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Forest Ecosystem Restoration

Verification

Report for:

Sewanee - University of the South

in

Tennessee, USA

Report Finalized:	November 9, 2021
Audit Dates:	May 10-11, 2021
Audit Team:	Richard Z. Donovan, Auditor
	Technical Review: Mateo Cariño Fraisse
Verification issue/expiry:	24.01.2022
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TABLE of CONTENTS

INTRODUCTION

This report presents the findings of an independent verification audit conducted by a forest auditor representing Preferred by Nature. The auditor had technical support from Preferred by Nature staff in Spain and the US (Vermont).

The purpose of the audit was to evaluate the ecological, economic, and social performance of Sewanee-University of the South's (referred to as "Sewanee" hereafter) restoration initiative using Forest Ecosystem Restoration Standard Version 1.0 by Preferred by Nature.

The Sewanee restoration efforts are part of a larger forest management context covering 11,838 acres (4,790.6 ha) of forest and other natural areas managed by Nathan ("Nate") Wilson, the designated Restoration Manager (RM) for this restoration effort. Nate's formal title is Domain Manager, as the Sewanee Forest is named "the Domain".

Dispute resolution: If Preferred by Nature clients encounter organisations or individuals having concerns or comments about Preferred by Nature and our services, these parties are strongly encouraged to contact relevant Preferred by Nature regional office (in this case Richmond, Vermont and the contact person is Kara Wires – kwires@preferredbynature.org). Formal complaints and concerns should be sent in writing.

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1 AUDIT CONCLUSIONS

1.1 Audit Recommendation and verification decision

Based on Organisation's conformance with cerification requirements, the following recommendation is made:	
☒	Verification approved: Upon acceptance of NCR(s) issued below
☐	Verification not approved:

1.2 Non-conformity Reports (NCRs)

☒ Check if no NCR(s) have been issued

1.3 Observations

Note: Observations are issued for the early stages of a problem which does not of itself constitute a non-conformance, but which the auditor considers may lead to a future non-conformance if not addressed by the organization; observations may lead to direct non-conformances if not addressed.

☐ No observations

OBS: 01/21	**Standard & Requirement:**	Forest Ecosystem Restoration Standard 1.0, Indicator 4.1
	Report Section	Indicator 4.1, Monitoring
Description of findings leading to observation:	Though monitoring is ongoing, on daily and annual basis to examine progress on restoration and all other forest management activities. It will be important to see specific written monitoring reports on restoration activities, with reference to performance on a site-by-site basis and using the site-specific shapefile reports that were provided as part of the class project by Molly Morgan (reference 10), and additional information in a scientific publication by Dr. Kenneth Smith, et. al. (reference 9). This should also be useful for responding to some stakeholder concerns.	
Observation:	The RM should produce specific written monitoring reports on restoration activities, with reference to performance on a site-by-site basis and perhaps site-specific shapefile reports that can be used for on-site and remote monitoring and to respond to stakeholder concerns.	

1.4 Stakeholder consultation

Sewanee's Domain Forest area is already FSC-certified (NC-FM/COC-000238) since November 14, 2014, as part of a group FM certification managed by The Nature Conservancy). As such, this verification focused on the technical implementation of restoration on the forest, using Version 1.0 of the Preferred by Nature Forest Ecosystem Restoration Standard. Stakeholder outreach during this audit consisted of interviews with one concerned stakeholder and with other Sewanee Forest and forestry-related staff. Given that the forest is continually under FSC certification and there have been no outstanding stakeholder issues to date, the auditor did no broader public stakeholder outreach. No public meetings were held.

The table below summarizes the issues identified by the assessment team with a brief discussion of each based upon specific interview and/or public meeting comments.

Principle/Subject Area	Stakeholder comment	Preferred by Nature response
1: Planning	Per implementation comments below, there is concern on the part of one scientist stakeholder that the restoration approach is too intrusive per both planning and implementation.	See comments on implementation and monitoring below. More specificity on restoration monitoring, with transparency, may address some of the stakeholder's concerns.
2: Tenure & Security	n/a	n/a
3: Implementation	Concerned that Sewanee management is both unnecessarily and too intrusive in terms of establishing shortleaf pine and oak species on the forest, i.e., harvesting, prescribed burns and soil disturbance are too intensive. Also concern that some management activities are negatively affecting water resources, including ephemeral water resources (e.g., vernal pools).	Field audits indicated that Sewanee does implement aggressive actions (prescribed burns, soil disturbance, etc.) to create better conditions for the regeneration of shortleaf pine and multiple oak species. In practice these actions favor their target species and disfavor others. That said restoration activities affect only a very small percentage of the overall Domain forest (less than 3%). Also, though initially there might be small blocks (typically less than a couple acres) of monocultural shortleaf pine areas, the intent is not to maintain them as monocultures but to let them regenerate as multi-species stands. Hardwood regeneration (many species) is prolific throughout the forest and the expectations of multi-species stands seem realistic.
4: Monitoring and Reporting	There is concern that annual monitoring of forest management interventions is not rigorous or transparent.	Though monitoring and reporting meets FSC requirements (per existing FSC certification status), it would be useful for Sewanee to produce periodic reports on the progress of restoration efforts for both on-site and remote or virtual monitoring. See OBS 01/21.

1.5 Actions taken by Organisation Prior to Report Finalization

N/A

2 AUDIT PROCESS

2.1 Certification Standard Used

Standards Used (including version):	Version 1.0 of the Preferred by Nature Forest Ecosystem Restoration (FER) Standard.

2.2 Audit Team and accompanying persons

Name	Role and qualifications
Richard Zell Donovan	Field forest auditor for this audit with over approximately 30 years of experience in forest management certification in tropical, temperate, and boreal countries. From 1975-1987 Richard was natural resources management specialist with the Peace Corps in Paraguay, on various research projects through Antioch New England Graduate school, a professional tree feller, and a forest and conservation management staff person with ARD, Inc. in Burlington, Vermont. From 1987-1991 Richard led a field forest management and conservation project in Costa Rica conducting tree planting and assisted natural regeneration in tropical forest, and prior to that was a natural resources consultant focused on community forestry, forestry project evaluations, watershed management and rural environmental management. Starting in 1990, Richard helped coordinate the founding of the FSC and in 1992 began a 27-year career as chief of forestry at Rainforest Alliance, developing FSC standards for forest management, separate logger certification standards, and implementing forest audits in many countries. He is also a co-writer of the Preferred by Nature Forest Ecosystem Restoration (FER) standard. The auditor has an MSc in natural resources management and administration with a focus on community forestry and hydrology. The auditor is based in Jericho, Vermont, USA. Field experience includes over 50 countries in tropical, temperate, and boreal forest biomes.
Mateo Cariño Fraisse	Technical reviewer of this draft report and Landscape specialist and forester at Preferred by Nature. Co-author of the FER standard and project manager for restoration standard field tests in multiple locations around the globe in temperate and tropical forests (so far, tests in boreal forest may happen in the future). Experienced forest auditor in temperate and tropical forests for both plantations and natural forests, primarily in the FSC system.

2.3 Audit Overview

Site(s)	Date(s)	Main activities	Auditor
Sewanee University	May 10	Openning meeting, examination of documents, office visit, & discussions with University staff	Richard Zell Donovan
Sewanee University Forest	May 10-11	Field visits and interviews	Richard Zell Donovan
Sewanee University	May 11	Closing meeting	Richard Zell Donovan
Total number of person days used: 4 days by one auditor, including 1 day spent in preparation, 2 days on site and 1 day for post site visit follow-up.			

Description of Overall Audit Process

The audit was organized with forester and Restoration Manager or RM (per terminology in this verification standard) Nathan Wilson and consisted of office discussions, review of available documentation and field visits to virtually all the restoration sites. The Sewanee Forest has been most recently FSC-certified since 2018 under a TNC Group FM, with no major issues. The auditor did interact with one stakeholder on the overall management and restoration approach being taken on the forest. In addition to restoration site visits, the auditor was also able to see water resources (ponds, ephemeral streams, vernal pools) which are a part of the forest and an important source of water supply for resource management (water for fire control) and wildlife habitat. The auditor interacted with 2 other Sewanee staff who supervise and/or are involved in day-to-day management or research activities on the forest, an additional university scientist, and approximately 20 students during a 1-hour class given by the auditor on the topic of forest management certification and restoration.

The sites visited included areas where plantings of shortleaf pine are occurring, prescribed burn sites, tree harvesting sites, and areas under strict protection (including nature trails), plus forest roads and other trails that are used for hiking and mountain biking. All restoration sites were visited.

The forest is in and around the town of Sewanee, Tennessee.

2.3.1 List of FMUs selected for evaluation

FMU Name	Rationale for Selection
"The Domain" at the Sewanee - University of the South	The university accepted being the site of a field test for the Preferred by Nature draft 1.0 Forest Ecosystem Restoration standard. The university is implementing restoration on parts of its forest, primarily to restore mixed oak/shortleaf pine woodlands.

2.3.2 List of management aspects reviewed by assessment team

Type of site	Sites visited	Type of site	Sites visited
Road construction	4	Illegal settlement	
Soil drainage	3	Bridges/stream crossing	5
Workshop		Chemical storage	
Tree nursery		Wetland	2
Planned Harvest site		Steep slope/erosion	
Ongoing Harvest site		Riparian zone	3
Completed logging	3	Planting	2
Soil scarification	2	Direct seeding	
Planting site	3	Weed control	
Felling by harvester		Natural regeneration	6
Felling by forest worker		Endangered species	
Skidding/Forwarding		Wildlife management	
Clearfelling/Clearcut		Nature Reserve	2
Shelterwood management		Key Biotope	1
Selective felling	4	Special management area	3
Sanitation cutting		Historical site	1
Pre-commercial thinning		Recreational site	2
Commercial thinning		Buffer zone for water bodies	multiple
Prescribed burns	2	Local community	
Logging camp		Mountain bike trails	multiple

3 Organization DETAILS

3.1 Organization specific background information

Ownership and land tenure description (legal and customary)
Sewanee is the fee-simple owner (land title) of the 10,880 acres of the Sewanee Forest.
Legislative and government regulatory context
Forest management in Tennessee is under the purview of the Tennessee Wildlife Resource Agency and the state Division of Forestry, which is under the Tennessee Department of Agriculture. The Division of Forestry also supervises fire management, and Sewanee coordinates with them on the use of prescribed fire, and all other forest management activities (timber and non-timber forest products harvesting, biological protection, etc.).
Environmental Context
The Sewanee Forest is located at the western edge of the Cumberland Plateau. The forest and surrounding ecosystems have unique resources, as identified through the HCV assessment that has been completed and considered during FSC forest certification activities. The college has identified 4 types of to HCV forest – in Categories 1, 3, 4 and 6. HCVF 3 is 835.2 acres including South-Central Interior Mesophytic Forest, Southern Ridge and Valley/Cumberland Dry Calcareous Forest. HCVF 4 is 319.4 acres including South-Central Interior Small Stream and Riparian/Cumberland Acidic Cliff and Rockhouse features. The "rock house" overhanging structures also have cultural heritage value based on indigenous history. HCVF 1 is 180.6 acres and are designated because of poplulations of Morefield's Leather-Flower (*Clematis morefieldii*), the presence of karst habitat, and associated rare species. HCVF 6 is 34.4 acres and consists of the "Big Spring" portion of compartment 12 protected because of its unique character and unique assemblage of mature upland and mesic plateau forest.
Socioeconomic Context

There are well-documented multiple land uses in the region, including timber harvesting, mining, hunting, historic indigenous presence and relics, and indigenous and non-indigenous historic settlements. Sewanee is a college town, but also hosts a secondary preparatory school that is located adjacent to parts of the Sewanee Domain. Per discussions with the RM, Sewanee management attempts to consistently be sensitive to the concerns of adjacent and nearby landowners.

3.2 General overview of the organization and scope

As previously described, the Sewanee Forest is owned directly by the university. The forest is private titled land. Though the "Domain" is approximately 13,000 acres the area under formal forest management (for multiple values) is 11,880 acres. Management of the Domain by the RM is under the direct supervision of Amy Turner, Sewanee Director of Environmental Stewardship and Sustainability, who participated in interviews during the audit. Ms. Turner also signed off on the 2019 Management Plan.

The forest is considered a single forest management unit (FMU), covered under one management plan. As mentioned elsewhere, there 53 forest compartments and 7 on which restoration is actively being pursued.

Activities on the forest include recreation (hiking, hunting, animal watching, mountain biking), education (theoretical and practical), timber management, and non-timber forest products harvesting, scientific research, biological inventories and monitoring, and forest management technique testing.

After the University was formed in 1857, and during the first forty years of the University's history, the management of the Domain was largely a matter of unmanaged use and exploitation (Burckle and Smith 2003). Timber harvesting, livestock grazing, coal mining, quarrying, woods burning, and other activities went largely unregulated and uncontrolled. Beginning in 1897, Vice Chancellor Lawton Wiggins recognized the need for management of the timber resource and began correspondence with Gifford Pinchot. The first management plan for the original Domain Forest was produced in 1898 by Dr. Carl Schenk, in coordination with Mr. Pinchot. Schenk was a German forester and managed the historically significant Biltmore Forest School in North Carolina. Pinchot was an American forestry pioneer and first head of the U.S. Forest Service.

Since then, multiple plans have been produced, with the latest dated 2019 (and applicable to the period from 2019 to 2029) – publicly available on the Sewanee website.

Sewanee's overall land area is called "the Domain" and includes area devoted to academic resources (382 acres), commercial and residential areas (783 acres) that are embedded within and surrounded by diverse natural lands (an additional 11,838 acres), located at the southern end of the Cumberland Plateau which extends down through Kentucky into Tennessee and Alabama. The term "Greater Domain" is used to describe both for the entire 13,036 acres and typically "the Domain" refers to the 11,800-acre natural land matrix where forestry and conservation dominate. Within the 11,800-acre natural land matrix there 6 larger scale "conservation areas" that encompass 53 compartments. Prescribed fire is to occur over the next 5 years (2019-2024) in 16 compartments (an average of 100 acres per year), recreational system upgrades in 6 compartments and exotic species control in 4 compartments, all over the same 5-year time. Seven compartments are devoted at least in part to restoration activities that were the subject of this verification audit. The auditor visited all 7 restoration sites with the RM.

The entire forest area is already certified under the Forest Stewardship Council (FSC) system (since 2018), as part of a "group" forest management (FM) certificate managed by TNC. Due

to its size, as part of the group FM, the Sewanee Forest is already subject to annual FM auditing by Preferred by Nature, per FSC requirements.

The 2019 management plan is comprehensive and mirrors values that the FSC system has promoted. The overall thrust of the management plan is to promote more complex forest structure, age classes and species diversity. Multiple use is a guiding principle, including biodiversity conservation, recreation, timber harvesting and watershed protection. Per the 2019 management plan (page 65), specific to timber harvesting, Sewanee's states that "Income generated timber harvesting has historically been an important objective of the University…. This income was utilized to develop and maintain infrastructure including fire lanes, lakes, dams, and other recreational facilities. Historical timber harvests were also utilized as sources of income to fund construction projects and to provide funding sources for the general revenue (Burckle and Smith 2003). Current timber harvesting is undertaken for ecological and habitat management considerations within an income generating context, but never an expectation of achieving net profits in recent years to defray costs."

In general, the Sewanee restoration efforts focus on both restoration of mixed shortleaf pine and oak (various species, including Chestnut oak) woodlands within the forest complex. For some parts of the forest resource, Sewanee will some areas from "oak-pine" to "pine-oak", indicating a priority on re-establishing more presence of shortleaf pine in the pine-oak savannah woodlands. Through prescribed burns and tree planting, shortleaf pine is to gain increased presence, and this will result in reducing areas that, through past human land use, had moved to white pine or other species. Sewanee is using a combination of tree plantations using native species (in small blocks typically not more than 3-4 acres), prescribed burning, enrichment planting with oak and pine species, associated thinning or release activities, invasives control, and hunting to foster the propagation and growth of desired species.

Sewanee places a high importance on using the forest as an education resource for students at the college and others in the local community about forest dynamics, wildlife and biodiversity, land use and forest history, sustainable use of forest products, and forest practices in general. The Domain is also famous regionally as a site for recreation, including well-mapped and -identified mountain-bike and hiking trails. During the weekends it is subjected to relatively heavy recreational use. The forest is also a source of water supply for the university and the town, with two manmade lakes – O'Donnell and Jackson – providing that supply. Thus, watershed protection is important. There are approximately 17 ponds, lakes, reservoirs, and numerous wetlands on the forest. Sewanee also has relatively strict guidelines for "special management zones" (SMZs) that include, for example, 60 meter no harvest buffers on perennial streams, reservoirs and recognized emphemeral ponds (SMZ requirements that exceed FSC standards for the region).

The university also allows deer hunting each Fall (typically starting late September) on specific parts of the forest, in a controlled manner. The annual organized "hunt" started in 2000 to control the deer population. Domain managers were concerned were increased deer population was beginning to negatively affect the composition and quality of the forest through herbivory. During the last 20 years, approximately 2,000 deer have been safely harvested in and around central campus. According to the university, the population of deer in Sewanee peaked in 2010 at 145 deer per square mile, approximately six times the herd density recommended by the Tennessee Wildlife Resources Agency. At the time, the ratio of does to bucks was more than 9 to 1 – a relatively high annual reproductive rate. This ratio is the metric Sewanee uses to track most closely to ensure that our population remains in check. In 2020, Sewanee data indicates that the doe to buck ratio is 4 to 1 in hunted areas but remains greater than 10 to 1 in areas that are not hunted. The long-term goal is to reduce the doe to buck ration to 1 to 1. Hunting is aligned with the regulations of the Tennessee Wildlife Resource Agency, though Sewanee rules and targets on doe to buck ratios and other hunting requirements are typically more stringent. All hunters (who can be Sewanee students

or from the local community) must complete the https://www.bowhunter-ed.com/tennessee/ course run by the state.

Sewanee provides open access to key Domain and forest management documents at https://new.sewanee.edu/offices/university-offices/environmental-stewardship-sustainability/the-domain/ecosystem-management/.

In 2018, Sewanee entered a partnership with TNC for collaboration on management of the forest and FSC certification. The partners expect that, over the period from 2019-2029 most of the Domain's forests will remain intact and undisturbed. In some areas, forest management will take place, including prescribed burning and restoration of shortleaf pine habitat to benefit some wildlife species. In addition to the TNC collaboration, Sewanee has enjoyed collaboration with the Forest Stewards Guild on management planning and implementation, and Sewanee staff are active members of the Guild (Sewanee ecologist Ken Smith is currently on the Guild Board of Directors).