Technical Note

Target Communities and Condition for Forest Land Reclamation

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1. Introduction

The target community or condition is the expected end point of reclamation. Selection of a target community incorporates the core concept of <u>equivalent land capability</u>. The Conservation and Reclamation Regulation defines equivalent land capability where "the ability of the land to support various land uses after conservation and reclamation is similar to the ability that existed prior to an activity being conducted on the land, but that the individual land uses will not necessarily be identical."

As set out in the 2010 Reclamation Criteria for Forested Lands, selection of a target community or condition that is different from the adjacent undisturbed land would be a non-routine application. Non-routine applications have modified sampling and reporting criteria and must be justified based on site conditions or other identified constraints. Non-routine applications will also receive additional scrutiny from regulators.

Once selected the target community will act as a filter that will require certain actions be taken, and constrain other reclamation activities that may limit the establishment and growth of the desired plants (particularly woody plants). Based on the initial assessment, some sites may require that the target be different than the pre-disturbance condition (it is non-routine). The most likely change in condition is from lowland to upland (wet site to dryer site), or from a poor to a richer condition. Change in condition is most often dictated by the type and amount of fill material (clay or coarse aggregate material used for pad or road construction) remaining on site.

Note: condition refers to the underlying site capability as described by moisture and nutrient status.

2. Selecting a Target

The selection of a target community for reclamation is the most important step in planning and flows from site assessment. Central to selecting a target for reclamation is understanding how the two main components of the 2010 Reclamation Criteria will be implemented. The two main components are:

1. <u>Assessment Process and Criteria:</u> This outlines the standards and methodology used for assessing various components of the Landscape, Vegetation, and Soil Assessments that make up the 2010 Reclamation Criteria.
2. <u>Assessment Tool and Record of Observation (RoO) Datasheets</u>: The Assessment Tool for each land type poses Yes/No questions based on what is present onsite compared to offsite and whether it meets the standard set out in the Rationale.

Combined, the assessment process and the RoO are used to support the application for a reclamation certificate and to identify areas of noncompliance.

The first step in selecting a target community is assessing the site within the context of the surrounding landscape. Guidance for the required landscape assessment is provided in the 2010 Reclamation Criteria for Forested Lands. The required landscape level assessment includes:

1. Drainage
    a. Surface Water Flow;
    b. Sub-Surface Water Flow;
    c. Riparian Areas
2. Erosion
3. Stability (Subsidence)
4. Bare Areas
5. Operability
    a. Macro-contour;
    b. Meso-contour;
    c. Micro-contour;
    d. Surface Stoniness
6. Debris
    a. Woody Debris;
    b. Refuse

When assessing the landscape prior to target community selection the goal is to identify potential future problems and opportunities. Depending on the age and type of disturbance the site may be partially re-vegetated. Some sites may have topsoil placement complete and others have no soil work conducted. Regardless of the stage of abandonment, all six required criteria for the landscape assessment must be completed. If site adjustment is required based on the landscape assessment then the assessment must be repeated after work is complete. Whenever possible it is highly recommended that the landscape assessment be conducted after sufficient time has passed since site adjustment (e.g., drainage repair or modification, soil placement) for potential landscape issues to manifest.

The next step in selecting a target community is to assess soil and vegetation. Soil assessment must be performed both on site and at reference (control) sites. Depending on the age and stage of abandonment,

vegetation assessments may also include both on and off site data collection. The intensity, location and timing of data collection should be similar to that described in the 2010 Reclamation Criteria for Forested Lands. Use of the standards and methodology described in the 2010 Reclamation Criteria will allow for early identification of noncompliance. Early identification will allow for additional remediation or site adjustment to occur and avoid costly duplication of other reclamation work. During the assessment, emphasis should be placed on determining the ecosite and ecosite phase of the surrounding undisturbed lands using the *Field Guide to Ecosites of Northern Alberta* (Beckingham and Archibold 1996). In addition, in the surrounding undisturbed landscape, the presence, age and condition of trees and shrubs that may provide seed should be noted. This will allow natural regeneration to be integrated into the reclamation plan.

If the condition of the site has changed substantially compared to the immediately surrounding landscape, it may not be necessary to sample adjacent lands. In this case placement of sample plots may be expanded to include stands further away but likely more representative of the target community. For example, if a proposed reclamation site was formerly a peatland and is now an upland site, then sampling can be conducted in undisturbed upland sites farther away from the reclamation site. Placement of additional sampling locations along the access route to the site is recommended.

Once the landscape, soil and vegetation data have been compiled, selecting the target community is possible. When no landscape or soil issues are found, selecting a target community can be done in the field by experienced personnel. Selecting the target community should consider the following questions in order. Answering yes to any of the questions below would require that additional sampling be conducted prior to selecting a target plant community, or that a non-routine application will be planned:

1. Are there any landscape issues that must be corrected?
2. Were any of the required soil criteria in noncompliance?
3. Will the site no longer support the adjacent community (condition change)?
4. Would the site better support a community other than the adjacent community?
5. Is there native vegetation on the site that is established, healthy and providing some measure of restored ecosystem function (vegetation override, or minor adjustment)?

The starting point for target community selection is the plant community present on adjacent undisturbed land as described by ecosite and ecosite phase (Beckingham and Archibold 1996). When selecting a target community, the first decision must be based on ecosite. Ecosite is determined from the position on the edatope (moisture regime and nutrient regime). Position on the edatope must be estimated using information collected during the assessment. Most ecosites will support more than one tree species and multiple shrub species. For example, in the boreal mixedwood (*Field Guide to Ecosites of Northern Alberta*), only ecosite a (lichen) and ecosite k (rich fen) contain only one characteristic tree species. All other ecosites support multiple tree species that may occur together in highly variable mixtures. Within an ecosite, the understory communities are typically composed of the same suite of species that differ primarily in abundance. Ecosite phase is based on the tallest vegetation layer (typically trees) and dominant lower vegetation. It is not recommended that the plant community type (the finest level of resolution in the Alberta ecosite classification system) be used for target selection. Plant community types are highly variable and descriptive of large homogeneous mature forest stands.

If a site will not support the trees and shubs of the surrounding undisturbed land, then selection of the target community should be based on the assessed site conditions, and on anticipated future condition. Future conditions are largely driven by landscape position and surrounding terrain (e.g., position in drainage basin, position on slope).

2.1. Target Communities of the Boreal Mixedwood

The following summarizes the woody vegetation characteristic of ecosites and ecosite phases in the Boreal Mixedwood of northern Alberta, as explained in detail in *Field Guide to Ecosites of Northern Alberta* (Beckingham and Archibald 1996). These summaries, and the accompanying tables, are intended to help set targets for reclaimed sites based on moisture and nutrient regimes, as well as vegetation and wildlife objectives.

Lichen

This ecosite is characterized by xeric to subxeric moisture regimes and poor to very poor nutrient levels. Indicator species include jack pine, blueberry, bearberry, bog cranberry, sand heather and lichen. This ecosite has one ecosite phase, (a1) lichen Pj.

Blueberry

This ecosite is characterized by submesic to subxeric moisture regimes and medium to poor nutrient levels. Indicator species include blueberry, bearberry, bog cranberry, Labrador tea, cream-colored vetchling and hairy wild rye. This ecosite has four ecosite phases, (b1) blueberry Pj-Aw, (b2) blueberry Aw(Bw), (b3) blueberry Aw-Sw, and (b4) blueberry Sw-Pj.

Labrador tea–mesic

This ecosite is characterized by subhygric to submesic moisture regimes and poor to very poor nutrient levels and relatively acidic surface soil conditions. Indicator species include jack pine, black spruce, Labrador tea, bog cranberry, blueberry, feather moss and reindeer lichen. This ecosite has one ecosite phase, (c1) Labrador tea–mesic Pj-Sb.

Low-bush cranberry

This ecosite is characterized by a mesic moisture regime and medium nutrient levels. Indicator species include low-bush cranberry, Canada buffalo-berry, dewberry and wild sarsaparilla. This ecosite has three ecosite phases, (d1) low-bush cranberry Aw, (d2) low-bush cranberry Aw-Sw, and (d3) low-bush cranberry Sw.

Dogwood

This ecosite is characterized by a subhygric moisture regime and rich nutrient levels. Indicator species include balsam poplar, bracted honeysuckle, dogwood, currants, wild red raspberry, tall lungwort, sweet-scented bedstraw, and oak, lady and shield ferns. This ecosite has three ecosite phases, (e1) dogwood Pb-Aw, (e2) dogwood Pb-Sw, and (e3) dogwood Sw. The dogwood ecosite tends to be the most productive in the Boreal Mixedwood.

Horsetail

This ecosite is characterized by hygric to subhygric moisture regimes and rich to very rich nutrient levels. Indicator species include common horsetail and meadow horsetail. This ecosite has three ecosite phases, (f1) horsetail Pb-Aw, (f2) horsetail Pb-Sw, and (f3) horsetail Sw.

Labrador tea–subhygric

This ecosite is characterized by hygric to subhygric moisture regimes and medium to very poor nutrient levels. Indicator species include black spruce, jack pine, Labrador tea and bog cranberry. This ecosite has one ecosite phase, (g1) Labrador tea–subhygric Sb-Pj.

Labrador tea/horsetail

This ecosite is characterized by hygric to subhygric moisture regimes and medium to rich nutrient levels. Indicator species include white spruce, black spruce, Labrador tea, common horsetail, meadow horsetail and woodland horsetail. This ecosite has one ecosite phase, (h1) Labrador tea/horsetail Sw-Sb.

Bog

This ecosite is characterized by hydric to subhydric moisture regimes and poor to very poor nutrient levels. Indicator species include black spruce, Labrador tea, bog cranberry, cloudberry and peat moss. This ecosite has two ecosite phases, (i1) treed bog and (i2) shrubby bog.

Poor fen

This ecosite is characterized by hydric to subhydric moisture regimes and medium to very poor nutrient levels. Indicator species include black spruce, tamarack, Labrador tea, dwarf birch, willow, cloudberry, sedge, peat moss, golden moss, tufted moss and brown moss. This ecosite has two ecosite phases, (j1) treed poor fen and (j2) shrubby poor fen.

Rich fen

This ecosite is characterized by hydric to hygric moisture regimes and medium to very rich nutrient levels. Indicator species include tamarack, willow, dwarf birch, sedge, golden moss, tufted moss and brown moss. This ecosite has three ecosite phases, (k1) treed rich fen, (k2) shrubby rich fen and (k3) graminoid rich fen. There are no characteristic woody plant species found in (k3) graminoid rich fen.