developed over a two-year period, that offers guidelines for forest stewardship practices on publicly owned or funded land and on nonprofit owned parcels in NJ's Highlands Region. The committee that developed the position paper includes ecologists, foresters, wildlife biologists, sportspeople, environmental advocates, and other interested stakeholders.
(<http://www.njhighlandscoalition.org/PDF/Forest%20Stewardship%20Position%20Paper.pdf>)

Strategy 9

Program Monitoring and Evaluation Goal: Maintain an up-to-date and effective program that will focus forestry efforts where they are most needed, when they are most needed, and in a manner that takes local interests into account while tracking achievements and progress towards attaining established goals

- In 2012 the USDA Forest Service, Forest Inventory and Analysis (FIA) program provided timber loss estimates for NJ and surrounding states from Hurricane Sandy, using wind speed data from the National Weather Service.
- Throughout 2013 and early 2014 NJDEP’s Office of Science conducted an assessment of damage to natural resources on State lands resulting from Hurricane Sandy. The purpose was to determine appropriate restoration steps and needs. Approximately 40,000 acres of State forest land were surveyed. The survey found that the most severe damage was due to saltwater toxicity in coastal areas and affected AWC and other deciduous and conifer species. Wind damage was the most pronounced in higher elevations in the northwestern part of the state. Some areas had extensive blowdown but the overall average for State forest land was rated ‘slight’ (less than 1%). The final report was issued in May 2015 and is posted on the Office of Science website (<http://www.state.nj.us/dep/dsr>).

Strategy 10

Information, Research, and Public Awareness Goal: Raise public awareness of critical forestry concepts and ideals by providing accurate information in clear and accessible formats addressing a diverse population of interested parties as well as supporting ongoing research wherever appropriate

- Interpretive programs provided at State Parks inform the public about forests and the natural environment. For example, Washington Crossing State Park has offered over 40 public programs per year over the past five years that included or addressed issues relating to forestry and forest protection. The Bass River State Forest, through its seasonal naturalist program, has offered approximately 60 programs each year to campers and the public. The programs include crafts, activities, and guided walks. Additionally, through its Wednesday Walk-in-the-Woods program, Bass River has offered the public and campers a year-around (48 of the 52 weeks in a year) the opportunity to participate in a hike lead by a Volunteer Master Naturalist.
- State Park staff, including staff at the Monmouth Battlefield State Park, provide forest information to the public through distribution of brochures.
- Arbor Day celebration: SFS hosts an Arbor Day celebration each year on the last Friday in April. The celebration is held each year in a different NJ municipality. In the 2010 through 2015 period, 1200 volunteers helped plant 564 trees and attended the Arbor Day Ceremony. Each participant also received a tree seedling to take home to plant.

(Strategy 10 continued)

- NJDEP's Office of Science managed a study carried out by Richard Stockton College of New Jersey and the SFS's Office of Natural Lands Management from fall 2008 through spring 2010 on broom crowberry (*Corema conradii*) plants in the southern NJ's Dwarf Pine Plains. Baseline monitoring data was collected on broom crowberry (*Corema conradii*) plants in order to initiate fire hazard reduction/ecological forestry management for the purpose of conserving extant populations and to restore open-canopy habitat in the West and East Plains Natural Areas. The study sought to evaluate environmental factors influencing broom crowberry distribution. Broom crowberry was found to be negatively correlated with the presence of litter ($R^2 = -0.518$, $p < 0.0001$), canopy ($R^2 = -0.262$, $p < 0.0001$), and ericoid shrubs ($R^2 = -0.284$, $p < 0.0001$), supporting the assumption that broom crowberry persists in open patches produced by fire, as well as offering a mechanistic explanation of its failure to persist after vegetation in a burned area regenerates. The final report was posted in 2011 on the Office of Science website (<http://www.state.nj.us/dep/dsr/publications/crowberry-report.pdf>).
- New York City Central Park staff was permitted to collect tree seeds at Monmouth Battlefield State Park for study.
- Tube Seedlings for Arbor Day: In addition to the Arbor Day celebration mentioned above, SFS through the State Forest Nursery offers a Tube Seedling program that provides tree seedlings affordably to communities and groups throughout the State for distribution at local Arbor Day ceremonies and other environmental community event. From 2010 through 2015 the Nursery produced over 175,000 tube seedlings for use at events across the state.
- One the three core elements of the forest fire mission of the SFS is the protection of life and property through the education of residents to prevent wildfire. Given that roughly 99% of all wildfires are human caused, either accidentally or intentionally, the importance of prevention efforts cannot be overemphasized. Annually the SFS conducts and/or attends events where Smokey Bear, the national symbol of wildfire prevention, is the focus. On average, approximately 300 events are conducted annually that reach an estimated audience of 300,000 people. Local National Night Out, county fairs, parades, schools, and trade shows are a few of the venues that are used to promote this message.
- SFS's Forest Nursery annually distributes to each 3rd grader a free tree seedling, if the local school signs up to participate. Educational materials help teachers explain to students the value and importance of trees and to encourage environmental awareness. From 2010 to 2014, 64,200 3rd graders received a free tree seedling through their school.

NATIONAL THEME:
CONSERVE AND MANAGE WORKING LANDSCAPES FOR MULTIPLE VALUES AND USES

Sub-Theme 1.2:
Actively and sustainably managed forests

(Strategy 10 continued)

- SFS and the Joint Base McGuire-Dix-Lakehurst (JB MDL) have collaborated on forest management proposals for the reduction of hazardous forest fuel accumulation.
- NJDEP's Green Acres acquired properties in the vicinity of the Forest Resource Education Center (FREC), to provide expanded capacity to support of the FREC's educational and teacher training programs, environmental events, and demonstration areas. This includes the 58 acres Nappe Acquisition, which contains a 20-acre AWC bog and was acquired in 2010, and the 180 acres Mogerma Acquisition acquired in 2011.
- The NJ Tree Foundation held a total of five "Right Tree in the Right Place the Right Way" Seminars in 2014 and 2015. The 209 attendees were from Atlantic, Bergen, Camden, Essex, Gloucester, Hudson, Mercer, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, and Union counties.
- During the 2010-2015 period, the NJ Pinelands Commission hosted forest-related Pinelands Research Series talks for members of the public. The talks included "Ecology of the Southern Pine Beetle, a Smokeless Wildfire in the Pinelands," "Prescribed Fire and Soil Disturbance in the Pinelands," "Effects of Invasive Insects in the Pinelands" and "Forest Susceptibility to Southern Pine Beetle in the New Jersey Pinelands."

NATIONAL THEME:
PROTECT FORESTS FROM THREATS

Sub-Theme 2.1:
Restore fire-adapted lands and reduce risk of wildfire impacts

Strategy 1

Maintain an active prescribed burning program that projects to prescribe burn (RxB) 20,000 acres per year throughout the State

- New Jersey uses prescribed burning as an effective tool for reducing hazardous fuels. Over the last five years the SFS has carried out prescribed burns on 64,232 acres, primarily on State lands. This includes portions of Allaire State Park, Hacklebarney State Park, Monmouth Battlefield State Park, Ringwood State Park, and Long Pond Ironworks State Park. In addition to reducing forest fire danger, prescribed burning promotes growth of new seedlings.
- National Park Service’s Delaware Water Gap National Recreation Area (DEWA) has carried out prescribed burns on 1,475 acres in the 2010 to 2015 period. The burned areas were mostly old fields or shrub-lands and the burning was carried out primarily to create and maintain native grasslands, but some forested areas were also burned. The areas burned by year were as follows:

2010 – 298 acres (4 units)	2013 – 304 acres (5 units)
2011 – 115 acres (2 units)	2014 – 402 acres (5 units)
2012 – 154 acres (6 units)	2015 – 202 acres (2 units)

Strategy 2

Initiate and participate in multi-agency forest management activities

- The SFS is implementing a project to reduce tree density and improve infrastructure (roads and firebreaks) in a 770-acre portion of Wharton State Forest in the NJ Pinelands Region.
- Researchers from the USDA Forest Service and university partners (Rutgers, Rochester Institute of Technology, Worcester Polytechnic Institute, Michigan State, Edinburgh, and West Virginia) received two Joint Fire Science Program grants to 1) Develop a new smoke emission model for low-intensity fires and 2) Evaluate fuel treatment effectiveness and further develop and evaluate new high- resolution fire behavior models. These efforts have led to the development and evaluation of an advanced smoke emission model that incorporates the effect of the forest canopy on wind and dispersion of smoke during low-intensity prescribed fires, and a better understanding of turbulence and heating in the fire environment. The second effort is resulting in field data sets to test a new, physics based fire behavior model developed by researchers at NIST and the USDA Forest Service. The Wildland Fire Dynamics Simulator, or WFDS, represents a “state of the science” fire behavior model, and it will be appropriate for fuel types in the New Jersey Pinelands. Both of these efforts have also resulted in a number of important scientific publications. SFS personnel have been invaluable in conducting the large scale, highly instrumented prescribed fires to achieve the goals of these two projects.

- Researchers at the Silas Little Experimental Forest of the USDA Forest Service in New Lisbon, NJ measured hazardous fuel reduction in over 25 prescribed fires conducted by the SFS from 2010 to 2015. Measurements have been used to evaluate the effects of fuel reduction treatments on rates of carbon sequestration by forests over the typical rotation interval of 5-8 years employed by the SFS. On an annual basis, the researchers found that stands lost an average of 4.7 ± 1.4 tons C per hectare during the year of the burn. Little effect on forest productivity occurred following the first growing season after the burn, and stands had replaced burned carbon by the end of the third year following prescribed burns. Depending on burning interval, the researchers estimated that stands would then sequester 3.0 to 8.4 t C per hectare. Field measurements and model simulations suggest that continued prescribed burning in upland fire-dependent pine-dominated stands would have little appreciable effect on long-term forest C dynamics at the landscape scale. Overall, upland forests where hazardous fuel reduction treatments are conducted continue to sequester carbon over a typical 5-8 year rotation interval. Relationships between fuel loading and consumption generated from this research have also been used to improve estimates for EPA smoke dispersion models to support management decisions where smoke emissions are a critical factor.
- Researchers at the Silas Little Experimental Forest of the USDA Forest Service received a grant from the Joint Fire Sciences Program to develop a rapid method to assess canopy fuel loading and vertical fuel stratification in Pitch pine forests of the Pinelands National Reserve using remote sensing techniques. This effort involved the collection and analysis of Light Detection and Ranging (LiDAR) data, forest census data, and sequential harvesting of over 180 trees to develop predictive equations for the accurate estimation of canopy fuel loads and its distribution through the canopy, and to calibrate the relationship between LiDAR returns and canopy fuel loading. This research has facilitated the accurate estimation of stand level to landscape scale canopy fuel loads and their vertical distribution at 20 x 20 m resolution using aircraft-based LiDAR data. Allometric equations for individual trees were also developed so that ground-based forest census data could also be used to estimate canopy fuel parameters and individual fuel components on individual trees. The results of this work improve our ability to evaluate hazardous fuel loading and wildfire risk, validate predictions generated from forest management simulators such as the Forest Vegetation Simulator (FVS) used by the SFS, quantify effects of fuel treatments on canopy fuel loading, and estimate standing biomass stocks for mechanical thinning projects that aim to incorporate low-grade biomass utilization.

NATIONAL THEME:
PROTECT FORESTS FROM THREATS

Sub-Theme 2.1:
Restore fire-adapted lands and reduce risk of wildfire impacts

(Strategy 2 continued)

- Researchers from the Silas Little Experimental Forest of the USDA Forest Service used ground-based methods to evaluate burn severity at wild and prescribed fire in order to calibrate the remote sensing method of burn severity estimation, Differenced Normalized Burn Ratio (dNBR), to pine dominated forests in southern New Jersey and the Atlantic Coastal Plain. 109 census plots were installed in 25 burn units, and severity was evaluated using destructive harvest methods, pre- and post-burn, and with the USFS's Monitoring Trends in Burn Severity visual estimation protocol. Ongoing analysis through 2015 of overlapping ground based data and dNBR data generated from USGS Landsat imagery aim will define the accuracy of dNBR in evaluating burn severity and provide a remote sensing-based method of monitoring burn severity and fire effects across the landscape or individual burn units, such as percent of fuel reduced, probability of mortality by diameter class, and watch-out locations for SPB.
- During the last five years the NJ Audubon Society has initiated the restoration of fire adapted habitats on 300 acres in Berkeley Township, Ocean County.

Strategy 1

NATIONAL THEME:
PROTECT FORESTS FROM THREATS

Sub-Theme 2.2:
Identify, manage and reduce threats to forest and ecosystem health

Address threats from insects and disease (gypsy moth, southern pine beetle, emerald ash borer, bacterial leaf scorch, hemlock woolly adelgid, etc.)

- State Park Service staff, including at Spruce Run Recreation Area, Voorhees State Park, and Hacklebarney State Park, has been working with USDA Forest Service and the SFS to track forest health and be on the lookout for detrimental pests such as Asian long-horned beetle (*Anoplophora glabripennis*) (ALB) and EAB.
- To address the threat from EAB, in 2015 the State Forest Nursery stopped producing ash tree seedlings for distribution because of the potential die off of a significant percentage of ash trees throughout the State in the near future due to the EAB.
- In 2014 the SFS and Rutgers University initiated the establishment of a NJ EAB Task Force, and the Rutgers University Urban Forestry Program took on a leadership role in its formation and coordination. The EAB Task Force has evolved into a partnership between the SFS, NJDA, USDA APHIS, and Rutgers and consists of 22 members representing these four organizations. In addition to acting as the Chair of the Task Force, Rutgers has compiled ash tree data from over 50 existing municipal street tree inventories, and is partnering with SFS to conduct ash surveys in 20 additional municipalities this summer to help determine the extent of the municipally controlled ash resource in NJ, and the impact that EAB will have on municipal budgets.
- In 2015 the SFS selected 31 high-value, healthy ash trees growing throughout Washington Crossing State Park and, to protect them from EAB, hired a contractor to apply the pesticide, *emamectin benzoate*, via trunk injection. Although this treatment is normally effective for two to four years, the trees will be monitored annually for any sign of EAB infestation.
- The National Park Service's Delaware Water Gap National Recreation Area instituted a ban on transporting any un-treated/un-certified raw lumber or firewood into the park in order to prevent the spread of invasive pests like EAB and ALB.
- To suppress hemlock woolly adelgid (*Adelges tsugae*) infestations, the National Park Service's Delaware Water Gap National Recreation Area, between 2010 and 2013, treated 1,055 hemlock trees with insecticide (imidacloprid) in areas in the park within both Warren and Sussex Counties; and released 3,647 *Laricobius nigrinus* beetles as biocontrol in the park within in Sussex County.

NATIONAL THEME:
PROTECT FORESTS FROM THREATS

Sub-Theme 2.2:
Identify, manage and reduce threats to forest and ecosystem health

(Strategy 1 continued)

- In 2013 the National Park Service’s Delaware Water Gap National Recreation Area surveyed 180 ash (*Fraxinus* spp.) trees for EAB at eight visitor use areas to assess their relative risk becoming infested. The trees’ DBH was measured and the potential “target(s)” of each tree (parking lot/cars, picnic table(s)/people, etc.) identified to determine the potential hazard each tree could pose if infested.

Strategy 2

Address threats from invasive plant and animal species

- Within the past five years, the State Forest Nursery has stopped producing White Birch and Silver Maple seedlings because of the threat that they may spread into other areas due to their invasive growth habit.
- In 2015, a goat-grazing project was initiated in approximately a two-acre area of upland forest near Liberty State Park’s Sullivan Natural Area. The goats are removing all invasive and undesired vegetation. Once completed, the staff at Liberty State Park will partner with volunteer organizations and a professional landscaper to reintroduce desired vegetation.
- Over the past five years Morristown National Historical Park has controlled new invasive plant threats, such as: Siebolds Viburnum (*Viburnum sieboldii*); Chokeberry (*Photinia* spp.) and Black Swallow-wort (*Cynanchum louiseae*).
- From 2010-2015, the Forest Stewardship Plans for forestry on private lands that were submitted to the Pinelands Commission for review infrequently identified invasive plant species as subject to forest management activities. Few of those plans that did address invasive species proposed the use of herbicides to control invasive plant species. In the few instances when invasive species management prescriptions were included, mechanical means was employed instead of herbicides.
- State Park staff work to reduce invasive species on Park lands. For example, Bass River State Forest dug out and removed several invasive barberry bushes noted on State forest lands by SFS staff. Other invasive species removal work was done at Monmouth Battlefield State Park, Norvin Green State Forest, and Ramapo Mountain State Forest.
- NJ’s Highlands Water Protection and Planning Council is drafting a Recommended Planting list for conforming municipalities.

- ENSP, the Natural Resources Conservation Service, nonprofit conservation organizations, and consultant foresters have partnered to create an incentive program to promote the management of forests for golden-winged warblers (*Vermivora chrysoptera*), under which private landowners eradicate invasive plant species prior to conducting forest management and continue to control invasive species in subsequent years. Since the launch in 2012, 16 landowners representing over 5,000 acres have enrolled in the incentive program and are actively eradicating invasive plant species in portions of their forests.
- Throughout the 2010 to 2015 period, active control of invasive plant species continued on the 2,742 acre Duke Farms Foundation property, based on a detailed plan for how Duke Farms should approach its invasive plant species problem that was written in 2007. The effort approaches removals on three fronts: 1) controlling newly emerging 'priority' species occurring on the property, 2) completely removing all invasive species from core forested, programmatic areas and other areas of high visitation, and 3) controlling those species threatening conservation priorities. Some of the species that Duke Farms is controlling include widespread threats to forested communities such as *Acer platanoides*, *Berberis thunbergii*, *Rhamnus cathartica*, *Rosa multiflora*, *Ailanthus altissima*, *Ligustrum sp.*, and *Lonicera sp.* In addition, Duke Farms has been actively treating E.D.R.R. (Early Detection, Rapid Response) species including *Aralia elata*, *Alnus glutinosa*, *Phellodendron amurense*, *Euonymus fortunei*, *Rhodotypos scandens*, and exotic *Viburnum sp.*
- In 2009 the NJ Invasive Species Strike Team created and has since maintained a database of invasive species present in New Jersey's forests which is displayed as an interactive map on its web site: <http://njisst.org/invasive-map.htm>. All data that the Strike Team gathers is uploaded into this database where it is mapped, analyzed and shared through the web site.
- The NJ Invasive Species Strike Team assists stakeholders in tracking occurrences and control of invasive species. Between 2010 and 2014, the Strike Team surveyed 467,099 acres on 621 properties and detected 5,537 populations of invasive species. Of those populations, 1,086 have been eradicated. Eradication work was initiated on many of the remaining populations.

- The NJ Invasive Species Strike Team continually assesses the distribution and densities of target species and identifies sources and trends of emerging infestations in order to preempt their spread. It provides alerts about species found in the mid-Atlantic and New England in order to help prevent their proliferation into NJ. Cumulative data, along with correspondences from partners across NJ and throughout the Northeast and Mid-Atlantic states, is reviewed each year to determine the target species list. The total number of 2015 target species is 134 (up from 68 in 2011 and from 128 in 2014). The 2015 target list includes 94 plants (up from 88 in 2014) and 40 animals (same as 2014). Two tree species were added to the target list in 2015: gray poplar (*Populus x canescens*) and white poplar (*Populus alba*). Examples of other tree species on the target list include sycamore maple (*Acer pseudoplatanus*), black alder (*Alnus glutinosa*), Kousa dogwood (*Cornus kousa*), Amur cork tree (*Phellodendron amurense*), and weeping Higan cherry (*Prunus subhirtella* var. *pendula*).
- In 2014 the NJ Invasive Species Strike Team created and deployed a smart-phone/tablet app designed to enhance the capacity of New Jersey producers and forest owners to identify, report and rapidly respond to newly discovered and localized invasive species. *NJ Invasives* focuses on early detection. This tool helps users accurately identify and report sightings of invasive species, both emerging and widespread. Smartphone users can submit geo-tagged photos and information via online data entry forms. The data is uploaded directly into the Strike Team database, where it is verified and entered into a national Early Detection & Distribution Mapping System database. The app also highlights the species that are new and potential invaders in New Jersey. It helps users become familiar with widespread species and describes appropriate control measures. The maps generated over time will help fill in information gaps and aid in identifying likely locations of undetected invasive species populations.
- Another tool that the NJ Invasive Species Strike Team created in 2014 (IPCCconnect.org/New Jersey) allows users to track and monitor eradication activities, including tracking pesticide applications. Data is integrated directly into the existing Strike Team database as well as the nationwide Early Detection & Distribution Mapping System.
- The NJ Conservation Foundation promotes the Invasive Species Strike team efforts on early detection and eradication of emerging invasive species on public and private lands, including its own properties.
- The NJ Invasive Species Strike Team encourages voluntary restrictions on the use of invasive plants and hopes that by addressing both the supply of and demand for invasive species, significant progress can be made in reducing their presence in cultivated landscapes.

Strategy 3

Address threats from air pollution

- NJ’s outdoor levels of ozone, an air pollutant known to damage vegetation and other materials, showed about a 50% decline in the 1-hour average ozone concentration from 1985 to 2014 and about a 30% decline of the 8-hour average ozone concentration from 1998 through 2014. Nonetheless, NJ continues to have exceedances of the 75 ppb ozone health standard. As of 9/8/15, there were 17 days of exceedances at one or more NJ monitors for the summer of 2015. Also, the USEPA is scheduled to adopt a new ozone health standard by 10/1/15, which would also consider adverse impacts on vegetation. NJ and other states that exceed the new ozone standards will be required to further reduce precursors of ozone, resulting in additional air quality improvement and benefits for forests.
- The State attained the annual and 24-hour primary and secondary standards for fine particulate matter (PM2.5) and coarse particulate matter (PM-10). Particles can also affect the health of vegetation.
- In 2009, the NJDEP adopted a rule to lower the sulfur content of all distillate fuel oil, including home heating oil, sold in the state by over 80% on July 1, 2014 and by over 99% by July 1, 2016. This will lower the amount of acid rain formed within the State and lessen its damaging effects upon forests and crops. It also significantly improves visibility which adds to the enjoyment of natural resources.
- Decreasing emissions of sulfur dioxide and nitrogen oxides have lowered the amount of acid rain in our environment. The pH levels of New Jersey’s rainwater improved from an average pH of 4.25 in 1990 to 5.13 in 2013.
- New Jersey has successfully taken legal action against coal-burning power plants in Pennsylvania whose sulfur dioxide and nitrogen oxides emissions were impacting the health and welfare in New Jersey. Several power plants subsequently shut down or controlled their coal-burning operations, reducing the impact upon the forest environment in New Jersey.

Strategy 4

Address threats from wildfire

- Arson, disregard for rules, and carelessness can cause forest fires. The SFS’s canine (K-9) unit provides assistance to various cooperating police agencies in investigating the cause of wildfires. The K-9 unit is administered in accordance with the NJ Attorney General’s “K-9 Training Standards and Qualifications Requirements for New Jersey Law Enforcement” and is certified both locally and nationally. The K-9 has been instrumental in numerous arrests and convictions.

Address overabundant deer

- Washington Crossing State Park maintains a deer enclosure area intended to promote the growth of native plant species free from deer impacts.
- Cheesequake State Park initiated a management plan to protect the forest ecosystem from overabundant deer. In 2011, the deer population was 66 per square mile. That number is 10 times higher than a forest can function properly to sustain itself. After just three years using an organized bow hunt season, the population was reduced to six per square mile. A Forest Health Monitoring Report was also initiated that found due to the excessive deer browse over a long period of time, only 22% of the native shrub cover remained and native grasses and herbs were down to 2% of normal. Increases in those species have been very evident with the reduced number of deer and a follow up Health Report will be done in 2016. Cheesequake also constructed deer enclosures to instantly protect certain species and one location increased the population of Pink Lady Slipper (*Cypripedium acaule*) from 2 in 2011 to 381 this past May.
- ENSP partners with the Natural Resources Conservation Service, nonprofit conservation organizations, and consultant foresters, as part of its effort to promote the management of forests for golden-winged warblers (*Vermivora chrysoptera*), assesses each participating private landowner’s property for deer browse. If necessary, a deer management plan and/or deer enclosure area are included in the landowner’s management plan. Of the 16 landowners enrolled, three already had existing deer management plans prior to enrollment, five did not need to manage deer or install an enclosure, four agreed to manage deer as part of the habitat management, and four are still yet to be determined. So far no deer enclosures have been determined to be needed.
- In the 2010 to 2015 period, Duke Farms Foundation continued its deer management program, initiated in 2004, on its 2,742 acre property in Hillsborough Township, Somerset County. Duke Farms is following an integrated program utilizing exclusionary fencing in targeted areas, controlled management with volunteers, agricultural depredation, professional sharpshooting and sophisticated deer dispersal during cull (deer drives) annually. With a concerted effort to target mature does and setting cull goals every year, Duke Farms has been able to reduce the density of deer on the property from nearly 300 per square mile in 2004 to 15 per square mile in 2014. Duke Farms has been tracking vegetation response in relation to deer densities. The severe negative impacts to forest regeneration is beginning to be reversed and woody cover is rapidly increasing in many portions of the property. Native woody cover appears to be bounding forward quickly (even since 2013). Past measurements have shown a large number of small woody seedlings; some of these have been released and are growing rapidly into the browse zone. This rapid increase in total woody cover in the browse zone (from 29% to 62% since 2010) appears to have led to reductions in native and non-native grasses along with native herbs, while non-native herbs are relatively stable.

NATIONAL THEME:
PROTECT FORESTS FROM THREATS

Sub-Theme 2.2:
Identify, manage and reduce threats to forest and ecosystem health

(Strategy 5 continued)

- The NJ Conservation Foundation promotes deer herd reduction on public and private lands. However, since in NJ's heavily-forested priority forest areas (Pinelands Area and the Highlands Preservation Areas) the prevalent deer density results in diminution of forest integrity, the NJ Conservation Foundation also encourages fencing of critical areas and rare flora.

Strategy 6

Address other threats

- The USDA Forest Service's FIA program issued a report in 2011 entitled "New Jersey's Forests 2008." The report contains estimates of the average size of forested patches in the State and documents the continuing trend of forest fragmentation.
- In anticipation of major road construction and consequent fragmentation of forest habitat, NJDEP's Office of Natural Resource Restoration has contributed to a study by ENSP to monitor the movement of reptiles, amphibians and other animals for the purpose of assessing the effectiveness of using animal passage structures to mitigate the impacts roads may have on a sensitive habitat. This will help set a plan for strategic habitat conservation. The findings from the study will support this effort by providing a better understanding of how passage structures can be used in sensitive habitats for mitigating road mortality and impediments to normal migration patterns.
- Since 2014, the Office of Coastal and Land Use Planning has been working with coastal municipalities to address resiliency to coastal hazards emphasizing ecological solutions which include stabilizing shorelines and protecting, enhancing or creating wetland/forest habitat:
 - OCLUP has been working with 90 municipalities to promote resilient and sustainable communities, addressing potential impacts from development and coastal hazards;
 - OCLUP and partners have been working with 9 municipalities and Cape May County on ecological solutions to coastal hazards that include living shorelines mitigating erosion and restoring wetlands and habitat; living shorelines combined with constructed wetlands and upland berms to address flooding; and planning for shoreline strategies to preserve wetland and coastal forest reserves;
 - OCLUP and partners have been developing municipal wide inventories of shoreline conditions, assessing those conditions and creating strategic shoreline plans for three municipalities which will be used to inform comprehensive growth and preservation directions.

NATIONAL THEME:
PROTECT FORESTS FROM THREATS

Sub-Theme 2.2:
Identify, manage and reduce threats to forest and ecosystem health

(Strategy 6 continued)

- The Sandy Hook Unit of the National Park Service’s Gateway National Recreation Area is protecting seral stages of maritime Holly Forest on Sandy Hook barrier peninsula in Monmouth County, NJ. The historic Holly Forest (101 acres) is threatened by storm surge and sea level rise. Other forest and woodland types (541 acres) at higher elevations, with varied soils and exposures, are protected from excessive development and recreational disturbances, wildfire, and invasive non-native plants, to maintain diversity and allow for migration of the Holly Forest. These plant communities currently contain varying amounts of young holly. Through ecological succession, future Holly Forests may grow at higher elevations in the next century as saline ground water and submergence overcome the low-lying historic forest. The diverse plant communities are important habitats for migratory birds.
- The NJ Natural Lands Trust reduced invasive Asian bittersweet vine over a 10-acre area at the Trust’s Mount Rascal Preserve in Hackettstown, Warren County.
- The Rutgers University Urban Forestry Program has entered into a joint venture with the USDA Forest Service to develop the Center for Resilient Landscapes (CRL), housed at Rutgers Cook Campus. The CRL has explicit linkages to forest health.

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.1:
Protect and enhance water quality and quantity

Strategy 1

To avoid discouraging forest management that is compatible with protection of water resources, revise procedures to reduce the administrative burden of permit requirements

- The Highlands Water Protection and Planning Act Rules N.J.A.C. 7:38 7:38-2.3(a)7 exempt forestry management activity from its requirements, provided the activity is conducted in accordance with an approved Woodland Management Plan issued pursuant to the Farmland Assessment Act, N.J.S.A. 54:4-23.3, or the activity constitutes the normal harvesting of forest products in accordance with a forest management plan approved by the State Forester.
- NJDEP's Freshwater Wetlands Protection Act rules regulate many activities, including forestry, conducted within forested wetlands and transitional areas. Specific forestry activities are granted a conditional exemption to the freshwater wetlands permit requirement. To qualify for the exemption, a proposed forest harvest within a wetland, or its regulated upland transition area, must be detailed in a forest management plan approved by the State Forester and be carried out in a manner that protects water resources. This model is incorporated in the amendments that the NJDEP proposed On June 1, 2015, to its Flood Hazard Area Control Act rules at N.J.A.C. 7:13. NJDEP's Division of Land Use Regulation consulted the SFS in its drafting of the permit-by-rule included in the proposal for forestry management activity conducted under a forestry plan, substantially relieving the administrative burden on forest management conducted under an approved plan.

Strategy 2

Protect water resources in streamside management zones and filter strips, at stream crossings, and during timber harvesting

- The Division of Water Monitoring and Standards, Bureau of Freshwater and Biological Monitoring (BFBM) performed chemical, physical and biological monitoring of the state's rivers/streams and lakes, including forested watersheds in 5 Watershed Management Areas with 35- 57% forested lands (1 – Upper Delaware, 2- Wallkill, 3 – Pompton, Pequannock, Wanaque and Ramapo, 14 – Mullica, and 15- Great Egg Harbor). Approximately 2400 water monitoring site visits were made to evaluate water quality from 2009 to 2014. Water quality data from these monitoring site visits are available in EPA's STORET data system and through the National Water Quality Portal (NWQP).

**NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS**

**Sub-Theme 3.1:
Protect and enhance water quality and quantity**

(Strategy 2 continued)

- NJDEP’s Office of Natural Resource Restoration (ONRR) has implemented, or worked with responsible parties to implement, a number of restoration projects that restore river functions and enhance stream corridors. The projects accomplished over the past five years include removal of three dams on the Raritan River to open nine river miles to a free flowing condition; removal of a weir within forested habitat on the Cedar Creek in Ocean County, reestablishing free river flow; restoration of a two mile channelized stretch of the Squankum Brook in Monmouth County to restore the sinuosity of the stream and the stream banks and riparian habitat within a forested area. ONRR is in the planning stages for river restoration at other locations, including the Paulins Kill, the Musconetcong River and the Raritan and Millstone Rivers.
- The NJ Tree Foundation’s urban & community forestry programs result in the interception of stormwater runoff:
 - In Newark, approximately 231,750 gallons of stormwater runoff intercepted annually due to removal of 4,944 square feet of concrete in preparation for planting, plus approximately 81,920 gallons of stormwater runoff intercepted annually due to planting of 1,024 trees and 840 shrubs and perennials
 - In Camden, approximately 496,500 gallons of stormwater runoff intercepted annually due to removal of 10,592 square feet of concrete in preparation for planting, plus approximately 127,360 gallons of stormwater runoff intercepted annually due to planting of 1,592 trees.
- Additionally under the NJ Tree Foundation’s Green Streets program, approximately 401,360 gallons of stormwater runoff intercepted annually due to planting of 5,017 trees. 700 of these trees were funded through a Redesign grant awarded by USDA Forest Service.

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.2:
Improve air quality and conserve energy

Strategy 1

Improve air quality, reduce energy consumption and produce biomass for energy production through urban and exurban forest cover, including agroforests

- NJDEP’s Office of Natural Resource Restoration has funded grants to municipalities throughout the state for tree planting, with the total expenditure of funds approaching \$8,467,000.

Strategy 2

Consider human population characteristics and trends

- In July 2010, John Hasse, Director of the Geospatial Research Laboratory at Rowan University, and Richard Lathrop, Director of the Grant F. Walton Center for Remote Sensing & Spatial Analysis at Rutgers University, released a study entitled “Changing Landscapes in the Garden State: Urban Growth and Open Space Loss in NJ 1986 thru 2007.” The study found that in the 21 year period between 1986 and 2007, New Jersey experienced a seven percent loss of upland forest lands, falling from 1,641,279 acres to 1,526,358 acres.

Assist communities in identifying wildfire risks, developing Community Wildfire Protection Plans (CWPP), and promoting FIREWISE and other risk reducing policies and actions. Communities can play an essential role in reducing the risks of catastrophic wildfire

- Firewise Communities/USA: The Firewise Communities/USA program provides an opportunity for residents to become better informed and prepared about the risks associated with wildfire in their local area. Communities that complete five simple steps are eligible to become a nationally recognized Firewise Community/USA. To date, NJ has 15 recognized communities. Eleven of these have been designated since 2010. In 2013, New Jersey's program was recognized nationally as one of the top five programs in the country as part of the National Firewise Challenge initiative. Residents living in a designated Firewise Community have become better educated and prepared about wildfire through annual open houses held within each community. Better communication has resulted among emergency services personnel, and township officials have become engaged in wildfire protection activities.
- The SFS is using the Spatial Analysis Project (SAP) to identify sites where fire risk on private lands and adjacent state lands intersect to select locations for possible fuel reduction treatments. By identifying high, very high and extreme fire risk the SFS will be able to provide survey results to the landowners to make them aware of defensible space concerns. Landowners who respond with interest will be offered the opportunity to meet with a forester and the Section Warden to discuss the potential for prescribed burning (RxB) on their property to reduce hazardous fuel loading. If mechanical treatments are necessary prior to initiating any RxB the SFS will explain that as well. To date, it appears over 1,400 landowners will be provided the survey results.
- Community Wildfire Protection Plans (CWPP's): Authorized in 2003 as part of the Federal Healthy Forest Restoration Act (P.L. 108-148), the development of municipal level wildfire plans became a new national initiative designed to identify and prioritize wildfire risks at the municipal level. SFS was awarded competitive Federal funding to implement a program for development of 25 CWPP's in NJ. During the period 2010-2015, 25 NJ municipalities that were targeted as having high wildfire risk completed municipal-level plans. Once these municipalities adopted their CWPP they became eligible to receive a \$5,000 sub-grant to offset the costs associated with implementing the hazard mitigation recommendations in the plan. Of the 25 municipalities, 22 took advantage of the funding offered. Projects that were completed included: installation of dry hydrants, WUI drills and training exercises, removal and clean-up of hazardous fuels, outreach and education, and improvement of firebreaks and fuelbreaks. SFS has secured additional grant funding in order to continue to support the development and implementation of additional CWPP's in at risk municipalities.

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.3:
Assist communities in planning for and reducing forest health risks

(Strategy 1 continued)

- To support communities' creation of defensible space, fuelbreaks, and firebreaks and other firewise efforts, the SFS has provided one or more grants to 16 communities. Since 2010 approximately \$150,000 has been awarded.
- Fire Adapted Communities – Learning Network (FAC-LN): This new national initiative was introduced in 2014 as part of the National Cohesive Strategy on wildfire. The concept strives to bring all wildfire mitigation, preparedness, suppression and prevention efforts under one umbrella that operates in unison with common goals and objectives. In its first year none of the eight communities selected nationwide to participate as pilot communities were located in NJ. But in 2015, the FAC-LN selected an additional eight communities to participate in the pilot program, and Barnegat Township in NJ was chosen, based on its participation and success with the Firewise Communities/USA program and other wildfire initiatives such as Ready, Set, Go. SFS continues to work with Barnegat to support their FAC-LN and Firewise Communities efforts as they work to build a model for other communities and other states.
- Sustainable Jersey (SJ) is a certification program for New Jersey municipalities that want to go green, save money and take steps to sustain their quality of life over the long term. From its start as an informal partnership in 2006, it has evolved in the winter of 2011/2012 into a 501(c)(3) non-profit organization. SJ provides tools, training and financial incentives to support communities as they pursue sustainability. Emergency preparedness and planning, including for wildfire prevention and preparedness, are important elements of community resiliency and had not been initially been recognized by in the SJ certification process. But in 2014/2015, the SJ program incorporated opportunities for municipalities to earn credits toward their certification as a SJ Municipality through participation in programs such as Firewise Communities and CWPP development. This is a new direction and opportunity for wildfire preparedness at the local level.
- In 2010, NJ Pinelands Commission staff worked with SFS to address wildfire preparedness concerns regarding an approved a 12 lot residential subdivision in Chatsworth (Woodland Township). Commission staff assisted SFS staff regarding the township's ability to require the developer to provide a fire hazard fuel break on the parcel.
- The NJ Tree Foundation's Green Streets program installed firewise gardens and learning kiosks at three locations: Ocean County Vocational & Technical School, Jackson; Cloverdale Farm County Park, Ocean County; and Estell Manor Park, Mays Landing. The program is a partnership with the NJ Parole Board. Each tree planting season, individuals under parole supervision are hired, trained in tree work, and provided time-limited jobs that combine real work, skill development and support services to help participants overcome barriers to employment.

Strategy 2

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.3:
Assist communities in planning for and reducing forest health risks

In cooperation with the Division of Fire Safety in NJ's Department of Community Affairs, support counties' required development of a Wildfire Response Plan that defines the roles and responsibilities of the county coordinators and fire company officers during wildland/urban interface structure protection assignments

- The Federal Stafford Act (42 U.S.C. §5121 et seq.) requires state governments to develop hazard mitigation plans for disaster preparedness and update these plans every five years. Previous state hazard mitigation plans had mentioned wildfire, but the revised and expanded New Jersey State Hazard Mitigation Plan approved by FEMA in 2014 for the first time included a separate section (5.12), developed by the SFS several years previously, that solely addresses wildfire. FEMA's approval of the 2014 plan enables SFS to remain eligible to apply for Federal funding under programs such as: Fire Management Assistance Grants, Public Assistance (Categories C-G), the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant Program and Flood Mitigation Assistance.
- FEMA's approval of the 2014 New Jersey State Hazard Mitigation Plan put into effect a requirement for each county also to have coordinating county plans in place and approved for integration into NJ's State Hazard Mitigation Plan in order to remain eligible for federal funding. New Jersey's 21 counties already had wildfire plans in place that could serve as a basis for their plans. Following the World Trade Center attacks on September 11, 2001, the Fire Service Resource Emergency Deployment Act (N.J.S.A. 52:14E-11 et seq.) was enacted in 2003, in recognition of the need for better coordination of the response to statewide emergencies. That law required each county to adopt a county fire mutual aid plan and to review and update the plan every two years. To satisfy with the FEMA requirement to have a coordinating county plan in place, each county needed only to update its existing county fire mutual aid plan to bring it into compliance with hazard mitigation plan standards. These updates, prepared with the aid of the SFS and the Department of Community Affairs' Division of Fire Safety, have been completed as of August 2015 for 16 out of the 21 counties. Updates for the county plans of the remaining six counties are scheduled to be completed by the end of 2015.
- A goal of NJ's 2014 State Hazard Mitigation Plan is for each of the 565 municipalities within the state to have Community Wildfire Protection Plans. As of June 2015, 20 municipalities have completed Community Wildfire Protection Plans, and an additional 10 plans are scheduled to be finalized in 2016. Development of Community Wildfire Protection Plans has been funded by Community Wildfire Protection Plan Grants provided by the USDA Forest Service, State and Private Forestry. Development of additional plans will be initiated as additional funding is secured.

Strategy 3

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.3:
Assist communities in planning for and reducing forest health risks

Measure and map hazardous fuel loads

- US Forest Service research scientists are conducting a study to characterize 3D canopy fuel structure using LIDAR products and models developed from destructive harvest to quantify crown fuel structure and canopy bulk density (CBD). This research has been focused on the Cedar Bridge/Greenwood Wildlife Management Areas (WMA) and Warren Grove/Stafford Forge WMA areas.
- US Forest Service research scientists are assisting with fuel loading measurements at Warren Grove with Dr. Walter Bien of Drexel University. These measurements are used to characterize fuel accumulation following wildfires in 1956, 1971, 1998, and the 2007 wildfire.

Strategy 1

Identify forest landscape areas where there is a real, near term potential to access and supply traditional, non-timber, and/or emerging markets such as those for biomass or ecosystem services

- In the fall of 2014, the SFS backfilled the Utilization & Marketing (U&M) forestry position. The purpose of this SFS backfill is to assist landowners, loggers and sawmills in finding ways to utilize value-challenged timber and thereby convey to landowners opportunity for at least partial cost-subsidy when they get their forested stands thinned or harvested. Realizing value from value-challenged timber will entail supporting the development of historically-overlooked markets for the small diameter material. Young overstocked stands need to be thinned to promote stand development, wildlife habitat creation and enhancement, and mitigation of wildfire hazard. In addition to assisting private forest landowners, the SFS’s program will also seek means of gaining value from thinnings proposed for State lands in order to extend the SFS’s capacity for carrying out landscape-level resource management. The SFS will also work with to municipalities and owners of commercial and residential properties to identify ways of making productive use of urban and suburban trees downed during storms and routine arboricultural maintenance, rather than being disposed of as municipal waste.
- The “Restoration and Resilience of New Jersey Forests” workshop, co-organized by the Forest Guild, SFS, and others and held in November 2013 at Merrill Creek Reservoir in Warren County, raised awareness about the need for markets for low-grade wood to enhance forest health and resilience in New Jersey.
- During the last five years the NJ Audubon Society has assisted private & public landowners implementing forest management projects specific to developing new markets for underutilized low-grade wood products on over 600 acres.

Strategy 2

Recognize that forestry in New Jersey tends not to be driven by direct economic return but a diverse array of other amenities (tax incentives, wildlife habitat, forest health, water quality). Economic return from timber harvesting is usually considered as means to defray the cost of management for these amenities

- NJDEP’s Green Acres Program works with local governments and nonprofit conservation organizations to promote the economic benefits of New Jersey forests. Ecosystem services of clean air, watershed protection, recreation and wildlife habitat are critical elements of forest protection in New Jersey and provide many benefits to the State's residents.

Strategy 3

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.4:
Identify, manage and reduce threats to forest and ecosystem health

Improve State lands and private lands under a forest stewardship or woodland management plan to provide economic benefits while maintaining the ecological integrity

- In 2011, four acres of a former field at Liberty State Park were designated as a reforestation area; trees, bushes and plants are added each year. In 2013, an additional one acre area of a former field was designated suitable for reforestation and planted with approximately 75 trees. In 2014, a professional tree pruning company was hired to assist with the pruning of about 125 London plane trees (*Platanus × acerifolia*) throughout the park.
- NJ's Highlands Water Protection and Planning Council's Forest Stewardship Program is under construction.
- Morristown National Historical Park is in the last stages of developing a Vegetation and Deer Management Plan/EIS which will utilize deer and invasive plant control to hopefully allow for native plant regeneration throughout the park's forests.

Strategy 1

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.5:
Protect, conserve and enhance wildlife and fish habitat

Protect, conserve, and restore forested wildlife habitat as it is critical to maintaining and enhancing the rich biodiversity of our nation

- ENSP partnered with the Bureau of Lands Management in the creation, completion, and implementation of forest stewardship plans for Weldon Brook and Sparta Mountain Wildlife Management Areas. During plan preparation ENSP has facilitated multiple meetings with stakeholders to understand concerns and to discuss alternatives pertaining to possible impacts of forestry activities on the endangered, threatened, and rare plants and animals within those areas.
- The SFS's review of proposed Woodland Management Plans, Forest Stewardship Plans, and harvest plans include consideration of whether adequate protection is included for T&E plant and animal species. A plan may not include activities that have the potential to cause irreversible impact. Each plan must include the results of a search for the property in the Natural Heritage database maintained by the SFS's Office of Natural Lands Management. Plant and/or animal species designated as threatened or endangered, found in the search results to be on or in the immediate vicinity of the property, need to be addressed. The prescriptions in the plan must be designed to include protections, such as with buffers and/or by timing restrictions on forestry activities.
- NJDEP's ONRR has assisted in funding acquisition of land to protect swamp pink, a Federally-threatened and state endangered plant that grows in wet forested areas. Notably, in 2014, ONRR helped acquire the Bland Property, a 2.18 acre parcel in Fairfield Township, Cumberland County for swamp pink conservation. The parcel is being managed by NJ Natural Lands Trust. In addition, funding has been provided by ONRR to erect a fence around swamp pink habitat located in Washington Township, Gloucester County to prevent deer browse on the plants. ONRR continues to work with Green Acres and NJ Natural Lands Trust in these efforts.
- The NJ Conservation Foundation is working closely with NJDEP's ENSP on projects to improve habitat for T&E and non-game wildlife (timber rattlesnake (*Crotalus horridus*), corn snake (*Pantherophis guttatus*), golden-winged warbler (*Vermivora chrysoptera*), and northern pine snake (*Pituophis melanoleucus melanoleucus*)) without causing negative consequences for other forest interior animals or rare plant species.
- The NJ Natural Lands Trust has been preparing biodiversity inventories of plants, animal, birds, reptiles and ecological communities to document threatened or endangered species and other natural resource elements for better management at Great Piece Meadows Preserve, Essex County (1100- acres); Bear Swamp at Red Lion Preserve, Burlington County, NJ (2200 -acres); Hamilton Preserve, Atlantic County (2300- acres); and Bear Creek Preserve, Warren County (900- acres).

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.5:
Protect, conserve and enhance wildlife and fish habitat

(Strategy 1 continued)

- During the last five years the NJ Audubon Society has developed management plans for over 20,000 acres, and implemented projects on over 800 acres that were primarily driven by wildlife conservation concerns.
- Since 2010, the NJ Chapter of The Nature Conservancy has actively reforested preserves to enhance forest health and for wildlife habitat, including:
 - Johnsonburg Swamp Preserve active traditional hardwood reforestation project (Frelinghuysen, NJ)
 - Approximately 3,700 trees over 42.5 acres of fields
 - Approximately 21 acres of autumn olive removed
 - Continuous invasive monitoring and removal
 - Minisink Valley Preserve completed gravel quarry restoration (Montague, NJ)
 - Quarry was causing sediment to wash into the Clove Brook
 - 10 acres planted with approximately 1,500 trees, seeded with native herbaceous seed, and fenced
 - Lummis Ponds Preserve (Cumberland County) currently managing early successional shrubland habitat and in other areas actively reforesting field habitat to reduce gaps in forest continuity. (Planted approximately 1500 trees).
 - Managing more than 75 acres for early successional shrubland habitat at our Cape Island Creek Preserve (Cape May County), Maurice River Bluffs Preserve (Cumberland County) and Eldora Preserve (Cumberland County).

Strategy 2

With the Division of Fish & Wildlife, actively coordinate forest management with habitat improvement projects

- Municipalities in the Highlands Region will be producing Critical Habitat Conservation and Management Plans that include all habitat types in their jurisdiction.
- In March 2015, the Forest Guild, NJ Audubon, and ENSP convened a stakeholder meeting at Audubon’s Plainsboro Preserve for the “Healthy Forests for New Jersey Birds” program. The goal of the program is to improve forest bird habitat and increase forest stewardship in NJ.

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.5:
Protect, conserve and enhance wildlife and fish habitat

Strategy 3

The continued decline and corresponding mortality of hemlock will lead to increased stream temperatures thereby reducing the quality necessary for trout habitat. The proposed Hemlock Assessment and Recovery Plan will address these issues

- The insecticide treatments and releases of *L. nigrinus* by the National Park Service's Delaware Water Gap National Recreation Area, reported above, mostly targeted high-value riparian areas, such as along Van Campens Brook.

Strategy 4

Forest management projects are conducted to enhance habitat for a range of other species, including ruffed grouse, quail and woodcock

- The National Park Service's Delaware Water Gap National Recreation Area worked with the Ruffed Grouse Society to enhance ruffed grouse (*Bonasa umbellus*) habitat on 11 acres in Sussex County by tree cutting and other activities that promote aspen and birch sprouts and saplings.

Strategy 5

The Berkeley Triangle Project's objective is to prepare comprehensive Forest Stewardship Plans for a 13,000 acre cooperative project area for lands administered under the NJ Natural Lands Trust, NJ Audubon Society, and NJDEP. The resulting plans will provide management prescriptions promoting forest health, wildfire protection, game and non-game species management, and other stewardship objectives

- In 2014, as part of its participation in the Berkeley Triangle Project, the SFS completed and began implementation of a Natural Resource Stewardship plan for the 1,100 acre Whiting Wildlife Management Area, with the cooperation of the NJDEP's Natural Heritage Review Group, which includes the Division of Fish and Wildlife, the Historic Preservation Office, and the State Park Service, as well as the SFS. The implementation started with low thinning conducted in a 100-acre safety strip in the Wildlife Management Area's Wildland Urban Interface (WUI) which was designed to mitigate the likelihood of crown fire.
- In 2015, as part of its participation in the Berkeley Triangle Project, the SFS completed a Natural Resource Stewardship Plan for Double Trouble State Park (approximately 8,500 acres), with the cooperation of NJDEP's Natural Heritage Review Group. This plan is currently under review by the NJ Pinelands Commission.
- The NJ Conservation Foundation has participated in the development of and supported the outcomes of this particular project, because substantial care was taken by all parties to account for concerns regarding critical natural communities and rare heritage elements.

Strategy 1

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.6:
Connect people to trees and forests, and engage them in environmental stewardship activities

Find opportunities to educate the people on the value of natural resources for the benefit of current and future generations

- In 2010 SFS partnered with Rutgers Cooperative Extension, the Division of Fish and Wildlife, and NJ Forestry Association to establish the first ever New Jersey Woodland Stewards program. Participants attend a weekend retreat where they are trained in the natural resource topics that contribute to fostering healthy forests. Stewards then commit to 30 hours of volunteer service over the course of the next year. Sessions were held in 2010, 2011, 2012, and 2014. There are currently 43 people who have successfully completed the Woodland Stewards program and who have collectively provided 1100 volunteer hours of service by participating in forest stewardship activities across New Jersey.
- In 2015, SFS partnered with Rutgers Cooperative Extension to create a 90-page book titled “My Healthy Woods” to help private landowners get started with managing their woodlands. Chapter topics include prescribed burning, harvesting, invasive species, wildlife, and planning for the future of the forest. Six thousand copies are being printed and will be distributed to landowners across the state.
- To protect the safety of campers, hazardous trees were removed in Stephens State Park campground in Hopatcong State Park. The removal took approximately one month, starting in November and finishing in December, 2014. Carried out by a contract vendor, all 40 campsites were assessed, 164 trees were removed, and various other trees were limbed and pruned where needed. The opened tree canopy is resulting in expanded forest growth.
- In 2014, the EAB was found in New Jersey. SFS partnered with the NJ Department of Agriculture, Rutgers University, and USDA APHIS to get information out to the public through:
 - NJDEP website updated and maintained: http://www.state.nj.us/dep/parksandforests/forest/community/Emerald_Ash_Borer.htm
 - Printed educational materials: fact sheets and brochures created for use by municipalities, landowners, homeowners, and forestry professionals.
 - Signage: Signs created to hang with EAB traps providing information on EAB and the link to the NJDEP website for more information.
- In 2012, SFS launched a Facebook page, New Jersey Forests. The page shares information on forests, trees, and nature and creates an on-line community of those who are interested in NJ forests. The page also promotes the diverse programs SFS offers to the public. The SFS posts three times weekly to the 3200 people that follow the page. Some posts, such as forest fire danger updates and free seedling giveaways, have individually been viewed by over 20,000 people. On average, the posts reach 12,000 people per week.

(Strategy 1 continued)

- SPB communication: In 2010, southern NJ experienced a major SPB outbreak. 14,000 acres were determined to be infested. The SFS provided information to the public through:
 - NJDEP website: www.southernpinebeetle.nj.gov provided updated information on SPB suppression undertaken on State lands.
 - Public meetings: To facilitate suppression activities on non-NJDEP lands, 12 public meetings were held to educate the public and provide landowners information about grant opportunities to cover the cost of SPB suppression on their property.
 - Digital SPB Action Kits: The SFS prepared kits containing a collection of SPB-related materials for use by partners and affected municipalities and help them provide information on SPB to the public. The kit includes a press release template, advertisement templates for newsletters, fact sheets, a poster, a bookmark, a video, a PowerPoint presentation, web banners, and more. All materials are available on the NJDEP website for download or, upon request, as a USB drive or CD-ROM.
- Forest Resource Education Center: The FREC in Jackson is the only public facility and interpretive center in New Jersey dedicated to teaching forestry and stewardship issues. The facility is situated on 900 acres in the Pinelands and shares the property with the State Forest Nursery which grows 300,000 seedlings annually for reforestation. The interpretive center features exhibits on forest history, urban forests, forestry tools, native wildlife, succession, and forest fire. Visitors enjoy the exhibits when visiting for a program or hike, or can stop by during office hours.
- Backyard Forestry in 90 Minutes: Starting on October 9, 2014, SFS, Rutgers Cooperative Extension, and the NJ Forestry Association began hosting *Backyard Forestry in 90 minutes* at FREC monthly on the second Thursday of each month. Landowners and homeowners enjoy this free series of sessions on forest management topics such as pruning, insects and diseases, and harvesting trees for firewood. The program seeks to interest more landowners and homeowners in managing their forest for multiple benefits. Eight sessions were held from October 2014 to May 2015, with a total of 232 participants.
- Festivals: The FREC has hosted the Fall Forestry Festival on the first Saturday in October yearly since 1994. From 2010 to 2014, 3,400 people attended the Fall Forestry Festival to enjoy the free interpretive hikes, demonstrations, nature crafts, and hayrides, which all instill a stewardship ethic. The SFS also distributed forest-related information from a booth at the New Jersey Wild Outdoor Expo, organized by the Division of Fish and Wildlife and held at the Assunpink Wildlife Management Area. This event had an attendance of 8,400 in 2013 and 6,700 in 2014.

**Sub-Theme 3.6:
Connect people to trees and forests, and engage them in environmental stewardship activities**

(Strategy 1 continued)

- During the last five years the NJ Audubon Society has hosted at least 17 environmental stewardship events, attended by over 430 people.
- Interpretive programs: Groups are allowed to schedule and hold free interpretive programs at the FREC. From 2010 to 2015, naturalists gave 321 interpretive programs for 10,738 people on topics such as forest products, tree identification, forest fire investigations, wildlife, and watersheds. Participants included PreK-12 students, senior groups, and scout troops.
- Project Learning Tree: Project Learning Tree (PLT) is an award-winning environmental education program designed for teachers working with youth from preschool through grade 12. From 2010 to 2014, 2,396 New Jersey teachers and other educators participated in PLT professional development workshops offered by SFS Forest Resource Education Center staff. Since 2014 an additional 253 educators have participated in PLT professional development workshops provided by State Park Service resource interpretive specialists and over 100 additional teachers were reached through the PLT Green Schools Program. The PLT Green Schools Program is a grant-funded program that was coordinated through Rutgers University.
- The NJ Tree Foundation, through its Green Streets program, hired and trained 33 parolees in basic tree planting and maintenance skills.
- Through the USDA Forest Service’s North Atlantic Fire Science Exchange, the Forest Guild and partners are planning a three-day workshop to be held November 2015 at Stockton University. Fire scientists and forest managers will convene for an in-depth look at ecological management in New Jersey’s fire-adapted Pine Barrens ecosystem. As part of the workshop, a full-day field trip is planned for people with an interest in understanding fire management in the Pine Barrens landscape.

Strategy 2

Engage people in environmental stewardship activities

- The NJ Tree Foundation’s urban & community forestry programs, in the years from 2010 to 2015, engaged over 8,600 volunteers in tree planting, resulting in the planting of 1,592 trees and 840 shrubs and perennials in Newark and 1,024 trees in Camden. 1,000 of the trees were funded through a Redesign grant awarded by USDA Forest Service.

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.6:
Connect people to trees and forests, and engage them in environmental stewardship activities

(Strategy 2 continued)

- In the 2010 to 2015 period, in support of Arbor Day celebration, the NJ Tree Foundation supplied 57,134 tree saplings across 279 municipalities in NJ for planting by 17,681 volunteers. 20,000 of these trees were funded through a Redesign grant awarded by USDA Forest Service. Additionally the NJ Tree Foundation recruited 871 Arbor Day volunteers who planted 383 trees in four municipalities: Newark, Freehold, Asbury Park, and Haddon Township.
- Each year the SFS's canine (K-9) unit offered information and education programs that have been result in contact with over 15,000 members of the public. These have been held at venues such as schools, fire departments, civic organizations, fairs and festivals. These programs provide information on forest fire prevention and the accomplishments of the K-9 units in supporting law enforcement's work in tracking down individuals whose illegal actions cause wildfires.
- From 2010 through 2014, the NJ Invasive Species Strike Team conducted 169 educational program sessions for 4,105 participants. The Strike Team tailors its message to each audience. Volunteer Ambassadors represent the Strike Team with a table-top display at community events. The Strike Team hosts invasive plant buy-backs where citizens trade an invasive plant dug from their garden for a coupon from a local nursery to replace it with a non-invasive plant. The Strike Team presents programs to groups such as property managers, elected officials, garden clubs and civic associations. The programs for property managers and elected officials are designed to encourage and facilitate invasive species management. Public programs focus more on personal responsibility, for example, promoting the use of native plants, encouraging boaters and anglers to clean their equipment to stop the spread of aquatic hitchhikers, and helping trail enthusiasts understand how their hiking boots can transport invasive plant seeds. The Strike Team also conducts both classroom and field sessions to teach participants to identify targeted species, properly record data about populations they detect and safely initiate control/eradication efforts.

Strategy 1

NATIONAL THEME:
ENHANCE PUBLIC BENEFITS FROM TREES AND FORESTS

Sub-Theme 3.7:
Manage trees and forests to mitigate and adapt to global climate change

Manage trees and forests to mitigate and adapt to global climate change

- Tree planting by the NJ Tree Foundation's urban & community forestry programs are estimated to result in the storage of over 150 thousand pounds of CO₂ annually
- Over 40 species/varieties of trees were planted in approximately 75 municipalities throughout the state through the NJ Tree Foundation's Green Streets program to increase species diversity and maximize the resiliency of the urban forest.
- NJ Highlands Water Protection and Planning Council is currently drafting mitigation standards for forest impacts due to linear development projects that are not now regulated in other ways.
- The forests within the New Jersey portion of National Park Service's Delaware Water Gap National Recreation Area (approximately 30,000 acres) were estimated by the USDA Forest Service to sequester approximately 7,725 tons of carbon (or 28,350 tons of CO₂) per year.
- In March 2011 a multi-disciplinary research team led by Professor Richard Lathrop, Director of the Center for Remote Sensing and Spatial Analysis at Rutgers University, released a report entitled: "Assessing the Potential for New Jersey Forests to Sequester Carbon and Contribute to Greenhouse Gas Emissions Avoidance." The initial impetus for the project as well as funding was provided by the NJDEP. The project was broken into four components to examine the role of forests in sequestering carbon as well as the role wood products may have in providing alternative energy needs.