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Finger Lakes National Forest

Biennial Monitoring and Evaluation Report

Fiscal Years 2017 and 2018



Blue vervain planted at Satterly Hill to establish native plant communities

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Biennial Monitoring and Evaluation Report
Fiscal Years 2017 and 2018

Finger Lakes National Forest

USDA Forest Service, Eastern Region
April 2022

This Biennial Monitoring and Evaluation Report combines monitoring completed in fiscal years 2017 and 2018 for the Finger Lakes National Forest Land and Resource Management Plan (Forest Plan) dated 2006. Monitoring and evaluation of forest plans is required by the National Forest Management Act and associated 1982 planning rule (36 CFR 219 dated September 30, 1982). Monitoring consists of mandatory components found in every forest plan, as well as monitoring that is tailored to address specific Finger Lakes National Forest resource concerns raised from public involvement and Forest Service interdisciplinary team review. The Finger Lakes National Forest monitoring plan is described in Chapter 4 (Monitoring and Evaluation) of the Forest Plan.

New planning regulations went into effect in 2012 (36 CFR 219 dated April 9, 2012). The new rule required every National Forest's monitoring plan must address each of eight resource monitoring elements with at least one monitoring question and associated indicator(s) by May 9, 2016. The Finger Lakes National Forest monitoring program was modified in early May 2016 to comply with the 2012 planning rule. Ten existing, modified, or new monitoring questions were specifically selected to address the required monitoring elements, and administrative changes were made to Chapter 4 of the Forest Plan accordingly.

Approval

I have reviewed the *Finger Lakes National Forest - Fiscal Years 2017 and 2018 Biennial Monitoring and Evaluation Report* including its findings, conclusions, and recommendations. I find the report meets the intent of both the Forest Plan (Chapter 4) as well as the CFR 219 planning regulations (2012 planning rule).

/s/ *John A. Sinclair* 5/7/2026

John A. Sinclair — Date
Forest Supervisor
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1. Introduction

Monitoring and evaluation reporting is required by the National Forest Management Act. The Finger Lakes National Forest (FLNF) monitoring program was developed following the 1982 planning rule effective September 30, 1982 (36 CFR 219.12(k)). The intent of the monitoring program is to determine how well the FLNF Land and Resource Management Plan (Forest Plan) is being implemented.

Monitoring Program Transition

The monitoring program was modified in May 2016 to comply with the 2012 planning rule dated April 6, 2012. The 2012 planning rule required every National Forest's monitoring plan to address each of eight resource monitoring elements with at least one monitoring question and associated indicator(s). The required monitoring elements include (36 CFR 219.12(a)(5)):

1. The status of select watershed conditions.
2. The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.
3. The status of focal species to assess ecological conditions.
4. The status of a select set of ecological conditions that contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.
5. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.
6. Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.
7. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.
8. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.A. 1604(g)(3)c)).

Nine existing, modified, or new questions and their measurement indicators were identified to comply with the 2012 planning rule and reflected in administrative changes to the Monitoring Plan (Chapter 4 of the Forest Plan) in May 2016. Some existing questions were also retained to supplement the required resource element monitoring.

The *Finger Lakes National Forest - Fiscal Years 2017 and 2018 Biennial Monitoring and Evaluation Report* documents the results of the monitoring accomplished during fiscal years 2017 and 2018 (October 1, 2016, to September 30, 2018). The report describes monitoring items by resource category, provides data pertaining to the effects and effectiveness of Forest Plan management direction, and discusses various resource management efforts implemented during fiscal years 2017 and 2018. A major part of the report is to determine if the resource outputs, management costs, returns, and environmental objectives were achieved as envisioned in the Forest Plan.

Biennial Monitoring and Evaluation Report Outline

This report is divided into five chapters and multiple appendices:

- Chapter 1 is the introduction providing an overview of the monitoring program.
- Chapter 2 provides monitoring and evaluation results for the monitoring questions addressing the eight required monitoring elements (36 CFR 219.12(a)(5)).
- Chapter 3 provides monitoring and evaluation results for the other monitoring questions retained to help ascertain how well management activities are implementing the Forest Plan and validating the effectiveness of Standards and Guidelines.
- Chapter 4 is a list of the Forest Service staff that provided information for the report.

- Chapter 5 is literature cited to support evaluation for monitoring items.
- Appendices include detailed information to supplement evaluation of various resource monitoring items.

The activities and outputs monitored may be traced to one of three sources:

- The 1982 and 2012 planning rules associated with the National Forest Management Act (36 CFR 219 dated September 30, 1982, and April 9, 2012, respectively) that outline specific activities and outputs to be monitored.
- Forest Plan components (Chapter 4) selected to facilitate comparison between actual conditions and desired future conditions.
- Questions derived from public comments received during Forest Plan revision. Public input is particularly useful for monitoring satisfaction with the resources and services provided by FLNF.

Each monitoring question is addressed in the following format:

- Monitoring Resource Category
- Monitoring Item
- Monitoring Question
- Detailed Monitoring Question
- Monitoring Driver
- Monitoring Activities
- Evaluation and Conclusions
- Recommendations

Monitoring Plan

The modified Chapter 4 of the FLNF Forest Plan (Monitoring and Evaluation, or Monitoring Plan) includes programmatic direction for monitoring and evaluating Forest Plan implementation. Chapter 4 defines the over-arching, strategic questions that must be addressed by the Forest Service through monitoring, including broad timetables and schedules for analysis and reporting.

In addition to direction for monitoring and evaluation, the Forest Plan describes FLNF goals, objectives, and desired future conditions. The Forest Plan allocated land to different management areas, each with unique desired future conditions, major emphasis, and management direction.

Specifically, monitoring and evaluation provides a basis to determine:

- Whether Forest Plan implementation is achieving multiple resource goals, objectives, and desired conditions
- If application of standards and guidelines are effective in maintaining the productivity of the land
- If conditions or demands in the area covered by the Forest Plan have changed significantly enough to require a revision to the Plan

The Forest Plan may also be amended to adapt to new information and changed conditions identified through monitoring and evaluation efforts. Through this adaptive management approach, the Forest Plan is kept current.

Monitoring Implementation Guide

In addition to the programmatic direction provided in the 2006 Forest Plan, Forest Service staff completed the *Monitoring Implementation Guide* (also referred to as the Monitoring Guide) in 2007. The monitoring guide provides more specific procedural guidance to implement the monitoring strategy outlined in the Forest Plan. The guide contains specific monitoring elements, along with methods, protocols, and analytical procedures to be followed. The monitoring guide is a suite of monitoring activities used to help Forest Service staff understand and answer the Forest Plan monitoring questions. Based on information garnered through annual monitoring and evaluation reports, the monitoring guide was updated in 2017 to incorporate suggested changes since 2007. The biennial monitoring and evaluation report for fiscal years 2017 and 2018 is based on the updated guide (*2017 Finger Lakes National Forest Monitoring Guide*).

Annual Monitoring Schedule

The *Annual Monitoring Schedule* outlines monitoring items, time frames, roles, and locations for the upcoming year and is linked directly to both the 2006 Forest Plan and the Monitoring Guide. The Forest Service prepares and revises this schedule as necessary as part of the annual work planning process. Some monitoring items are performed or measured annually, whereas others are scheduled with different time intervals that are determined necessary or appropriate for timely and effective evaluation. The schedule was last updated in 2017 and is now incorporated into the 2017 Monitoring Guide.

Biennial Monitoring and Evaluation Reports

The 2012 planning rule changed the requirement for annual monitoring and evaluation reports to a biennial schedule (36 CFR 219.12(d)). The 2017 and 2018 biennial report is the first to reflect this regulation change. Biennial monitoring and evaluation (M&E) reports provide a forum for the review of findings over the two-year monitoring period including:

- What monitoring activities were completed?
- What Forest Plan monitoring questions were addressed?
- How well did the monitoring address those questions?
- Do future monitoring activities need modification?

Comparison of results with those from previous years can identify trends and highlight where management is or is not achieving desired goals. It is during this biennial review that Forest Service staff can determine if changes to the 2006 Forest Plan or the Monitoring Guide are necessary.

Biennial M&E reports are prepared by an interdisciplinary team of Forest Service specialists that incorporate information gathered from various sources including partners, private citizens, and non-profit organizations. The Forest Service is grateful to the people who contribute their monitoring efforts and results and who take an interest in actively participating in FLNF management.

2. Required Monitoring Questions

This chapter includes consideration of the monitoring questions addressing the eight required monitoring resource elements (36 CFR 219.12(a)(5)). Table 2-1 provides the monitoring questions selected to address the required eight monitoring elements from Table 4.1-2 of the modified Chapter 4 of the Forest Plan. It identifies the required resource element, monitoring question, and indicator and measurement that are discussed in this report.

Table 2-1. Required monitoring questions (from Table 4.1-2, Forest Plan, Chapter 4).

Required Element	Monitoring Question	Indicator and Measurement
1. Status of select watershed conditions.	What is the existing status of watershed biological, chemical, and physical integrity on the Forest, and how are our management activities affecting them?	Indicators: • Water quality, biological, and physical attributes Measurements: • Water quality: dissolved oxygen, pH, nitrite, nitrate, total nitrogen, phosphate, temperature, E. coli, turbidity, conductivity, and total dissolved solids • Biological: macroinvertebrate community biometrics, macroinvertebrate percent community composition by major orders, and macroinvertebrate community functional group composition • Physical: stream bankfull channel dimensions (width and depth), substrate composition, substrate embeddedness, canopy cover, streambank condition, immediate upstream use, stream color condition, and wetland hydrology
2. Status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.	To what extent are management actions and natural processes leading to increased structural diversity within forested stands and across forested landscapes, moving areas toward desired objectives identified under Goal 2 of the Forest Plan?	Indicators: • Forest structure • Management actions with forest structure objectives Measurements: • Number of acres and proportion of each forest type in each age class • Number of acres and proportion of harvest acres treated with uneven-aged management • Number of acres treated explicitly to enhance early successional characteristics • Number of acres treated explicitly to enhance late successional characteristics • Number of acres treated with various methods to explicitly enhance the health, longevity, and/or structural diversity of forested stands at the stand and landscape scales
3. The status of focal species to assess the ecological conditions required under § 219.9.	Does the grasslands ecosystem provide a full array of habitat types across the Forest and align with the Forest Plan for overall abundance?	Indicator: • Savannah sparrow Measurement: Detection and non-detection, and relative abundance of savannah sparrow

Required Element	Monitoring Question	Indicator and Measurement
4. The status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.	What are the population trends for sensitive plants on the Forest and to what extent is management sustaining or enhancing habitat conditions for populations?	Indicator: • Population trends for plants listed as Regional Forester Sensitive Species Measurements: • Number of ramets or genets • Percent reproductive • Spatial extent of population • Number of populations of a species • Ranked condition of populations
5. The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.	Is the Forest moving toward the desired future condition for Recreation Opportunity Spectrum (ROS) settings?	Indicator: • Recreation opportunity settings Measurement: Trends toward desired future condition
	Are we providing high quality recreation services that meet the expectations of the public?	Indicator: • Visitor satisfaction from National Visitor Use Monitoring (NVUM) Measurement: • Mean visitor satisfaction compared to mean importance to visitor
6. Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area.	Are insect and disease levels compatible with objectives for maintaining healthy forest conditions?	Indicator: • Insect or disease infestations Measurements: • Number of outbreaks by species • Acres affected by species
7. Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities.	How close are actual resource outputs and services to those projected in the Forest Plan?	Indicator: • Projected outputs for resource activities or practices listed in Table D-5 in the Forest Plan Measurement: • Actual annual outputs for resource activities and practices listed in Table D-5 in the Forest Plan
8. The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).	How are soil quality and productivity changing in response to forest management?	Indicators: • Soil sustainability • Hydrologic function • Soil productivity Measurements: • Amount of forest floor impacted • Amount of topsoil displacement • Severity of rutted, burned, or compacted soil • Severity of platy/massive soil structures, or puddled soil

Monitoring Element 1: Water

Monitoring Item: Forest-wide Water Quality

Monitoring Question: To what extent are environmental stressors and Forest management affecting water quality and the physical features of aquatic, fisheries, riparian, vernal pool, and wetland habitats?

Detailed Monitoring Question: What is the existing status of watershed biological, chemical, and physical integrity on the Forest, and how are management activities affecting them?

Monitor Driver: Forest Plan Goal 4 and associated Objectives.

Monitoring Activities: This monitoring question was derived from modifications to an existing monitoring item to address required Element 1 from the 2012 planning rule (36 CFR 219.12(5)(i)): *The status of select watershed conditions.* This question helps address whether management activities meet the intent of Forest Plan Goal 4, "*Maintain or restore aquatic, fisheries, riparian, vernal pool, and wetland habitats*" (Forest Plan, p. 13).

Water quality is one critical component of watershed conditions. Protection and maintenance of aquatic ecological communities dependent on healthy water conditions is a primary goal during implementation of management activities, particularly cattle grazing in permitted areas. Monitoring methods generally consist of collecting water samples and evaluation testing is completed in the field lab.

No water quality monitoring was conducted during fiscal years 2017 and 2018.

Evaluation and Conclusions: Water quality on FLNF would generally be impacted by legacy land use impacts, existing roads, and livestock grazing. Although data are not available to specifically discuss the condition of water quality for this monitoring period, permitted and administrative land uses are generally designed with the intent of preventing degradation of water quality or of restoring previously degraded water conditions.

Recommendations: Specific physical, chemical, and biological parameters may not be the most effective at characterizing the effects of local land management on water quality. Consider changes to this monitoring question and measurement indicator that would more readily demonstrate water quality conditions at the forest-wide scale. Specifically, since a Forest Plan Goal 4 objective states management will "*Meet or exceed all State Water Quality Standards, including biotic standards*", modification of monitoring indicators should be derived from State measurement criteria (such as water quality classifications, surface water impairment status, and approved Total Maximum Daily Loads for impaired waterbodies).

Monitoring Element 2: Vegetation

Monitoring Item: Forest Structure

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: To what extent are management actions and natural processes leading to increased structural diversity within forested stands and across forested landscapes, moving areas toward desired objectives identified under Goal 2 of the Forest Plan?

Monitoring Driver: Forest Plan Goal 2 and associated Objectives.

Monitoring Activities: This new monitoring question was developed from combining the intent of several existing monitoring questions (including early successional habitat, late successional forest habitat, and uneven-aged management monitoring items) to address required Element 2 from the 2012 planning rule (36 CFR 219.12(5)(ii)): *The status of select ecological conditions including key characteristics of terrestrial and aquatic ecosystems.* Forest structure is a key ecosystem characteristic that is important for restoring and maintaining the abundance and distribution of native species. Forest Plan Goal 2 is to "*Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals*" (Forest Plan, p. 10). Age class objectives associated with even-age systems are identified in Tables 2.2-2 and 2.2-3 (Forest Plan, pp. 11-12), while the objective for managed uneven-age forest structure is a minimum of 20 percent of lands suitable for timber management (Forest Plan, p. 12).

Not knowing how age class diversity is changing could have serious consequences for meeting viability objectives for species that rely on certain age classes. Active forest management has the largest and quickest influence on age class diversity compared to natural processes. Timber harvesting activities and other silvicultural treatments are tracked using the Forest Service Activity Tracking System (FACTS). FACTS manages information about activities related to fire/fuels, silviculture, special funding, range vegetation improvement, and invasive species used by all levels of the Forest Service. Field Sample Vegetation data is also tracked in the FSVeg system, which is updated to reflect treatments once completed. These systems can provide reports summarizing the number of acres and proportion of harvest acres treated with uneven-aged management (selection, groups, irregular shelterwood); the number of acres treated explicitly to enhance early successional characteristics (clearcutting, patch cutting, shelterwood); then number of acres treated explicitly to enhance late successional characteristics; and the number of acres treated with various methods (thinning, improvement) to explicitly enhance the health, longevity, and/or structural diversity of forested stands at the stand and landscape scales. This data can be used to monitor the progress made toward desired age class and structure objectives. There is some error associated with this data entry and consistency of activity classification, however the data is sufficient for tracking overall trends.

Evaluation and Conclusions: Table 2-2 provides a summary of the treatments over the past five years (2014 to 2018) added to treatments implemented from 2006 to 2013 that have contributed toward moving age class diversity toward the objectives identified in Table 2.2-2 in the Forest Plan.

Table 2-2. Acres treated from 2006 to 2018 to move age class distribution toward Forest Plan objectives (Forest Plan Table 2.2-2, and pp. 11 to 12).

Age Class Objectives	Acres treated from 2006-2013	Acres treated from 2014-2018	Total acres treated
Create regenerating age classes[1]	47	0	47
Improve health and longevity	54	0	54
Uneven-age management	0	0	0
All treatments	**101**	**0**	**101**

Source: Fores Service data

[1] Includes both commercial and non-commercial treatments

Approximately 101 acres have been treated to change age class distribution since 2006. This total treatment area is approximately one percent of total suitable NFS lands. No acres were treated between 2014 and 2018. At this level, the effects of management on overall age class distributions are minimal, with natural processes, succession, and the aging of forests having a much greater effect. Some natural disturbance has taken place on the landscape, however no large scale, stand replacing disturbance has been documented. Most natural disturbance has been small-scale, creating gaps and contributing to more diverse forest structure at the stand level as forests age.

Table 2-3 shows the comparison of the existing age class distribution as of 2013 across all federal lands and lands suitable for timber management with the existing condition documented in the Forest Plan Final Environmental Impact Statement (Final EIS) and Forest Plan age class objectives. The percentage of forestland in the regenerating age class (0 to 9 years) is well below Forest Plan objectives across all habitat types for suitable lands, and minimal progress has been made toward these objectives. Forest Plan objectives range from 5 to 20 percent across habitat types. In 2006, less than once percent of suitable forestland was in the regenerating age class. All that area has now aged into the young age class. Since 2006, less than one percent of suitable lands has been harvested using even-age regeneration methods. Management implemented since 2006 has slowed the decline of the regenerating forest habitat type but is not increasing or moving it toward target levels.

The percentage of forestland in the young forest habitat type is also well below Forest Plan objectives across all habitat types for suitable lands and has been steadily decreasing as forests age. The level of harvesting on FLNF has not been sufficient to move toward Forest Plan objectives or to maintain 2006 levels. Forest Plan objectives for young forest in suitable lands range from 15 to 55 percent across habitat types. In 2006, approximately 18 percent of suitable forestlands were in the young age class. By 2013, the estimate decreased to 10 percent. That proportion of young forest habitat has continued to decrease.

Across all forest types, the old age class has almost tripled in area, increasing from five percent to 14 percent of the forested land base. For each habitat type the old age class doubled or tripled as well, and for all but hardwoods the mature age class has decreased, indicating that the shift from mature to old is not being compensated by a shift from young to mature. For the hardwoods young age class, which had far more acres in 2006, had some transition to mature, over-compensating for the transition of mature to old age class. The trends are similar for the forested land base as a whole and for just the suitable lands.

In addition to age class objectives by habitat type, the Forest Plan includes objectives for the proportion of suitable lands managed using uneven-aged silvicultural methods. These include single tree selection, group selection and irregular shelterwood methods. Forest Plan objectives include the use of uneven-aged harvesting for approximately 20 percent of management activities. Since 2006, no uneven-aged management has been implemented on FLNF. All management has consisted of even-age regeneration harvests and thinning. Only one timber sale (Cotton Mill Timber Sale) has been sold since 2006 which emphasized oak habitat types and conversion of non-native plantations, for which even-aged management is most appropriate.

Table 2-3. Comparison of existing age class distribution in 2013 across all federal lands and lands suitable for timber management with the existing condition documented in the FEIS and Forest Plan Age Class Objectives.

Habitat Type	Age Class (years)		2013 Existing Condition (all FS lands)		2013 Existing Condition (suitable)[1]		Existing Condition 2006 Plan[2]		Forest Plan Objectives
	years	*class*	*ac*	*%*	*ac*	*%*	*ac*	*%*	*%*
Mixed Hardwoods	**0-9**	**Regen.**	**0**	***0***	**0**	***0***	**0**	***0***	5-10
	10-59	Young	601	*20*	550	*22*	906	*33*	30-50
	60-119	Mature	1,810	*63*	1,669	*69*	1,647	*60*	25-35
	120+	**Old**	**482**	***17***	**213**	***9***	**192**	***7***	5-10
Oak	**0-9**	**Regen.**	**21**	***1***	**21**	***1***	**54**	***2***	5-10
	10-59	Young	154	*6*	141	*7*	243	*9*	30-50
	60-99	Mature	1,995	*74*	1,499	*73*	2,265	*84*	25-35

Habitat Type	Age Class (years)		2013 Existing Condition (all FS lands)		2013 Existing Condition (suitable)[1]		Existing Condition 2006 Plan[2]		Forest Plan Objectives
	years	*class*	*ac*	*%*	*ac*	*%*	*ac*	*%*	*%*
	100+	**Old**	**517**	***19***	**399**	***19***	**135**	***5***	5-10
Softwood	**0-9**	**Regen.**	**0**	***0***	**0**	***0***	**0**	***0***	10-20
	10-39	Young	95	*3*	95	*4*	242	*8*	15-35
	40-99	Mature	2,714	*93*	2,382	*94*	2,756	*91*	35-55
	100+	**Old**	**97**	***3***	**70**	***3***	**30**	***1***	5-40
Aspen	**0-9**	**Regen.**	**26**	***12***	**26**	***12***	**0**	***0***	10-20
	10-49	Yng/Mat	50	*22*	50	*23*	158	*66*	70-80
	50+	**Old**	**149**	***66***	**139**	***65***	**81**	***34***	5-15
All Types		**Regen.**	**47**	***1***	**47**	***1***	**54**	***1***	
		Young	899	*10*	836	*12*	1,549	*18*	
		Mature	6,519	*75*	5,550	*76*	6,669	*76*	
		Old	**1,245**	***14***	**821**	***11***	**439**	***5***	

[1] Applies only to NFS lands suitable for timber management.
[2] Acres are based on Table 3.5-8 of the Forest Plan FEIS, with proportions by age class for all management areas derived from Tables 3.5-9 through 3.5-12; age class proportions for softwood stands are for native softwood stands, as indicated in the FEIS, but the FEIS text indicates that proportions are similar for plantation stands, and so are applied here to all softwood stands.

These management trends are generally moving FLNF toward an older and more uneven-age forest structure. Increased structural diversity in uneven-aged stands and the development of old forest can be beneficial for habitat diversity. The aging of forests and treatments enhance late successional characteristics creating forest habitats with large trees, abundant dead and downed wood, and canopy gaps. The complex structure of these forests creates diverse habitats, many of which are not present in younger forests. However, both young and old forest conditions are needed to maintain an ecologically functional landscape. Even-aged regeneration harvest has not been implemented at the rate needed to reverse a declining trend in regenerating and young forest and to reach a level that supports native species that depend on the habitat they provide. This type of management is also necessary to maintain oak and aspen habitat types. Without the establishment of larger patches of early successional habitat over the next 50 or more years, a whole suite of early successional species strongly associated with this habitat will continue to decline.

Management trends also have potential consequences for forest health and resilience to climate change. Relatively homogenous, even-aged stands resulting from agricultural abandonment in the early 1900s make up a large proportion of FLNF. The maturing of these even-aged stands and the lack of diversity present are risk factors for forest health. Forest health stressors which are compounded by climate change include native and non-native insects and diseases, invasive plants, invasive earthworms, pollution and atmospheric deposition. These risks can be mitigated by increasing structural diversity and sustaining productivity and growth at the stand and landscape level.

Since 2006, the level of timber harvesting on FLNF has not been sufficient to move age class distributions toward Forest Plan objectives, or even to prevent further departure from these objectives.

Forest Service staff should consider opportunities to increase the number of acres treated using all methods to move age class distributions toward Forest Plan objectives, or at least to slow the departure.

Recommendations: No recommended change to this monitoring question.

Monitoring Element 3: Terrestrial Wildlife Habitat

Monitoring Item: Grasslands Ecosystem (Savannah sparrow)

Monitoring Question: Are the ecological sustainability and diversity of natural communities present and functioning on the FLNF?

Detailed Monitoring Question: Does the grasslands ecosystem provide a full array of habitat types across the Forest and align with the Forest Plan for overall abundance?

Monitoring Driver: Forest Plan Goal 2 and associated Objectives.

Monitoring Activities: This new monitoring question was developed specifically to address required Element 3 from the 2012 planning rule (36 CFR 219.12(5)(iii)): *The status of focal species to assess the ecological conditions required under 36 CFR 219.9*. For context, 36 CFR 219.9 is a reference to the planning rule section on ecological conditions to provide for a diversity of plant and animal communities. Focal species are defined as a small subset of species whose status permits inference to the integrity of the larger ecological system to which it belongs and provides meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area (36 CFR 219.19). Focal species are selected based on their functional role in ecosystems. Savannah sparrow (*Passerculus sandwichensis*) was selected as the FLNF focal species for monitoring because there is a strong tie to ecosystem conditions that can't be better monitored using more direct indicators. It also enables the monitoring effort needed to achieve meaningful results within staffing and budget capabilities.

This monitoring question ties directly to Forest Plan Goal 2 to "*Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals"* (Forest Plan, p. 10). A Forest Plan objective related to this goal calls for maintaining acres of grassland habitat at levels higher than ecological tendencies to support species that prefer these habitats. Another objective calls for providing for at least 80 percent of the Grassland for Wildlife Management Area in grass/forb vegetation (80 percent of 688 acres = about 550 acres or about three percent of FLNF lands). Dominant grassland ecosystem vegetation includes many varieties of edible grasses and forbs that also provide cover and nesting habitat for a wide variety of game and non-game wildlife species that are dependent on grassland habitats during all, or part of, their life cycle.

Savannah sparrow is a ground nesting species that has a rather narrow habitat niche across the landscape. The species is a continental migrant but tends to migrate short distances and winter in areas as close as New Jersey. Savannah sparrow is an obligate grassland species meaning that they will only utilize grassland areas for life history processes. The standard breeding bird survey protocol used for Regional Forester Sensitive Species can be used for monitoring Savannah sparrow populations. Using a presence/absence survey indicates that if Savannah sparrow is present on the landscape, they are utilizing appropriate grassland areas. If they are present with relative abundance, it is presumed the grassland is functioning with the correct components (composition) to provide cover and food for grassland dependent species.

Due to the current condition of the landscape in terms human-induced factors that are relatively permanent based on social and economic needs and desires, the ability of the central Finger Lakes region to again operate totally within the range of variation that might be expected is extremely difficult. In particular, grasslands and shrublands on FLNF are maintained well outside the expected range of variation, due both to social and economic considerations of the local community, and the need to protect rare species and provide uncommon habitat structure for wildlife.

Grassland habitats are declining in abundance and quality in much of the Northeast. Without vegetation management, particularly mowing, prescribed fire, and timber management, these habitats quickly revert through succession to forested conditions. The grasslands ecosystem has been identified as a priority for monitoring on FLNF because un-grazed grasslands are rare within the region and support numerous wildlife species that are important for maintaining ecological diversity. The present composition and distribution of this vegetative community on FLNF are the result of a long history of land use. The restoration of ecosystem conditions to desired levels provided by Forest Plan direction are designed to increase ecological integrity across the landscape. Monitoring conditions of this ecosystem will help determine the efficacy of management activities and provide the basis for potential changes in project planning for improved success in achieving desired objectives.

During fiscal years 2017 and 2018, Savannah sparrow was not intentionally monitored. However, Forest Service staff completed yearly grassland bird surveys with the same data collection method used since 2006. Grassland species identified during surveys were recorded including the presence of Savannah sparrow in 32 of 48 units surveyed.

Evaluation and Conclusions: Although Savannah sparrow presence was confirmed in 32 of 48 units surveyed during fiscal years 2017 and 2018, consideration of their relative abundance across the landscape and how this may indicate whether grasslands are functioning as healthy ecosystems was not evaluated.

Recommendations: No recommended change to this monitoring question.

Monitoring Element 4: Rare Plants Population

Monitoring Item: Sensitive Plant Population Trends

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Detailed Monitoring Question: What are the population trends for sensitive plants on FLNF? To what extent is management sustaining or enhancing habitat conditions for populations?

Monitor Driver: Forest Plan Goal 2 and associated Objectives.

Monitoring Activities: This existing monitoring item question was selected to address required Element 4 from the 2012 planning rule (36 CFR 219.12(5)(iv)): *The status of a select set of the ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.* For context, 36 CFR 219.9 is a reference to the planning rule section on ecological conditions to provide for a diversity of plant and animal communities. This section provides for the identification of species of conservation concern, which is *a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the Regional Forester has determined that the best available scientific information*

indicates substantial concern about the species' capability to persist over the long-term in the plan area (36 CFR 219.9(c)).

Although species of conservation concern are not anticipated to be identified for FLNF until the Forest Plan is revised, the focus on plant species listed as Regional Forester Sensitive Species (RFSS, or sensitive species) is a good alternative approach to meet the intent of this monitoring element. Regional Forester Sensitive Species are those that have been identified to have population viability as a concern as evidenced by: 1) significant current or predicted downward trends in population numbers or density; and 2) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. This question was selected to address this monitoring element from the existing monitoring program because it provides a practical means to determine how well habitat for sensitive species is managed to provide for healthy and viable populations across the landscape. The indicator and measurements have been modified to provide more meaningful information based on new available literature.

This question ties directly to addressing Forest Plan Goal 2 to "*Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals*" (Forest Plan, p. 10). It is a Forest Plan objective to protect critical habitat and key habitat features upon which RFSS depend. Agency policy provides direction to develop and implement management practices to ensure that sensitive species do not become threatened or endangered because of Forest Service actions (Forest Service Manual 2670). Management decisions must not result in loss of sensitive species viability or create significant trends toward federal listing.

The RFSS list for plants was updated in 2017 and now includes 23 species (Appendix B, Table B-2). During the update two species were removed because they are considered common on FLNF (swamp white oak and American bittersweet) and one believed to not be at risk in New York state (Tuckerman's sedge). Five species were added: one of these was found in grasslands (Frank's sedge); and four were found during the fiscal years 2014 and 2015 inventories at Caywood Point (yellow giant hyssop, woodland agrimony, butterfly weed, Steller's cliffbrake, and common snowberry), all of which are rare/scarce in the Cayuga Lake Basin but less rare in New York state overall.

Monitoring data collected for each rare plant population and stored in NRIS TESP-IS, the Forest Service corporate database for botanical data, includes: 1) number of ramets or genets, 2) percent reproductive, 3) spatial extent of population, 4) number of populations of a species, and 5) ranked condition of populations. At times the available taxa list in NRIS does not keep up with species tracked; data for those taxa are stored in a spatial layer, called "Rare Plants not in NRIS".

Monitoring efforts consisted of five of 23 sensitive plants (5 sites/populations) in fiscal year 2017, and two of 23 RFSS plants (2 sites/populations) in fiscal year 2018. Monitoring all sensitive plants at Caywood Point was planned for 2018, but only two species got monitored due to heavy rain and flooding during the planned monitoring site visits. Monitoring trends for each species are summarized in Appendix B, Table B-3. Uncommon or rare non-RFSS plants newly found or monitored will be evaluated for possible inclusion on the RFSS list during the planned fiscal year 2022 list update.

In addition to monitoring known sensitive plant populations, botanical inventory is undertaken to search for new populations, either in response to proposed ground-disturbing projects, or to learn more about supportive habitat on NFS lands. In fiscal years 2017 and 2018 botanical inventory for rare plants occurred in the following locations, and simultaneously included inventory for non-native invasive plants (NNIP):

Fiscal Year 2017 (534.1 acres)

- Eight shrublands proposed for management were inventoried (202.3 acres). Three new sensitive plant populations were found, and 60 populations of 22 species that are rare or scarce in the Cayuga Lake Basin were found; of these 22, four are rare enough that they will be evaluated in the next RFSS list update scheduled for fiscal year 2022.
- Seven known or suspected rare plant sites were monitored (126.7 acres): three in Shrublands Management Area (MA), one in Grassland for Wildlife MA, and three in Grasslands for Grazing MA. Three suspected sites were determined to be misidentifications, known rare plants were found and monitored at three other sites, and not found at one site.

Fiscal Year 2018 (219.3 acres)

- 18 stands in shrublands and grasslands were inventoried prior to managing them with prescribed fire or enhancing for pollinators; some were repeats of areas previously visited. No new rare plant populations, RFSS or otherwise, were found.

Evaluation and Conclusions: The Forest Plan (Goal 2, p. 10) directs management to "*maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals*". Forest-wide Standards and Guidelines for Rare and Unique Biological Features (Forest Plan, p. 26) require a periodically updated list of all threatened, endangered, and sensitive species (Standard S-1) and investigating all project sites for threatened, endangered, and sensitive species (Standard S-2).

This Forest Plan direction is usually met by having rare plant inventories completed at sites of proposed projects or in habitats where management is considered. While large areas were surveyed in fiscal years 2014 to 2016, none were surveyed in the current monitoring period. Forest Plan direction is also followed by monitoring known rare plant occurrences on a cyclical basis; formerly aimed for a five-year cycle, but as the botany program of work has increased, switched to a seven-year cycle.

Foliar spot spraying and manual control of NNIP benefited 20 sensitive plants including: 13 sensitive plants at Caywood Point, one at the Blueberry Patch wetland creation site, one in a grassland area, three along trails, and two along Breakneck Creek. See the Non-native Invasive Species monitoring item for detailed information regarding NNIP treatments.

Monitoring trends are provided in Appendix B, Table B-3. Of the 23 sensitive plants listed as RFSS, trends appear to be stable for four species, 15 species were not monitored during this two-year evaluation period (most not due for monitoring on the seven-year cycle until at least 2021), and trends for the remaining four (Frank's sedge, bottle gentian, butternut, and Canada lily) were uncertain.

Recommendations: No recommended change to this monitoring question. Species-specific recommendations are provided in Appendix B, Table B-3.

Monitoring Element 5: Recreation

Monitoring Item: Equity

Monitoring Question: Is the Forest providing recreation equity to serve a diverse public?

Detailed Monitoring Question: Is there disproportionate utilization of recreation resources by demographic?

Monitor Driver: Forest Plan Goal 11 and associated Objectives.

Monitoring Activities: This existing monitoring item question was selected to address required Element 4 from the 2012 planning rule (36 CFR 219.12(5)(v)): *The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.* The FLNF is a popular recreation destination in the Finger Lakes Region of central New York. Historically the role of FLNF has been to provide high-quality scenery and opportunities for dispersed recreation such as hiking, horseback riding, hunting, fishing, and camping in undeveloped settings. Recreation and tourism within New York State are important to the State, regional, and local economies. In the Finger Lakes region, tourism is recognized as an economically important industry. The FLNF plays a unique role in complementing the private tourism sector by providing predominantly natural settings and nature-based recreation opportunities.

The existing Recreation Opportunity Spectrum (ROS) monitoring item question was selected to address monitoring element 5 during the monitoring transition process. The ROS is a planning tool used to identify and evaluate the supply of recreation settings on national forests based on actual on-the-ground conditions. Two ROS classes are currently inventoried on FLNF (Roaded Natural and Rural). Measuring trends from existing to desired ROS was anticipated to be an effective measure to determine how well management activities are achieving forest visitor satisfaction and desired recreation objectives specific to Forest Plan, Goal 11, "*Provide a diverse range of high-quality, sustainable recreation opportunities that complement those provided off National Forest System lands*" (Forest Plan, p. 15). Monitoring for this question was envisioned to compare inventoried ROS settings at the time of Forest Plan revision with the inventory after 5 and 10 years of plan implementation.

It was determined ROS setting methodology to measure visitor satisfaction and progress toward meeting recreation objectives required data that was not readily available. Thus, the ROS monitoring question was difficult to address and has never been reported since it was initially developed in 2006. Only projects which have a positive effect toward the desired ROS, or no effect at all, are approved for implementation with site specific environmental analysis. Without a complete inventory of the existing ROS settings, it is not feasible to determine the amount of change which has occurred. To better address this monitoring element, the ROS setting monitoring question has been replaced with the Equity monitoring item included in this report. Forest Service staff are more readily able to address this monitoring question by comparing demographic data from the National Visitor Use Monitoring (race/ethnicity, age, socioeconomic status, disability, gender) with average census data for the counties represented by survey respondents.

This monitoring compares data from the U.S, Forest Service National Visitor Use Monitoring (NVUM) program conducted on the Green Mountain and Finger Lakes National Forests to 2010 U.S. Census data to examine whether there is disproportionate utilization of recreation resources on NFS lands.

National forest visitation data for racial and ethnic minority and non-minority user groups was obtained from the NVUM program (USDA Forest Service 2018a, b and c). Visitor inventories are conducted on a five-year cycle; the most recent datasets from 2005, 2010 and 2015 were utilized for this study. The NVUM data was then compared with 2010 demographic data obtained from the U.S. Census Bureau (US Census Bureau 2010) for Massachusetts, New York, Vermont, and the United States. The difference between NVUM (percent Forest Visitor Minority) and U.S. Census (percent Minority) was computed.

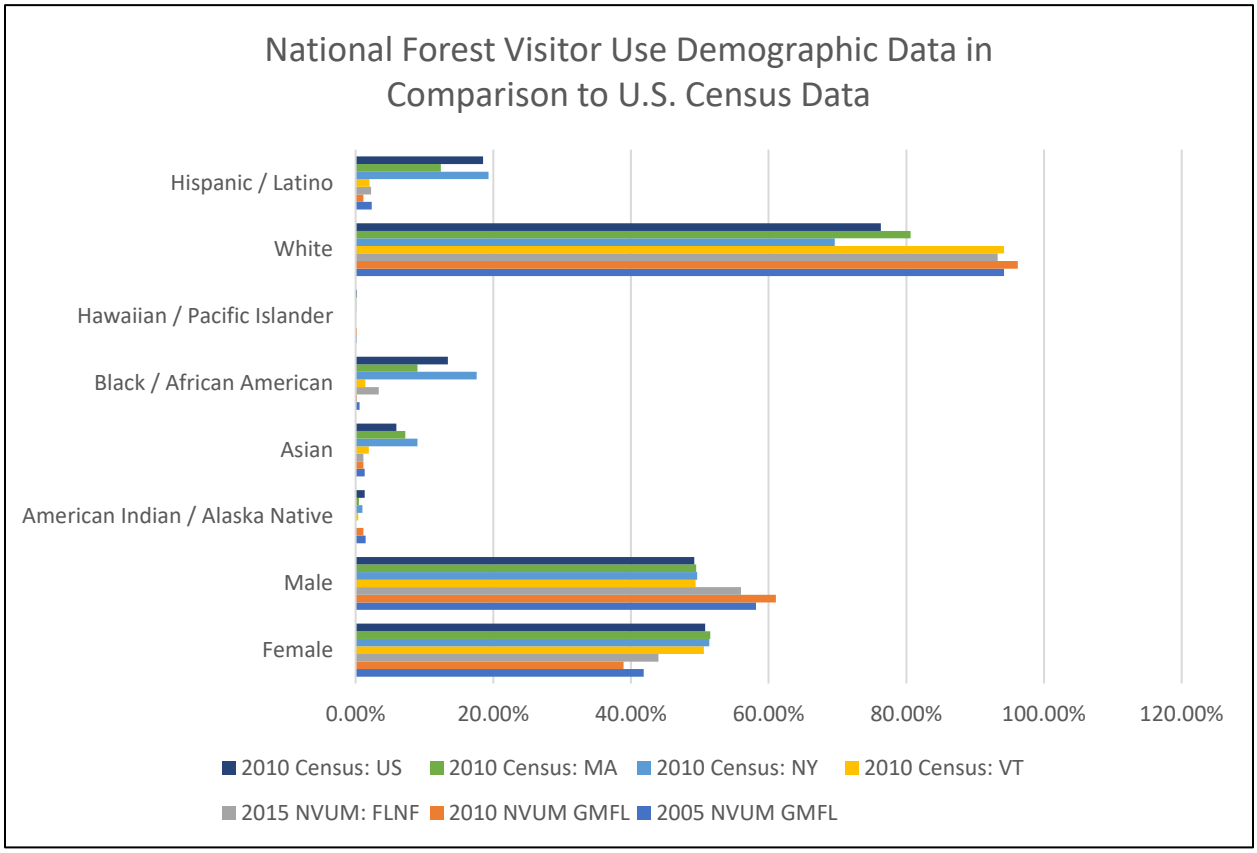
Evaluation and Conclusions: This information is the same as the evaluation and conclusions found in the *FLNF Fiscal Years 2014, 2015, and 2016 Annual Monitoring and Evaluation Report* since it is based on the same 2015 NVUM data.

It is important to discuss the limitations associated with this analysis before discussing the results. The 2005 and 2010 NVUM results include data for the Green Mountain (VT) and Finger Lakes (NY) National Forests combined; the 2015 NVUM results are specific to FLNF only. The comparison between U.S.

Census and NVUM datasets considered Census populations from the national average as well as Census populations from the three states representing the majority of NVUM responders averaged from the 2005, 2010 and 2015 results: Massachusetts (approximately 10 percent of responders); New York (approximately 10 percent of responders); and Vermont (approximately 50 percent of responders); however, national forest visitation estimates represent all visitors regardless of the distance they traveled.

Figure 2-1 shows percentage of NVUM responders reporting by gender and race/ethnicity in comparison to US Census Bureau 2010 data population percentages for Massachusetts, New York, Vermont and the United States (three states representing the majority of NVUM responders). NVUM responses are recorded by year and location: Green Mountain and Finger Lakes (GMFL) or FLNF). Monitoring results suggest an inequity gap wherein racial minorities are not utilizing FLNF recreation opportunities at the same rate as their white counterparts. The percent of NVUM responders reporting as Black/African American, Asian, and Hispanic/Latino are consistently below Census population percentages for Massachusetts, New York, Vermont and the United States with the exception of 2005 Hispanic/Latino NVUM responders exceeding the percentage of Vermont Census data (2.32 percent Hispanic/Latino NVUM responders and 2 percent Hispanic/Latino Vermont population by Census) (USDA Forest Service 2018a, b and c and US Census Bureau 2010).

Figure 2-1. *National Forest Visitor Demographic Comparison to U.S. Census Data.*



National Visitor Use Monitoring responders identifying as female gender also showed National Forest visitation estimation percentages below Census data (Table 2-4).

Table 2-4. National Visitor Use Monitoring (NVUM) percent visitation by reported gender in comparison to 2010 U.S. Census Bureau data from the national average as well as census populations from the three states representing the majority of NVUM responders.

Gender	2005 GMFL[1] NVUM	2010 GMFL[1] NVUM	2015 FLNF[1] NVUM	2010 Census: VT	2010 Census: NY	2010 Census: MA	2010 Census: US
Female	41.85%	38.94%	45.67%	50.60%	51.40%	51.50%	50.80%
Male	58.15%	61.06%	54.33%	49.40%	49.60%	49.50%	49.20%

[1] 2005 and 2010 NVUM results include data for the Green Mountain (VT) and Finger Lakes (NY) National Forests (GMFL). The 2015 NVUM results are specific to FLNF only.

The results from monitoring suggest there is disproportionate utilization of forest recreation opportunities for many racial and ethnic minority groups, demonstrating the need for the Forest Service to identify and evaluate strategies that would enhance greater racial and ethnic inclusion in outdoor recreation. There is also a need to better refine measures to encourage diversity and inclusiveness in local decision-making and planning processes to best serve all our publics and to sustain future relevance of the agency (Flores, et al 2018).

Recommendations: Consider refining measurement indicators for this monitoring question to better track forest user diversity and inclusiveness.

Monitoring Element 5: Recreation

Monitoring Item: Recreation Visitor Satisfaction

Monitoring Question: To what extent have objectives been attained?

Detailed Monitoring Question: Are we providing high quality recreation services that meet the expectations of the public?

Monitor Driver: Forest Plan Goal 11 and associated Objectives.

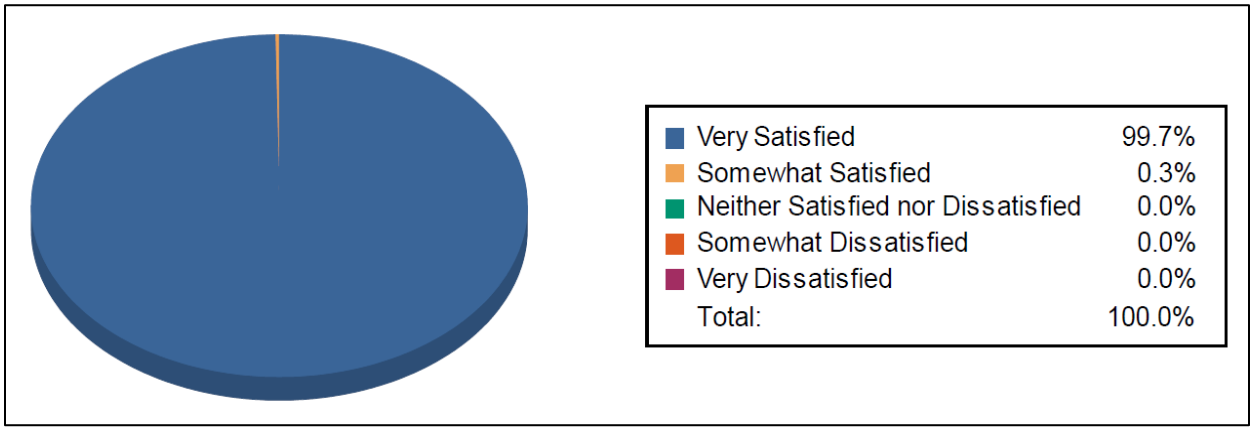
Monitoring Activities: This existing monitoring item question was selected to address required Element 4 from the 2012 planning rule (36 CFR 219.12(5)(v)): *The status of visitor use, visitor satisfaction, and progress toward meeting recreation objectives.* The National Visitor Use Monitoring (NVUM) program provides science-based estimates of the volume and characteristics of recreation visitation to the National Forest System, as well as the benefits recreation brings to the American public. The measure for visitor satisfaction is the "mean visitor satisfaction" from the NVUM compared to "the mean importance to the visitor". This indicator tracks the congruence between the agency's performance and customer evaluations of importance. The idea behind this measure is that those elements with higher importance levels must have higher performance levels. Lower scores indicate a gap between desires and performance.

The NVUM program provides reliable information about recreation visits to NFS lands at the national, regional, and forest level. The NVUM program has two concurrent goals. First, to produce estimates of the volume of recreation visitation to National Forests and Grasslands. Second, to produce descriptive information about that visitation, including activity participation, demographics, visit duration, measures of satisfaction, and trip spending connected to the visit. Specific NVUM protocols, terminology, limitations, data, annual reports, and other information is available at: https://www.fs.usda.gov/about-agency/nvum/

National Visitor Use Monitoring (NVUM) data is collected and reported on a five-year cycle. To assess visitor satisfaction, recreation visitors were asked through the NVUM program to provide an overall rating of their visit to the national forest, on a 5-point Likert scale, ranging from not important to very important. Visitors rated both the importance and performance (satisfaction with) of these elements.

Evaluation and Conclusions: This information is the same as the evaluation and conclusions found in the *FLNF Fiscal Years 2014, 2015, and 2016 Annual Monitoring and Evaluation Report* since it is based on the same 2015 NVUM data. An overwhelming majority of visitors to FLNF (99.7 percent) report they are "very satisfied" with their overall National Forest experience (Figure 2-2).

Figure 2-2. *Percent of National Forest Visits by Overall Satisfaction Rating.*



In respect to providing high-quality recreation services, NVUM monitoring looks at the satisfaction elements most readily controlled by managers. These are aggregated into four categories: developed facilities, access, services, and visitor safety and the site types sampled are aggregated into two groups: developed sites (includes both day use and overnight developed sites) and dispersed areas. The "Percent Satisfied Index (PSI)" identifies the proportion (percent) of elements and sites with a numerical rating of 4 or 5, equivalent to the percent of all recreation customers who are satisfied with agency performance. The agency's national target for this measure is 85 percent. Table 2-5 displays the aggregate PSI scores for FLNF.

Table 2-5. Percent Satisfied Index[1] scores for aggregate categories from 2015 survey data.

Satisfaction Element	Satisfied Survey Respondents (%)	
	Developed Sites[2]	Undeveloped Areas
Developed Facilities	88.0	100.0
Access	88.5	88.3
Services	70.3	43.2
Feeling of Safety	100.0	100.0

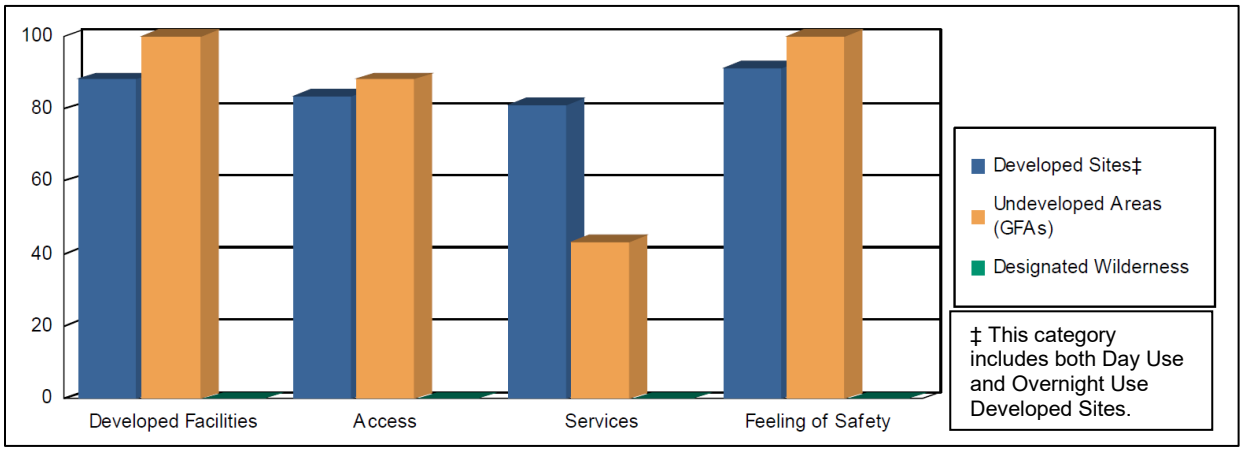
[1] This is a composite rating. It is the proportion of satisfaction ratings scored by visitors as good (4) or very good (5). Computed as the percentage of all ratings for the elements within the sub-grouping that are at or above the target level, and indicates the percent of all visitors that are reasonably well satisfied with agency performance.
[2] This category includes both Day Use and Overnight Use Developed Sites.

Developed recreation sites met user expectations to a very high degree for developed facilities (88 percent), access (88.5 percent) and the feeling of safety (100 percent); however, visitors to undeveloped areas are less satisfied with available services (70.3 percent). Visitors to undeveloped areas had expectations met for developed facilities (100 percent), access (88.3 percent) and the feeling of safety

(100 percent); however, visitor satisfaction dropped below the agency's national target of 85 percent to 43.2 percent for services in undeveloped areas on FLNF (Table 2-5).

The NVUM results also identify the proportion of satisfaction ratings in which the numerical satisfaction rating for a particular element is equal to or greater than the importance rating for that element, known as the "Percent Meet Expectations (PME)." This indicator tracks the congruence between the agency's performance and customer evaluations of importance. The idea behind this measure is that those elements with higher importance levels must have higher performance levels. Lower scores indicate a gap between desires and performance. Figure 2-3 shows all scores rated above 80 percent suggesting there is no significant gap between public desires and agency performance, with the exception of services provided in undeveloped areas (below 50 percent); FLNF has no Congressionally-designated Wilderness so those scores do not apply. Additional details from the NVUM results indicate that PME scores would increase if efforts focused on improving trail conditions.

Figure 2-3. *Percent Meets Expectations Scores.*



Monitoring shows no substantial changes to recreation management and maintenance should be taken; however, opportunities to improve trail conditions should be considered to narrow the gap between public desires and agency performance.

Recommendations: No recommended change to this monitoring question.

Monitoring Element 6: Forest Health

Monitoring Item: Increase of Destructive Insects and Diseases

Monitoring Question: Are insect and disease levels compatible with objectives for maintaining healthy forest conditions?

Detailed Monitoring Question: To what extent have destructive insects and disease organisms increased?

Monitor Driver: Forest Plan Forest-wide Pests, Diseases, and Non-Native Invasive Species Standards and Guidelines.

Monitoring Activities: This existing monitoring item question was selected to address required Element 6 from the 2012 planning rule (36 CFR 219.12(5)(vi)): *Measurable changes on the plan area related to climate change and other stressors that may be affecting the plan area*. Insect and disease represent a potentially major stressor in the ecosystem. It is important to monitor both individual outbreaks of insect

and disease as well as trends that may indicate ecosystem stress resulting from climate change, acid deposition or other factors. It is necessary to adapt management practices to achieve long-term forest management goals considering ongoing and future anticipated ecosystem stressors.

A variety of monitoring activities are conducted at the State and Forest level by several different agencies and organizations. Forest staff review this data and cooperate with partners to assess forest health conditions, and then supplement observations made during inventory and management activities. Monitoring conducted during fiscal years 2017 and 2018 are summarized in Table 2-6.

Table 2-6. Insect and disease monitoring for fiscal years 2017 and 2018.

Insect or Disease Agent	Organization & Date of Monitoring	Type of Monitoring Effort
Sirex wood wasp (*Sirex noctilio*)	New York Department of Environmental Conservation (NY DEC), FLNF, ongoing.	Statewide survey, stand inspections and walk-through examination.
Hemlock wooly adlegid (*Tsugea adelges*)	Cornell University Entomology Department, NY DEC, FLNF and partners, ongoing.	Walk through with foliage inspection. Mapping/description of infestation site.
Root diseases and invasive insects	Northeastern Area State & Private Forestry, USDA Forest Service, ongoing.	Stand inspections and walk-through examination.
Thousand cankers disease	NY DEC, FLNF, ongoing.	Statewide surveys, stand inspections and walk-through examinations.
Defoliation, dieback or mortality from any insect or disease agent	NY DEC, flown summer 2017 and 2018.	Annual aerial detection surveys of forest health conditions statewide.

Several invasive insects and diseases of concern have been detected on or near FLNF since 2006. Currently sirex wood wasp and hemlock wooly adelgid (HWA) are found on FLNF and emerald ash borer (EAB) was found on the northern and southern edges of FLNF in 2017. EAB is expected to spread throughout FLNF over the next few years. There is also potential for thousand canker disease (TCD) to afflict black walnut. Gypsy moth populations have been low and defoliation has been minimal, although the potential exists for future outbreaks.

In New York State, damage mapped from the 2017 forest health aerial survey totaled about 98,000 acres of the approximately 15 million acres surveyed by air. More than half of all damage observed during the aerial survey was defoliation of hardwoods. Gypsy moth defoliation accounted for about 26,000 acres of damage in the southeastern part of the State, while forest tent caterpillar defoliated more than 22,000 acres in northern New York.

In 2018, forest health aerial survey mapped about 106,000 acres of damage, with approximately 11.5 million acres surveyed by air. Gypsy moth defoliation accounted for almost 7,700 acres of damage in the southeastern part of the State, while forest tent caterpillar defoliated over 4,200 acres in northern New York. Ash mortality and dieback were recorded on about 5,400 acres and mortality of pitch pine caused by southern pine beetle was mapped on almost 12,000 acres of Long Island. Minimal damage was mapped on the FLNF. The spring and summer of 2017 were wetter than average for most of New York, which contributed to the prevalence of several common fungal leaf diseases.

The HWA population on FLNF continues to grow and hemlock mortality is increasing as evidenced by surveys and walk-through examinations. Despite the establishment of biocontrol agents on the Forest (*L. nigrinus*), significant hemlock mortality is expected unless further management is conducted. Hemlock elongate scale has also been detected in hemlock stands at Caywood Point and is likely increasing mortality. In 2014, chemical treatments were implemented at Caywood Point. A Decision Memo was

signed in 2015 (Hemlock Wooly Adelgid Suppression Project) authorizing chemical and biological treatments for HWA on 2,872 acres on FLNF. Treatments were implemented in several stands in 2015, 2016, 2017 and 2018, with additional treatments planned for future years.

A variety of silvicultural techniques can be used to increase forest diversity and resilience in the face of stressors. Field assessments and inventory to support the planned Finger Lakes Invasive Pest Strategy (FLIPS) project continued in 2015. The FLIPS project Decision Notice was signed in early 2017 authorizing silvicultural treatments and commercial harvest on 800 acres to mitigate forest health risk. Timber sale preparation began in 2018; however, no treatments have yet been implemented during this monitoring period.

Evaluation and Conclusions: Insect epidemics and resulting population numbers vary greatly from year to year, resulting from a combination of susceptible host habitats, favorable weather conditions, and previous year population levels. Individual tree mortality within mature stands increases as the forest ages. Current harvest levels are low and average stand age is increasing. The most extensive damage observed in fiscal years 2017 and 2018 was the defoliation and mortality of hemlock resulting from HWA and hemlock elongate scale infestation. Mortality and dieback resulting from EAB has not yet been observed, but is expected to be detected on a large scale within the next three years. Sirex wood wasps have been identified on FLNF, but surveys have not yet shown extensive damage. Non-native and off-site softwood plantations are most at risk from sirex wood wasp. Forest health risk in these stands is high due to high stem density and overstocking. Planted species and genetics are also not well adapted to sites in many stands. Light gypsy moth defoliation ad white pine needle damage have also been observed on FLNF, and beech bark disease continues to affect beech trees throughout the forest.

Oak wilt has been detected in New York but has not yet been found near the FLNF. Other non-native insects and diseases of risk that have not been identified in western New York include Asian longhorned beetle, winter moth, and the agents that cause thousand cankers disease, and sudden oak death.

Insect and disease levels at present do not significantly impact Forest Service management efforts to maintain forest conditions and meet Forest Plan objectives, however significant forest health risks exist, particularly for eastern hemlock, ash species and softwood plantations. Increasing mortality in plantations should be closely monitored and salvage opportunities should be evaluated. These stands should also be considered for conversion to a more resilient, diverse mix of native species. Monitoring of hemlock wooly adelgid and EAB should also be prioritized given recent population increases within or near FLNF.

Recommendations: No recommended change to this monitoring question.

Monitoring Element 7: Program Management

Monitoring Item: Outputs Accomplished - Other Resources

Monitoring Question: How close are actual outputs and services to projected outputs and services?

Detailed Monitoring Question: How do actual outputs compare to those projected in Forest Plan Appendix D, Proposed and Probable Practices, specifically related to heritage, recreation, roads, vegetation, rare, ecological, wildlife, and fisheries resources?

Monitor Driver: Forest Plan Goal 1 and associated Objectives.

Monitoring Activities: This existing monitoring item question was selected to address required Element 7 from the 2012 planning rule (36 CFR 219.12(5)(vii)): *Progress toward meeting the desired conditions*

and objectives in the plan, including for providing multiple use opportunities. This question was selected because it provides an excellent means to measure how well Forest Service management activities are influencing the local and regional economy through implementation of the Forest Plan. It also provides a full array of multiple use management activities needed to implement Forest Plan direction. Table D-5 in Appendix D of the Forest Plan provides an estimate of the proposed and probable management practices expected during the first two decades of Forest Plan implementation, as well as estimates of the goods and services provided by FLNF. This schedule of management practices provides information and direction to achieve the desired future conditions set out in the Forest Plan goals and objectives.

There were numerous outputs and services provided by FLNF during fiscal years 2017 and 2018. These outputs are displayed in Table 2-7.

Evaluation and Conclusions: Management of FLNF entered the second decade of Forest Plan implementation in fiscal year 2016. Although Appendix D, Table D-5 of the Forest Plan provides estimated measure of unit activity outputs to work toward desired conditions and management objectives for the first decade of Forest Plan implementation (2006 to 2015), these estimated outputs are repeated for the second decade (2016 to 2025). For this report, a summary of total resource output for each management activity during the first decade of Forest Plan implementation is provided in Table 2-7 for context. The monitoring resource outputs are then provided for 2017 and 2018 so they can be compared with amounts estimated for the second decade.

Table 2-7. Estimated and actual outputs achieved in fiscal years 2017 and 2018 (Forest Plan Appendix D, Proposed and Probable Practices).

Activity or Practice	Unit of Measure	Estimated Amount (Decades 1 and 2)[1]	Total Amount Achieved FY 2006-2015	Amount Achieved FY 2017	Amount Achieved FY 2018	Total Amount Achieved FY 2016-2018
Recreation Resources						
Trail Improvement	Miles	3-6	3	0	0	1
Trail Maintenance – to standard	Miles	50-200	120	7	12	24
Trail Rehabilitation	Miles	20-40	10	2	5	8
Trail Maintenance – total system	Miles	380	205	27	32	95
Vegetation						
Site Preparation/ Reforestation	Acres	250	7	0	0	1
Stand Improvement	Acres	80-120	0	0	0	0
Thinning Harvest	Acres	250-300	54	0	0	0
Shelterwood Regeneration	Acres	100-150	0	0	0	0
Shelterwood Removal	Acres	50-100	0	0	0	0
Selection Harvest	Acres	325-375	0	0	0	0

Activity or Practice	Unit of Measure	Estimated Amount (Decades 1 and 2)[1]	Total Amount Achieved FY 2006-2015	Amount Achieved FY 2017	Amount Achieved FY 2018	Total Amount Achieved FY 2016-2018
Clearcut	Acres	30-50	11	0	0	0
Wildlife, Fisheries, Rare Plant, Rare or Outstanding Natural Community Resources						
Shrub Opening Maintenance	Acres	1,000-1,500	593.6	1.2	16.3	104.8
Wildlife Pond Maintenance	Ponds	6	15	0	1	1
Pasture Maintenance						
Mowing	Acres	7,500-10,000	11,892	1,376	1,642.5	4,418.5
Liming	Acres	500-1,000	819	0	0	0
New Fencing	Miles	4-6	8.3	0	0	0
Reconstruct Fence	Miles	20-30	34.9	0.4	1.2	3.3
New Stock Pond	Ponds	3	1	0	0	0
Facilities	Facilities	5	12	0	2	3
Total Forage Production	Animal Unit Month	108,500	85,035	7,709	7,800	23,902
Non-Commercial Clearcutting of Aspen	Acres	80	14	0	0	10
Monitor condition of sites and species under special forest product permits	Sites	All	0 plants are under special forest projects (SPF) permits	0 plants are under SPF permits	0 plants are under SPF permits	0 plants are under SPF permits
Inventory for TES[2] species and rare or outstanding natural communities	Acres	1,600	9,527 sensitive plants; 3,552 sensitive birds	534.1 sensitive plants	219.3 sensitive plants	1,466.1 sensitive plants; 1,775 sensitive birds
Monitor known rare or outstanding ecological, biological, or geological features, including TES occurrences	Sites	All	180 sites (all plants)	5 sites (all plants)	2 sites (all plants)	9 sites (all plants)
Prepare conservation plans for each rare or outstanding area	Sites	7	0	0	0	0

Activity or Practice	Unit of Measure	Estimated Amount (Decades 1 and 2)[1]	Total Amount Achieved FY 2006-2015	Amount Achieved FY 2017	Amount Achieved FY 2018	Total Amount Achieved FY 2016-2018
Establish RNAs	Sites	2	0	0	0	0
Protect known occurrences of TES species	Sites	All	All sites protected during project implementation	All sites protected during project implementation	All sites protected during project implementation	All sites protected during project implementation
Protect, and where feasible, improve or restore habitat conditions for TES species	Sites	All	All sites protected; 14 sites improved for sensitive plants	All sites protected; 3 sites improved for sensitive plants	All sites protected; 3 sites improved for sensitive plants	All sites protected; 17 sites improved for sensitive plants
Protect important habitat sites for TES bats	Roost and den trees	Adequate numbers of roost and den trees	All known roost/ den trees protected during project implementation	All known roost/ den trees protected during project implementation	All known roost/ den trees protected during project implementation	All known roost/ den trees protected during project implementation
Update conservation assessments for RFSS	Species	All	1	0	0	0
Fish Stocking	Ponds	6	30	3	3	6
Fish Surveys	Surveys	3	18	0	0	0
Heritage Resource Protection Acres Surveyed	Acres	250-750	800	Not available	Not available	Not available
Agreements w/County Law	Agreement	2	5	1	0	1
NF land signs placed and/or maintained	Signs	20-30	Not available	Not available	6	6

[1] These numbers represent the sum of annual activities in years 1 through 10 (2006 to 2015) and repeated for years 11-20 (2016 to 2025).
[2] Threatened, endangered, and sensitive (Regional Forester Sensitive Species) species.

Recommendations: No recommended change to this monitoring question.

Monitoring Element 8: Soils

Monitoring Item: Soil Quality Standard Compliance

Monitoring Question: Are the effects of Forest management, including prescriptions, resulting in significant changes to productivity of the land?

Detailed Monitoring Question: How are soil quality and productivity changing in response to forest management?

Monitor Driver: Forest Plan Goal 3 and associated Objectives.

Monitoring Activities: This new monitoring question was developed specifically to address required Element 8 from the 2012 planning rule (36 CFR 219.12(5)(iii)): *The effects of each management system to determine that they do not substantially and permanently impair the productivity of the land (16 U.S.C. 1604(g)(3)(C)).* For context, U.S.C. 1604(g)(3)(C) is a reference to the section of the National Forest Management Act specifying guidelines for land management plans to achieve the goals which "*insure research on and (based on continuous monitoring and assessment in the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land*".

The intent of monitoring Element 8 is to focus on key ecosystem characteristics in the plan area related to soils and soil productivity. Forest Plan Goal 3 is to "*Maintain or restore the natural, ecological functions of the soil*" (Forest Plan, p. 12). The objectives for this goal are to minimize the adverse impacts on soils from management activities; and restore natural soil processes and functions on degraded soils.

Soil quality is defined as the capacity of the soil to function within ecosystem boundaries to sustain biological productivity, maintain or enhance water quality, and support human health and habitation. It is assumed that to maintain soil quality, the most important and understood soil properties must be protected including soil organic matter, aeration (porosity), moisture, and productivity (ability to support plant growth). When soil quality is reduced, the soil is less capable of restoring, protecting, maintaining and enhancing above and below-ground biological and ecological diversity. Soil productivity is one aspect of soil quality. It is defined as the inherent capacity of a soil to support the growth of specified plants, plant communities, or a sequence of plant communities.

The Forest Soil Disturbance Monitoring Protocol (FSDMP) examines the quantity, severity, and distribution of soil disturbance within project areas (Page-Dumroese 2009). Presence of bare soil, rutting, compaction, erosion, and other observations are used to estimate effects of management activities on soil productivity. Soils with increased disturbance have greater losses in soil productivity. Monitoring can provide feedback to land managers on the effects of management and inform future management actions. Measurement indicators used for this report include topsoil displacement, bare soil, erosion, rutting, compaction, and mixed topsoil/subsoil; and "Soil Disturbance Class and Percent" of area where soil quality standards are met.

Soil Disturbance Monitoring/Soil Quality Monitoring

Timber sale units monitored in fiscal years 2017 and 2018 include 12 before and 42 after harvest activities (Table 2-8). Although six units in the Burnt Butcher timber sale (Finger Lakes Invasive Pest Strategy project) were included in monitoring, most occurred on GMNF timber sales where results can also be applied to FLNF. Pre-monitoring is done up to 3 years before harvest begins and post-harvest monitoring 1 to 3 years after harvest. Harvest prescriptions include improvement, selection with gaps, thinning, permanent wildlife opening, and clearcut. Data was collected to give a 70 percent confidence level, with a 20 percent confidence interval. In fiscal years 2017 and 2018, 54 units were monitored covering approximately 732 acres: Dorset-Peru and Upper White River Integrated Resource Projects, and the Gilmore Aspen project. These acres also included the Finger Lakes Invasive Pest Strategy. Most units monitored were in the Dorset-Peru and Upper White River Integrated Resource Project areas, and Nordic project area. Only three units were in the Gilmore Aspen project area, and one in the Robinson Integrated Resource project area. Units were in the following timber sales: Beattie Hill, Cobb Hill, Country Road, Old Manchester, School, Grouse, Mad Tom, Gilmore Aspen, Albee, North Branch, Cook Brook, Old Cemetery, Texas, Upper White, Pumphouse, Tucker Brook, Sunnyside, and Souphouse.

Based on observed soil disturbance, monitoring points were each assigned to a disturbance class ranging from 0 (no disturbance) to 3 (so disturbed that soils will not recover without restorative action) (Page-Dumroese 2009, USDA Forest Service 2009).

Table 2-8. Units monitored in fiscal years 2017 and 2018.

Project Name	Timber Sale Name	Sale Unit(s)
Pre- Harvest		
Dorset-Peru	Mad Tom	8
Dorset-Peru	Pumphouse	8
Dorset-Peru	Sunnyside	1, 14
Finger Lakes Invasive Pest Strategy	Burnt Butcher	4, 6, 10, 12, 13, 15
Gilmore Aspen	Gilmore Aspen	4, 7
Upper White River	Albee	5
Post-Harvest		
Dorset-Peru	Cook Brook	3, 7, 9, 10
Dorset-Peru	Mad Tom	13, 18
Dorset-Peru	Pumphouse	1, 3, 16
Gilmore Aspen	Gilmore Aspen	3
Nordic	Country Road	2, 3, 6, 7
Upper White River	Grouse	3, 7, 9, 18
Upper White River	Texas	2, 15, 18, 19, 22
Upper White River	Tucker Brook	1, 3, 5
Upper White River	Upper White	3, 15, 13B

Evaluation and Conclusions:

Pre-Harvest Monitoring

Dorset-Peru

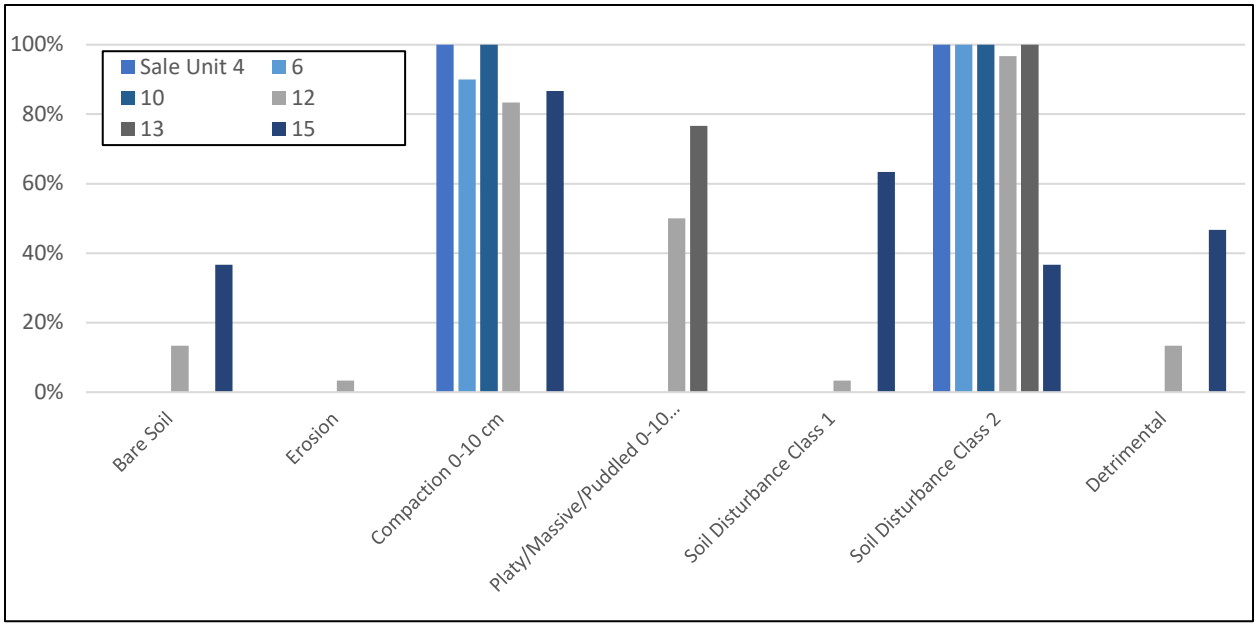
In the Dorset-Peru Integrated Resource Project (IRP) area, four pre-harvest units were monitored. Bare soil and erosion were observed in an average of 1.7 percent of the harvested area, with no rutting or compaction observed. Class 0 disturbance was found in 79.0 percent of the area monitored, Class 1 in 19.3 percent, Class 2 in 1.7 percent, and no Class 3 disturbance was observed. Detrimental disturbance occurred in 1.7 percent of the area monitored. Soil quality standards (SQS) for the Dorset-Peru IRP state less than 5 percent of partially harvested area will contain Class 2 and Class 3 disturbance and less than 20 percent of the area in clearcut and shelterwood units will contain Class 2 or Class 3 disturbance (USDA Forest Service 2010). All four pre-monitored units in Dorset-Peru IRP have disturbance below those thresholds. These observations reflect prior land management.

Finger Lakes Invasive Pest Strategy (FLIPS)

Six pre-harvest units were monitored (Figure 2-4). No rutting was observed. No compaction or platy/massive/puddled soil structure was observed deeper than 10 centimeters. The soil disturbance class was either 1 or 2 for all observed points, with only Unit 15 having a significant amount of land-just over 60 percent, with Class 1 soil disturbance. Topsoil displacement was observed at every monitoring point, and mixed topsoil/subsoil was observed at nearly every point, mainly because of earthworm activity, which is widespread throughout the Finger Lakes National Forest, since nearly all the land was cultivated for row crops before recent reforestation. Detrimental disturbance was found on only two units (Units 12

and 15), due mainly to the presence of bare soil. The units selected are representative of all the units in the FLIPS project.

Figure 2-4. *Soil Disturbance before harvest in Finger Lakes Invasive Pest Strategy sale units.*



Gilmore Aspen

Two pre-harvest units were monitored in the Gilmore Aspen Project area. Mixed topsoil/subsoil was observed in 69.2 percent of the area (all of Unit 4, and none in Unit 7). Bare soil, rutting, erosion, or soil compaction were not observed. All observed areas had Class 0 disturbance, with no detrimental disturbance observed.

Upper White River

One unit was monitored in the Upper White River IRP area (Albee 5). Bare soil covered an average of 3.3 percent of the area, and topsoil displacement covered 3.3 percent, with no erosion, rutting, compaction, or mixed topsoil/subsoil observed. All the soil observed had Class 0 soil disturbance, with no detrimental disturbance observed. Soil Quality Standards for the Upper White River IRP state that less than 15 percent of the harvested area will have detrimental disturbance. The only pre-monitored unit in the Upper White River IRP is below this threshold before harvest.

Post Harvest Monitoring

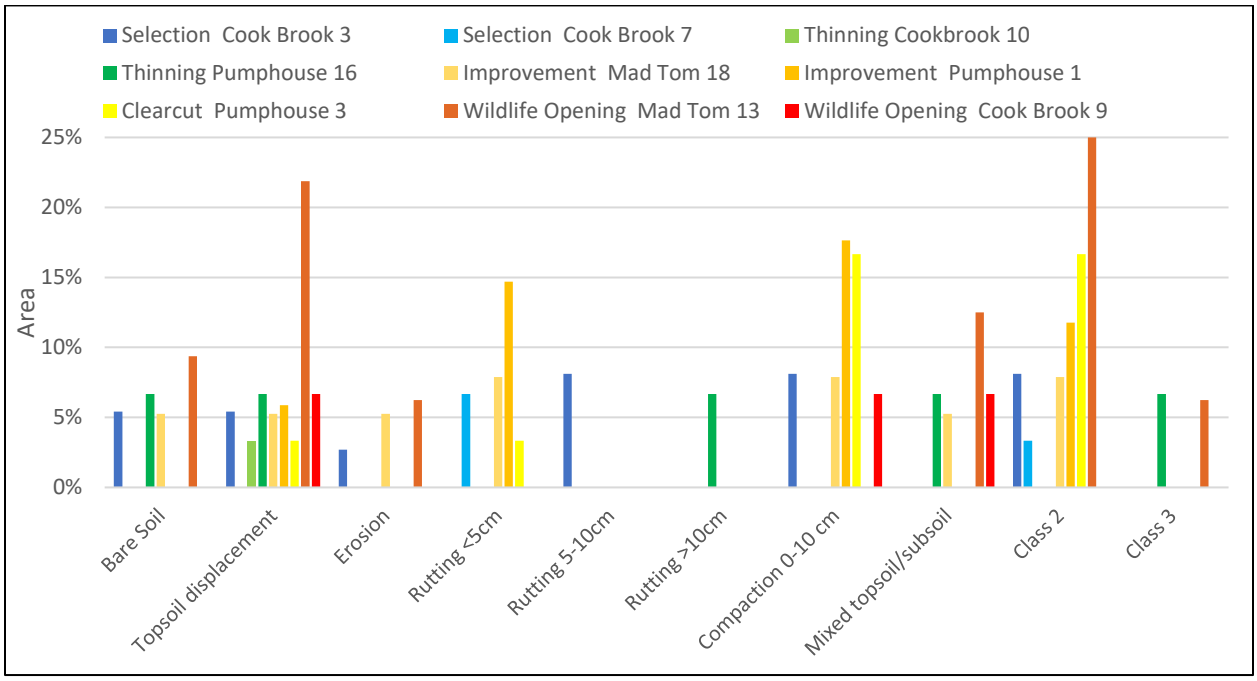
Dorset-Peru

In the Dorset-Peru IRP area, 9 harvested units were monitored (Figure 2-5). In the clearcut unit not in a permanent wildlife opening, no bare soil or erosion was observed. Topsoil displacement was observed on 3.3 percent of the harvested area. Ruts shallower than 5 centimeters deep covered 3.3 percent of the harvested area, with no deeper ruts observed. Soil was compacted less than 10 centimeters deep in 16.7 percent of the harvested area, with no deeper compaction observed. Class 0 soil disturbance was found in 26.7 percent of the unit, while 56.7 percent had Class 1, 16.7 percent had Class 2, and 0 percent had Class 3 disturbance. Detrimental disturbance was not observed.

Within the six units with partial harvests, an average of 2.1 percent of the area had bare soil, 4.2 percent had topsoil displacement, and 0.7 percent had erosion. Rutting less than 5 centimeters deep was observed

to be over 2.9 percent of the harvested area, rutting between 5-10 centimeters deep on 2.2 percent, and deeper rutting on 0.7 percent of the area monitored. Compaction 0-10 centimeters deep was observed at 5.6 percent of the area, with no deeper compaction observed. Class 0 soil disturbance covered 44.5 percent of the area, 33.7 percent Class 1, 4.5 percent Class 2, and 2.1 percent Class 3. Detrimental disturbance was observed on 0–15.8 percent of each unit, with an average of 2.1 percent of the area having detrimental soil disturbance. Only Mad Tom 18 had detrimental disturbance on more than 15 percent of the unit, due to the presence of erosion and deep slash.

Figure 2-5. *Soil disturbance observed in Dorset-Peru IRP sale units.*



Soil quality standards for the Dorset-Peru IRP were established to maintain acceptable levels of disturbance after harvest. The threshold for units with partial harvest (intermediate cut, improvement, or thinning) is less than 5 percent of each sale area with disturbance class 2 or 3. Clearcuts or shelterwood require less than 20 percent of each sale area to have disturbance Class 2 or 3 to comply with the Soil Quality Standards (USDA Forest Service 2010).

Two of the three sale areas with partial harvest units monitored do not appear to meet the soil quality standard threshold of less than 5 percent with Class 2 or 3 disturbance (Figure 2-6). The two units monitored in the Pumphouse sale have an average of 7.8 percent in Class 2 and 2.3 percent in Class 3, for a total of 10.0 percent having Class 2 or 3 soil disturbance. Mad Tom 18, an improvement cut, exceeds the Soil Quality Standards threshold of 5 percent, with an average of 7.9 percent of the unit monitored having Class 2 disturbance.

All three sales with clearcut units monitored appear to meet the Soil Quality Standards threshold of less than 20 percent with Class 2 or 3 disturbance (Figure 2-7), with Class 2 disturbance only observed in Pumphouse 3, and no Class 3 disturbance observed. Only one clearcut unit from each sale was monitored. Looking at all past monitoring within a timber sale will give a more accurate picture than only examining data from the past two years in future monitoring reports.

Pumphouse and Mad Tom sales make up 49.5 out of the 149.9 acres of partial harvests monitored in the Dorset-Peru IRP. This represents 67.0 percent of the sale area monitored with partial harvests complying with project soil quality standards. All the 45.4 acres of clearcut monitored met the Soil Quality Standards.

Figure 2-6. *Average area of partial harvest (thinning, improvement, or selection) sales with Soil Disturbance Class 2 or 3 in the three timber sales monitored in the Dorset-Peru IRP. Soil Quality Standards for Dorset-Peru require no more than 5 percent of each sale area in units with partial harvests have Class 2 or Class 3 soil disturbance. The threshold is shown with a black line.*

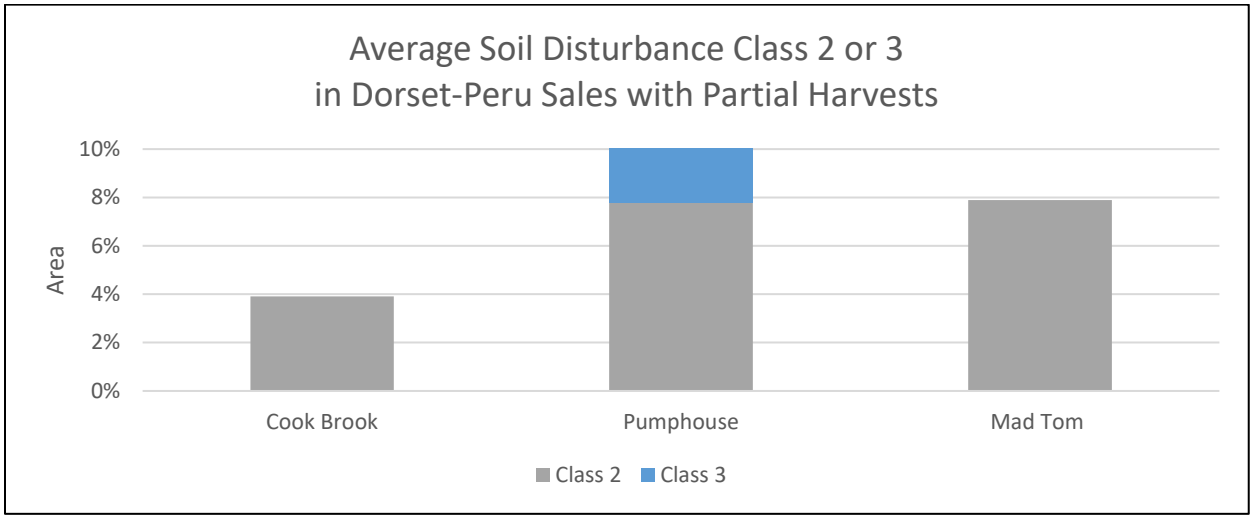
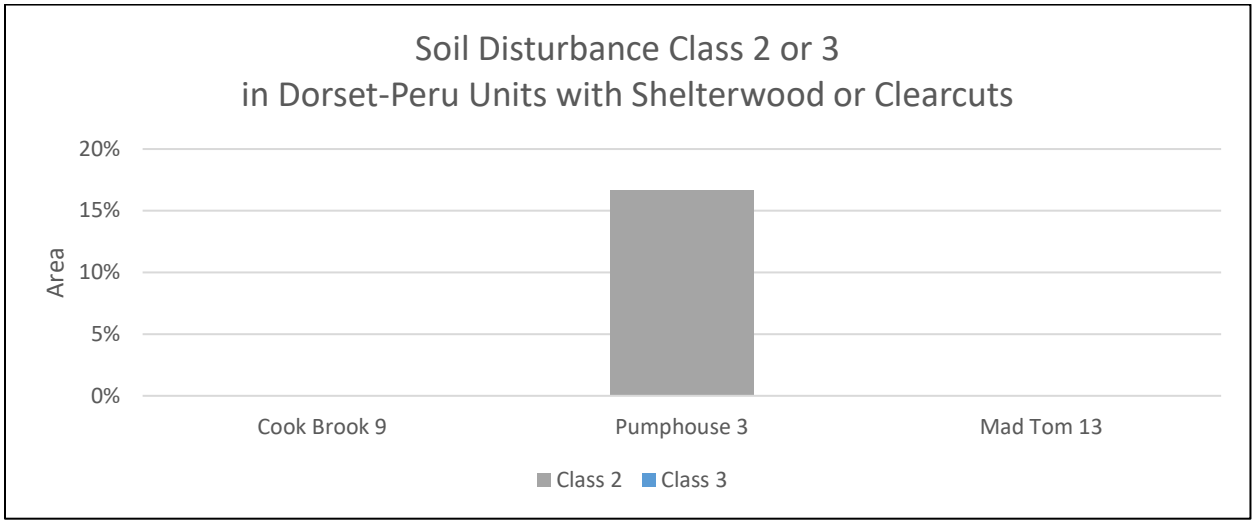


Figure 2-7. *Area in Dorset-Peru clearcut sales with Soil Disturbance Class 2 or 3. Soil Quality Standards for Dorset-Peru state that no more than 20 percent of each sale area in units with shelterwood or clearcut will have Class 2 or Class 3 soil disturbance. The threshold is shown with a black line.*



Gilmore Aspen

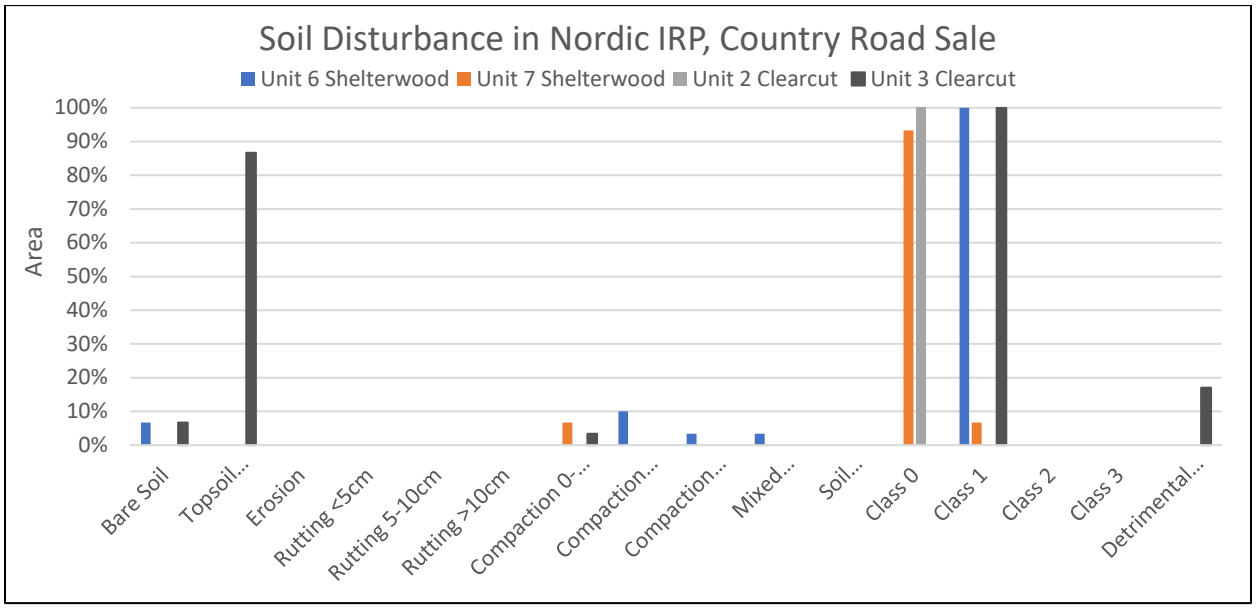
One unit was monitored in the Gilmore Aspen project area (Unit 3). Bare soil covered 76.7 percent of the harvested area and signs of erosion covered 30.0 percent of the harvested area. Ruts shallower than 5 centimeters in depth covered 3.3 percent of the harvested area, and no deeper ruts were observed. Soil was compacted less than 10 centimeters deep in 10.0 percent of the harvested area, with no deeper compaction observed. Mixed topsoil/subsoil was observed in 83.3 percent of the unit. Class 2 soil disturbance covered 80.0 percent of the unit, and Class 3 16.7 percent of the unit.

Soil Quality Standards for the Gilmore Aspen project require less than 15 percent of the harvested area in each sale area to be detrimentally disturbed. This sale does not appear to meet the standard, with detrimental disturbance covering 76.7 percent of the unit, due to the presence of bare soil.

Nordic

In the Nordic Project area, four units were monitored, all in the Country Road sale (Figure 2-8). Bare soil was observed on an average of 5.7 percent of the area monitored. Topsoil displacement was only observed in Unit 3, on 86.7 percent of the unit. Rutting was not observed. Compaction less than 10 centimeters deep covered 2.6 percent of the sale area monitored, compaction 10 to 30 centimeters deep covered 2.9 percent of the area, and compaction more than 30 centimeters deep covered 1.0 percent of the area. Mixed topsoil/subsoil covered 1.0 percent of the sale area. Class 0 soil disturbance covered 13.9 percent of the area, Class 1 86.1 percent, and no points were observed with Class 2 or 3 soil disturbance.

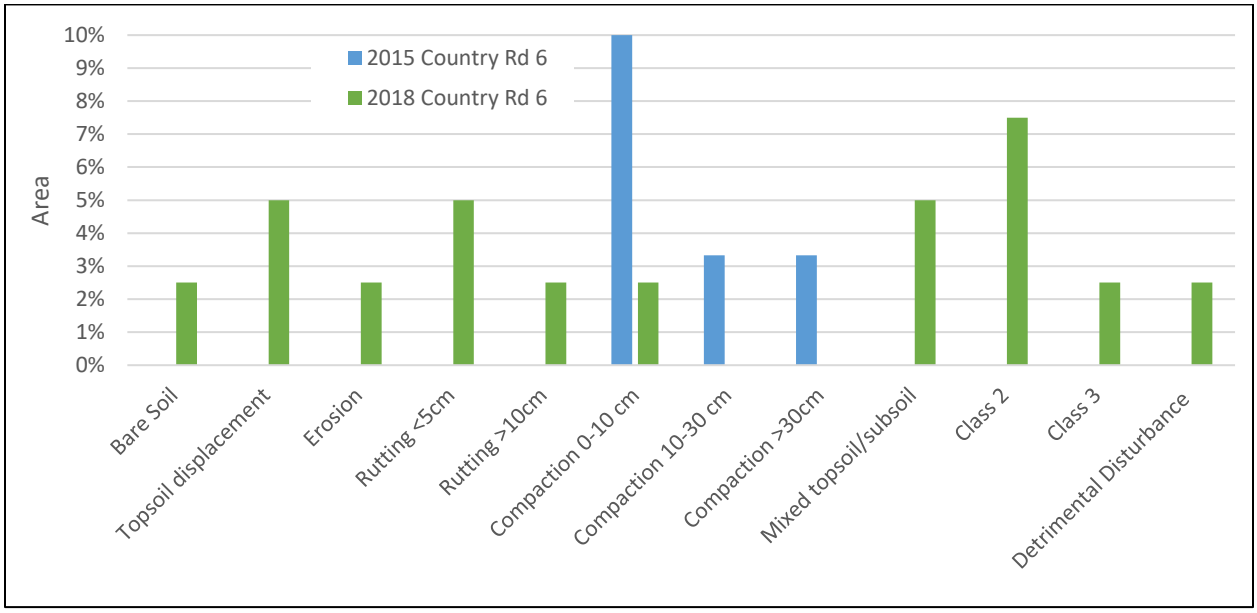
Figure 2-8. *Soil disturbance in Nordic Project, Country Road sale units.*



Pre-monitoring data was collected in Country Road Sale Unit 6 one year before harvest began (Figure 2-9). Most measures of soil disturbance were observed to increase, while soil compaction at three depths was observed more often after harvest than before. For each unit, at least 30 and up to approximately 40 observations are taken on a random transect. In 2015, compaction within the top 10 centimeters of the soil surface was observed at three of the 30 points monitored, and in 2018, it was only observed at one out of the 40 points monitored. In 2015, compaction deeper than 10 centimeters was observed at one monitoring point and was not observed in 2018.

Detrimental soil disturbance covered approximately 9.6 percent of the area monitored in the Country Road sale after harvest, mostly due to excessive slash accumulation. The entire monitored area complies with the 15 percent threshold for detrimental soil disturbance for each sale.

Figure 2-9. *Soil Disturbance observed in Country Road 6 sale unit one year before and two years after harvest activities.*



Upper White River

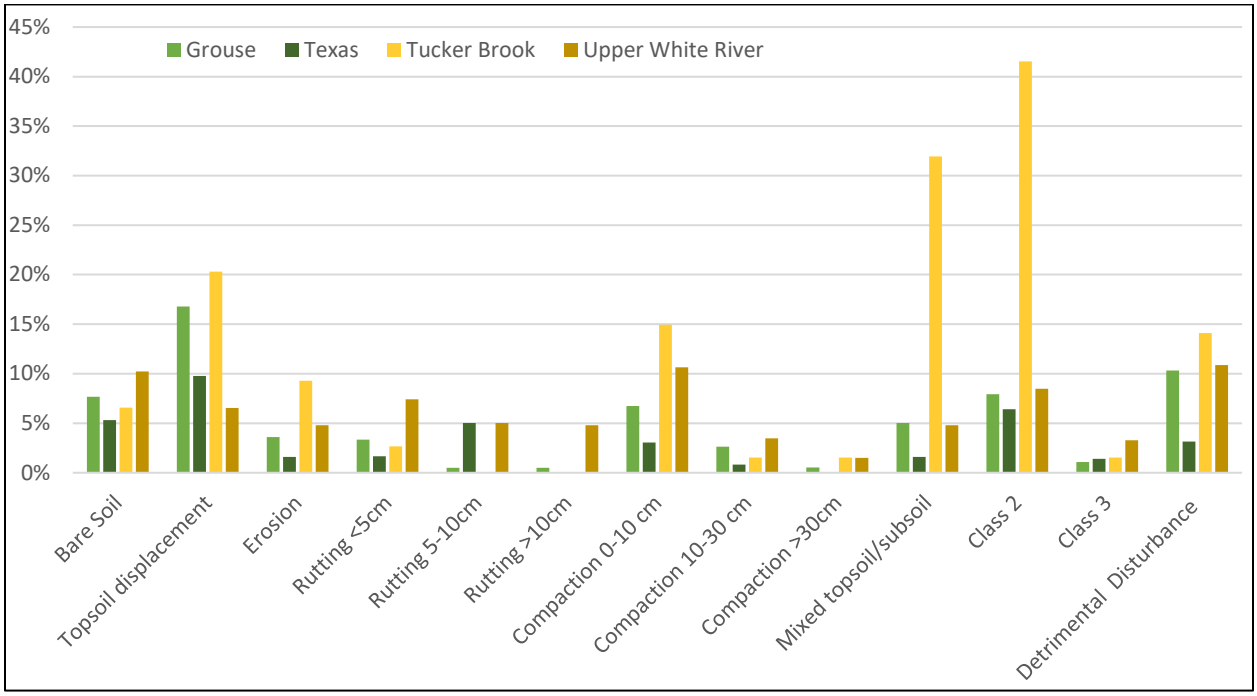
Fifteen units were monitored in the Upper White River IRP area, in four timber sales (Figure 2-10). In Grouse, bare soil covered 7.7 percent of the harvested area, topsoil displacement covered 16.8 percent, and erosion covered 3.6 percent. Ruts shallower than 5 centimeters covered 3.3 percent of the harvested area, rutting between 5- and 10-centimeters 0.5 percent, and ruts deeper than 10 centimeters in 0.5 percent. Soil was compacted less than 10 centimeters deep in 6.7 percent of the harvested area, 10 to 30 centimeters deep in 2.6 percent, and deeper than 30 centimeters in 0.5 percent of the harvested area. Soil in 59.0 percent of the harvested area had Class 0 disturbance, 31.9 percent had Class 1, 7.9 percent had Class 2, and 1.1 percent had Class 3 disturbance. Detrimental disturbance occurred in 10.3 percent of the monitored area.

In the Texas sale units, bare soil covered 5.3 percent of the harvested area, topsoil displacement covered 9.8 percent, and erosion covered 1.6 percent. Ruts shallower than 5 centimeters covered 1.7 percent of the harvested area, rutting between 5–10 centimeters 5.0 percent, and no deeper rutting was observed. Soil was compacted less than 10 centimeters deep in 3.1 percent of the harvested area, 10 to 30 centimeters deep in 0.8 percent, and no deeper compaction was observed. Soil in 29.3 percent of the harvested area had Class 0 disturbance, 62.9 percent had Class 1, 6.4 percent had Class 2, and 1.4 percent had Class 3 disturbance. Detrimental disturbance occurred in 3.2 percent of the monitored area.

In Tucker Brook sale units, bare soil covered 6.6 percent of the harvested area, topsoil displacement covered 20.3 percent, and erosion covered 9.3 percent. Ruts shallower than 5 centimeters covered 2.7 percent of the harvested area, with no deeper ruts observed. Soil was compacted less than 10 centimeters deep in 14.9 percent of the harvested area, 10 to 30 centimeters deep in 1.5 percent, and deeper than 30 centimeters in 1.5 percent of the harvested area. Mixed topsoil/subsoil was observed in 31.9 percent of the area. Soil in 10.8 percent of the harvested area had Class 0 disturbance, 46.1 percent had Class 1, 41.5

percent had Class 2, and 1.5 percent had Class 3 disturbance. Detrimental disturbance occurred in 14.1 percent of the monitored area.

Figure 2-10. *Average soil disturbance in each Upper White River IRP timber sale. The detrimental disturbance threshold for sales in the Upper White River IRP is less than 15 percent of each sale area with detrimental disturbance, shown with a black line.*



In Upper White IRP sale units, bare soil covered 10.2 percent of the harvested area, topsoil displacement covered 6.5 percent, and erosion covered 4.8 percent. Ruts shallower than 5 centimeters covered 7.4 percent of the harvested area, rutting between 5- and 10-centimeters 5.0 percent, and ruts deeper than 10 centimeters in 4.8 percent. Soil was compacted less than 10 centimeters deep in 10.6 percent of the harvested area, 10-30 centimeters deep in 3.5 percent, and deeper than 30 centimeters in 1.5 percent of the harvested area. Soil in 44.2 percent of the harvested area had Class 0 disturbance, 44.0 percent had Class 1, 8.5 percent had Class 2, and 3.3 percent had Class 3 disturbance. Detrimental disturbance occurred in 10.9 percent of the harvested area.

Figure 2-11 shows pre-monitoring data collected in 2015 compared to post harvest data collected in 2018 for Unit 3 in the Grouse sale which was harvested with the selection method. With average detrimental disturbance lower than 15 percent in each timber sale (Figure 2-12), 100 percent of the sales monitored in the Upper White River IRP comply with the soil quality standards.

Soil Quality Standards for all timber sales monitored during fiscal years 2017 and 2018 appear to have been met in all but the one unit monitored in the Gilmore Aspen sale, the one clearcut monitored in Mad Tom sale, and the one clearcut monitored in the Pumphouse sale. These make up approximately 57 acres of the 527 acres monitored, or 10.8 percent of the area monitored (Figure 2-12). When sale units do not meet Soil Quality Standards, productivity of soils may be negatively impacted. However, this analysis is not conclusive since for each of the three sales where soil disturbance is higher than defined thresholds, only one sale unit was monitored. In future years, data is needed from more units, and monitoring reports should include all available data from prior years in addition to the data collected during the two-year monitoring period.

Figure 2-11. *Soil Disturbance in Grouse 3 before and after selection harvest.*

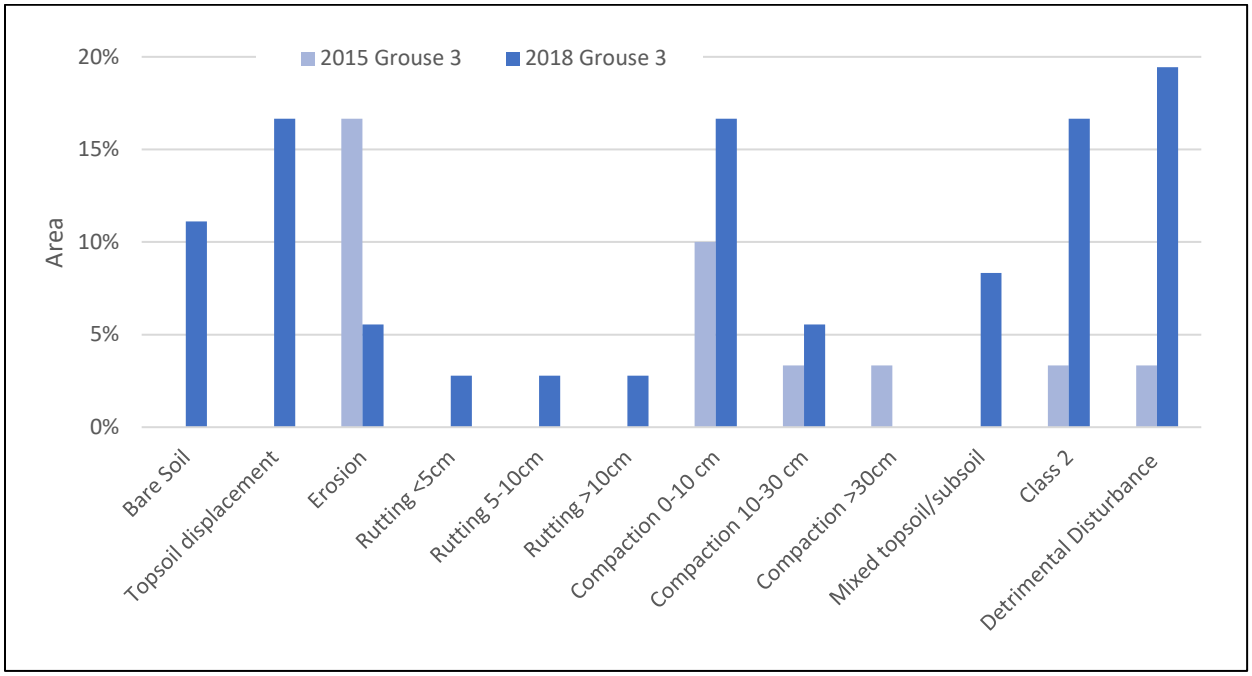
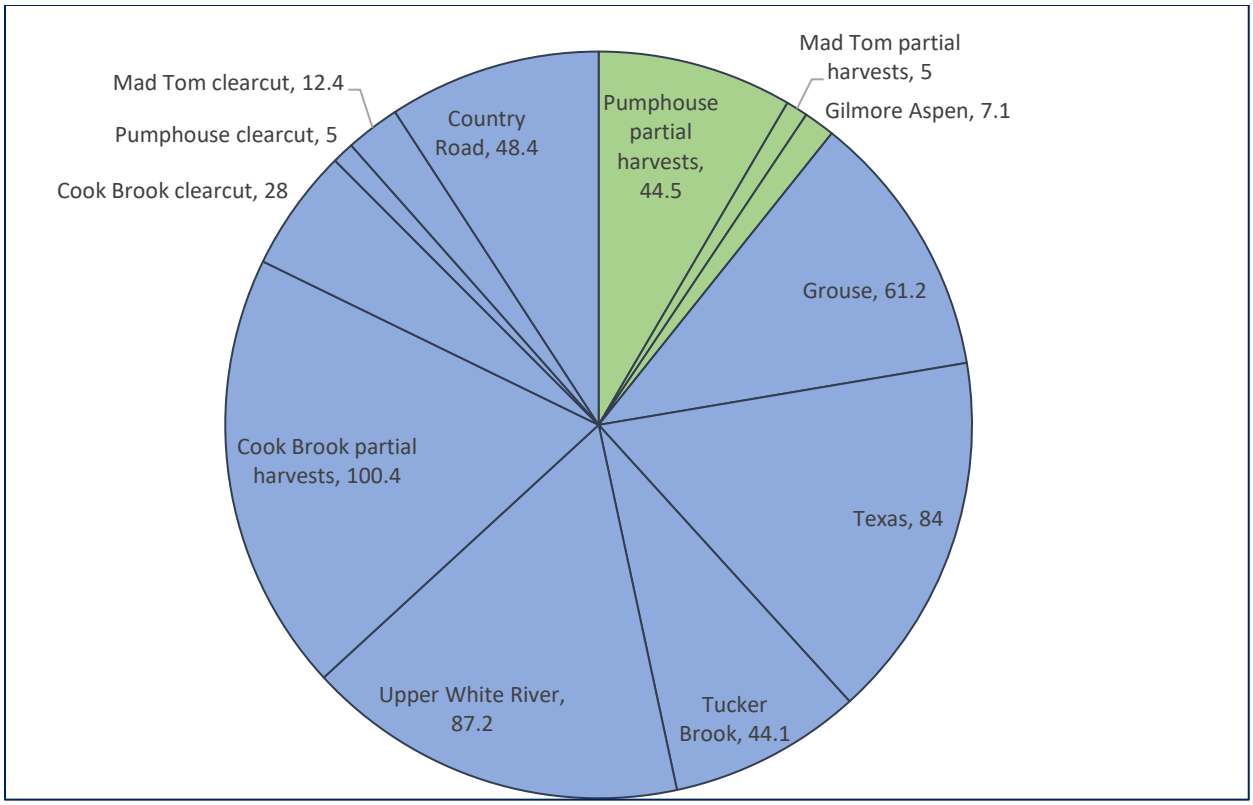


Figure 2-12. *Timber sales meeting Soil Quality Standards are shown in blue, and those not meeting them are shown in green. Acres monitored in each sale follow the sale names.*



Recommendations: No recommended changes to this monitoring question.

3. Other Monitoring Questions

Table 3-1 provides other monitoring questions retained to help ascertain how well management activities are implementing the Forest Plan and validating the effectiveness of Standards and Guidelines. While none of these were selected to address required monitoring elements, the Forest Service will continue to include them in the monitoring program (as budgets and staffing permit) and the results will be used to improve the Forest Plan or refine management activities when deemed necessary. Details regarding their indicators, measurements and monitoring protocol can be found in the 2017 Monitoring Guide.

Table 3-1. Other monitoring questions (from Table 4.1-3, Forest Plan, Chapter 4).

Forest Plan Goal	Monitoring Questions
Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals (Goal 2)	To what extent do Forest Service management activities contribute toward restoration and maintenance of habitat for native and desirable non-native species?
	To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?
Monitor air quality and the effects of atmospheric deposition on the forest ecosystem (Goals 2 to 7)	To what extent are air quality and atmospheric deposition affecting sensitive components of the forest ecosystem?
Maintain or restore the natural, ecological functions of the soil (Goal 3)	Are the effects of Forest Service management resulting in significant changes to productivity of the land?
Maintain or restore aquatic, fisheries, riparian, vernal pool, and wetland habitats (Goal 4)	To what extent are environmental stressors and Forest management affecting water quality, quantity, flow timing, and the physical features of aquatic, fisheries, riparian, vernal pool, and wetland habitats?
Provide a diverse range of high-quality, sustainable recreation opportunities that complement those provided off National Forest lands (Goal 11)	Is the quality of the Forest Service trail system being improved through operation and maintenance?
Provide a diverse range of information and education opportunities (Goal 12)	In what way is the Forest Service providing information and education opportunities that enhance the understanding of the Finger Lakes National Forest?
Provide protection and stewardship for significant heritage resources on the Finger Lakes National Forest (Goal 10)	To what extent have objectives been obtained and Standards and Guidelines applied for heritage resource site protection and management?

Aquatic Habitat

Monitoring Item: Pond Habitat

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Detailed Monitoring Question: Is habitat quality and quantity being maintained in FLNF ponds? Is aquatic vegetation encroaching upon more of the surface area of ponds? Are water control structure well maintained and support adequate water levels in ponds?

Monitoring Driver: Forest Plan Goal 4 and associated Objectives

Monitoring Activities: No monitoring of vegetative pond cover or pond depth was completed during fiscal years 2017 and 2018. Qualitative monitoring of water control structures is conducted by Forest Service staff on an ongoing, opportunistic basis.

Evaluation and Conclusions: Evaluation of vegetative pond cover and pond depth cannot be completed due to lack of monitoring data. Information related to the condition of any control structures during this monitoring period was not recorded or reported in a way that allows for discussion of implementation or effectiveness of the Forest Plan. Forest Service staff continued to identify pond control structure maintenance needs and regularly works toward funding and completing the needed maintenance.

Recommendations: Consider better defining measurement indicators for this monitoring question. Current protocol references data related to pond levels relative to capacity, but this is not clearly represented in measurement indicators and should be removed or clarified. Monitoring of control structures could be changed to a 3 to 5-year time scale rather than annually or in response to potentially damaging events.

Aquatic Population - Lakes

Monitoring Item: Pond Fisheries

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Detailed Monitoring Question: Are fish populations in ponds being maintained at levels to sufficient to support a recreational fisheries or natural reproduction. If not, is supplemental stocking or habitat improvement required?

Monitoring Driver: Forest Plan Goal 4 and associated Objectives.

Monitoring Activities: Some monitoring for this question was completed in 2017; however, the data are currently not available for evaluation.

Evaluation and Conclusions: Evaluation of pond fisheries cannot be completed due to lack of monitoring information.

Recommendations: Consider improving or clarifying the measurement indicators for this monitoring question (such as variables, parameters, and units of measure). More qualitive measures might be more appropriate to help ensure that monitoring is achievable.

Fire

Monitoring Item: Fire Agreements

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Questions: How many agreements for fire management have been developed and maintained with outside partners?

Monitoring Driver: Forest Plan Forest-wide Standards and Guidelines, Chapter 2.3.11 – Fire Management.

Monitoring Activities: Monitoring is tracked by research of existing agreements through NRM and grants and agreements personnel. No records were found for local cooperative agreements during fiscal years 2017 and 2018.

Evaluation and Conclusions: Local agreements allow agency fire managers and cooperators to communicate resource needs more effectively and allow for compensation for equipment and personnel used during suppression activities. Cross-boundary training increases through existing agreements. The current Annual Operating Plan with the State of New York allows for resource sharing between agencies but does not cover local Volunteer Fire Departments or other cooperators. The longevity of local agreements is three years and reviewed annually for amendment updates.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Hazardous Fuels

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: To what extent have hazardous fuels been reduced?

Monitoring Driver: Forest Plan Goal 5 and associated Objectives, and Forest-wide Standards and Guidelines, Chapter 2.3.11 – Fire Management.

Monitoring Activities: Primary hazardous fuels activities consist of prescribed fire in the Wildland Urban-Interface (WUI) with accompanying objectives to enhance wildlife and pollinator habitat of both shrublands and grasslands. Secondary hazardous fuels activities include treatments such as mowing and mastication for wildlife habitat, grazing in grasslands, and disposal of non-native invasive plants.

Approximately 1,000 acres have been accomplished through prescribed fire activities, all within the Wildland Urban-Interface during fiscal years 2018 and 2018. On average about 500 acres are burned annually.

Evaluation and Conclusions: Fire management follows best practices when implementing prescribed fire activities, although the number of acres accomplished with prescribed fire are limited to small windows of opportunity atop of multiple constraints set by Forest Plan standards and guidelines (S&Gs) across several resource areas. Creation of new wetlands within Grasslands for Wildlife Management Area units (Aman North and Ahouse West) posed challenges to safely implement with ease while meeting S&Gs for activities near wetlands without having a fire break to exclude fire from. The Fire program is challenged with meeting objectives and meeting all S&Gs and project specific mitigation measures without prescribed fire efficiency and safety fully considered.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Prescribed Fire and Wildland Use Fire

Monitoring Question: Prescribed fire and wildland fire for resource benefit: What are the effects of management practices using fire as a resource tool?

Detailed Monitoring Question: Did wildland fires managed for resource benefit and prescribed fires successfully meet objectives set forth in the Forest Plan and the Fire Management Plan? Did the fire function as a natural ecosystem process to restore and/ or maintain natural plant communities? Are the forests actively reintroducing fire into historically fire adapted landscapes?

Monitoring Driver: Forest Plan Goal 5 and associated Objectives, and Forest-wide Fire Management Standards and Guidelines, Chapter 2.3.11 – Fire Management.

Monitoring Activities: Both prescribed fire and wildland fire play a significant role as a natural ecosystem process in fire-adapted plant communities, currently on a small scale in Shrublands and Grasslands for Wildlife management areas. Not only does prescribed fire offer the ability for managers to set back vegetation succession for wildlife and pollinator habitat but also promotes response of desirable grass and forbs. Prescribed fire monitoring considers the burn severity and composite burn index to track both first and second order fire effects. In addition to plant response, duff and substrate consumption along with scorch height and young tree/shrub mortality have been monitored with accompanying ocular photos. Monitoring is conducted in a collaborative effort with Forest Service wildlife, range and botany staff to better understand the results of fire application in conjunction with other resource treatments.

Evaluation and Conclusions: There were no eligible wildland fires for resource benefit on FLNF in fiscal years 2017 and 2018. As discussed in the Hazardous Fuels monitoring item section, there were 1,000 acres treated with prescribed fire during this monitoring period. Most prescribed fires successfully met objectives, as documented through formal and informal monitoring. Forest Service staff are actively reintroducing fire into historically fire adapted landscapes on a small scale. Proposals to apply prescribed fire beyond shrublands and grasslands into landscape oak have been considered but not planned to date.

Recommendations: No recommended changes to this monitoring question.

Monitoring Item: Wildfire Occurrence

Monitoring Question: To what frequency do wildfires occur?

Detailed Monitoring Questions: How many wildfires occurred on NFS land? How many total acres? How many human-caused wildfires? How many wildfires in the Wildland Urban Interface (WUI)? Is there a Fire Danger Operating Plan in place?

Monitoring Driver: Forest Plan Forest-wide Standard and Guidelines, Chapter 2.3.11 – Fire Management, Chapter 2.3.11 – Fire Management.

Monitoring Activities: Wildcad report was queried by the Northeastern Interagency Coordination Center to track the number of wildfire occurrences on FLNF. Other methods that would be available to query would be Firestat or Inform. New York State fire managers can also be a method of data collection in the event a fire response by a cooperator occurred but was not entered into any other database. There was one (1) half acre wildfire entered into Wildcad occurring on NFS lands during fiscal years 2017 and 2018, which was human-caused and within designated WUI. There is no current Fire Danger Operating Plan.

Evaluation and Conclusions: Wildfire suppression activities were effective and met all associated Forest Plan direction. Human-caused fires are the leading cause of wildfires on NFS lands and occur annually. Through prescribed fire implementation, fire management is reducing the fuel loading thus reducing the availability of fuels for combustion in the event of an unplanned ignition. These activities along with continued public education on the hazards of wildfires will likely keep wildfire size, intensity, and occurrences lower.

Recommendations: No recommended change to this monitoring question.

Heritage

Monitoring Item: Heritage Resource Program Objectives

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: Have Heritage Resource program management objectives related to: backlogged site evaluations; meeting curation guidelines; developing a Geographic Information Systems (GIS) model for prehistoric site locations; increasing partnerships for Section 110 activities; consulting with State Historic Preservation Officers (SHPO) and Tribes; and incorporating heritage components into historic building management plans been addressed?

Monitoring Driver: Forest Plan Goal 10 and associated Objectives.

Monitoring Activities: Very little data was captured during fiscal years 2017 and 2018 due to a gap in the Forest Archaeologist position, however consultation with the New York State Historic Preservation Office (SHPO) was conducted by an Archaeologist on a 90-day detail with FLNF and continued after the position was filled. In 2017, artifact boxes were returned from Western Michigan State University, containing thousands of historic artifacts collected during Field School work on FLNF.

Evaluation and Conclusions Due to a transition in the Forest Archaeologist position and a lack of readily available data for this report, it is unclear how much Section 110 outreach work, site evaluation, survey, and tribal consultation occurred.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Heritage Resource Site Protection

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: Have Heritage Resources across FLNF been inventoried and protected?

Monitoring Driver: Forest Plan Goal 10 and associated Objectives.

Monitoring Activities: One cultural resource was monitored during fiscal years 2017 and 2018 due to significant damage from inclement weather. The National Register of Historic Places (NRHP)-listed Queen's Castle at Caywood Point received roof damage that was immediately repaired with in-kind materials. Although the roof had been replaced in the past, New York SHPO concurrence was received prior to replacement. No other cultural resources or historic sites were surveyed during this monitoring period.

Evaluation and Conclusions: Not available since no monitoring aside from Queen's Castle occurred.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Heritage Resource Standards and Guidelines

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: Have heritage resources within the "Areas of Potential Effect" of FLNF-sponsored projects (undertakings) been protected and managed according to Forest Plan Standards and Guidelines?

Monitoring Driver: Forest Plan Goal 10 and associated Objectives.

Monitoring Activities: During fiscal years 2017 and 2018, three projects were reviewed in accordance with Section 106 of the National Historic Preservation Act (NHPA) including: wetland restoration, apple tree release, and solar array installation projects. Projects with a determination of No Adverse Effect were protected from management activities through project specific mitigations measures or exclusion boundaries. No data was available during this monitoring period indicating that monitoring occurred post-implementation of any projects.

Evaluation and Conclusions: A review of project activities is necessary for compliance with the NHPA and allows for historic properties to be identified and design features/mitigation measures applied prior to project implementation. Post-project monitoring efforts provide the necessary data to confirm site protection mitigation measures were followed and provides opportunity to adjust mitigations needs for future projects to reduce potential effects to the resource. Since no post-project monitoring occurred during this monitoring period, it is unknown whether prior protective measures were followed appropriately.

Recommendations: No recommended change to this monitoring question.

Human Dimensions

Monitoring Item: Forestry Education Sites

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: Were sites established on the Forest for forestry education?

Monitoring Driver: Forest Plan Goal 12 and associated Objectives.

Monitoring Activities: Not reported for fiscal years 2017 and 2018. This question was removed from the monitoring program based on recommendations from the *FLNF Fiscal Years 2014, 2015, and 2016 Annual Monitoring and Evaluation Report* because its intent is redundant with the Teacher Professional Development in Forest Stewardship monitoring item question.

Evaluation and Conclusions: Not applicable.

Recommendations: Not applicable.

Monitoring Item: Partnerships Maintenance and Enhancement

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: Are partnerships active and effective on FLNF and are Forest Service personnel participating in partnership activities?

Monitoring Driver: Forest Plan Goal 15 and associated Objectives.

Monitoring Activities: The following measurement indicators are used to address this monitoring question:

1. Number of formal partnership agreements (inter-agency, Challenge Cost Share, Memorandums of Understanding)
2. Number of Forest Service staff participating in outside organizations in official capacity (representing Forest Service interests)
3. Evaluation (narrative) of how the partnership has been effective in helping the Forest Service meet Forest Plan Goals and Objectives
4. Number of person-hours contributed by partnerships

Agreements with partners, such as challenge cost-share agreements and participating agreements, are recorded for the Green Mountain and Finger Lakes National Forests (combined) in the Natural Resource Management database, including partner cash, non-cash and in-kind contributions (Table 3-2). Reporting contributions from partner agreements is a consistent, accurate method for reporting contributions; however, it is recognized that this does not account for all annual volunteer hour contributions. Volunteer hours are reported inconsistently and there is no accurate way to depict annual volunteer contributions currently for FLNF. Similarly, there is no consistent data collection effort to document and quantify the number of partners engaged in any given year given many partners may informally collaborate with the Forest Service outside of a signed agreement.

Table 3-2. Partner agreement contributions in New York and Vermont from fiscal years 2017 and 2018.

Fiscal Year	Non-Federal Contributions	Other Federal Contributions	State Contributions	Total
2017	$616,986	$43,000	$0.00	$662,003.00
2018	$702,917	$98,512	$0.00	$803,447.00
Total	$1,319,903.00	$141,512.00	$0.00	$1,465,450.00

In addition to monitoring agreements, individual and group volunteer contributions were recorded over this monitoring period (Table 3-3).

Table 3-3. Volunteer contributions in New York and Vermont from fiscal years 2017 and 2018.

Fiscal Year	Number of Volunteers	Total Hours Contributed	Equivalent Fund Contribution	Percent of Full-Time Employee Contributed
2017	43	7,768	$187,519.52	4.32
2018	21	5,220	$128,881.80	2.90
Total	64	12,988	$316,401.32	7.22

Evaluation and Conclusions: Forest Service staff have maintained, expanded and enhanced formal and informal partnerships in recent years and continue to successfully meet management objectives through financial and other agreements. Engagement continues with many partners through regular e-mails, mailings, phone conversations and in person meetings. Partnerships continue to be active / valued and many if not all Forest Service program areas communicate with partners on a frequent basis.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Teacher Professional Development in Forest Stewardship

Monitoring Question: In what way is the Forest Service providing information and education opportunities that enhance the understanding of the FLNF?

Detailed Monitoring Question: Did teacher professional development in Forest stewardship occur?

Monitoring Driver: Forest Plan Goal 12 and associated Objectives.

Monitoring Activities: The measurement indicators for this monitoring question are the number of teachers trained, and number of programs offered. Programs designed to provide teacher emphasis on conservation can help toward Forest Plan goals and objectives related to social and economic sustainability.

Evaluation and Conclusions: Forest Service staff continue to provide annual teacher and student development and programming to educate the next generation of National Forest users. This work comes in several forms including outreach to teachers and schools, and providing in-person programming delivered by Forest Service staff. In addition, agreement and funding opportunities and natural resource programming to cooperating partner organizations occur annually. Forest Service programs continue to provide Forest Stewardship education through community events. It is estimated that about a dozen programs per year are provided to educate teachers, students, partners, and the public.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Payments to Towns

Monitoring Question: To what extent have Objectives been attained?

Detailed Monitoring Question: What was the amount paid to each FLNF town through PILT, 25% fund or Secure Schools. What type of communications have occurred on this topic with each town?

Monitoring Driver: Forest Plan Goal 14 and associated Objectives.

Monitoring Activities: There are two types of federal payments reaching municipalities that have NFS lands: 1) Payments in Lieu of Taxes; and 2) Public Law 106-393, Secure Rural Schools and Community Self-Determination Act of 2001, reauthorized in 2008. Payments in lieu of taxes funds are directed to towns, and the Public Law 106-393 funds are directed to school districts.

Evaluation and Conclusions: See Appendix A for specific federal payment information for each FLNF town. All towns have access to specific payment amounts as soon as they are released.

Recommendations: No recommended change to this monitoring question.

Invasive Species Population

Monitoring Item: Non-native Invasive Species

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Detailed Monitoring Question: To what extent are non-native invasive species impacting other Forest resources?

Monitoring Driver: Forest Plan Goal 2 and associated Objectives, and Forest-wide Pests, Diseases, and Non-Native Invasive Species Standards and Guidelines.

Monitoring Activities: The impact of non-native invasive plants (NNIP) on FLNF has been monitored by surveying the extent of infestations in areas prioritized to protect, or in areas most likely to be sources of seeds or plant propagules that could be dispersed to areas to be protected. It also includes monitoring any treatments. All data was gathered using the USDA Forest Service Natural Resources Information System (NRIS) protocol, to be entered into the NRM (Natural Resources Manager) corporate database. All sites monitored provide baseline information that can be used during ongoing implementation of the Forest-wide Invasive Plant Control Project approved in 2008.

Botanical inventory occurred in the following locations:

Fiscal Year 2017 (534.1 acres):

- Eight shrublands proposed for management were inventoried (202.3 acres).
- Seven known or suspected rare plant sites in three Shrublands, one Grassland for Wildlife, and three Grasslands for Grazing management areas were monitored (126.7 acres).
- 11.7 miles of streams were surveyed for Japanese stiltgrass (70.7 acres) in a project that began with the help of Vermont Youth Conservation Corps (VYCC) in fiscal year 2016 and ended with the help of volunteers in 2017 and required permission from private landowners to cross their land.
- All trails on the FLNF (36.9 miles, 134.4 acres) were surveyed for all NNIP by an employee of the Finger Lakes Institute at Hobart and William Smith Colleges, paid for by a grant that the Finger Lakes Partners for Regional Invasive Species Management (PRISM) received via the Great Lakes Restoration Initiative (GLRI).

Fiscal Year 2018 (219.33 acres):

- 18 stands in shrublands and grasslands were inventoried prior to managing them with prescribed fire, or enhancing for pollinators; some were repeats of areas previously visited.

The grasslands monitored in fiscal year 2017 were prioritized because they are sites where rare plants occur (sites we want to protect). The streams were prioritized to get a sense of the extent of Japanese stiltgrass prior to developing a containment and treatment plan. The trails were prioritized because they are pathways of dispersal for NNIP from one part of FLNF to another, or between NFS land and other land. All other surveys/monitoring were prioritized because they were sites of proposed management activities.

Stream surveys showed that, while Japanese stiltgrass is prevalent along Breakneck Creek, it does not yet occur along other creeks on FLNF. Given the steepness of the ravines through which many of the creeks on FLNF flow, some could only be surveyed by sampling at accessible points and extrapolating from what could be seen. However, in the ravines accessible by foot, it appears likely that the steep dark hemlock ravines that were difficult to access likely provided very different habitat than the floodplains of Breakneck Creek, where Japanese stiltgrass is common. Unfortunately, where Japanese stiltgrass is common, there are also rare plants that could eventually be overcome by competition.

In grasslands and shrublands, the most abundant and widespread NNIP were multiflora rose, common buckthorn, Morrow honeysuckle, autumn olive, border privet, and garlic mustard. Norway maple was

recorded a couple of times, primarily near a road, knapweeds were common, and Japanese barberry, thistles, European swallowwort, oriental bittersweet, and periwinkle were uncommon.

Along FLNF trails, the same species (multiflora rose, common buckthorn, and Morrow/other honeysuckles) are the most abundant and widespread, and the some of the same species (Japanese and common barberry, European swallowwort, oriental bittersweet, and periwinkle) were uncommon.

Many NNIP were observed at the rare plant monitoring sites, but none of them were new occurrences.

Species seldom recorded on FLNF are purple loosestrife and common reed. Both are associated with riparian and wetland habitats, which are not monitored as often as upland habitats. Purple loosestrife is also decreasing in New York due to the success of widely distributed biocontrol organisms. Oriental bittersweet is also rarely recorded on FLNF; in fact, the uncommon American bittersweet is more common than the invasive oriental bittersweet. Forest Service botanists currently have no hypothesis as to why this is so.

Non-native invasive plant treatment also occurred in the following locations:

Fiscal Year 2017 (293 acres)

- A variety of NNIP were manually/mechanically controlled (73.7 acres):
    - Shrubby NNIP were controlled with hand tools in Ahouse West (63.5 acres).
    - Water chestnut was hand-pulled by partners in Auble pond (0.4 acres).
    - Japanese stilt grass was hand-pulled along Breakneck Creek (9.8 acres).
- A variety of NNIP were foliar spot sprayed in three pastures, two wetland creation sites, and one grassland for wildlife (76.2 acres).
- Knapweeds and thistles were broadcast sprayed in one pasture (133.2 acres).
- Japanese stiltgrass was hand pulled by staff working with VYCC (9.9 acres).

Fiscal Year 2018 (431.5 acres)

- A collaborative project with the Finger Lakes PRISM (Partners for Regional Invasive Species Management) resulted in manual control of a variety of NNIP along ten sections of trails (17.3 acres), accomplished by 109 volunteers from VYCC, New York Invasive Species Research Institute, and the Cornell Cooperative Extension Reach After School Programs at Watkins Glen and Montour Falls/Odessa schools. The work was organized by an employee of the Finger Lakes Institute at Hobart and William Smith Colleges, paid for by a grant that the Finger Lakes PRISM received via the GLRI.
- Knapweeds and thistles were broadcast sprayed in one pasture (103.2 acres).
- All NNIP at Caywood Point were retreated with foliar spot-sprayed herbicide (215 acres).
- A variety of NNIP were retreated at one wetland creation site (48.7 acres).
- Woody NNIP were foliar spot sprayed as part of the FLIPS (Finger Lakes Invasive Pest Strategy) project (47.3 acres).

Evaluation and Conclusions: While monitoring (botanical inventories/surveys) indicated the extent of NNIP infestations, Forest Service staff do not currently have a means of quantifying the effect of NNIP on other resources. Monitoring protocols were otherwise efficient and easy to use and allow assessing the short-term effectiveness of the treatments. Broadcast herbicide is generally effective at reducing knapweeds and thistles in grasslands, and most effective when a grassland is sprayed two to three times over a period of a few years, but does not always adequately treat these NNIP in the corners of the grasslands; any NNIP remaining in corners may spread back into the pasture. Foliar spot-spraying the

same species using different a herbicide in wet areas (required, since the herbicide broadcast sprayed in uplands is not legal to apply in wet areas) is less effective and allows these habitats to continue to be a source for reintroducing these species to the rest of the grassland. Foliar spot-spraying woody species is generally effective although needs more than one treatment. The same method used on garlic mustard is minimally effective, most likely due to the extensive seed bank. Cutting woody NNIP is temporarily effective at knocking back these shrubs and needs to be followed by foliar spot spray of regrowth. Hand-pulling water chestnut is labor intensive and generally effective but must be repeated to get all the nut-like fruits that can disseminate seeds.

Forest Plan Goal 2 (Forest Plan, p. 10) directs management to "*Maintain and restore quality, amount, and distribution of habitats to produce viable and sustainable populations of native and desirable non-native plants and animals*". Management activities monitored comply with this direction by having rare plant and non-invasive plant inventories completed at rare plant sites and in Integrate Resource Project areas. Knowing what NNIP are present, along with what rare plants occur there that need protection, allows the effective development of treatment plans. Management activities also comply with Forest Plan direction (Forest Plan Forest-wide Standards and Guidelines, Pests, Diseases, and Non-Native Invasive Species Standard S-1, p. 28) by implementing mitigation measures developed during Integrated Resource Project analysis.

Monitoring shows it is never enough to treat infestations just once, and sometimes even two times is not adequate. The reasons for this vary; in some cases, the treatment method is simply not 100 percent effective, and in other cases, the method might be effective, but there is an abundant NNIP seed source in the soil. It is also very difficult to prevent new infestations that can arrive at a site by several means, including wind, rain, wild and domestic animals, and human activity of all kinds.

Despite NNIP control challenges, monitoring guide measures, indicators, and methodology appear to be working, although they only assess the extent of infestations and effectiveness of treatments, not the impact on other resources. Impact on other resources may be best assessed qualitatively by specialists who manage other resources. For example, a silviculturist may recognize reduced tree seedling regeneration in a forest heavily infested with garlic mustard, and a range manager may notice decreased forage in a pasture infested with knapweeds and thistles.

Recommendations: No recommended change to this monitoring question.

Lands

Monitoring Item: Special Uses

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: Is the Forest improving its administration of existing authorizations?

Monitoring Driver: Forest Plan Goal 1 and associated Objectives, and Forest-wide Special Uses Standards and Guidelines.

Monitoring Activities: Data for special use permits is consolidated for the Green Mountain (Vermont) and Finger Lakes (New York) National Forests and is found in the Special Uses Database System (SUDS). Information for this report was obtained by pulling the fiscal year-end Administered to Standard report. SUDS contains six elements that can feed into determining if a permit is administered to standard: is the authorization current, are fees calculated, has a bill been issued, is insurance current, has the permit

area been inspected on the appropriate schedule, and have performance evaluations been conducted on the appropriate schedule (Table 3-4).

Table 3-4. Special use permit authorization and Administered to Standard Report for the Green Mountain and Finger Lakes National Forests for fiscal years 2017 and 2018.

Monitoring Items	Fiscal Year	
	2017	2018
Permit Authorizations to Standard	103	116
Permit Authorizations not to Standard	34	19
Percent Permits to Standard	**81.1%**	**85.9%**

Evaluation and Conclusions: The Forest is improving the administration of existing authorizations. A transition in Lands Special Uses staff occurred in 2016 enabling steady progress to reduce a backlog of permit administration needs.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Land Ownership Adjustment

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: To what extent has the FLNF land base been adjusted through purchase, exchange, transfer, interchange, boundary adjustment and donation?

Monitoring Driver: Forest Plan Goal 13 and associated Objectives.

Monitoring Activities: Land adjustment activities are recorded in the Landownership Adjustment Data System (LADS), including the acquisition of parcels, the donation of parcels to the federal government, the exchange of land, and the conveyance of land. No lands activity occurred on FLNF during fiscal years 2017 and 2018.

Evaluation and Conclusions: Not applicable.

Recommendations: No recommended change to this monitoring question.

Program Management

Monitoring Item: Costs of Plan Implementation

Monitoring Question: How close are actual costs to projected costs?

Detailed Monitoring Question: To what extent is the Forest Service providing a mix of products, services, and amenities?

Monitoring Driver: Forest Plan Goal 1 and associated Objectives.

Monitoring Activities: Table 3-5 displays the targets that were achieved on the Green Mountain and Finger Lakes National Forests in fiscal years 2017 and 2018, and the estimated cost for achieving that target. Information is presented as a collective report for both National Forests because the information is tracked regionally in a combined report.

Table 3-5. Fiscal years 2017 and 2018 target accomplishments and estimated cost.

Target Activity	Amount Accomplished Fiscal Year 2017	Estimated Cost Fiscal Year 2017	Amount Accomplished Fiscal Year 2018	Estimated Cost Fiscal Year 2018
Inventory and Monitoring				
Annual monitoring requirements completed	All items	Not available	All items	Not available
Inventory data collected or acquired to standard	All items	Not available	All items	Not available
Forest Planning				
Amendments Underway	0	$ 0	0	$ 0
Facilities				
Forest administrative and other facilities maintained to standard	20 facilities	$ 158,749	20 facilities	$ 39,004
Recreation sites managed to standard	117 sites	$ 148,200	118 sites	$ 154,360
Hazardous Fuels				
Treated with prescribed fire to reduce the risk of catastrophic wildland fire	971 acres	$ 103,897	1,411 acres	$ 126,990
Lands				
Land Acquisitions/adjustments	166.3 acres	Not available	40 acres	Not available
Boundaries marked	13.5 miles	$ 130,856	16.5 miles	$ 77,044
Non-Recreation Special use permits administered to standard	103 permits	$ 107,322	116 permits	Not available
Non-Recreation Special use applications processed	31 applications	$ 40,011	20 applications	Not available
Rights of Way acquired	0 easements - acquired with a land acquisition	$ 0	0 easements - acquired with a land acquisition	$ 0
Vegetation and Watershed				
Forest vegetation established	414 acres	$ 82,800	384 acres	$ 76,800
Timber stand & genetic tree improvement	15 acres	$ 3,000	100 acres	$ 20,000
Treated annually for noxious weeds and invasive plants	388.5 acres	$ 86,698	494.7 acres	$ 132,904
Range land vegetation improved	1102 acres	$ 31,975	1215 acres	$ 35,032
Soil and Water resource acres improved	377 acres	$ 84,349	362 acres	$ 931,999
Wildlife, Fish and Threatened, Endangered and Sensitive Species				
Lake habitats restored or enhanced	218 acres	$ 10,127	239 acres	$ 58,835
Stream habitats restored or enhanced	26.5 miles	$ 1,702,906	21.4 miles	$ 888,786
Terrestrial habitats restored or enhanced	3,708 acres	$ 262,370	3,816 acres	$ 213,746

Target Activity	Amount Accomplished Fiscal Year 2017	Estimated Cost Fiscal Year 2017	Amount Accomplished Fiscal Year 2018	Estimated Cost Fiscal Year 2018
Range				
Grazing allotments managed to 100 percent standard	4,911 acres	$ 84,886	4,911 acres	$ 119,114
Recreation				
Heritage assets managed to standard	Not available	Not available	Not available	Not available
Recreation site capacity operated to Standard	874,040 PAOT days	$ 148,200	907,680 PAOT days	$ 154,360
Number of interpretive & conservation education plans implemented	1 Plan	$ 60,000	1 Plan	$60,000
Recreation special use authorizations administered to standard	42 permits	$ 0	32 permits	Not available
Recreation Special use applications processed	11 applications	$ 0	14 applications	Not available
Trails improved to standard	0 miles	$ 0	10.4 miles	$184,965
Trails maintained to standard	306.1 miles	$ 152,200	317.2 miles	$167,569
Wilderness Areas managed to standard	0 areas	$ 64,498	0 areas	$ 63,980
Roads				
Roads decommissioned	0 miles	$ 450,726	0 miles	$513,774
High clearance roads maintained	12.1 miles		8.3 miles	
Passenger car roads improved	2.88miles		1.3 miles	
Passenger car roads maintained	70.4 miles		69.9 miles	
Lands covered by motor vehicle use map (MVUM) – includes development of the GM MVUM	408,972 acres	Not available	408,972 acres	Not available
Timber				
Timber volume sold	11,181 ccf[1]	$ 1,164,000	6,637 ccf[1]	$ 1,264,000

[1] CCF = hundred cubic feet; to convert CCF to thousand board feet (MBF) multiply by 0.62 (CCF x 0.62 = MBF).

Evaluation and Conclusions: Tracking costs of Forest Plan implementation activities provides program managers unit cost information that is helpful in the development of work plans and out-year planning. Over an extended period, tracking these costs can be used to develop management activity unit cost trend information enabling managers to make more informed decisions about the costs of management activities.

Recommendations: Consider removing this question from the monitoring program because monitoring project costs is not strongly tied to any Forest Plan component and it does not provide enough meaningful or accurate information to warrant its retention.

Monitoring Item: Desired Future Condition

Monitoring Question: What are the effects of management practices prescribed by the 2006 Forest Plan?

Detailed Monitoring Question: What activities have occurred in management areas? How have these management actions helped to achieve the desired future condition of the management area? Have activities occurred that detract from the desired future condition of the management area?

Monitoring Driver: Forest Plan Goal 1 and associated Objectives, and Forest Plan Management Area direction (management area major emphasis and desired future conditions).

Monitoring Activities: The total number of FLNF projects approved in fiscal years 2017 and 2018 to implement the Forest Plan is provided in Table 3-6 by the level of analysis required by the National Environmental Policy Act (NEPA). The list of projects approved for each fiscal year is provided in Table 3-7.

Table 3-6. Number of FLNF projects approved for implementation in fiscal years 2017 and 2018.

National Environmental Policy Act – Level of Analysis	FY 2017	FY 2018
Record of Decision (EIS – Environmental Impact Statement)	0	0
Decision Notice (EA – Environmental Assessment)	1	0
Decision Memo (CE – Categorical Exclusion)	3	4
Letter To the File (CE – Categorical Exclusion)	1	1
Supplemental Information Report	0	0
Total Projects Approved	**5**	**5**

Table 3-7. List of projects approved for implementation in fiscal years 2017 and 2018.

Project Name (alphabetical order)	NEPA Level[1]	FY Approved	Project Description
Boardman Creek Range Resource Project	DM	2018	Remove culvert and install a hardened ford (geo-cell, concrete pavers, etc.) in Aman East pasture. Replace/improve 85 feet of fencing in Aman East pasture. Improve drainage at Butcher Hill.
Burnt Hill Communications Site Special Use Permit Renewal	DM	2017	Issue a special use permit to New York State police for use of the Burnt Hill communications site in the Town of Burdett.
Cook Grassland Hedgerow Removal	DM	2018	Remove a hedgerow for grassland birds and provide better access to one of the haying units on the east side of the grassland. Remove the old fences, clear the brush, cut <5 trees over 3-inches at diameter breast height through mechanical means such as trucks, tractors, chainsaws, and brush cutters.
Finger Lakes Invasive Pest Strategy	EA	2017	Improve forest health and restore ecosystem functions with timber harvest and other management treatments across FLNF.
FLNF Openings Maintenance	DM	2018	Prescribe burn and/or mechanical treatment to maintain existing grasslands and shrublands across FLNF.
FLNF Solar Array Installation	DM	2017	Install two row 56 panel solar array located in Ballard Pasture fence site and plant area with native plants and pollinators.

Project Name (alphabetical order)	NEPA Level[1]	FY Approved	Project Description
Hobart and William Smith Colleges Salamander Research	LTF	2018	Hobart and William Smith Colleges research to examine the abundance and behavior of terrestrial salamanders related to land use history in 3 to 5 grassland/pasture sites.
Primitive Pursuits Priority Special Use	DM	2017	Issue a 5-year special use permit to conduct a 4-H Primitive Pursuits Summer Camp on NFS land.
Sawmill Creek Wetland Restoration	DM	2018	Restore wetlands in and around Sawmill Creek Ravine candidate Research Natural Area. Includes restoration of drainage across old road.
Springer & Cocker Spaniel Field Trial Permits	LTF	2017	Not to exceed 1-year permits for Springer and Cocker Spaniel field trials as part of the English Springer Spaniels National Amateur Championship events

[1] EA = Environmental Assessment; DM = Categorical Exclusion (Decision Memo); Categorical Exclusion (Letter to the File).

Evaluation and Conclusions: There were a total of 10 projects approved for Forest Plan implementation in fiscal years 2017 and 2018. All projects were designed and found to be consistent with Forest Plan direction including goals, objectives, and forest-wide and management area standards and guidelines. Collectively, these projects have moved existing conditions toward desired future conditions according to each management area direction where they are located.

Recommendations: No recommended changes to this monitoring question.

Range

Monitoring Item: Range Improvements Functional

Monitoring Question: To what extent have Objectives been attained?

Monitoring Question: Are we providing functioning range improvements (watering facilities, fence, corral) to support approximately 10,000 Animal Unit Months (AUMs) annually?

Monitoring Driver: Forest Plan Goal 7 and associated Objectives.

Monitoring Activities: Forest Service staff and Hector Cooperative Grazing Association (HGA) members annually inspect all existing watering facilities to assess maintenance and adequacy of systems. HGA provided maintenance activities throughout fiscal year 2017 including valve and cement trough repair in some pastures. Two ponds (one in Fox pasture and one in Peterson pasture) were dredged and a tire trough installed in 2017 with none completed 2018. Pasture total Animal Unit Months supported with functioning watering facilities were 7,709, and 7,800 AUMs in fiscal years 2017 and 2018, respectively. Watering facilities are adequate to support at least 10,000 AUMs; however, there were fewer animals on pastures than permitted to graze because of a lower demand by area farmers. Over the past few years, improvements were made to the watering infrastructure allowing infrastructure to retain its ability to support AUM objectives.

Evaluation and Conclusions: Of the 44 manmade ponds on FLNF providing water to livestock, reviews during fiscal years 2017 and 2018 indicate that although all were functioning, several require dredging to remove sediment and to repair earthen dams damaged from nearly 40 years of natural, rodent (such as beaver and muskrat), and livestock-caused bank erosion. Cattle exclusion fencing was found to be in

disrepair on a few ponds, allowing for total cattle access. Additional ponds included in the 2009 Allotment Management Plan will continue to be prioritized for repair as funding allows. Also, repair and replacement of pipeline and trough fixtures will continue to ensure livestock watering needs are met.

HGA routinely provides maintenance and monitoring of watering areas, but, additional new fencing to enhance water quality and riparian protection in pastures for wildlife and livestock will result in increased costs. Forest Service staff will continue to work with HGA to consider innovative approaches to fund watering facility maintenance needs.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Animal Unit Months

Monitoring Question: To what extent have Objectives been attained?

Monitoring Question: Are we maintaining forage production sufficient to support approximately 10,000 Animal Unit Months (AUMs) annually?

Monitoring Driver: Forest Plan Goal 7 and associated Objectives.

Monitoring Activities: Monitoring activities were not conducted during fiscal years 2017 and 2018 mainly due to continued Forest Service staff vacancies.

Evaluation and Conclusions: Although the early mowing of goldenrod and herbicide treatments for NNIP successfully reduced targeted vegetation during this monitoring period, repeated herbicide treatments are needed for knapweed and thistles to reduce the surviving seed bank within the soil (see the Non-native Invasive Plants monitoring item section). Continued treatments and monitoring are planned to assess the effectiveness of this ongoing treatment intended to enhance forage quality and grassland habitat conditions. The average annual forage biomass continues to rise in indicating managed grasslands are still producing adequate forage to support current grazing numbers.

Goldenrod and NNIP continue to pose management challenges to long-term livestock grazing and forage production, especially in areas not recently mowed or sprayed. Control activities approved in the 2008 Forest-wide Invasive Plant Control Decision Notice guide the efforts to improve forage and wildlife habitat within grasslands. The use of herbicides, experimental sheep grazing, rotational grazing with cows, biological controls (such as the release of approved insects), and earlier goldenrod mowing are expected to continue contributing toward long-term enhancement of forage quality in pastures. These activities should continue in additional pastures with high infestations where spraying and mowing were not done recently.

Recommendations: No recommended change to this monitoring question.

Recreation

Monitoring Item: Effects of Vehicle Use Off Roads

Monitoring Question: Is the use of vehicles off roads causing considerable adverse effects on resources or other forest visitors? How effective are forest management practices in managing vehicle use off roads?

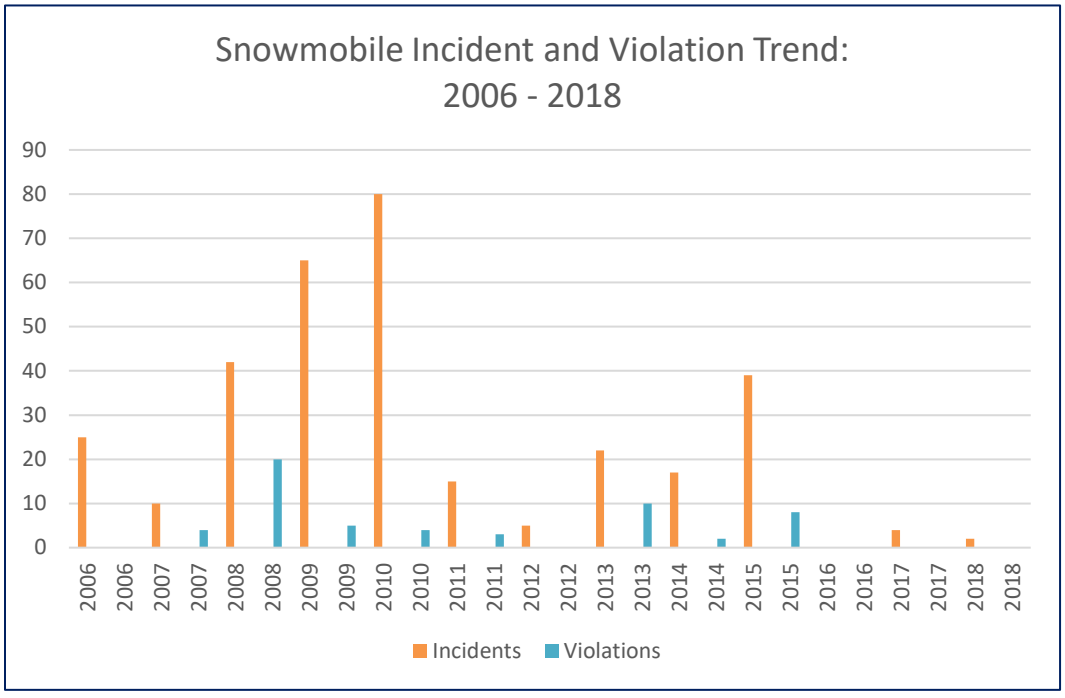
Monitoring Question: What is the effect of snowmobile use on the quality of recreation experienced by other forest users?

Monitoring Driver: Regulatory requirements (36 CFR 295) state that use of vehicles off roads shall be planned, implemented and monitored to protect resources and visitors from considerable adverse effects, promote public safety, and minimize conflicts with other uses of National Forest System lands

Monitoring Activities: From fiscal years 2014 to 2018, monitoring of off-road vehicle use continued in conjunction with routine law enforcement patrols. Off-road vehicle use includes summer off-highway vehicles (OHVs), including all-terrain vehicles (ATVs) and utility terrain vehicles (UTVs), as well as winter over-snow vehicles (snowmobiles). As patrols and trail condition inventories document incidents or the issuance of notices of violation, the incidents are recorded and entered into the Law Enforcement and Investigation Management Attainment and Reporting System (LEIMARS) database. Retrieved data can be used to show trends; however, the number of incidents fluctuates depending on the availability of law enforcement and forest protection officer personnel.

Evaluation and Conclusions: This monitoring measures the change in law enforcement incidents and violations utilizing data entered over the ten-year period of 2006 to 2018 for the Green Mountain and Finger Lakes National Forests (Figures 3-1 and 3-2). Data indicate trends and provide baseline quantitative data to which monitoring can be added annually. Data are separated into "incidents" (includes warnings and visual identification of a violation) and "violations" where somebody receives a citation for the infraction.

Figure 3-1. *Law Enforcement Incidents and Violations for Over-Snow Vehicles between 2006 and 2018.*

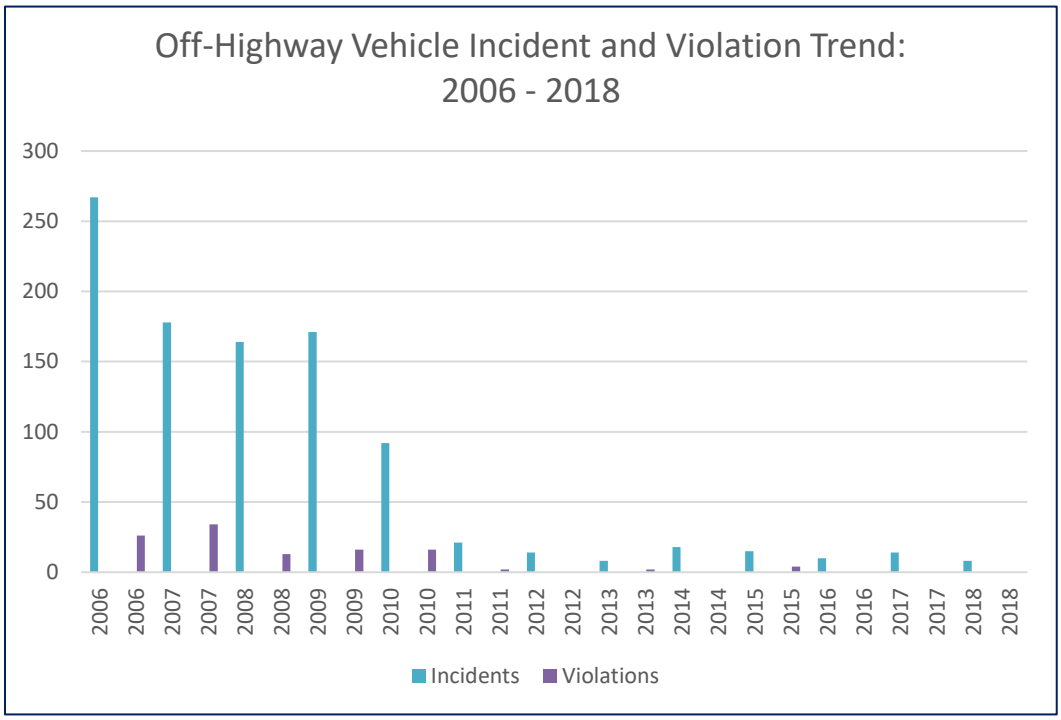


The data shows an overall decreasing trend from 2006 to 2018 for OHV incidents and violations. The reasons for this trend is unclear, but could be the result of: 1) a decreased field presence of law enforcement personnel; 2) better understanding from the public due to improved education, signing and barrier control efforts; 3) increased partner collaboration to help address unauthorized use and to better align public demand for snowmobile and off-highway vehicle trails with approved and designated

National Forest System trails. In addition, Forest Service staff have been making a focused effort to include mitigation measures in site specific projects to deter unauthorized vehicles through public collaboration and education, and installation of signing and engineering controls such as gates, stiles and boulders.

The data shows fluctuating levels of snowmobile incidents and violations from 2006 to 2018. This is likely the result of varying levels of law enforcement personnel, including Forest Protection Officers, and fluctuating capacity to provide weekend snowmobile patrols. Increasing patrol and presence in areas with repetitive violations and installation of travel management barriers to deter repetitive, unauthorized use are key elements to successfully address the effects of illegal off-road vehicle use on NFS lands.

Figure 3-2. *Law Enforcement Incidents and Violations for Off-Highway Vehicles between 2006 and 2018.*



Recommendations: More qualitative data such as narratives based on site specific project analyses and monitoring can improve monitoring conclusions. Consider refining methods of collecting and analyzing data so that summer off-highway vehicle and over-snow vehicle incidents are accurate and mapped with GIS, including distinguishing between incidents in Vermont and New York.

Monitoring Item: Recreation Facility Maintenance

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Monitoring Question: Is the Forest reducing deferred maintenance on developed recreation facilities and sites. Is the Forest increasing the number of recreation facilities that are maintained to standard.

Monitoring Driver: Forest Plan Goal 11 and associated Objectives.

Monitoring Activities: This monitoring question measures percentage managed to standard and trends; however, annual reports for 2017 and 2018 were not generated to identify the deferred maintenance nor the number of recreation facilities managed to standard during this monitoring period.

Evaluation and Conclusions: Not available.

Recommendations: No recommended change to this monitoring question. Ensure annual reports are generated to capture deferred maintenance on developed recreation facilities and the number of recreation facilities managed to standard for future reporting efforts and trend data.

Monitoring Item: Scenic Integrity Objectives

Monitoring Question: To what extent have Objectives been attained?

Monitoring Question: Has the Forest transitioned from the current Visual Management System to the Scenery Management System?

Monitoring Driver: Forest Plan Goal 16 and associated Objectives.

Monitoring Activities: The transition to managing for scenic integrity objectives from using the Visual Management System to the Scenery Management System (SMS) has not been completed.

Evaluation and Conclusions: Competing priorities and inadequate staff and skills have delayed the transition to the SMS. Forest Service staff should continue to explore opportunities, including the Enterprise Program, to transition to the SMS as soon as practical.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Trail Maintenance

Monitoring Question: Is the quality of the Forest Service trail system being improved through operation and maintenance?

Detailed Monitoring Question: Is the amount of deferred maintenance on the FLNF trail system being reduced?

Monitoring Driver: Forest Plan Goal 11 and associated Objectives.

Monitoring Activities: This monitoring measures total deferred maintenance divided by total system trail miles for FLNF; however, annual reports for 2017 and 2018 were not generated to identify the deferred maintenance nor National Forest Trail System miles during this monitoring period.

Evaluation and Conclusions: Not available.

Recommendations: No recommended change to this monitoring question. Ensure annual reports are generated to capture deferred maintenance and trail mileage data for future reporting efforts.

Monitoring Item: Trends in Trail Partnerships

Monitoring Question: To what extent have Objectives been attained?

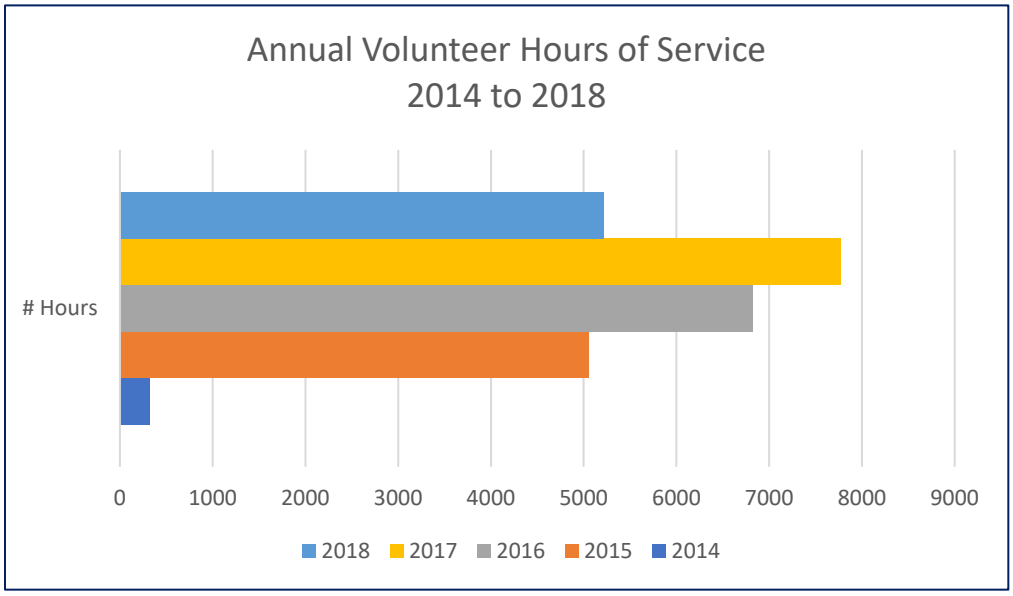
Detailed Monitoring Question: How well is the Forest using partnerships to assist in the operations and maintenance of the Forest trail system?

Monitoring Driver: Forest Plan Goal 11 and associated Objectives.

Monitoring Activities: Forest Service staff and partners collect volunteer data annually, including demographic figures, total volunteer numbers, hourly contributions, and more. This data is compiled and reported nationally through the Volunteer & Services Reporting system for both individual and group volunteers on the Green Mountain and Finger Lakes National Forests.

Evaluation and Conclusions: Figure 3-3 depicts annual volunteer contributions (total hours) over the three-year period from fiscal years 2014 to 2016. Annual volunteer contributions rose sharply from 320 total hours in 2014 to 6,821 hours in 2016. The reason for this trend is unclear but could be the result of increased Forest Service partner/volunteer engagement as well as improved reporting. Additionally, several large projects were implemented in 2016; these projects had consistent social media presence with organized volunteer events resulting in an outpouring of volunteer support.

Figure 3-3. *Annual Volunteer Contributions (Hours) on the Green Mountain and Finger Lakes National Forests from 2014 to 2018.*



Recommendations: No recommended change to this monitoring question.

Monitoring Item: Visual Quality Objectives

Monitoring Question: To what extent have Objectives been attained?

Detailed Monitoring Question: Is the Forest being managed in accordance with the visuals standards and guidelines found in the Forest Plan and are the visuals standards and guidelines and any additional site specific design criteria effective in helping to meet the VQOs (Visual Quality Objectives)?

Monitoring Driver: Forest Plan Goal 16 and associated Objectives.

Monitoring Activities: Annual monitoring trips provide the opportunity to review project implementation and adherence to Forest Plan Visual Quality standards and guidelines as well as project-specific design criteria and mitigations. During the monitoring trips, resource staff determine if the VQOs were met and if not met, discuss what could have been done to achieve VQO and/or what could be done toward meeting VQO.

Additionally, ongoing field reviews identify visual concerns from project implementation and major storm events as well as opportunities to enhance visual resources.

Evaluation and Conclusions: Based on available documentation, annual monitoring trips did not identify any projects that failed to adhere to VQOs.

Recommendations: No recommended change to this monitoring question.

Soils

Monitoring Item: Soil and Water Standards and Guidelines, Mitigation Measures, and Best Management Practices

Monitoring Question: To what extent have Standards and Guidelines (S&Gs) and Mitigation Measures been applied? How often are Best Management Practices (BMPs) implemented and effective?

Detailed Monitoring Question: Were Soil and Water S&Gs, mitigation measures, and BMPs implemented on selected projects, and were they effective in protecting the soil, water and wetland resources?

Monitoring Driver: Forest Plan Goals 3 and 4, and associated Objectives, and Forest-wide Soil, Water, and Riparian Area Protection and Restoration and Management Area Standards and Guidelines.

Monitoring Activities:

Current Indicator and Corresponding Measurement

1. Are Forest Plan Standards and Guidelines being followed? What percentage of the time are they implemented?
2. Of the Mitigation Measures that are put into place, what percentage of the time are they being implemented?
3. Best Management Practices for water quality management on NFS lands, implementation and effectiveness ratings.

In fiscal years 2017 and 2018, soil monitoring activities measured the implementation and effectiveness of Forest Plan Standards and Guidelines (S&Gs) designed to control erosion, prevent sedimentation, protect wetlands, and maintain soil and water quality. Periodic visits were made to active timber sale areas (during and after harvest), recreation, construction, and road maintenance projects, and special use permit sites to determine whether Forest Plan S&Gs and mitigation measures were implemented and effective in minimizing soil erosion, stream sedimentation, and impacts to wetlands and water quality. Sites were selected for review for various reasons: randomly, because of the presence of concern, or because an issue or noncompliance had been reported. Although most monitoring occurred on GMNF timber sales and other project sites, results can be evaluated along with sites monitoring on FLNF.

This monitoring also helps determine whether Forest Plan Goals 3 and 4 are being achieved (maintain or restore the natural ecological functions of the soil; and maintain or restore aquatic, fisheries, riparian, and wetlands, respectively). Soil ecological functions include the ability of the soil to store water, provide a substrate for plant growth, filter pollutants, and store carbon.

Monitoring was completed by Forest Service soil scientists or soil technicians. Tree harvest activities have a high potential to impact soil, water, and wetland resources, so harvesting continues to be the major emphasis of the monitoring program (Table 3-8).

Table 3-8. Soil and water quality monitoring locations in fiscal years 2017 and 2018.

2017 Monitoring	2018 Monitoring
Country Road Timber Sale (Payment Unit 4)	Grouse Timber Sale (Payment Unit 22)
Pumphouse Timber Sale (Payment Units 5 and 11)	Texas Timber Sale (Payment Unit 7)
Cookbrook Timber Sale	Roaring Brook Timber Sale (Payment Unit 11, landings)
Grouse Timber Sale (roads/culvert)	Mad Tom Timber Sale (skid trail)

Evaluation and Conclusions: Table 3-9 shows the results of BMP effectiveness ratings from sites monitored in fiscal years 2017 and 2018.

Table 3-9. Best Management Practices for water quality management on NFS lands, implementation and effectiveness ratings.

Site Name	Monitoring Activity	Implementation	Effectiveness	Composite
Apple Orchard, Stand 111	Use of Prescribed Fire	Fully	Effective	Undetermined
Johnson Pasture, 16	Grazing Management Site	Marginal	Marginal	Poor
Backbone Horse Camp	Pack and Riding Stock Use Areas	Fully	Not Effective	Poor
Grouse Lane	Completed Construction/ Reconstruction or Operation & Maintenance of Parking Areas	Fully	Effective	Excellent
Terry Berry Wetland Restoration	Completed Aquatic Ecosystem Improvements	Fully	Effective	Excellent
Blueberry Patch Campground	Developed Recreation Sites	Marginal	Effective	Good
Mount Snow, Fallen Timbers	Ski Run Operation and Maintenance	Marginal	Mostly	Fair
Forest Road 42 (Bingo Road)	Road Operation and Maintenance	Fully	Marginal	Fair
Mad Tom Stewardship (Unit 13)	Mechanical Site Treatments	Marginal	Effective	Good
Texas Stewardship Service Project	Mechanical Site Treatments	Mostly	Effective	Excellent
Pumphouse Timber Sale (Unit 1)	Mechanical Site Treatment	Mostly	Not Effective	Poor

Outside of BMP Program monitoring, regular field inspections were made to determine whether Forest Plan S&Gs and mitigation measures were followed during implementation of management activities.

Fiscal Year 2017

Out of 17 sites monitored, 3 had S&G, design criteria, mitigation measure, or BMP noncompliance:

- Cook Brook Sale, Peru, VT: Skidder operation occurred within a stream buffer. Logs were also piled within buffer. Sawdust was observed within the buffer as well, mixed with the snow. Operators were notified to stay out of the buffer in the future and spread sawdust uphill of the landing, away from the stream, to avoid transport into the stream during spring snowmelt.
- Camp Capella: A perennial stream was running down a 6-ft length of trail. Restoration work suggested

Fiscal Year 2017

Out of 15 sites monitored, 4 had S&G, design criteria, mitigation measure, or BMP noncompliance:

- Grouse Timber Sale, Hancock, VT: Stream crossing and buffering AMP noncompliance. Logging slash in the stream was removed from stream bed afterward.
- Sunnyside Sale, Dorset Peru IRP: A log landing was located within a wetland buffer, a S&G noncompliance. Corrective action was to not use corner of landing within the buffer. Excessive rutting from skidder operation was also identified. Corrective actions were to smooth and install water bars.

Forest Plan S&Gs were followed at approximately 75 percent of the units monitored. Overall impacts to soil, water, and wetland resources were small in magnitude, duration, and extent. Erosion, stream sedimentation, and wetland disturbance were not often observed. When incidents of noncompliance occurred, they were corrected when possible and used as learning opportunities to change future management.

Recommendations: No recommended change so this monitoring question.

Monitoring Item: Grassland Soil Productivity, Condition, and Quality

Monitoring Question: Are the effects of forest management resulting in significant changes to soil productivity?

Detailed Monitoring Question: Are the effects of forest management resulting in significant changes to grassland soil/site productivity, condition, and quality?

Monitoring Driver: Forest Plan Goal 3 and associated Objectives, and Forest-wide Soil, Water, and Riparian Area Protection and Restoration and Management Area Standards and Guidelines.

Monitoring Activities:

Measurement indicators for this monitoring question include:

- Site Productivity - percent desirable plants, plant cover, plant diversity plant residue, plant vigor, percent legume, uniformity of use, livestock concentration areas, soil compaction and erosion, plant vigor measures.
- Pasture (Grassland) Soil Quality - infiltration, bulk density, electrical conductivity, pH, nitrates, slaking, and soil physical observations of topsoil, root growth, penetration resistance, and soil physical observations.

Site productivity monitoring informs land managers about the quality of forage present in pastures. This provides a measure of utility for grazing purposes and can identify areas that require management to

improve forage quantity and quality. USDA Natural Resources Conservation Service (NRCS) Soil Quality test kit protocol was used to measure the following:

- Infiltration. Higher infiltration rates reduce runoff and increase water storage potential.
- Bulk density. Higher bulk density can restrict root growth, biological activity, and movement of water and air in the soil.
- Electrical conductivity (EC). Higher EC indicates excess salts, which can reduce plant growth and water quality.
- Soil pH relates to nutrient availability and plant growth.
- Soil slaking is related to erosion.
- Soil physical observations and estimations. Shows how to observe soil structure and root patterns and to estimate topsoil depth, penetration resistance, and soil texture in the soil profile. These properties are important to the physical environment for plant growth.

Evaluation and Conclusions: Site productivity was not assessed during fiscal years 2017 and 2018. Table 3-10 shows results from Soil Quality test kit measurements.

Table 3-10. FLNF pasture soil quality test kit results for fiscal years 2017 and 2018.

Pasture Name	Soil Texture	Infiltration Rate Class	Bulk Density (g/cubic cm)	EC (dS/m)	pH	Estimated Soil Nitrate (ppm)	Average Soil Slake Rating	Soil Structure Index	Topsoil Depth (cm)
Fox	Silt Loam	Moderately Rapid	1.17	0.03	6.1	0-5	6	75	12
Peterson	Silt Loam	Moderate	1.29	0.05	6.3	5-10	6	75	10
South Velie	Silt Loam	Moderately Slow	0.98	0.10	6.2	0-5	5.5	58	<1
Ballard	Silty Clay Loam	Moderately Slow	1.34	0.04	5.8	0-5	6	46	4

Baseline soil quality levels were assessed in four pastures on FLNF in 2018: Fox, Peterson, South Velie, and Ballard. Surface soil textures in these pastures are mostly silt loams. Soil texture is generally fixed for a given soil- that is, not impacted by management activities. Knowing the soil texture helps to determine optimal levels for bulk density and soil structure index. Infiltration rates of moderately fast or faster are desirable to decrease risks of surface erosion. Peterson, South Velie, and Ballard pastures are rated more poorly, indicating increased susceptibility to runoff, ponding, and erosion. The lower infiltration rates are likely the result of soil structure changes induced by cattle management.

Bulk densities in each pasture are within the acceptable range, below 1.3 grams per cubic centimeter for silt loams, indicating bulk density is not limiting root growth. EC values are below 1.6 dS/mL, indicating no salinity issues for livestock and forage growth. Soil pH is within a normal range of 5 to 7, though 5.8 pH for Ballard pasture falls slightly below desirable plant growth range of 6 to 7 pH. This is most likely a reflection of acidic atmospheric deposition and other climate and soil parent material factors than due to management activities. Slake test results were very high, indicating high resistance to erosion. High slaking values can also indicate the presence of soils crusts, which can inhibit infiltration, air exchange, and seed germination. Soil crusts were observed in the pastures. Structural soil crusts are relatively thin, dense, somewhat continuous layer on the surface of soil. Structural crusts can develop when the soil surface dries out after rainfall or irrigation. Water droplets striking soil aggregates and water flowing across soil breaks surface aggregates into individual soil particles. Fine soil particles wash, settle into and

block surface pores causing the soil surface to seal over and prevent water from soaking into the soil. As the muddy soil surface dries out, it crusts over. This crust can slow infiltration and prevent seed bed germination.

Soil structure index ranges from 0 to 100 and is calculated using physical observations. For optimal plant growth, the soil is loose, friable, and porous, allowing free movement of water and air, and unobstructed germination and root growth. Structure index is calculated by determining soil structure type, size, and grade. The higher the index value the better the soil's capacity to transmit water and air and to promote root growth and development. Ballard pasture scored 46, the lowest of the pastures sampled due to the observation of weak, fine soil aggregates. Smaller, "weaker" aggregates are more susceptible to compaction. Larger, stronger aggregates hold their shape allowing for better root penetration, gas exchange, and infiltration. South Velie pasture scored similarly. Fox and Peterson pastures scored 75, due to moderate soil structure grades. These scores indicate soils that may require management changes if stronger subsoil structure is desired.

Recommendations: No recommended change to this monitoring question.

Terrestrial Ecological Units

Monitoring Item: Ecological Type Mapping and Representation

Monitoring Question: To what extent have Objectives been attained?

Detailed Monitoring Question: To what extent are ecological types on the Forest represented within the ecological reference area network? To what extent do ecological types recognized on the Forest accurately represent the diversity of ecosystems and potential natural vegetation on the Forest?

Monitoring Driver: Forest Plan Goal 5 and associated Objectives.

Monitoring Activities: The Forest Plan supports the notion that ecological processes and systems are to be maintained on FLNF within the desired ranges of variability (Goal 5, p. 13). This goal includes the objective to manage at least five percent of each ecological type present on FLNF for old growth characteristics. Managing a small proportion of each type in a way that allows natural disturbance processes to regulate forest types and forest structure ensures that the full range of variation in ecological systems on FLNF can be supported.

Ecological types are defined in the FLNF Forest Plan Environmental Impact Statement (EIS) in two ways:

1. Ecological Landtypes (ELTs) represent unique combinations of soil conditions and late-successional vegetation expected to be at a particular site due to geology, soils, topography, existing vegetation, and land use history.
2. Landtype Associations (LTAs) represent groupings of ELTs that represent landscape patterns, such as groups of ELTs associated with lake plains or with ravines and cliffs.

Management for old growth characteristics in the Forest Plan EIS was done by ensuring these ELTs and LTAs were represented in the "Reference Area Network", a grouping of management areas and other conditions that "…provide ecological reference or benchmark conditions for baseline monitoring and research, provide refugia for rare species, and provide some ecological conditions or functions that are not otherwise available across the landscape." (Forest Plan EIS, p. 3-204). Areas that are or will provide these conditions for FLNF comprise the Reference Area Network (RAN) and include:

- Future Old Forest MA

- Existing and Candidate Research Natural Area MA
- Ecological Special Area MA
- Unsuitable lands

In addition to monitoring adequate representation, another objective associated with this monitoring item was to revise ELTs and LTAs to ensure they represent the latest science and understanding of ecological classification and natural communities in the New York Finger Lakes region. If there are ecosystems not captured or well-characterized in the ELT or LTA classifications, then they may not be adequately represented in the RAN.

Forest Service staff have been unable to revise its ecological classification system over the past seven years due to staff and budget constraints and other priorities. During monitoring of FLNF special areas, as well as other inventory efforts, no new natural communities or ecosystems have been identified that are not either represented by ELTs or LTAs, or represented in the RAN.

In fiscal year 2014, a contract was awarded to survey and classify natural communities at Caywood Point, which is one of a small group of areas not covered by the original ELT classification. It is anticipated that the data and classification from this effort will supplement and improve the current classification. No additional revision efforts are currently planned.

In 2007, the Forest Service agreed to an appeal resolution associated with the revised Forest Plan, which identified 14 stands of mature forest with limited human impacts beyond the original forest clearing, and which obligated protection of these sites while they were being evaluated. While the evaluation is ongoing, these stands are not considered suitable for timber harvesting, and so also contribute to the RAN. Most of these stands were visited in 2008 to conduct a qualitative assessment, and all that were visited were determined to merit further consideration. No unique ecological types were noted for these stands, but all had mature forest conditions such as trees more than 100 years old, limited signs of recent harvesting, no non-native invasive plants, and some structural diversity. These conditions are rarely present on FLNF outside of the RAN.

Representation of ecological types in the RAN appears relatively stable. There have been only 30 acres of land acquisition since 2006, and the addition of old forest areas of interest is provisional depending on the conclusions of the evaluation. No new ecological types have been added to the list identified in the Forest Plan EIS, and no areas have been removed from the RAN. Therefore, for all intents and purposes, representation continues to be above the five percent threshold defined by the Forest Plan.

Evaluation and Conclusions: Based on current information, the full range of ecosystems and processes on FLNF continues to be represented within the RAN at greater than the desired five percent (Forest Plan EIS, Tables 3.10-9 and 3.10-10, p. 3-223). The current ELTs and LTAs also capture most unique ecological types at two different scales. As these ecosystems age and develop more complexity, they will begin to take on some of the old growth characteristics that are missing from FLNF. As noted in the Rare or Outstanding Natural Areas monitoring item section, non-native invasive plants (NNIP) are a concern in several special areas, particularly in areas adjacent to pastures. It will be important to control and hopefully eliminate these plants before significant gap-forming disturbances begin to form openings in these stands. In areas that are more dynamic, like Mill Creek Ravine and The Ravine, where NNIP have a significant presence, reducing the amount and impact of these NNIP will be more of a challenge.

Representation of ecological types in the RAN continues to be important to monitor, particularly within the context of climate change. The abundance and distribution of species is expected to change with time because of changes in temperature and patterns of precipitation. It will be important to monitor how

ecological types are changing over the next 100 years in terms of composition, structure, and function. Having representation of all types within a RAN ensures baseline conditions can be monitored and compared to management activities outside the RAN and to regional trends in species movements and natural community changes.

Continued efforts at updating and improving existing ecological classifications will be important to better determine baseline conditions and detect changes in composition and structure. Old forest areas of interest should continue to be investigated and stand histories reconstructed so that disturbance histories are better understood. This is also true for the rest of the RAN, for which limited stand reconstruction efforts have been conducted. Different disturbance histories can influence how other disturbance agents (such as insects, diseases, NNIP, and climate change) impact natural communities, making it important to understand how the old forest areas of interest and the rest of the RAN originated in their current form.

Recommendations: No recommended change to this monitoring question.

Terrestrial Wildlife Habitat

Monitoring Item: Grassland Habitat

Monitoring Question: To what extent do Forest Service Management activities contribute toward restoration and maintenance of habitat for native and desirable non-native species?

Detailed Monitoring Question: What are the conditions of grasslands and pastures on the FLNF? What are the vegetative conditions and wildlife use patterns of grazed and non-grazed grasslands? Do maintenance programs produce desired conditions?

Monitoring Driver: Forest Plan Goal 2 and associated Objectives.

Monitoring Activities: Each year the Forest Service contracts grassland bird surveys to be completed. During fiscal year 2017 There were 22 and 26 pastures/grasslands surveyed during fiscal years 2017 and 2018, respectively. Five bird species listed as Regional Forester Sensitive Species (RFSS) were documented as present each year. Pasture conditions are discussed in the Range monitoring item sections.

Evaluation and Conclusions: The major management emphasis for grasslands on FLNF is to allow for grazing of cattle and to provide management of grass forb production. Grassland management is commensurate with producing editable forage for cattle as well as both game and non-game species for food and cover. Forest Plan direction is effective in portraying goals, objectives and standards and guidelines relative to desired grassland conditions to support a diversity of plant and animal species.

Recommendations: No recommended change to this monitoring question.

Terrestrial Wildlife Population

Monitoring Item: Threatened, Endangered, and Sensitive Bats

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Detailed Monitoring Question: Are management actions adequately protecting ecological conditions required by threatened, endangered, and sensitive (TES) bat species known to occur on National Forest System lands?

Monitoring Driver: Forest Plan Goal 2 and associated Objectives.

Monitoring Activities: Indiana bat (*Myotis sodalist*) is a federally listed endangered species. Northern long-eared bat (*Myotis septentrionalis*) was federally listed as threatened in April 2015. All projects must comply with Endangered Species Act consultation requirements prior to implementation to ensure Indiana bat and northern long-eared bat protection. Eastern small-footed bat (*Myotis leibii*), little brown (*Myotis lucifugus*), and tri-colored bat (*Perimyotis subflavus*) are identified as sensitive species (2017 Regional Forester Sensitive Species list). All site-specific project analyses include a biological evaluation to ensure sensitive species viability and to preclude trends toward endangerment that would result in the need for Federal listing.

No survey or monitoring data is available for fiscal year 2017. In 2018, the Forest Service started implementation of NABAT, the North American Bat model, which breaks down North America into grid cells. The FLNF consists of one grid cell requiring the placement of four stationary recoding units on the landscape for four nights. Monitoring protocol entails completing two driving surveys within the grid cell block within the 4-night deployment. Surveys were completed July 17 to 20, 2018.

Evaluation and Conclusions: The current measurement indicator for bat monitoring is presence, location and number of individuals. Forest Service staff were unable to obtain an "incidental take" permit to survey/trap threatened or endangered bats without an overarching scientific goal. For future monitoring evaluation it may be beneficial to base presence/location from NABAT survey locations. While this is not the most ideal, it is the least intrusive methodology and can still provide some valuable information. It could also be beneficial to access additional roost location information, but the current biological opinion as it pertains to northern long eared bat indicates that gathering additional data for the species is not necessary. This direction is likely to change in 2022. The current protection placed on projects are expected to protect bats in critical locations, including near maternity roost trees and near hibernaculum.

Recommendations: Consider changing the detailed monitoring question to "Are bats continuing to persist on the landscape?" and develop measurement indicators accordingly to more meaningfully determine what extent Forest Service management activities contribute toward population viability for native and desired non-native species.

Monitoring Item: Herptile Sensitive Species

Monitoring Question: To what extent are Forest Service management activities contributing toward population viability for native and desired non-native species?

Detailed Monitoring Question: What are the population trends of wood turtle, Jefferson salamander, blue-spotted salamander, and four-toed salamander on National Forest System and adjacent lands? Do they need protection or habitat management?

Monitoring Driver: Forest Plan Goal 2 and associated Objectives.

Monitoring Activities: There currently are no herptiles on the 2017 Regional Forester Sensitive Species list. No specific monitoring was completed during fiscal years 2017 and 2018 to ascertain the presence, location and number of individuals or reported sightings of herptiles relative to this monitoring question.

Evaluation and Conclusions: No data was collected or recorded to evaluate during this monitoring period.

Recommendations: Consider removing this question from the monitoring program because none of these herptile species are currently on the RFSS list.

Vegetation

Monitoring Item: Forest-wide Habitat Composition

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: To what extent are management actions and natural processes moving Forest composition toward desired objectives in Table 2.2-1 of the revised Plan?

Monitoring Driver: Forest Plan Goal 2 and associated Objectives. Specifically, the objective that states management should address composition objectives found in the Forest Plan Table 2.2-1.

Monitoring Activities: Timber harvesting activities and other silvicultural treatments are tracked using the Forest Service Activity Tracking System (FACTS). FACTS manages information about activities related to fire/fuels, silviculture, special funding, range vegetation improvement, and invasive species used by all levels of the Forest Service. Field Sample Vegetation data is also tracked in the FSVeg system, which is updated to reflect treatments once completed. These systems can provide reports summarizing the number of acres and proportion of harvest acres treated with uneven-aged management (selection, groups, irregular shelterwood); the number of acres treated explicitly to enhance early successional characteristics (clearcutting, patch cutting, shelterwood); then number of acres treated explicitly to enhance late successional characteristics; and the number of acres treated with various methods (thinning, improvement) to explicitly enhance the health, longevity, and/or structural diversity of forested stands at the stand and landscape scales. This data can be used to monitor the progress made toward desired age class and structure objectives. There is some error associated with this data entry and consistency of activity classification, however the data is sufficient for tracking overall trends.

Evaluation and Conclusions: The Forest Plan identified a set of habitat composition objectives associated with the unique cultural and ecological characteristics of FLNF (Forest Plan, Table 2.2-1, p. 11). In areas dominated by forests, objectives support the natural transition of forested ecosystems toward a species composition that is more suited to the natural tendencies of the sites. A small proportion of these lands are to be managed for aspen, an uncommon but important habitat type. Grassland and shrublands objectives are at levels higher than would be expected under natural disturbance regimes to provide important habitat for a variety of animal and plant species. Table 3-11 shows habitat composition objectives considering all NFS lands within FLNF.

Table 3-11. Habitat type composition objectives for all FLNF lands (Forest Plan, Table 2.2-1).

Habitat Type	Objective (% Forest)
Mixed Hardwoods (N. Hardwoods and Oak)	35-50
Aspen	1-3
Softwoods	6-10
Shrubland	10-12
Grassland	33-35

Most of FLNF had been cleared at least once by the end of the nineteenth century, and much of it was also farmed through the early twentieth century. To restore degraded agricultural lands, the U.S. Soil Conservation Service planted many old fields with a variety of conifer species that appeared suited to site conditions. Most of these softwood species were not native to the region and some have not turned out to

be well suited, however these plantations have had value in restoring forest soils. Forest Plan objectives include conversion of many of these plantations to native plant communities.

Since 2006, one timber sale (Cotton Mill) has been implemented on FLNF that contributed toward meeting Forest Plan composition objectives. Some non-commercial aspen management has also been implemented. Although the Finger Lakes Invasive Pest Strategy project consisting of harvest activities was approved in 2017, no vegetation treatments have been implemented between 2014 and 2018. Table 3-12 shows a summary of the treatments over the past seven years that have contributed toward moving habitat composition toward Forest Plan objectives (Table 3-11).

Although there has been progress made for each habitat type, the level of management on FLNF since 2006 has not been sufficient to make notable or detectable progress toward Forest Plan composition objectives. Total acres managed to promote any one habitat type represents less than one percent of the total FLNF area. Timber harvest and other management activities continue to provide opportunities to facilitate shifts in habitat composition toward desired objectives but will ultimately only supplement natural shifts that will occur over time for habitats like northern hardwoods, mixedwood, and softwoods.

Table 3-12. Acres treated from 2006 to 2018 to move habitat composition toward Forest Plan objectives.

Habitat Objective	Acres Treated 2006 to 2013	Acres Treated 2014 to 2018	Total Acres Treated
Maintain and create aspen-paper birch habitat	26	0	26
Enhance and restore oak habitat	65	0	65
Convert non-native softwood plantations to native habitats	11	0	11

Source: Forest Service data

No landscape-scale projects have been implemented since the Forest Plan was revised in 2006. Management activities have been limited for the most part to maintenance of existing habitats, like grasslands and shrublands. There has been some aspen management at levels below what would be needed to perpetuate aspen within FLNF over the long-term. As part of the Cotton Mill timber sale, an 11-acre plantation was converted to native hardwoods, with an emphasis on oak, contributing to the objectives of removing non-native plantations and enhancing oak habitat. Grasslands are maintained on a 3-year schedule which includes mowing and prescribed fire treatments. Not all existing shrublands have been treated during this period and will need treatment soon to maintain their desired condition (such as a mix of grasses, forbs, shrubs, and small patches of trees). Shrubland areas remain stable at 1,421 acres but may have declined slightly due to forest succession and lack of maintenance. Grassland maintenance has allowed that area to remain stable at 5,250 acres of grassland for grazing, and 688 acres of grassland for wildlife.

Conifer plantations are declining due to poor site suitability, high density, Sirex wood wasp and other insects and pathogens. Some of these plantations have begun to naturally transition from non-native to native trees. Non-native invasive plants (NNIPs) continue to occur in abundance on FLNF, and as overstories in plantations decline due to tree mortality or harvesting, increased light on the forest floor will increase the risk of NNIP spread, preventing the establishment of native plant communities. Control treatments approved in the 2008 Forest-wide Invasive Plant Control project will be important for conversion of these plantations to native forest habitat.

For oak and aspen, management levels to promote these habits are not sufficient to keep pace with the aging and decline of stands of these species. Aspen stands are still represented on FLNF at levels within the desired range for composition objectives. Some small patch cuts to regenerate existing aspen stands and create new ones have been implemented. Continued work will be needed to keep pace with the aging and decline of aspen on the landscape. Most aspen stands are now either mature or over-mature, and once

they start to decline, they quickly die and are replaced by species expected to live two-three times as long. The objective of 80 acres of regenerating aspen within the first decade has not been met. Aspen is the most likely habitat to fall below the lower threshold of one percent in the Forest Plan composition objectives over the next 50 years at the current level of treatment.

Oak stands are also aging, and the trees species growing below oak overstories tend to be northern hardwood species, particularly beech affected by beech bark disease, along with maple and birch species. Oak trees are relatively long-lived and many of these stands will retain oak in the overstory for decades, however shade tolerant northern hardwood understories will continue to develop. Maintaining oak on these sites will become increasingly difficult and impractical. At the current rate of management, it is likely that most of existing oak stands on FLNF will be replaced by northern hardwoods over time and the proportion of forest dominated by oak will slowly decrease. Potential habitat for oak species is projected to increase under various climate change scenarios, however forest stand dynamics and succession is expected to play a larger role in determining future forest types. Oak stands with well-developed northern hardwood understories are already on a trajectory toward those species in the absence of continued disturbance or management.

The recently approved Finger Lakes Invasive Pest Strategy Project in January 2017 authorized approximately 800 acres of vegetation management. The project includes treatments to create and enhance aspen and oak/hickory habitat as well as conversion of plantations to native forest. No treatments have been implemented yet to date, but treatments are expected to be completed during the second decade of Forest Plan implementation.

Recommendations: No recommended change for this monitoring question.

Monitoring Item: Outputs Accomplished - Volume and Acres of Timber Offered and Sold

Monitoring Question: How close are actual outputs and services to projected outputs and services?

Detailed Monitoring Question: How do actual outputs compare to those projected in Appendix D, Proposed and Probable Practices, specifically related to timber offered and sold?

Monitoring Activities: Forest Activity Tracking System (FACTS) and Timber Sale Accounting (TSA) reports were used to monitor timber offered and sold along with the type of timber harvesting practices used to implement the Forest Plan.

Monitoring Driver: Forest Plan Goal 8 and associated Objectives.

Evaluation and Conclusions: The Forest Plan average annual Allowable Sale Quantity (ASQ) is the maximum amount of timber volume that may be offered and sold during Decade 2 (2016 to 2025), expressed on an annual basis. The annual average ASQ for FLNF is 258 thousand board feet (MBF). The annual amount of timber sold may exceed 258 MBF as long as the decadal ASQ (2.58 million board feet) is not exceeded. No timber sales were sold or operated during fiscal years 2017 and 2018, thus no progress was made in achieving the annual ASQ.

For context, Table 3-13 displays the actual acres harvested during Decade 1 of Forest Plan implementation (2006 to 2015) compared to Forest Plan estimated annual management practices (Forest Plan, Appendix D, Table D-4). Forest Plan estimated annual management practices acres are different for Decade 2 of Forest Plan implementation (2016 to 2025). Table 3-14 shows Forest Plan estimated annual

management practices acres for Decade 2 and reflects no harvest was implemented on FLNF in fiscal years 2017 and 2018.

Table 3-13. Actual acres for fiscal years 2006 to 2015 compared to Decade 1 Forest Plan estimated management practices (2006 to 2015).

Estimates of Management Practices	Planned Annual Acres in Decade 1[1]	Total Acres Harvested 2006-2015	Percent of Planned Annual Acres
Even-aged Regeneration Harvest[2]	156	11	<1
Even-aged Intermediate Harvest	352	54	15.3
Uneven-aged Harvest	360	0	0
Total Harvest	**868**	**65**	**<1**

[1] 10-year annual average of Decade 1 (2006-2015) acres from Forest Plan, Appendix D, Table D-4.
[2] The only even-aged regeneration harvest treatment implemented from 2006 to 2015 is clearcut.

Table 3-14. Actual acres for fiscal years 2017 to 2018 compared to Decade 2 Forest Plan estimated management practices (2016 to 2025).

Estimates of Management Practices	Planned Annual Acres in Decade 2[1]	Acres Harvested by Fiscal Year		Percent of Planned Annual Acres by Fiscal Year	
		2017	2018	2017	2018
Even-aged Regeneration Harvest[2]	250	0	0	0	0
Even-aged Intermediate Harvest	133	0	0	0	0
Uneven-aged Harvest	513	0	0	0	0
Total Harvest	**896**	**0**	**0**	**0**	**0**

[1] 10-year annual average of Decade 2 (2016-2025) acres from Forest Plan, Appendix D, Table D-4.
[2] Includes clearcut, shelterwood and shelterwood removal harvest methods.

It is not likely that management practices will approach Forest Plan estimates over the Decade 2 ten-year period unless harvest activities increase. Continued low harvest levels inhibit management ability to meet other objectives such as those related to desired forest type age class and composition, or contributions to the local and regional timber-based economy. Work has started on the Finger Lakes Invasive Pest Strategy project which may lead to additional timber harvesting on up to 800 acres over the next five to ten years.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Rare or Outstanding Natural Areas

Monitoring Question: To what extent have Forest Plan Objectives been attained?

Detailed Monitoring Question: To what extent are rare and outstanding biological, ecological, or geological features on the FLNF being protected, maintained, or enhanced?

Monitoring Driver: Forest Plan Goal 6 and associated Objectives.

Monitoring Activities: Although no formal monitoring was documented for fiscal years 2017 and 2018, restoration work was completed within the Sawmill Creek Ravine Candidate Research Natural Area (cRNA) in September 2018. The work included restoring wetlands south of old Terry Berry Road adjacent to the cRNA and culvert replacement with a permanent grade control structure to prevent erosion from drainage into the cRNA area.

Evaluation and Conclusions: The Forest Service ecology program was limited in capacity (key positions vacant) during this reporting period. This impacted both the amount of site monitoring and record keeping.

Recommendations: No recommended change to this monitoring question.

Monitoring Item: Stocking Level

Monitoring Question: Are harvested lands adequately restocked according to Plan goals?

Monitoring Question: Are lands adequately restocked within five years of a regeneration harvest or site preparation activities?

Monitoring Driver: The National Forest Management Act requires suitable timberlands are adequately restocked following harvest (16 USC 1604(g)(3)(E)(ii)).

Monitoring Activities: Monitoring protocols and procedures for stocking surveys are well established and consistent with Forest Service Handbook (FSH 2409.17, Silvicultural Practices). Reforestation success is measured on new plantations or harvested stands in years one, three, and five (if needed) following the planting or other regeneration effort. Successful reforestation is assured when new stands are certified as "free to grow" by year five. No stands were surveyed for first, third or five year stocking surveys during fiscal years 2014 to 2018 since the only regeneration harvest completed since Forest Plan revision (11 acres harvested in 2010) was certified fully stocked in fiscal year 2013.

Evaluation and Conclusions: Not applicable.

Recommendations: No recommended change to this monitoring question.

Water

Monitoring Item: Forest-wide Water Quantity and Flow

Monitoring Question: To what extent are environmental stressors and Forest management affecting water quantity and flow timing?

Monitoring Question: What is the existing status of water quantity and flow timing on National Forest System lands, and how are our management activities affecting them?

Monitoring Driver: Forest Plan Goal 4 and associated Objectives.

Monitoring Activities: Water quantity and flow timing data were not collected or not available for fiscal years 2017 and 2018. Data available from the U.S. Geological Survey stream gaging network are minimal across FLNF and not representative of stream flow and timing issues that may influence management of streams.

Evaluation and Conclusions: Although data were not collected for this monitoring question, Forest Service staff did not permit any management activities that were likely to degrade processes related to stream flow quantity or timing. Such activities could include large-scale conversion of land use and land cover types (such as forested lands to agricultural lands) or installation of a dam. During this monitoring period, no dams were removed which would restore more natural processes related to stream flow

quantity and timing. Forest Service staff did complete wetlands construction and restoration of wetland function at two sites: Blueberry Patch and Sawmill Creek. These projects are intended to reduce flood flows and increase base flows, though this effect may only be measurable at the small scale until this functionalist can be restored across more of the landscape.

Monitoring stream discharge (quantity and timing) across FLNF is not within the financial and technical capability Forest Service programs, even with assistance from partners. Given the limited capacity for monitoring stream discharge, this monitoring question does not appear to be well suited to help decide whether management is meeting Forest Plan direction, or what impacts climate change may have on forest resources. Related indicators such as regional precipitation and temperature patterns may be appropriate in addressing the climate-related stressors but are not likely useful in determining whether plan components are effective and appropriate and whether management is effective in maintaining or achieving progress toward Forest Plan objectives and desired conditions.

Recommendations: Consider removing this monitoring question from the monitoring program.

4. List of Preparers

Table 4-1 provides the Forest Service monitoring team that collected, evaluated, or compiled data for the *Finger Lakes National Forest Fiscal Years 2017 and 2018 Biennial Monitoring and Evaluation Report*:

Table 4-1. Preparers of the Fiscal Years 2017 and 2018 Biennial Monitoring and Evaluation Report.

Name	Position or Resource Responsibility
Jay Strand	Monitoring Team Leader/Forest Planner
Holly Knox	Recreation Program Manager/Public Services Staff Officer
Suzanne Gifford	Ecologist
Jeremy Mears	Fisheries Biologist
John Mccann	Watershed Program Manager
Greg Flood	Wildlife Biologist
Angie Quintana	Soil Scientist
Jeffrey Tilley	Silviculturist
MaryBeth Deller	Botanist
Steven Pytlik	Recreation Planner
Karen Bucher	Archaeologist and Heritage Resource Specialist
Matt Lark	Range
Marty Knipe	Fire Management Officer
Lindsay Rae Silvia	Fire and Fuels Technician
Brian Austin	Engineer
Ethan Ready	Public Affairs Officer
Briana Shepherd	Public Affairs Specialist
Pat D'Andrea	Lands Specialist
Jennifer Edmonds	Special Uses Coordinator

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Appendix A: Payments to Towns

There are two types of federal payments reaching municipalities that have National Forest System (NFS) lands: 1) Payments in Lieu of Taxes (PILT); and 2) Public Law 106-393, Secure Rural Schools and Community Self-Determination Act of 2001, reauthorized in 2008. Payments in lieu of taxes funds are directed to towns, and the Public Law 106-393 funds are directed to school districts.

Payments in Lieu of Taxes

Generally, federal lands may not be taxed by state or local governments unless they are authorized to do so by Congress. Since local governments are often financed by property or sales taxes, the inability to tax the property values or products derived from the federal lands may significantly affect local tax bases. Instead of authorizing taxation, Congress created various payment programs designed to make up for lost tax revenue.

Under current federal law, local governments are compensated through various programs for losses to their tax bases due to the presence of most federally owned land. The most widely applicable program, while run by the Bureau of Land Management, applies to many types of federally owned land, and is called "Payments in Lieu of Taxes" or PILT. The level of PILT payments is calculated under a complex formula which considers figures such as acres of eligible lands, population, and previous year payments from other federal agencies. The PILT, made in or around October, is indexed by the inflation rate and set by federal law.

Table A-1 shows PILT payments and entitlement acres for New York counties. Each county can receive additional PILT dollars if they contain other federal lands, such as National Park Service or Army Corps of Engineer lands. Not all federal acres within towns are entitled to PILT payments.

Table A-1. New York Payments in Lieu of Taxes (PILT) and acreage for fiscal years 2017 and 2018.

Government Unit	2017 PILT Payment[1]	2017 Entitlement Acres[2]	2018 PILT Payment	2018 Entitlement Acres
ALBANY COUNTY	$ 27	10	$0	10
ALLEGANY COUNTY	$ 35	13	$0	13
BROOME COUNTY	$ 7,727	2,905	$7,866	2,905
CATTARAUGUS COUNTY	$ 6,139	2,308	$6,251	2,308
CHAUTAUQUA	$ 0	0	$0	0
CHENANGO COUNTY	$ 3	1	$0	1
COLUMBIA COUNTY	$ 117	44	$119	44
CORTLAND COUNTY	$ 4,437	1,668	$4,517	1,668
DELAWARE COUNTY	$ 1,569	590	$1,597	590
DUTCHESS COUNTY	$ 13,763	5,174	$14,010	5,174
ERIE COUNTY	$ 468	176	$477	176
GREENE COUNTY	$ 593	223	$604	223
LIVINGSTON COUNTY	$ 6,597	2,480	$6,716	2,480
NASSAU COUNTY	$ 253	95	$257	95
ONEIDA COUNTY	$ 43	16	$0	16
ONONDAGA COUNTY	$ 0	0	$0	0
ORANGE COUNTY	$ 7,294	2,742	$7,426	2,742
PUTNAM COUNTY	$ 2,594	975	$2,639	975
RENSSELAER COUNTY	$ 19	7	$0	7
SARATOGA COUNTY	$ 3,849	1,447	$4,379	1,617
SCHUYLER COUNTY	$ 17,140	10,987	$28,331	10,987

Government Unit	2017 PILT Payment[1]	2017 Entitlement Acres[2]	2018 PILT Payment	2018 Entitlement Acres
SENECA COUNTY	$ 7,864	5,276	$13,608	5,276
STEUBEN COUNTY	$ 2,929	1,101	$2,981	1,101
SUFFOLK COUNTY	$ 7,065	2,656	$7,192	2,656
SULLIVAN COUNTY	$ 24	9	$0	9
TIOGA COUNTY	$ 0	0	$0	0
WASHINGTON COUNTY	$ 189	71	$192	71
WESTCHESTER COUNTY	$ 13	5	$0	5
WYOMING COUNTY	$ 3,570	1,342	$3,633	1,342
TOTAL	**$ 141,746**	**60,150**	**$161,076**	**60,321**

[1] Not all towns listed are within the National Forest boundary, however they still receive PILT payments based on the presence of other federal lands within their boundaries.

[2] Entitlement acres are those lands that were not tax exempt (such as owned by state or local government) prior to when the land was conveyed to the United States.

Secure Schools Act

Table A-2 provides the payments to New York by county in fiscal years 2017 and 2018. The Secure Rural Schools (SRS) and Community Self-Determination Act of 2001 (Secure Schools Act) was reauthorized for four years in 2008. This law was promulgated by Congress to restore stability and predictability to the annual payments made to states and counties containing NFS lands for the benefit of schools and roads. Prior to the passage of the Secure Schools Act, these payments were based upon income generated by the USDA Forest Service, typically through timber sales. As this timber sale-related income fluctuated and generally waned, communities that relied on the annual payments for the support of their schools suffered from a lack of funding stability and predictability to the detriment of their educational systems. The Secure Schools Act severs the tie between rural school funding and timber sale income to offer rural school systems continual, level funding.

Table A-2. Secure Rural Schools payments by New York county for fiscal years 2017 and 2018.

County	Fiscal Year 2017		Fiscal Year 2018	
	Payment Amount	Acres	Payment Amount	Acres
Schuyler County	$11,513.15	11,083	$11,500.80	11,083
Seneca County	$6,761.67	5,269	$6,214.67	5,269

Source: https://www.fs.usda.gov/working-with-us/secure-rural-schools/payments

Appendix B: Threatened, Endangered and Sensitive Species (Fauna and Flora)

Table B-1 lists federally listed threatened and endangered wildlife species specific to the Finger Lakes National Forest per the Endangered Species Act during the fiscal years 2017 and 2018 monitoring period. Table B-2 lists the Finger Lakes National Forest 2017 Regional Forester Sensitive Species (fauna and flora).

Table B-1. Wildlife species listed as threatened or endangered under the Endangered Species Act with current or historic occurrence in New York and on National Forest System lands.

Scientific Name	Common Name	ESA Status	Status on FLNF
Canis lupus	Gray wolf	Endangered	Historic only
Lynx canadensis	Canada lynx	Threatened	Historic only
Myotis septentrionalis	Northern long-eared bat	Threatened	Current
Myotis sodalis	Indiana bat	Endangered	Last recorded in 2010

Table B-2. Fauna and flora species listed on the Regional Forester Sensitive Species List specific to Finger Lakes National Forest (scientific name in italics, followed by common name).

MAMMALS	
Myotis leibii	Eastern Small-footed Myotis
Myotis lucifugus	Little Brown Myotis
Perimyotis subflavus	Tri-colored Bat

BIRDS	
Accipiter gentilis	Northern Goshawk
Ammodramus henslowii	Henslow's Sparrow
Ammodramus savannarum	Grasshopper Sparrow
Asio flammeus	Short-eared Owl
Bartramia longicauda	Upland Sandpiper
Circus cyaneus	Northern Harrier
Pooecetes gramineus	Vesper Sparrow
Spizella pallida	Clay-colored Sparrow

INVERTEBRATES - INSECTS	
Anax longipes	Comet Darner
Cordulegaster obliqua	Arrowhead Spiketail
Danaus plexippus	Monarch
Pieris virginiensis	West Virginia White

PLANTS	
Agastache nepetoides	Yellow Giant-hyssop
Agrimonia rostellat	Woodland Agrimony
Allium cernuum	Nodding Onion
Asclepias tuberosa	Butterfly Milkweed
Baptisia tinctoria	Yellow Wild Indigo
Boechera stricta	Drummond's Rockcress
Botrychium oneidense	Bluntlobe Grapefern
Carex frankii	Frank's Sedge

PLANTS	
Crataegus intricata (syn = C. boyntonii)	A Hawthorn
Cryptogramma stelleri	Fragile Rockbrake
Gentiana clausa	Bottle Gentian
Juglans cinerea	Butternut
Lilium canadense	Canada Lily
Morus rubra	Red Mulberry
Phegopteris hexagonoptera	Broad Beechfern
Piptatherum racemosum	Black-fruit Mountain-ricegrass
Shepherdia canadensis	Russet Buffaloberry
Sisyrinchium mucronatum	Michaux's Blue-eyed-grass
Solidago squarrosa	Squarrose Goldenrod
Solidago ulmifolia	Elmleaf Goldenrod
Symphoricarpos albus	Snowberry
Veronicastrum virginicum	Culver's-root
Quercus muehlenbergii	Chinquapin Oak

Table B-3. Monitoring results for species listed on the Regional Forester Sensitive Species list (flora) specific to the Finger Lakes National Forest (species with an asterisk were added to the list in fiscal year 2017). NM = not monitored.

Species (number of populations in parenthesis)	FY 2017 Monitoring Results	FY 2018 Monitoring Results	Trend	Recommended Action
Agastache nepetoides Yellow giant hyssop* (1)	NM	No change noted	Stable	Monitor 2025
Agrimony rostellata Woodland agrimony* (1)	NM	NM	Unable to assess	Monitor 2021
Allium cernuum Nodding onion (1)	NM	NM	Unable to assess	Monitor 2022
Arabis drummondii (=*Boechera stricta*) Drummond rockcress (1)	NM	NM	Unable to assess	Monitor 2022
Asclepias tuberosa Butterfly weed* (1)	NM	No change noted	Stable	Monitor 2021
Baptisia tinctoria Yellow wild-indigo (1)	NM	NM	Unable to assess	Search entire site; if found, mark with GPS
Botrychium oneidense Blunt-lobed grape fern (2)	NM	NM	Unable to assess	Monitor McBride 2021, Blueberry Patch 2022
Carex frankii Frank's sedge* (2)	Very few plants found; not sure if loss due to trampling or management vs. just not visible	NM	Uncertain	Monitor Tunison 2024, Bumpus 2023
Crataegus boyntonii (= *C. intricata*) Copenhagen hawthorn (1)	Stable, but woody NNIP pressing in	NM	Stable	Control NNIP and monitoring 2024
Cryptogramma stelleri Steller's cliffbrake* (1)	NM	NM	Unable to assess	Monitor 2022
Gentiana clausa Bottle gentian (6)	Stable, though part not found; succession, NNIP are threats	NM	Uncertain	2 sites need monitoring 2021, 2 in 2024, the rest sooner if possible; control NNIP as needed
Juglans cinerea Butternut (Many)	NM	NM	Uncertain; suspected loss of individuals due to disease	Monitor individual sites as time permits
Lilium canadense Canada lily (4)	1 population not found; 1 doubled in size; and 1 new population found	NM	Uncertain; small populations are found, then disappear	Monitor Burnt Hill site 2021; search again for lost populations as time permits
Morus rubra Red mulberry (1)	NM	NM	Unable to assess	Monitor 2021

Species (number of populations in parenthesis)	FY 2017 Monitoring Results	FY 2018 Monitoring Results	Trend	Recommended Action
Oryzopsis racemosa (=Piptatherum racemosum) Black-fruited rice grass (1)	NM	NM	Unable to assess	Monitor 2022
Phegopteris hexagonoptera Broad beech fern (3)	NM	NM	Unable to assess	Monitor original site 2021, mark using GPS; monitor others in 2023
Quercus muehlenbergia Chinquapin oak (2)	Site with 1 tree found, stable; NNIP are a concern	NM	Stable	Monitor both sites by 2022
Shepherdia canadensis Canada buffalo berry (1)	NM	NM	Unable to assess	Monitor by 2021
Sisyrinchium mucronatum Sharp-tipped blue-eyed grass (2)	NM	NM	Unable to assess	Monitor 2022
Solidago squarrosa Stout goldenrod (1)	NM	NM	Unable to assess	Monitor 2021
Solidago ulmifolia Elm-leaved goldenrod (1)	NM	NM	Unable to assess	Monitor 2022
Symphoricarpos albus Common snowberry* (1)	NM	NM	Unable to assess	Monitor 2022
Veronicastrum virginicum Culver's Root (1)	NM	NM	Unable to assess	Monitor 2021