

# Speedy conversion of science into management at Rocky Mountain National Park

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Applying science to park management at Rocky Mountain National Park, Colorado, happens quickly, sometimes the same day staff becomes aware of research results. Generally speaking, Natural Resource Challenge programs and universities are working together to develop and apply science-based management information throughout the National Park System; the following examples from Rocky Mountain National Park demonstrate that inserting good science into park practices does not need to take years.

## Using a biocontrol to fight exotic species

Some species of native penstemon (e.g., *Penstemon virgatus* and *P. whippleanus*, fig. 1) are among the most common wildflowers in Rocky Mountain National Park. By contrast, the endemic Harbour's beardtongue (*P. harbourii*) is listed as vulnerable by NatureServe, a nonprofit conservation organization and leading source of information about rare and endangered species and threatened ecosystems. These flowering plants, in addition to making significant contributions to visitor enjoyment, are important to park biodiversity. The exotic invasive species Dalmatian toadflax



Figure 1. Native penstemon species are very important to the biodiversity of Rocky Mountain National Park. This beardless sidebells penstemon (*P. virgatus*) is common throughout most of the park at mid-summer, while Harbour's beardtongue (not pictured) is rare. Both species are threatened by invasive, nonnative Dalmatian toadflax (page 54). NPS



(*Linaria genistifolia* spp. *dalmatica*, fig. 2) and yellow toadflax (*L. vulgaris*) are threatening native penstemon. Though biocontrols such as *Calophasia lunala* (a leaf- and flower-eating moth), *Eteobalea intermediella* (a root-boring moth), and *Mecinus janthinus* (a stem-boring weevil) are available to fight these pest species, until recently park staff did not know what the impact of such controls would be on the native penstemon population in Rocky Mountain National Park. In particular, as members of the same plant family Scrophulariaceae (figwort), toadflaxes are closely related to native penstemon, suggesting that predators of one may also attack the other. A disastrous outcome would be introducing a biocontrol that attacked both native penstemon and nonnative toadflax.

In order to test the host specificity of the biocontrol organisms in a controlled location, the Continental Divide Research Learning Center, Rocky Mountain Cooperative Ecosystem Studies Unit, and University of Colorado–Boulder provided cooperative funding for graduate student Nehalem Breiter to use penstemon salvaged from the recent widening of Bear Lake Road, a main transportation corridor in the park (fig. 3). Breiter placed the salvaged plants in a greenhouse environment at an off-park location and exposed them to the biocontrol insects. This study determined that the biocontrol organisms did not attack native penstemon. Because the park’s invasive species management plan permits the use of biocontrols when proven not to threaten native biodiversity, park resource managers approved the use of the stem-boring weevil within one week of receiving the researcher’s final report (Breiter 2005).

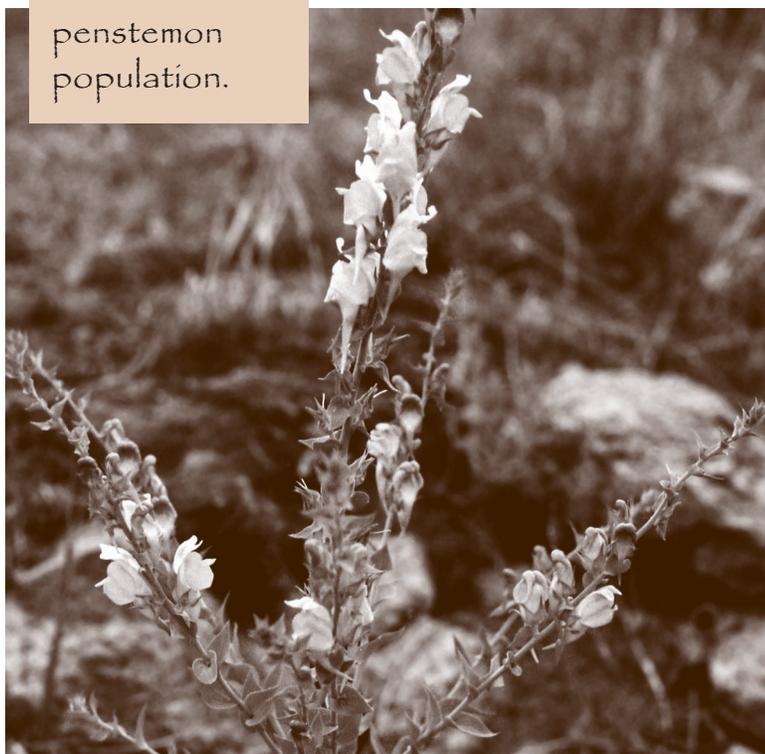
## Changing prescribed burning practices to preserve rare communities

Researchers from the University of Northern Colorado reported that at the current level of ungulate herbivory (as many as 3,500 elk inhabit the park and Estes Valley during the summer—a historical high), prescribed burns in shrub communities prevented the regeneration of the globally rare steppe shrub communities in the park (Nesvacil 2003). Additionally, as lands east of the Continental Divide undergo rapid development in Colorado, shrublands, which are primary habitat for nine species of birds, are being lost. Graduate student Kelly Nesvacil presented these findings at a staff seminar. Park resource and fire managers met immediately after the presentation and changed prescribed burning practices in order to protect shrub communities in the park.

## Closing back country campsite to protect threatened species

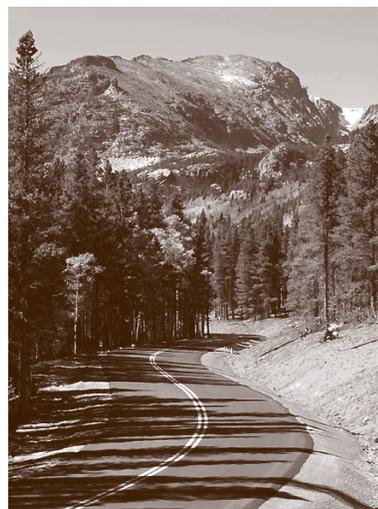
The boreal toad (*Bufo borealis*), like many amphibian species, has suffered dramatic declines in the last decade and is a threatened species in Colorado. The same day that a researcher from the U.S. Geological Survey (USGS), Erin Muths, discovered the toads spawning in a pond adjacent to a backcountry campsite, park managers closed the campsite and relocated campers; thereby, disturbance to the pond and adjoining areas was limited.

Park staff did not know what the impact of [bio]controls would be on the native penstemon population.



**Figure 2.** As a result of research at the University of Colorado–Boulder, Rocky Mountain National Park now has a biological control available to fight Dalmatian toadflax, pictured here.

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**Figure 3.** Researchers used samples of native penstemon species salvaged from the widening of Bear Lake Road in Rocky Mountain National Park in 2004–2005 to test biocontrol insects for host specificity.

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## Testing for mercury in fish

During air-quality studies, USGS researchers detected mercury in snowpack adjacent to remote, high-elevation lakes in the park. These results sparked curiosity as to whether investigators had ever analyzed fish in Rocky Mountain National Park for mercury. A search of records turned up previous analysis of fish tissue in 1999 (U.S. Geological Survey, D. P. Krabbenhoft, personal communication, January 2004) that showed total mercury wet-weight concentrations averaging between 0.01 and 0.12 parts per million (ppm). However, individual trout had concentrations as high as 0.15 ppm, that is, about half the amount of EPA guidelines (i.e., 0.3 ppm) for mercury in fish tissue intended for human consumption. Because some lakes receive more precipitation and the surrounding topography favors drainage into some lakes, potentially more mercury is deposited; therefore biologists surmised that fish with higher concentrations of toxic methyl mercury might be present in park waters. The 1999 analysis report and follow-up discussion triggered a rapid collaborative effort among the U.S. Fish and Wildlife Service, U.S. Geological Survey, and park staff to conduct systematic fish surveys. Analysis of tissue did not identify any fish that exceeded consumption guidelines; hence, park managers have not issued any mercury advisories. Nevertheless, scientists are continuing analysis to determine general patterns regarding mercury accumulation in high-elevation lakes.

## Removing deer with chronic wasting disease

Researchers from the Colorado Division of Wildlife and park staff have been using tonsillar biopsies since 2002 to test for chronic wasting disease in deer. They collar tested animals and remove from the herd the deer that test positive. Chronic wasting disease, like mad-cow disease, is caused by abnormal proteins called prions. Although studies do not indicate that the disease can be transmitted to humans, eating meat from infected animals is not recommended. The National Park Service classifies the disease as nonnative, and park staff is cooperating with the State of Colorado in limiting its spread. Preliminary results indicate this “test and cull” method may be helping to reduce prevalence of the disease among mule deer in the Estes Park–Rocky Mountain National Park herd. However, investigators will not complete the study until spring 2007 (Colorado State

University, M. K. Watry, personal communication, December 2005).

In a related study, data from collared animals also revealed that migrant deer may play a more significant role in spreading the disease than dispersing deer, at least in north-central Colorado. For example, about half of the mule deer that winter in the Estes Park area (adjacent to the national park) migrated from winter to summer range, but only 2% actually dispersed (left the area and did not return) (Conner and Miller 2004).

Results from both the ongoing “test and cull” and deer-movement studies have provided information that is useful in predicting the likely spread of chronic wasting disease and perhaps controlling local outbreaks where they occur.

## Facilitating management actions

During the often frenetic, day-to-day operations in parks, research reports may come in and get filed without receiving the attention needed to turn results into action. At Rocky Mountain National Park, staff uses several mechanisms to ensure that research informs decision making.

A park staff member serves as a project shepherd, making a special point to be involved throughout the duration of a study and taking necessary post-project action.

An informal presentation brings key people together to discuss results with the researcher. This is especially valuable when the project investigator is a graduate student who may be moving out of the area.

Sometimes the research partner personally requests a management action such as the closure of an area to visitors. Having a designated point of contact for researchers helps ensure that recommendations are addressed and appropriate action can be taken.

Now that investigators’ annual reports (<https://science1.nature.nps.gov/research/ac/ResearchIndex>) can be exported into file formats that are easy to share electronically (e.g., PDF), staff entering these reports into the system can forward concise documents to other interested staff. This approach is very helpful in providing a manageable amount of information about multiple projects.

Rocky Mountain National Park hosts a biennial research conference during a relatively quiet time of the year, thereby encouraging staff participation. The conference focuses attention on project results and is also a forum for sharing science-based information with the public and media, alerting stakeholders to the need for management action.

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The park's electronic morning report includes research report citations along with information about obtaining the full report (e.g., in the park's library).

Based on the number of research permits issued at Rocky Mountain National Park, the park's research program has nearly doubled over the last six years. Founded in 2001 as part of the Natural Resource Challenge, the Continental Divide Research Learning Center, hosted in Rocky Mountain National Park, handles the task of improving information transfer of research results. Research learning center staff has found that using the aforementioned routes to share information is extremely useful. Many parks

The Continental Divide Research Learning Center ... handles the task of improving information transfer of research results.

have these types of communication mechanisms already in place. Hence, ensuring that critical research results turn into swift, beneficial actions may be as simple and feasible as coordinating and applying these already established communication strategies.

## References

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