

**Esplanade® 200 SC Herbicide**



**Stewardship Guide for Release or Restoration of  
Desirable Vegetation in Natural Areas**



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## Esplanade® 200 SC Herbicide Stewardship Guide for Release or Restoration of Desirable Vegetation In Natural Areas

Invasive annual grass species such as cheatgrass (*Bromus tectorum*), medusahead (*Taeniatherum caput-medusae*), ventenata (*Ventenata dubia*) and red brome (*Bromus rubens*) are changing western natural areas and rangeland in a cycle that favors their spread at the expense of desirable vegetation.

They compete with desirable grasses, forbs and shrubs by germinating in late-summer and winter, continuing root development over winter, starting rapid above ground growth in late-winter and stealing moisture and nutrients before desirable perennials start to grow in spring.

- Every year after the annual grasses mature and produce seed they turn brown and die in mid- to late-summer. The new seed production is added to the soil seed bank and the foliage is added to the thatch layer. The annual grasses are well adapted to germinating under their own thatch layer.
- The thatch layer creates a continuous bed of fine fuel that is associated with an increase in the frequency and intensity of wildfire. Desirable perennial species can be killed by the high intensity fires or never have a chance to fully recover because of the increased fire frequency. In addition, the wildfires are a threat to humans, wildlife, property and infrastructure.
- In areas with perennial forb populations, pollinator habitat is reduced with fewer flowering forbs present and reduced flower abundance.
- Forage quality for wildlife and livestock is reduced since the annual grasses have high silica content or are only optimal for grazing over a very short window.
- Wildlife species such as the sage grouse and desert tortoise are at risk because of the dramatic increase in invasive annual grass dominated landscapes.



Restoration activities such as reseeding and replanting are expensive and difficult. The best time to control invasive annual grasses is when viable populations of desirable perennials are still present.

**Prioritize invasive annual grass control on sites that still have viable populations of desirable perennials.**

Trial work across the western US has documented that Esplanade is a highly effective tool for control of many invasive annual grasses. While other products are available for annual grass control, they are inconsistent or only provide a relatively short duration of control. Annual grass seed can remain viable in the soil and thatch layer for many years and other products do not provide enough residual control to adequately address the total number of viable seeds, known as the "seed bank". A single application of Esplanade can prevent germination of annual grasses for multiple years. This provides land managers with a new opportunity to start the process of eliminating the annual grass seed bank. Additionally, most alternative products have the same herbicide site of action (Group 2, ALS inhibitors) and there are reported cases of annual grass resistance to this group. Esplanade is a new site of action (Group 29, cellulose biosynthesis inhibitor) and is an effective tool for managing herbicide resistant weeds.

## Esplanade 200 SC label

Directions for using Esplanade for the release or restoration of desirable vegetation are currently available on a Supplemental Label that is approved in all states (EPA Reg. No. 432-1516). This label allows for use of Esplanade in non-crop areas such as: parks and open space, wildlife management areas, recreation areas, fire rehabilitation areas, prairies and fire breaks. Grazing or feeding forage, hay or straw from treated areas to livestock is not allowed. If you intend to graze livestock on an area, do not use Esplanade.

## Species controlled

Esplanade controls a broad spectrum of grasses and broadleaf weeds including all the major winter annual grass invaders in the western US.

Some invasive annual grasses controlled by Esplanade® 200 SC Herbicide	
Cheatgrass or downy brome	<i>Bromus tectorum</i>
Cheat	<i>Bromus secalinus</i>
Red brome	<i>Bromus rubens</i>
Japanese brome	<i>Bromus japonicus</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Ventenata*	<i>Ventenata dubia</i>
Feral rye	<i>Secale cereale</i>

\* Use for ventenata control is covered by a 2ee label

## Application timing

Esplanade provides pre-emergence control of seedlings by disrupting and inhibiting normal root growth as they try to emerge. In general, Esplanade has no post-emergence activity meaning that it does not control plants after they have emerged and established a root system.

- For control of annuals, Esplanade must be applied before they emerge (pre-emergence).
- In order to provide pre-emergence control of annuals, Esplanade must first be activated by rainfall (minimum 0.25 inches).
- Many herbicides are degraded quickly by sunlight if they lie on the soil surface before rainfall allows them to bind with soil particles. In contrast, Esplanade has good photo stability meaning minimal breakdown on the soil surface as a result of exposure to sunlight. This allows some flexibility in application timing relative to rainfall.
- Esplanade should be applied with an expectation of precipitation within two months after application.
- To increase the chance of activating rainfall before annual grass germination, a minimum time of one month between application and first expected germination of annual grasses is recommended.
- Recent trials on high elevation sites indicate that an October-November application timing of straight Esplanade may be too late for consistent first year cheatgrass control even when there is no obvious cheatgrass emergence at the time of application. This could be due to the cheatgrass germinating and developing a root well before the first leaf emerges above the soil surface. Target straight Esplanade treatments on these sites for June-August to allow for activation by rainfall before first cheatgrass germination. For later applications tank mix with a soil active product that provides post-emergence control such as Plateau®, Matrix® or Lambient® or tank mix with glyphosate when cheatgrass has fully emerged and desirable perennials are dormant.

Some annual grasses may escape a planned pre-emergence application. Annual grass germination timings are highly variable between years and some individuals may germinate much earlier than others. Additionally, low rates of precipitation may not be enough to activate the herbicide but can stimulate germination of annual grasses. However, because Esplanade can prevent germination of annual grasses for multiple years, the grasses that escape in the first year after treatment may be controlled the following season. A minimum Esplanade 200 SC rate of 5 oz per acre is required to provide longer term residual control.



Esplanade® 200 SC provides a new opportunity for elimination of invasive annual grass seed banks allowing for improved pollinator habitat, wildlife habitat, species diversity and reduced threat of wildfire

### Tank-mixing Esplanade with other herbicides

For first year annual grass control, Esplanade should be tank mixed with a soil and foliar active herbicide at the following application timings:

- Application is less than a month before first expected annual grass germination
  - Application is after first germination of annual grasses
  - Expectation of insufficient precipitation to activate Esplanade prior to first annual grass germination
- Tank-mix options that provide both soil and foliar activity include Plateau®, Lambient® and Matrix®. These herbicides are absorbed by both roots and foliage and can provide pre- and post-emergence control of annual grasses.

Glyphosate can also be used as a tank-mix partner. Glyphosate should only be used when desirable perennials are dormant. To be effective, glyphosate must be sprayed directly onto the leaves of emerged annual grasses. Since newly emerged annual grasses are very small, good coverage is essential. If annual grasses have emerged but are still covered by thatch or other material, they will not be controlled.

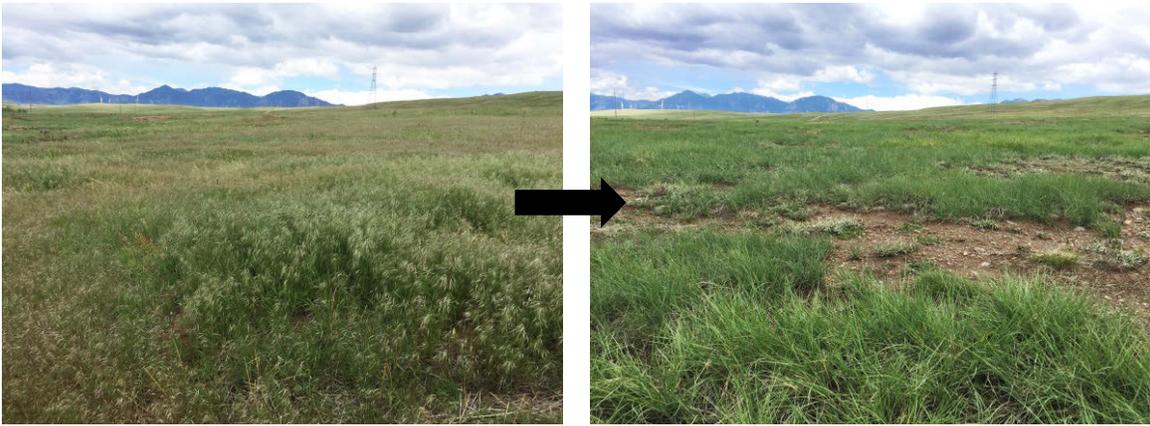
Efficacy of tank mix partners varies between annual grass species and annual grass growth stage. Also, tolerance of desirable perennials varies between species and application timing. Review all labels carefully and use the most restrictive label when using tank-mixes.

Esplanade is a suspension concentrate formulation that mixes easily. However, when tank mixing with other products, it is important to follow the correct mixing procedure. The correct mixing procedure is essential to get good distribution of Esplanade in the tank, allowing for good distribution on the ground. Poor distribution on the ground will result in skips. The correct mixing order is: 1) water dispersible granules or dry flowables, 2) suspension concentrates, 3) soluble granules, 4) soluble liquids, 5) surfactants.

Tank mix partner	Mechanism of Action	Activity	Formulation	Mixing order
Glyphosate	EPSPS inhibitor	Foliar	Soluble liquid	Esplanade – glyphosate – NIS
Plateau	ALS inhibitor	Soil and foliar	Soluble liquid	Esplanade – Plateau – NIS
Matrix SG	ALS inhibitor	Soil and foliar	Soluble granule	Esplanade – Matrix SG – NIS
Lambient	ALS inhibitor	Soil and foliar	WDG	Lambient – Esplanade – NIS
Matrix FNV	ALS inhibitor	Soil and foliar	Dry flowable	Matrix FNV – Esplanade – NIS

NIS = Non-ionic surfactant added at 0.25% v/v, WDG = Water Dispersible Granule

1. Start by adding half the water to the tank
2. Add each component separately and mix thoroughly before adding the next component
3. End by adding the remaining water and mix thoroughly
4. If the mix sits for more than a few hours, mix thoroughly before spraying



Release of perennial grass following Esplanade® 200 SC + glyphosate application on a cheatgrass and Japanese brome dominated site

### Uniform soil coverage is important

Since Esplanade has low water solubility and tends to be relatively immobile once it is activated by rainfall and binds with soil particles, it is important to get good soil coverage at the time of application. For ground application use 20-30 gallons per acre (GPA) of total spray mix. For aerial application use 5-10 GPA.

### Creation of bare ground

Removal of dense stands of annual grasses in degraded areas with few perennial species remaining may result in large areas of bare ground devoid of vegetation. Before making applications in such areas, a multi-year restoration management plan should be in place.

### Adaptive management

Esplanade controls a broad spectrum of annual grasses and broadleaf weeds but does not provide extended residual control of all annual species. Open space created by removal of the annual grasses may be invaded by other non-desirable species, particularly broadleaf weeds. An adaptive management plan should be in place to deal with changing site conditions after annual grasses are removed. Two species that have demonstrated a high degree of tolerance to Esplanade include western salsify (*Tragopogon dubius*) and red stem filaree (*Erodium cicutarium*). Other species that are more tolerant to low soil residual rates of Esplanade than annual grasses, may start to invade treated areas as the active ingredient degrades.



Restoration of remnant Palouse Prairie sites using Esplanade® 200 SC to control ventenata and other invasive annual grasses

## Avoiding damage to desirable species

While the majority of test work has demonstrated excellent tolerance of established perennial grasses, forbs and shrubs, testing can't cover all site and environmental conditions. When planning a program in situations not covered by testing or previous experience, treat small areas first before large scale use.

### Situations where small scale applications should occur before large scale applications:

- Areas with desirable perennial species not listed in the tolerant species table of the Esplanade supplemental label, especially if these species are a dominant component of the perennial plant population.
- Areas with desirable perennial *Poa* species or *Festuca* species (fescues). Some species in these genera were shown to be intolerant to indaziflam (the active ingredient in Esplanade) in fine turf settings. Additional testing in natural area situations is needed.
- Areas with small or young perennial grasses with crowns less than two inches in diameter.
- Areas where substantial soil disturbance has occurred such as from mining operations or landslides.
- Soils with 20% or more gravel content or soils with >85% sand. To determine gravel content do not remove gravel from soil samples before sending for texture analysis, and request that gravel content be included in the analysis. The gravel content (greater than 2 mm or 0.079 inches in size, US standard sieve size 10) is defined as total % gravel by weight before conducting soil texture analysis.

**Application rate:** To minimize the potential for perennial grass injury, use a maximum Esplanade 200 SC rate of 5 oz per acre for any of the situations mentioned above and wait at least three years before making a sequential application.

**Soil Moisture and Rainfall:** For all applications it is important to consider soil moisture at the time of application and rainfall potential after application. To allow adequate time for Esplanade to bind with soil particles, do not apply when soils are saturated or when rain is expected within two days of application. Application to saturated soils or rain soon after application can allow Esplanade to move on the surface or into the soil profile before it has a chance to bind to soil particles. If the herbicide moves directly into lower soil layers or distributes unevenly, roots of perennial species may be damaged. Uneven distribution can also decrease efficacy. These same precautions are needed on irrigated sites. The first irrigation should be light (0.1 inches) and at least two days after application.

**Wildlife grazing after application:** Grazing animals show a strong preference for areas free of annual grasses. Intensive grazing on newly released perennial grasses can prevent or delay recovery. Grazing injury will be exacerbated if only small areas are treated resulting in a high concentration of grazing animals, or when treating small perennial grasses that can be uprooted by grazing animals.



Western wheatgrass outcompeted by medusahead (left) and released with Esplanade® 200 SC (right)

## Protecting crops and other sensitive areas

Do not apply in situations or under conditions where Esplanade can move off-site onto sensitive areas, including crop areas. Indaziflam (the active ingredient in Esplanade) is not approved for use in most crops and any off-target movement into crop land could damage the current and future crops. In addition to following all label directions to prevent off-site movement, it is important to note that Esplanade binds tightly to soil particles and if soil blows off the treated area, the Esplanade could move with the soil. This is an especially important consideration when treating post-fire on bare ground or when large areas of bare ground will be created after removal of the annual grasses.

## Restoration of degraded areas

Unfortunately many areas are degraded by invasive annual grasses to the point where restoration is needed. Remember, however, that it is difficult to assess how many viable perennial plants remain on site. Perennials may be suppressed and hidden from view but are ready to respond as soon as they are released from the stifling effects of successive waves of annual grass stealing their moisture, nutrients and growing space. **Don't assume that all sites that appear to be dominated by annual grass will need restoration.** Scout for remnant populations of desirable perennials prior to formulating a management plan. There are different options to consider if restoration is needed:

### Drill seeding after Esplanade application

Trials on drill seeding following Esplanade application are on-going. One trial has shown that placement of the seed below the herbicide layer can allow for successful establishment of desirable vegetation. Additional research is needed to demonstrate this effect on a variety of sites and species. The label recommends waiting at least 8 months and then planting test strips before large scale seeding. For the best chance of success:

- Drill seeds at least  $\frac{3}{4}$  inch below the surface, the idea being that the seeds are deposited below the herbicide layer
- Choose species that can germinate from this depth
- Choose species with high likelihood of dispersing by seed over time or rhizomatous species such as western wheatgrass that can fill in bare ground areas over time
- Use diverse seed mixtures to improve the probability that environmental conditions and herbicide tolerance will meet requirements of at least some species
- Plan on adaptive weed management since controlling weeds is essential for successful establishment in restoration areas

### Drill seeding before Esplanade application

An alternate approach is to establish desirable perennials before using Esplanade. In this case alternative herbicides will be needed to provide enough weed control for successful establishment. Follow up with Esplanade in years two or three to provide residual control of invasive annual grasses.



Successful perennial grass and forb establishment following drill seeding nine months after application of Esplanade® 200 SC

### **Relying on perennial recruitment from natural seed rain or the soil seed bank**

Since Esplanade is a pre-emergence herbicide, germination of perennial seed at or near the soil surface may be inhibited. Important points to consider:

- Heavy annual grass competition will also inhibit germination of perennial seed
  - Many perennial species are not adapted to germinating under the annual grass thatch layer
  - Dense annual grasses are likely to out-compete perennial seedlings that do manage to emerge
  - The increased fire frequency resulting from the annual grass fine fuel load may prevent surviving perennial seedlings from becoming established
- Over a longer time horizon, control of annual grasses will create conditions more conducive to perennial recruitment from seed
  - Perennials released from annual grass competition will become larger and healthier with an expectation of increased seed production
  - Many perennial species have seeds that remain viable for long periods of time, allowing for germination after Esplanade has started to degrade



Firebreak created by using Esplanade® 200 SC to control invasive annual grass and release native perennials

#### **ALWAYS READ AND FOLLOW LABEL INSTRUCTIONS**

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