# Chapter IV
# Program Alternatives

In this chapter:

- **Right-of-way Program Alternatives**
- **Electric Yard Program Alternative**
- **Non-electric Program Alternatives**

## Alternatives Overview

This chapter describes and compares the different **program alternatives—**the different options for action to address the need to manage vegetation. Each set of alternatives identifies one alternative as "**current practice" (No Action**): this means that we keep doing what we are now, without any change.

*The National Environmental Policy Act says that, when agencies are making a decision on an action that could affect the environment, the agency must also consider **not** taking action—the "no action" alternative.*

In preparing this environmental study, we have analyzed, evaluated, and compared the alternatives. The resulting information will be used to decide which course of action to follow.

The alternatives are divided into three different programs, beginning on page 91. The "current practice," "environmentally preferred," and "Bonneville preferred" alternatives are also noted.

### Right-of-way Program

The right-of-way program includes vegetation management on transmission-line rights-of-way and access roads, and along microwave beam paths. This program has three sets of alternatives that can be combined in different ways to create an overall right-of-way program. The different combinations will address the following three questions:

1. Which **management approach** should Bonneville adopt for maintaining rights-of-way?

| Management Approach | |
|---|---|
| **MA1** *(current practice)* | **Time-Driven** - uses repetitive maintenance cycles for vegetation control |
| **MA2** (*Bonneville and environmentally preferred)* | **Promotion of Low-growing Plant Communities** – promotes low-growing plants where possible along the right-of-way, lessening intensity of maintenance in long term |

2. What **methods package** (or "tool box") should Bonneville adopt for managing right-of-way vegetation?

| Methods Package | |
|---|---|
| **R1** | **Manual, Mechanical, Biological** |
| **R2** *(environmentally preferred)* | Manual, Mechanical, Biological **+ Herbicide – *spot and localized application*** |
| **R3** *(current practice)* | Manual, Mechanical, Biological, Herbicide – *spot, localized* **+ *broadcast application*** |
| **R4** *(Bonneville preferred)* | Manual, Mechanical, Biological, Herbicide – *spot, localized, broadcast* **+ *aerial application*** |

3. If Bonneville decides to use **herbicide methods** in the right-of-way program, on what **kinds of vegetation** should they be applied?

| Vegetation Selection | |
|---|---|
| **VS1** | **Noxious Weeds** only |
| **VS2** *(environmentally preferred)* | **Noxious Weeds & Deciduous** |
| **VS3** *(Bonneville preferred) (current practice)* | **Any Vegetation** |

### Electric Yard Program

The Electric Yard Program includes substations, electric yards, and sectionalizing switches. The program has one alternative, and one alternative eliminated from further consideration.

| Electric Yard Program | |
|---|---|
| **E1** *(current practice)* | **Herbicide Treatment** |

### Non-electric Program

The Non-electric Program includes facilities that have landscaping and gravel work yards or parking lots. The two alternatives will address the following question:

What methods should Bonneville use for managing non-electric facility vegetation?

| Non-electric Program | |
|---|---|
| **NE1** *(Bonneville preferred) (current practice)* | **Mixed Methods with Herbicides** |
| **NE2** *(environmentally preferred)* | **Non-herbicide Methods** |

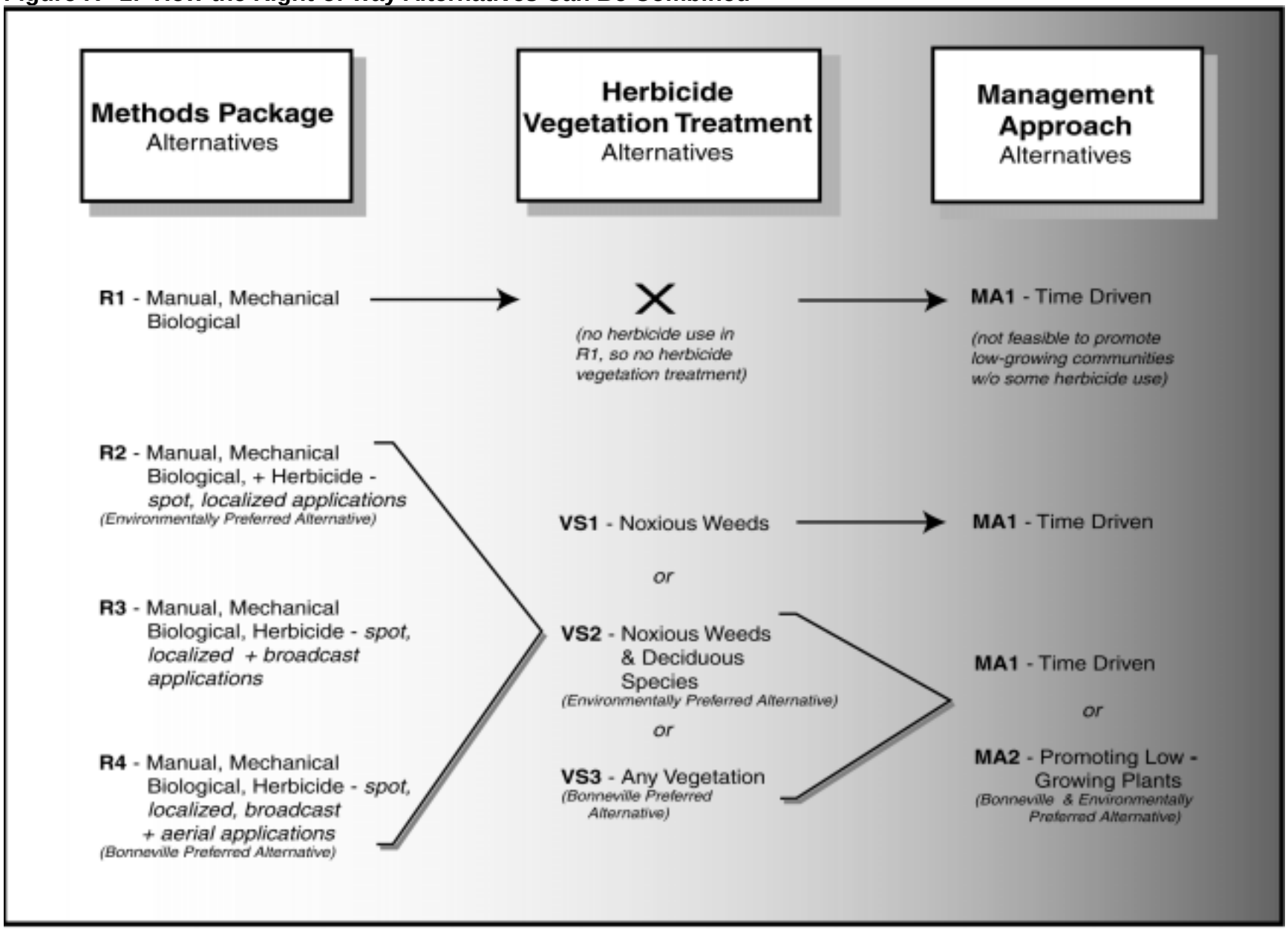
### Differences between the Alternatives

Because herbicide use was a major topic of the comments received on Bonneville's vegetation management program, we have designed many of the alternatives to reflect the issue of **whether or not to use herbicides and, if so, to what degree.**

The **right-of-way program** addresses the herbicide issue in three ways:

1. The management approach, including whether there is an end goal that would reduce herbicide use in the long term;
2. Whether herbicides are included in our "tool box," and (if so) what kind of application methods would be allowed (a range from spot treatments to aerial spraying); and
3. If we do use herbicides, whether we limit the type of plants that can be treated with herbicides.

**Figure IV–1: How the Right-of-way Alternatives Can Be Combined**



The **non-electric program** addresses the herbicide issue by offering an alternative with, and an alternative without, herbicide use.

The next sections contain detailed information on each set of alternatives.

# Right-of-way Management Approach Alternatives

The right-of-way program manages vegetation on transmission-line rights-of-way and access roads. (Rights-of-way cannot have tall trees or brush close to transmission-line conductors, nor can brush block access roads or towers; noxious weeds need to be controlled as appropriate.) The program also includes microwave beam paths (trees must not block paths). The right-of-way program has two alternatives for how to approach vegetation management:

| Management Approach | |
|---|---|
| **MA1** *(current practice)* | **Time-Driven** - uses repetitive maintenance cycles for vegetation control |
| **MA2** (*Bonneville and environmentally preferred)* | **Promotion of Low-growing Plant Communities** – promotes low-growing plants where possible along the right-of-way, lessening intensity of maintenance in long term |

## Alternative MA1: Time-driven *(current practice)*

### Description

Bonneville would follow a management approach in which cycles of maintenance are repeated in a continuing (and basically unvarying) loop to achieve the desired result.

We would determine appropriate scheduling (cycle times) for managing vegetation for a right-of-way. For instance, now we cut vegetation every 2 - 8 years on the West side of the Cascades (where ample water supply means that vegetation growth is faster) and every 10 - 15 years on the East side of the Cascades (where vegetation growth is slower).

At each designated cycle management point, we would clear or treat the right-of-way to try to ensure that no vegetation would threaten the transmission line or block access until the next cycle of treatment. As

with MA2, we would also undertake any emergency work (trees that threaten the line and need to be removed immediately, rather than waiting for planned maintenance).

This approach might use herbicides, or not. It is based on clearing or treating vegetation as it needs to be done, rather than trying to clear preventively to lessen future vegetation management. This approach could be implemented with any of the right-of-way program alternatives (e.g., any of the Methods Package alternatives and the Vegetation Selection alternatives).

**This approach most closely resembles our current practice.** We mostly manage our rights-of-way based on a time-driven approach, although we are attempting to promote low-growing plant communities in a few areas. More information on our current practice related to the Time-driven approach is found in Chapter I, under **Managing Vegetation at Bonneville Facilities.**

### Impacts

Under this management approach**,** impacts would continue very much as at present. Sapling-filled corridors would develop, requiring the same or increasingly intensive maintenance with each maintenance cycle. With each cycle, there would be repeated disturbance of the right-of-way, including habitat disturbance, noise disturbance, and soil and non-target plant disturbance.[1]

Health and safety impacts associated with this alternative would be regular maintenance impacts; however, the chances of such impacts occurring would be greater with this alternative than with Alternative MA2 because the maintenance cycles would involve more intense work. If herbicides were not used, then there would not be any potential health impacts associated with exposure to herbicides (as there could be with Alternative MA2).

Because this approach could use any of the maintenance methods, the method-specific impacts would depend on the methods used. This alternative does not *require* the use of herbicides, and therefore could eliminate potential impacts associated with herbicide use.

### Cost

This alternative would cost less than MA2 initially, but more in the long term. The costs of maintaining the right-of-way with a Time-

[1] Details on impacts are described in **Chapter VI.**

driven management approach would remain constant or go up with each maintenance cycle because the right-of way would either keep reverting back to forest stage, or would increase with tree density as deciduous species resprouted.

## Alternative MA2: Promotion of Low-growing Plant Communities

*(Bonneville Preferred & Environmentally Preferred Alternative)*

### Description

With this alternative, Bonneville would promote the establishment of low-growing plant communities on the right-of-way, in a progressive (evolving) approach that requires somewhat more intense work in the short term, but diminished work in the long term.

The goal of this alternative is to change the vegetation structure to predominately low-growing vegetation, so that the right-of-way would require less intensive maintenance over time. In the long term, the *schedule* for vegetation management along the right-of-way might be the same as that for the Time-driven alternative; however, established low-growing plant communities would lessen the *amount* of vegetation that would need to be managed. In the short term, the vegetation maintenance schedule would need to be adjusted to allow for more frequent visits: perhaps every year or two to treat new tree seedlings before they get tall enough to compete with the low-growing species.

As with MA1, we would also immediately undertake any emergency work to remove trees that are an imminent threat to the line.

Because maintenance would likely be scheduled often at first, we would be unable to do all rights-of-way at the same time and would have to “phase” the program in.

This management approach of promoting low-growing plant communities is based on protecting low-growing plants from disturbance during maintenance and from competing tall-growing vegetation so that low-growers can establish and propagate. We could not carry out a wholesale planting of species, which would be infeasible and expensive for some 24,140 km (15,000 mi.) of corridor.

This alternative could be implemented *only* with the right-of-way methods package alternatives that include the use of herbicides (R2, R3, or R4), and the vegetation selection alternatives that include treatment of deciduous species (VS2 and VS3). This alternative requires the use of at least spot-herbicide treatment to treat deciduous species. See Figure IV-1 for these combinations.

### How Low-growing Plant Communities Function

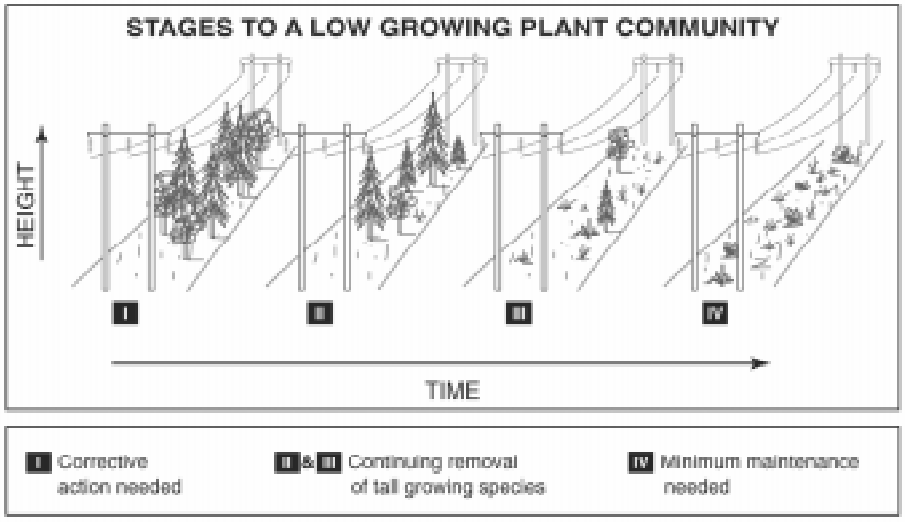
Research has shown that the establishment of a dense low-growing plant community may reduce the presence of trees (Bramble and Burns, 1983). Low-growing plants (grasses, shrubs, forbs, and herbs) can often “out-compete” trees and tall-growing brush for sunlight and nutrients. Where the low-growing plants shade the ground and absorb available moisture, it is harder for the trees to germinate underneath the shrubs or to grow up through the low-growing plant cover. This is essentially vegetation “self-management,” and lessens the need for human intervention.

The low-growing plant community consists of shrubs, ferns and grass species (e.g., salmonberry, ceanothus, blackberry, bracken fern, and pinegrass).

In addition to competing for nutrients and sunlight, some plants produce chemicals to keep competing plants away. Such "allelopathic" interactions between plants may help establish and maintain low-growing communities in the rights-of-way.

There will always be some trees that are able to ”get through” the low-growing vegetation and brush layer. We would have to eliminate those tall plants before they, in turn, begin shading and competing for moisture and space with the low-growing species.

### Figure IV-2: Stages to a Low-growing Plant Community




There are a number of ways to achieve the goal of a semi-stable low-growing plant community that competes with and slows the growth of

tall-growing trees. Here are steps to illustrate one way to achieve a low-growing plant community:

1. Remove existing tall-growing vegetation.

   If the tree density is thick (as in Stage #I in Figure IV-2), it is considered **corrective** action. Methods used for corrective actions can include non-selective methods such as mechanical clearing and broadcast, or aerial herbicide applications. However, if the tree density is not great (as in Stages II & III), it is not considered corrective. At this stage, more selective methods of vegetation removal may be more appropriate so as not to disturb any existing low-growing or desirable plants.

2. Use herbicides to treat deciduous trees to ensure that the trees do not resprout. (Studies to date indicate that early herbicide treatments are instrumental in keeping taller-growing vegetation from developing, just long enough to allow low-growing plants to be competitive (Bramble and Burns, 1983)).

3. Consider replanting or reseeding with ground cover if none exists or if there is a low potential for natural revegetation by low-growing species (and a high potential for natural revegetation by tall-growing species).

4. Maintain by selectively eliminating tall-growing vegetation before it is tall enough to shade or compete with other desirable species. Maintenance should be done with great care, so as not to disturb low-growing plants. The first few years may require continuing removal (Stages II & III in Figure IV-I) of tree saplings before the low-growing plant community can successfully maintain itself.

*Bonneville, in conjunction with Oregon State University, is undertaking a long-term research project to test and demonstrate vegetation management strategies on electric utility rights-of-way. The primary goal of the research project is to design, test, and document vegetation management strategies and methods that will promote the establishment and growth of successionally stable low-growing plant communities within rights-of-way. We hope to gain valuable information regarding Pacific Northwest rights-of-way plant community dynamics with respect to various applied vegetation control strategies.*

### Impacts

The right-of-way clearing for Alternative MA2 would be less drastic than that for Alternative MA1. Over time, low-growing plant communities would lead to fewer tall-growing plants and less need to clear. Impacts associated with removing vegetation (sedimentation, disturbance) would decrease over time.

Health and safety impacts of this alternative also decrease over time as low-growing plants become established and maintenance activities lessen.

Because this alternative requires the use of at least some herbicides to help control the resprouting of deciduous species, impacts include potential herbicide impacts.

### Cost

This alternative would probably cost more than Alternative MA1, Time-driven, in the short term, because for the first few years vegetation would most likely need to be treated more often until low-growing plant communities were established. In the long term, however, it would be less expensive to maintain the right-of-way under this alternative because less clearing would be needed.

Table IV-1, below, compares the costs, impacts, and effectiveness of the two management approaches.

### Table IV-1: Comparison of the Right-of-way (ROW) Management Approach Alternatives

| Decision Factors | MA 1 Time-Driven *(current practice)* | MA2 Promotion of Low-growing Plant Communities *(Bonneville Preferred & Environmentally Preferred Alternative)* |
|---|---|---|
| | *Managed on a designated cycle time* | *Managed to achieve low-growing vegetation on ROW in the long term* |

| Decision Factors | MA 1 Time-Driven *(current practice)* | MA2 Promotion of Low-growing Plant Communities *(Bonneville Preferred & Environmentally Preferred Alternative)* |
|---|---|---|
| | *Managed on a designated cycle time* | *Managed to achieve low-growing vegetation on ROW in the long term* |
| **Minimizes adverse environ-mental impacts** | Increased frequency of habitat, noise, soil, and non-target plant disturbance and intrusions upon landowners.<br>More frequent maintenance cycles in long-term increase health and safety risks.<br>Reduced contamination risks if herbicide use is avoided. | Reduced soil, non-target vegetation, and habitat disturbance because less clearing needed as low-growing plant communities successfully establish on ROW.<br>Reduced safety risks as maintenance cycles become less frequent.<br>Slightly increased contamination risk from herbicide use. |
| **Achieves cost and administra-tive efficiency** | Long-term maintenance costs increase as deciduous species resprout and require more frequent treatment. | Long-term costs reduced as low-growing plant communities are successfully established and maintenance cycles become less frequent. |
| **Complies with laws and regulations** | Complies with all laws and regulations. | Complies with all laws and regulations. |
| **Ensures a safe and reliable power system** | Electric stability and reliability could be compromised if maintenance cycles are not adequately implemented. | Electric stability and reliability improves as low-growing plant communities successfully inhibit growth of species that could interfere with power flow. |

# Right-of-way Methods Package Alternatives

The right-of-way program has four Methods Package alternatives:

| Methods Packages | |
|---|---|
| **R1** | **Manual, Mechanical, Biological** |
| **R2** *(environmentally preferred)* | Manual, Mechanical, Biological + **Herbicide – *spot and localized application*** |

| | |
|---|---|
| **R3** *(current practice)* | Manual, Mechanical, Biological, Herbicide – *spot, localized* **+ *broadcast application*** |
| **R4** *(Bonneville preferred)* | Manual, Mechanical, Biological, Herbicide – *spot, localized, broadcast* **+ *aerial application*** |

These alternatives are the various packages or combinations of methods that could be available for use in our management program—the "tools" in our "tool box."

*Please note: For each alternative described below, a pie chart shows a general percentage of each method that would be used to control right-of-way vegetation throughout our service territory, given the methods available with the alternative. These general percentages were developed by people who conduct vegetation management for Bonneville, who know the system, and who have the training to apply the various methods, given the terrain, vegetation types and natural resources present.*

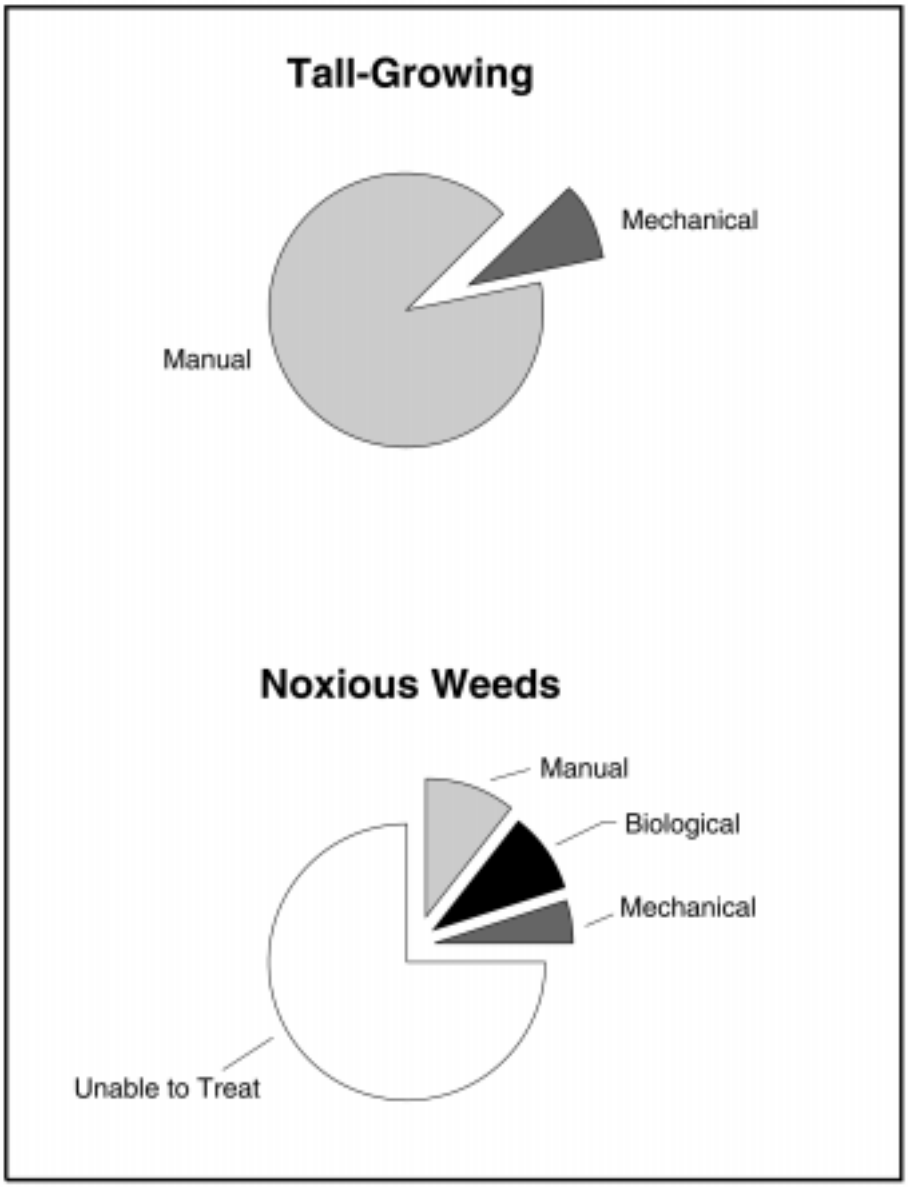
*Also: The amount of biological control used does not change from alternative to alternative. Bonneville plans to pursue the use of insects, where possible in conjunction with other agencies, to help control the spread of noxious weeds, regardless of the management program chosen.*

## Alternative R1: Manual, Mechanical, Biological

### Description

**Alternative R1** would use a mix of manual, mechanical, and biological methods to control vegetation on the rights-of-way, access roads, and around towers. No herbicides or growth regulators would be used.

**Figure IV-3: Mix of Methods under Alternative R1**




*This chart shows generally how much each of the methods would be used to maintain our rights-of-way using methods available under Alternative R1.*

Some people think that herbicides should not be used in a variety of land management practices—forestry, agricultural, or home use. This sentiment (as well as the opposing sentiment that herbicides should be so used) was reflected in our EIS scoping, as well as in some comments to other Federal land-managing agencies in their practices. Alternative R1 was developed to see how it would work *not* to use herbicides to manage the vegetation along our rights-of-way.

With this mix of methods, most of the right-of-way would be managed manually, through chainsaw cutting of tall-growing vegetation. Mechanical control would be used in areas where vegetation was extremely dense, possibly on access roads where low brush can be a hindrance, and around tower structures. A large percentage of areas with noxious weeds could not be treated with this alternative. In those areas where noxious weeds could be treated, biological, manual, and a small amount of mechanical means would be used.

This alternative would be compatible with the Time-driven approach (MA1); it would not be compatible with the Low-growing Plant Communities approach (MA2).

### Impacts

This alternative relies heavily on manually keeping the right-of way cleared. The environmental impacts, therefore, are mostly associated with manual impacts. Generally, environmental impacts from this alternative would be relatively benign in the short term: there would be some noise from chainsaws that would disturb wildlife and residents, and there is potential for chainsaw oil to get into water bodies. Overall, however, the direct environmental impacts from using chainsaws (other than the cutting of the vegetation) would be minimal.

The indirect or long-term impacts of this alternative would occur as vegetation resprouted. Deciduous vegetation resprouts with an increased number of stems when cut, creating more thickly vegetated rights-of-way that need to be managed even more intensively. The right-of-way then needs more extensive clearing (more vegetation per acre needs to be cut) with each successive maintenance cycle.

When densely vegetated areas are cleared, environmental impacts are more drastic compared to the selective removal of trees or brush. More habitat is affected, more soil is disturbed, non-target plants that have grown in shade-tolerant situations are suddenly exposed, human

presence on the right-of-way is increased, and visual impacts are more sudden and more dramatic.

Noxious weed control is a concern with this alternative. Biological control agents (insects) are available for some, but not all, noxious weeds. Biological controls can also be limited due to weather and site-conditions. Mechanical or manual methods are also not very effective, because noxious weeds are very resilient and capable of resprouting through roots, as well as from seed.

Worker health and safety impacts with this alternative would be related to chainsaw accidents, felling of trees, and relatively minor physical impacts of hiking—often on very rough terrain. It is also potentially dangerous to cut trees on steep terrain, compared to spraying a tree with herbicide and leaving it standing. Impacts related to mechanical methods would be due to heavy equipment accidents; impacts of biological methods include injury from hiking rights-of-way; and potential helicopter or plane accidents if aerially applying biological controls.

### Cost

This alternative would cost more to implement than alternatives that include the use of herbicide methods, for the following reasons:

1. No herbicide treatments of deciduous vegetation means that maintenance cycles would repeat more often in areas of deciduous species.
2. In deciduous areas, maintenance would be more intensive (resprouts are denser than initial saplings).
3. The more labor-intensive manual methods generally cost more than herbicide methods. (See Table II-5 in **Chapter II**.)
4. Labor-intensive manual methods are more time-consuming, requiring higher administrative costs than herbicide methods.

## Alternative R2:
Manual, Mechanical, Biological **+ Herbicide – *spot and localized application***
*(Environmentally Preferred Alternative)*

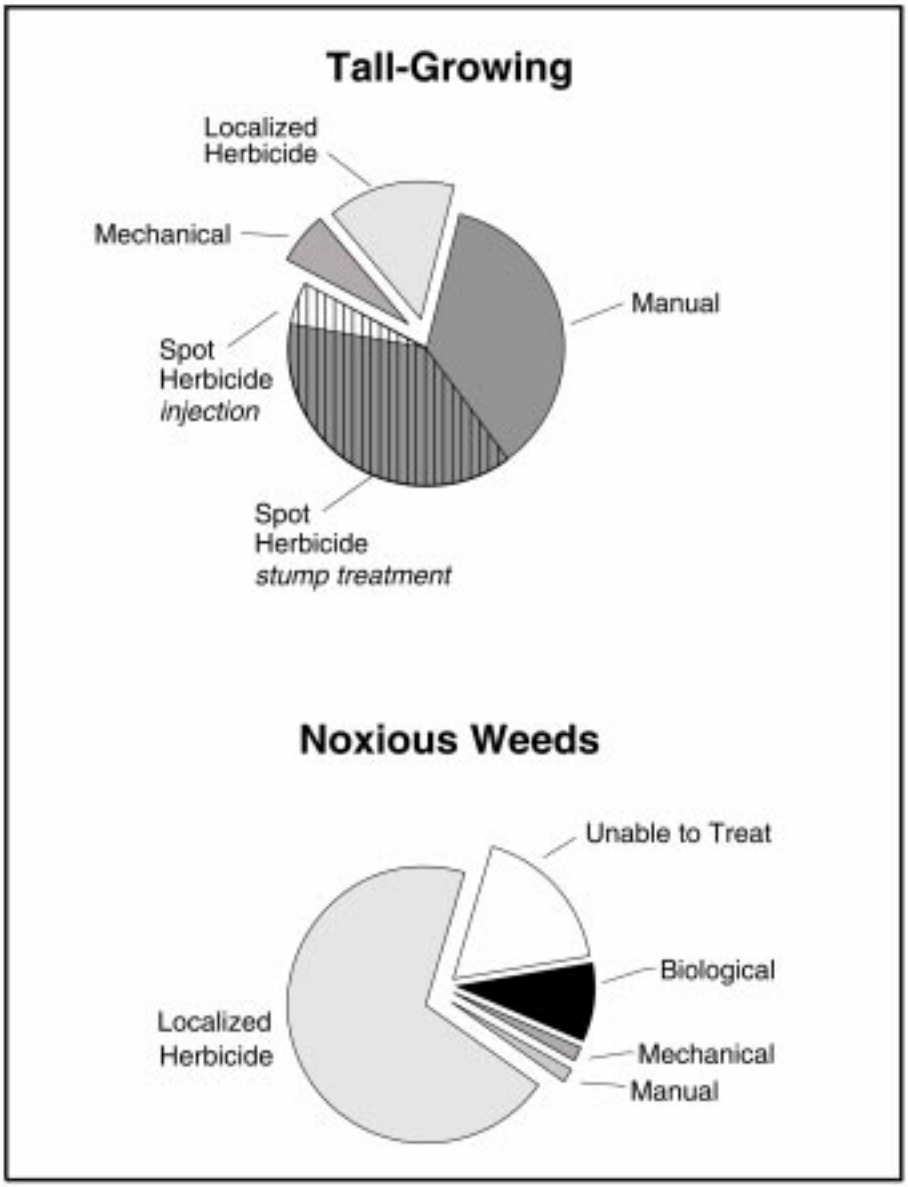
### Description

**Alternative R2** would use a mix of all the methods—manual, mechanical, biological, and herbicide. However, only spot herbicide and localized herbicide applications would be used (no broadcast or aerial herbicide applications would be used). Herbicide applications include the use of growth regulators.

**Figure IV-4: Mix of Methods under Alternative R2**

*This pie chart shows generally the percentage of the methods we would use to maintain our rights-of-way under Alt. R2.*

*Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).*




As with all the alternatives, most of the right-of-way would still be managed manually: we would use chainsaws to cut tall-growing vegetation.

However, nearly half those areas manually cut would receive follow-up spot herbicide treatments (on deciduous vegetation). *Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).*

The next most used method would be localized herbicide treatments. A relatively small amount of spot treatment (not used in conjunction with cutting) and mechanical methods would also be used. By adding herbicide methods, manual methods would be used somewhat less than with R1.

Noxious weeds would be treated mainly via localized herbicide applications (backpack or ATV-mounted sprayers). Some biological methods would be also used. Manual and mechanical would rarely be used. There would still be some areas or weeds that could not be treated.

This alternative would be compatible with both the Time-driven approach (MA1) and the Low-growing Plant Communities approach (MA2).

### Impacts

This alternative would have short-term environmental impacts from manual methods (chainsaw noise, exhaust, potential fuel/oil leaks), although those impacts would be less than those of R1. Spot and localized herbicide use could involve potential spills that could contaminate water bodies and affect other non-target vegetation. However, because this alternative uses more selective herbicide application techniques that can target only the plants needing treatment and have less potential for drift, there is less potential to affect non-target plants or water bodies than under R3 or R4.

In the long term, this alternative could be able to control resprouting of deciduous plants, reducing the amount of regrowth along rights-of-way.

Worker health and safety issues associated with this alternative would include those for manual (chainsaw accidents, felling of trees), mechanical (heavy equipment accidents), and biological (hiking right-of-way) methods. This alternative would have fewer manual safety issues for workers than R1, because workers would be able to use herbicides to treat vegetation on steep slopes or sites that are awkward or potentially dangerous for felling trees.

Worker safety issues would also include those associated with handling herbicides—toxicity and potential chronic effects of repeated exposures to herbicides. Herbicides must be handled appropriately and with caution. (See discussions of herbicides in **Chapters II and III**.)

Public health and safety impacts with this alternative would include those associated with manual (little/no impact), mechanical (flying debris) and slight potential public exposure to herbicides (potential toxic reactions if there were a spill or misapplication).

This alternative could control noxious weeds more easily than R1, because noxious weeds are difficult to manage solely with mechanical and manual methods. However, noxious weed control would not be as easy as under R3 and R4, which allow the use of broadcast and/or aerial applications of herbicides.

### Cost

This alternative would cost less to implement than Alternative R1 in the *short term*: herbicide methods of controlling vegetation are less expensive than manual methods. However, the cost difference is not dramatic because herbicide methods of treatment replace only some of the manual treatments that would occur in R1.

This alternative would cost quite a bit less to implement than R1 in the *long term:* the use of spot and localized herbicide treatments on deciduous trees should reduce the overall need for maintenance, which in turn should reduce overall program costs.

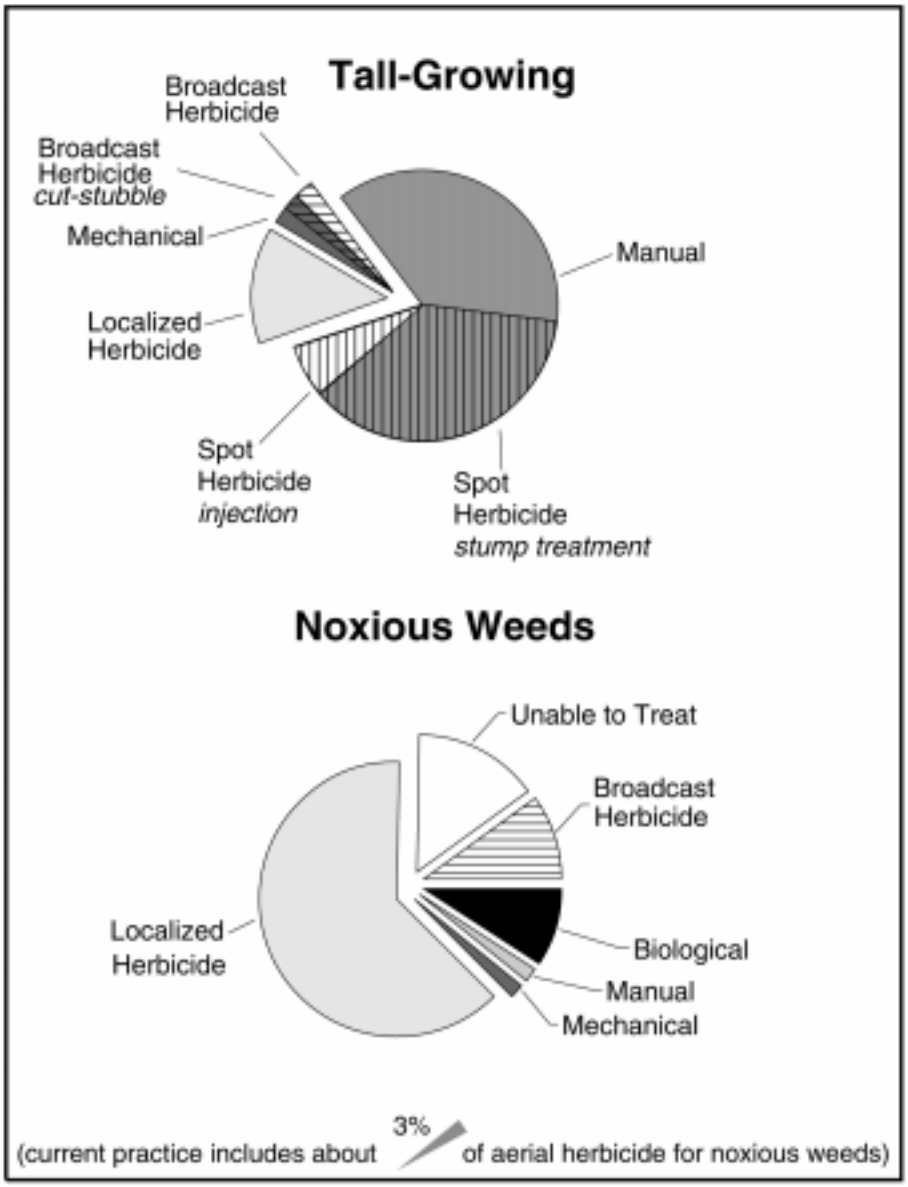
This alternative would cost slightly more than R3, and quite a bit more than R4.

## Alternative R3:
Manual, Mechanical, Biological, Herbicide – *spot, localized* **+ *broadcast application***
*(current practice)*

### Description

**Alternative R3** would use a mix of all the methods—manual, mechanical, biological, and herbicide. Spot, localized, and broadcast herbicide applications would be used. No herbicides would be aerially sprayed. See Figure IV-5, below.

**Figure IV-5: Mix of Methods under Alternative R3**




*This pie chart shows generally the percentage of the methods we would use to maintain our rights-of-way under Alt. R3.*

*Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).*

This alternative varies only slightly from R2: most of the right-of-way would still be managed manually. Nearly half of those areas manually cut could receive follow-up spot herbicide treatments (deciduous vegetation).

*Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds and deciduous), or VS3 (any vegetation).*

The next most-used method could be localized herbicide treatments. A relatively small amount of broadcast herbicide, spot herbicide treatment (not used in conjunction with cutting), and mechanical methods would also be used.

Half of the mechanical treatments could also receive a subsequent broadcast herbicide treatment ("cut-stubble" treatment of deciduous species). Using broadcast herbicide means that the amount of right-of-way that would be treated manually is slightly reduced, compared to R2. The ability to use one more "tool" offers a little more flexibility in determining the best way to manage a right-of-way, given all the site conditions.

Noxious weeds would still mostly be treated with localized herbicide applications, with some broadcast application being used instead of localized or spot treatments. There would still be untreatable areas.

This alternative would be compatible with both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2).

**This method most closely represents Current Practice for right-of-way vegetation management.** However, our current practice includes participation with other agencies for a small amount of aerial herbicide applications on noxious weeds.

### Impacts

Environmental impacts would be very similar to those for R2, with slightly less impact from manual methods and somewhat more potential for herbicide contamination impacts. The latter would be greater because somewhat more herbicide would be used and because the added broadcast *application* technique is non-selective (note, however, that the herbicide itself can be selective). Non-selective broadcast spraying can potentially affect non-targeted plants and has greater potential for drift.

As with R2, this alternative could in the long term be able to control resprouting of deciduous plants and reduce the amount of regrowth along rights-of-way. If promoting low-growing plant communities, broadcast herbicide applications would be most appropriate for rights-of-way requiring corrective action (see Figure lV-I). Broadcast herbicide applications are non-selective; they would not be appropriate for maintaining rights-of-way with low-growing plant communities.

As with R2, the worker health and safety issues associated with this alternative would include those for manual, mechanical, and biological. This alternative would have somewhat fewer manual safety issues for workers than R2, because manual controls would be used less, but slightly more potential herbicide safety issues because more herbicide would be used. However, because the application is done via a truck, there is actually less potential for worker exposure with the chemical.

Public health and safety impacts with this alternative would include those associated with manual, mechanical, and potential public exposure to herbicides. The slight potential public exposure to herbicide would be somewhat greater with this alternative than with R2, because there is more potential for drift and accidentally spraying persons on the right-of-way with broadcast methods (compared to spot or localized herbicide applications).

Noxious weeds could be controlled more easily with this alternative than with R1, which is limited to mechanical and manual methods, and somewhat more easily than with R2. Alternative R3 allows the flexibility to choose broadcast applications to treat a noxious weed infestation if the site and weed species would best be treated in this manner.

### Cost

The costs of this alternative would be slightly less than R2. There would be some slight efficiencies in the use of broadcast applications (quicker right-of-way treatment of large areas), with higher costs for the use of the necessary equipment. As with R2, the long-term costs of this alternative would be less than those for R1 because deciduous plants could be treated so that they don't resprout.

## Alternative R4:

Manual, Mechanical, Biological, Herbicide – *spot, localize*d, *broadcast* ***+ aerial application***

*(Bonneville Preferred Alternative)*

### Description

**Alternative R4** would use all the methods available, including limited use of aerial herbicide application.

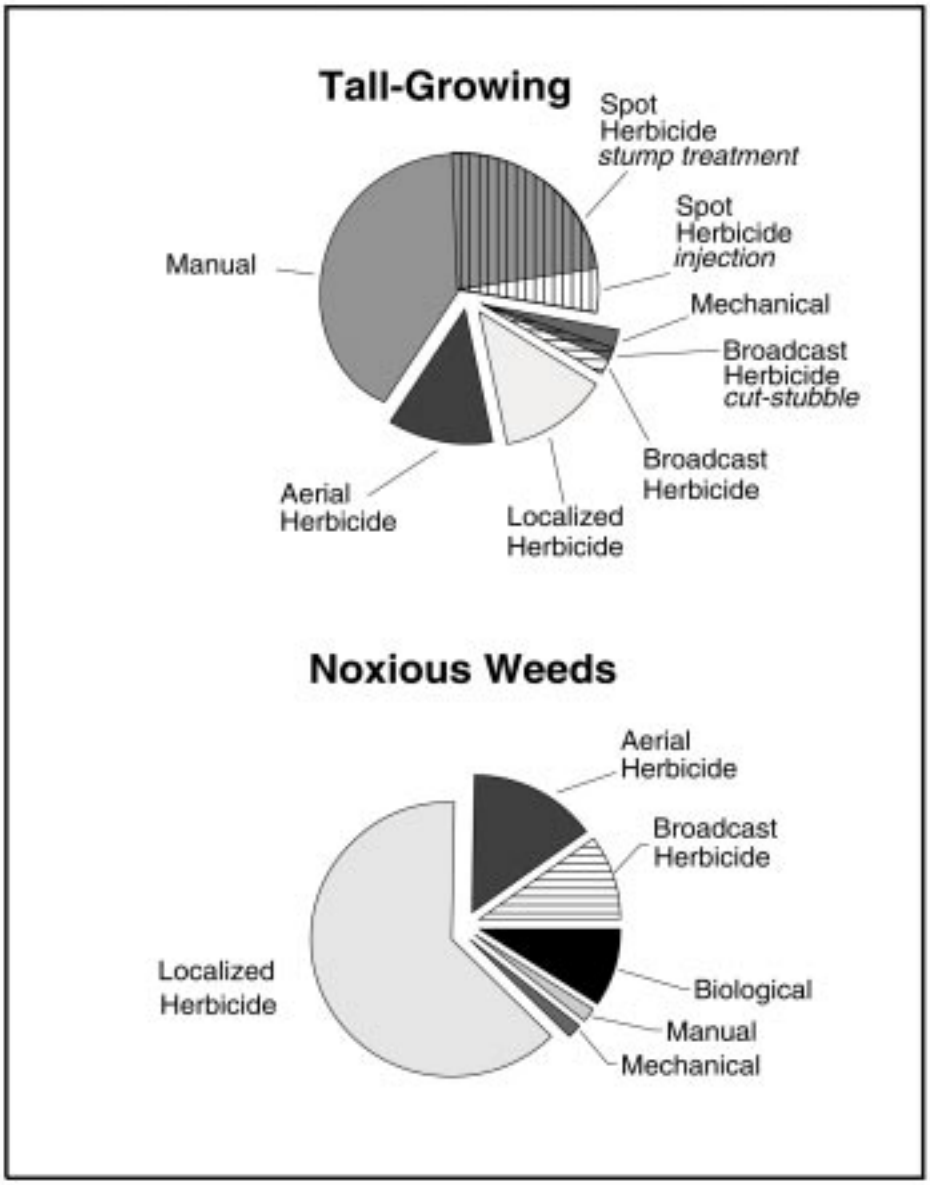
This alternative is similar to R2 and R3: most of the right-of-way would still be managed manually. Nearly half of manually cut areas could receive follow-up spot herbicide treatments (deciduous).

*Herbicide use for tall-growing vegetation depends on selection of Alternatives VS2 (noxious weeds/deciduous), or VS3 (any vegetation).*

**Figure IV-6: Mix of Methods under Alternative R4**

*This pie chart shows generally the percentage of the methods we would use to maintain our rights-of-way under Alt. R4.*

*Herbicide use for tall-growing vegetation is dependent on the selection of Alternatives VS2 (noxious weeds or deciduous), and VS3 (any vegetation).*




The next most-used methods would be localized herbicide and aerial herbicide treatments. Some spot herbicide treatment (not used in conjunction with cutting), broadcast herbicide applications, and mechanical methods would also be used. Half of the mechanical treatments would also receive a subsequent broadcast herbicide treatment ("cut-stubble" treatment of deciduous species).

Adding aerial spraying would reduce reliance on manual methods, manual-with-spot-herbicide treatments, and localized treatments.

This alternative offers the widest range of methods to be used—the greatest number of "tools" in the tool box—when determining the appropriate way to manage the vegetation along a right-of-way.

This alternative would be compatible with both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2).

### Impacts

The environmental impacts of this alternative would be very similar to those of R2 and R3, with slightly fewer impacts from manual methods and somewhat more potential for herbicide contamination impacts (more herbicide would be used, and the aerial application technique added to this alternative is non-selective).

Because aerial herbicide applications are non-selective, non-targeted plants can *potentially* be affected and there is a greater potential for drift. Although aerial spraying is a non-selective application technique, the *type* of herbicide used can be species-selective—affecting only the plant species it is designed for.

As with R2 and R3, this alternative could in the long term control resprouting of deciduous plants and reduce the amount of regrowth along rights-of-way. If we were promoting low-growing plant communities, broadcast and aerial herbicide applications would be most appropriate for rights-of-way requiring corrective action (see Figure IV-2). Because these herbicide applications are non-selective, they would not be appropriate for maintaining rights-of-way with low-growing plant communities.

Other environmental impacts associated with this alternative include short-term helicopter or plane noise disturbance of wildlife and potentially of neighbors. This alternative would lessen some environmental impacts on those small portion of corridors that would be treated with aerial spraying, because aerial applications do not cause ground disturbance, non-target plants are not crushed, and soils are not disturbed.

As with R2 and R3, the worker health and safety issues associated with this alternative would include those for manual, mechanical, biological, and herbicide methods. However, because manual methods would be used slightly less, this alternative would have somewhat fewer manual safety issues for workers than R2 and R3.

The additional use of herbicides would entail more potential herbicide safety issues. However, because aerial herbicide application is done via a helicopter or plane (rather than by backpack or hand application), there is actually less potential for worker contact or exposure with the chemical with this application technique. There is some risk of aircraft accidents when flying over or under transmission lines.

As with R2 and R3, public health and safety impacts with this alternative would include those associated with manual, mechanical, and potential public exposure to herbicides. The potential for public exposure to herbicides with this alternative would be slightly more than with R2 and R3, because there is more potential for drift with aerial herbicide use and a slightly greater potential for accidentally spraying persons who could be on the right-of-way.

Alternative R4 allows the additional flexibility to choose aerial herbicide applications to treat noxious weed infestations (if the site and weed species would best be treated in this manner).

### Cost

The costs of this alternative would be quite a bit less than those for R2 and R3—there would be some administrative efficiencies in the use of aerial applications (quicker right-of-way treatment of large areas), with relatively low costs for aerial methods. As with R2 and R3, the long-term costs of this alternative would be less than those of R1 because deciduous plants can be treated so that they don’t resprout.

Table IV-2, page 111, compares the methods packages alternatives.

**Table IV-2: Comparison of the Methods Package Alternatives**

| Decision Factors | R1<br>**Manual, Mechanical, Biological** | R2<br>Manual, Mechanical, Biological,<br>**+ Herbicide – *spot, localized* application**<br>*(Environmentally Preferred Alternative)* | R3<br>Manual, Mechanical, Biological,<br>Herbicide – *spot, localized*<br>***+ broadcast application***<br>*(current practice)* | R4<br>Manual, Mechanical, Biological,<br>Herbicide – *spot, localized, broadcast*<br>***+ aerial application.***<br>*(Bonneville Preferred Alternative)* |
|---|---|---|---|---|
| **Minimizes Adverse Environmental Impacts** | **Mostly manual impacts**<br>▪ Resprout of deciduous species.<br>▪ Chainsaw noise disturbance (people & wildlife).<br>▪ More worker presence on ROW.<br>▪ Potential worker accidents.<br>**Some mechanical impacts**<br>▪ Can cause resprout.<br>▪ Can disturb non-target vegetation.<br>▪ Possibly expose/compact/erode soils & subsurface artifacts.<br>▪ Noise.<br>▪ Safety machinery accidents, flying debris.<br>**Small amount of Biological impacts**<br>▪ Potential feed for fish, wildlife.<br>▪ Insects not aesthetically pleasing.<br>▪ Difficult to treat noxious weeds. | **Manual impacts** same as R1, with the following difference:<br>▪ If herbicides are used on deciduous vegetation, no resprout impacts.<br>**Mechanical impacts** same as R1.<br>**Biological impacts** same as R1.<br>**Herbicide impacts**<br>▪ If used on deciduous, lessens resprout, ROW not treated as intensively, less worker presence.<br>▪ Potential spill, drift, or leaching could affect water, fish, vegetation; slight potential to affect wildlife, public.<br>▪ Slight potential for soil microbes to be affected.<br>▪ Standing dead vegetation may reduce aesthetics.<br>▪ Worker impacts if careless repeat exposure.<br>▪ Greater ability to treat noxious weeds. | **Manual impacts** same as R2.<br>**Mechanical impacts** same as R1, with the following difference:<br>▪ If follow-up broadcast herbicide is used, no resprout impacts.<br>**Biological impacts** same as R1.<br>**Herbicide impacts** same as R2, with the following differences:<br>▪ Additional *potential* for herbicide drift (broadcast applications).<br>▪ Greater ability to treat large areas of noxious weeds. | **Manual impacts** same as R2, with the following difference:<br>▪ Somewhat less impact—manual method used less.<br>**Mechanical impacts** same as R3.<br>**Biological impacts** same as R1.<br>**Herbicide impacts** same as R3 with the following differences:<br>▪ Slight potential for aerially spraying unseen resources—wetlands, etc<br>▪ Less worker presence on ROW in aerially treated areas.<br>▪ Less soil disturbance in aerially treated areas.<br>▪ Slight potential for public exposure in aerially treated areas if unable to ensure no public on remote ROWs.<br>▪ Greater ability than R3 to treat large areas of noxious weeds. |
| **Achieves Cost and Administrative Efficiency** | **Higher costs than other alternatives due to the following:**<br>▪ Manual labor takes more time to carry out.<br>▪ Deciduous resprouts create more clearing required in future.<br>▪ However, some administrative efficiencies in environmental reviews (compared to determining buffers and mitigation for herbicide use). | **Less cost than R1 due to following**<br>▪ Spot stump treatment of manual cuts more expensive short-term, but lessens resprout & thus long-term cutting costs.<br>▪ Localized & spot herbicide applications used instead of manual reduces costs (less labor-intensive, requires little debris disposal).<br>▪ However, increased administrative costs (compared to R1) due to environmental reviews for herbicide use. | **Relatively similar to R2, with the following differences:**<br>▪ In small areas where broadcast used instead of manual, cost and administrative efficiencies.<br>▪ Use of broadcast on portion of mechanical cuts would lessen those resprouts. | **Relatively similar to R3, with the following differences:**<br>▪ Where aerial is used instead of manual, labor costs more, but also administrative efficiencies (fewer people to coordinate – large area done quickly).<br>▪ Increased environmental review costs for use of aerial compared to other herbicide application methods. |
| **Complies with Laws and Regulations** | Complies with all laws and regulations (may be difficult to comply with control of noxious weeds). | Complies with all laws and regulations. | Complies with all laws and regulations. | Complies with all laws and regulations. |
| **Ensures a Safe and Reliable Power System** | Electric reliability and safety could be compromised, with difficulty in keeping up with fast deciduous tree growth. | Electric reliability and safety possible. | Electric reliability and safety possible. | Electric reliability and safety possible. |

ROW = Right-of-way

# Vegetation Selection Alternatives

Methods package alternatives R2, R3, and R4 use herbicides. For these three alternatives, another decision needs to be made—**which vegetation** can be treated with herbicides. We have three Vegetation Selection Alternatives, based on the three groupings of vegetation types that are being considered for herbicide treatment:

| Vegetation Selection | |
|---|---|
| **VS1** | **Noxious Weeds** only |
| **VS2** *(environmentally preferred)* | **Noxious Weeds & Deciduous** |
| **VS3** *(Bonneville preferred) (current practice)* | **Any Vegetation** |

## Alternative VS1: Noxious Weeds

With **VS1** (noxious weeds only), we would treat only noxious weeds with herbicides. With this alternative, we would be able to be in compliance with controlling noxious weeds.[2] However, deciduous species would not be treated. It would not be possible to implement the Promotion of Low-growing Plant Communities management approach (MA2) with VS1.

With this alternative, the environmental impacts from herbicide use would be limited to *only* those areas treated for noxious weed invasion. Because herbicides would not be used on deciduous species, there would be environmental impacts associated with the increased maintenance needed to clear densely vegetated areas.

## Alternative VS2: Noxious Weeds & Deciduous *(Environmentally Preferred Alternative)*

With **VS2** (noxious weeds and deciduous), only noxious weeds and deciduous resprouting/suckering-type plant species could be treated with herbicides. With this alternative, noxious weeds could be adequately addressed, as could the major issue of treating deciduous resprouting vegetation. With the ability to treat those deciduous species, we could promote low-growing plant communities along the right-of-way.

[2] It is difficult to manage noxious weeds without herbicides, especially when a biological agent is not available for a particular weed species.

The environmental impacts of this alternative would include those associated with the use of herbicides in areas with deciduous species. However, there would be less impact (compared to Alternative VS1), because less maintenance would be needed on the right-of-way. Both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2) could be implemented with this VS alternative.

## Alternative VS3: Any Vegetation *(current practice - Bonneville Preferred Alternative)*

With **VS3** (any vegetation), we would be able to choose to treat any targeted vegetation with herbicides. Noxious weed issues could be addressed, deciduous species could be controlled, and there would be added flexibility in how a right-of-way would be managed. Being able to treat any vegetation allows for the option to injection-treat a stand of conifers in the right-of-way and leave the dead trees standing for habitat, while also eliminating the costs and the impacts on non-target plants from felling trees, chopping them up, and disposing of them. **This alternative represents Current Practice for Vegetation Selection for Herbicide treatment.**

There would be more potential environmental impacts associated with herbicide use. The extent of maintenance needed and the associated environmental impacts would be the same as those under Alternative VS2 (because deciduous species could be treated) and less than those under Alternative VS1. Both the Time-driven management approach (MA1) and the Low-growing Plant Communities management approach (MA2) could be implemented with this VS3 alternative.

Table IV-3, following page, compares the impacts of selecting different groups of vegetation for herbicide treatment.

## Table IV-3: Vegetation Selection for Herbicide Treatment Alternatives

| Decision Factors | VS1<br>Noxious Weeds | VS2<br>Noxious Weeds and Deciduous<br>*(Environmentally Preferred Alternative)* | VS3<br>Any Vegetation<br>*(current practice-Bonneville Preferred Alternative)* |
|---|---|---|---|
| | *Use herbicides to treat only noxious weeds* | *Use herbicides to treat only noxious weeds & resprout-ing/ deciduous species* | *Use herbicides to treat any vegetation* |
| **Minimizes Adverse Environmental Impacts** | ▪ Able to treat noxious weeds.<br>▪ Most impacts due to manual & mechanical.<br>▪ Resprout of deciduous vegetation; more human presence & maintenance-related impacts.<br>▪ Herbicide impacts limited to areas treated for noxious weeds. | ▪ Able to treat noxious weeds.<br>▪ Most impacts due to manual & mechanical, some herbicide impacts.<br>▪ Deciduous treatments lessen resprout, ROW not treated as intensively, less human presence & maintenance-related impacts.<br>▪ Potential herbicide impacts greater than VS1, less than VS3. | ▪ Able to treat noxious weeds.<br>▪ Impacts due to manual, mechanical, & herbicide.<br>▪ As with VS2, deciduous treatments lessen resprout, ROW not treated as intensively, less human presence & maintenance-related impacts.<br>▪ Potential herbicide impacts greater than VS1 & VS2. |
| **Achieves Costs and Administrative Efficiency** | **Higher costs than VS2, VS3**<br>▪ Manual labor takes more time to carry out.<br>▪ Deciduous resprouts create more future clearing.<br>▪ However, some administrative efficiencies in environmental reviews w/ no herbicides for tall-growing. | **Less cost than VS1, due to the following:**<br>▪ Herbicide treatment of deciduous less expensive than manual (VS1); also lessens resprout & thus long-term cutting costs.<br>▪ However, some increased administrative costs (compared to VS1) due to environmental reviews for herbicide use. | **Somewhat less cost than VS2**<br>▪ Herbicide treatment of tall-growing less expensive than other methods, also lessens resprout & thus long-term cutting costs.<br>▪ Additional potential savings compared to VS2 due to less debris disposal.<br>▪ Some administrative efficiencies due to increased flexibility to treat areas difficult to treat with manual methods.<br>▪ However, some increased administrative costs (compared to VS1) due to environmental reviews for herbicide use. |
| **Complies with Laws and Regulations** | Complies with all laws & regulations. | Complies with all laws & regulations. | Complies with all laws & regulations. |
| **Ensures a Safe and Reliable Power System** | Electric reliability & safety could be compromised with difficulty keeping up with fast deciduous tree growth. | Electric reliability & safety possible. | Electric reliability & safety possible. |

# Electric Yard Program Alternative

The electric yard program includes vegetation management in substations, electric yards and sectionalizing switches. All these areas need to be kept bare, with no vegetation at all.

There is one alternative for managing vegetation in our electric yards:

| Electric Yard Program | |
|---|---|
| **E1** *(current practice)* | **Herbicide Treatment** |

One alternative was also eliminated from consideration for safety reasons (see below).

## Alternative E1: Herbicide Treatment

### Description

To control vegetation in electric yards we would mostly use pre-emergent herbicides—herbicides that are applied to the ground to keep vegetation from germinating. Herbicides would be applied about once a year. For the few cases where vegetation *has* been able to grow within the electric yard, we would use a follow-up post-emergent herbicide, weed burners, steamers, or selective hand-pulling. These post-emergent methods have potential safety issues, but are necessary in cases of sprouted vegetation. **This alternative represents current practice for electric yards.**

### Impacts

Any potential environmental impacts associated with keeping an electric yard free of weeds would be those resulting if any herbicides were to migrate off-site. Any migration would be due to either leaching or run-off. Pre-emergent herbicides tend to be persistent—they stay active for a long time—and are therefore more likely still to be active after moving.

Pre-emergent herbicides, however, do not have any greater chance of causing health impacts compared to post-emergent herbicides (there is no relationship between persistence and toxicity).

Worker health and safety impacts could occur from potential exposure to herbicides during application and when a worker is present in the yard. Application exposure would be about once a year.

Potential public health and safety impacts from electric yard vegetation control could occur if there was herbicide movement off-site, such that it exposed a person to herbicides.

**Eliminated from Consideration**

For safety reasons, we **eliminated from consideration** the alternative that would *not* use pre-emergent herbicides in electric yards. If we did not use pre-emergent herbicides, people would have to treat all vegetation after it has sprouted. A plant in an electric yard has to grow up through a metal ground mat and could provide another grounding path for electricity. If a person were to come in contact with a plant in the yard during a fault in or near the substation, he or she could be electrocuted.

# Non-electric Program Alternatives

The non-electric program includes vegetation management in or around facilities that have landscaping, gravel work yards or parking lots. It also includes the control of noxious weeds on property that we own (fee-owned land) such as acreage around a substation.

There are two alternatives for how to manage vegetation in and around our non-electric facilities:

| Non-electric Program | |
|---|---|
| **NE1** *(Bonneville preferred) (current practice)* | **Mixed Methods with Herbicides** |
| **NE2** *(environmentally preferred)* | **Non-herbicide Methods** |

**Alternative NE1:**
**Mixed Methods with Herbicides**
*(current practice - Bonneville Preferred Alternative)*

### Description

**Alternative NE1** would continue to control vegetation and maintain landscaping and work yards with a variety of methods including manual methods (hoes, saws, clippers), mechanical methods (lawn mowers), landscape material (permeable black plastic), herbicides, and fertilizer. **This alternative represents Current Practice for Non-electric Facilities.** The vegetation at most of our non-electric facilities is presently maintained by licensed, contract landscaping services.

### Impacts

The potential environmental impacts associated with this alternative would be due to possible herbicide movement off lawns, gravel yards, and general landscaping; and to noise and pollution from lawn mowers, weed whackers, and leaf blowers. There is no potential environmental impact from hand hoeing, clipping, or weed pulling.

Health and safety impacts for workers, and to a much lesser extent for the public, would include exposure to herbicides, exhaust, and noise. Workers also have the potential to be hurt with sharp objects such as clippers, or to experience back injuries from hoeing or weed pulling.

### Cost

This alternative would cost less to maintain vegetation around our non-electric facilities, because herbicide use is less labor-intensive and maintenance would not have to be conducted as often.

## Alternative NE2: Non-herbicide Methods

*(Environmentally Preferred Alternative)*

### Description

**Alternative NE2** would manage vegetation landscaping and vegetation at other non-electric facilities without using any herbicides. We would use manual methods (hoes, saws, clippers), mechanical methods (lawn mowers), landscape materials, and fertilizer.

### Impacts

Environmental impacts would include the potential spread of noxious weeds: it is difficult to treat noxious weeds without herbicides. Visual impacts could occur if facilities were not kept up very regularly (as they would have to be when using all-manual methods); weeds (any kind—noxious or non-noxious) growing in landscaped areas or in parking lots would not be visually appealing. Noise and pollution could occur from lawn movers, weed whackers, and leaf blowers.

Health and safety impacts would be limited to manual and mechanical methods (potential exposure to exhaust and noise). Because this alternative would rely more heavily on manual and mechanical labor than Alternative NE1, workers would have some increased potential to be hurt with sharp objects such as clippers, and to experience back injuries from hoeing or weed pulling. There would be no potential herbicide exposure impacts with this alternative.

### Cost

This alternative would cost more to maintain vegetation around our non-electric facilities, because it would require more labor-intensive maintenance more often.

**Table IV-4: Comparison of Non-electric Program Alternatives**

| Decision Factors | NE1 Mixed Methods with Herbicides *(current practice - Bonneville Preferred Alternative)* | NE2 Non-Herbicide Methods *(Environmentally Preferred Alternative)* |
|---|---|---|
| | *Use manual, mechanical, and herbicide methods, and fertilizer.* | *Use manual and mechanical methods, and fertilizer.* |
| **Minimizes Adverse Environmental Impacts** | ▪ Potential herbicide movement off-site; noise and pollution from mechanical equipment use. No anticipated impacts from manual methods.<br>▪ Workers/Public: Potential exposure to herbicides, exhaust, noise. Workers could be hurt by equipment. | ▪ No impacts associated with potential herbicide movement off-site. Without herbicide use, noxious weeds could spread in the area. If maintenance were not carried out frequently, visual appearance could degenerate. Noise and pollution impacts would be the same, but would be likely to occur more often.<br>▪ Worker/public: Same as under NE1, except that exposure to herbicides would not occur and there would be increased potential for injury because more mechanical and manual methods would be used. |
| **Achieves Cost and Administrative Efficiency** | Less costly alternative because it is less labor-intensive. | This alternative would cost more because it would require more labor-intensive maintenance, more often. |
| **Complies with Laws and Regulations** | Complies with all laws and regulations | Complies with all laws and regulations |
| **Ensures a Safe and Reliable Power System** | Would not affect electric reliability or safety. | Would not affect electric reliability or safety. |

*This page intentionally left blank.*