



Investigating Aerial Application of Herbicides for Buffelgrass Control

Over the past five years, the economic and ecological threats created by the buffelgrass invasion in southern Arizona have resulted in serious concerns for the future health of the Sonoran Desert ecosystem. The consensus of local citizens, public officials, and government agencies is that we need to act quickly and immediately to control this invasive grass. Despite the best efforts of volunteers and increased efforts on the part of federal agencies and local jurisdictions, control activities have not been able to keep pace with the rapid expansion of buffelgrass in the Sonoran Desert.

Background

- Buffelgrass is widespread and able to colonize both disturbed and undisturbed sites; it forms large continuous, monoculture patches that can double in size every 2-3 years.
- Buffelgrass has already infested thousands of acres in the Tucson basin.
- Buffelgrass is increasing faster than ground-based efforts (pulling and spot spraying with herbicides) are able to control it.
- Buffelgrass has spread into steep, rocky and remote areas where inaccessibility makes it difficult or impossible for field crews to work.
- Buffelgrass is competing with native plants for resources and prohibiting native species germination and establishment. Research has shown that as buffelgrass patches become larger and denser, native plant diversity and abundance is suppressed.
- Buffelgrass is creating a major fire

hazard, threatening public safety, the plants and animals of the Sonoran Desert including the iconic saguaro cacti which will, in turn, impact the tourism based economy of southern Arizona.

- Buffelgrass biomass is between one to four tons per acre; this amount of biomass or fuel load, has the potential to carry fires in a non fire-adapted ecosystem.
- The location of many significant buffelgrass infestations are in close proximity to both metropolitan centers and high elevation woodlands and buffelgrass may soon link high elevation forests with low elevation urban ignition sources.

Ongoing Research

In response to these challenges, several ongoing research projects are currently evaluating alternative control methods.

Herbicide Trials

Herbicides with glyphosate as the active ingredient are currently the most effective herbicide for killing buffelgrass. Unfortunately, glyphosate is non-selective and can injure or kill a wide variety of plants. Trials are being performed in cooperation with Saguaro National Park to evaluate other herbicides that may be more specific to buffelgrass and not harm native plants.

Helicopter Application of Herbicides

Two experiments were conducted in the summer of 2010 to evaluate the use of helicopters and specialized equipment to aerially apply glyphosate to buffelgrass infestations. The following partners worked collaboratively to design, plan, implement, and analyze these experiments: Pima County Natural Resources, Parks and Recreation, National Park Service, US Forest Service, City of Tucson, Bureau of Land Management, University of



Aerial spray of herbicide with a boom sprayer

Arizona, and Southern Arizona Buffelgrass Coordination Center.

Boom Sprayer

The first experiment took place in Pima County's Tucson Mountain Park on August 18, 2010. The objectives were:

- Determine if a helicopter using a boom sprayer can safely navigate steep, saguaro dominated terrain.
- Evaluate the effectiveness of two different concentrations of herbicide and two different application rates on buffelgrass.
- Determine the effects of herbicide on non-target native vegetation.
- Evaluate herbicide drift outside the target location.

Twelve, one acre plots were delineated for treatment. Before spraying, monitoring transects were established in each plot and in adjacent areas that would not be treated. Over 1,600 individual native plants and 1200 buffelgrass plants were marked for long-term monitoring. The plants will be monitored for a minimum of three years for long-lived species like saguaros. Marker cards were set up to evaluate the herbicide coverage that deposited on the plots and in adjacent areas. To view the experimental plan go to www.buffelgrass.org click on the research tab.

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Aerial spot spray application for precision

Spray Ball

The second experiment took place in Ironwood Forest National Monument, managed by the Bureau of Land Management, on September 9, 2010. The objectives were:

- Evaluate the use of a spot sprayer or spray ball which is suspended from a helicopter on a cable. The spray ball is able to come within 6 feet of the ground and spray an area as small as 12 feet in diameter.
- Determine if the spray ball can be used safely in difficult terrain with obstacles such as saguaros, rock outcroppings, and narrow canyon bottoms.
- Evaluate the equipment's effectiveness at treating small patches of buffelgrass.

Eight sites were selected to represent a variety of terrain difficulties, varying densities of saguaros, and different-treatment areas. The operation was documented with photographs and video.

Because the objectives were to evaluate the equipment, no herbicide was used. Therefore, no follow up monitoring is required.

Status

Initial observations suggest that both the spray boom and spray ball have potential for spraying buffelgrass patches in remote areas. The boom sprayer appears to have utility for larger patches of dense buffelgrass. The spray ball would be effective when applying herbicides to multiple small patches of buffelgrass interspersed with intact native plant communities.

Marker cards from both experiments are being analyzed by the Missoula Technology Development Center. The first round of post-treatment native plant and buffelgrass monitoring took place in September 2010. The next vegetation monitoring period is scheduled for August 2011. A progress report will be available in the fall of 2011 and as other results become available; a final report is expected in late 2013. Reports will be available at www.buffelgrass.org.

Saguaro National Park will incorporate preliminary data from these experiments plus other ongoing research into National Environmental Policy Act compliance documents to evaluate the impacts associated with aerial application of herbicides and determine if it is an appropriate control method to use in the park.



Helicopter pilot negotiating difficult terrain

More Information

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