High Conservation Value Forests 3.3

Rare, Threatened or Endangered Ecosystem

Management & Monitoring Framework

Introduction

According to the Forest Stewardship Council's High Conservation Value Forest Assessment Framework, High Conservation Value Forests can be selected for a variety of "values" that merit additional protection and management. High Conservation Value Forests in category 3 are described as "Forest areas that are in or contain rare, threatened or endangered ecosystems."

After reviewing the FSC framework document, the PA Bureau of Forestry interpreted the guiding questions provided and developed three types of High Conservation Value Forests (HCVFs) that fit into the Category 3 Framework:

HCVF 3.1:
HCVF 3.2:
HCVF 3.3: Rare, threatened, or endangered ecosystems consisting of plant communities ranked as critically imperiled (S1) or imperiled (S2) in Pennsylvania.

This document outlines the framework for developing management plans and drafting monitoring protocols for HCVF 3.3 Areas on state forest lands.

Nineteen locations on State Forest lands were selected for this category of High Conservation Value Forest across the state forest system. These HCVF areas contain nine plant communities classified as S1 or S2:

- Pitch pine – rhodora – scrub oak woodland (S1)
- Black spruce – tamarack palustrine woodland (S2)
- Pitch pine – leatherleaf palustrine woodland (S2)
- Low heath shrubland (S1)
- Freshwater intertidal mudflat (S1)
- Riverside ice scour community (S1S2)
- Robust emergent marsh (S2)
- Red maple – magnolia coastal plain palustrine forest (S1)
- Serpentine pitch pine – oak forest (S1)

The Bureau of Forestry will prepare management and monitoring plans using this framework for these sites to ensure that the values for which they were chosen are maintained or enhanced.

Preparing a Management Plan

The structure and content of management plans for HCVF 3.3 will be somewhat dependant on the specific the plant communities for which the area was designated. However, a basic framework has been created to guide the development of management plans and maintain

consistency among areas across state forestland. In some cases, management plans may be vague until further data is collected. Other areas where more information on the species/communities of interest is known and management objectives are clear, the management plans may be more detailed specifications for management.

Describing the Site and the Plant Community

Currently, there are many sources of information rare plant communities in PA, such as county natural area inventory reports, district landscape exams or forest stand information, and PNDI information on the communities of interest. Field views will also provide valuable information on the feasibility of management activities, current uses of the sites, and threats or disturbances.

General description: When possible and relevant, management plans should include the following area description information:

- Size of area in acres.
- Vegetation communities and species of concern present (include heritage State/Global ranks), including acreage of various vegetation types/communities.
- General site and ecological conditions. Also, what makes this site unique for designation as a HCVF 3.3 Area.
- Note if the site is part of a larger designation on state forestland, such as a wild or natural area, gas lease tract, or other HVCF Areas.
- Any site specific information on the plant community or species of concern (including previous biotics records and data from latest field view).
- Areas colonized by invasive species.

Plant Community: Details that should be included in this section will depend on the amount of information available regarding the plant community and its associated ecology. Also in this section, include information on plant species of concern and their life history that may occur in the site. Relevant information includes:

- Description of the plant community, including associated species, structure, and distribution in the state.
- Important natural disturbances to maintain the site as well as disturbances that may be detrimental.
- Variations in this plant community and which one the HCVF 3.3 Area would fit into.

Land Use History: Details regarding land use history will vary by site. Relevant information to consider includes:

- Any indication of site being created or influenced by human disturbance (e.g. bogs that have been created through the rising of the water table following harvest).
- Surrounding area uses, such as timber management, gas development, or recreation activities.

- Other uses of site that may or may not influence the site, such as high recreation use.

Threats and disturbances: This section should include a description of current threats and disturbances to the natural community or site integrity (e.g. invasive species expansion could be a threat). Foreseeable threats and associated potential impacts based on surrounding land use.

Management Objectives

Management objectives are important to clearly outline the conditions that any management plan attempts to achieve. They provide the basis for activities and also the basis for future evaluation of the projects' effectiveness. The development of management objectives should reflect current conditions in the HCVF 3.3 Area, a good understanding of the needs for maintenance or improvement of the natural community, and consideration of any potential conflicts of management activities on species of concern or more common species within the site. In some cases, a justification may be given for activities that improve the conditions of the natural community, but could diminish habitat conditions for particular species.

Management objectives may need to be broken down by species or habitat type and should consider:

- Quantitative objectives for habitat conditions as much as possible to measure success.
- Specific structural elements of the plant community and natural disturbance regimes necessary to maintain/improve conditions. Practices to emulate or restore natural disturbance regimes.
- Presence of invasive species or other threats.
- Threats that may presently be in check but could arise due to site sensitivities (e.g. deer pressure).
- Other resources or management objectives of the site that may fit into larger landscape management (prioritization of management objectives may be necessary).
- Emulation or restoration of natural disturbance regimes, when appropriate and feasible.

Management Recommendations

Based on objectives, management recommendations can be developed to improve, maintain, or restore conditions on the site. Often there may be more than one way to satisfy an objective, and alternative activities may be considered and prioritized. The objectives should guide management activities if conflicts arise between species with differing habitat needs, but priority should be given to the resources for which the HCVF was designated. Management recommendations should provide some specifications to help with implementation, but also be flexible to allow for adaptive management.

The management recommendations should include prescriptions and management activities necessary for site maintenance, improvement, or restoration at present. The following information should be included:

- Specifications of activities and how plant community will be treated or created.
- Prioritization of management options.
- Feasibility of various treatment types and who will carry out efforts.
- The ‘wish list’ of management recommendations, understanding that they may not be practical or possible for the district or BOF to carry out.
- If there are conflicting management objectives for species of special concern on the site or desired management cannot be employed (e.g. prescribed fire conditions are not met within a burn window), use objectives or prioritization to determine best course of action.
- Other management that may be allowed (timber harvesting, recreation, herbicides etc) and what limitations may be put on these activities.

Mapping

For internal use only an appropriate, a to scale map shall be provided for each HCVF 3.3 Area indicating boundaries of plant communities, species of concern within or near the site, and other important ecological features. Management recommendations shall be identified and included on the map to be maintained and updated along with the management plan.

Updates

Updates shall be made to the management plan as management activities are carried out, field visits reveal additional information, or monitoring results indicate a need to change the course of action.

Updates should be relevant to the management objectives and include:

- Notes from field visits.
- The management efforts to date and community/species responses.
- Lessons learned from management efforts.
- Input from external sources regarding management or species at the site.
- Recommendations for updating the plan.

Preparing a Monitoring Plan

Individual areas designated as HCVF 3.3 may vary in the important elements that characterize the sites or the plant communities of interest. As a result, preparing one type of monitoring protocol that provides sufficient information in the health or status of these plant communities is likely not feasible. The following framework is meant to provide guidance in preparing monitoring plans, but each individual site may need unique protocols. Ideally, this framework would be used in conjunction with information from the Management Plan to sufficiently monitor factors necessary to inform decision making and provide ecological information on the site and important characteristics.

Review of Management Plan and Purpose

The first step in drafting any monitoring plan or protocol is to thoughtfully consider the goals of monitoring. These goals should be similar with the goals of the particular management regime that has been agreed upon in the Management Plan. Thoughtful consideration of the types of questions that one wishes to answer through monitoring is critical to the success of our effort. In many cases, careful inventory (sometimes over multiple field seasons) is necessary to establish baseline information on the Species of Concern before a monitoring plan can be written.

Early Considerations

Manpower & Efficiency: Determinations should be made concerning who will be conducting the monitoring (Eco Services, Monitoring Team, District). Protocols should be designed to be only as thorough as necessary to provide data necessary to obtain desired results or answer pre-determined questions regarding the site. This helps to provide for a better use of man-power and time for BOF employees.

Timing: The time of the year in which the monitoring takes places should be ultimately dependent on the various resources of interest on site, which may have varying survey windows. If multiple species are found on site, multiple visits during one field season may be necessary to fully assess multiple species' populations during multiple ideal survey windows. Similarly, in some cases a second visit may be warranted to carefully assess competition from other species or presence of animal species that may use the site seasonally.

Study Size: Because many of the sites are smaller, a thorough site examination may be possible. Monitoring permanent plots within a site may also be appropriate, especially if research based, quantitative data collection is essential to complete the monitoring goals set forth for the site.

Monitoring Period: As a basic rule, site monitoring should take place at least every 5 years. However, depending on the plant community or species of interest and the level of active management taking place, a shorter period between

site visits may be likely necessary to better detect any changes that may occur. It is also recommended that monitoring take place the following growing season after any active management has been completed to assess short-term changes on the site. Long-term monitoring may be necessary in order to determine overall site trends in relation to other factors including habitat management and natural population variability.

Baseline Data: Ideally, baseline data collection has taken place prior to any management activities outlined in the management plan. If management activities have not yet taken place, then baseline data can and should be collected using the same protocols drafted for future site monitoring. Careful consideration should be given to important elements in the plant community. It may be necessary to collect multiple years of baseline data before any management decisions are made and/or work commences.

Ecosystem Health: Depending on the plant community, an attempt should be made to collect data that will help address and track (quantitatively) the health and viability of the community. For wetland habitats, this should include factors such as water quality and changes in hydrology. For forest habitats, this may include information regarding herbivory, tree regeneration, and any negative impacts due to forest pests (e.g. gypsy moth defoliation). Ultimately, an appropriate approach would be to first examine structural elements important for the characterization of the plant community and any particular life histories of important species found within the community to indicate factors of a “healthy” ecosystem for these sites.

Adaptive Management: Monitoring protocols should be drafted within the context of adaptive management. As soon as a desired or undesired change is detected, management at the site can be altered to better conserve the important elements within the site. Similarly, monitoring protocols should also have the ability to be adapted, if necessary, based on careful analysis of the data being collected.

Data Collection

Site Data: Basic site description information should be collected during each visit to the site. This information should include, but is not limited to:

- Plant Communities (and Forest Stand Types). This includes evaluating and updating the delineated BOF stand layer(s) within the site.

- Any new disturbance (natural or man-made; deer browse, windfall, flooding, ATV trail, etc.)

- Surrounding land uses (timber harvest, private land, gas development, etc.)

- Threat Evaluation (Site level) – Depending on what threats may have been indicated in the management plan, evaluate their effects across the whole site. Include effects or presence of new/emergent threats.

Community/Stand Data: The community/stand level factors that are captured during the site visit could vary greatly depending on the species and its preferred conditions. However, it is recommended that the following information be collected:

- Overstory data: Overstory density and cover (to evaluate light levels) and species composition.

- Invasive Species: If the site was previously free of non-native or invasive plant species, presence/absence data is sufficient. If non-native species were present during preliminary evaluation, % cover and abundance data should be collected.

- Hydrological factors: If the site is within a wetland, streamside or vernal pool habitat additional data should be collected regarding any perceived changes in hydrology or water quality.

- Species list: When practical, a species list should be prepared for the site. A goal for a complete species list is 80% of all species found on site. If the site is too large to adequately reach 80% of all species captured in the list, representative study plots could be used.

Community or Site-Specific Data: Collecting data on the species or communities of concern found within the site to properly evaluate the effectiveness of the Management Plan and to inform changes that could improve the viability of the Species or Community. *The list that follows is by no means a complete list of site factors to capture during site monitoring. The life history of species or important elements within the community will dictate what factors are monitored.*

-Updated GPS coordinates and directions to occurrence

-Documentation of the extent of the population and/or maps with polygons indicating occupied habitat(s).

-Additional Habitat Description: Any microsite information that was not captured in the site and community-level observations deemed important. Including, but not limited to: Aspect, Slope, Light Level, Topo Position, Moisture presence, and Elevation.

-Vigor: Measurements that may evaluate the vigor of individuals within a population of a species of concern or other important species on site are varied. Some measurements include:

- Height
-Number of Stems (ramets/genets)
- % Cover and Population Area
- Change in internode length or stem diameter

-Reproduction: Measurements that may evaluate the reproductive viability of a population of important species on site. Some measurements include:

- Seed set
- Vegetative reproduction/growth
- Proportion of flowering/fruiting stems
- Age structure
- Presence or evidence of pollinators
- Reproductive strategy
- Evidence of seed bank

- Photo documentation should also be made of the site.

Threat Data: Any perceived or immediate threats to the site should be evaluated and recorded. These factors may include, but are not limited to:

- Human disturbance
- Invasive species colonization
- Deer browse or insect herbivory
- Adjacent land use
- Succession
- Pathogens

Management Results: Depending on the management (active or passive) set forth in the management plan, a multitude of factors could be recorded. For instance, if opening the canopy benefitted invasive species like Japanese stiltgrass, specific observations regarding this result should be noted.

Conclusions and Recommendations

After collecting site data, it is important that a conclusion and summary be prepared that carefully outlines any changes (positive or negative) either perceived observationally or quantitatively. While some changes may only be evident in the long-term, if a short-term change is noted, it may be possible to either build on this result (if positive) or attempt to correct this result (if negative). If other sites exist with the same plant communities of interest, comparisons could be drawn between the management techniques in other sites.