RESEARCH HIGHLIGHT

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"Northern Landscaping: A Guide to Restoring Plants and Soil in Northern Communities"

PURPOSE

Interested in ideas on low-maintenance landscaping for the north? This pamphlet summarizes the manual *"Northern Landscaping: A Guide to Restoring Plants and Soil in Northern Communities."* The manual concentrates on smaller-scale planting projects within communities, using native species. It is not a guide to restoring contaminated sites, industrial sites, or for large ecological restoration projects.

This guide includes information on soil and plant types for communities in Labrador, Nunavik, Nunavut, NWT and Yukon, and also examples of projects in each Region. This information should help you and your community make a plan specifically for your location.

PREVENTION IS THE BEST CURE

The first main section of the manual deals with prevention. The best way to achieve healthy landscapes is to prevent damage in the first place. Careful construction techniques can prevent a lot of damage. When restoring your landscape, not creating damage elsewhere is equally important. Preventing foot and vehicle traffic on a newly restored landscape is vital to its success, certainly in the early stages, and possibly long-term. This will take planning and ongoing care, and usually requires some community involvement to achieve. Barriers may be necessary, either in the short or long term.

PLAN FOR MAINTENANCE . . . LOW-MAINTENANCE

Another imperative to a successful landscaping project is **planning for maintenance.** Low-maintenance does not mean no-maintenance. Besides protection as mentioned, watering will be needed at the beginning of most projects, and garbage cleanup will continue long-term. Until a natural landscape is established, your plants need help in community areas.

GETTING TO KNOW YOUR LANDSCAPE

Before planning and planting, **get to know and understand your site, and northern plants.** The guide gives some additional details of what to look for in mapping out your project, physically and over time. Suggestions include checking into:

- why/how is the site degraded?
- who owns the land?
- what is the site's history?
- what ecozone is the site in?
- what is the topography?
- what are the microclimates? (shaded areas, wet areas, sunny exposure, windy exposure, eroded areas, etc.);
- what plants grow on the site, or nearby?

NORTHERN SOILS

Looking at your site from all angles means paying attention to below ground features, bedrock, soil depth, and permafrost. You must handle northern soils differently than soils in southern areas. **Permafrost** can be easily upset when people strip off, crush or otherwise disturb the plants. Plant cover acts as insulation. Once you disturb the plants, much more surface heat penetrates through the ground, increasing soil temperature and leading to thawing and melting of underground ice and frozen soils.

Plants need their native soils. If the soil is severely damaged, concentrate your efforts here first, before you move onto planting. For the best results use some soil from the host site, and make sure the soil is as close to the host soil as possible.

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NORTHERN PLANTS

Northern plants are adapted to the conditions of northern climates and soils. They can take in nutrients at very low levels and/or are very efficient in using the nutrients they manage to get. Having long life cycles is usual for north plants: processes such as flowering can be prolonged over two or even more years. Years unfavourable for seed production probably outnumber the favourable years. Vegetative reproduction is common in arctic plants, allowing them to propagate even in years of severe climate. Perennials (non-woody plants that come back year after year) are more common than annuals (those plants growing from seed each year). Though tundra plants are low, they are not necessarily small. Much of the plants' biomass is underground . . . for instance, in wet tundra 95 per cent of the plant is below ground. These factors need to be considered in transplanting, collecting seed, taking cuttings, and other restoration techniques.

GOALS, OBJECTIVES . . .AND TIME

While getting to know the physical parameters, you will need to set out your goals and objectives for your project. In this, you will find that for long-term success, **patience and diversity** are required. Diversity, which is using a variety of plant species, is necessary for the long-term stability of your landscape. Monocultures (landscapes covered by a single species) are very difficult to maintain, and not healthy from an ecological point of view. Pioneer species (short-lived species that quickly establish in open conditions) are very useful initially in rehabilitation work. However, you will generally want the persistent "climax" species (those plants that grow more slowly and persist longer) in the long term.

This is where patience comes in. Short term triumphs of rapid plant cover are often less desirable in the long term . . . a more positive trend is a plant community moving toward climax. A northern revegetation project **takes years** to reach its goals . . . take time to enjoy the process. And be sure others are aware that this is not a quick fix, but a long term aspiration.

So remember in your goals and objectives:

1. Diversity is needed
2. Take advantage of pioneer species, but not exclusively
3. Plan and set maintenance goals to allow climax growth to develop

EXPLORE OPTIONS

While patience is a must, there are many **options** to explore, including

- how you lay out your site,
- what planting techniques you choose,
- what construction methods are available and cost effective,
- how long the project will need construction and concentrated maintenance, and so forth. Seek assistance. Others in the community, including naturalists, elders and educators, may be available to give advice, or be part of your project.

TECHNIQUES

Diversity of species is healthy ecologically. It also gives you great design possibilities. The different plants often have different ways to become established, and using a **variety of techniques** is generally recommended. Restoration and planting techniques include:

- natural colonization
- seeding
- sprigging
- cuttings
- rootings
- transplanting of native sods
- mass planting

Each of these techniques is explained briefly below:

Natural colonization is not "leave it and see what happens." It means establishing conditions right for succession so that nearby native plants can spread into the disturbed area more quickly. **Appropriate site preparation** has a lot to do with the success of this, and any other, technique.

Seeding can be done using commercially-grown, or locally collected seed. Unfortunately, there are very few commercially produced seeds of northern native species. Those that are available are mostly grasses, which tend to crowd out other species. On the other hand, collecting native seed can be difficult. Arctic plants tend to produce very few seeds, and in some years none at all. Timing of seed collection is extremely important to assure ripe viable seed. The seeds of many woody plants are best collected in late summer or fall, though there is considerable variation with species and the weather. Seeds of some species (for example, cranberry, birch, alder, black spruce) remain on the land for part or all of the winter. You can delay collection of these species.

Once seed is collected, you do not necessarily have to plant it right away . . . it can be stored for various lengths of time. The most desirable storage conditions are below freezing in airtight containers. Some seeds, such as those of willow, aspen and balsam poplar, are very fragile, and die within a few weeks after collection if stored at room temperature. Luckily, these species propagate well by other means.

Seed can be used either directly (seeding projects) or indirectly (production of seedlings). Using seed to produce seedlings will produce many more plants than direct sowing, and more quickly. Directly sown seeds often lie dormant for several years. However, producing seedlings is obviously a much more labour and time involved process than direct seeding. Spot seeding is frequently used for tree regeneration. Seed is sown on small, prepared spots spaced on the site. This method makes more efficient use of limited seed supplies.

Seeding done in the fall will take advantage of snow melt the following spring. If not done in the fall, seeding should be done during snow melt in the spring. Late seedings (June or July) may fail because of lack of moisture, unless watering is done throughout the rest of the season.

Sprigging involves harvesting small pieces of grass crown, roots and rhizomes. Half the root material is left behind for regrowth. Not much research has been done on sprigging, particularly of woody plants such as aspen. However, sprigging does seem to work well for a number of species that root readily at aboveground stem nodes, such as Arctophila fulva (Pendant Grass).

Cuttings are pieces of branches cut from a woody plant (tree or shrub), then planted. As the cuttings don't have roots, not all types of plants take well to this method. Willow species tend to be suitable, being easy to collect, store, and transplant, with good survival provided sufficient fine-grained sediment is available. Balsam poplar has also been dependable in the taiga and boreal ecozones.

Rooting is similar to cutting, but pieces of root stock are taken, rather than the aboveground branches. As with cuttings, poplar and willows can be easily propagated from viable root stock. The best time for root collection is in the fall, at the time of or after the leaves have fallen. At this time, the trees put most of their carbohydrate reserves into the rooting system. Roots kept at the proper temperature, and without drying, still show good germination rates even after about two months of storage.

Transplanting of native sod refers to taking up patches of intact vegetation, and transplanting them to part of the disturbed area. Sods can be planted by hand or machine. They have the advantage of having native soil with them, of containing a variety of species, including some held as seed. Get as much roots as possible, both by digging low, and by the size of the sods. This can work particularly well in permafrost areas, where root growth is restricted to the active layer (the part that thaws each summer, rather than the permanently frozen ground below). Lifting the sod from the frozen ground can be relatively easy, using the permafrost as the guide to how deep to go. This manner of restoration is relatively labour intensive. However, it works particularly well when plants on another site (or a portion of your site) are going to be destroyed (e.g., building, road).

Mass planting is the large scale version of transplanting of sods, as it involves moving larger shrubs and even small trees as a group, rather than individually. This requires a machine to move the volume and weight of soil needed to ensure the plants survive. A "bobcat" type small loader, or larger loader, can work, depending on the size of plants to be moved. This can be particularly effective in salvaging material from a site to be overtaken by construction. Getting good depth under the plants is important, as shrubs and trees tend to have deeper root systems than grasses and perennials.

More details on these techniques, and projects that have used them in the north, can be found in the full manual.

LOCATION, LOCATION, LOCATION

Collect your plants and seeds as close to the site as possible, near the same altitude, and in the same type of soil. This helps ensure they are best suited to the exact light, growing and climatic conditions. Collection within 200 kilometres (particularly in terms of latitude) or 500 vertical metres is preferred. Thus, for instance, getting birch seed or plants from cities in the provinces, such as in Edmonton or Montréal, is not recommended. Even though they might look the same, they are still "southerners", and not necessarily adapted to northern conditions. However, given the difficulties of obtaining native seeds and plants, sometimes going outside these bounds is necessary, and has indeed proven successful on occasion. Choose plants suited to the location: match how much light, moisture, and soil as best as possible.

SITE PREPARATION

The type of site preparation will depend on the goals and objectives of the project, and the planting techniques chosen. Preparations can include:

- correcting soil problems
- re-contouring of the site
- conserving as much topsoil or organic material as possible

- ensuring erosion is controlled through the project
- protecting adjacent area
- scarifying the surface to accept seed
- trapping snow with snow fences to accumulate organic matter and moisture

FERTILIZING

A big question in site preparation is, should you fertilize? If so, when and how much? As we are dealing with low-maintenance landscapes, the ongoing application of fertilizers is not appropriate (nor reasonable from an ecological viewpoint). Fertilizers tend to favour non-local species. Fertilizers in the arctic in particular can have very long lasting effects (decades). Fertilizers do not tend to help an area return to a native vegetation in the long term. Arctic plants use nutrients differently than southern plants. Thus a standard soil test, showing low nitrogen level, may not mean that the soil is low in the nutrients that arctic plants need. Given these cautions, careful use of fertilizer can be important to initiate and accelerate natural plant succession. Nitrogen seems particularly useful for arctic plants.

FOLLOW-UP

Keep **records** of your project . . . where you got your materials, how you did your planting, what your maintenance is. Not much information about restoration is specific to northern communities. Your successes, and failures, all add to the information base in the north. They'll also help you in your next project!

For the full manual, please contact CMHC at:
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Housing Research at CMHC

Under Part IX of the ***National Housing Act***, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research.

This fact sheet is one of a series intended to inform you of the nature and scope of CMHC's research.

To find more ***Research Highlights*** plus a wide variety of information products, visit our website at

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