Raco Field Trip Notes – SAF Conference 11 May 2006

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The Hiawatha manages barrens and outwash sand ecosystems for timber outputs and wildlife habitat. In addition to the Forest Plan, management direction for outwash sand areas of the Hiawatha, like Raco, are guided by 2 key documents;

1) Draft Conservation Assessment for Sharp-tailed Grouse *(Tympanuchus phasianellus)* in the Great Lakes Region USDA Forest Service, Eastern Region, April 11, 2006 (Sjogren and Corace 2006).

2) Hiawatha National Forest Technical Guide for Kirtland's Warbler Habitat Management Decade 1 (2005-2015). (*starts on page 8*)

The following are excerpts from these documents and help explain why Raco looks like it does today, and covers much of the information discussed on the SAF field trip to Raco.

Draft Conservation Assessment for Sharp-tailed Grouse

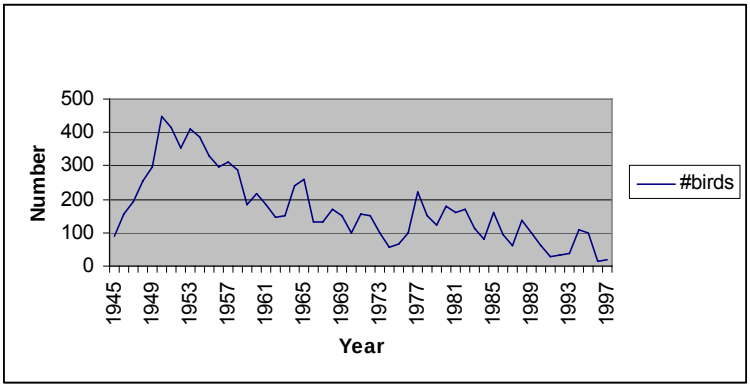
Executive Summary

In recent years, Sharp-tailed Grouse populations have declined and their historic range has been reduced as early successional ecosystems have undergone substantial alternations in amount and extent. The loss and fragmentation of large blocks of quality habitat through barren conversion and degradation, wetland drainage and degradation, intensive agricultural practices, reforestation, fire suppression, and natural succession, threatens this species. Management for this and other area sensitive openland bird species requires a large-scale ecosystem perspective. Low intensity farming, prescribed fire, barrens restoration and even-aged timber management can provide important habitat for sharptails and associated early successional species.

Sharptails likely existed in the burned areas, barrens and wetlands of Michigan until turn-of-the-century logging and subsequent slash fires created much larger areas of openalnd. It is likely that sharptail populations expanded and contracted depending on the effects of natural disturbances such as fire (Ammann 1957, Peterle pers. com.). Portions of Gogebic and Ontonagon counties in western Upper Michigan, for instance burned in excess of 18,000 ha annually between 1923 and 1927 (Peterle 1954). This magnitude of disturbance undoubtedly improved conditions for the species and caused significant population growth. In the late 20th Century, forest maturation and conversion of natural prairies to other uses has reduced habitat resulting in isolated subpopulations of Sharp-tailed

Grouse across northern Michigan. The available Michigan Department of Natural Resources (MDNR) long-term population trend is displayed.

Sharp-tailed Grouse lek count population trend data for Upper Michigan (1946-1997).



Habitat

Fire is the key natural-history disturbance process for creating and maintaining sharptail habitat. Wildfires create a mosaic of burned and unburned patches of habitat depending on local fire intensity and weather patterns (Niemi and Probst 1989), and is instrumental in the creation and maintenance of early successional habitat used by Sharp-tailed Grouse and other open-land species.

Typical occupied sharptail habitat on the Hiawatha near Raco, Michigan.

Peripheral populations are often genetically and morphologically divergent from central populations, and the long term conservation of a species may depend on the protection of these genetically distinct populations (Lescia & Allendorf 1995). Consequently, in Michigan, sharptails may exhibit behavioral and habitat use patterns that are different from birds in more central parts of their range. Michigan lies geographically near the eastern edge of the prairie race of sharptails and south of the northern race. While prairie sharptails are generally thought of as upland species, Hanson (1953) found the northern race breeding in extensive open muskeg wetlands. Sharptails in Michigan are found in both wetland and upland habitats.

Sharptails are now concentrated in the eastern portion of Upper Michigan and found occasionally in suitable habitat in western Upper Michigan. They were previously known to breed in Lower Michigan (Brewer et al. 1991). Of the 3 National Forests in Michigan, only the Hiawatha is known to currently support a breeding population. The Huron-Manistee and Ottawa have likely had breeding sharptails in the past and still have occasional reports of individuals. There are sharptails breeding adjacent to the Ottawa on private land, but habitat on the Forest is limited (Edde 2005, *pers comm*). The Huron-Manistee National Forest would like to re-establish a breeding population to compliment their barrens restoration and Endangered Kirtland's Warbler (*Dendroica kirtlandii*) management programs (Huber 2005, *pers comm*).

Existing Management Activities

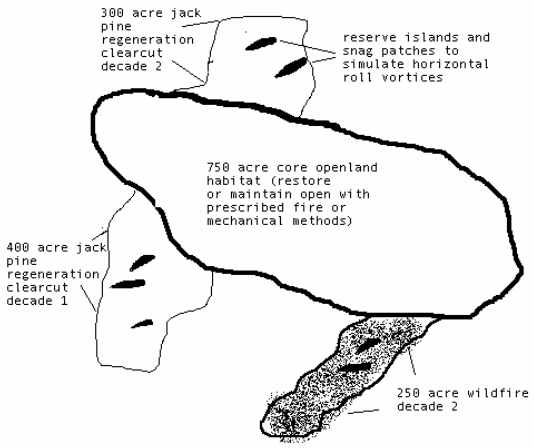
Management for an area-sensitive species, such as sharptail, requires a large-scale ecosystem perspective by which large tracts of openland are maintained through even-aged timber management, wildfire or burning, grazing, cutting or mowing. Low intensity farming and the restoration of pine barren ecosystems utilizing prescribed fire and even-aged timber management will provide important, if not critical, habitat for this and other openland bird species of conservation concern. Because public lands cannot be expected to provide habitat for all openland species (Probst and Crow 1991), partnerships involving private lands (e.g., agriculture, timber industry, state and federal, etc.) would help to maintain sharptail habitat.

Multi-scale approaches will best meet the needs of sharptails and associated early successional species because some characteristics of sustainability are best viewed from a regional perspective, while others should be evaluated at the landscape or stand/patch scales (Probst and Crow, 1991). Management objectives should be directed towards providing the mix of habitat conditions to which species have become adapted. Conservation of biological diversity in forests will require management plans that mimic, to some extent, the long-term historical and natural disturbance regime (Lorimer 2001).

The Sharp-tailed Grouse is an important component of the native biological diversity of fire-regulated ecosystems. Efforts directed at maintaining Sharp-tailed Grouse are focused on restoring quality habitat at existing subpopulation centers and on other potentially occupied habitats such as historic pine barrens wetlands and other fire-regulated ecosystems. Sharptail populations respond rapidly to improved habitat conditions, such as timber harvest in large blocks (that mimic wildfire disturbance patterns), and controlled burning of suitable habitat.

Many of the habitat patches inhabited by sharptails are imbedded within a matrix of forested habitat in the upper Great Lakes. This forested matrix also provides habitat for many regionally important bird species that use forested ecosystems. Therefore, openland habitat management should be accomplished within the context of conserving patterns and processes of native ecosystems. Management of openlands requires coordination between wildlife biologists, ecologists, silviculturalists and fire staff. Timing and location of clear-cuts, size of clear-cuts, site preparation, reforestation, prescribed burn plans, preparation and implementation decisions all have an impact on openlands habitat.

Maintaining a system of large openland habitat can provide a “coarse filter” approach to species protection. The highest conservation priority species are those in which ecological conditions (e.g., soil and hydrologic characteristics) sustain openland vegetation. Openland habitat management has been implemented on state and federal lands within Region 9 in conjunction with silviculture practices. For example, on the Hiawatha, pine barrens complexes are managed for timber production and prescribed burning to restore native plant and animal communities. Establishment of large opening complexes is accomplished using jack pine harvests adjacent to large permanent openland habitat. This interdisciplinary approach provides timber products, creates and maintains fuel breaks, and provides habitat for area sensitive openland species like sharptails.



Example of an interdisciplinary management scenario providing multiple outputs.

In Upper Michigan, sharptails may use large areas of recently burned openland habitat (Baumgartner 1939, Sjogren and Robinson 1997). Fire can substantially increase the quality and quantity of blueberries and other native plants that function as food or cover resources for sharptails (Ammann 1957, Niemi and Probst 1990). However, prescribed burning, requires interdisciplinary coordination, long-range planning, suitable weather, and public acceptance. In combination with even-aged timber management, fire provides a suitable and integrated approach to openland habitat management. Next to wildfire, prescribed fire is the best method to restore and maintain large patches of high quality habitat and simulate conditions historically found in xeric and wetland portions of the range. The application of fire should be designed to establish a mosaic of grasses, shrubs, snags and blueberries over large areas.

Prescribed burn operation to maintain and restore barrens habitat.

Another option for control of tree succession is the use of hand tools or mechanical brush cutters. Chainsaw or hand-saw cutting of encroaching vegetation, while labor intensive, provides an excellent method to maintain land in an open condition. Hand cutting has the advantages that it can be done at any time of the year, the manager can be very selective in designation of tree or shrub species to remove, and work can be completed using relatively cheap labor sources like prison crews and volunteers. Mechanical brush cutters have similar advantages as hand cutting but they can treat an area much quicker if the site is suitable. If the site is stump and slash free, is relatively flat, and encroaching vegetation is relatively small (<5 cm DBH), a brushog pulled behind a farm tractor or dozer is an efficient method to maintain openland .

Tractor and brush-hog operation used to simulate a light surface fire and restore barrens habitat

Ground disturbing equipment should not introduce or spread non-native or exotic vegetation. Non-native vegetation can colonize a site and replace native vegetation which can displace animals adapted to the native vegetation. In addition exotic plants can out-compete or displace habitat for native and possibly rare plant species. Equipment may be washed prior to moving onto the site to remove and prevent the accidental spread of weeds.

Silvicultural techniques have an important role in creating and maintaining early successional habitats across the landscape (Thompson et al. 2001). Natural disturbance regimes in the jack pine ecosystem have historically resulted in very large tracts of even-aged trees. Silvicultural techniques that mimic this structure and condition should be employed when managing for open-land habitat. In historic barrens areas, tree harvest may be used with fire to restore elements of the original land cover condition. For example, on the Hiawatha, Kirtland's Warbler and sharptails are successfully managed together since large stands of young jack pine (i.e., 0-9 years of age) adjacent to managed barrens openings provides excellent sharptail habitat, before it becomes suitable for KW.

At the time of timber sale layout, considerations should be given to simulating wild-fire structure, for visual management, and other habitat considerations. For example, leaving large oaks or red pines or narrow islands or fingers of live trees to resemble skip areas in burns. These strips will simulate horizontal roll vortices or green islands frequently found after stand replacing wildfires in jack pine. These strips provide habitat diversity as feeding, cover and nesting areas for many open-land associated species. The habitat value remains as the strips die and fall over or blow over. Consider providing areas of red pine savanna where open-land habitat or jack pine regeneration is established under a stand of lightly stocked (i.e. <40 basal area) but large red pine trees.

The jack pine budworm *(Choristoneura pinus pinus)* is an important consideration in the management of jack pine and sharptail resources. Jack pine, fire and budworm are interrelated in the ecological system of barrens and xeric pine plains. Jack pine salvage operations following a budworm outbreak replace fire as the stand regenerating disturbance agent. Fire and budworm are natural components of the ecological function of this system. In general, budworm outbreaks will be minimized by providing decreased edge, fully stocked stands and few open grown trees. The probability of wildfires will be reduced by maintaining large openings, surrounded by large temporary clear-cuts, providing large rotating fire break complexes.

Sample and Mossman (1997) have provided guidelines for management of grassland birds, including sharptails, for Wisconsin. These guidelines are generally applicable across the sharptail range in Region 9, and include excellent recommendations on management techniques, disturbance ecology, vegetation height, priority landscapes, and more using a multi-species landscape ecosystem approach.

The State of Wisconsin Wildlife Action Plan (Wisconsin Department of Natural Resources. 2005) identifies the following priority conservation actions;

- Since this species requires large areas of grassland/barrens, the best management and preservation opportunities are on public land.
- Continue to build barrens partnerships in appropriate landscapes.
- Create habitat corridors and consider translocations to restore genetic variability within isolated populations.
- Create financial incentives to incorporate large aggregated clearcuts in and around managed core areas. This will require sound long-term planning. This strategy could be used in conjunction with management for Kirtland's Warbler and Connecticut Warbler, as well as the other barrens species.

The following priorities were recommended for openland habitat and sharptail management in a draft Openland Conservation Strategy (2000) for land in eastern Upper Michigan. These have been used to guide management of State and Federal lands in Michigan:

1) Maintain a system of large open-land habitat across the eastern U.P. that will provide a "coarse filter" approach to species protection. The highest priority are areas where ecological conditions will sustain open-land vegetation.

2) Pine barrens and wetland complexes are extremely important areas to prioritize the use of prescription burning for restoration of native plant and animal communities.

3) When contemplating jack pine harvest, establishment of very large blocks of temporary openings, or clearcuts, should be a priority, especially when they

are located near large areas of permanent open-land habitat, or where needed to meet specific wildlife population goals.

4) Agricultural lands in the eastern U.P. currently provide important habitat for open-land species and some of these lands should be a priority for open-land conservation.

5) Restore natural hydrology to wetland habitats.

6) Consider open-lands and early successional wildlife habitat requirements in rehabilitation and management of areas burned by wildfire.

7) Prevent the spread and colonization of non-native and exotic or invasive plants.

Hiawatha National Forest Technical Guide for Kirtland's Warbler Habitat Management Decade 1 (2005-2015).

Introduction

This document provides technical information to help implement Kirtland's Warbler (KW) management actions to meet Hiawatha Forest Plan goals, objectives and guidelines. Landscape and stand level planning is needed to maintain a balanced age-class-distribution of jack pine that will ensure a sustained flow of KW habitat. The only significant difference between KW habitat and standard jack pine habitat (non-KW) is the stocking density of the trees. KW's nest in 6-16 year old stands that have at least 1,089 trees per acre (with small openings), while standard jack pine management usually strives for about 800 trees per acre.

Technical direction is needed to identify where, when and how jack pine harvest and associated management could occur, to regenerate an average of 670 acres of jack pine per year to provide approximately 6,700 acres of sustained suitable Kirtland's Warbler habitat. This assessment will help the Forest prioritize the location and timing of Environmental Assessments (EA) for outyear jack pine management activities. Much interdisciplinary work will be needed to develop new and innovative approaches to jack pine management on the Hiawatha. Field data is needed to evaluate options. Adaptive management should be used to test new approaches and make informed decisions based on field inventory and monitoring.

Forest Plan Goals, Objectives and Guidelines specific to KW management;

Goals:

- *Provide for Kirtland's warbler management within forest-wide vegetation goals.*
- *Provide a minimum of 6,700 acres of jack pine in the appropriate size class, as determined in consultation with the U. S. Fish and Wildlife Service (FWS), striving to achieve desired Kirtland's warbler stocking levels on ELT 10/20 in Management Areas 4.4 or 4.2*.

Objectives:

- *Regenerate an average of 670 acres of jack pine per year in Management Areas 4.4 or 4.2 on ELT 10/20 to provide Kirtland's warbler habitat.*

Guidelines:

- *For Kirtland's warbler management, strive to regenerate jack pine stands with the appropriate stem density and non-forested openings, as determined in consultation with the FWS.*
- *Pre-commercial thinning or release of jack pine should not occur in areas managed for Kirtland's warbler prior to vegetation achieving the suitable size criterion or until vegetation exceeds the suitable size criterion for Kirtland's warbler breeding, unless such activity maintains or enhances Kirtland's warbler habitat on the forest, as determined in consultation with the FWS.*
- *The maximum size of temporary openings for sharp-tailed grouse and Kirtland's warbler management should not exceed 1,100 acres. In KW management areas the 1,100-acre temporary opening guideline may be exceeded by harvesting adjacent blocks after the appropriate stocking density (determined in consultation with the FWS) is achieved, and after the third-year stocking review.*

Habitat

KW's nest in 6-16 year old jack pine stands that are large. KWMA's are divided up into blocks, or timber sale units. KW habitat regulation is based on jack pine timber sales and subsequent reforestation. Once sold the operator generally has 1-5 years to harvest the unit.

It is important to provide habitat connectivity and continuity, within each KW Management Area (KWMA), since many KW return to the same habitat each year. It is better to provide high quality habitat (large connected blocks) for 30 years, rather than marginal habitat (small spread-out blocks) for 50 years.

Large blocks provide the best KW habitat because they offer the best chance for colonization, are occupied for longer periods, support denser KW colonies, are beneficial to other species (i.e., sharptail), and more closely simulate wild-fire conditions. However, in many KWMA's the existing landscape structure does not

permit large contiguous blocks. Smaller block size will allow management flexibility to spread out the harvest over several occupied KWMA's, and meet Forest Plan vegetation goals. Whenever possible, large blocks should be created by placing several smaller harvest blocks adjacent to each other, even though they may be in different timber sales, and sold in different years (as long as the sold-date is within a few years). Jack pine fragmentation would be reduced by creating larger KW habitat blocks by adding inclusions, and converting some non-jack pine forest type to jack pine, with the timber sale and reforestation.

Ideally, 80 acres would be the smallest block size to consider for KW management. However, due to the fragmented nature of existing jack pine systems, blocks smaller than 80 acres should be identified and reforested for KW if they are in suitable landscapes (i.e, ELT 10/20 in Management Areas 4.4 or 4.2), and have other stands of jack pine or openland in the vicinity. Several KWMA's on the Hiawatha have existing jack pine stands in small blocks, separated by areas of other forest types, or different jack pine age-classes. Smaller, separated blocks should be used to create KW habitat, even though the blocks are not contiguous and less than optimal.

The KW Management Strategy (Huber et. al, 2001, page 12) states that; "Treatment blocks in each management area should be sequentially scheduled....for regeneration close to other blocks in space and time. New blocks will be developed adjacent or in close proximity to recently developed blocks to better mimic the effects of large crown fires. Generally, smaller treatment blocks are developed adjacent to one another and regenerated no more than 5 years apart."

Reforestation

Reforestation following harvest of KW blocks should provide for the appropriate stem density of 1,089 trees/acre with openings (about ¼ acre per acre), as recommended by the USFWS. KW reforestation silvicultural methods are available such as, natural regeneration, supplemental seeding, planting and seed tree burning.

Natural regeneration is cheaper than planting and has been shown to be successful in regenerating dense stands of jack pine, even on excessively drained soils on the Hiawatha. Timing is especially important for natural regeneration (chop and chain site-prep), since the soil must be scarified before the jack pine seed falls off the logging slash (generally in July following harvest) and germinates on an unsuitable seed bed.

If planting jack pine for KW is prescribed there are methods available that can help fund, reduce the cost, or improve the quality of the plantation. For example,

the Huron-Manistee (HM) frequently includes red pine, hardwood or aspen products in KW sales to provide a species mix and help fund reforestation.

Adaptive management should be used to refine techniques and reduce reforestation costs, as the Hiawatha continues to seek best management approaches for KW reforestation. Other options to explore include; 1) trenching followed by hand planting, without chop and chain, which has increased survival, lowered cost, and provided better habitat for other grassland birds (due to slash retention), on KWMA's in the Lower Peninsula; 2) use seed-tree methods with burning such as are planned for KW regeneration in Raco; 3) experiment with seed-tree methods without burning, just light scarification resulting from harvest operations or site prep; 4) use natural regeneration then wait 1-3 years for stocking survey results then schedule fill-in planting if needed.

It will be important to incorporate a ¼ acre opening on each acre of KW habitat reforested. For example, it is not necessary to site-prep (chop-chain-seed) the entire acre for natural regeneration since the objective is only to reforest ¾ of the acre. When hand planting is prescribed, it may be possible to use the opposing wave pattern for brakee scalps, thus providing for the openings. Another option, on some sites, would be to reserve large-diameter red-pine, individually or in clumps, to provide openings by shading regeneration. These techniques still need to be tested on the Hiawatha since natural regeneration and hand-planting are not typically used in the Lower Peninsula for KW reforestation. It is important to consider the openings before reforestation starts, to avoid the effort and expense of creating openings later. Additional interdisciplinary discussion and cooperation will occur during the NEPA process to finalize silvicultural treatments for reforestation.

Thinning, Release, Timber Stand Improvement

Many stands typed as red pine plantation have dense volunteer jack pine reproduction and are suitable for, and occupied by, KW. Timber Stand Improvement treatments in red pine plantations that are located in or near occupied KW habitat (e.g. ELT 10/20 in Management Areas 4.4 or 4.2), and that remove jack pine, or reduce the stem density, will have an adverse impact on KW habitat, and should be discussed by an inter-disciplinary team. Inter-disciplinary discussions should include timing of treatments and how treatments will improve KW habitat. Additional interdisciplinary discussion and cooperation will occur during the NEPA process to finalize silvicultural treatments for stand improvement that benefit, and do not adversely impact, the suitability of KW habitat.

Snags

Two to ten snags per acre should be reserved, except where additional snags would be beneficial to rare species or unless they present a safety concern or

interfere with mechanical site preparation. The KW Management Strategy (Huber et. al, 2001) states that "All dead trees should be left in the sale area. An overall objective of 15-25 dead trees per acre is desirable" (pg 15). Additional interdisciplinary discussion and cooperation will occur during the NEPA process to finalize silvicultural treatments to provide this important structural component during sale layout, administration and site preparation.

Stewardship Contracting

The National Forest should consider the use of stewardship contracting to reduce costs, schedule skidder time, and improve natural regeneration. For example, site prep preformed by the timber sale operator prior to sale closure would reduce fuels and ensure site-prep is completed immediately after harvest, thus ensuring a suitable seed bed for germination. This type of stewardship contract could ensure more time for the Forest skidders to site-prep other priority stands.

Long-term Modeling

Long term modeling is needed to coordinate Forest Planning goals and to address potential future problems in regulating the flow of jack pine, and KW habitat in sufficient size blocks. Appendix 4 shows the modeled Forest Plan relationship between young jack pine (J1, J2) and KW habitat (K1, K2). Future modeling would be most useful if it is linked to a GIS, with stand attributes and age-class distribution, showing the long-term sustainability of jack pine and KW habitat outputs.