High Conservation Value Forests 1.2

Significant Concentrations of RTE Species

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 1 are described as "Forest areas containing globally, regionally, or nationally significant concentrations of biodiversity values (e.g., endemism, endangered species, refugia)." Furthermore, significant concentrations of biodiversity values are described by FSC as:

> "areas that contain concentrations of rare/threatened/endangered species, natural communities or other biodiversity values that occur in numbers, frequency, quality and/or density that are sufficiently outstanding to be considered unique or highly important in comparison with other areas within the ecoregion in which the forest management unit is located."

After reviewing the FSC framework document, the PA Bureau of Forestry interpreted the guiding questions provided and developed two types of High Conservation Value Forests (HCVF) that fit into the Category 1 Framework:

HCVF 1.2: Areas on State Forest lands with significant concentrations of Rare, Threatened or Endangered species (species of special concern, SOSC).

These HCVF areas represent over 75 PA Plant Species of Concern and more than 20 PA Animal Species of Concern. These areas were selected after careful analysis which included input from the PA Natural Heritage Program, the State Forest Districts and outside stakeholder groups including The Nature Conservancy.

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 1.2 will be somewhat dependant on the specific species or resources 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 Species of Concern

Currently, there are many sources of information or data for HCVF 1.2 areas, such as county natural area inventory reports, district landscape exams or forest stand information, and PNDI

information on the species or communities of interest. Field reviews 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 and 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 1.2 Area.

- Note if the site is part of a larger designation on state forestland, such as a wild or natural area or gas lease tract.

- Acreage of current or potential habitat for species of concern.

- Summary of information on the species of concern (including previous biotics records and data from latest field view).

- Areas colonized by invasive species.

- Other habitat elements important for species of interest.

SOSC Life History:
This information may be separated by species or groups of species. Details that should be included in this section will depend on the amount of information available regarding the animal, plant, community and invertebrate species of concern. These may be more detailed for some species (e.g. timber rattlesnake) and less detailed for other (e.g. invertebrates). Relevant information includes:

- Description of the species, including state-wide or entire range characteristics.

- Characteristics of species at the site, such as population trends, reproduction patterns, or other aspects important for species conservation.

- Habitat requirements, including anything that is a sensitive requirement or activities that could be detrimental. These could be individual stand characteristics or landscape conditions based depending on species.

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.

- Description of natural disturbances that may have influenced the site or are necessary for the species/community to thrive, such as fire or flooding.

- Connectivity of habitats within the Area and in the surrounding landscape.

- 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 species of interest or site integrity (e.g. invasive species expansion could be a threat to a population of a Plant Species of Special Concern). Foreseeable threats based on surrounding land use, including possible associated impacts. If population trends for SOSC found within the Area can be explained (whether the result of natural or unnatural disturbances), please include this information. Unexplained population trends should also be noted.

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 1.2 Area, a good understanding of the needs of the SOSC found on site, and consideration of any potential conflicts of management activities on other SOSC or more common species within the site. In some cases, a justification may be given for activities that improve habitat for one species, but could diminish habitat conditions for another species.

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

- Quantitative objectives for habitat conditions and SOSC population estimates as much as possible to measure success.

- Specific habitat needs for species/communities of interest and current availability of potential habitat.

- Presence of invasive species or other threats.

- Threats that may presently be in check but could arise due to species sensitivities (e.g. deer pressure).

- Other resources or management objectives of the Area 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 habitat conditions on the site for SOSC or other resources. 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. 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 habitat maintenance/improvement at present. The following information should be included:

- Describe specifications of activities and how species/ community/ habitat elements 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 different species of concern or desired management cannot be employed (e.g. prescribed fire conditions are not met within a burn window), use objectives or prioritization to determine the 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 map to scale shall be provided for each HCVF 1.2 Area indicating locations of SOSC, potential habitat, 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

This category of High Conservation Value Forests poses an interesting challenge in terms of drafting monitoring plans in that many of these HCVF areas have both Plant and Animal Species of Special Concern present on site. At times the habitat requirements for both the flora and fauna are similar, but in most cases monitoring protocols may vary significantly. As with Wild Plant Sanctuaries, preparing one type of management or monitoring protocol that provides sufficient protection and insight into the health of these HCVF sites is difficult. The following framework is meant to provide direction as a monitoring protocol for each HCVF 1.2 site is drafted. Depending on each situation, there may be additional considerations or variables that must be captured outside of what is mentioned in this document. Ideally, this framework would be used in conjunction with information from the specific HCVF Management Plan to sufficiently monitor all factors necessary to provide as clear a picture as possible to inform decision making and answer ecological questions regarding the site and both the Animal and Plant Species or Natural Communities of Concern for which the site was designated.

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. In most cases, drafting the monitoring protocols and Management plans will require cooperation from both Wildlife and Botany staff within Ecological Services.

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 Plant and Animal Species of Special Concern (SOSC) found on site. Many SOSC have ideal survey windows. Since many HCVF 1.2 sites have both Plant and Animal SOSC, it is assumed that multiple site visits is likely necessary to fully assess the SOSC populations and management progress.

Study Size:

For small populations of Plant SOSC, a thorough site examination may be possible. If preparing monitoring for a larger site, a timed meander survey may be the most efficient means to evaluate the plant communities on the site as a whole. Monitoring permanent plots within the HCVF site is likely the most appropriate means to evaluate the site, especially if research based, quantitative data collection is essential to complete the monitoring goals set forth for the HCVF. This determination is dependent on many site factors as well as species occurrence size (Plant and Animal), life history, and habitat requirements.

Monitoring Period:

As a basic rule, site monitoring should take place at least every 5 years. However, depending on the species in question and the level of active management taking place, a shorter period between site visits is likely necessary to better detect any changes that may occur. It is also recommended that monitoring take place the following season after any active management has been completed to assess short-term changes in the species population or habitat. For many SOSC, long-term monitoring will be necessary in order to determine overall population 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 the life history of the SOSC located in the Area. It may be necessary to collect multiple years of baseline data before any management decisions are made and/or work commences.

Non-SOSC:

Be sure to also consider how best to monitor the presence of other plant and animal species which are not Species of Special Concern. A timed-meander style survey is likely the most efficient way to capture a complete (at least 80% of all species on site) plant species list. Depending on the data available, additional techniques may need to be utilized to develop a reasonably complete list of animal species known to exist on site. These data are necessary to attempt to track changes in biodiversity and species richness on site.

Ecosystem Health:

Depending on the types of ecosystems within the HCVF Area, 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 is to first examine the life history for each SOSC (plant and animal) known to exist within the HCVF area and use this information to dictate what factors contribute to a “healthy” ecosystem for these species. Thus forest health can be evaluated in relation to ecosystem function.

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 preserve the particular SOSC or Community of Concern for which the site was chosen. This adaptive ability is imperative to the long term conservation of these sites. Similarly, monitoring protocols should also have the ability to be adapted, if necessary, based on careful analysis of the data being collected.

Data Collection – Plant Species of Concern

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) Present. 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 each site visit could vary greatly depending on the species and 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 SOSC are obligate or facultative wetland species, and 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.

SOSC Data: Collecting data on the Species or Communities of Concern found within the Area is imperative 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. Each individual species or collection of Species' life history 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 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 a Species of Concern are varied. 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

- Associated Species: Associated species found in the immediate vicinity of the SOSC occurrence(s) should be recorded.

- Photo documentation of SOSC populations within the Area, if possible.

Threat Data: Any perceived or immediate threats to the Species of Special Concern 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 before a particular early successional SOSC, specific observations regarding this result should be noted.

Data Collection – Animal SOSC

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) Present

- 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 of new/emergent threats.

-Evidence of wildlife species within the area (scat, nests, direct sighting, etc)

Community/Stand Data: The community/stand level factors that are captured during the site visit could vary greatly depending on the SOSC and 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 SOSC are obligate or facultative wetland species, and 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.

- Plant species list: When practical and necessary to assess the animal SOSC, a plant 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.

SOSC Data: Collecting data on the Species or Communities of Concern found within the Area is imperative 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. Each individual species or collection of Species' life history 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 are varied. If species are being captured some measurements may include (but will depend on the species):

- Weight
- Sex
- Age
-Measured (length)

-Reproduction: Measurements that may evaluate the reproductive viability of a population of a SOSC are varied. Some measurements include:

- Reproductive status of individuals (e.g. gravid, non-breeding, etc.)
-Evidence of young (including nests)
-Evidence of breeding activity or territoriality

- Associated Species: Any wildlife species found in the immediate vicinity of the Species of Concern occurrence(s) should be recorded.

- Photo documentation should also be made of all SOSC populations within the Plant Sanctuary.

Threat Data: Any perceived or immediate threats to the SOSC 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 before a particular early successional SOSC, 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. A careful discussion should also be prepared that evaluates the HCVF Area as a whole, including information regarding both the Plant and Animal SOSC known to exist on site, and if appropriate, how perceived changes (or lack thereof) are effecting both flora and fauna on site. 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 Plant Sanctuaries or HCVF 1.2 sites exist with the same SOSC, comparisons could be drawn between the management techniques in multiple Areas.