

BUFFELGRASS CONTROL RESEARCH PROJECT BACKGROUND INFORMATION

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WHY CARE ABOUT BUFFELGRASS?

Across southern Arizona, an invasive non-native plant has introduced a new fire risk and threatens to irrevocably alter our Sonoran Desert. Buffelgrass (*Pennisetum ciliare*) is a fire prone and shrubby grass introduced from the African savannah. Buffelgrass grows in dense stands that can crowd out native plants and creates a fire regime in the desert that never existed before. This potentially leads to devastating fires that can convert the ecologically rich Sonoran Desert into a more monotypic exotic grassland environment.

Buffelgrass spreads aggressively by seed and establishes itself readily in areas that have been disturbed. Once established in the disturbed areas the invasive grass can then move into native desert habitats on hillsides and along drainages. Buffelgrass stands can burn at over 1,400 degrees and are almost three times hotter than fires generated by flammable native vegetation. Buffelgrass fires are highly detrimental to cacti and native trees and can eliminate them from the landscape. The fires don't significantly impact the buffelgrass stands which can come back more vigorously than before the fire.



Over the past five years, the buffelgrass invasion in the Southwest has been the subject of considerable outreach, extensive media coverage and nearly-unanimous consensus over the need to aggressively control this invader grass. Despite the best efforts of a growing group of volunteers and a growing public investment, control activities have not kept pace with buffelgrass spread. Because this spread is almost exponential – populations of this grass and the costs of controlling it may be doubling every year – time is of the essence and requires working collaboratively and decisively to implement effective control programs.

WHERE DO I LEARN MORE ABOUT THE BUFFELGRASS INVASION?

A multi agency/organization web site has been established to help communicate about buffelgrass as an issue and is a source of information on the ongoing control efforts. Go to www.Buffelgrass.org. Other sources are available and you can contact or stop by Pima County Natural Resources, Parks and Recreation for a copy of the brochure Buffelgrass – Wanted Dead and Gone.

WHAT IS THE PROPOSED PROJECT?

Pima County, in cooperation with other land management agencies and environmental organizations, has proposed to conduct a limited scientific test of the use of computer controlled aerial application of a

commonly used and environmentally safe herbicide (Glyphosate) to control dense infestations of buffelgrass in rugged terrain. The test will involve a one time application of the herbicide at low concentrations across twelve plots. Each plot is approximately one acre in size. The plots will then be monitored over the next several years to document effectiveness of the control and any short or long-term impacts to native plants. The plots are located on steep hillsides in Tucson Mountain Park that are already heavily infested with buffelgrass. The scattered plots are located on southern and western facing slopes for about a mile west of Kennedy Park and north of any residences along Ajo Highway.

HOW DID THIS RESEARCH PROJECT GET STARTED?

In February of 2009, an Interagency Workshop was held in Tucson that brought together scientists, environmental organization representatives and resource land managers from around the country to discuss current trends, research findings and control methods for invasive plants. Buffelgrass was a target species of many conference speakers. Out of that meeting a working group of representatives of local agencies, jurisdictions and national experts began to explore shared needs for definitive data on the use of aerial spraying in rugged Sonoran Desert situations.

HAVE PUBLIC MEETINGS BEEN HELD ON THIS PROJECT?

Yes, at the request of the Pima County Board of Supervisors, two public meetings were held in the summer of 2009. Two additional public informational sessions were conducted as part of the Board of Supervisor formal public meeting schedule. In August of 2009, the Board voted to allow the test to be conducted in Tucson Mountain Park when conditions met the research design parameters. Those conditions were not met in the summer of 2009 so the project was put off until the summer of 2010.

WHO IS CONDUCTING THE PROPOSED SPRAYING RESEARCH PROJECT?

The project has been a joint cooperative project of scientists and staff of Pima County, USDA Forest Service, National Park Service, University of Arizona, Bureau of Land Management and the City of Tucson. Because the test will be conducted primarily in Tucson Mountain Park, Pima County has taken the role of lead agency.

WHY WAS TUCSON MOUNTAIN PARK SELECTED FOR THE STUDY?

The Tucson Mountain Park locations were selected for:

- Accessible but rugged terrain close to town
- Extended distances from residences during spray test
- Existing dense stands of buffelgrass infestation on hard to reach rugged slopes
- Existing local support for ongoing buffelgrass control efforts in the park since the early 2000
- Ability to provide an in-kind, no-cost contribution from Pima County as a partner in the research project

HOW MUCH OF THE PARK WILL BE IMPACTED BY THE STUDY?

Tucson Mountain Park is just over 22,000 acres in size. The twelve study plots will cover less than 10 acres in the park.

WHY SPRAY AT ALL? WHY NOT GET VOLUNTEERS AND EMPLOYEES TO PULL IT UP?

This test was specifically designed to look at the safety, effectiveness and cost efficiency of utilizing computer controlled and GPS based aerial spraying technology in remote and rugged terrain applications in the Sonoran Desert. Unfortunately, buffelgrass continues to expand its distribution and density in natural habitats all around the Tucson basin. The extensive efforts of all the volunteers and limited agency staff

working on buffelgrass control have not been able to impact the expansion of the buffelgrass invasion in the rugged foothills and mountains that ring Tucson. Mountainous terrain is a dangerous work environment for most volunteers and even trained crews have major barriers to working in the rugged environments due to the time necessary hiking in and out, the need for on-site water for spray projects, the need to pack tools into remote area and other logistical concerns. The cost per acre of buffelgrass control efforts on sites in the county with steep terrain can easily exceed the cost for more accessible sites with flat terrain by a factor of ten and in the thousands of dollars.

In the Catalina Mountains and Rincon Mountains, the expansion of dense stands of buffelgrass creates a fire ladder up the mountain from the previously fire resistant desert ecosystem that is of major concern. Labor intensive mechanical control or hand pulling methods will not work on the scale and terrain limitations in these situations. In many areas, the patches of dense fire prone buffelgrass have been seen to double in size in good weather years.

WERE OTHER ALTERNATIVES THAN SPRAYING CONSIDERED?

The primary focus of the test was the use of aerial spraying technology. Many other buffelgrass control methods have been previously looked at including use of grazing animals, fire, organic sprays, mechanical removal, biological/insect controls and other herbicide sprays. All have their positive points and negative points. However, none had the majority of positive potential outcomes for an effective tool for use in rugged terrain.

WHAT HERBICIDE WILL BE USED IN THE STUDY?

The active ingredient of the herbicide will be glyphosate. There are over thirty commercial formulations of glyphosate available for use. We will be using an EPA approved formulation of Roundup. This herbicide has been routinely used with hand spray or truck mounted spray systems to control buffelgrass and weeds by agencies, jurisdictions, landscape companies and individuals for years. Glyphosate has also been used to control invasive plants utilizing aerial spray technology in other natural resource conservation situations. The herbicide was developed in the 1970s and is readily available as an off-the-shelf product in most garden centers or nurseries. Because glyphosate specifically attacks plant growth and not human health systems, it can be used safely with no harm to humans, pets or wildlife when applied properly.

IS GLYPHOSATE SAFE?

Any chemical or organic herbicide spray needs to be used judiciously and carefully to ensure human and wildlife safety. Glyphosate was specifically selected because it is a proven effective herbicide for buffelgrass and has been proven environmentally safe when applied correctly according to guidelines approved by the manufacturer and EPA. One primary reference that was used to establish product safety parameters and guide application considerations was the body of research referenced in the report Glyphosate-Human



Health and Ecological Risk Assessment prepared for the USDA, Forest Service in 2003. The link to that report can be found at: <http://www.fs.fed.us/foresthealth/pesticide/risk.shtml>.

Use of any chemical herbicide can be controversial and glyphosate is no exception. Only through extensive research and evaluation of main stream scientific reports was the decision to use glyphosate made. Studies can be found that bring into question the safety of glyphosate, especially from other countries. These studies need to be carefully reviewed for their scientific rigor and actual applicability to real world exposure conditions. Glyphosate is registered and used in over 130 nations.

For humans, the greatest risk from glyphosate comes as a result of improper and extended handling of the material at high levels of direct exposure. The herbicide is very poorly absorbed across the skin. There is no scientific basis to assert that glyphosate is likely to pose a substantial carcinogenic risk. As noted in the Forest Service's risk assessment, "For members of the general public, none of the longer-term exposure scenarios exceed or even approach a level of concern."

HOW MUCH HERBICIDE WILL BE APPLIED DURING THE TEST?

We anticipate that the final volume for all twelve plots will be just six gallons of the spray concentrate mixed to approximately 100 gallons of dilute spray. Two application levels will be used in the test, five gallons per acre or ten gallons per acre. These levels are significantly below any manufacturer guideline maximum application per acre per year.

WHAT IMPACT DO YOU EXPECT THE TEST WILL HAVE ON NATIVE VEGETATION AND WILDLIFE?

The study plots that will be sprayed are already badly infested with dense stands of buffelgrass that have crowded out most small native plants. Glyphosate is a nonselective herbicide that can kill all plants. It works most effectively on actively growing grasses with large leaf surface. We expect that the one time application of the herbicide will kill most actively growing buffelgrass and possibly impact other growing native grasses, weeds or flowers. We do not expect any long-term impact to the larger shrubs, trees and cacti based on other situations where spray was applied on all plants; however, this is one question we hope to answer by monitoring the test plots over the next several years.

The herbicide is designed to work on plants by specifically inhibiting synthesis of aromatic amino acids in the plant necessary for growth and this same metabolic pathway does not occur in humans, domestic animals or wildlife. The Forest Service's risk assessment generally supports the US. EPA conclusions that "Based on current data, it has been determined that effects to birds, mammals, fish and invertebrates are minimal." A recent study done for the City of Tucson as part of its Habitat Conservation Plan, Wildlife Research Report # 2007-07, concluded that there is no apparent glyphosate affect on burrowing owls in the Avra Valley where glyphosate is routinely applied.

WILL THE SPRAY DAMAGE PLANTS THAT HAVE NOT EMERGED YET?

Glyphosate is not a pre-emergent herbicide. It does not affect seeds in the ground. Native plants that sprout immediately after the treatment should not be affected. It will also not impact underground rhizomes or rootstock of perennial plants.

This also means that the buffelgrass seed in the ground will sprout under the right conditions requiring future treatments to fully control it. Current research indicates the potential viability of any buffelgrass seed to be at 3–5 years. Fortunately, following effective treatments the next generation of buffelgrass is far smaller in numbers and generally density thereby allowing native plants a chance to reestablish themselves

as well. Additional buffelgrass treatments of the study plots will not occur during the monitoring phase of the project.

HOW LONG WILL THE HERBICIDE STAY ACTIVE?

Glyphosate was chosen because it has a short active life span and degrades quickly. In our test environment, we expect the glyphosate spray to dry upon surfaces within minutes of application and become relatively immobile in the soil. Once the spray comes in contact with a plant it immediately goes to work inhibiting its growth. Because the spray is poorly absorbed through the skin of animals, potential effects to any wildlife in the area are further minimized. Before an animal can ingest enough treated plant material to raise any contact toxicity concerns, the material will have been degraded even further. Glyphosate does not bioaccumulate in animals and move up food chains. The material applied that falls to the ground is bound tightly to the soil and will not runoff into drainages and water systems even if rains occur within several hours of application. The herbicide is relatively non-persistent, will break down in the desert system in days, does not hurt soil microbes and does not stay residually within the environment.

HOW WILL YOU CONTROL POTENTIAL SPRAY DRIFT?

Two major strategies are being used to reduce potential drift concerns. First, the helicopter used to deliver the spray will be utilizing GPS computer driven technology to precisely deliver the spray within the boundaries of the plots. Each plot has been GPS mapped and the geographical reference points will be used by the onboard computer to turn spray delivery on and off. A special boom designed to deliver precise droplet size that does not produce fine mist spray will be used to deliver the spray from no more than 30–50 feet above the ground and at ground winds of less than 5 mph.



Second, the herbicide spray will be delivered in a very coarse (large) droplet size and will not be a mist spray more commonly seen in agricultural applications with fixed wing aircraft. The droplet size is very large and will fall rapidly to the ground based on previous application experience elsewhere and actual modeling of drift potential. At a slow forward movement or hover, a helicopter actually generates a down draft where spray can be delivered before it might be scattered by vortices around the edges of the rotor wash.

WILL ANY SPECIAL SAFETY PRECAUTIONS BE PUT IN PLACE FOR THE PUBLIC AND/OR TEST STAFF?

A number of procedures and precautions have been planned into the project. Local residences that are close to the test area will be notified of the test and what is going on. No residence is within a distance that causes any concern based on potential overspray modeling and previous observations by science team members.

Safety is a primary concern in any operation that includes aircraft, ground crews and herbicide applications. A safety plan has been developed and will be reviewed by all participants during any operations. Aircraft safety has been provided for and project monitors will be in place to stop operations if any concerns are raised.

Temporary closures of any hiking trails in the immediate vicinity of test plots will occur in Tucson Mountain Park where secondary exposure might occur during the recommended restricted entry interval of four hours.

Ground staff will be briefed and monitored to stay well away from plots during active spray operations and precautions for necessary personal hygiene will be observed during and after the test operations.

WHAT IS THIS PROJECT COSTING AND SPECIFICALLY, PIMA COUNTY?

A specific project cost was never developed because of the multi-agency approach to the project and because most of the cooperators are utilizing funds from their current annual operating budgets for invasive species. The project has been developed to minimize direct costs as much as possible and rely on in-kind support from the partners.

Pima County is not providing any direct dollars to the project. All of the county contribution is in the form of in-kind manpower, technical support and access to the buffelgrass infested plots for the study. Several county agencies have been involved in the project planning with Natural Resources, Parks and Recreation having the lead responsibility.

FOR ADDITIONAL INFORMATION CONTACT:

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