

Guidelines for Management

A Framework for Selecting the Most Appropriate Management Action

Asking the Right Questions

Selecting the most effective management action (including no action) should be based on the current condition of the landscape unit, taking into account the response of soil, water, flora, and fauna. Addressing the questions below will allow managers to effectively identify and set

priorities, greatly increase the probability of success, and increase the ability to predict the probable outcome.

To develop a strategy for restoring communities to proper functioning condition the following questions need to be addressed.

Setting goals and objectives

1. What are the desired future conditions or how should the site look in 5, 10, 20 years?

(Example: maximize the abundance of shrubs, grasses, and forbs suitable for the site.)

2. What vegetation changes need to occur to meet functional goals and/or habitat needs?

Clearly define the perceived problems

3. What is (are) the factor(s) affecting proper ecological function?

(Examples: western juniper density is increasing, resulting in shrub die-off, low cover and density of desirable native grasses and herbs; relatively high proportion of bare ground, resulting in rill erosion, etc.)

Identifying (inventory) current state of the site

4. What is the stage of woodland transition (i.e., Phase I, II, or III)?
5. What is the understory composition?
6. What are the fuel characteristics?
7. What are the soil characteristics?
8. How is the site functioning with respect to:
 - a. hydrologic function—erosion and infiltration;
 - b. recruitment of desirable and undesirable plants;
 - c. plant succession?
9. How does the site connect to the surrounding landscape?
10. Are seed sources available for desirable understory species?

11. Is seeding required? If perennial grass density is above 2/10ft², probably not.

12. Is restoration feasible or practical?

13. What site components need to be restored?

What are the landscape spatial characteristics of the area to be treated with respect to:

14. Patch size;

15. Amount of edge;

16. Connectivity to other patches;

17. Distance to similar patches;

18. Landscape patch composition;

19. Current use and management activities?

Selecting the best management action and treatment

Woodland succession within and across woodland successional phases will be determined by the type, frequency, intensity, and/or lack of disturbance (Fig. 35, 36). The best management actions will be determined by the composition of all vegetation layers of the woodland (see Appendix 4).

Predicting the outcome of management action and treatment

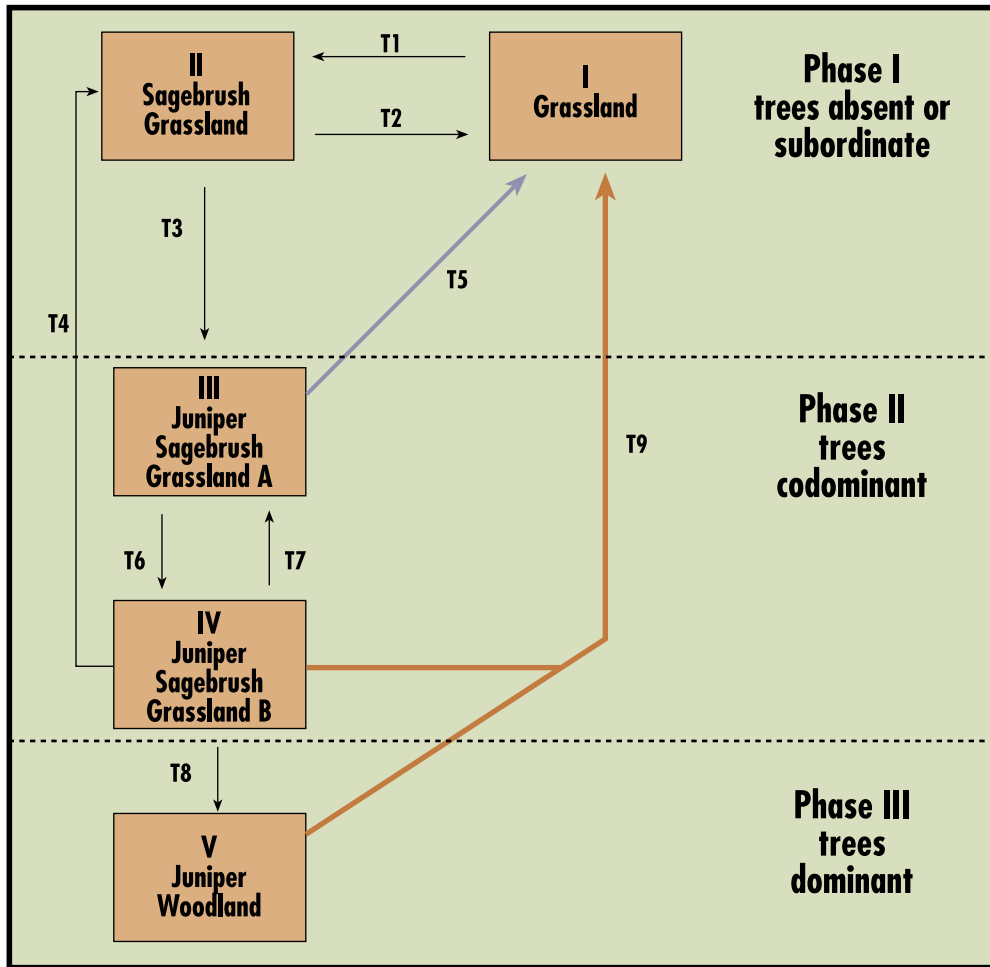
20. How will populations of undesirable and desirable plants respond?

21. How will capture, storage, and runoff of water change in response to treatment?

22. Will soil erosion increase or decrease?

23. How will fauna respond?

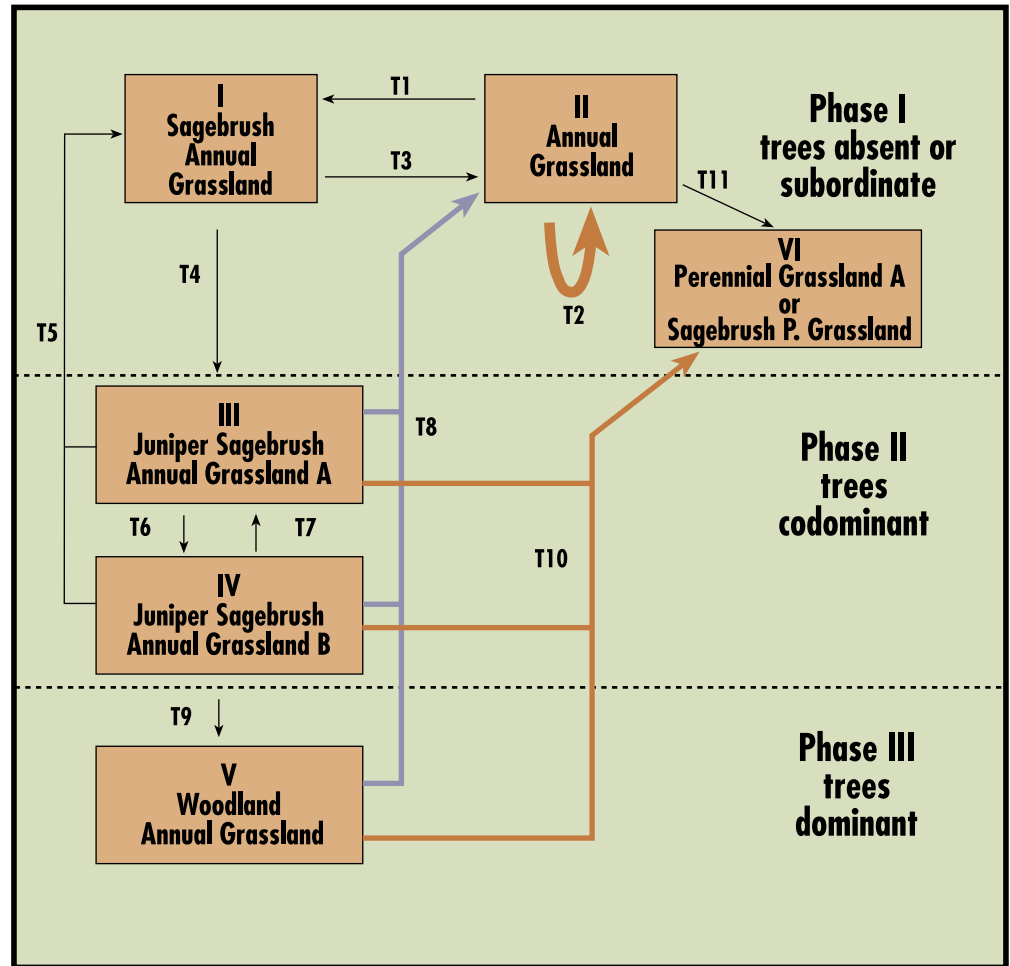
Figure 35. Successional trajectories in the mountain big sagebrush alliance, where the potential for weed encroachment is minimal, are determined by the type, intensity, and frequency of disturbance.



Definitions for Transitions

- Transition 1 (T1):** (Grassland to Sagebrush Grassland). **Lack of fire** results in succession from an herbaceous-dominated system to co-dominance of shrubs and grass. Fire return intervals of less than 20 years will result in a herbaceous dominated community. Transitional period from grassland to shrub-steppe will vary, especially after fire, depending on the shrub seed bank, weather conditions, and site potential. Most stands will return to 20–25 percent sagebrush cover within 20–35 years (in some cases 15–60 years)(Ziegenhagen 2003).
- Transition 2 (T2):** (Sagebrush Grassland to Grassland). **Natural or prescribed fire** (spray or brush beat could be included) removes shrubs and results in grassland dominance.
- Transition 3 (T3):** (Sagebrush Grassland to Juniper-Sagebrush Grassland A). **Lack of fire**. Rate of tree encroachment varies with site, seed source, and establishment (see Fig. 24).
- Transition 4 (T4):** (Juniper-Sagebrush Grassland A to Sagebrush Grassland; Juniper-Sagebrush Grassland B to Sagebrush Grassland). **Cutting** (chainsaws, feller bunchers) of trees. Life of treatment will depend on the density of seedling junipers and saplings missed during treatment; can be as short as 15–25 years.
- Transition 5 (T5):** (Juniper-Sagebrush Grassland A to Grassland) Fuels are sufficient to carry **fire** and remove trees and shrubs. Results in return to grassland.
- Transition 6 (T6):** (Juniper-Sagebrush Grassland A to Juniper-Sagebrush Grassland B). **Lack of fire** results in expansion of the juniper canopy and increased tree density. Shrubs decline in cover and density. Control options may be limited to mechanical or combinations of mechanical and prescribed fire (see T9).
- Transition 7 (T7):** (Juniper-Sagebrush Grassland B to Juniper-Sagebrush Grassland A) **Thinning operations** to retain mix of trees-shrubs and herbaceous layer. Often lasts for 15–25 years before re-treatment is necessary as seedling junipers and saplings are usually missed. If most trees are removed the community can return to sagebrush grassland if adequate seed source of herbaceous and shrubs are present.
- Transition 8 (T8):** (Juniper-Sagebrush Grassland B to Juniper Woodland) Community **conversion to woodland**. Shrubs lacking or few in the understory. Herbaceous layer may or may not be affected depending on depth to the restrictive layer below the soil surface. Main method of treatment remaining will be mechanical control.
- Transition 9 (T9):** (Juniper Sagebrush Grassland B or Juniper Woodland to Grassland). Lack of fuels eliminates fire as the sole method of tree removal. Removing all trees by **cutting** or **cutting plus fire** (creating a fuels base by cutting a portion of the trees to carry fire) to control remaining live trees is a management option. Treatment results in conversion to early succession community dominated by forbs and grasses. If deep-rooted perennials are fewer than 2/10ft² seeding will be required.

Figure 36. Successional trajectories in the mountain big sagebrush alliance, where the presence or potential for weeds are high, are determined by the type, intensity, and frequency of disturbance. Successful treatment will require control of both trees and annual grass and seeding deep-rooted perennial grasses. Weeds are a primary concern in Klamath and John Day provinces and below 4,500 ft and south aspects in High Desert and Humboldt provinces.



Definitions for Transitions

- Transition 1 (T1):** (Annual Grassland to Sagebrush Annual Grassland) **Lack of fire** may allow reestablishment of shrubs, resulting in the succession from annual-dominated system to codominance of shrubs and annual grass.
- Transition 2 (T2):** (Annual Grassland) **Reoccurring fire** (5 to 15 year cycle).
- Transition 3 (T3):** (Sagebrush Annual Grassland to Annual Grassland) **Natural or prescribed fire** (or herbicide, or mechanical) removes shrubs and results in annual grassland dominance without additional treatment for weed control.
- Transition 4 (T4):** (Sagebrush Annual Grassland to Juniper Sagebrush Annual Grassland A) **Lack of fire** results in juniper invasion and co-dominance of trees, shrubs, and annuals.
- Transition 5 (T5):** (Juniper Sagebrush Annual A and B to Sagebrush Annual) **Cutting** (chainsaws, feller bunchers). Life of treatment will depend on the density of seedling junipers and saplings missed during treatment; can be as short as 15–25 years. Will increase the production of annual grasses and increase the risk of fire.
- Transition 6 (T6):** (Juniper Sagebrush Annual A to Juniper Sagebrush Annual B) **Lack of fire**. Juniper continues to increase in density and shrub abundance declines.
- Transition 7 (T7):** (Juniper Sagebrush Annual B to Juniper Sagebrush Annual Grassland A) **Thinning** will probably increase annual weeds production resulting in an increased risk of fire. Life of treatment will depend on the density of seedling junipers and saplings missed during treatment; can be as short as 15–25 years.
- Transition 8 (T8):** (Juniper Sagebrush Annual A & B and Juniper Woodland Annual to Annual Grassland) Stand replacement **Fire**.
- Transition 9 (T9):** (Juniper Sagebrush Annual B to Juniper Woodland) **Lack of fire or cutting**.
- Transition 10 (T10):** (Juniper Sagebrush Annual A and B, and Juniper Woodland to Perennial Grassland or Sagebrush Perennial Grassland) **Cutting, fire, control of weeds, and seeding** of perennial grasses and forbs.
- Transition 11 (T11):** (Annual Grassland to Perennial Grassland or Sagebrush Perennial grassland) **Control of weeds and reseeding** of perennial grasses and forbs.

Management Actions

Fire

Advantages: most economical; natural process; vegetation can respond positively under the right conditions; can treat large areas; some control over intensity of fire; and usually results in the longest time period before juniper returns to the site.

Disadvantages: risk; liability; weed threat in some locations; reduction of shrubs (e.g., sagebrush, bitterbrush, mountain mahogany); tree selectivity limited; must have adequate fuels; potential nutrient losses with high intensity fires; limited climatic conditions under which prescribed fire can be used; smoke issues; urban interface.

Site Factors

Desirable

Fuels: adequate fine fuels (grasses and forbs, estimates of more than 500 lbs/acre) to carry the fire and ladder fuels (shrubs and small trees less than 3 ft tall) to kill trees over 5 ft tall.

Understory: desirable understory species are present in adequate abundance that will allow these species to quickly respond during the early post-season fire years.

Introduced annuals: absent or if present, only in small amounts relative to desirable herbs.

Stage of woodland development: South aspects Phase I and early II; North aspects Phase I and mid-II.

Undesirable

Fuels: inadequate to carry a fire under moderate conditions.

Understory: limited abundance of desirable native herbs, especially deep-rooted tussock grasses; potential seed source from undesirable species.

Soil surface: total bare ground in the tree interspace more than 50 percent, indicators of accelerated soil erosion (rills, etc).

Stage of woodland development: South aspects Phases mid II and III; North aspects late Phases late II and III.

Mechanical: chainsaws

Advantages: selective (trees removed); control the area that is treated; broad time period when treatment can be applied; minimal liability; friendly near urban interface, which may negate high costs; maintains shrubs with proper planning; little soil

disturbance; not fuel limited; slash may be beneficial in restoring the site; broadcast seed beneath slash.

Disadvantages: high cost/acre; limited amount of area treated; large amounts of woody debris remains following treatment in dense woodlands; potential liability in fire protection zones adjacent to pine forests.

Mechanical: heavy machinery

Advantages: control the area that is treated; broad time period when treatment can be applied; minimal liability; friendly near urban interface, which negate high costs; maintains shrubs with proper planning; not fuel limited; slash may be beneficial in restoring the site; broadcast seed beneath slash; soil surface disturbance may enhance germination of seed broadcast prior to treatment.

Disadvantages: high cost/acre; limited amount of area treated; some mechanical equipment are limited by steepness of slope and rockiness; large amounts of woody debris remain following treatment in dense woodlands; soil disturbance or compaction.

Chemical

Advantages: Can treat areas quickly; not limited by topography; effective on trees less than 6 ft in height.

Disadvantages: Use is highly restricted on Federal lands, at least in Oregon; effectiveness of control often limited; few effective products are currently labeled for this use.

Seeding

If the density of desirable deep rooted grasses is less than 2 /10ft² on relatively dry western juniper sites or fewer than 1/10ft² on wet sites, seeding should be incorporated into the treatment. Broadcast seeding usually results in limited establishment. However, broadcasting beneath slash or just prior to disturbance of the soil surface (e.g., chaining) may increase success of establishment. Whether exotics or natives, the seed source and species selected must be adapted to the site and should be certified weed free.

Weeds

Questions to address prior to treatment:

- How will weedy annuals respond to the treatment?
- Which ecological sites are to be treated?
- What is the plant composition and present weed population or source of weed seed?
- Why have weeds invaded the site?