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Treatment Evaluation Project

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Improving Public Support for Restoration Plans: A Matter of Trust

By Mark Brunson,
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Land managers know it can be much harder to make a project happen if there's significant public opposition. This is true even when the proposed management is based in sound science. Efforts to restore degraded environments sometimes come under strong criticism if they include certain practices (e.g., using herbicides). To help managers achieve socially and ecologically sustainable restoration efforts, SageSTEP research included a study aimed at understanding the social acceptability of practices used in restoring sagebrush ecosystems. We wanted to help managers predict how citizens would respond to proposed activities, and also learn how they might gain better understanding and acceptance in cases when there is vocal opposition.

To answer these questions, we first interviewed "key informants" across the region in 2006. Based on what we heard in the interviews, we designed a public survey that we administered twice, four years apart. Surveys were mailed in 2006 to randomly selected households in three urban centers (Boise, Reno, and Salt Lake City) and six rural counties in southeast Oregon, eastern Nevada, and west-central Utah (see Issue 3, Spring 2007 for details). In 2010 we sent a survey asking the same questions to those who replied the first time (see Issue 15, Spring 2011 for details).

In both surveys, only a few people said it's *never* acceptable to use the practices we asked about (spraying herbicides, chaining pinyon or juniper, felling pinyon or juniper, mowing shrubs, prescribed burning, and grazing livestock on unwanted plants). Practices that most closely mimic nature (grazing, prescribed fire) were most acceptable.

However, many people felt the practices should be used sparingly, rather than wherever managers see fit. Livestock grazing – a practice of fairly limited applicability – was the only one where a majority expressed unconditional acceptance. Therefore, while it's possible to get public support for any tool in the restoration toolkit, managers should take pains to justify their choices for each restoration situation or else that support might not be given.

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We also found there are more people who believe these practices can be acceptable than who trust public land managers to use those them effectively. These findings, while disheartening, reflect today's reality. It should surprise no one that trust in government is low these days. Public displeasure is greatest for officials in Washington, DC, but distrust is directed at all levels of government, including local land managers.

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Improving Public Support, cont.

Since 2011 we've dug deeper into the data. We wanted to know: What are the reasons behind these acceptability judgments? And when people change their minds about a practice, why? Did something else change in their perceptions of sagebrush management and restoration?

One thing we noticed immediately was that even though ratings of social acceptability hadn't changed very much overall – that is, the percentages of people who were positive, negative, or lukewarm toward each practice were about the same in 2006 as in 2010 – a large proportion of our sample (36% to 57%, depending on the practice) gave different answers in different years. Moreover, the numbers of people who changed their minds in a positive direction were about the same as those who viewed the practices more negatively.

This suggests people's views on restoration practices often are not well formed. It means managers might be able to positively influence public acceptance if they understand what factors caused people to change their minds in either direction.

To learn more, we first looked at the predictors of acceptance in each of the two years of our survey. For this analysis we looked for factors that predicted whether respondents chose complete acceptance vs. partial or non-acceptance, because either of the latter choices would likely require significant effort on managers' part to gain public acceptance before activities could be implemented.

When we did so, we were surprised to find no relationship between acceptance level and general knowledge about rangelands and their management. Nor was there a link between acceptance level and overall beliefs about rangeland health. In 2006 there were differences between rural and urban respondents, but those differences had largely faded by 2010.

We did find that people were more willing to accept a practice if they were concerned about specific threats related to a specific practice. For example, someone concerned about juniper encroachment is more likely to support the use of felling, but a person who is more concerned about wildfire is *less* likely to support prescribed fire as a restoration practice. These effects, too, were more pronounced in 2006 than in 2010.

However, by far the most important factor in acceptability judgments was trust in the ability of land management agencies to implement the practices effectively. If people believe an agency can use a practice safely and effectively, they are much more likely to say the practice can be applied wherever managers want to use it.

By far the most important factor in acceptability judgments was trust. If people believe an agency can use a practice safely and effectively, they are much more likely to say the practice can be applied wherever managers want to use it.

When we looked at why people changed their minds between 2006 and 2010, trust was the only factor that really mattered. If people grew more trusting of agencies over those four years, they also were likely to grow more accepting of restoration practices. If their trust had diminished in that time, their acceptance of practices also declined.

What does this mean? Clearly the path to better acceptance of restoration practices is to create events that build trust – not just with regard to sagebrush ecosystem restoration, but in all activities that may attract public interest. Managers can't do much about public perceptions of Washington, DC, but they can work to improve relationships locally.

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Improving Public Support, cont.

One important element of trust building is to keep decision processes as transparent as possible. Explain decisions clearly – not simply what the decision is, but why it was made, and how positive and negative aspects were weighed in making the decision. In public meetings and in all public outreach efforts, include opportunities for discussion and true give-and-take. Unidirectional outreach – websites, lectures, videos, etc. – are still useful because they can reach a lot of people efficiently, but they cannot take the place of events that let people ask questions and better understand how their personal experience fits with the latest scientific information and the laws agencies must follow.

Tips to Improve Public Support

- An important element of trust building is to keep decision processes as transparent as possible.
- During outreach efforts, include opportunities for discussion and give-and-take.
- Single direction outreach, such as websites, lectures, and videos, are useful because they reach a lot of people efficiently, but they cannot take the place of events that let people ask questions and better understand how their personal experience fits with the latest scientific information.
- The most effective information campaigns will focus on specific threats to sagebrush ecosystems.

Even though greater knowledge of rangelands doesn't necessarily mean greater acceptance of restoration practices, public education is still valuable. The most effective information campaigns will focus on specific threats to sagebrush ecosystems such as changing wildfire cycles, cheatgrass invasion, and especially conifer encroachment, which is much less recognized as a threat throughout the Great Basin. It is important not to overestimate the implications of these threats – this approach quickly fails if a catastrophe doesn't soon materialize – but to explain long-term negative consequences as well as short-term risks.

Scientists and managers these days often discuss enhancing the resilience of rangeland ecosystems. In truth, managed rangelands are just as much a part of social systems as they are of ecosystems. Their resilience depends not only on maintaining essential components and processes of healthy ecosystems, but also on maintaining healthy relationships with communities that depend on those ecosystems. Trust between managers and stakeholders is a key element of healthy relationships. It is vitally important that we take the time and the effort to maintain and build trust for the benefit of the land as well as the people.

This research was conducted by Ryan Gordon and Bruce Shindler at Oregon State University and Mark Brunson at Utah State University.

Research Highlight

A look at what the Great Basin science community is studying:

Bacteria show potential for cheatgrass control

by Lael Gilbert

If you go to Ann Kennedy's house near Pullman, Washington, you'll see rolling green hills, meandering gravel roads, and maybe a farm dog or two loping along. But it is actually what you don't see in this neighborhood that is momentous. There is no cheatgrass.

There used to be. But Kennedy, a soil scientist for the USDA-Agricultural Research Service, has spent the last several decades on a treasure hunt – one that would eventually lead to the elimination of cheatgrass in her neighborhood (with proper permission, of course) … and may eventually help to knock out cheatgrass across a larger western landscape. She has sifted through thousands of strains of soil bacteria for one that would suppress the exotic, annual grass (*Bromus tectorum*) but wouldn't harm native plants, near native plants, crops, soil microbes, insects or animals. She found several different bacteria with potential to fight invasive grasses.

ACK55 (*Pseudomonas* spp.), also known as Battalion Pro, is a naturally occurring soil bacteria that has the potential to change cheatgrass from the invasive monster that managers combat today into an insignificant pest, said Fred Wetzel, National Wildland Fire & Emergency Response Advisor for the U.S. Fish and Wildlife Service. After a single application on test plots, it killed up to 50 percent of cheatgrass, medusahead (*Taeniatherum caput-medusae*) and jointed goatgrass (*Aegilops cylindrica*) within three years, and allowed the native vegetation to increase. In long-term field trials in the western U.S., the bacteria reduced these fall annual grass weeds to near zero, when desirable plants (winter wheat, perennial bunchgrasses and natives) were present.

The bacteria uses the same sneaky approach invasive grasses use to dominate western landscapes, which is one reason it is so successful against them. Cheatgrass … well … cheats by being first. It germinates first, uses available moisture first, burns first and is first to

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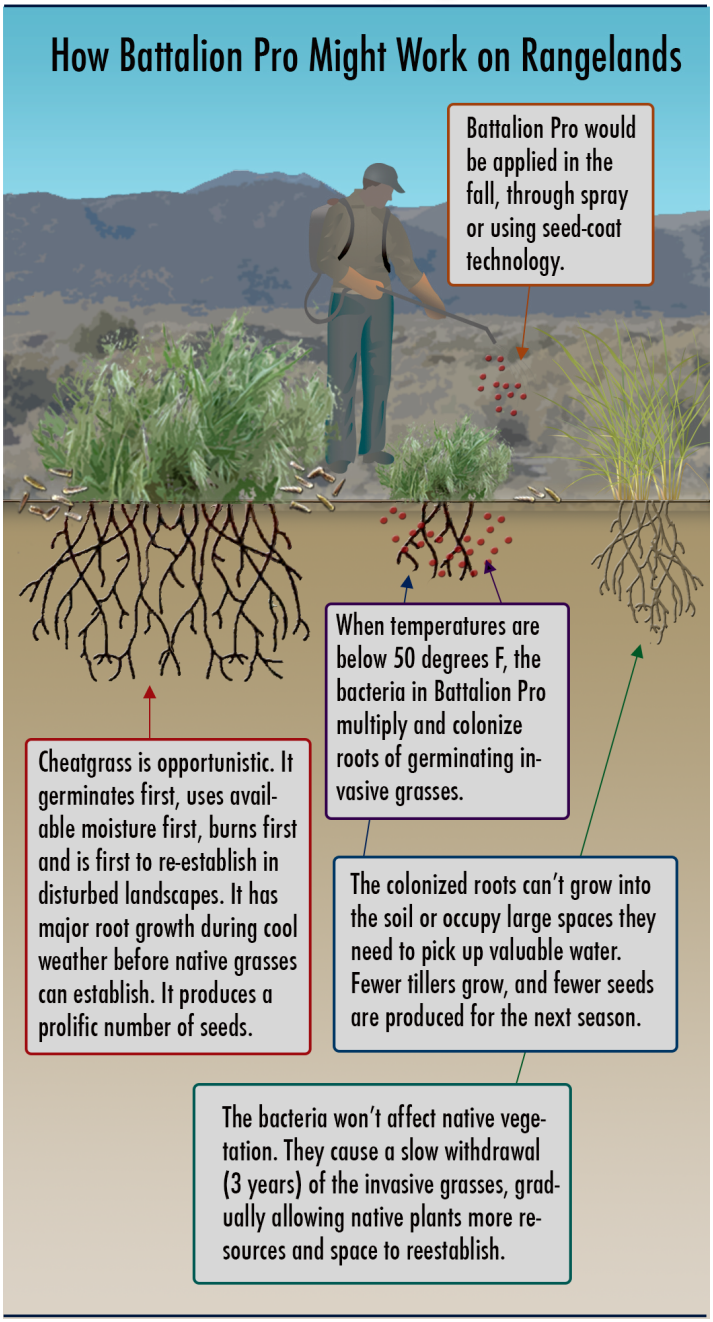

More Pathogen Research

Another biological agent, a fungus, colorfully named black fingers of death (*Pyrenophora semeniperda*), has possibility for cheatgrass control. Learn more about that pathogen by clicking here, or see our upcoming newsletter for the latest research by Susan Meyer, a Forest Service ecologist based in Provo, Utah, and BYU Professor of Landscape Management Phil Allen.

Bacteria, cont.

re-establish in disturbed landscapes. Invasive grasses have major root growth during cool weather before native grasses can establish.

In late fall, winter and early spring, when temperatures are below 50 degrees F, the bacteria in Battalion Pro also multiply. They colonize roots of germinating invasive grasses, and produce a compound that inhibits root cell elongation. The colonized roots can't grow into the soil or occupy large spaces they need to pick up valuable water. In turn, desirable plants have more access to water and nutrients and are healthier. Since the root cells are smaller, the weeds also produce fewer tillers and therefore fewer seeds.

During warm summer months when native plants flourish, the bacteria don't multiply. "They don't become a permanent resident in the soil microbial community," said Kennedy. "They don't endure in field soil for more than three years after application."

Soils from southwestern Asia, where cheatgrass is native and less of a pest, contain high numbers of cheatgrass inhibiting bacteria … much higher than in the United States. Finding indigenous natural enemies (called biocontrol agents) species for cheatgrass, and increasing their numbers for a short periods is a science with a lot of potential, Kennedy said.

Battalion Pro doesn't affect plants that are actively growing. For this reason, managers may need to use it in conjunction with other treatments. "They might add it to an herbicide they are already using," she said. There are two delivery methods for Battalion Pro … as a liquid or as a freeze-dried material that can be stored in a refrigerator or freezer for long periods. The bacteria can be integrated into weed-management plans using both spray and seed-coat technologies.

The timing of the application will be important, Kennedy said. Low temperature root growth is really part of cheatgrass' competitive advantage. The bacteria in Battalion Pro like cold temperatures too. They increase during freeze-thaw events and colder temperatures, but don't survive in air temperatures greater than 50 or 60 degrees F. "They are just not very competitive at temperatures you normally think that bacteria like. At those warmer temperatures, the other guys that are growing will eat them up."

Timing is important for another reason. "If it rains in August, and the cheatgrass starts growing, an application in October or November won't get at those plants that are actively growing. But the second year, the weed-suppressive bacteria will be in high enough numbers to inhibit the weed," Kennedy said.

It takes time for a bio-herbicide like this to have an effect, she said. You won't see immediate results like you would with an herbicide. The first year will take down 10-20% of the cheatgrass, then 30-40% the second year, and up to 50% the third year, she said.

Battalion Pro is still several years away from being on the shelf at your local home-improvement store. Currently, Kennedy and her colleagues are putting together documents to submit to the Environmental Protection Agency for registration. Once it receives approval, they will initiate larger-scale experiments (up to now, they have been limited to 10 acres). Some trials on public lands might be first in line. When Battalion Pro finally does make it to store shelves, she doesn't expect it to be prohibitively expensive. "It doesn't cost a lot to grow bacteria. Research and regulatory costs are where the money goes," she said. She expects the price to be comparable to other herbicides currently in use. Wetzel agrees – less than $10 per acre, he predicts.

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The next step, Wetzel anticipates, will be to figure out how to fill the vacuum that mass die-off of cheatgrass creates. "For Battalion Pro to perform at 100% removal, you need native plants positioned to take back the site. We have to figure out how that is going to happen," he said.

"Native plants are fragile during the first year or two. We have to figure out what levels we need

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Bacteria, cont.

natives present to take back a site," Wetzel said. When [Battalion Pro] is registered, and we have an opportunity to treat larger landscapes, we are going to be looking at how this is going to play out."

The bacteria will allow the natives to be more competitive. We will need to develop management strategies to get the natives back into the system, said Kennedy. We need to get desirable in place or the cheatgrass will just come back in the void, she said.

The use of a bioherbicide creates a new dynamic for restoration. Preventing further cheatgrass expansion is more cost-effective than trying to restore an environment that is already severely impacted by cheatgrass. "We have the unique opportunity to put it on sites as they become available through fire or other management techniques. We've never been able to do that before. We have to ask, how do we best capitalize on events like that? We have to consider all the variables that go into a location. Each site will have different circumstances by rainfall, by elevation, by starting type. It is a new tool in our toolbox, and we'll have to figure out how to best use it," Wetzel said.

This research is significant to studies like SageSTEP, said Jim McIver, Ecologist at Oregon State University and SageSTEP Project Coordinator. "In general, bio-control agents of cheatgrass like ACK55 can be considered in a similar light as herbicides such as imazapic, in that they can potentially improve the likelihood that native perennial grasses will dominate a site," he said. "They can be more beneficial than herbicides however, because applications last longer. In addition, our social science work (see the other article in this issue) suggests that the public is more likely to support treatments that more closely emulate nature. More particularly, SageSTEP sites would be excellent places to test ACK55 on sagebrush ecosystems that offer a wide range of conditions. We could track impacts on cheatgrass and other plants for the long-term, to determine intended and any potential unintended consequences," he said.

The emerging field of biological suppression has scientists and managers in high anticipation. Kennedy is investigating other bacteria that suppress weeds such as wild oats, Ventenata, bulbous bluegrass, rattail fescue, annual bluegrass, and several other emerging annual grass weeds. "It is a great field to be in right now. I love it," she said.

SageSTEP **is a collaborative effort among the following:**

- Brigham Young University
- Bureau of Land Management
- Bureau of Reclamation
- Joint Fire Science Program
- National Interagency Fire Center
- Oregon State University
- The Nature Conservancy
- University of Idaho
- University of Nevada, Reno
- US Geological Survey
- US Fish & Wildlife Service
- USDA Forest Service
- USDA Agricultural Research Service
- Utah State University

Funded by:

Announcements and Events:

- Webinar now available: Gene Schupp, Plant Population Ecology and Restoration Ecology, USU. Preliminary research findings on plant responses to imazapic and other treatments after four years post-treatment. Sponsored by Great Basin Fire Science Delivery
- New SageSTEP Fact Sheet: Reducing Carbon Emissions from Sagebrush-Steppe at www.sagestep.org
- Large Wildland Fires: Social, Political & Ecological Effects, University of Montana, Missoula, May 19-23, 2014.
- Webinar series: Invasive Plants – Issues, Challenges, and Discoveries by the Grassland, Shrubland and Desert Ecosystems Science program. Series on invasive plant management.

Vegetation Treatment Field Workshops. June 3, 6, 11 and 17. Boise, Elko, Tooele, and Burns. Great Basin Fire Science Delivery.

National Workshop on Large Landscape Conservation. October 23-24, 2014. Washington, DC.

Society for Ecological Restoration Northwest & Great Basin Regional Conference. Redmond, Oregon. October 6-10, 2014

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