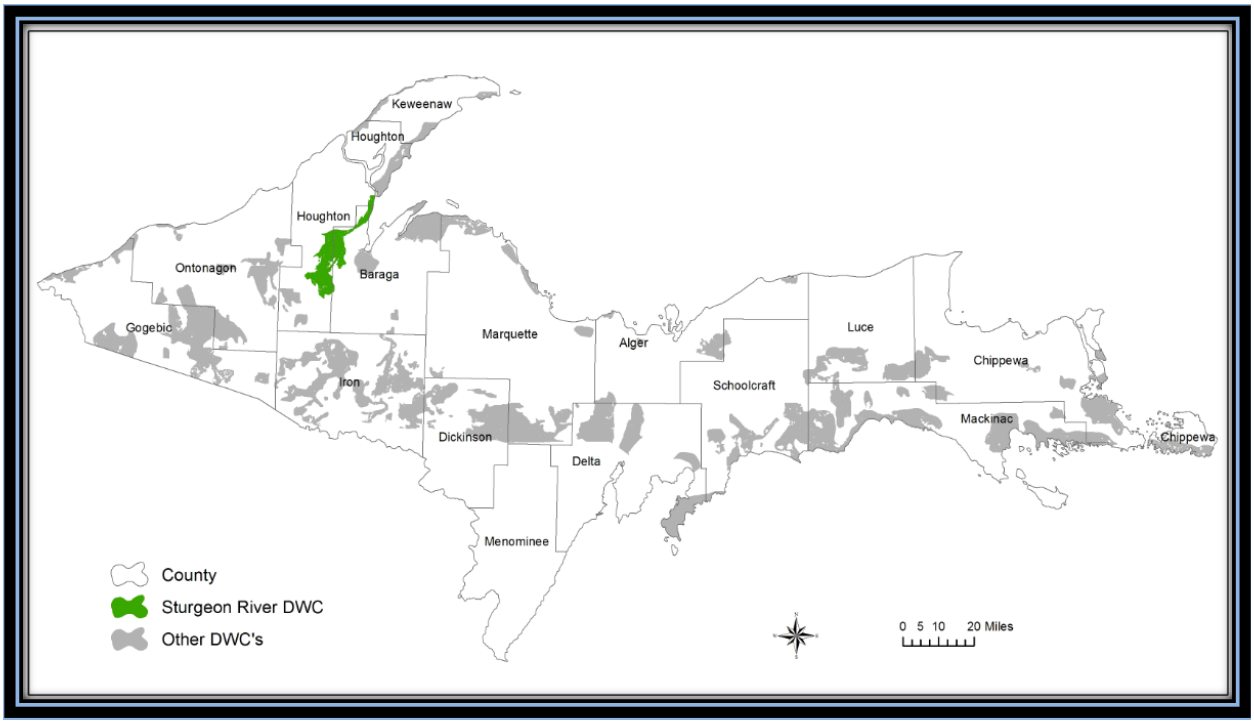
Sturgeon River
Deer Wintering Complex
Management Plan



Upper Peninsula of Michigan Habitat Workgroup

November 2015

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Background

In the northern portions of the Upper Peninsula (UP) of Michigan, deer encounter deep snow which limits access to food. Deer have adapted to deep snow conditions by migrating to find suitable food and shelter to survive the winter. These migratory destinations are called deer wintering complexes (DWCs) and are sometimes referred to as “deeryards.”

Recent consecutive severe winters (2012-2014) raised concern regarding the condition of these DWCs. In response, the Michigan Department of Natural Resources (MDNR) reconvened the Upper Peninsula Habitat Workgroup (UPHW) early 2015 to focus on improving and conserving critical UP winter deer habitat. The UPHW is comprised of natural resource professionals from state, federal and tribal governments, private landowners and sportsmen's groups. The group is led by the Natural Resources Commission.

The UPHWs mission is to develop comprehensive habitat strategies for identified DWCs, focusing primarily on lands not managed by the DNR. Fifty-seven DWCs were identified across the UP. The majority of winter deer habitat in the UP (an estimated 80 percent) is managed by entities other than the MDNR. The workgroup's purpose is to identify the various landowners and work cooperatively with them to improve critical deer winter range through the use of professional forestry and habitat management practices. Management plans for each DWC will be developed. Private landowners will be offered technical assistance and other incentives to encourage support for maintenance and enhancement of winter deer habitat on their property, such as wildlife habitat and forest stewardship grants.

This document is a result of this effort and is intended to provide information and strategies for managing lands to benefit deer wintering within the Sturgeon River DWC.

Components of a Deer Wintering Complex

In most of the UP, deer begin migrating to wintering complexes when snow accumulates between 12-18 inches, typically in mid to late December. Deer remain on their winter ranges until snow melts in spring when their mobility is restored. This confinement period on winter range can vary from 60 days to well over 100 days during an especially long winter. Significant winter-related deer deaths, reduced physical body condition and high newborn fawn mortality occur with durations of 90-100 days with greater than 12 inches of snow covering the ground. The UP winters of 1996 and 2014 had winter durations greater than 100 days and are remembered as especially severe for deer. To survive these long confinement periods on winter range, deer seek locations that provide both shelter and food suitably interspersed across the landscape.

Conifer stands with high canopy closure provide deer with shelter by reducing snow depths beneath the canopy and facilitating movement via extensive connected packed trails. Trail systems provide easier access to food and also assist deer in evading predators. These shelter stands also reduce wind chill and perhaps radiant heat loss. Shelter is defined by several categories.

- Functional Shelter: Conifer stands with at least 70 percent canopy closure and tree heights greater than 30 feet. These thresholds for canopy closure and height ensure the stand is effective at intercepting snow, resulting in decreased snow depths and increased mobility for deer to access food and avoid predators.

- Primary Shelter: Cedar and hemlock trees provide the best functional shelter as they intercept larger amounts of snow than other conifers. These species also are a favored winter food source which makes them difficult to regenerate and recruit back into the stand canopy. However, these species are long lived and may survive 400 years or more. Most stands in the UP are only 100-200 years old.

- Secondary Shelter: White spruce, balsam fir and white pine intercept less snow than cedar and hemlock but contribute to functional shelter especially when mixed with cedar and hemlock trees. These trees also provide feeding corridors through hardwood stands and shelter during periods of lower snow depth. Often these species occur as a component of mixed stands in the transitions between upland and lowland, such as in red maple stands.

Food is an integral habitat component for deer in winter. While adult deer can enter winter with sizeable fat reserves, fawns have not yet completed skeletal growth and therefore carry smaller percentages of fat. Thus, fawns must have dependable access to food to survive the winter. Some key sources of winter food are:

- Cedar and hemlock fronds where accessible;
- Litter fall: cedar and hemlock fronds, hardwood stems, and lichens dropped due to wind and snow action;
- Hardwood browse: most of the browse is available in aspen, red maple and northern hardwood stands, either as felled tops from winter timber harvest activity or as regenerating stems of trees and shrubs in years following timber harvests or natural disturbances such as windfall;
- Oak acorns: on especially good acorn years deer are able to access acorns early and late in the winter as snow depths allow; and
- Spring herbaceous foods: forest openings inside and adjacent to DWCs often provide protein-rich food for several weeks in spring and fall before deer enter or vacate the complexes.

Goals and Objectives for Managing Deer Wintering Complexes

The deer wintering complexes in the UP have been inventoried and mapped by the MDNR since 1927. Currently there are 57 named complexes in the UP. The extent of summer range used by deer in these complexes has been the subject of extensive deer tagging studies over the years. In 2014, the MDNR implemented deer winter range guidelines for managing Michigan state forest lands, which represent about 20 percent of all DWC acreage in the UP. The UPHW builds on these previous efforts by identifying goals, objectives and specific habitat management strategies for managing deer winter range across all land ownerships. Below are the goals and objectives defined by the workgroup.

Deer Winter Range Goal:

1. Sustainably manage shelter and food resources on deer winter range to reduce overwinter deer population fluctuations by:
    a. Enhancing conifer shelter thereby facilitating deer movement to obtain food and avoid predation.
    b. Providing high quality food adjacent to shelter.

DWC objectives:

1. Move toward 50 percent of the complex in shelter species:
    a. Maintain primary shelter (cedar and hemlock).
    b. Increase secondary shelter (white spruce, balsam fir and white pine) when below 50 percent.
2. Move toward 50 percent of complex in sustainable food stands (primarily aspen and hardwoods) to enhance available browse.

These objectives provide the initial direction for habitat management strategies in each DWC management plan to achieve stated goals. Each DWC however, may have unique characteristics such as percent shelter and deer browse pressure that may result in different recommendations for achieving the goals. The first requirement for planning in the Sturgeon River DWC is an analysis of the current characteristics.

The Sturgeon River Deer Wintering Complex

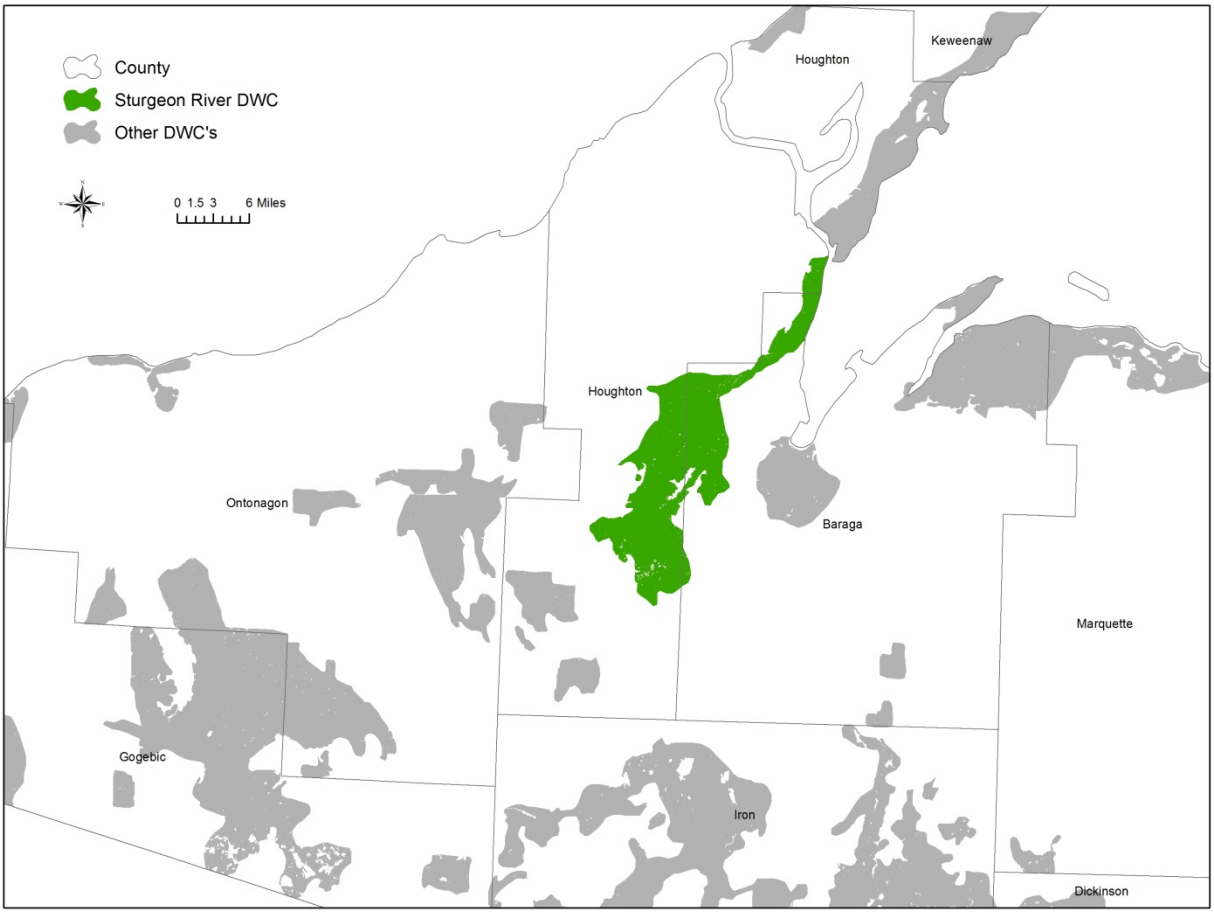

Figure 1 – Western UP DWC map with the Sturgeon River DWC in green

The Sturgeon River DWC is located in the western UP west and south of Baraga, spanning Baraga and Houghton Counties. This complex encompasses 79,795 acres (Figure 1). Deer use has been documented in parts of this complex by the MDNR since 1937. The Sturgeon River DWC is located in the heavy snow belt of the UP and averages 95 days of more than 12 inches of snow on the ground. The deer wintering in this complex are spread relatively thinly across the landscape, and forest browse pressure is moderate as evidenced by successful regeneration and recruitment of hardwoods in many locations. The summer range extent of the deer using this complex is not known, as only a limited amount of winter deer tagging operations occurred in this DWC. The land ownership of the DWC is comprised of 43 percent Ottawa National Forest, 6 percent corporate forest owners, 6 percent state forest and other state of Michigan lands with the balance (45 percent) comprised of private non-corporate landowners (Figure 2).

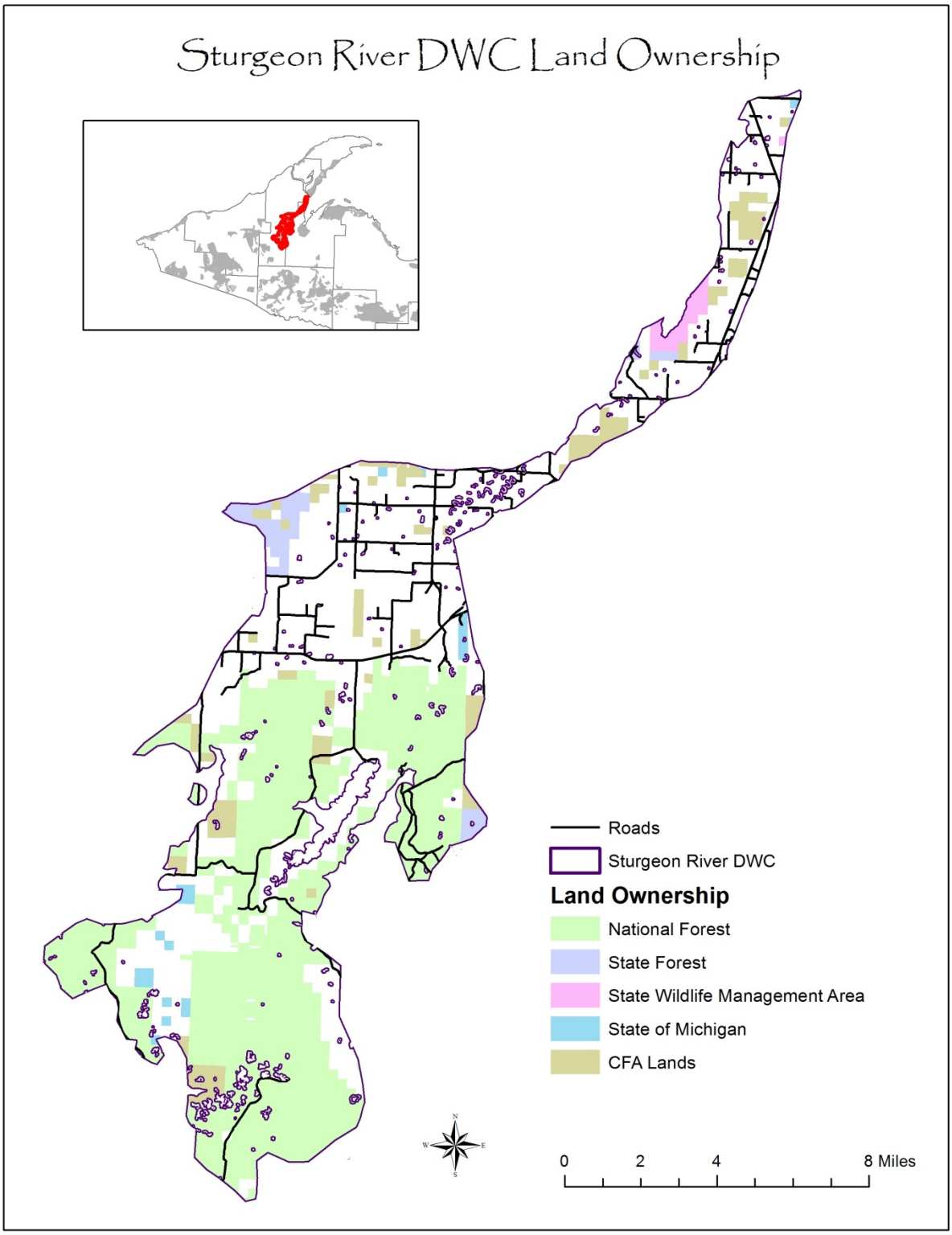

Figure 2 - Sturgeon River DWC ownership map

Current Food and Shelter Conditions in Sturgeon River DWC

The U.S. Forest Service (USFS) dominant vegetation layer was used to estimate the current food and shelter conditions of the Sturgeon River DWC by key habitats by land covers which are important for wintering deer (Figure 3). These analyses have accuracy limitations and are not intended to provide exact habitat contribution percentages. They can be used however to portray the general condition of the food and shelter resources and the relative makeup of the land cover in order to highlight potential strengths and weaknesses in the habitats and also to identify opportunities for improvement.

Sturgeon River DWC Land Cover Summary (percent of the complex)

Shelter 18 percent

- hemlock 6 percent
- cedar 6 percent
- white spruce, balsam fir, white pine 6 percent

Food 63 percent

- aspen 17 percent
- northern hardwood 19 percent
- red maple transitional stands 27 percent
- forest openings < 1 percent (too small to map)

Other Cover Types (Grey) 19 percent

- Tamarack, black spruce, jack pine

For cedar and hemlock, an additional analysis was conducted to determine the relative occurrence and abundance of these important primary shelter species. The output provides a prediction of locations that have higher amounts of cedar and hemlock and reasonably predicts broader functional primary shelter areas. See hemlock analysis map (Figure 4) and cedar (Figure 5).

Habitat summary

This complex is composed of 18 percent shelter species with hemlock and cedar making up 6 percent and 6 percent respectively. Secondary shelter species including white spruce, balsam fir and white pine make up another 6 percent. Based on the hemlock and cedar analysis, hemlock appears to be providing the largest areas of high density shelter (Figures 4 and 5). From a food standpoint, the red maple stands provide the majority of the food opportunities in this complex at 27 percent and has total food resources representing 63 percent of the DWC. Ideally, based on our DWC objectives, food and shelter resources should be arrayed at a 50/50 ratio to facilitate deer movement between food sources and functional shelter. Shelter represents only 18 percent of this complex. There appear to be opportunities to increase the shelter especially in the 27 percent of the complex identified red maple stands. These stands often form the transition between shelter and food areas and can both increase the shelter composition and the access to adjacent food resources. As previously mentioned, these analysis percentages have limitations and as such the red maple stands should be viewed as opportunity areas for improvement in the shelter/food composition not as literal percentage change goals.

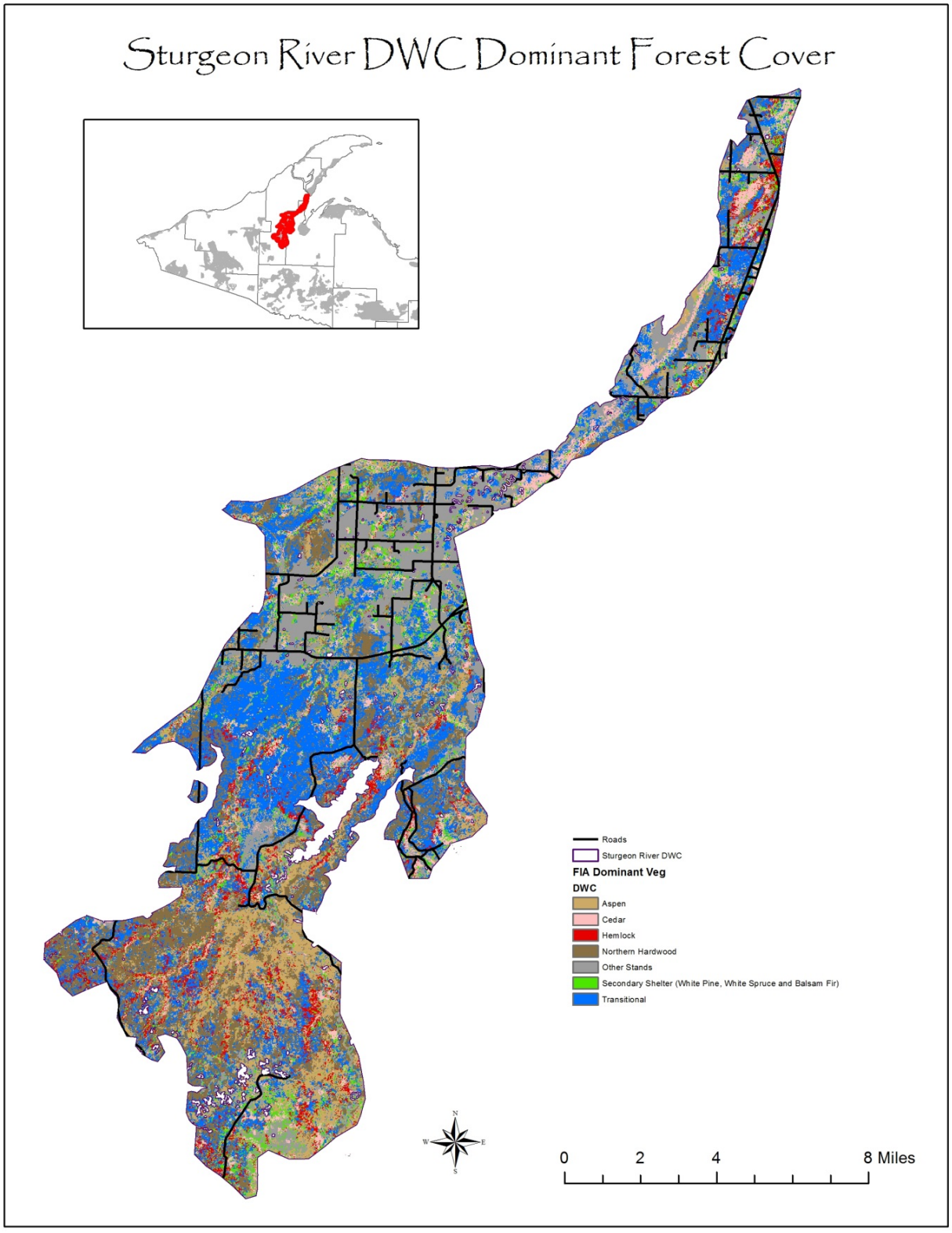

Figure 3 – The Sturgeon River dominant forest cover

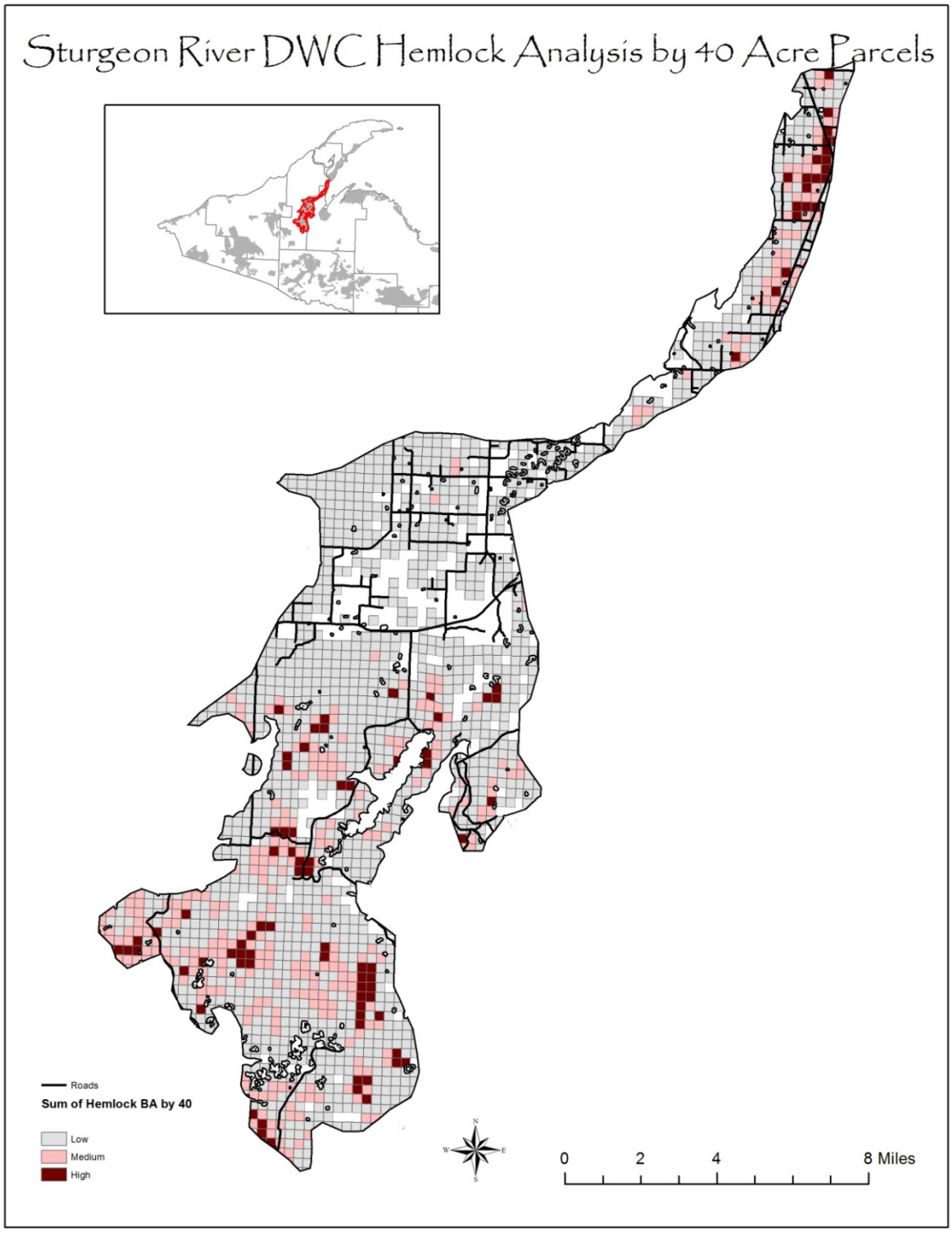

Figure 4 - Sturgeon River DWC hemlock Analysis

Depicting hemlock basal area by 40-acre parcels. The darker colored squares likely provide the best deer shelter potential. This analysis is based on data obtained from the USFS Forest Inventory Analysis.

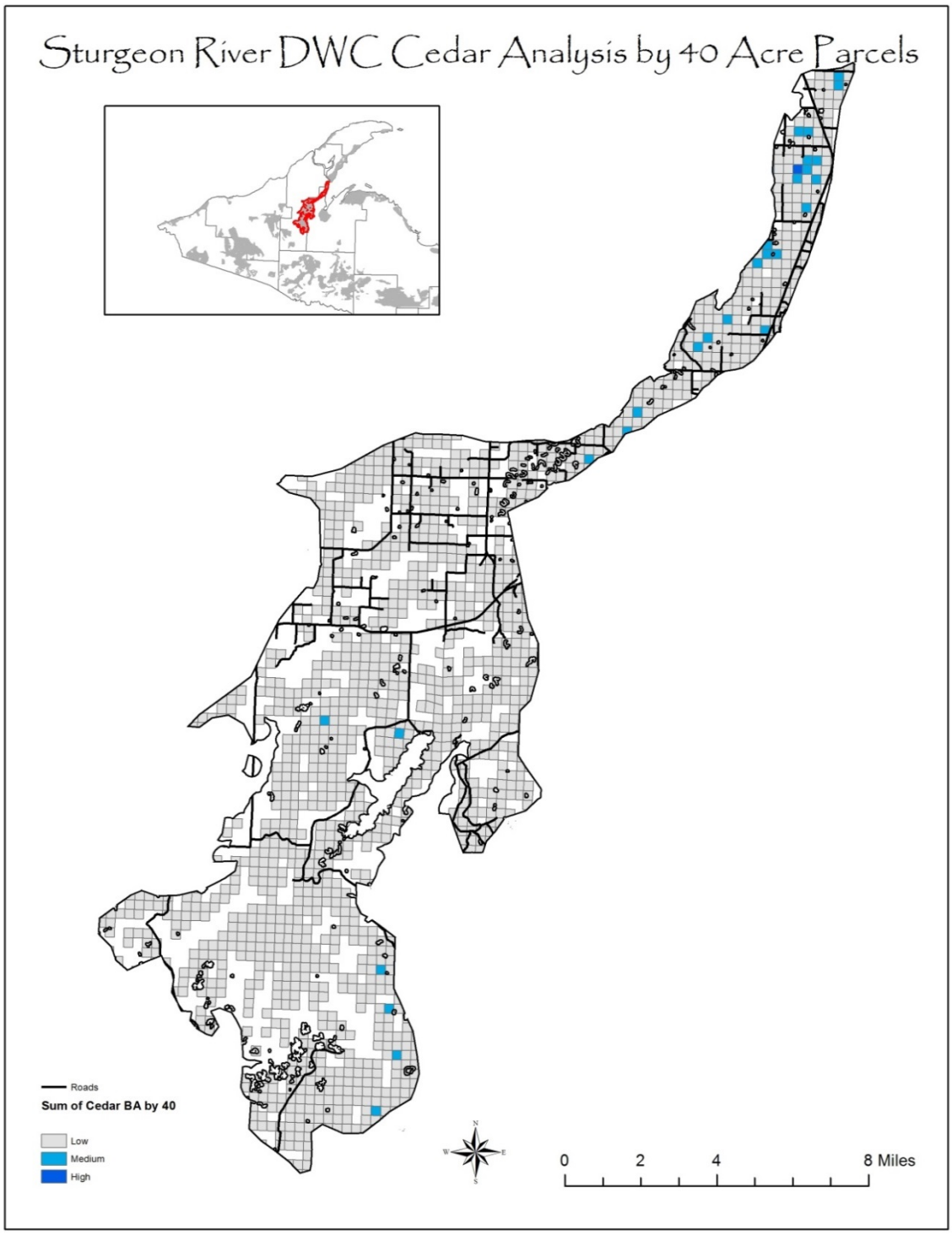

Figure 5 - Sturgeon River DWC cedar Analysis

Depicting cedar basal area by 40-acre parcels. The darker colored squares likely provide the best deer shelter potential. This analysis is based on data obtained from the USFS Forest Inventory Analysis.

Management Recommendations for the Sturgeon River DWC

Application of the DWC objectives to the Sturgeon River DWC

1. Consider the existing conditions in the entire Sturgeon River DWC in relation to adjacent properties within the DWC including site specific overstory, understory, soil and hydrologic conditions.
    a. Coordinate with neighboring landowners for complimentary land management in order to benefit conditions for deer.
2. Maintain primary shelter (cedar and hemlock).
    a. Deer numbers in winter most likely preclude regeneration of these species.
    b. If timber harvest is necessary, consider retaining these species or implementing. shelterwood with reserves systems (Figure 6) that retains higher canopy closures of these species to preserve shelter value for wintering deer while allowing timber harvest.
    c. Key habitat types: (cedar and hemlock) consider planting if site conditions and low browse conditions will allow.
3. Increase secondary shelter (white spruce, balsam fir and white pine).
    d. Use silvicultural methods to increase the conifer component in stands exhibiting mixed conifer/hardwood conditions especially in areas adjacent to existing shelter.
    e. The red maple stands appear to offer the best management opportunity for increasing conifer in this complex.
    f. Consider conifer planting, especially white pine as the moderate deer browse pressure should allow the successful recruitment of this species.
    g. Key habitat types: northern hardwood, lowland conifer, aspen, red maple.
4. Enhance food resources.
    h. Harvest aspen and northern hardwood stands during winter and leave the felled tops for deer to consume.
    i. Maintain oak in timber harvests to provide acorns during years of abundance; encourage and retain all mast species.
    j. While limited in the Sturgeon River DWC, manage forest openings to provide spring forage.
    k. Key habitat types: northern hardwood, aspen, red maple, forest openings.

Habitat Strategies Overview

Most of the forest land in the Sturgeon River DWC is actively managed. Meeting the objectives for food and shelter requires the application of appropriate timber harvest methods for each of the key habitats. Recommended habitat management strategies were determined through reference to the silvicultural literature, examination of existing deer winter range management guidelines, and consultation with state, federal and private foresters and biologists.

Hemlock and cedar are the most critical deer habitat components due to their sheltering value. Deferring harvest of these species is the preferred management recommendation to ensure sustainability for providing shelter. If harvest of these species is necessary due to land owner objectives, a "shelterwood with reserves" harvest system is suggested as an alternative (Figures 6 and 7) to maximize shelter retention for wintering deer.

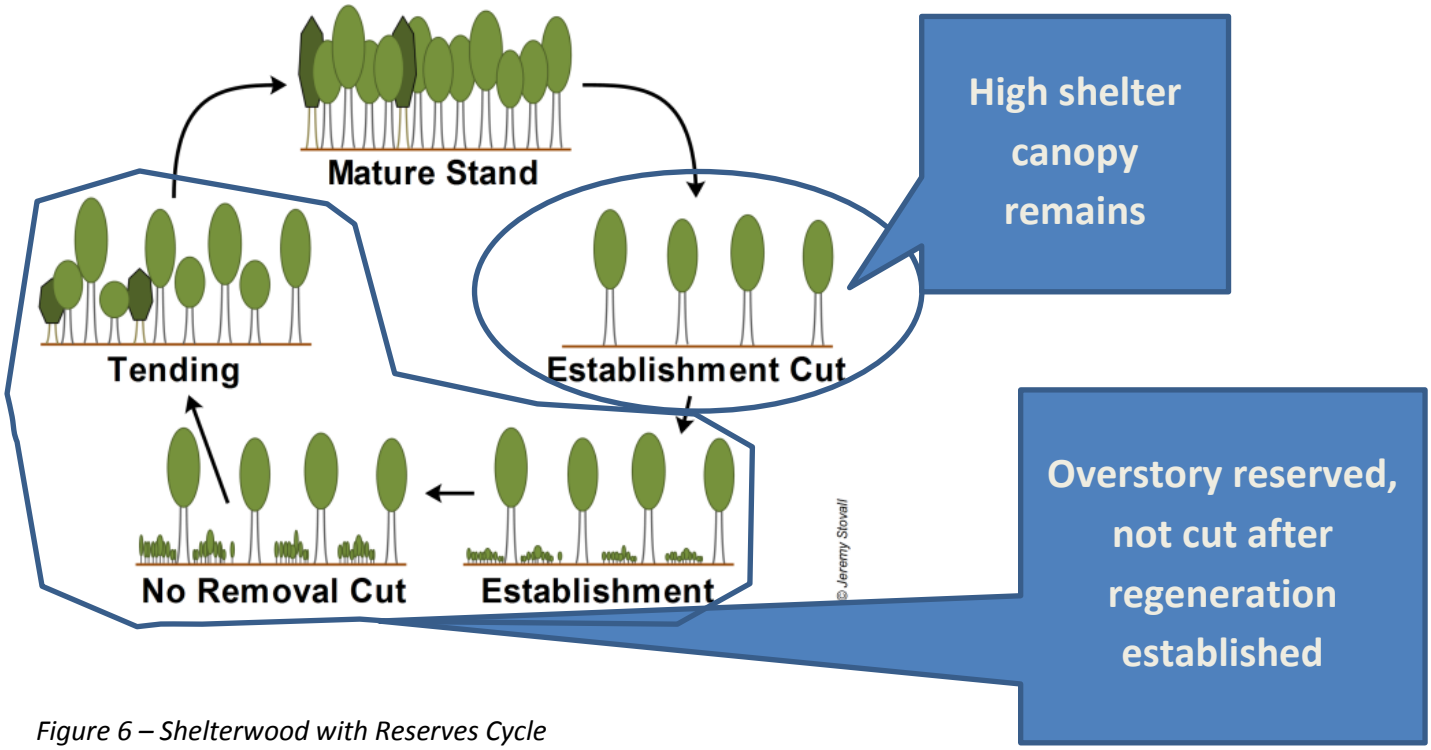

Figure 6 – Shelterwood with Reserves Cycle

Figure 7 - Shelterwood with Reserves Post-Harvest Cedar stand

Strategies for Managing Preferred Habitat Types

Hemlock: Hemlock and Northern Hardwood with Hemlock Dominant

Hemlock provides the best snow intercept and the majority of primary shelter in the Sturgeon River complex. Hemlock stands, based on the USFS FIA data, represent only 6 percent of the landscape (Figure 3). However, the basal area analysis (Figure 4) demonstrates that a large amount is in heavier basal area density that likely is serving as functional shelter. Hemlock stands that provide functional shelter usually have basal areas greater than 100 sq. ft. /acre. These stand conditions reduce snow depths under the canopy and result in increased mobility for deer in the form of trails systems to access food and avoid predators. These stands also reduce the effects of wind and low temperatures and provide a surprisingly large amount of food from litter fall, including hemlock fronds, hardwood stems and lichen.

Hemlock strategies center on retention of this species in the stand as deer browsing makes it difficult to regenerate, and removing the trees can permanently eliminate the shelter value. These stands are relatively young and should be able to sustain periods of deferred harvest until regeneration and recruitment conditions improve. Beyond the deer benefits, retaining these trees has the added value of preserving seed trees for future reforestation and maintaining stand diversity to enhance biological diversity.

Strategy 1 - Recommended: Defer timber harvest in these stands. This is the simplest method to maintain the current shelter value.

Strategy 2 - Alternative: Harvest other species but retain the hemlock. Maintain sufficient basal area in the residual stand to minimize windfall of remaining hemlock.

Strategy 3 - Alternative: Harvest using shelterwood with reserves leaving 70 percent canopy closure with retention heavy to hemlock (Figure 6). Without future regeneration and recruitment of hemlock this method may have limited repeatability.

Cedar: Lowland Conifer with Cedar Dominant

While not as efficient as hemlock, cedar also intercepts snow and provides additional primary shelter in the Sturgeon River complex. Cedar is a preferred winter food for deer and is the only species that provides all components of winter nutrition for deer. Cedar stands, based on the USFS FIA data, represent 8 percent of the landscape (Figure 3). However, the basal area analysis (Figure 5) demonstrates that a reduced amount is in higher basal area density that likely is serving as functional shelter. Based on basal area, there appears to be numerous low site quality cedar stands in this complex. Cedar stands that provide functional shelter usually have a cedar basal area greater than 150 sq. ft/acre. These stand conditions function to reduce snow depths under the canopy and result in increased mobility in the form of trail systems to access food and avoid predators. These stands also reduce the effects of wind and low temperatures and provide a surprising amount of food from litter fall, including cedar fronds, hardwood stems and lichen.

Cedar strategies center on retention of this species in the stand as deer browse make it difficult to regenerate and removing the trees can permanently eliminate the shelter value. Cedar stands are relatively young at 100-200 years and should be able to sustain several periods of deferred harvest until regeneration and recruitment conditions improve. Beyond deer benefits, retaining these trees has the added value of preserving seed trees for future regeneration efforts and maintaining stand diversity.

Strategy 1 - Recommended: Defer timber harvest in these stands. This is the simplest method to maintain the current shelter value.

Strategy 2 - Alternative: Harvest using shelterwood with reserves leaving 50 percent canopy closure with retention heavy to cedar (Figure 6). Without regeneration and recruitment of cedar this method may have limited repeatability.

Strategy 3 - Alternative: Harvest other species but retain the cedar. Other conifer species may be contributing to functional shelter and their removal may significantly reduce the shelter value depending on the arrangement and extent of the cedar retention.

Lowland Conifer: Cedar Minority but not Majority Black Spruce and Tamarack

Lowland conifer stands used by deer that are not a majority of cedar are typically comprised of combinations of white spruce, black spruce, balsam fir, cedar, hemlock and deciduous trees including balsam poplar and red maple. These stands often provide patches of functional winter shelter in mature, heavy cedar/hemlock stocked patches within the mixed species stand. Even sub-functional stands (short tree heights and poor canopy closure) can provide valuable travel corridors between functional shelter and food stands. Similar to hemlock and cedar stands, they provide food in the form of litter fall including hemlock and cedar fronds, hardwood stems and lichens. In addition, the scattered canopy gaps can provide valuable browse such as red maple and red osier dogwood. One concern in these stands is that some timber harvest methods result in conversion from mixed lowland conifer to balsam poplar which provides little shelter or food value for wintering deer. The recommended strategies reflect that concern.

Strategy 1 - Recommended: Harvest using shelterwood with reserves leaving 50 percent canopy closure with retention heavy to cedar (Figure 6).

Strategy 2 - Alternative: Harvest short-lived species but retain cedar if available using other silvicultural methods. The drawback to this alternative is large areas may convert to balsam poplar depending on the stand conditions unless sufficient overstory canopy is retained to discriminate against balsam popular. Without adequate overstory stocking, this could result in a short-term and long-term reduction in shelter.

Strategy 3 - Alternative: Mark out heavy patches of cedar or functional shelter patches for stand retention and then harvest using other silvicultural methods. Similar to alternate strategy 2, the drawback to this alternative is that large areas may convert to balsam poplar depending on the stand conditions, extent of retention and harvest method. This could result in a short term and long term reduction in shelter.

Northern Hardwood Dominant and Mixed Conifer/Hardwood (Hemlock a Minority)

Northern hardwood stands where hemlock is a minority component, serve primarily as a food source for wintering deer although patches in the stand heavier to conifers may provide shelter during mild winters. Sugar maple typically makes up a majority of these stands but can be mixed with white ash, basswood, red oak, black cherry and shelter species including hemlock, white spruce, balsam fir and white pine. Often these stands become more mixed with shelter species as the stand transitions from the upland to the lowland. The mixed portions become important travel corridors for foraging on regenerating hardwood stems and moving between functional shelter areas. The recommended strategies center on providing food for deer the year of harvest and in subsequent years from regenerating stems. These strategies may increase the conifer component, especially in transition areas.

Some properties may not have the preferred species composition as identified winter deer complex habitat (i.e. proper mixed composition with hemlock and cedar). The following lists of species combinations were identified within the sturgeon river management area from the USFS vegetation layer in GIS and provide examples of dominant species compositions that currently exist within parcels of the Sturgeon DWC.

Bigtooth aspen
Mixed lowland hardwoods
Northern red oak
Paper birch
Red maple (wet sites)
Sugar maple
Sugar maple/Beech/Yellow birch
Sugar maple/Northern red oak
Eastern white pine/Hemlock
Jack pine/Oak
Northern white cedar/Aspen/Paper Birch
Black ash/American elm/Red maple
Mixed northern hardwoods
Oak/Aspen
Quaking aspen
Red maple (dry sites)
Sugar maple/Basswood
Sugar maple/Beech/Yellow birch/Red spruce
Balsam/Aspen/Birch
Eastern white pine/Northern Red Oak/White ash
Northern hardwoods/Hemlock
White spruce/Balsam fir/Aspen

Recommended Strategies to Increase Cover:

- Retain conifer trees to facilitate deer movement and cover
- Increase secondary shelter by one or more of the following:
    - Use seed tree silviculture in areas dominated by other conifers but avoid high grading; retain a good distribution of high quality seed trees.
    - Plant combinations of white spruce, balsam fir, white pine and possibly hemlock depending on local site conditions.
        - White pine under plantings are preferred given the moderate deer numbers in this complex.
        - White pine planting may require timber harvest planning to keep deer away from the plantings sites until they are out of reach of deer.

Recommended Strategies to Increase Food:

- Harvest in winter using single tree or group selection leaving felled tops to provide easily accessible winter food.
- Retain cedar and hemlock trees to facilitate feeding opportunities and provide diversity in stand.
- Retain oak trees to provide access to acorns during early and late winter as snow depths allow.
- Select cut to produce small openings for regeneration and multi age management.
- Plant and/or retain mast species.
- Feather edges to encourage early succession and shrubby mast species establishment along boundaries.

Aspen (Pure Aspen or Mixed Conifer Component)

Aspen stands serve primarily as a food source for wintering deer although patches of conifers may provide shelter. Big tooth aspen, quaking aspen and birch typically makes up a majority of these stands but they can be mixed with shelter species including hemlock, white spruce, balsam fir and white pine. Often, these stands become more mixed with shelter species as the stand transitions from the upland to the lowland. These heavily mixed stands become important travel corridors for deer to forage on regenerating hardwood stems and to move between shelter areas. The recommended strategies center on providing food for deer in the year of timber harvest and in subsequent years from regenerating stems. The strategies also include increasing the conifer component, especially in transition areas.

Recommended Strategies to Increase Cover:

- Encourage a mixed conifer – hardwood (aspen) stand condition.
- Retain conifer and release subcanopy conifer trees using single tree or group selection
- Retain conifer trees to facilitate cover and deer movement.
- Increase secondary shelter presence where possible using one or more of the following:
- Retain patches that are heavier to conifer as retention especially those with cedar and hemlock present
- Protect existing conifer regeneration
- Plant white spruce and balsam fir post-harvest.
- In red maple areas of stand refer to the red maple recommendations.
- Utilize downed branches to create barriers around regenerating/planted conifer
- Avoid cutting near areas recently planted with conifer to discourage browsing pressure .

Recommended Strategies to Increase Food:

- Harvest in winter leaving felled tops to provide accessible winter food.
- Consider small cut units (e.g. 20 acres) in order to spread the harvest over multiple winters.
- Retain cedar and hemlock trees to facilitate feeding opportunities and provide diversity in the stand.

- Retain oak trees to provide access to acorns during early and late winter as snow depths allow.
- Cut aspen to encourage regeneration as spring forage
- Retain and release patches of understory mast species (i.e. hazelnut, dogwood, serviceberry, etc.)
- Plant and protect hemlock and cedar for future browse

Conifer Dominant Habitats


There are parcels of conifer dominated habitat that may not include the preferred primary cover species of cedar and hemlock, or even the secondary cover species of white spruce, balsam fir and white pine. These conifers intercept less snow but may be able to contribute to functional shelter especially when mixed with primary and secondary cover species. These trees also provide feeding corridors through hardwood stands and shelter during periods of lower snow depth. Many of these species occur as a component of mixed stands in the transitions between upland and lowland. Some properties may not have the preferred species composition as identified for winter deer complex habitat. The following lists of species combinations were identified within the sturgeon river management area from the USFS dominant vegetation layer in GIS.

Balsam fir
Eastern white pine
Jack Pine
Tamarack
Upland northern white cedar
White spruce/Balsam fir

Black Spruce
Eastern white pine/Hemlock
Mixed pines
Upland black spruce
White spruce

Recommended Strategies to Increase Cover:

- Retain ≥50 percent conifer canopy cover with selective cutting of single tree or group selection to encourage multiple canopy layers.

- Use seed tree silvicultural method especially for primary cover species but avoid high grading; retain a good distribution of high quality seed trees.
- Plant a combination of conifer species for diversity and incorporating the hemlock or cedar as site conditions allow and/or protective measures are utilized to protect plantings.
- Avoid cutting near planted or young conifer to discourage browsing pressure.

Recommended Strategies to Increase Food:

- Harvest in winter to provide downed tops for food.
- Plant acorns for oak regeneration as conditions allow.
- Create small openings to encourage a mixed hardwood/conifer habitat type.
- Feather edges to encourage early successional growth and shrubby mast establishment along boundaries.

Forest Openings

Forest openings within and adjacent to deer wintering complexes may provide a key early spring food source. Deer leave complexes in the spring and move toward their summer ranges as soon as snow depths moderate. In the Sturgeon River DWC, existing openings are limited and represent less than 1 percent of the complex. Examples of openings include utility corridors, timber harvest landings, old logging roads and remnant forest openings. Snow melts early on south facing slopes and these sites often provide the first available green vegetation for deer. These south facing slopes represent especially good locations for managing for forest openings. Strategies center on maintaining these openings in cool season plants species that provide early spring nutrition.

Recommended Strategies:

- Maintain existing openings by cutting, mowing or burning to control tree encroachment.
- Emphasize cool season grasses and forbs; keep it native species.
- For maximum spring deer food benefit, consider maintaining forest openings in wildlife clover mixes with annual late summer mowing and regular 3-5 year maintenance and, if necessary, reseedings.

- Take advantage of south facing slopes for openings and/or managing for early succession growth for spring forage

Planting Trees

In cases where planting of conifer or other species is warranted and/or desired, protection of the seedlings from browse pressure will most likely be required for optimal seedling survival. Protection may be required for several years until the trees can survive minimal browse. Damage to planted seedlings by deer can occur by browsing off terminal and primary lateral growth tips which retards growth, and by damaging roots by jerking seedlings out of the soil. Seedling protectors can protect the entire plant or protect the terminal growth (Schaap and DeYoe 1986).

Recommended Strategies to Protect Planted Seedlings

- Stapling pieces of brown paper bags around the tips of seedlings can protect the primary growth.
- Encircle small planted areas with downed slash as barrier.
- Use commercially available protective tree tubes.

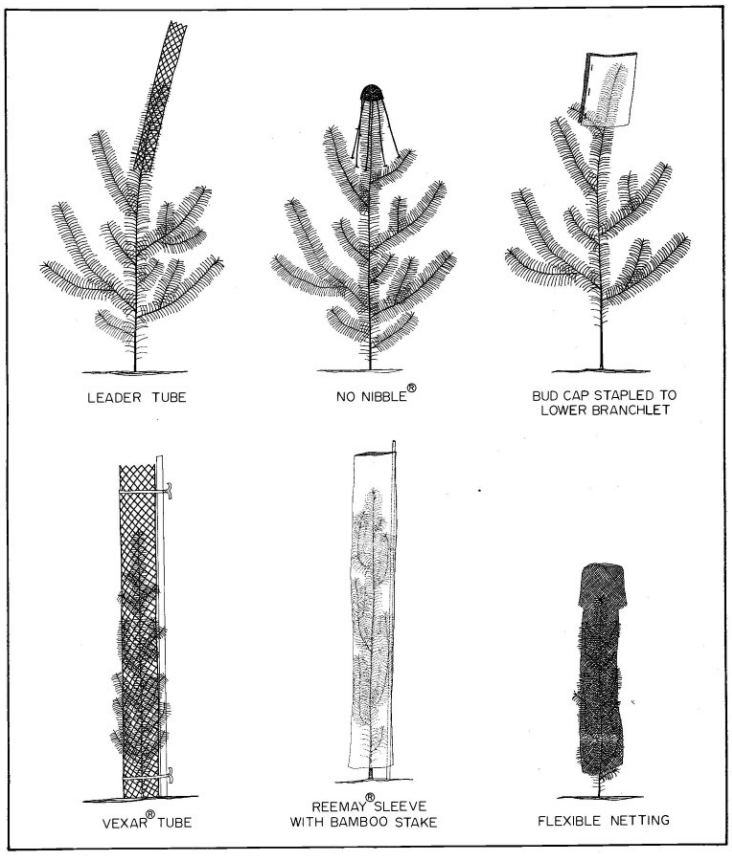

Figure 8 - Seedling Protectors for Preventing Deer Browse.
Schaap and DeYoe 1986

Summary

The Sturgeon River DWC is the largest of the 57 DWCs in the UP. While the summer range extent of this complex is unknown it certainly is an important complex for deer in much of Baraga and Houghton counties. Most of the land located inside this complex is actively managed forestland. To effectively manage the food and shelter resources for deer use during the winter, it requires application of timber harvest strategies to manage those key habitats. This document provides habitat recommendations including timber harvest guidance for each of these key habitats. This complex has been used by wintering deer since at least 1937 and application of these strategies should contribute to the overall winter range goal to "sustainably manage shelter and food resources" and result in the continued use of this complex by wintering deer into the future.

If you are a landowner within this complex and interested in implementing some of the strategies identified in this document, be sure to review the reference section on the next page. The references include resource links that can guide and potentially even help fund your forest management plans. A good starting point is contacting your local county conservation district forester (for Baraga County: (906) 875-3765, for Houghton County: (906) 667-1100 x 632). They can provide guidance identifying and implementing these strategies based on your interest in timber harvest, or non-timber harvest activities such as tree planting or forest opening creation or maintenance.

UPHW Strategies to Achieve Habitat Objectives in the Sturgeon River DWC

- Engage with the Ottawa National Forest to provide input on opportunity areas that fall within the Sturgeon River DWC
- Contact forestry consultants in the area, share the habitat goals and summary of this complex and encourage them to consider these recommendations when working with landowners located in this complex.

Appendices

- Appendix 1: Glossary
- Appendix 2: Silvicultural Treatments
- Appendix 3: Habitat Type Acreages in Sturgeon River DWC
- Appendix 4: References

Appendix 1: Glossary

These definitions reflect some of the terms used in this plan and others related to habitat management.

ACRE - A unit of area used in land measurement equal to 160 square poles, 4,800 square yards or 43,560 square feet.

ADVANCE REGENERATION - Seedlings or saplings that are present in the understory prior to removal of any overstory.

AGE CLASS - A group of trees in a stand that are at or nearly the same age.

ARTIFICIAL REGENERATION (reproduction) - Creation of a new age class by direct seedling, or by planting seedlings or cuttings.

AESTHETICS - The perception of beauty conveyed by a natural scene, a pleasant sight.

BASAL AREA - Total area of cross section of stems measured at breast height (4 2
feet above the ground), usually expressed in square feet per acre.

BEST MANAGEMENT PRACTICES - Guidelines establishing standards for all aspects of logging which have been developed to reduce sedimentation of streams.

BIOLOGICAL DIVERSITY - The distribution and abundance of different plant and animal communities.

BURNING, PRESCRIBED - The application of fire, usually under existing stands and under specific conditions of weather and fuel moisture, in order to control vegetation to meet goals of silviculture or hazard or disease reduction.

CLEANING - A release treatment made in an age class not past the sapling stage in order to free the favored trees from less desirable individuals of the same age class which overtop them or are likely to do so.

CLEAR-CUT - An even-age method of regenerating a stand through the removal, in a single cut, of all trees larger than seedlings. The new age class develops in a fully- exposed microclimate. In some situations, small numbers of trees may be left within the clear-cut opening for some special purpose.

CLIMAX FOREST - The final stage of succession, that is relatively stable and self- perpetuating.

COMPETITION - the constant demand of each organism for more growing space, light, nutrients and water.

COMPOSITION, STAND - The proportion of each tree species in a stand expressed as a percentage of either the total number, basal area, or volume of all tree species in the stand.

CONDITIONING CUT - A harvest cut which is used to improve the overall health of the stand by removing mature, overmature, low vigor and poor quality trees. The result is a stand of better stocking, more vigorous and desirable species, increased diversity, quality and growth potential.

CONSERVATION - The wise-use of natural resources. The management of a resource which retains the basic character of that resource over time.

CROP TREE - Any tree that is selected to become a component of a future final harvest.

CROWN CLASS - A class of tree based on crown position relative to crowns of adjacent trees.

- Dominant - Trees with crowns extending above the general level of the main canopy of groups of trees, and receiving full light from above and comparatively little from the sides.
- Codominant - Trees with crowns forming the general level of the main canopy in groups of trees, receiving full light from above and comparatively little from the sides.
- Intermediate - Trees with crowns extending into the lower portion of the main canopy of groups of trees, but shorter in height than the codominants. They receive little direct light from above and none from the sides.
- Overtopped (suppressed) - Trees of varying levels of vigor that have their crowns completely covered by the crowns of one or more neighboring trees. These trees receive little if any direct light.

CROWN COVER - The ground area covered by the crowns of trees or woody vegetation as delimited by the vertical projection of crown perimeters and commonly expressed as percent of total ground area (syn. Canopy Cover).

CROWN DENSITY - The compactness, or depth of foliage of the crowns of trees and/or shrubs.

CULL TREES - Any tree in which 50% or more of the total volume is defective.

CUTTING CYCLE - The planned interval between partial harvests in an uneven-aged stand.

DEFERMENT CUT- A regeneration practice during which, up to 20% of the basal area of the stand is carefully selected for retention. These trees are meant to remain through the end of the succeeding rotation. This practice creates a two-aged stand.

DEN TREE - Any tree with one or more cavities that afford shelter or protection to wildlife.

DIAMETER AT BREAST HEIGHT (DBH) - A measuring point on a tree made at 42 feet above the ground on the uphill side.

DIAMETER CLASSES - A group of trees or logs of similar sizes at a common point. Usually in two-inch increments at DBH for trees and one-inch increments, inside the bark on the small end for logs.

ECOLOGICAL APPROACH - Natural resource planning and management activities that assure consideration of the relationship between all organisms (including humans) and their environment.

ECOLOGICAL PROCESSES - The actions or events that link organisms (including humans) and their environment, such as disturbance, successional development, nutrient cycling, carbon sequestration, productivity, and decay.

ECOREGION - A continuous geographic area over which the macroclimate is sufficiently uniform to permit development of similar ecosystems on sites with similar properties. Ecoregions contain multiple landscapes with different spatial patterns of ecosystems.

ECOSYSTEM - The natural complex of plant and animal populations and the particular sets of physical conditions under which they exist.

EMERGENT (aquatic plant beds) - A site covered by water populated by plant species whose roots are below the surface and which extend some part of the plant above the surface. An indicator of wetlands.

ENDANGERED SPECIES - Any life form which is in danger of extinction throughout all or a significant portion of its range. Its population level is so critically low and/or its habitat is so degraded that immediate action must be taken to avoid the loss of the species.

ENVIRONMENT - All the conditions, circumstances, and influences surrounding, and affecting the development of, an organism or group of organisms.

EVEN-AGED STAND - A stand of trees containing a single age class in which the range of tree ages is usually less than 20 percent of rotation.

EXCLUDED AREA - A specifically designated area segregated from the predominant activity. An area set aside from specific management regimes.

FAUNA - Of or related to animals, the animals of a specified region or time, a descriptive list of such animals.

FLORA - Of or relating to plants, the plants of a particular region or time, a descriptive list of such plants.

FOREST HEALTH - Forest can be considered healthy when there is a balance between growth and mortality, and the forest has the resiliency to react and overcome various forest impacts. Potential forest stressors include insects, pathogens, weather, climate, pollution, and others.

FOREST PRODUCT - Something produced during the natural processes in a forest.

FOREST PRODUCTIVITY - The ability of tree species to grow on a particular site; influenced by internal (tree physiology) and external (soil, climate) factors.

FOREST RESOURCES - Natural resources associated with forested ecosystems, included but not limited to; fish, air, clean water, wildlife, vegetation, soil, recreation and aesthetics.

FORESTRY - A profession embracing the science, business, and art of creating, conserving, and managing forests and forest lands for the benefit of society.

FRAGMENTATION - The breaking up of contiguous areas into smaller patches of increasing degrees of dissimilarity.

FULLY STOCKED STANDS - Any stand containing a combination of basal area and stems per acre sufficient to indicate optimum use of the available growing space.

GROUP SELECTION - A method of regenerating uneven-aged stands in which trees are removed, and new age classes are established, in small groups. The maximum width of the group is approximately twice the height of the mature trees, with these small openings providing micro-environments suitable to regenerate shade intolerant tree species (requiring direct sunlight for growth). These areas are generally not more than one-quarter acre in size.

HABITAT - The specific combination of food, shelter, and water that is required to accommodate a species.

HARDWOOD STAND - Any forest stand in which the number of stems, basal area or volume consists of a majority of broad-leaf tree species.

IMPROVEMENT CUTTING - A cutting made in a stand past the sapling stage primarily to improve composition and quality by removing less desirable trees.

INGROWTH - Trees that, during a specified period, have grown past an arbitrary lower limit of (usually) diameter or height. Ingrowth is usually measured as basal area or volume per unit area.

INTERMITTENT STREAMS - Any water course which carries a visible flow of water periodically, usually depending on the season of the year, or the current and recent weather condition.

INTERMEDIATE TREATMENTS - A collective term for any treatment designed to enhance growth, quality, vigor, and composition of the stand after establishment of regeneration and prior to final harvest.

INVENTORY (forest) - The gathering of information such as the forest condition, land area, tree volumes, growth and mortality to provide for effective management planning.

LANDSCAPE - An area composed of interacting ecosystems that are repeated because of geology, land form, soils, climate, biota and human influences throughout the area. Landscapes are generally of a size, shape and pattern which is determined by interacting ecosystems.

LIBERATION - A release treatment made to a stand not past the sapling stage in order to free the favored trees from competition of older, overtopping trees.

MATURE FOREST - Generally used in an economic sense to indicate that a forest has attained harvest age.

MULTIPLE-USE - The act of satisfying more than one need with a single resource.

NATURAL REGENERATION - A stand of trees created from natural seeding, sprouting, suckering, or layering.

NURSE TREE (Nurse Crop) - A tree, group of trees, shrubs, or other plants, either naturally occurring or introduced, used to nurture or improve the form of a more important tree or crop during youth by protecting it from frost, sun scald or wind.

NUTRIENT CYCLE - The movement of soluble chemicals from the soil to the roots of plants into the stems and foliage; back to the surface of the ground in the form of leaves, fruits and twigs; and into soluble compounds again by the decomposition of this litter through the combined action of bacteria, fungi and soil animals.

OLD-GROWTH FOREST - Forests that contain a wide range of tree sizes and ages, a deep, multilayered crown canopy, diverse shrub and forb layers, and significant accumulations of coarse woody debris including snags and fallen logs. Stands typically appear all-aged rather than even-aged. Large trees can be evidence that the old growth ecosystem has had sufficient time to develop diverse structure, although not all old growth stands have large trees, particularly on less productive sites. Large trees can exist in relatively young stands on very productive sites.

OVERSTORY REMOVAL - The cutting of trees comprising an upper canopy layer in order to release trees or other vegetation in an understory.

PARTIAL CUTTING - The removal of a specific segment or component of a stand in a single operation, followed by a series of operations which remove other components until a specific goal is attained.

PERENNIAL STREAMS - Any stream channel containing a visible volume of water throughout the year with the exception of drought periods.

PERMISSIBLE CUT - The volume of timber that can be removed from a fully stocked stand without adversely affecting the stands ability to fully utilize the available growing space within the stand.

PINE STAND - Any forest stand whose composition, based on number of stems, volume, or basal area, consists of a majority of pine species (trees with needles in bundles).

PRECOMMERCIAL THINNING - A thinning that does not yield trees of commercial value, usually designed to improve crop spacing.

PRESCRIPTIONS - The written instructions by a forester for the preparation and administration of a resource management practice.

PRESERVATION - The act of guarding, securing, or sustaining an item so as to retain its character and quality.

PROPAGATION - To breed or multiply by regeneration, seed or cuttings.

PRUNING - To cut off or remove dead or living tree branches to improve tree growth, quality and commercial value of the tree.

RARE (species) - Species of a given region that are found in unusual habitats where local edaphic, topographic or biotic factors provide conditions unfavorable for those species having a more widespread distribution. Examples of such areas in WV are; rock cliffs, rocky water splashed river banks, sphagnum bogs (or glades) and shale barrens.

REGENERATION (reproduction) METHOD - A cutting method by which a new age class is created. The major methods are clear cutting, seed tree, shelterwood, selection, and coppice.

- Coppice Methods - Methods of regenerating a stand in which the majority of regeneration is from stump sprouts or root suckers.

REGULAR UNEVEN-AGED (balanced) STAND - A stand in which three or more distinct age classes occupy approximately equal areas and provide a balanced distribution of diameter classes.

RELEASE - A treatment designed to free young trees from undesirable, usually overtopping, competing vegetation. Treatments include cleaning, liberation and weeding.

RESIDUAL STAND - The aggregate of trees remaining in a stand following a silvicultural practice or natural disturbance.

RIPARIAN ZONE - The immediate area influenced by the presence of a concentration of water. The banks of streams, lakes or marshes.

ROTATION - The planned number of years between the regeneration of a forest stand and its final cutting.

SALVAGE CUTTING - The removal of dead trees or trees being damaged or killed by injurious agents other than competition, to recover value that would otherwise be lost.

SANITATION CUTTING - The removal of trees to improve stand health and to reduce actual or anticipated spread of insects and disease.

SAPLING - A tree, usually young, that is larger than a seedling but smaller than a pole, generally between 1" and 5" in diameter.

SECONDARY GROWTH FOREST - The forest subsequent to a harvest or other disturbance.

SECONDARY SUCCESSION - The succession or progression of plant communities that occurs on a site that previously contained a plant community that was removed by natural or man-caused disturbance. Primary succession is a term applied to vegetational changes that occur on sites where no vegetation has grown before (e.g., a new island, newly exposed rock).

SEDIMENTATION - The process of depositing a solid after being transported by a liquid. The act or

process of depositing soil particles onto the stream bed.

SEED TREE METHOD - An even-aged regeneration method in which a new age class develops from seedlings that germinate in fully exposed micro-environments after removal of all the previous stand except a small number of trees left to provide seed. Seed trees are removed after regeneration is established.

SHADE INTOLERANT - A description assigned to any tree species whose seedlings are incapable of sustained development in low light.

SHADE TOLERANT - Plants that are more competitive in shaded environments through selection for low respiration rates, they also tend to have lower photosynthetic rates and hence grow slowly in all environments.

SHRUB - A woody plant of relatively low height, distinguished from a tree by having several stems rather than a single trunk.

SHELTERWOOD METHOD - A method of regenerating an even-aged stand in which a new age class develops beneath the partially-shaded micro-environment provided by the residual trees. In one or more succeeding harvests the residual stand is removed to fully release the established regeneration.

SILVICULTURE - The art and science of controlling the establishment, growth, composition, health, and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis.

SILVICULTURE SYSTEM - A planned process whereby a stand is tended, harvested, and re-established. The system name is based on the number of age classes and/or the regeneration method used.

SINGLE TREE SELECTION - A method of creating new age classes in uneven-aged stands in which individual trees of all size classes are removed more or less uniformly throughout the stand to achieve desired stand structural characteristics.

SITE CLASS - A classification of site quality, usually expressed in terms of ranges of dominant tree height at a given age or potential mean annual increment at culmination.

SITE QUALITY (productivity) - The productive capacity of a site, usually expressed as volume production of a given species.

SITE PREPARATION - Reduction of competing vegetation, the removal of physical obstacles to planting and the drainage of water toward or away from the planted trees - to insure successful establishment of new trees.

SITES - Areas considered by ecological factors with reference to capacity to produce forests or other vegetation; the combination of biotic, climatic, and soil conditions of an area.

SIZE CLASSES - Tree sizes recognized by distinct ranges, usually of diameter or height.

SNAG - A standing dead tree from which the leaves and most of the branches have fallen.

SPECIAL TREATMENT AREAS - Any site within an area under a prescription which requires a modification to that prescription in order to suitably address the needs of the site.

SPECIES DIVERSITY - The amount of variety of life forms associated with an area. Often used as an indicator of the health of an ecosystem.

STAND - A contiguous group of trees sufficiently uniform in age class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable unit.

- Mixed Stand - A stand in which there is a mixture of species.
- Pure Stand - A stand composed of essentially a single species.
- Stratified Mixture - A stand in which different species occupy different strata of the total crown canopy.

STAND CONVERSION - A prescription advocating the removal of a dominant existing species in order to favor another species better suited to the site which may be either currently absent or suppressed.

STAND DENSITY - A quantitative, absolute measure of tree occupancy per unit of land area in such terms as numbers of trees, basal area, or volume.

STAND IMPROVEMENT - A term comprising all intermediate cuttings made to improve the composition, structure, condition, health and growth of even or uneven-aged stands.

STAND PRESCRIPTIONS - A written evaluation of a forest stand including directions and guidelines to be applied in order to change the condition of the stand to some desired condition as expressed in the management plan.

STEM - The main ascending axis of a plant, a stalk or trunk.

STEWARDSHIP - The integration of managing, growing, nurturing and harvesting of trees for useful products with the conservation of soil, air and water quality, wildlife and fish habitat and aesthetics. A management ethic advocating practices designed to improve a resource.

STOCKING - An indication of growing-space occupancy relative to a pre-established standard. Common indices of stocking are based on percent occupancy, basal area, relative density and crown competition factor.

STRATUM (canopy layer) - A distinct layer of vegetation within a forest community.

SUBCLIMAX FOREST - The stage in forest succession immediately preceding the climax forest.

SUCCESSION (ecological) - A process of community development that involves changes in species structure and community processes over time.

SUCCESSIONAL STAGE - One in a series of usually transitory communities or developmental stages that occur on a particular site or area over a period of time. Eventually, on most sites, a relatively stable, self-perpetuating stage, called a climax, is attained.

SUSTAINABLE - To produce a steady predictable quantity of all resources over time.

THREATENED SPECIES - One which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. This species may be rare but relatively stable in its population size, or it may be fairly common but declining rapidly.

THINNING - A cutting made to reduce stand density of trees primarily to improve growth, enhance forest health, or to recover potential mortality.

TIMBER COVER TYPES - A descriptive classification of forest land based on present occupancy of an area by commonly recognizable combinations of tree species.

TIMBER SIZE CLASS - A descriptive classification grouping a broad range of tree sizes together based on the common utility of trees within that range.

TOLERANCE, SHADE - The relative capacity of a plant to become established and grow in the shade.

TREE - A usually tall, woody plant, distinguished from a shrub by having comparatively greater height and characteristically, a single trunk rather than several stems.

TREE SHELTERS - A translucent plastic tube supported by a stake, placed around tree seedlings. Shelters protect seedlings from deer and small mammal damage and extremes in environmental conditions, thereby boosting the seedlings chances of survival and usually enhancing the growth rate.

TWO-AGED STAND - A stand composed of two distinct age classes that are separated in age by more than 20 percent of rotation.

UNEVEN-AGED STAND - A stand of trees of three or more distinct age classes, either intimately mixed or in small groups, separated in age by more than 20% of the rotation.

UNDERSTOCKED - A stand with any combination of basal area and stems per acre insufficient to optimally utilize the available growing space by the trees present.

VEGETATIVE COVER - The composite of all plant life on a given site.

VERTICAL STRUCTURE - The layering effect of plants in a stand, determined by different growth forms; trees, vines, shrubs, herbs, mosses and lichens and by the distribution of different tree species having different heights and crown characteristics and different ages of the same species. Multiple vegetative layers; overstories with rich species composition and well developed herbaceous shrub understory and woody mid- story layer.

WATERSHED - The entire area contributing to the supply of a river or lake; a drainage area. The entire area of land upon which the excess water (runoff) enters a common stream.

WETLANDS - Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered with shallow and sometimes temporary waters, at least part of the year.

WILDLIFE RESOURCES - Wild animals, wild birds and wildlife as defined in WV Code '20-1-2.

WORKING FOREST - Any boundary of forest land managed as a unit which is subject to active management including the use of silvicultural practices designed to manipulate the vegetative cover to create conditions desirable or not otherwise found on the forest.

Appendix 2: Silvicultural Treatments

What are stand prescriptions?

A stand prescription is a planned treatment of a forest site designed to change current stand structure or condition to one that meets management goals. Prescriptions are arranged hierarchically within categories. For example, "even-aged regeneration harvest" is a general category, with "clear-cut" being one method within this category. Under clear-cut, different types of clear-cut harvest are further defined. General prescriptions are commonly used at the planning stage. After a stand has been examined, a more specific prescription is usually assigned.

Key to stand prescription definitions

Large bold type	The most general stand prescription categories
Normal-sized bold type	General categories within the most general categories
Bold italic type	More specific categories
Normal type	The most specific level of stand prescription

Definitions

Regeneration Harvest	Harvest is designed to prepare a stand for natural (natural seeding/sprouting) or artificial (planting/seeding) regeneration.
Even-Aged Regen Harvest	Harvest is designed to regenerate a stand with a single age class. The result is a stand of trees containing a single age class in which the range of tree ages is usually less than 20 percent of the rotation.
Clear Cut	Essentially all trees in the stand are removed or felled in a single cutting.
Seed Tree	The area is Clear Cut except that certain trees, called seed trees, are left standing singly or in groups to furnish seed to restock the cleared area. Seed trees are removed after regeneration.
Shelterwood	An even-aged stand undergoes a series of partial cuttings resembling thinnings that extend over a small fraction of the rotation and provide

Regeneration Harvest	Harvest is designed to prepare a stand for natural (natural seeding/sprouting) or artificial (planting/seeding) regeneration.
	protected seedbeds for regeneration.
Clear Cut-With Reserves	Clear cutting (as Clear Cut) occurs, but varying numbers of trees, or groups of trees, are not harvested to attain goals other than regeneration.
Seed Tree-With Reserves	Some or all of the seed trees are retained after regeneration has been established to attain goals other than regeneration.
Shelterwood-With Reserves	Some or all of the shelter trees are retained well beyond the normal period of retention to attain goals other than regeneration.
Uneven–Aged Regen Harvest	A stand is regenerated and an uneven-aged structure maintained by removing some trees in all size classes singly, in small groups, or in strips. The result is a stand of trees of three or more distinct age classes, either intimately mix
Group Selection	Uneven-aged stands are regenerated by removing trees and establishing new age classes in small groups. The maximum width of the groups is approximately twice the height of the mature trees.
Single Tree Selection	New age classes are created in uneven-aged stands by removing individual trees of all size classes more or less uniformly throughout the stand to achieve desired stand structure.

Source: http://www.dnr.state.mn.us/forestry/harvesting/prescription_defs.html

Appendix 3: Habitat Type Acreages in Sturgeon River DWC

Habitat composition within the Forest Service owned parcels of the Sturgeon River DWC as determined by the dominant vegetation layer in GIS. The total area of the Sturgeon River DWC is 48,367 acres of which 11,473 acres (23.7%) are state, tribal, or privately owned.

Habitat Composition	Total Acres	% Total Acres
Mixed upland hardwoods	9,123	24.7
Sugar maple-beech/yellow birch	6,968	18.9
Quaking aspen	5,359	14.5
Northern hardwoods-hemlock	4,021	10.9
Hemlock	2,318	6.3
Sugar maple	1,511	4.1
Open	1,032	2.8
Red pine	975	2.6
Mixed swamp conifer	870	2.4
Balsam fir-aspen/paper birch	798	2.2
Black ash-American elm/red maple	610	1.7
Bigtooth aspen	563	1.5
Aspen-white spruce/balsam fir	558	1.5
Lowland shrubs	482	1.3
Eastern white pine	404	1.1
Paper birch	401	1.1
Red maple (dry site)	212	0.6
Sugar maple-beech-yellow birch/red spruce	205	0.6
Eastern white pine-hemlock	87	0.2
Sugar maple-northern red oak	84	0.2
Jack pine	65	0.2
Red pine-oak	48	0.1
Black spruce	47	0.1
Northern white-cedar	27	0.1
Sugar maple-basswood	26	0.1
Jack pine-oak	23	0.1
Tamarack	18	0.05
Upland shrubs	17	0.05
Mixed lowland hardwoods	17	0.05
White spruce-basalm fir	9	0.02
Northern white cedar-aspen/paper birch	9	0.02
Northern red oak	7	0.02
Total Acres of USFS Land	**36,895**	**100**
Private Land Holdings	**11,473**	**23.7**

Source: US Forest Service GIS information query

Appendix 4: References

Deer Winter Range Information

UP Habitat workgroup information and online maps:
http://bit.ly/uphabitatworkgroup

Michigan State Forest Deer Winter Range Guidelines:
https://www.michigan.gov/documents/dnr/DeerWinterRangeGuidelines_469021_7.pdf

Forestry Links

List of Conservation District Foresters by County
http://michigan.gov/MIFAP

Summary of forestry programs for landowners in Michigan
http://michigan.gov/documents/dnr/GeneralForestryInfo_474276_7.pdf

Forest Stewardship Program – provides management plan assistance
http://michigan.gov/foreststewardship

Natural Resource Conservation Service (NRCS) - provides management plan assistance
http://www.nrcs.usda.gov/wps/portal/nrcs/main/mi/technical/landuse/forestry/

Schaap, W. and D. DeYoe. 1986. Seedling Protectors for Preventing Deer Browse. Forest Research Lab, College of Forestry, Oregon State University. http://bit.ly/1FNk2CK

Stand Treatment Prescriptions. Minnesota Department of Natural Resources
http://www.dnr.state.mn.us/forestry/harvesting/prescription_defs.html

Grant Programs: these programs are competitive and may help fund some of the recommendations identified in this document beyond timber harvest, including conifer tree planting and opening maintenance.

Wildlife Habitat Grant Program: The Wildlife Habitat Grant Program (WHGP) purpose is to provide funding to local, state, federal and tribal units of government, profit or non-profit groups, and individuals to assist the Wildlife Division with developing or improving wildlife habitat for game species.
http://www.michigan.gov/dnr/0,4570,7-153-58225_67395-324696--,00.html

U**pper Peninsula Deer Habitat Improvement Grant:** The Deer Habitat Improvement Partnership Initiative is a grant program designed to foster productive relationships between the DNR, sportsmen's organizations, concerned citizens and other partners that produce tangible deer habitat improvement benefits and educate the public about the importance of the work and the scientific principles involved in it.

http://www.michigan.gov/dnr/0,4570,7-153-58225_67395-271849--,00.html

NRCS Environmental Quality Incentives Program (EQIP): Provides financial and technical assistance to landowners through contracts that provide financial assistance to help plan and implement conservation practices that address natural resource concerns and for opportunities to improve soil, water, plant, animal, air and related resources on agricultural land and non-industrial private forestland.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

Tree sales: Most county conservation districts have spring tree sales including white pine, white spruce, hemlock and balsam fir.

List of local districts
http://macd.org/local-districts.html