# Process and Criteria to Identify and Evaluate Candidate DNR Lowland Conifer Old Growth

**Minnesota Department of Natural Resources: Divisions of Forestry, Fish and Wildlife, and Ecological and Water Resources – January 2015**

Minnesota
DEPARTMENT OF NATURAL RESOURCES

## Introduction

In 1994, the Minnesota Department of Natural Resources (DNR) approved an **Old-Growth Forests Guideline** establishing criteria and goals guiding the nomination, evaluation and designation of "old-growth" for forest types that typically develop old-growth forest characteristics. These guidelines did not establish criteria for selection or management of old-growth lowland conifers for a number of reasons, including the relative abundance of old lowland conifer forest on DNR lands and the lack of sufficient data to characterize quality old-growth candidates for lowland conifer forest. However, DNR did recognize the need to address lowland conifer old-growth (LCOG). The DNR is now moving forward to identify, evaluate, and designate LCOG.

This document describes DNR's proposed process, evaluation criteria and related background information.

## Background

In the early 2000's, DNR embarked on a new landscape forest management planning process for DNR lands known as Subsection Forest Resources Management Planning (SFRMP). These plans established management direction for forest lands managed by the DNR Division of Forestry and the Division of Fish and Wildlife for the ensuing decade. Knowing that the DNR was not prepared to fully address LCOG at that time (staff resources were still focused on completing the original old-growth evaluation and designation process), DNR determined there was a need to identify some lowland conifer sites that might be considered old-growth or were otherwise ecologically important. Specifically, DNR SFRMPs identified stands of Ecologically Important Lowland Conifers (EILC), which were temporarily reserved from harvest pending completion of a LCOG designation process.

With the statewide completion of the first round of SFRMPs in 2012, approximately 185,000 acres of lowland conifers were temporarily reserved from harvest as EILC, over half of which is productive lowland conifers (approximately 11 percent of DNR's total productive lowland conifer forest land). The DNR has now committed to make the transition from the temporary EILC designation to the new LCOG designation for the next round of SFRMP revisions.

The first two large northern SFRMP revisions began January 2014. The DNR intends to include proposed LCOG designations in these two SFRMPs prior to their completion in 2015.

## Defining Lowland Conifer Old Growth

Over the past several years, DNR staff has been working to develop a definition for LCOG to be used in designation of old-growth lowland conifer stands. DNR staff met regularly and conducted extensive literature review in crafting a LCOG definition. DNR staff determined that similar efforts in Canada had produced the most comprehensive LCOG definitions to date and decided to use some of their published work as a starting point. DNR staff then incorporated Ecological Classification System (ECS) information on lowland conifers to complete the LCOG definition.

Lowland conifer ecosystems are very rare on a global scale. However, in Minnesota, lowland conifer forests comprise about 20 percent of all forest lands and approximately 50 percent of state-administered forest lands. Due to the large amount of lowland conifer forest in the state, DNR staff determined there was a need for a process to identify a target pool of stands from the state forest inventory to be evaluated for future potential designation.

DNR staff also determined that even though lowland conifer forest is common in the northern parts of the state, there are some areas (predominantly in southern Minnesota) where such forests are very rare. In order to designate the appropriate amount of LCOG, exceptions to the general definition for LCOG might be needed in those regions.

The characteristics of LCOG that are being proposed by DNR to define lowland conifer old-growth candidate complexes are presented below. We anticipate that future DNR landscape teams will be able to use these characteristics, along with the following evaluation criteria, to identify candidate pools of LCOG for protection within each SFRMP landscape.

## Definition and Characteristics of Lowland Conifer Old-Growth Forest

Lowland conifer stands are defined as conifer-dominated treed wetlands that occur on mucky mineral or wet organic soils. Lowland conifers stands include black spruce, tamarack and white cedar cover types (including stagnant stands). These cover types span three Wetland Forest Systems and include 11 Native Plant Community (NPC) Classes (e.g. Northern Wet Forest) and 17 NPC types (e.g. Lowland White Cedar Forest (North Shore)) recognized in DNR's NPC Classification[1] as shown below:

- **Wet Forest System**
    - WFn53 Northern Wet Forest Class
        - WFn53a Lowland White Cedar Forest (North Shore)
        - WFn53b Lowland White Cedar Forest (Northern)

[1] See: http://www.dnr.state.mn.us/npc/wetforest.html

- **Rich Forested Peatland System**
    - FPn62 Northern Rich Spruce Swamp (Basin)
        - FPn62a Rich Black Spruce Swamp (Basin)
    - FPn63 Northern Cedar Swamp
        - FPn63a White Cedar Swamp (Northeast)
        - FPn63b White Cedar Swamp (North-central)
        - FPn63c White Cedar Swamp (Northwest)
    - FPn71 Northern Rich Spruce Swamp (Water Track)
        - FPn71a Rich Black Spruce Swamp (Water Track)
    - FPn72 Northern Rich Tamarack Swamp (Eastern Basin)
        - FPn72a Rich Tamarack Swamp (East-central)
    - FPn81 Northern Rich Tamarack Swamp (Water Track)
        - Types undefined
    - FPn82 Northern Rich Tamarack Swamp (Western Basin)
        - FPn82a Rich Tamarack (Alder) Swamp
        - FPn82b Extremely Rich Tamarack Swamp
    - FPs63 Southern Rich Conifer Swamp
        - FPn63a Tamarack Swamp (Southern)
    - FPw63 Northwestern Rich conifer Swamp
        - FPw63a Tamarack-Black Spruce Swamp (Aspen Parklands)
        - FPw63b Tamarack Seepage Swamp (Aspen Parklands)
- **Acid Peatland System**
    - APn80 Northern Spruce Bog
        - APn80 Black Spruce Bog
    - APn81 Northern Poor Conifer Swamp
        - APn81a Poor Black Spruce Swamp
        - APn81b Poor Tamarack-Black Spruce Swamp

All unproductive (i.e., stagnant) lowland conifer forest types are found in the Acid Peatland System. Lowland conifer-associated NPCs from the Forested Rich Peatland and Wet Forest Systems will be primarily found in productive (i.e. commercial) lowland conifer stands. Each of the three NPC systems represents different ecological processes and plant species. Likewise, each NPC Class and Type within each system has different plant species associations. The DNR's "*Minnesota's Native Vegetation: A Key to Natural Communities*"[2] provides descriptions that illustrate these differences.

As such, it will be important for DNR to consider potential LCOG from both productive and non-productive lowland conifer types to be consistent with DNR's long established old-growth policy to protect the highest quality old-growth stands of each old-growth community type in each ecological region.

Lowland conifer stands being considered as candidate old growth should be examples of

[2] http://files.dnr.state.mn.us/eco/nhnrp/nckey.pdf

superior or unique lowland NPC types. Such stands will have developed over a long period of time essentially free from catastrophic disturbance. These stands are also relatively free of past human disturbance and will likely exhibit ecosystem functions that are different from earlier stages of forest succession: e.g. diminished timber productivity, slower nutrient cycling, and more complex wildlife habitat. They will contain relatively large, old trees that are beyond traditional rotation ages (stagnant stands may not contain relatively large trees due to limited nutrients in the NPCs where they are located). Furthermore, superior candidate stands will typically exhibit many of the following characteristics:

- potentially dominated by trees approaching their maximum possible size, given site conditions
- complex stand structure (including presence of tree-fall gaps, advanced regeneration, and variable height-class distribution)
- dead standing trees (snags)
- accumulations of downed woody material
- up-turned stumps
- hydrology relatively uncompromised by human activity
- few or no non-native invasive species
- minimum age greater than or equal to 90 years[3]
- complex size, scale and landscape context appropriate to the subsection: e.g. near Old Forest Management Complex (OFMC), large size, or rare occurrence in subsection
- presence of rare species
- animal damage below a level that changes the plant community succession
- accelerated tree mortality compared to earlier stages of forest succession
- relative lack of human disturbance (e.g. roads, trails, ditches, and past timber harvests)

In addition, good candidate stands will be part of larger complexes of adjacent lowland conifer forest with the same characteristics noted above. Larger complexes of similar candidate stands generally provide and sustain greater old-growth values over time compared to small, isolated stands. Ideally, candidate old-growth lowland conifer complexes will represent a mix of the NPCs noted above, which are also represented by a mix of both productive and stagnant DNR Forest Inventory Module (FIM) lowland conifer forest types.

[3] The DNR recognizes that candidates for older lowland conifer forests generally begin beyond the DNR's established normal rotation (i.e. harvest) ages for productive lowland conifer forest types. These normal rotation ages vary from 60 to 120 years depending on the forest type and site quality. Given this variability in normal rotation ages by type and site quality, and variability in the accuracy of age information for older lowland conifer stands in the DNR's forest inventory (i.e. Forest Inventory Module, or FIM), the DNR recommends that the target pool include all lowland conifer stands with a minimum age of 90 years in FIM, and all stagnant stands regardless of age, that also meet other target pool selection criteria.

## Proposed Lowland Conifer Old-Growth Evaluation Process and Criteria

Given the above written LCOG definition and general criteria, DNR staff was tasked with identifying operation criteria and a process to:

1. Identify lowland conifer stands to include in a "target pool" of stands from which candidate complexes would be identified;
2. Identify an appropriate pool of candidate LCOG complexes for further evaluation by DNR landscape teams; and
3. Provide specific criteria for DNR landscape teams to use in evaluating candidate LCOG complexes.

## Identifying the Target Pool of Stands

The target pool of stands from which candidate LCOG complexes will be identified includes:

- All lowland conifer stands within the DNR forest inventory (FIM) database that are:
  - Identified in the forest inventory as being ≥ 90 years old[4] (for productive stands); or
  - Stagnant, non-productive lowland conifer types; and
  - Identified in the forest inventory as being on wet sites; and
  - Not already sold for timber harvest; and
  - Stands that exhibit multiple characteristics listed in the LCOG definition.

## Identifying Candidate LCOG Complexes

Geographic Information Systems (GIS) analysis will be used to identify LCOG complexes within each ECS subsection by dissolving boundaries between adjacent stands within the target pool. Complex size thresholds will be established for each subsection that results in the identification of complexes that:

- Are well distributed spatially across the subsection.
- Include an appropriate number of complexes for landscape teams to evaluate.
- Include approximately10-20 percent of the productive lowland conifers averaged across all subsections within each ECS section.

[4] Refer to footnote #2

As a result, the average size of lowland conifer complexes will vary by subsection. For example, candidate complexes will be larger in the Agassiz Lowlands ECS subsection where lowland conifers are abundant and exist in large, contiguous patches; whereas candidate complexes will tend to be smaller in subsections farther south in the state where they are less abundant and scattered. The DNR expects that this will provide DNR landscape teams the appropriate number of complexes from which to identify the highest quality LCOG complexes.

## Criteria for Evaluating Candidate LCOG Complexes

DNR landscape teams will use criteria (see below) to evaluate the candidate LCOG complexes identified as a result of the above GIS analysis. Evaluations will apply relative weighting to these criteria based on the categories provided below (i.e., with "critical information" weighted higher and "augmenting information" weighted lower). Following are two important assumptions related to the evaluation process:

- Evaluations will be based on available information, either from existing databases or from staff knowledge and expertise about each complex. On-site visits are NOT intended to be included in the evaluation process due to the difficulty, time, and costs of accessing LCOG sites, and more limited variability in lowland conifer types from site-to-site compared to upland forest types.
- DNR landscape teams will be allowed to identify and evaluate additional candidate complexes or stands based on local field knowledge.

### Lowland Conifer Old Growth (LCOG) Complex Evaluation Criteria

**Foundation information/criteria (not included in individual complex evaluations):**

- Representative of DNR Forest Inventory Module (FIM) lowland conifer forest types and Native Plant Communities (NPC's) and inclusions of other cover types up to 10% of complex area.
- Age of stand
    - Only productive stands (SI>22) over age 90 will be considered (71-73 cover type)
    - Nonproductive stands (SI<23) of any age may be considered (75-77 cover type)

**A. Critical information to consider:**

a) Presence of relatively uncompromised hydrology (include road impediments)
b) Complexity of stand structure *
c) Presence of MBS High or Outstanding Site of Biodiversity Significance
d) Presence of rare species or rare native plant communities
    - S1 Species critically imperiled in state
    - S2 Species imperiled in state
    - G1 Species critically imperiled globally

- G2 Species imperiled globally
- S1 Community critically imperiled in state
- S2 Community imperiled in state
- G1 Community critically imperiled globally
- G2 Community imperiled globally

**B. <u>Important information to consider:</u>**

e) Presence of Species of Greatest Conservation Need (SGCNs)

f) Landscape context relative to other stands with statutory designations that limit management
   - Scientific and Natural Areas (SNAs), State Parks, Shipstead-Newton-Nolan reserve, federal Research Natural Areas (including candidate RNAs), Boundary Waters Canoe Area Wilderness (BWCAW), Tribally protected sites, etc.

g) Landscape context relative to other stands with administrative designations that limit management
   - Designated old growth stands, Representative Sample Areas (RSAs), Watershed Protection Area (WPA), The Nature Conservancy reserves, National Natural Landmarks, etc.

h) Amount of human caused disturbance

i) Presence or absence of invasive species

j) Amount mortality in complex (insect outbreak, etc.)

k) Size of complex relative to other complex sizes in the Subsection

l) Relative distribution of Lowland Conifer Old Growth (LCOG) complexes across the Subsection

**C. <u>Augmenting information to consider:</u>**

m) Long term animal damage*

n) Other subsection specific information*
   - Special management units, etc.

o) Past Ecologically Important Lowland Conifer (EILC) designation

p) School trust land status

***GIS/aerial photograph information combined with local knowledge**

## Stakeholder Involvement in the LCOG Process

DNR is providing three opportunities for stakeholders to provide input to the LCOG designation process:

1. The first opportunity (now completed) was to review and provide input on:
   a. proposed candidate LCOG complex identification and evaluation PROCESS described above AND
   b. proposed criteria that will be used to evaluate the candidate LCOG complexes (as described above)

2. The DNR will seek stakeholder input on SFRMP modeling scenarios early in each planning process. Stakeholders will have an opportunity to review model scenarios with different levels of LCOG designation. There will also be an opportunity to review the effects of the different LCOG amounts on model outputs and to provide comments on preferred outcomes.

3. The DNR will seek stakeholder input after DNR has proposed LCOG designations in each draft SFRMP plan. Stakeholders will have the opportunity to provide comments on the proposed draft designations.

## LCOG Process and Timelines

Following is a sequential listing of the general steps in DNR's process for identifying, evaluating, and ultimately designating LCOG. This includes how the process is integrated with the development of SFRMP revisions and identifies points of stakeholder involvement.

1. DNR staff develops proposed criteria and process for evaluating LCOG complexes.
    - Draft completed December 2013

2. Stakeholders provide feedback on proposed evaluation criteria and overall process. The DNR incorporates stakeholder input in final process and evaluation criteria.
    - Stakeholder comment period - December 2013/January 2014
    - DNR finalizes process and criteria – January 2015

3. DNR staff identifies candidate complexes at a scale that is appropriate for each subsection landscape (approximately 10-20 percent of productive LCOG with varying complex minimum sizes based on landscape characteristics).

4. DNR LCOG landscape teams evaluate candidate complexes using the criteria established in steps 1 and 2.
    - For the first two northern SFRMP revisions (Northern Minnesota and Ontario Peatlands and Northern Superior Uplands), steps 3 and 4 will occur during the plan revision process.
    - For subsequent SFRMP revisions, steps 3 and 4 are intended to be completed prior to the start of each revision process.

5. DNR SFRMP teams develop modeling scenarios that include different levels of LCOG designation.

- These modeling scenarios will be shared with stakeholders early in each SFRMP process.

6. The DNR proposes LCOG designation based on landscape team evaluations and stakeholder input on SFRMP modeling scenarios (step 5 above).
    - Prior to the release of each draft SFRMP for public review.

7. Proposed LCOG designations are reviewed by stakeholders as part of draft SFRMP plans.
    - With the release of each draft SFRMP for public review.

8. The DNR responds to comments received in step 7 and makes final LCOG designations.

## Glossary of Terms Used in Lowland Conifer Old Growth Documents

**Ecological Classification System (ECS):** A method to identify, describe, and map units of land with different capabilities to support natural resources. This is done by integrating climatic, geologic, hydrologic, topographic, soil, and vegetation data.

**Ecologically Important Lowland Conifers (EILC):** A temporary designation used by the DNR pending completion of a LCOG designation process. It includes stands of black spruce, tamarack, and cedar, including stagnant lowland conifer stands that are representative, high quality examples of lowland conifer native plant communities (NPC) found on DNR forest lands. Designated EILC stands are reserved from treatment during each 10 year SFRMP planning period. This designation will be retired once the lowland conifer old growth stands are designated.

**Forest Inventory Module (FIM):** FIM provides a database and application through which field foresters can maintain an integrated and centralized inventory of forests on publicly owned lands managed by the Division of Forestry and other divisions in the DNR. In the field, foresters collect raw plot and tree data. The data is summarized in stand level data that are linked to a spatial representation of stand boundaries.

**Geographic Information Systems (GIS):** Computer software used to manipulate, analyze, and visually display inventory and other data. GIS also creates polygons called shapefiles (visual maps) of the analyzed data for use by foresters, ecologists and wildlife biologists.

**Minnesota Biological Survey (MBS):** The MBS systematically collects, interprets, and delivers baseline data on the distribution and ecology of rare plants, rare animals, native plant communities, and functional landscapes needed to guide decision making

**National Natural Landmarks (NNL):** This is a national program which encourages the conservation of outstanding examples of the natural history of the US. It was established in 1962, is administered by the National Park Service, and is the only natural areas program of national scope that identifies and recognizes the best examples of biological and geological features in both public and private ownership. NNLs are owned by a variety of land stewards and participation in the program is voluntary.

**Native Plant Community Classification (NPC):** A classification system used to categorize native plant communities into recognizable units such as oak forest, prairie, marshlands, peatlands, etc. These communities are classified by physiognomy, hydrology, landforms, soils, and natural disturbance regimes such as wildfires, wind storms, normal flooding cycles.

**Old Forest Management Complex (OFMC):** An area of DNR land comprised of several stands that include three different elements: 1) designated old-growth or future old-growth

stands, 2) SMZs around these stands, and 3) additional stands managed for older growth stage characteristics.

**Representative Sample Areas (RSA):** Ecologically viable representative samples designated to serve one or more of three purposes: 1) to establish and/or maintain an ecological reference condition; or 2) To create or maintain an under-represented ecological condition (i.e., includes samples of successional phases, forest types, ecosystems, and/or ecological communities; or 3) To serve as a set of protected areas or refugia for species, communities and community types (e.g. developmental stages).

**Rotation Ages:** The period of years between the establishment (i.e. regeneration) of a forest stand (i.e. primarily even-aged) and when it receives its final harvest. The time period is an administrative decision based on economics, site conditions, growth rates, and other factors.

**Shipstead-Newton-Nolan:** Refers to a federal law (and corresponding state law) that restricts logging within 400 feet of navigable waters within a defined area of northeastern Minnesota (portions of Lake, Cook and St. Louis Counties).

**Species of Greatest Conservation Need (SGCN):** SGCN are species whose populations are rare, declining, or vulnerable in an identified state or location. They must meet one or more of the following criteria including: 1) Species whose populations are identified as being rare, declining, or vulnerable; 2) Species at risk because they depend upon rare, declining, or vulnerable habitats; 3) Species subject to other specific threats that make them vulnerable including over-exploitation, invasive species, disease, contaminants, lack of citizen understanding and stewardship; 4) Species with certain characteristics that make them vulnerable such as species that require large home ranges/use multiple habitats; depend on large habitat patch sizes; need special resources; depend upon an ecological process such as fire for survival; are limited in their ability to recover due to low dispersal ability or low reproductive rates; have a highly localized or restricted distribution; concentrate their populations during specific times of the year (migrations). 5) Species whose populations are stable in one location, but declining in a substantial part of their range outside that location.

**Stands:** Plant communities, particularly of trees, sufficiently uniform in composition, constitution, age, spatial arrangement, or condition to be distinguished from adjacent communities.

**Stagnant stands:** Stagnant stands refer to stands that lack vitality and show growth rate declines due to over-crowding, and poor site/nutrient conditions. Over time these stands become so stressed that there is often complete die-off and the entire stand dies.

**State Forest Inventory:** A statewide inventory of forest lands and covers species from aspen, hardwoods (oak, maple, etc.) and pine cover types to stagnant conifers, muskeg, and lowland brush.

**Subsection Forest Resources Management Plans (SFRMP):** A DNR plan for vegetation management on forest lands administered primarily by DNR divisions of Forestry and, Fish and Wildlife. The basis for delineating planning units are ECS subsections. The plans provide long-term (i.e., 10- and 50-eyar) strategic direction for DNR forest management, and identify forest stands that will be field examined during the 10-year planning period for potential timber harvest.

**Thinning:** A forestry treatment made to reduce the density of trees within a forest stand primarily to improve growth, enhance forest health, adjust tree species composition, or recover potential mortality.

**School Trust Land:** School trust lands include lands granted by the US government for use of schools within each township, swampland granted to the state, and internal improvement lands that are managed for the benefit of the permanent school fund purposes under the Minnesota Constitution, article XI, section 8. State law establishes the goal of the permanent school fund to secure the maximum long-term economic return from the school trust lands consistent with the fiduciary responsibilities imposed by the trust relationship established in the Minnesota Constitution, with sound natural resource conservation and management principles, and with other specific policy provided in state law. The DNR is responsible for managing school trust lands.