



## Participant Guide to the **Invasive Plant Management Plan** for Yosemite National Park

Public comment period on the Environmental Assessment  
runs from June 13, 2008 through July 13, 2008



Invasive Bullthistle



Yellow starthistle covered 1 million acres  
of California in 1958. By 2006 it had  
spread to over 14.3 million acres.



Volunteers remove  
invasive Himalayan blackberry.

Invasive plants are one of the greatest threats to the integrity of national park lands. Non-native plants invade an estimated 4,600 acres of federal land in the United States every day, and already infest millions of acres in the national parks. Fortunately, Yosemite National Park is at the early stages of invasion. Unfortunately, at least 177 non-native plant taxa have already established within Yosemite's borders, many with the potential to spread rapidly.

# SCHEDULE OF MEETINGS

## CALENDAR OF PUBLIC COMMENT EVENTS FOR THE INVASIVE PLANT MANAGEMENT PLAN ENVIRONMENTAL ASSESSMENT

The public comment period on the Environmental Assessment runs from June 13 through July 13, 2008.  
For information and a copy of the plan, visit [www.nps.gov/yose/parkmgmt/invasive.htm](http://www.nps.gov/yose/parkmgmt/invasive.htm).

### JUNE

S	M	T	W	TH	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

**Wednesday, June 25**  
**Open House, 1-5 pm**  
Auditorium  
Yosemite Valley  
Visitor Center

### JULY

S	M	T	W	TH	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

**Tuesday, July 8**  
**El Portal Planning**  
**Advisory Meeting,**  
**7pm**  
Clark Community Hall

## INVASIVE PLANT BACKGROUND INFORMATION

### WHAT ARE INVASIVE PLANTS?

Invasive plants, also known as noxious weeds, are plants introduced from other regions which have the ability to reproduce rapidly and displace native species. The spread of invasive plants is a primary cause of degradation to ecological systems. Invasive plants threaten natural communities by reducing habitat and food for native insects, birds, and other wildlife. Some invasives can even alter ecosystem processes such as hydrology, fire regimes, and soil chemistry. These invasive plants have a competitive advantage because they are no longer controlled by their natural predators, and can quickly spread out of control. In California, approximately 3% of the plant species growing in the wild are considered invasive, but they inhabit a much greater proportion of the landscape.

### WHAT ACTION IS YOSEMITE CURRENTLY TAKING TO CONTROL INVASIVE PLANTS?

Yosemite has actively controlled invasive plant populations since the 1930s and these efforts continue today. Park staff has aggressively managed highly invasive species over the last several years. This control program includes the use of Geographic Positioning System technology to map plant populations. Crews then remove plants using a variety of techniques, including hand-pulling. Treated areas are photographed and re-visited each year to assess results and provide follow-up treatment. While there has been a large, concerted effort to control invasive plants in the park without the use of herbicides over the past 20 years, this wholehearted effort is unfortunately not keeping up with some of our most noxious weeds.

# PURPOSE & NEED FOR THE PLAN

## WHAT IS THE PURPOSE & NEED FOR THE PLAN?

Invasive plants are one of the greatest threats to the integrity of National Park Service lands. Non-native plants invade an estimated 4,600 acres of federal land in the United States every day, and already infest millions of acres in the national parks. Fortunately, Yosemite National Park is at the early stages of invasion. Unfortunately, 177 non-native plant taxa have already established within Yosemite's borders, many with the potential to spread rapidly.

The purpose of this Invasive Plant Management Plan & Environmental Assessment for Yosemite National Park is to evaluate a range of alternatives to prevent the establishment and spread of invasive plants into uninfested areas of the park, and quickly and effectively eradicate new infestations.

## WHAT DOES THE INVASIVE PLANT MANAGEMENT PLAN ADDRESS?

This plan will explore alternatives for a comprehensive, prioritized program of prevention & early detection, prioritization & control, outreach & education, systematic monitoring & research, and ecological restoration.

Some of the goals are to:

- Prevent new invasions through systematic early detection and prevention.
- Prioritize existing populations and sites for control.
- Reduce the number of existing plants to minimize threats to natural and cultural resources and scenic values.
- Preserve plants and sites valued by Native Americans.
- Reconcile potential conflicts between preservation of cultural landscapes and removal of invasive plants.
- Promote restoration of native species and habitats in ecosystems that have been invaded by invasive plants.
- Implement the most appropriate control technique for each species and site.
- Ensure that the invasive plant program is regularly monitored and improved, environmentally safe, and is supported by science and research.
- Promote an understanding of invasive species with park visitors, employees, park partners, and gateway communities.
- Provide information to the public on when, where, and how control efforts will take place.

## WHAT INVASIVE PLANTS ARE CURRENTLY IN YOSEMITE?

177 non-native plants have been recorded in the park, and 25-30 of those are considered invasive. Most occur at lower elevations in the developed and disturbed areas of El Portal, Wawona, Foresta, Yosemite Valley, and Hetch Hetchy.

Some of the worst plant invaders that currently pose the greatest ecological threat to Yosemite are Yellow star-thistle (*Centaurea solstitialis*), Himalayan blackberry (*Rubus discolor*), Velvet grass (*Holcus lanatus*), Spotted knapweed (*Centaurea maculosa*), Perennial pepperweed (*Lepidium latifolium*), Klamathweed (*Hypericum perforatum*), Cheat-grass (*Bromus tectorum*), Bull thistle (*Cirsium vulgare*), Ox-eye daisy (*Leucanthemum vulgare*), Black locust (*Robinia pseudoacacia*), and Italian thistle (*Carduus pycnocephalus*).

## WHY SHOULD WE BE CONCERNED?

Invasive plant species can have severe negative impacts on many of the cultural and natural features that make Yosemite a spectacular and enjoyable place to visit. Many invasive species are able to displace native plants by out-competing native plants for limited resources such as water, sunlight, and nutrients. Mid-elevation meadows and foothill wildflower displays are two Yosemite plant communities that are highly threatened by invasive plants.

Invasives also disrupt native wildlife. Many animals are adapted to use very specific plants for food and habitat. When desirable plants are replaced by invasive species, the animal's food source or habitat is lost. Numerous invasive species are poisonous or harmful to animals. Additionally, invasive plants can increase the frequency, seasonality, and intensity of fires in Yosemite National Park. Quite a few native plants and animals that would otherwise be unaffected by invasive species can be displaced by changes to the fire regime.

Invasive plants can transform spectacular displays of showy wildflowers into large, unattractive monocultures. Thorns and irritants on invasives can transform inviting and accessible areas into impassable and unattractive thickets of thorns and brambles. Invasive plants also impact cultural resources. Yosemite is home to numerous plant species used by Native Americans. These plants often thrive in areas now threatened by the spread of invasive species. Finally, invasive plants cause impacts beyond park borders. They can rapidly spread from Yosemite onto adjacent lands outside of the park and inflict environmental and economic costs onto other agencies and private landowners.

# SUMMARY OF ALTERNATIVES

<p><b>Elements common to all Alternatives:</b></p>	<p><b>ALTERNATIVE 1:</b> No Action</p>	<p><b>ALTERNATIVE 2 (Preferred Alternative):</b> Eradicate or prevent the spread of high- and medium-high priority invasive plants into natural habitats</p>	<p><b>ALTERNATIVE 3:</b> Eradicate or prevent the spread of high-, medium-high-, and medium-priority invasive plants</p>
<ul style="list-style-type: none"> <li>• High- and low-priority invasive plants would be prioritized for early detection and control.</li> <li>• Early detection activities would be conducted for invasive plants on the Watch List for Yosemite.</li> <li>• Best management practices would be followed to prevent the introduction and spread of invasive plants.</li> <li>• The locations of invasive plants and efficacy of control techniques would be monitored to determine whether objectives were being met.</li> <li>• Research would be solicited to promote informed decisions regarding invasive plant management and control.</li> <li>• Outreach and educational activities would be used to foster an understanding of invasive plant prevention and control.</li> </ul>	<ul style="list-style-type: none"> <li>• An extensive program, using existing techniques and staffed by park employees and volunteers, would be followed to detect and prevent invasive plant populations in the park from spreading into uninfested areas.</li> <li>• Work crews would use a variety of manual and mechanical techniques to control invasive plants. The invasive plant program would not involve the use herbicides for invasive plant control.</li> <li>• The land area in Yosemite treated for invasive plants would remain approximately the same over time.</li> <li>• While densities of selected invasive plant populations would decrease, the park would not meet management objectives for priority invasive plants.</li> </ul>	<ul style="list-style-type: none"> <li>• An extensive program, using an integrated pest management approach and staffed by park employees and volunteers, would be followed to detect, control, and prevent high- and medium-high-priority invasive plants from spreading into uninfested areas.</li> <li>• Work crews would use a variety of manual and mechanical techniques to control invasive plants.</li> <li>• Crews would use selected herbicides to control up to 22 invasive plant species (out of 177 non-native plants in the park) if management objectives could not be achieved by using other control methods and invasive plant populations did meet size and location thresholds.</li> <li>• The land area in Yosemite treated for invasive plants would increase over time.</li> <li>• The park would meet objectives for invasive plants that pose the greatest threats to natural communities in the park.</li> <li>• Herbicide use is expected to decrease over time.</li> </ul>	<ul style="list-style-type: none"> <li>• An extensive program, using an integrated pest management approach and staffed by park employees and volunteers, would be followed to detect, control, and prevent high-, medium-high-, and medium-priority invasive plants from spreading into uninfested areas.</li> <li>• Work crews would use a variety of manual and mechanical techniques to control invasive plants.</li> <li>• Crews would use selected herbicides to control up to 35 invasive plant species (out of 177 non-native plants in the park) if management objectives could not be achieved by using other control methods and invasive plant populations did meet size and location thresholds.</li> <li>• The land area in Yosemite treated for invasive plants would increase over time.</li> <li>• The park would meet objectives for invasive plants that pose the greatest threats to natural communities, as well as to developed and disturbed lands in the park.</li> <li>• Herbicide use is expected to remain the same over time.</li> </ul>

# SUMMARY OF ALTERNATIVES

## WHAT IS THE PREFERRED ALTERNATIVE IN THE PLAN?

Three alternatives are being considered in the plan and Environmental Assessment. A chart on the previous page summarizes these alternatives. Alternative 2, *Eradicate or prevent the spread of high- and medium-high priority invasive plants into natural habitats*, is the park's preferred alternative.

Under Alternative 2, an extensive program staffed by park employees and volunteers would employ an integrated pest management approach to detect, control, and prevent high- and medium-high-priority invasive plants from spreading into uninfested areas. High- and medium-high-priority plants pose the greatest threats to natural communities in the park. Work crews would treat medium-priority plants—which tend to favor disturbed sites and generally do not have the potential to invade into undisturbed natural communities—with manual and mechanical control techniques.

Under Alternative 2, work crews would use herbicides to control up to 22 invasive plant species that meet predetermined thresholds. Program managers would develop annual work plans that would include the time and planned locations of herbicide applications, and distribute this information to the public via the Yosemite National Park website and other print media before herbicide applications take place. Herbicide use is expected to decline over time as invasive plant populations decline in size.

Currently, 15 of the 22 invasive plant species proposed for herbicide use under Alternative 2 meet the specified population size and location criteria. Work crews would not use herbicides on the remaining 7 species unless population sizes change to meet the thresholds identified in Table II-4 (see plan). Program managers would also consider herbicide use for newly discovered invasive plants in the park if the Cal-IPC or CDFA consider the species an ecological threat (see Control Treatments section in the plan).

The manual and mechanical control methods outlined in Actions Common to All Alternatives (see chart on previous page) would be the preferred methods to treat invasive plants in the park. Work crews would use

herbicides to control specific invasive plant populations when management objectives could not be met with the use of manual or mechanical control techniques.

Two herbicides—glyphosate and aminopyralid—would be utilized (see Appendices E, F, G, and H in plan). In upland areas, work crews would use terrestrial-approved formulations of glyphosate or aminopyralid. Glyphosate would be applied at the maximum equivalent of four quarts per acre per year. Aminopyralid would be applied at the maximum equivalent of seven ounces per acre per year. In seasonally flooded wetlands (such as habitat for Himalayan blackberry), work crews would use aquatic-approved formulations of glyphosate with an R-11 surfactant. This is the only surfactant approved for aquatic use in California. This formulation would only be used in seasonally flooded wetlands, and during the dry phase of the year. Work crews would never apply herbicides within six feet of standing or flowing water, within the bed and banks of Wild and Scenic Rivers, or to plants growing in water.

All applications would take place using manually applied applications from backpack sprayers, hand-held wands extending from truck-mounted tanks, or individual containers of herbicide and a wiper tool such as a paintbrush. Work crews would not use aerial applications such as from an airplane or helicopter, or from truck-mounted tanks with boom attachments. All herbicide use would follow the Herbicide Use and Storage Protocol (see Appendix I in the plan).

Invasive plant program managers followed a four-step process to determine the invasive species that work crews would treat with herbicides under Alternative 2. First, program managers prioritized invasive plants in the park for treatment (see Tables II-1 and II 2). Secondly, program managers developed species-specific management objectives for the highest-priority species (see Appendix A). Next, managers determined which priority species are responsive to herbicide use, and which species would require herbicide use to meet management objectives (see Table II-4). Lastly, managers developed species-specific population size and location criteria that invasive plants must meet before herbicides would be applied (see Table II-4). Herbicide use would

## SUMMARY OF ALTERNATIVES

also meet special criteria in protection zones such as Wild and Scenic River corridors, wilderness, special-status species habitat, wetlands, riparian zones, cultural landscapes, and areas that contain traditional cultural properties (see Table II-5). Program managers would consider the use of herbicides on newly discovered invasive plant species if the Cal-IPC or CDFA considers them an ecological threat.

### **WHAT DO THE OTHER ALTERNATIVES PROPOSE?**

**Alternative 1 is the No Action alternative.** Under the No Action alternative, the park would continue existing invasive plant management practices. An extensive program staffed by park employees and volunteers would strive to detect, control, and prevent invasive plant populations in the park from spreading into uninfested areas using manual and mechanical techniques. This invasive plant program has been in place for over a decade. In 2007, volunteers spent over 10,000 hours removing invasive plants from wetlands and meadows; in addition, one to two National Park Service crews work throughout the growing season to control invasive plants. Under this alternative, the invasive plant program would not use herbicides as part of invasive plant control treatments.

Current resource conditions and trends would continue. Over the past decade, the park has reduced the rate of spread of existing invasive plant populations. For example, after decades of work, eradication efforts have reduced the density of large populations of yellow starthistle, one of the park's most noxious weeds. Because mowing treatments for yellow starthistle are most effective when two to five percent of the plant is in bloom, mowing is restricted to a few weeks of the year. It is difficult to treat all populations within this small time window, and smaller outlying populations of yellow starthistle would continue to grow and are likely to spread. In the case of non-native blackberry, park staff and volunteers have been treating or retreating non-native blackberry in Yosemite Valley using hand-pulling or mowing at a rate of about five acres a year (about three acres of re-treatment and two acres of new treatment). The total acreage of blackberry in Yosemite Valley is about 85 acres. Individual blackberry plants can spread at the rate of 10 feet per year,

and the rate of re-growth and spread of blackberry may surpass this rate of treatment. Under Alternative 1, the park is not likely to increase noticeably the total acreage of invasive plant treatment in the park. As invasive plants continue to spread into uninfested areas, the park would not meet its overarching goal of protecting the natural, cultural, and scenic resources of Yosemite National Park from the threat of non-native plant invasion.

**Alternative 3 is Eradicate or prevent the spread of high-, medium-high, and medium-priority invasive plants.** Under Alternative 3, an extensive program staffed by park employees and volunteers would use a full slate of techniques to meet management objectives for medium-priority invasive species, as well as high- and medium-high-priority species. Medium-priority species are mainly found in disturbed areas such as road corridors, campgrounds, parking lots, and staging areas. Medium-priority species do not have as great a potential to invade natural plant communities as higher-priority plants. Under Alternative 3, park crews would utilize herbicides to control up to 35 invasive plant species if objectives could not be met through other control methods and invasive plant populations did meet size thresholds (see Table II-4 in the plan).

Program managers would also consider herbicide use for newly discovered invasive plants in the park, only if the Cal-IPC or CDFA consider the species an ecological threat (see Control Treatments section). Program managers would develop annual work plans, which would include the time and planned locations of herbicide applications, and distribute this information to the public via the Yosemite National Park website and other print media before herbicide applications take place.

## I'M CONCERNED ABOUT THE USE OF HERBICIDES IN A NATIONAL PARK. WHY IS IT INCLUDED IN THE PREFERRED ALTERNATIVE?

The manual and mechanical control methods outlined in Actions Common to All Alternatives would be the preferred methods to treat invasive plants in the park. Herbicides provide one tool in an integrated pest management approach, but are the tool of last resort. In the preferred alternative, herbicide use would be limited, tightly controlled, and used as a method of last resort only on plants listed as high-priority. Work crews would use herbicides to control specific invasive plant populations when management objectives could not be met with the use of manual or mechanical control techniques. It should be noted, however, that manual techniques like hand-pulling can cause substantial disturbance to the soil—which encourages the spread of more invasive species. Two herbicides—glyphosate and aminopyralid—would be utilized. Because very limited application can be effective against invasive species, it is anticipated that herbicide use would decline over time.

Park staff fully understand the concerns raised by using herbicides in a national park. Resource Management & Science staff along with an interdivisional team have thoroughly examined the trade-offs involved in the use or exclusion of herbicide use. Scientists, including park botanists, have found that park ecosystems are more threatened by the spread of invasive plants than by the judicious and informed use of herbicide. Botanists and resource managers have a thorough and well-considered process for determining whether the use of herbicides is appropriate. The herbicide application, when deemed appropriate and after careful consideration under a 4-step selection process, will be very limited in its application on very specific plant species. There will be no blanket or overhead spraying. Herbicide will not be applied within 6 feet of standing or flowing water, within the bed and banks of a Wild & Scenic River, or to plants growing in water. Because Yosemite is at the early stage of plant invasion, it is possible to prevent the spread with very conservative use, and that use will decline over time. Additionally, herbicide will not be applied unless manual and motorized techniques are not feasible.

Herbicide use has been demonstrated to be effective on

invasive plants and as part of an integrated pest management approach, and the quantities of herbicide proposed for use are very limited. Glyphosate would be applied at the maximum equivalent of four quarts per acre per year while aminopyralid would be applied at the maximum equivalent of seven ounces per acre per year. The park is proposing the judicious use of these two herbicides to treat a limited number of invasive plants that meet specific criteria. Following a careful analysis of a full slate of herbicides, the invasive plant team selected two herbicides that it believes pose a minimal risk to human and environmental health. Environmental consequences associated with each of the Alternatives are examined in detail within the plan.

## HOW WILL HERBICIDES BE APPLIED?

Work crews would use one of four herbicide application methods. All application rates and methods would be consistent with product specimen labels. An “indicator dye” would be mixed with the herbicide to see where it was applied. The application methods are as follows:

- **CUT STUMP:** Work crews would apply herbicides to the stump of a woody species (tree, shrub, or vine) within one minute after cutting down the tree or shrub. The herbicide would penetrate into the plant’s vascular system and translocate to the remaining belowground portions of the plant to kill roots and prevent re-sprouting.
- **FRILL:** This is similar to the cut stump process, but work crews would leave the tree or shrub standing. Multiple small cuts would be made into the cambium of the tree, and work crews would immediately apply herbicides. The herbicide would translocate throughout the plant.
- **WIPER:** Work crews would wipe herbicides onto the leaves of plants using a wick, sponge, paintbrush, or similar tool.
- **FOLIAR SPRAY:** Presently this method is the only method used to apply aminopyralid. Work crews would spray leaves with a mixture of herbicide, water, and non-ionic surfactant from a backpack or other sprayer. Precise mixes would vary depending on the species, the life cycle of the species, and other factors. In some cases, work crews may cut perennial plants first, allowing plants to re-sprout before herbicide spraying takes place; this would reduce the amount of herbicide used.

# HOW CAN I GET INVOLVED?

## WHY IS COMMENTING IMPORTANT?

Although park planners and resource managers often have very specialized knowledge of an area, it would be impossible for them to know all the issues of importance to the hundreds of thousands of visitors to that area—this information needs to come from the visitors themselves. Park plans are more thorough because of the members of the public who have chosen to participate in them...

*One comment CAN make a difference!*

## WHAT IS MY ROLE IN THE PLANNING PROCESS?

Public comments are sought for major planning efforts to help identify the range of issues that should be addressed. Public scrutiny of proposed actions helps to ensure that actions are consistent with the National Park Service mission, enabling legislation, and other relevant laws and policies.

Each planning process provides at least two formal opportunities for the public to become involved, in accordance with the National Environmental Policy Act and National Historic Preservation Act: scoping and public comment periods on the draft document. First, when a planning effort is announced, public scoping takes place. At that time, the public is asked to raise issues and concerns to help park staff identify issues to be addressed.

Once a draft document is released, the public is provided the opportunity to examine sets of proposals (known as “alternatives”) and submit comments. The comments are then analyzed and often contribute to revisions in the final plan. This Participant Guide has been created to help summarize the alternatives for the Invasive Plant Management Plan for Yosemite National Park in order to make informed public comments about the draft plan.

## WHEN IS PUBLIC COMMENT PERIOD FOR THE DRAFT INVASIVE PLANT MANAGEMENT PLAN ENVIRONMENTAL ASSESSMENT FOR YOSEMITE NATIONAL PARK?

The public comment period will run from June 13, 2008 through July 13, 2008. In addition to Public Open House on June 25, 2008 in Yosemite Valley, there will be park representation at the El Portal Planning Advisory Meeting in El Portal on July 8, 2008.

For more information, visit

[www.nps.gov/yose/parkmgmt/invasive.htm](http://www.nps.gov/yose/parkmgmt/invasive.htm)

## WHAT HAPPENS TO MY PUBLIC COMMENT ONCE I SUBMIT IT?

As a formal part of the planning process, National Park Service staff reads and analyzes all comments submitted. A report will be developed to summarize key issues and concerns. Your comments will inform whether changes to the draft document need to occur.

The public scoping period for the Invasive Plant Management Plan took place from January 1, 2005 through February 15, 2005. The park received 46 comment letters during the public scoping process, including 29 from individuals and 17 from organizations. The park held two public meetings to discuss the plan—one in El Portal on January 11, 2005, and one in Wawona on January 18, 2005. Members of the planning team were available at public open houses held monthly in Yosemite, during the public scoping and through the planning period.

## HOW CAN I GET MORE INFORMATION?

For more information on park plans and how you can stay involved, visit the park’s website at [www.nps.gov/yose/parkmgmt/planning.htm](http://www.nps.gov/yose/parkmgmt/planning.htm). You can also subscribe to the Planning Update newsletter and/or the electronic newsletter by contacting us by any of the methods listed below.

## HOW CAN I RECEIVE A COPY OF THE PLAN AND HOW DO I SUBMIT COMMENTS?

You can request a copy of the plan and submit comments by the following means:

- In person at Open Houses and public meetings
- By email to [yose\\_planning@nps.gov](mailto:yose_planning@nps.gov)
- By fax to (209)379-1294
- By mail to:

### **Superintendent**

Yosemite National Park

Attn: Invasive Plant Management Plan

PO Box 577

Yosemite, CA 95389

Additionally, the plan is available in pdf format

online at [www.nps.gov/yose/parkmgmt/invasive.htm](http://www.nps.gov/yose/parkmgmt/invasive.htm)