

## Information and tools to conserve and restore Great Basin ecosystems

### Limiting Medusahead Invasion and Impacts in the Great Basin

Medusahead (*Taeniatherum caput-medusae*) is an exotic winter annual grass from Eurasia, and was first reported in North America in the 1880s. It occurs across a broad range of climatic and soil conditions. Medusahead can occur on sites receiving from 250 to 1000 mm (10-40 in) of precipitation. Medusahead is most problematic on fine-textured soils below 1524 m (5000 ft), but can occur at higher elevations and on more coarse-textured, well-drained soils.

It is critical to limit the spread and impact of medusahead invasion because it decreases biodiversity, degrades wildlife habitat, reduces livestock forage, increases the risk of frequent wildfires, and changes how ecosystems function (Young 1992; Davies and Svejcar 2008; Davies 2011). There are three primary tactics to limiting medusahead invasion and subsequent negative impacts: 1) reduce seed dispersal, 2) maintain or increase plant community resistance to invasion, and 3) use early detection and eradication of new infestations in non-invaded areas.

#### Reducing Seed Dispersal

Most medusahead seeds only disperse a few meters (Davies 2008) from the parent plant. Longer distance seed dispersal happens primarily by humans (often via vehicles) and animals (Davies et al. 2013).

##### *Strategies for reducing short-distance dispersal:*

- Reducing short-distance spread can be accomplished by applying selective herbicides around infestations. Applying pre-emergent herbicides in the fall can effectively control medusahead and minimize damage to perennial vegetation.
- Planting competitive vegetation, such as crested wheatgrass (*Agropyron cristatum*), around the infestations can also reduce the spread (Davies et al. 2010).

##### *Strategies for reducing long-distance dispersal:*

Reducing long-distance dispersal requires limiting contact by vehicles, animals, and humans with medusahead seeds and cleaning seeds off when contact occurs.

- Maintaining medusahead-free zones (usually with herbicides) along roads and trails can reduce the spread of medusahead seeds.

**Purpose:** To provide managers with strategies to reduce the spread and impact of medusahead.

#### In Brief:

- Medusahead invasions decrease biodiversity, degrade wildlife habitat, reduce livestock forage, increase the risk of frequent wildfires, and change how ecosystems function.
- Seed dispersal occurs primarily via vehicles and animals.
- Short-distance dispersal can be reduced by applying selective herbicides, and planting competitive vegetation (such as perennial grasses) around infestations.
- Long-distance dispersal requires limiting contact with vectors, maintaining “weed-free” zones, and controlling livestock rotations in infested areas.



Figure 1: Medusahead seed head in an invaded area.

- If medusahead-free zones cannot be maintained, some roads may need to be closed during times when seeds can be readily dispersed.
- Vehicles (especially fire suppression, off-road, and construction equipment) and gear, clothes, and shoes, should be cleaned after travelling through or working in medusahead invaded areas.
- Livestock should not be moved directly from infested fields to un-invaded areas. Pasture rotations should minimize livestock contact with infestations when seeds can be readily dispersed.

### Resisting Medusahead Invasion

The composition of the plant community is critical in determining resistance to medusahead invasion. In the Great Basin, a reduction in medusahead establishment is linked to increases in perennial bunchgrass abundance (Figure 2). It is necessary to maintain intact perennial bunchgrass communities and restore degraded bunchgrass communities to limit medusahead invasion.

- Carefully managed livestock grazing is crucial to maintain resistance to medusahead invasion. Livestock grazing during the growing season should be moderate (~40% utilization) or less. Managers should avoid repeated use over growing seasons and incorporate periods of grazing rest. Complete grazing exclusion likely has varying effects, but the accumulation of fine fuels in the absence of livestock grazing may increase fire risk, potential fire severity, and post-fire annual grass invasion in some situations (Davies et al. 2009).
- Managers need to minimize disturbances (e.g., construction, catastrophic wildfire, non-selective herbicide application) that reduce the perennial herbaceous understory, because this will increase the probability of medusahead invasion.
- Perennial bunchgrasses need to be re-established after disturbances that result in significant bunchgrass mortality, otherwise medusahead or other exotic annual species may fill open spaces in the plant community.
- Managers can monitor trends in bunchgrass abundance, and improve management if a negative trend is detected.

### Early Detection and Eradication

Management to limit the dispersal of medusahead, and increase the resistance of plant communities to invasion is highly effective, but will not prevent all medusahead establishment opportunities in previously uninvaded areas. It is very important to detect new infestations and implement management plans to eradicate them.

- A survey plan that outlines inventory techniques, the survey area, and survey time periods is critical for success (Sheley et al. 2003).

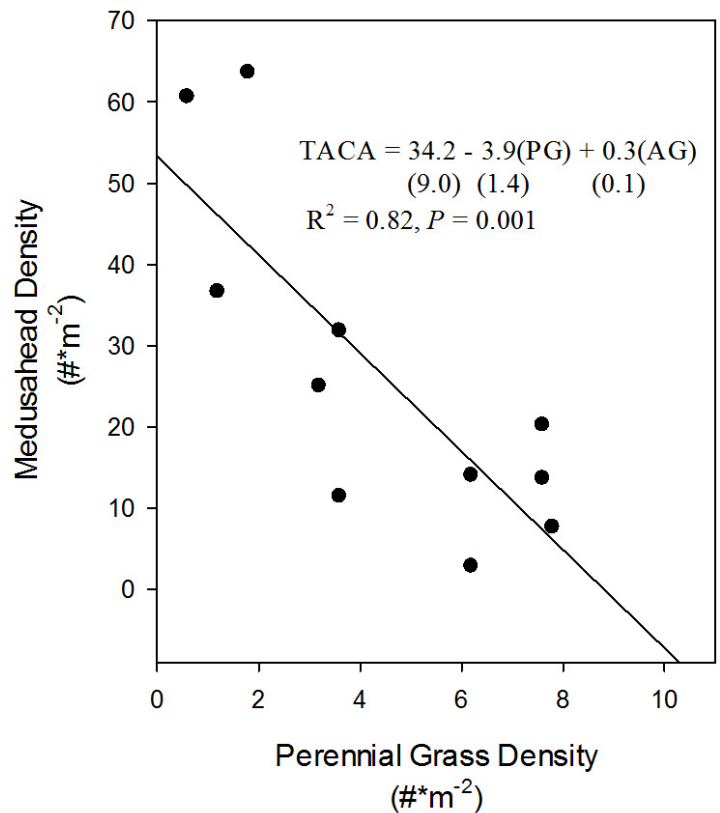


Figure 2. Relationship between medusahead density and perennial grass density. Adapted from Davies (2008). TACA = medusahead, PG = perennial grasses, AG = annual grasses excluding TACA.

- Priority for surveying should concentrate first along roads, secondarily along animal trails, and then at random locations, because roads are most likely the vector pathway for medusahead spread into new areas (Davies et al. 2013). Roadsides often are also an ideal environment for medusahead establishment.
- Managers might prioritize a survey near an existing infestation, because medusahead seed abundance and likelihood of establishing new infestations are much greater near existing infestations.
- They should survey more extensively within recently disturbed areas where susceptibility to invasion is greater.
- New infestations in uninvaded areas should be targeted for eradication.
- Areas that received control treatments should be routinely monitored to ensure treatments are successful and are re-treated as necessary. Revegetation may be necessary to prevent re-invasion of treated areas.

Limiting the spread and impact of medusahead requires involvement from all stakeholders. It is vital that stakeholders are informed about medusahead impacts and the efforts needed to prevent spread and negative impact.



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