

## **Protecting public lands: Progress in incorporating prevention practices into agency policy.**

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There are over 14 million acres of federally-owned wilderness in California, and much of this area is free of invasive non-native plants acres. California's federal land management agencies recognize the importance of active prevention measures in protecting these and other weed-free acres and are formulating weed prevention policy at all levels: individual parks and forests, regions, and agency-wide. In 1996, the Bureau of Land Management (BLM) issued agency-wide prevention guidelines and stated "prevention and public education are the highest priority weed management activities" (BLM 1996). An important feature of the BLM prevention guidelines is a prevention schedule, which assigns specific responsibilities for prevention tasks to particular BLM field office personnel. In 2001, The U.S. Forest Service (USFS) issued an agency-wide "Guide to Noxious Weed Prevention Practices" (USDA Forest Service 2001). This document contains extremely detailed and comprehensive best management practices for preventing the introduction and spread of invasive plants during all types of activities undertaken by the U.S. Forest Service. The National Park Service plans to issue agency-wide prevention guidelines in 2007. In the meantime, individual parks and regions are setting local policy and implementing weed prevention measures. In this paper, we will present a sampling of the weed prevention measures being implemented by Sequoia and Kings Canyon National Parks and Yosemite National Park. We will also discuss common themes that emerged from interviews with BLM, USFS, and NPS invasive plant specialists about their experience implementing weed prevention measures.

Yosemite National Park and Sequoia and Kings Canyon National Parks are located in the central to southern Sierra Nevada. Together, the parks comprise nearly 1.5 million acres of wilderness, most of which is weed-free. Both NPS units consider the protection of these weed-free areas to be the highest priority of their invasive plant management programs, and both have begun planning and implementing weed prevention measures. In 2004, the superintendent of Sequoia and Kings Canyon National Parks issued a directive to prevent the introduction of weeds into the park, and the spread of weeds from infested developed areas to weed-free wilderness areas. In 2005, Yosemite

National Park began work on an Invasive Plant Management Plan that will incorporate weed prevention practices as a major component of the plan. In taking these prevention measures from the planning to the implementation phase, both parks have encountered challenges to implementing ideal prevention measures. Solutions to these challenges are presented below.

Both parks experience high visitation – 3.5 million visitors in Yosemite and 1.5 million visitors in Sequoia and Kings Canyon annually – and constructing and maintaining the infrastructure to support this visitation is a major, ongoing activity in both parks. Construction activities have a high risk for non-native plant introductions and spread, particularly the use of earth fill materials originating outside the parks as well as the use of fill materials originating from weedy locations within the parks. Ideally, construction contracts would contain detailed specifications of weed prevention measures, and contracts would impose penalties for weeds imported to a project site as a result of a contractor's failure to follow specifications. Contractors would be responsible for removing imported weeds for a defined period following construction, providing them with a strong incentive to practice clean construction. However, it is difficult to say with certainty that a contractor's activity resulted in a particular weed introduction. Assessing penalties would also raise the cost of contracts, because the contractor's risk must be estimated and included in the contract price. Both parks have instead relied on including and enforcing contract specifications for equipment washing, inspecting sources of fill material, and conducting post-construction early detection surveys.

Implementation of these construction-related prevention measures has its challenges. Ideally, proposed quarry sources of rock, gravel, sand, and other earth materials would be inspected for invasive plants before the material is purchased. Only materials purchased from weed-free quarries would be accepted for import to the parks. Park staff would work with quarries to develop weed management plans, and quarries would have an incentive to maintain weed-free quarries because their weed-free products would

command higher prices. However, we found that all local quarries we inspected were contaminated with non-native species not present in the parks. Also, there is little overall demand for weed-free fill materials and the parks are not major customers, so quarries do not have much incentive to provide weed-free products. As a result, the parks have relied on risk management. Earth materials that have been stockpiled only a short period of time are considered to have a low risk of containing seed (depending on the time of year). Some coarse materials, such as gravel and rock, can be washed prior to use. Seed-containing topsoil can be carefully scraped away before materials are quarried. Even when these measures are carefully implemented, non-native propagules can still be introduced, so post-construction early detection surveys are crucial.

Ideally, all construction equipment entering the parks, or equipment moving from place to place within the parks, would be inspected for seed-containing soil and plant propagules, and dirty vehicles would be thoroughly cleaned. However, it can be costly in the short term to implement such practices for both the land managers and the contractors. It is also very difficult to ensure that large equipment is entirely free of any potential source of invasive plants. Although adding equipment inspections to a project may contribute to the overall cost of the project, it is far less costly than controlling an invasive population that became established as a result of the construction.

Sequoia and Kings Canyon National Parks and Yosemite National Park are prime destinations for hikers and backpackers, who can easily transport plant propagules into weed-free wilderness. Ideally, backpackers would be required to certify that their shoes, clothing, and equipment are free of mud, seeds, and plant parts as a condition of receiving a wilderness permit. However, permit requirements are already lengthy, and backpackers often don't comply with basic requirements such as camping 100 feet from water and not using soap directly in rivers and lakes. It is also virtually impossible to enforce such regulations in remote and expansive wilderness locations. Using educational tools at trailheads and wilderness kiosks is a practical and effective way to inform visitors to wilderness areas. Boot cleaning stations could also be placed at popular trailheads. These stations would not only provide a way for visitors to participate in

preventing the spread of new species, but also inform them that they are potential vectors.

There were common themes that emerged from interviews with BLM, USFS, and NPS weed managers about the success and difficulty of weed prevention measures. First, prevention is most successful when it can be incorporated into enforceable documents, such as contracts and special use permits, and into routine planning, such as standard operating procedures and environmental compliance. As weed prevention starts to be routinely incorporated into these documents, it becomes part of the regular work cycle, rather than something extraordinary. Second, prevention measures encounter the greatest difficulty when they affect others – they require a new regulation, cost someone money, or change the way someone does business – or when they require reaching a great number of people. In these situations, education and outreach is the key necessary activity. Third, prevention measures often fail when they are unrealistic. Weed managers may not understand the problems that prevention measures present to others. It is important to explain the purpose of and need for the measure, to listen to others' perspectives, and to work together to find a common solution. Finally, weed prevention can be time-consuming and difficult, and in most cases, comprehensive prevention measures can not be implemented in a year or even several years. It is helpful to prioritize weed-free sites that can benefit most from prevention, to analyze vectors of introduction, and to focus on vectors that present the highest risk to the high priority sites.

## References

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