



Comments and Recommendations on the Draft Stokes State Forest Management Plan:

Regarding the plan summary:

Appropriate forest management:

Conservation lands in New Jersey are different from public forest lands elsewhere. In the nation's most densely populated state, naturally recovering mature forests and fresh water supplies are precious to millions of people. The overarching question is: Why is forest management by logging at all appropriate stewardship in Stokes State Forest?

State forests in New Jersey should not be logged, and not managed with prescriptions appropriate for timber products management. Yet as proposed, forest management activities will harm natural forest dynamics, disrupt habitat connectivity, damage non-tree communities from amphibians to wildflowers, introduce and expand edges and fragmentation, all major threats to conservation worldwide.

Rationale for proposed management activities:

Specific activities in the draft Management Plan are problematic ecologically, as noted below, and contradict stated goals. The Early Successional Habitat (ESH) Purpose of Management states that the young forest will be transitioned into mature forest. However, this methodology appears to create, counter to Goal 2, a forested ecosystem that is not self-sustaining but is dependent on forestry to create ESH. It is important to acknowledge that ESH already results from natural processes, such as storms, insect outbreaks, fires, and natural gap formation, and that small patches of ESH within mature forest would be sufficient if the forest was allowed to attain old-growth status. If the methodology used in this plan is continued in future plans, a repeated pattern of logging mature forest to create large patches of ESH and then letting them mature will be carried out across Stokes State Forest. The result will be a significant cumulative area of disturbance and reduction of mature forest over time. These long-term intentions and impacts should be acknowledged.

Why is management by tree removal necessary? Those mature forests whose trees gain basal area into the future are depicted as problematic and specifically "overstocked" or overcrowded. Now, it is not surprising that modelled projections of future basal area and canopy coverage predict that both will increase into the future. It is reasonable to reduce crowding to optimize

timber yields, but this is not a path to achieve resilience, biodiversity, or ecological sustainability of the ecosystem.

Appropriate management in Stokes State Forest would focus on controlling invasive species, particularly prevalent in the valleys where they threaten the spring wildflower community, and deer populations, the major reason for low oak reproduction. Management for biodiversity and ecosystem services would not remove mature oaks where oak regeneration is desired, it would not harvest healthy mature hemlocks for any reason; it would not remove native trees. Stokes State Forest is not an overstocked, low-diversity landscape, as the plan implies.

Additionally, the use of herbicides on invasive plant species is mentioned throughout the plan. Stokes State Forest provides drinking water to millions of New Jersey and Pennsylvania residents that rely on the Delaware River; the use of herbicides of any kind would likely put at risk the quality of this pristine water source.

Stated goals of sustaining forest ecosystems and promoting resilience are at odds with many of the proposed management activities. If we want large mature healthy trees, why cut them down? If promoting oak is a primary prescription of the plan, why harvest mature oak trees? If we want a sustainable forest with tree recruitment, why not acknowledge tree reproduction now occurring, through natural processes of disturbance and succession?

Contravened by the plan or not likely to be achieved by planned activities (from Summary Document):

1. Manage forest stands to conserve biological diversity, critical habitats, and the diversity of native species associated with these various habitats.
 - *Concern: Proposed management actions will not achieve this, but will harm biodiversity and disrupt natural forest ecosystems and processes. Biodiversity is important and concerns more than just trees.*
2. Maintain the productive capacity of the landscape of Stokes State Forest to perpetuate self-sustaining forested ecosystems available for future generations.
 - *Concern: Forests in Stokes State Forest are already naturally self-sustaining for future generations, and management is not needed toward this goal. Young tree regeneration is present in most areas now, including shade-tolerant and intolerant species.*
 - *Concern: "Productive capacity" is only an appropriate goal when management is for timber product production. Here in New Jersey this should not be a driving goal on*

natural lands, where stewardship for ecological integrity outweighs any industrial forestry objectives.

3. Improve the distribution of age classes and densities to provide resilience to damage causing agents and ensure forest function in the face of unplanned events.
 - *Concern: Natural forest structure and reproduction is intact and diverse in most areas of Stokes State Forest now. Forests do not need proposed management activities to be resilient and sustainable; in today's landscape, clearing and thinning and removing wood make for less ecological sustainability and resilience.*
 - *"Improve" is not what proposed actions will do from an ecological resilience standpoint.*
 - *In Stokes State Forest, threats to resilience and failure of tree regeneration are posed chiefly by invasive species, particularly in invaded valley stands and in some post-agricultural stands with highly altered soil structure, and by overabundant deer.*

4. Conserve soil and water resources through detailed activity planning to ensure sustained future ecosystem services.
 - *Concern: No specific procedures are provided about how timber harvest and logging activities will protect soil and water. The draft Management Plan poses threats to both resources and to their ecosystem services.*

5. Provide social and economic benefits to surrounding communities to strengthen the constituencies for active management and conservation of the forest
 - *Comment: New Jersey does not have a substantial economic sector of forest management that must be supported at the cost of ecological values.*
 - *Comment: Forest management as proposed will negatively impact recreational values and use – transforming hiking trails to logging roads, and erasing one of the only New Jersey vistas of a broad forested landscape that can be reached by car.*

The goals are virtually identical to the seven criteria of the Montreal Protocol with one noticeable exception: maintenance of forest contribution to global carbon cycles. While that is perhaps understandable under the Christie administration, this is a glaring omission that can and should be addressed under the Murphy administration.

Regarding draft management recommendations:

It is reassuring to read of the “desire to maintain continuity between forest management activities taking place within Stokes State Forest and High Point SP throughout this planning cycle and in the future”, (p. 8) in that it recognizes that long-term coordination across multiple

plans is needed to provide landscape-level continuity. Stokes State Forest protects some of the state's most intact, maturing, contiguous forests. The contiguity of Stokes State Forest with High Point State Park and the Delaware Water Gap NRA magnifies its ecological importance. Within Stokes State Forest, we have seen great natural progress toward forest maturation since state-wide deforestation in the 1800's. Old trees ca. 100 years of age are widespread. Meanwhile a great diversity of forest ecosystems supports a huge range and number of species, not just trees but other taxa.

No management area:

The name "no management area" invites misunderstanding. 389 acres have been designated as "an area where no management will take place for this ten-year planning cycle." This implies that this area may be logged/managed in the future. It appears from the description that this area is really a "natural progression monitoring area" for the duration of the plan. The draft points out that "there is a large percentage of Stokes State Forest that will not be slated for any type of management" under this plan. Which means that the "no management area" is really much larger than 389 acres, but none of these acres have been designated as permanently protected from disturbance or set aside for the development of old-growth. The draft does, however, indicate that such designations might be possible in the future:

The inventory and simulations from this area will provide valuable data that can be used to further calibrate models in order to evaluate portions on the landscape that may be set aside as biological reserves where management options may be intentionally limited and portions and/or features of the forest can be identified that may be maintained in perpetuity. (p. 4)

Is it possible and reasonable to set a target percentage of acreage for biological reserves, or sketch out potential areas or characteristics for this based on the site visits and analysis that has been done in preparing this draft (or will be done for the resulting plan), especially given that the draft relies on the Forest Action Plan, a "landscape-level strategic plan"(p. 3)?

Given the potential impact and long recovery time from logging/active management, it is critical that all potential biological reserves be identified before management begins. As the draft points out, "no management" is a valid management decision/prescription; conversely, active management effectively precludes a potential biological reserve.

Also, the 11 stands designated for no management are predominantly hemlock (5) and maple (3). Only 7 of the 13 forest types at Stokes State Forest are represented. Oaks are not represented, even though they are the predominant type selected for early successional habitat treatment. If the purpose of the no management designation (and monitoring) is "to help showcase and understand forest trends and differences between management prescriptions"

(p. 4), then any forest type targeted for management should have a corresponding no management area.

Wildlife, Plants and Rare Species:

The plan does not consider, but clearly poses, threats to wildlife populations and communities, understory plants (very healthy and diverse assemblages are present,) and rare plants, or other species. Inventories and protection plans are missing. An unacceptably vague boilerplate statement is provided, repeated for each plan section: “This area is valued by rare species” or “Rare species are found in or in the vicinity of this area” and “restrictions will be implemented and care will be taken to minimize any adverse impacts based upon consultation with ENSP and ONLM.” The problem is that adequate surveys for E, T, or SC animals *and plants* have not been done on the vast majority of the landscape, so it is not possible for ENSP and ONLM to make the accurate decisions regarding potential conflicts. The authors of the plan fail to address how they plan on protecting the most sensitive, rare forest interior species that could be irreparably harmed by **any** alternation of habitat, such as Red Shouldered Hawk, Barred Owl and a host of now-state endangered bat and other species. Species status rule proposals have been stalled by the Christie Administration for years, so developers can continue to ignore these species, but they should not be ignored by NJDEP land managers! All current and proposed E, T, and SC species that currently reside with the Stokes State Forest need protection. Baseline inventories, specific site reviews, and protection plans are needed.

Soil and Water:

Discussion of impacts on soil erosion and hydrology are missing, aside from buffers in some locations. Further, have all wetlands and vernal pools been mapped? The specific proposed activities will have major impacts, even following BMPs, and should be weighed carefully against any possible benefits. These ecosystem services argue against harvesting activities.

Early Successional Habitat:

The draft states that Stokes State Forest is relatively even-aged due in large part to deer, pests and disease, and a large amount of abandoned farmland. Presumably deer would continue to be an issue, reducing regeneration and (combined with disturbance) promoting invasive species. What measures will be taken to manage or exclude deer so that ESH management is successful?

The draft states that “to mitigate any invasive species, activity areas will be monitored annually and the site will be treated by spot-spraying of herbicide.” p. 8. Given the value of Stokes State Forest in providing drinking water to thousands of New Jersey residents, mechanical means of removal should be used, and not herbicides that would compromise the quality of the water.

Regarding the “relatively” even-aged characterization, there are no doubt many areas with dominant canopy trees that are much older than the average tree in the forest. We have foresters characterize these old, canopy giants as “residual” trees, presumably based on the fact that they were remnants that survived the last disturbances. These “residual” trees are more like “legacy” trees, driving the maturation of the forests toward uneven-age, old-growth characteristics. Mixed stands with scattered legacy trees should be one of the prime targets for “no management,” where natural processes are allowed to move these habitats into natural old growth condition.

There’s another problem with this early successional forest plan. Most of Stokes State Forest is already early successional forest. The mixed oak forests that cover most of Stokes State Forest are not late successional forests, and our oak species are not shade-tolerant. The wonderful chestnut oak forests in particular have very little shade-tolerant undergrowth. So we have much early to – mid-successional forest already. Creating uneven age within these stands, through girdling and felling to create light gaps and structure, can be accomplished without creating roads and disturbance or removing product. This technique should be favored over product removal, and would meet the goals of the plan with less contradiction.

More information about what is considered appropriate and what is at Stokes State Forest now would be helpful. Ecologists and conservation biologists agree that the “young forest initiatives” advancing in some states are not appropriate to northern New Jersey’s limited amount of truly contiguous forests. Young forest should be created on lands already disturbed, not carved out of our best most intact natural woodlands. Young forests and fields are incredibly widespread across New Jersey, and there is no need for more of the already-widespread blackberry and goldenrod (as stated in the draft plan) to justify harvest in high-quality mature forests. The draft should show the bell curve for Stokes State Forest and not rely on generalizations about New Jersey or the Northern US to inform decisions about Ridge & Valley management. Similarly, the draft states that “through inventory efforts young forests were found to be under-represented currently on the landscape.” (p. 7). Is this specific to Stokes State Forest, or across New Jersey? The rationale for this management activity is problematic. The idea that “early successional young forests are under-represented” is important to evaluate carefully. A prevalence at Stokes State Forest of old trees does not represent a problem but a good and rare thing for our region.

The draft states that age-class distribution combined with “a growing issue regarding the lack of variety in species composition, forest issues associated with age-class distribution can be expected to perpetuate themselves without management intervention.” However, the draft shows there are 13 forest types in a 389-acre area: an amazing level of diversity, indicating that

this growing issue is nonetheless small in scale. The “growing issue” is the expected decline in oaks (which currently is the largest group by area in the Northeast US [Shifley Moser 2016]) and an increase in maple-beech-birch as the canopy closes up. To avoid this, the draft proposes to essentially clearcut oak stands (which “have a more disturbance-oriented origin” [Shifley Moser 2016]) to regenerate them. No justification is given for this goal or approach. As mentioned earlier, the draft does not address how oak stands can become self-sustaining (goal 2) without regular management, given the assumptions presented.

As the draft states, “young oaks are expected to benefit more from the harvest activity” (p. 7). Of the 6 stands targeted for this treatment, 5 are oak or oak hickory and only one is maple forest type. However, for this Red Maple Upland stand, “current species composition is mainly oak species (mostly chestnut oak)” (p. 11) So the ESH created will be oak. The age class diversity created will be for oaks. The stated goal “to promote early successional habitat and promote greater age class diversity” (p. 7) should be modified to specify the focus on oak and oak-hickory, or the proposed treatments should be modified to address other forest types. Similarly, the treatment type might be renamed to “Early Successional Oak Habitat.”

Stokes State Forest itself includes yet younger forests from clear-cutting in the 1980’s, and where Hurricane Irene (not Sandy) cleared large areas, particularly pine plantations. As trees naturally die or blow down, new trees take their place. Meanwhile, advance regeneration is quite widespread in Stokes State Forest, in patterns that vary among the great diversity of forest types. The forest is not declining, unhealthy, or unsustainable. The maturing forests here and their contiguity with minimal edges are incredibly valuable preserves.

Specific Observations on Early Successional Habitats:

- ESH-01: Stony Brook is a C1 stream. A 300 foot buffer should be maintained at all times for Stony Brook Tributary.

- There will be significant edge effect due to “irregularly-shaped harvest blocks and pockets of uncut forest [that]will allow for more forest edge to be within each activity area, and the distance to an intact forested edge will be limited to <300 feet.” The draft should address the edge effect.

- All trees less than 13” DBH will be removed, including oaks. This is extreme deforestation, and surprising given the management plan’s clear preference for oaks above all. Why, if there is a genuine goal of biodiversity, remove so much canopy diversity?

- The expectation of dense young forest after management actions is unrealistic, in my experience. Instead, expect extensive shrub growth and invasive species. Control will be costly and difficult to achieve without repeated herbicide use. This should be anticipated in budgets, and the environmental impact analysis including its affect on water. Also in my experience, expect little tree regeneration without deer protection - specifically, do not expect oaks, which to reiterate seem to be the goal of much of this management plan. Logging in the 1980s created clearings but nearly all was colonized by thickets of birch, and much management work was done to establish oaks instead, but to no avail. Oaks have not in the past 40 years taken over clear-cuts or openings. Note that some oak seedlings can be found, albeit sparsely, in some areas of Stokes State Forest. Clearing will not increase oak reproduction under current conditions. There is quite a lot of scientific research on this issue, which should be consulted.
- Note that the management plan is incorrect when it states that oaks are less shade-tolerant than birches. Our oak species are intermediate in tolerance (see U.S. Forest Service, Age Handbook, Silvics of North America).

Un-even Aged Management:

It is not clear why “no management” is not sufficient here. Let it develop naturally, especially given the possible presence of cultural artefacts and the need to create temporary landings, roads, and skid trails (RMO-03 RMO-04).

Eastern Hemlock Restoration:

Hemlock in New Jersey has sustained very heavy mortality, and there is **no justification** for removing more living mature hemlock trees, as proposed. Surviving hemlocks should remain untouched. Hemlock does reproduce in very heavy shade beneath its own canopy, so planting seedlings does not make a lot of sense, nor does removal of potential seed sources. The very slight reduction in canopy cover and plans for a deer fence are reassuring signs of the care put into this proposal. The deer fence will need to be checked and repaired regularly.

It is not clear what the long-term goal(s) of this restoration are. Maintaining ecosystem services via hemlock saplings? Propagation of hemlocks that have shown higher levels of resistance to the Hemlock Woolly Adelgid (HWA)? Release of surviving hemlocks? Creating a population of young hemlocks that will likely succumb after seeding the next generation?

Where hemlock forests have been decimated by the HWA, this would be wasted effort. Any replanting should happen only when and where the insect populations are under control, or

seedlings will certainly succumb. Are biological control efforts underway or planned on-site beforehand?

If and when HWA is under control, seedlings could be planted. However, this should *not* be accompanied by harvesting canopy trees of any species. This is because (a) hemlock seedlings are extremely shade-tolerant and will be more successful competitors in the shade than in openings, and (b) Stokes State Forest hemlock stands are nearly all in steep and/or streamside valleys, where timber removal would be very damaging.

Given that hemlocks are found near waterways or in wetlands, the likely presence of rare species, and the NHPS, could the treatment be done by hand, with a preference for girdling, with any cut vegetation left on-site? Regarding spot-treating invasives and competing vegetation, could they be removed by hand where minimal disturbance is possible, otherwise treated using cut-stem rather than foliar application?

Specific observations concerning Eastern Hemlock Restoration:

- The plan is inaccurate in stating the hemlock was historically a dominant forest type in New Jersey.
- Big Flat Brook is a C1 stream that should have a 300 ft. buffer.

Forest Stand Improvement:

When the goals are to protect ecosystem sustainability and biodiversity, as per the Plan, there is no good rationale for reducing native tree densities. Although FSI makes sense for harvest-oriented management, it does not improve ecosystem health in the broad sense. For example, ecosystems are stronger when snags and coarse woody debris remain on site, when edges are minimized, and when canopy openings are not accompanied by mechanical harvest activity.

To remove the forest canopy from 75-76% to 48-49% is not acceptable in areas where interior forest species reside. It does not make ecological sense to clear so much forest, including maturing acorn-producing trees, to get oak regeneration, when the natural understory is well developed and diverse, rich in native forbs, shrubs, and tree regeneration. We fear much destruction with little success. Moreover, a concerted effort to achieve oak regeneration would require a close examination of the ecological literature and consideration of herbivores and other bottlenecks, not just light. What will be done to protect clearings from deer?

Baseline inventories need to be done in all proposed treatment areas prior to performing any forest management techniques to limit any harm to currently residing E, T, and SC

species. New Jersey taxpayers pay to preserve our public open spaces, therefore EIA studies need to be done prior to any implementation to ensure that these natural areas are held to the highest standards.

We don't understand the pro-oak, anti-maple, anti-birch philosophy, which pervades the plan's narrative (although much oak removal is planned). Why is it bad for birch and red maple to have a "foot-hold"? Each native species provides its own set of habitat to invertebrates, especially caterpillars, and the entire food web. Denigrating tree species with low wood product value is an archaic approach on an important public treasure like Stokes State Forest.

Specific observations on Forest Stand Improvement:

- Again please note that the premise that birch is more shade-tolerant than oak is incorrect.
- Forestry activity in some FSI locations will harm recreational values by using hiking trails to access stands, and by logging directly along hiking trails and scenic state forest roads. We worry about impairing the many vistas from trails and major roadways, and the vista from Sunrise Mountain, which is unparalleled.
- In addition to the already created Geology "Ice-Age" Trail, there are numerous undeveloped opportunities for natural history education in Stokes State Forest. We should be considering not only the existing trails, natural areas, vistas, and other important areas for biodiversity or education, but also protect the future potential for the creation of unique visitor opportunities before assigning an area to a "stand to be managed via timber removal."

Success of Oak Regeneration:

We have not seen evidence that this management proposed to regenerate oaks will have the effects that are claimed. We have visited many forestry project sites conducted during the 1980s and 1990s, on various field trips having to do with Berkshire Valley and other locations. Oaks have not regenerated well in these areas. Most areas are dominated by birch and other more weedy species, and the few oak sprouts and seedlings were outcompeted after a decade or so. Even worse, the herb layer has been seriously impacted with invasive species on many of these sites. The only sites where this management might produce young oak forest are the most vulnerable areas such as steep slopes because deer use is constrained, but in these places rare herbaceous species often persist. We also have seen oak sapling success within exclosures, and actual treatment area should be fenced after being manipulated. We ask that the state provide an inventory of sites where successful oak regeneration has resulted and been

sustained for 20 years or so under competition and herbivory, so that we can gain confidence in these proposals.

Red Pine Plantation Management & Oak Regeneration

The red pine plantations of NW New Jersey are not natural forest ecosystems but CC plantings, with trees closely spaced in straight rows. Management to perpetuate these even-aged plantations is ecologically inappropriate. Following the downing of numerous trees due to Hurricane Irene these plantations could recover and be restored naturally, or with help, to native forest conditions. Contrary to the management plan, these plantations in Stokes State Forest (like most monoculture plantations) support almost no undergrowth, wildlife habitat, or native diversity, except for an occasional winter finch flock. Knowing these sites, thinning from below could not possibly create old growth conditions nor would row thinning create structural heterogeneity. Proposed management could increase timber growth rates for future harvest, while doing nothing for wildlife or biodiversity. Hopes for red pine regeneration seem misplaced and would not be realized without fire and deer protection. These would be good locations for oak plantings, after tree removal or thinning, if the soil hasn't been too acidified by conifer litter.

It is a false notion to think that oaks do not grow in the shade. Many of our New Jersey oak trees in the NW part of the state have been doing so for the last 40 years. To promote a Shelterwood treatment and removal from 76 % to 55% is only a 6% difference from the Modified Seed Tree treatment and is too aggressive (p17, ORR-01).

It's also worth noting that Stokes State Forest plantations of pine and non-native Norway spruce were heavily hit by recent hurricanes while adjacent natural hardwood forests were resilient.

Wildfire Mitigation:

This could be effective and valuable for protecting property, although such understory clearance is harmful ecologically. One correction: Removing "ladder fuels" of understory beech and oak will increase light on the forest floor, not decrease it, and promote invasive species. Thus contrary to the plan, on-going management will be needed to keep the understory clear. However, we would support experimentation with fire management as a tool to promote native species regeneration.

How are rare plants protected from prescribed burns? For Stokes State Forest SRR-01, the draft says "due to rare species within/adjacent to this burn block, no burning will occur between

November 15th and March 15th.” (p. 27) Is this meant to say the opposite, that burns would be done in winter to avoid harm to rare plants? This warrants further clarification from ONLM.

Further, we would recommend communicating with Kittatinny Lake WUI residents well in advance, for both input and notice of activity, preferably via US mail. This is not always done well and deserves proper attention so that residents are not unduly alarmed and residents with respiratory disorders can take precautions.

Conclusion:

Finally, we want to express our appreciation for the opportunity to contribute to this process, and to offer our assistance and expertise where appropriate in developing a sustainable plan for Stokes State Forest that will endure. We also welcome any possibility to work more closely on this plan given its inherent importance to northern New Jersey.

Citations:

Shifley, Stephen R.; Moser, W. Keith, eds. 2016. Future Forests of the Northern United States. Gen. Tech. Rep. NRS-151. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 388 p.

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