



Field Guide for Managing Fountain Grass in the Southwest



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Fountain grass (*Pennisetum setaceum*; synonyms: *P. ruppelii*, *Phlaris setacea*)

Grass family (Poaceae); Bromeae tribe

Fountain grass is currently expanding its range in the Southwestern U.S. and has been reported as invasive in California, Nevada, and Arizona. This field guide serves as the U.S. Forest Service's recommendations for management of fountain grass in forests, woodlands, and rangelands associated with its Southwestern Region. The Southwestern Region covers Arizona and New Mexico, which together have 11 national forests. The Region also includes four national grasslands located in northeastern New Mexico, western Oklahoma, and the Texas panhandle.

Description

Fountain grass (synonyms: crimson fountain grass, purple fountain grass, fountaingrass) is a warm climate, perennial bunchgrass native to northern Africa and western Asia. It has been widely planted in urban settings as a landscape ornamental. Over time, it has escaped cultivated areas and is now found in many arid land habitats.

Growth Characteristics

- Tufted perennial bunchgrass; warm climate; uses C4 pathway that fixes CO₂ into a four carbon compound (C4) rather than a three carbon compound (C3); may become dormant in the winter; individual plants may live 20 years or more.
- Has several upright stems growing from a densely clumped tussock; 2–4.5 feet tall.
- Leaves are bright green or purplish; these may turn reddish or tan with colder temperatures. Blades are long, slender, and arching (8–25 inches); sheath margin has stiff white hairs.
- Has a showy purplish, bottlebrush-like panicle (6–15 inches); spikelets have 1-inch long bristles.
- Roots are fibrous and grow to 1 foot deep; forms mycorrhizal associations; no rhizomes.
- Reproduces solely by seed, though it may be intentionally propagated through division; seeds

germinate in late spring after maturing for several months; seeds viable 6–7 years.

Ecology

Impacts/threats

While attractive in a contained setting, fountain grass can aggressively spread in an open, arid environment under full sun and rapidly out-compete native herbaceous species. When dry, it is highly flammable. Its presence greatly increases the fire potential and often causes a change in the fire pattern in areas it invades. Other impacts include reduced available forage, diminished diversity of flora and fauna, and decreased wildlife habitat.

Location

Warm, arid landscapes including canyons, desert, grassland, and rangeland; roadsides; arroyos and washes. It is found in similar habitats as buffelgrass; however, fountain grass is more cold tolerant and is able to occupy a wider elevational range. Fountain grass prefers mild winters, summer rain, and median annual precipitation of less than 50 inches. It does not tolerate freezing temperatures or saline soils.

Spread

Ornamental plantings serve as the primary way fountain grass can be spread. Even varieties of fountain grass mistakenly sold by nurseries as being infertile can still become pollinated by fertile varieties or closely related plant species and develop viable seed. Seeds have bristles that may become tangled in animal fur; they may be carried by wind, water, birds, or by small rodents. Seeds may also adhere to clothing or be carried for long distances on undercarriages of vehicles and road maintenance equipment.

Invasive Features

Fountain grass is highly adaptable to many environments (high plasticity). Growth characteristics and reproduction may change according to the altitude at which it is growing, and its physiology may adjust in response to physical features of the landscape. For example, its rate

of photosynthesis increases at greater altitudes. Repeated wildfire favors fountain grass.

Management

Prolific production of long-lived seed hinders control efforts once fountain grass is established. Control strategies should focus on removing seed heads and reducing seed production. Treatment priority should be assigned to small or sporadic infestations upon otherwise healthy sites, followed by larger infestations. Treatment should be made along the perimeter of an infestation and then worked toward the center. In most cases, multiple years of treatment is necessary to remove all seed-producing plants, followed by 6–7 years of monitoring and implementing measures to control seed germination and emerging seedlings. An adaptive management approach will allow for adjustments to be made as the plan is implemented.

Consider the following actions when planning a management approach:

- Landscape alternatives should be promoted to landowners (especially in housing developments near open rangelands) to minimize new introductions of fountain grass.
- Healthy plant communities should be maintained to limit infestations of fountain grass.
- Check hay, straw, and mulch for presence of weed seed before using them in weed-free areas; certified weed-free hay or pellets should be fed to horses used in the back country.
- Detect, map, and eradicate new populations of fountain grass as early as possible. Keep annual records of reported infestations.
- Implement monitoring and a followup treatment plan for missed plants or seedlings.
- Combine mechanical, cultural, biological, and chemical methods for most effective control.

Choice of control method for fountain grass depends on the current land use and site conditions; accessibility, terrain, and climate; density and degree of infestation; and nontarget flora and fauna present. Other considerations include treatment effectiveness, cost, and the number of years needed to achieve control. Table 1 summarizes management options for the most common situations involving fountain grass. More than one control method may be needed for each site.

Physical Control

Manual Methods

Hand pulling of seedlings and plants every 1–2 months has been used with some success in Hawaii Volcanoes National Park. Satellite and small, isolated populations should be eradicated, while larger areas of infestation should be contained and gradually reduced over time, starting around the perimeter. Remove as much of the root as possible. A pick, mattock, Pulaski, or shovel may be required for plants with a tussock diameter greater than 4–6 inches. Debris—especially debris with inflorescences—should be bagged and removed from the site to prevent spread.

Mechanical Methods

In many cases, mechanical methods (such as mowing or tillage) are not feasible management tools for fountain grass due to the rocky, steep locations the plant frequently inhabits. Fountain grass may be mowed when infestations are accessible, level, and free of large rocks. Cutting with a weed trimmer may be an alternative for areas where mower use is not feasible.

Where possible, tillage with a plow or disc may be used. Inflorescences should be burned or collected, bagged, and removed to prevent seed bank contribution. Mechanical methods may be combined with an herbicide application to increase control effectiveness. Whatever method is chosen, anticipate that it may need to be repeated to reach an acceptable level of control.

Table 1. Management options*

Site	Physical Methods	Cultural Methods	Biological Methods	Chemical Methods
Roadsides	Mow or grade repeatedly during growth season to suppress seed production. Assemble volunteer groups to hand pull.	Avoid planting as an ornamental near open range areas. Implement requirements for vehicle operations and for reporting infestations along roads.	No classical biological control agents have been approved for use by the USDA.	Use truck spraying equipment. Wash underneath to prevent spread.
Rangeland	Hand pull or use a weed trimmer; repeat every 1–2 months for at least 4 years. Bag debris, especially debris with inflorescences.	Use certified weed-free seed and hay. After moving livestock or vehicles through an infested area, inspect and remove any seeds from animals, clothing, and vehicles before exiting the infested area.	Early spring grazing can temporarily reduce density, fuel loads, and risk of wildfire. However, plants become less palatable as they mature which may increase preference for nontarget plants.	Use systemic, pre- or post-emergent herbicides. Use ground broadcast sprayer or backpack sprayer for areas difficult to access.
Wilderness and other natural areas	Manual methods such as hoeing or hand pulling may be needed to protect other resources.	Post signs warning visitors to remove seeds. Limit public access in severely infested sites.	Biological suppression via desirable perennial plant competition.	Use backpack sprayer for small stands. Broadcast spraying by ground or aerial methods may be used on thicker stands, if allowed.

* Choice of a particular management option must be in compliance with existing regulations for land resource.

Prescribed Fire

Burning is not recommended, except as a means to manage debris. Fountain grass rapidly regrows following fire, which often leads to an increase in its dominance.

Cultural Control

Land managers, the local public, and road crews should be educated in identification of invasive species so they can help report all suspected infestations. Vehicles, humans, and domestic animals should be discouraged from traveling through infested areas; and a program to check and remove seeds from vehicles, clothing, and domestic animals should be implemented to help stop dispersal. Since this species is currently promoted as an ornamental, coordination with local nurseries to distribute information about this plant’s invasive potential may be warranted.

Biological Control

Grazing

Except when young, fountain grass is not highly palatable nor is it very nutritious as a forage grass. It may be grazed intensively by sheep or cattle in early spring while shoots

are tender and succulent. However, livestock will usually graze other desirable species first and avoid fountain grass when given a preference.

Classical Biological Agents

At present, no biological control agents have been approved by the USDA for use on fountain grass. Identification of an acceptable biological control agent is hampered by the potential for impact to related forage and crop species, such as pearl millet and sugar cane.

Chemical Control

Fountain grass mortality rates of at least 90 percent have been attained by the Lake Mead Exotic Plant Management Team of the National Park Service through the use of glyphosate spot treatments performed annually to actively growing plants. Other herbicides listed in table 2 will also effectively control fountain grass when properly applied, although some may negatively impact nontarget species. Caution should always be taken if nontarget plants, including woody species, need protection. Each herbicide product has unique requirements and restrictions; therefore,

Table 2. Herbicide recommendations

Common Chemical Name (active ingredient)	Product Example ¹	Product Example Rate per Acre ¹ (broadcast)	Backpack Sprayer Treatment Using Product Example ²	Time of Application	Remarks
Glyphosate	RoundupPro, Rodeo, Accord	0.5–1 pint	5–8% + 0.5% nonionic surfactant	Any growth stage when green and actively growing.	Nonselective amino acid inhibitor; will affect most vegetation, including forbs and woody species; quickly inactivated in the soil. Foliar application only. Completely spray all green leaves; followup by spraying seedlings annually.
Imazapyr	Habitat, Arsenal, others available	2–3 pints	1–3% solution	When fountain grass is actively growing as indicated by bright green and glossy leaves.	Imazapyr is a nonselective amino acid inhibitor. Nontarget plants, including desirable forbs and woody species may also be killed or injured by root transfer of imazapyr between intertwined root systems. For perennial grasses, imazapyr is best used as a postemergent control, which requires the use of a 0.25 nonionic surfactant or 1 percent MSO ³ ; follow label instructions. Herbicidal activity may be slow. Allow two full growing seasons before followup treatment.
Hexazinone	VelparDF	1.5 lbs + 25 gallons water (minimum)	2.66 lbs + 1 gallon water	Anytime, preferably before a rain event.	Not for use near waterways or desirable woody species. High soil mobility; groundwater contamination potential. Contact and residual control; use lower rate on coarse-textured soil (sand to sandy loam); use higher rate with fine-textured soils (clay loam to clay) or soils high in organic matter.
Fluazifop-p-butyl	Fusilade 2000, Fusilade DX	1–1.5 pints	0.5% + 0.25% nonionic surfactant	In spring after emergence but before seed head is detectable.	Soil applied; attacks meristematic tissue of annual and perennial grasses. Does not affect broad-leaved plants.

¹ Trade names for products are provided for example purposes only, and other products with the same active ingredient(s) may be available. Individual product labels should be examined for specific mixing information and appropriate use.

² Herbicide/water ratio - As an example, a gallon of spray water with a 3 percent mixture is made by adding a sufficient volume of water to 4 ounces of herbicide until a volume of 1 gallon is reached (4 oz ÷ 128 oz/gal = 0.03 or 3 percent).

³ MSO = methylated seed oil.

it is important to read the label carefully and to follow all instructions and guidelines when mixing and applying the chemical.

When spraying fountain grass with a foliar active herbicide (such as glyphosate, imazapyr, or fluazifop-p-butyl), the foliage should be at least 50 percent green; however, better control is obtained when plants are more than 80 percent green. Hexazinone is active mainly through the roots so this herbicide should be applied before anticipated rainfall. A backpack sprayer should be used for smaller, less dense infestations. For areas with larger, denser infestations, it may be more practical to use an ATV or UTV sprayer or a conventional boom sprayer that is pulled or mounted to a truck or tractor.

Control Strategies

Areas for treatment should be prioritized, and a combination of control methods should be considered when attacking fountain grass. Initial treatment should attempt to eliminate as many live plants and disrupt as much seed production as possible. Secondary treatment should include monitoring and additional control measures (such as spot spraying) to eliminate seedlings and increase competition from desirable perennial plants.

Consider the following strategies to contain and reduce fountain grass populations:

- **Manual removal-herbicide strategy** – Coordinate hand pulling removal efforts, especially targeting isolated populations and sporadically occurring plants, which could become a future source of invasion. Monitor treated areas and follow, as needed, with herbicide applications to maximize control.
- **Herbicide-mechanical method strategy** – Apply herbicide to actively growing plants; allow 2 weeks for herbicide to translocate to roots; mow or cut with a weed trimmer. Or, mow first, allow plants to

regrow to a height of 10 inches and apply herbicide. Another option is to till, followed by an herbicide application to minimize germination of remaining seed.

Regardless of the initial strategy used, the key to successful fountain grass control is a long-term commitment to management, including annual monitoring and performing followup treatment(s) upon regrowth and newly emerged seedlings. Since seed is viable for 6 or more years in the soil bank, a short-term control strategy for fountain grass is not likely to succeed.

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Suggested Web Sites

For online access to herbicide labels:

<http://www.cdms.net/LabelsMsds/LMDefault.aspx>

**For more information
or other field guides, contact:**

USDA Forest Service
Southwestern Region
Forest Health
333 Broadway Blvd., SE
Albuquerque, NM 87102

Or visit:

<http://www.fs.usda.gov/main/r3/forest-grasslandhealth/invasivespecies>

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