

GUIDE: Restoration Assessment Form

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Last Mountain Lake National Wildlife Area and Migratory Bird Sanctuary

Environment Canada- Canadian Wildlife Service

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Preface

This guide was designed to work in conjunction with the restoration assessment forms. It gives you clear, step-by-step instructions on how to use the scoring sheet, and lists reasons why aspects might score the way they do. The scoring sheets were designed to give a clear picture of exactly how a restoration site is faring in the critical initial stages, and identifies its problems and attributes so that they might be dealt with in a timely matter. Results will vary slightly depending on what species were planted. Completing regular assessments will prevent restoration failure, saving time and money.

First-time users of this assessment form may wish to practice assessing an area before a real assessment is done in order to familiarize themselves with this assessment system. Conversely, more experienced users may wish to tailor the form to include other aspects not covered.

Ideally, assessments should be done every year to track the progression of a restoration site, but this isn't always feasible. Therefore, assessment forms for 1, 2, and 5 years after seeding have been included. Users wishing to do assessments in years 3 and 4 of a restoration should use the 'year 2' assessment form. Users wishing to do assessments beyond 5 years should use the 'year 5' assessment form, but could also use the Saskatchewan Range Health Assessment Form.

Before you start this assessment, walk in a zigzag pattern through the restoration site, ensuring to cover different types of habitat and topography (i.e. dry hilltops to moist depressions). Find a random yet representative area that typifies the restoration site as a whole. Walk this area in the same manner and then begin the assessment. If there are many different habitat and topography types, you may want to complete an assessment in each one to show the differences between the areas within the restoration. Use the same zigzag pattern to determine points where you need to take an average of 10 measurements.

Instructions

Fill out the top section as completely as possible so that the assessment can be referred to later. Also, having detailed location information will allow people to return to the same spot year after year to assess for any changes. Listing other people involved with the restoration is useful because they may be consulted with in the case of a discrepancy or omission.

Next, fill out the list of species occurring on the restoration site, but only list as many as will fit (or less). You just want to give an idea of the main species present. A complete species list will be filled out later.

Within your chosen site, answer the following 7 questions:

1. Human-caused bare ground. Delineate $\frac{1}{4}$ m² (50 cm x 50 cm) on the ground and estimate the percentage of human-caused bare ground. Write it in the space provided. This will be high in the first years because you will have had to cultivate and/or spray to prepare the seed bed, resulting in 100% human-caused bare ground prior to and just after seeding. It will take a while before this bare ground is covered with vegetation, and even longer before it is covered with litter. Having said that, if there are still large amounts of bare ground 5 years or more into the restoration, this may be a sign of overgrazing (if there has been grazing), soil compaction, or environmental limitations on the plant community, and may need mitigation measures. Annual weeds are usually the first thing to cover the bare ground and then your seeded species will appear. Don't worry – these annual weeds are actually somewhat beneficial at this stage, helping to hold the soil and protect against erosion, although too many might shade your seeded species out and compete for moisture.
2. Erosion of bare ground. Within the $\frac{1}{4}$ m² you estimated human-caused bare ground, estimate what percentage of the bare ground has been eroded. Write it in the space provided. This will largely depend on how much bare ground you have, and the frequency of severe weather events such as wind and rain storms that erode any exposed ground. As previously mentioned, this will be higher in the first few years of a restoration because of the site's susceptibility. Even initial moderate erosion can be mitigated so long as the plants in the restoration are numerous and vigorous. If erosion is still moderate after 5 years, this may need to be addressed with mitigation and/or preventative measures.
3. Litter accumulation. To determine litter amounts, delineate $\frac{1}{4}$ m² of an average-looking patch of ground. Rake the surface with your hand, clawing together all of the litter you rake up. Now make a ball with it in your hands. For LML, good litter amounts are those that are as much as you can fit into one hand (>437 kg/ha, average = 672 kg/ha), fair litter amounts are about the size of a soft ball (235-437 kg/ha), and poor litter amounts are those about the size of a mandarin orange (<235 kg/ha). These litter levels were determined based on LML being in the limited loamy, dark brown soil of the mixed grasslands. Write the estimated litter amount in the space provided. You may wish to bag these litter samples and weigh them later to determine exactly how much litter you have. In the first few years of the restoration, litter will be almost absent. It will probably be present only as dead annual weeds or straw from previous land uses. Plants that have been seeded need to reach mature height before they will contribute much to the overall litter accumulation. If litter is still noticeably low after 5 years, this is a sign of overgrazing (if there has been grazing) or environmental limitations on the plant community.
4. Community structure. Look at the vertical structure and texture of the area, including only seeded species contribution to the overall look. Are there layers (short, mid, and tall plants, bunch-type plants and mat-like plants)? Does everything look like it should? How does it compare to the "average normal prairie"? This is really the only subjective question of the seven, but if you score this aspect based on these questions, you should come close to the actual state of things. This category depends on the species you seeded. If no shrubs are planted, then the area will be without the taller woody layer until natural regeneration takes place. This will affect the score, but only by a point, which is not much of a concern. Obviously, this aspect of the restoration will score very low in the first year, as the plants have not yet had enough time to grow to a mature height and fill their vertical niche. In fact, many species may not even germinate until following years, so it may take some time before the full community structure is evident. However, if it has been more than five

years and there still a noticeable gap in the community structure, you may want to look at exactly what is missing and try to remedy the situation.

5. Community similarity. Count the number of seeded species you see in the restoration and divide that by the number of species you seeded into the restoration. Multiply that by 100 to give you the percent similarity. Write it in the space provided. Ideally, you want community similarity to reach 100%, meaning that all of the species you planted have germinated and are now growing. Of course, this isn't going to happen overnight, or even in the first few years. Some species may take several years before conditions are right for them to initiate germination. Typically, there will be a flush of a few species that readily germinate. These will dominate the plant community for several years, while other species begin showing up in small numbers. Eventually, the species that were initially dominant will strike a balance with the other species that are increasing, or in some cases may begin to decline. After five years though, most seeded species should be evident, if only in low numbers.

6. Plants per $\frac{1}{4}$ m². This is the best way to initially determine whether or not your restoration was successful (at least in the short-term). Delineate a $\frac{1}{4}$ m² and count how many seedlings (that is, species that were seeded by you for the restoration) there are. Do this an average of ten times over the assessment area to get a good average of what things look like. Write the result in the space provided. If you have fewer than 3 seedlings per $\frac{1}{4}$ m², return to the site later in the growing season to see how things have progressed. If another count reveals roughly the same number, wait until next year and do a re-count. Low counts may indicate poor germination due to improper seeding depth, seed dormancy, seed mortality, or seed depredation. Prepare for the fact that you may need to reseed. If next season the count is again less than 3 seedlings per $\frac{1}{4}$ m², you will probably have to reseed. If the count is 3-8 seedlings per $\frac{1}{4}$ m², wait until the end of the season or the beginning of the season after that, and recount. If nothing more has come up, you may need to supplementally reseed the site. If the count is at least 9 plants per $\frac{1}{4}$ m² at any time during the initial years, you have a successful establishment. These values were recommendations extrapolated from a DU publication.

7. Weeds per $\frac{1}{4}$ m². This indicates potential threats to your restoration, both now and in the future. Delineate a $\frac{1}{4}$ m² and count how many weeds there are. Write it in the space provided. Although a flush of annual weeds is almost assured early in the restoration, they stabilize the soil and should not compete well with your seeded species once they become established. However, if the flush of annual weeds comes up thick, they may out-compete your seedlings for moisture, and may shade them out as well. If you have lots of weeds and it is still early on in the restoration, you may want to take measures to manage your weeds. If you have perennial weeds or noxious weeds, it poses a more serious (and possibly long-term) threat. You may want to consider options to control these as soon as you identify them in any quantity. Also, if after five years, there are still persistent weed species, you may want to control them. Generally, any weed count less than 3 per $\frac{1}{4}$ m² is acceptable; 3-14 per $\frac{1}{4}$ m² is a judgment call, and more than 14 per $\frac{1}{4}$ m² requires action.

Community type. This is typically named using the top one or two most common species, whether seeded or not. For example, if your restoration site has 50% western wheatgrass and 30% flixweed, it would be a western wheatgrass/flixweed community. If it had 50% western wheatgrass and a group of other species that each comprised 5-10%, then it would just be a western wheatgrass community.

Photos taken. It might be a good idea to include a sheet with the date, your name, the site name, the site location, and a description right in the photo. A small laminated white sheet works best for this. If you don't have this, list the photo numbers and roll number/name on the assessment so that photos can be referenced later.

Grazing since restoration. Year 5 assessment form only. Note if grazing has taken place and write the approximate grazing intensity in the space provided. Knowledge of grazing is very important, as grazing changes the community composition and structure, as well as litter levels.

Burning since restoration. Year 5 assessment form only. Note if burning has taken place and write the approximate date of burn in the space provided. Knowledge of burning is also very important, as burning also changes the community composition and structure, as well as litter levels.

Previous assessments. These will help show the change over time, or if this is the first assessment, it will establish a baseline from which to compare future assessments.

Changes in site management. Changes in the way the site is managed may have an impact on the plant community. The most common changes are those regarding grazing, weed control, or burning.

Site trend. This is more or less your educated opinion given what you have observed out there, plus the restoration site health score, plus the weighting of the problems (if any) and benefits relating to the site. Take your time and when in doubt, score it conservatively. If you're really unsure of how to score it, circle the "unknown" option and list your reason(s).

General comments. Use this section to include anything that the assessment form has not made clear or included a space for. This could be thoughts, feeling, concerns, or anything really, as long as you feel it is important to the site. One example might be a comment on why the site scored as it did, such as "the site scored low due to poor seedling establishment, weeds, and a drought this spring".

Total vegetation cover. This is a percentage based on an estimate of an area. It is probably easiest to delineate a $\frac{1}{4}$ m² area in a representative part of the restoration and estimate. Look at how much ground is being covered by the vegetative canopy. For best results, you may want to do this 10 times for an average, if time permits.

Total seeded vegetation cover. This is done in exactly the same spot as total vegetation cover, so that we know how much of the total vegetation cover are weeds, and how much of it are seeded species. Follow the same instructions as total vegetation cover, this time looking only at the species you seeded.

Average seeded plant height. Pick at random 10 seeded plants that look like they represent the average plant growing in the restoration. Measure them and enter them on the supplementary sheet. Then average the 10 heights and enter the result on the average seeded plant height line.

Average biomass. Year 5 assessment form only. Delineate $\frac{1}{4}$ m² and cut all the growing vegetation off down to 5 cm within that area. Do this 10 times at random, representative areas, keeping each sample in a separate paper bag. Weigh them once you return from the field, and then enter the values on the supplementary sheet. If you wish, you can dry the samples and weigh them again to measure water content versus dry matter content of the vegetation. Average biomass gives an

indication of the productivity of an area and its species. It can also help determine the carrying capacity for grazing if that is to be implemented.

Supplemental sheet. List all species planted and all species present. List the 10 measurements for seeded plant height (in cm) and the 10 counts of seedlings per square meter.

Year 1 only - Circle the best scenario of how the site was seeded.

Year 5 only – There are 10 spaces provided to record biomass to indicate site production.

Scoring

Year 1 – 0-7 points is normal for a restoration site so young. Nothing will yet be established, and it will take a while for things to fill in. Bare ground will be high and litter will be low. Weeds will undoubtedly be present, but as long as they aren't noxious or perennial weeds, this is o.k. for now. The most important thing here is good germination and establishment of your seeded species. Scoring on the low end of this scale may indicate problems, so you should be on your guard and possibly re-assess the site in a few months.

>7 points is a good score for a restoration in its first year. In this case, your restoration has probably established well and/or has certain attributes going for it. Of course this doesn't negate the fact that you should go out next year to re-assess the site.

Year 2 – 0-7 points is low for a restoration in its second year. Maybe the site was generally slow in its first year and catching up, but keep an eye on things and try to determine if there is anything specific that is keeping the site from scoring higher. The easiest way to do this is to look at each category and identify the ones that scored low, and then look at the site and try to find explanations/solution for these. If the score is closer to 0 than 7, you will probably need to repair the site.

8-14 points is normal for a restoration of this age. Things should be establishing nicely, with decent vegetative cover and healthy, vigorous plants. Weeds may still be a problem, but should not be increasing. Bare ground and erosion should be becoming covered. Community structure and similarity should be on the rise.

15-21 points is high for a 2 year old restoration, and indicates that things are going better than expected. You are well on your way to a successful restoration.

Year 5 - 0-7 points is very low for a restoration of this age. You need to seriously look at what the problems are and take immediate corrective measures. If such measures can't be taken, you will have to re-do your restoration.

8-14 points is somewhat low for a 5 year old restoration. There may be some valid reasons why this is scoring slightly low, but there also may be some underlying problems. Look at which categories scored low and decide whether or not corrective measures need to be taken. As long as there aren't any categories that scored drastically low or other threats that may be insignificant now but will pose a real threat in the future, then you are probably in the clear.

15-21 points is what a restoration should score after 5 years. This indicates that everything has established nicely, and that all the components are functioning properly. Bare ground, erosion, and weeds should all be minimal, and litter should be building. Community structure should be quite developed, and community similarity may be reaching 80-100%. The site should appear to be a natural grassland, except for the rows if it was drill seeded. You may want to put this area into a grazing and/or burning regime. You may also want to collect seed off it for other restorations. Keep assessing it on a regular basis though, using either this form or the Range Health Assessment Form.