Preventing the Spread of Invasive Plants:
Best Management Practices for Land Managers
2nd Edition

California Invasive Plant Council

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Invasive plants can degrade the ecological integrity of wildlands, and land managers employ a range of tactics to reduce this damage. Controlling already established invasive plant infestations is important. However, stopping the introduction and spread of new invasive plant infestations is the most cost-effective approach to reducing this damage. Prevention is a key aspect of invasive plant management that does not always get the attention it deserves.

Land managers must have a good understanding of ways to avoid accidentally spreading invasive plants through their work. Such work often involves travel from one worksite to another. Tools, equipment, vehicles, animals, clothing, boots, and project materials moved between worksites can become potential vectors for the spread of invasive plants.

This manual provides essential guidelines for integrating prevention Best Management Practices (BMPs) into land management. These BMPs form an important foundation to help land managers prevent the introduction and spread of invasive plants. The nonprofit California Invasive Plant Council (Cal-IPC) formed a technical advisory team made up of land management experts in the state. The team reviewed existing resources to develop an accessible overview of key prevention measures that can be used by all land managers. While many prevention BMP manuals and lists already exist, most were designed for specific applications such as transportation corridors or federal lands and do not apply broadly to the needs of California land managers.

This manual does not include prevention measures for invasive aquatic plants nor does it include information on controlling invasive plants. References to source documents, some of which include extensive detail, can be found in the References section at the end of this manual. In this manual, the term “weeds” is synonymous with “invasive plant”, such as when referring to weed-free forage.
These prevention BMPs are designed for use throughout California by those managing large and small properties, and can be used in a number of ways. For instance, land managers can use the material in the manual to conduct trainings for work crews. The manual can help land managers by providing language for contractor specifications for work on their land. Managers can also use the manual to develop educational materials for the public. Each BMP is appropriate for particular situations; managers can select those that are practical for their use. For example, programmatic planning BMPs may be less applicable to smaller restoration groups, as these BMPs are more suited for large agencies.

A discussion of Prioritizing BMP Implementation appears later in this section on page 4 to help determine high priority areas for implementing prevention BMPs. Additionally, conducting a thorough pre-activity assessment can help to identify which tasks can spread invasive plants (See Pre-Activity Assessment Outline on page 5).

The checklist section of this manual presents ready-to-use checklists which contain only the BMP statements to provide a quick and portable reference for field activities. The checklists are divided into three categories: Routine Maintenance, New Projects, and Inspection & Cleaning. These checklists can be used as templates and be modified based on your needs.

When practicing prevention, there are some overarching principles to keep in mind:

**Control source populations of invasive plants.**
Invasive plants spread from a source of seeds or other reproductive material. Eliminating populations of invasive plants located in high-traffic areas reduces the potential for spread.

**Stop movement of invasive plant materials and seeds.**
The movement of workers and equipment can carry seeds and reproductive material between sites. Working in areas with invasive plants prior to seed set can reduce the likelihood of spread. This manual identifies potential pathways such as boots and equipment and how to address them.

**Minimize soil and vegetation disturbance.**
Disturbance can allow invasive plants to colonize a new area. Disturbance should be minimized, and when it is unavoidable, land managers should take precautions and follow up with monitoring to ensure early detection of any invasive plants that may have been introduced.

**Maintain desired plant communities.**
A healthy plant community with native and desirable species provides resistance to invasive plant establishment.

**Increase awareness of invasive plant prevention.**
Since people are potential vectors of invasive plant spread, it is critical that everyone understands their role in prevention. Educational efforts, like signs at trailheads or trainings for staff, can facilitate people to join the effort.

**Survey regularly for new invasive plants and eliminate new infestations.**
“Early detection and rapid response” is critical for controlling the spread of invasive plants with limited budgets. Regular monitoring increases the chances of success.

**Increase cooperation, communication, and information-sharing.**
Land managers understand the need to work with neighbors, both immediate and regional, to be most effective. Finding ways to cooperate increases everyone’s effectiveness.

This manual is divided into ten chapters, each representing a potential pathway of introduction for invasive plants. Chapters contain a list of prevention BMPs, and each BMP includes a list of more detailed considerations for adapting the BMP for use in particular situations. In general, selecting which prevention strategies will be most effective depends on a range of worksite factors and invasive plant characteristics.

Prevention practices are essential for limiting the introduction and spread of invasive plants. Land managers themselves can be significant vectors for the spread of invasive plants, and should incorporate the BMPs described in this manual. Working effectively and efficiently will better enable California’s land management community to be successful in meeting long-term conservation challenges.
Prioritizing BMP Implementation

Prevention BMPs in this manual are developed with the understanding that each situation and entity has different needs and resources. This outline can help you select which areas and species to prioritize when integrating BMPs into management activities.

1. **Prioritize areas including:**
   - Areas where invasive plants do not occur (“clean areas”)
   - Areas of high ecological or conservation value (e.g., native plant assemblages, endangered species habitat)
   - Areas where future control costs will be high if invasive plants become established
   - Areas where invasive plants are likely to be eradicated successfully
   - Wildland and natural areas
   - Areas where wildland interfaces with urban areas
   - Areas where fire risk is high
   - Areas containing water bodies
   - Areas with important scenic or recreational resources
   - Areas where adjacent land owners are cooperative
   - Wildland areas frequented by vehicles and foot traffic
   - Areas with new construction or disturbance

2. **Prioritize invasive plant species including:**
   - Species known or suspected to be invasive but still in small numbers
   - Species with the potential to impose high costs of management
   - Species that can alter ecosystem processes
   - Species determined to be of regional concern
   - Species that are likely to be controlled successfully
Pre-Activity Assessment Outline

This assessment outline can help you proactively address activities that have the potential to spread invasive plants. A site assessment and a description of planned activities will need to be completed as part of this pre-activity assessment.

1. **Conduct a site assessment to ascertain:**
   - A list of invasive plant species found in route to and within worksites. Include exact locations and densities, and the species’ dispersal mechanisms.
   - A list of priority areas for implementing prevention BMPs. Refer to Prioritizing BMP Implementation on the previous page for guidance on prioritization.

2. **Describe each activity (e.g. roadside mowing, facility inspection, access road grading and maintenance, and pole/tower repair) to ascertain:**
   - Location(s) of the activity
   - Location(s) of access routes
   - Timing for the activity
   - Tools and equipment to used
   - Materials to be moved, imported or exported
   - Expected alteration of existing vegetation and soil

3. **List the sequence of tasks that are included in the activity. Identify which tasks can be altered to reduce the likelihood of invasive plant spread based on:**
   Task location
   a. Is there a location for this task with less potential to spread invasive plants?  
   b. Can access routes be changed to avoid traveling through invasive plant populations?  
   c. If materials are being moved, is there a better location for materials to be stored?  
   Task timing
   a. Can the task be performed in a different time (earlier/later in the season) or in a different sequence (e.g. spraying after mowing)?  
   b. Can invasive plant populations be treated before project tasks commence to reduce the spread of invasive plant parts and seeds?  
   Task method
   a. Is there a different method of performing the task that can reduce the risk of spread?  
   b. Could using different tools/equipment/materials reduce the risk of spread?  
   c. Are weed-free materials available?

4. **Select BMPs from the following chapters to address the potential introduction and spread of invasive plants.**
List of Best Management Practices

Chapter 1: Planning BMPs

Programmatic Planning

PL1: Adopt official policy to prevent invasive plant introduction and spread.

PL2: Include invasive plant risk evaluation as a component of initial project planning.

PL3: Integrate invasive plant prevention BMPs into design, construction, vegetation management and maintenance planning activities.

PL4: Coordinate invasive plant prevention efforts with adjacent property owners and local agencies.

PL5: Develop monitoring plans for BMP implementation and effectiveness.

Activity Planning

PL6: Provide prevention training to staff, contractors and volunteers prior to starting work.

PL7: Conduct a site assessment for invasive plant infestations before carrying out field activities.

PL8: Schedule activities to minimize potential for introduction and spread of invasive plants.

PL9: Integrate cleaning BMPs into planning for land management activities.

PL10: Prepare worksite to limit the introduction and spread of invasive plants.

PL11: Monitor the site for invasive plants after land management activities.

Chapter 2: Project Material BMPs

PM1: Use a weed-free source for project materials.

PM2: Prevent invasive plant contamination of project materials when stockpiling and during transport.

Chapter 3: Travel BMPs

TR1: Plan travel to reduce the risk of invasive plant spread.

TR2: Integrate cleaning activities into travel planning.

Chapter 4: Tool, Equipment and Vehicle Cleaning BMPs

TE1: Designate cleaning areas for tools, equipment, and vehicles.

TE2: Inspect tools, equipment, and vehicles before entering and leaving the worksite.

TE3: Clean soils and plant materials from tools, equipment, and vehicles before entering and leaving the worksite.

TE4: Clean pack, grazing and support animals.

Chapter 5: Clothing, Boots and Gear Cleaning BMPs

CB1: Wear clothing, boots and gear that do not retain soil and plant material.

CB2: Designate cleaning areas for clothing, boots and gear.

CB3: Clean clothing, footwear and gear before leaving the worksite.
Chapter 6: Waste Disposal BMPs

WD1: Designate waste disposal areas for invasive plant materials.

WD2: Render invasive plant material nonviable when keeping it on-site.

WD3: When disposing of invasive plant material off-site, contain it during transport.

Chapter 7: Soil Disturbance BMPs

SD1: Minimize soil disturbance.

SD2: Implement erosion control practices.

SD3: Manage existing topsoil and duff material to reduce contamination by invasive plants.

Chapter 8: Vegetation Management BMPs

VM1: Schedule vegetation management activities to maximize the effectiveness of control efforts and minimize introduction and spread of invasive plants.

VM2: Manage vegetation with methods favorable to desirable vegetation.

VM3: Retain existing desirable vegetation and canopy.

Chapter 9: Revegetation and Landscaping BMPs

RL1: Develop revegetation and landscaping plans that optimize resistance to invasive plant establishment.

RL2: Acquire plant materials locally. Verify that species used are not invasive.

RL3: Revegetate and/or mulch disturbed soils as soon as possible to reduce likelihood of invasive plant establishment.
Integrating prevention BMPs into land management can significantly minimize the introduction and spread of invasive plants. Effective planning reduces costs and enhances project success. This chapter addresses how and when to integrate prevention BMPs into planning and management, and highlights the importance of communication among staff, adjacent property owners and local agencies.

Identifying invasive plant risks early in the planning process helps organizations develop strategies to prioritize prevention measures, allocate resources, and incorporate prevention costs into budgets throughout the project life cycle. Additionally, tracking the costs and results of implementing prevention BMPs will provide references for future projects.

Planning includes developing schedules, budgets, and strategies as well as identifying critical control points for carrying out prevention BMPs. Identifying and mapping invasive plants at worksites is critical for evaluating threats. This helps determine high-risk spots for potential establishment and spread, and helps land managers select appropriate prevention practices.

This chapter includes two sections on planning: programmatic planning and activity planning. **Programmatic Planning BMPs** are critical because they lay the framework for prevention BMPs to be integrated into all activity planning and land management. **Activity Planning BMPs** focus on limiting the introduction and spread of invasive plants during each stage of land management. These BMPs start on page 11.

**PROGRAMMATIC PLANNING BMPs:**

**PL1:** Adopt official policy to prevent invasive plant introduction and spread.

a. Adopt an environmental stewardship policy that encourages preventing the introduction and spread of invasive plants.

b. Increase organization/agency-wide awareness of invasive plant impacts.
c. Consider using multi-disciplinary teams to address site-specific invasive plant prevention and control challenges.

d. Identify funding, priorities, and personnel assignments for invasive plant prevention. Consider having a dedicated invasive plant contact person.

PL2: **Include invasive plant risk evaluation as a component of initial project planning.**

a. Integrate invasive plant identification and risk analysis as a part of NEPA/CEQA processes.

b. Evaluate invasive plant spread risks and the long-term maintenance consequences with natural resource managers. Determine project alternatives and management needs based on a pre-activity assessment. See Pre-Activity Assessment Outline on page 5.

c. Incorporate invasive plant prevention measures into project layout, design, and project decisions.

d. Develop mitigation plans for areas where avoidance of invasive plants is not possible.

e. Designate known invasive plant occurrences in maintenance plans and any associated contracts.

PL3: **Integrate invasive plant prevention BMPs into design, construction, vegetation management and maintenance planning activities.**

a. Include BMP costs in all budgets, estimates and bid packages. Include costs for prevention training for staff and contractors, cleaning routines for clothing, tools, equipment and vehicles, and site preparation and monitoring.

b. Track cost and results of implementing BMPs as a reference for future project planning and cost estimates.

c. Integrate cleaning routines into all land management activities. For detailed cleaning protocol see Checklist E on page 43.

d. Develop incentive programs among staff and volunteers to encourage invasive plant detection and reporting.

e. Include invasive plant prevention measures as part of contract notes and specifications.

f. Develop plant lists and design guidelines for revegetation and landscaping that will optimize resistance to invasive plant establishment. For details see Chapter 9: Revegetation and Landscaping, RL1 on page 31.

g. Plan to minimize soil and vegetation disturbance during activities. For details see Chapter 7: Soil Disturbance, SD1 on page 27 and Chapter 8: Vegetation Management, VM3 on page 30.

h. When designing vegetation management projects, consider the life cycle and dispersal mechanisms of the invasive plant species within and/or adjacent to the worksite.

i. Acquire documentation of invasive plants along roadways and address treatment strategies in the course of road maintenance activities.

PL4: **Coordinate invasive plant prevention efforts with adjacent property owners and local agencies.**

a. Coordinate prevention efforts with adjacent property owners to ensure their activities will minimize the introduction or spread of invasive plants into the worksite or neighboring properties.

b. Coordinate with local and state agencies to streamline record keeping systems of invasive plant infestations. Incorporate updates into appropriate databases such as CalWeedMapper ([calweedmapper.calflora.org](http://calweedmapper.calflora.org)) and share with local and state agencies.

c. Coordinate new research on invasive plant prevention and technology with Cal-IPC, agencies, and universities. Share findings with public and private partners.
PL5: Develop monitoring plans for BMP implementation and effectiveness.

a. Establish a periodic monitoring program based on knowledge of high priority invasive plant life cycles (ideally three times a year and during growth periods).

b. Identify and monitor sites that are susceptible to invasion, such as post construction areas and roadsides (from the edge of pavement extending a minimum of fifteen feet), pull outs, trailheads, campgrounds and parking lots.

c. Define “zero tolerance” zones in critical habitats. Commit to keeping these areas free of invasive plants through frequent monitoring and control efforts.

d. Track results of implementing BMPs as a reference for future project planning and cost estimates.

e. Develop follow-up treatments as needed based on monitoring results.

f. Consider modifying BMP implementation based on the following questions:
   • Were invasive plant populations reduced or adequately suppressed thus preventing spread?
   • Was the planned procedure used? If not, why did it vary from the original plan?
   • Were invasive plant prevention costs equal to, less than, or more than projected prevention costs?
   • What was the effect on the targeted invasive plant species?
   • Were there any side-effects on non-target organisms from implementing prevention measures?
   • Was available funding and manpower adequate?
   • Was personnel training adequate?

PL6: Provide prevention training to staff, contractors and volunteers prior to starting work.

a. Provide pre-work training on invasive plants and prevention BMPs to staff, contractors and volunteers. Training should include:
   • Field identification of invasive plants in the work area
   • Reproductive biology of invasive plants
   • Ecological and economic impacts of invasive plants
   • Invasive plant prevention BMPs
   • Inspection and cleaning protocols for vehicles, tools, equipment, clothes and personal gear
   • When and how to record and report occurrences for invasive plants
   • How to use prevention resources (reporting websites, checklists, etc.)
   • How to treat materials infested with invasive plant propagules.

ACTIVITY PLANNING BMPs:

In addition to the following BMPs, also refer to related BMPs in:

• Chapter 2: Project Materials for procuring and managing erosion and project materials.

Train staff and contractors in prevention measures.
b. Provide additional training to staff and contractors managing project materials. Training should include:
   • How to acquire weed-free materials
   • Project material inspection protocols

c. Ensure staff and contractors understand provisions for invasive plant prevention throughout the project. Invasive plant considerations should be routinely addressed during pre-bid, pre-work and meetings, as appropriate.

d. Identify and train personnel responsible for inspection of cleaned tools, equipment and vehicles at facilities and worksites. Require an inspection form or checklist be used to document tools, equipment and vehicles are cleaned before leaving an infested worksite and are clean upon arrival at a clean/uninfested worksite.

e. Provide invasive plant identification guides, prevention BMPs, activity, and cleaning and inspection checklists (see Checklists on page 35) to staff, contractors, and volunteers. Provide these resources in other languages when appropriate. Also have these resources available at highly visible locations such as:
   • Access points
   • Field stations and work trailers

f. Educate all site users about preventing invasive plant spread.
   • Post invasive plant prevention messages using signs and posters at prominent locations such as visitor centers, campgrounds, trailheads. Provide informational materials to site users at visitor centers and events.
   • Install prevention equipment such as boot brushes and washing stations at trailheads.

PL7: Conduct a site assessment for invasive plant infestations before carrying out field activities.

a. A site assessment for invasive plant infestations includes scouting for invasive plants found within the worksite (including the exact locations and densities), and determining priority areas for implementing prevention BMPs.
isolate contaminated soils during construction or other disturbance. Isolated contaminated soils should be either placed back in the original location or disposed of appropriately to avoid spreading isolated populations of invasive plants throughout the worksite.

g. Document invasive plant findings and communicate them to resource or facility managers.

h. Incorporate findings into a database (e.g. www.calweedmapper/Calflora.org) and project drawings or maps.


PL8: Schedule activities to minimize potential for introduction and spread of invasive plants.

a. Prioritize reducing invasive plant seed production along roadsides (edge to fifteen feet along roadway edge) to reduce seed movement by vehicles.

b. Conduct work under conditions that minimize the risk of spread (e.g. frozen ground, snow cover, seed absence).

c. Avoid working during rain events and high winds. Wet conditions make it easier for seeds to be picked up by a vehicle and spread miles down the road.

d. Develop site-specific plans for controlling existing invasive plants before ground-disturbing activities begin.

- Control invasive plants along access roads before moving equipment into the worksite.
- Manage invasive plants three to five years prior to the planned disturbance to minimize invasive plant seeds in the soil, when feasible.

e. For details on scheduling vegetation management see Chapter 8: Vegetation Management, VM1 on page 29.

PL9: Integrate cleaning BMPs into planning for land management activities.

a. Determine cleaning needs for tools, vehicles, equipment, clothing, boots and gear in conjunction with each activity and worksite. Include these cleaning needs in project plans, and make prior arrangements for any special needs identified. For details on cleaning see Chapters 4 and 5 on pages 21 and 23.

b. Include cleaning costs in project budgets.

c. Acquire necessary cleaning tools.

d. Designate sites for cleaning vehicles, equipment, pack animals, clothing and gear.

e. Identify cleaning facilities (such as car washes) near the worksite, in the event that cleaning on-site is not an option.

f. Use inspection checklists to ensure comprehensive cleaning. See Checklist E, page 43.
**PL10: Prepare worksite to limit the introduction and spread of invasive plants.**

a. Protect likely introduction sites such as pull-outs, trailheads, campgrounds, and parking lots from invasive plant introductions by paving, deep mulching, or planting a dominant non-invasive groundcover.

b. Periodically inspect areas of concentrated use, such as staging areas, parking areas, trailheads, or campgrounds, and keep them free of invasive plants.

c. Treat invasive plants at access roads and staging areas before using them.

d. Control invasive plants in areas adjacent to worksites. This prevents seeds or other reproductive structures from moving into the worksite. If removing plants is not feasible, stopping seed set can be an effective way to reduce the potential for spreading the plant.

e. Position activity boundaries to exclude areas infested with invasive plants. Activity boundaries include staging areas, timber harvest landings, skid trails, access roads and other temporary facilities. If this is not possible, control invasive plants in infested areas prior to their use.

**PL11: After land management activities, monitor worksites for invasive plants.**

a. Carry out the established monitoring plan. Partner with local WMAs (www.cal-ipc.org/WMAs), agencies and organizations to help with monitoring when possible.

b. Train staff to recognize and report invasive plants as part of ongoing monitoring.

c. Monitor areas including:
   - On-site cleaning area
   - Waste disposal area
   - Areas where project materials are stored
   - Access routes, roads and other areas of concentrated use
   - Areas near salt licks, watering sites, loading/unloading areas and corrals for animals

d. Monitor and maintain revegetation and landscaping to ensure long-term establishment of desired plant species.

e. Monitor during multiple growing seasons, especially at times of germination and flowering, for a minimum of three years after project completion to ensure that any invasive plants are promptly detected and controlled. If three years is not sufficient to control invasive plants, monitoring and treatment should be continued until confident that invasion has been controlled.

f. For on-going projects, continue to monitor until reasonably certain that invasive plants will not reappear. Plan for follow-up treatments based on presence of invasive plants.
Project materials are common vectors of invasive plant introduction into new areas. Infested project materials that are imported to worksites can introduce invasive plant propagules and lead to new infestations. This chapter includes practices for minimizing the spread of invasive plants from project materials.

Effective project material management can prevent invasive plant spread at the source and minimize contamination during transport and stockpiling. Because project materials are often managed by different entities or departments during different project phases, developing a procedure for procuring, storing, and inspecting materials at critical control points will streamline materials management and minimize contamination. Additionally, developing relationships with suppliers and requesting that they supply weed-free materials can help to increase demand and availability of these materials.

Project materials include:
- Erosion control materials (silt fences, fiber roll barriers, straw wattles, mulch and straw)
- Soil and aggregate (topsoil, fill, sand, and gravel)
- Landscape materials (plants, seed, sod, mulch, and soil amendments)
- Animal/livestock feed
- Water (for cleaning or irrigation)
- Construction/building materials
**PM1: Use a weed-free source for project materials.**

a. Develop a procedure for procuring and storing weed-free materials and inspecting material sources. Cultivate relationships with suppliers to streamline sourcing of weed-free materials.

b. Select materials based on the environmental needs of the worksite. Understand how weed-free materials are produced, whether the screening criteria is based on noxious weeds or wildland invasive plants. Weed-free materials may not be 100% weed-free, but using weed-free materials can reduce the probability of exposure to invasive plant parts and seeds.

- Noxious weeds are agricultural weeds listed by the California Department of Food and Agriculture. [www.cdfa.ca.gov/plant/ipc/weedinfo/winfo_list-pestrating.htm](http://www.cdfa.ca.gov/plant/ipc/weedinfo/winfo_list-pestrating.htm)
- California Invasive Plant Council’s inventory lists wildland invasive plants. [www.cal-ipc.org/ip/inventory/](http://www.cal-ipc.org/ip/inventory/)

c. Determine the degree to which weed-free project materials are needed for each worksite. Materials from an infested site may be suitable for a worksite that is already infested with the same species. Excavated material from areas containing invasive plants may be reused within the limits of the infestation.

- For example, materials from a yellow starthistle infested site could be reused in areas already infested by yellow starthistle, but not in areas free of yellow starthistle.
- Unused excavated material contaminated with invasive plants should be stockpiled on an impervious surface and managed until all invasive plant material is non-viable. For details on managing stockpiled materials see PM2 on page 18.

d. Use weed-free materials for erosion control and soil stabilization.

- When available, use weed-free straw certified by a county agriculture department, coconut fiber, rice straw and/or native grass straw. These types of erosion control material have limited quantities of invasive plants or contain wetland species that may not survive in dry upland conditions. See Cal-IPC ([www.cal-ipc.org/ip/prevention](http://www.cal-ipc.org/ip/prevention)) for a Weed-Free Forage & Straw Supplier List.

- Perform follow-up inspections at sites where erosion control materials have been used to ensure that any invasive plant introductions are caught early and treated.

e. Use weed-free sand and gravel.

- Any fill material brought on-site should be clean, debris-free, and devoid of invasive plant parts or seeds. Do not borrow fill from weed-infested stockpiles, road shoulders or ditch lines.
- Inspect aggregate material sources (including but not limited to surrounding ditches, topsoil piles, gravel/sand piles or pits). See Cal-IPC ([www.cal-ipc.org/ip/prevention](http://www.cal-ipc.org/ip/prevention)) for information about procuring weed-free sand and gravel.

f. Use weed-free seed. Verify seed mix to ensure it does not contain invasive plants.

- Use local seeding guidelines for your county to determine procedures and appropriate seed mixes.
- A certified seed laboratory should test each lot according to Association of Seed Technologists and Analysts (AOSTA) standards (which include a statewide invasive plant list) and provide documentation of the seed inspection test. Check state, federal, and California Invasive Plant Council lists to see if any local weeds need to be added prior to testing. For more information on locating lists of invasive plants, see PM1d on page 16.
· Seed purchased commercially should have a label that states the following:
  ◦ Species
  ◦ Purity: Most seed should be no less than 75% pure and preferably over 85% pure. The rest is inert matter, weed seed, or other seed.
  ◦ Weed seed content: The tag should state NO invasive plants are present. Only certified weed-free seed should be used. Note that seed is usually certified to be “noxious weed free”, referring to the California Department of Food and Agriculture noxious weed list, and may still contain seeds of wildland invasive plant species not included on the noxious weed list.
  ◦ Germination of desired seed: Germination generally should not be less than 50% for most species, although some shrubs and forbs will have lower percentages.

g. Keep and reuse on-site weed-free materials rather than importing new materials to limit contamination.
  ◦ Stockpile topsoil along perimeter of project for later use rather than importing topsoil. For details on topsoil management, see Chapter 7: Soil Disturbance, SD3 on page 28.
  ◦ Consider using mulch from non-invasive plant species chipped on site when feasible.

h. Find local sources when off-site weed-free project materials are needed. Inspect project material suppliers as appropriate to determine if the source is weed-free. Weed-free materials may not be 100% weed-free, but using these materials can reduce the probability of exposure to invasive plant contamination.

i. Designate and use weed-free water sources for each project.
  ◦ Inspect water sources to prevent introduction of invasive plants or animals.
  ◦ Designate weed free pathways to water sources.

j. Provide weed-free feed for livestock and pack animals before and after project use to limit invasive plant seed transport via manure.

k. If unable to obtain materials from a weed-free source:
  ◦ Work with a local weed specialist to sterilize or treat materials and provide results of post-treatment inspection. Monitor application areas. For monitoring protocol see Chapter 1: Planning, PL11 on page 14.
  ◦ If soil sources are infested, treat the invasive plants, then strip the infested topsoil and stockpile the contaminated material for several years to further deplete the soil seed bank. Check regularly for re-emergence of invasive plants and treat as needed.
  ◦ Inspect the area where material from weed-infested sources were used annually for at least three years after project completion to ensure that any invasive plants transported to the site are promptly detected and controlled. For monitoring protocol see Chapter 1: Planning, PL11 on page 14.

l. Inspect project materials, sources, and storage areas for invasive plants annually and prior to each use to ensure that no invasive plants have invaded since the last inspection. Record inspection results. Continue to monitor worksites for three year after project completion.

m. When feasible, include penalties, performance standards, or withholding provisions in contract specifications by which a contractor is assessed monetary damages for importing invasive plants as a result of non-compliance with contract specifications.
PM2: Prevent invasive plant contamination of project materials when stockpiling and during transport.

a. Move only weed-free materials into uninfested areas. Moving materials from one infested location to another within a particular zone may not cause contamination, but moving materials from infested to uninfested areas could lead to the introduction and spread of invasive plants.

b. Clean transport vehicles before and after loading project materials.

c. Encourage log yard and biomass plant operators to maintain weed-free yards, equipment parking areas, off-loading areas, and staging areas. This will reduce the likelihood of invasive plant spread from yard to worksite.

d. During transport, cover exposed piles of materials with geotextile fabric or impermeable material to prevent contamination of weed-free materials or spread of infested materials.

e. Cover exposed piles of project materials with impermeable material to protect materials from wind and rain, and reduce germination of invasive plants.

f. Cover active and inactive soil stockpiles with soil stabilization material or a temporary cover:
   - Soil stabilization used on bare slopes can be used for stockpiled soils. Temporary soil stabilization materials include:
     - Hydroseed (tackifier, fiber or seed)
     - Erosion control blanket (jute mesh or netting)
     - Mulch
     - Soil binder
     - Geosynthetic fabric
   - Surrounded with a linear sediment barrier (e.g. fiber roll).

g. For managing existing topsoil and duff materials see Chapter 7: Soil Disturbance, SD3 on page 28.

h. Frequently monitor stockpiles, materials storage areas and borrow pits. Quickly treat new invasive plant populations prior to seed production.
Land managers traveling between worksites can become vectors for the spread of invasive plants. For instance, driving a truck along an infested road can pick up seeds and carry them to a worksite. This chapter includes practices for minimizing the introduction of invasive plants by equipment, vehicles, animals and people.

It is important to be aware of travel routes. While cleaning vehicles, equipment, pack animals, clothing and gear is essential; land managers’ travel practices can reduce the amount of plant reproductive material that gets transported in the first place.

**TR1: Plan travel to reduce the risk of invasive plant spread.**

a. Consider the scale of infestation at worksites and travel routes. Typically not all areas are infested to the same degree with the same plants; this may affect the type and degree of prevention measures implemented.

b. Avoid driving off-road whenever possible.

c. When driving off-road, avoid patches of invasive plants.

d. Exclude areas infested with invasive plants from equipment travel corridors and staging areas.

e. Avoid parking on the side of the road in areas infested with invasive plants.

f. Prevent animals (pack and grazing) from entering areas infested with invasive plants.

g. When traveling through infested areas cannot be avoided:
Consider the sequence of operations. Arrange travel routes from uninfested areas to infested areas. Work first in uninfested areas when vehicles and equipment are free from invasive plant material.

Control invasive plants at access roads and staging areas before using them.

Clean your vehicle before leaving the infested area.

Travel under dry conditions when feasible. Traveling under wet conditions, particularly along unpaved roads, greatly elevates the risk of picking up invasive plant seeds and transporting them.

Restrict travel to those periods when spread of seed is least likely, such as just prior to flowering or late in the season when seeds have already dropped.

Limit the number of roads traveled to minimize soil disturbance and the risk of unintentionally transporting invasive plant parts and seeds on equipment into uninfested areas.

Close or reroute public roads or trails in areas infested with invasive plants. Where appropriate, ask user groups to become actively involved to help control an infestation so the trail can be reopened.

Perform road maintenance such as road grading, brush clearing, and ditch cleaning from uninfested to infested areas. If possible, schedule such activities when seeds or propagules are least likely to be viable.

**Integrate cleaning activities into travel planning.**

a. Include cleaning when planning travel time.

b. Set up cleaning operations to be efficient and effective to have minimal impact on travel time.

c. Remove soil and plant materials from tools, vehicles, equipment, clothing, boots and gear before entering and leaving a worksite.

d. Refer to an inspection checklist to ensure comprehensive cleaning of vehicles, equipment, pack animals, clothing and gear. See Checklist E, page 43.

e. Avoid traveling through areas infested with invasive plants when collecting water for dust abatement or cleaning.

Photo: Noa Rishe, California State Parks, Angeles District

Clean seeds and plant parts from vehicles before leaving worksites infested with invasive plants.
Chapter 4: Tool, Equipment and Vehicle Cleaning BMPs

Tools, equipment and vehicles used for land management activities are potential vectors for invasive plant spread. For example, a mower used at a site infested with yellow starthistle can trap seeds in the mower deck and deposit them at the next worksite. This chapter presents ways to prevent the spread of invasive plants by cleaning hand tools, power tools, construction equipment, vehicles, and pack and grazing animals. For a detailed cleaning protocol see Checklist E in the checklists section of this manual on page 43.

TE1: Designate cleaning areas for tools, equipment, and vehicles.

a. Tools, equipment, and vehicles should be cleaned in areas that are:
   - Easily accessible for monitoring and control
   - Located away from waterways
   - Located away from areas of sensitive habitats or species
   - Near areas already infested with invasive plants
   - Contained with silt fences or soil berms
   - Paved or have sealed surfaces to avoid re-accumulation of soil and plant material on cleaned vehicles and equipment

TE2: Inspect tools, equipment, and vehicles before entering and leaving the worksite.

a. Consider the extent of infestation at worksites. Typically not all areas are infested to the same degree with the same plants, and this may affect the type and degree of inspection needed.

b. Prior to entering an uninfested area, inspect vehicle and equipment undercarriages and tires for seeds or plant parts.

c. Refer to an inspection checklist to ensure comprehensive inspection. See Checklist E on page 47.
d. Train staff, contractors and volunteers to inspect for seeds, seed heads, plant material, soil and mud.

e. Procure appropriate equipment for inspections, such as flashlights, portable lighting if night-time inspections are necessary, and under-vehicle mirrors.

f. Inspect areas where tools, equipment and vehicles are stored for invasive plants. Maintain these facilities as weed-free.

g. Ensure that rental equipment is free of invasive plant material before accepting it.

**TE3: Clean soils and plant materials from tools, equipment, and vehicles before entering and leaving the worksite.**

a. Clean tools, equipment, and vehicles if soil and plant materials are found during inspections.

b. Remove soil, seeds and plant parts from tools, the undercarriage, tires, sideboards, tailgates, and grills of all vehicles and equipment. Wash tires and under carriage if the travel route is muddy. For detailed cleaning protocol see Checklist E on page 43. Cleaning methods are divided into two categories:

   - Cleaning without water:
     - Bristle brushes, brooms, scraper and other hand tools (to remove heavy accumulation of soil and debris prior to washing with other tools)
     - High pressure air devices
     - Vacuum cleaner
     - Hand removal
   - Cleaning with water:
     Wash on a paved surface to avoid creating mud. Contain waste water and splash to prevent invasive plant parts and seed from spreading through runoff. Berms or silt fences installed along perimeters of work areas can aid in preventing the spread of contaminated materials outside the cleaning area.
     - High pressure washers (preferably with 2,000-psi): wash once for six minutes or two to three times for three minutes for best results.
     - Portable cleaning station with undercarriage washers and pressure hoses (useful during maintenance of multiple sites).

c. Dispose of propagule-containing water from equipment washing at a waste management facility or incinerator; not a wastewater treatment plant.

d. Clean carpet, rubber, nylon or plastic materials using:
   - A vacuum cleaner
   - A variety of brushes with bristles of varying length and texture.

e. Frequently wash vehicles, especially after driving off-road or along roads bordered by a high density of invasive plants, and after traveling under wet conditions.

f. Include cleaning as part of routine maintenance activities for tools, equipment and vehicles. This is in addition to regular cleaning on site.

**TE4: Clean pack, grazing and support animals.**

a. Brush and clean animals — especially their hooves and legs — before leaving areas infested with invasive plants. For detailed cleaning protocol see Checklist E on page 43.

b. Provide weed-free forage or pelletized feed for livestock (preferably for three days or more) before and after project use to limit invasive plant seed transport via manure.

c. Consider using transitional pastures when moving livestock from invasive plant infested areas.
   - Allow animals to graze invasive plants only before they flower or set seed. If this is impossible, contain animals in a weed-free holding area (preferably for three days or more) before moving them into uninfested areas.

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*Photo: Marla Knight, USDA Forest Service*
Land managers have the potential to be a vector of seed dispersal through what they wear and what they carry into the field. The tendency for a fabric to attract and hold seeds and other plant material varies significantly depending on its texture. This chapter presents prevention practices that can minimize the spread of invasive plant material via clothing, boots, and gear. For a detailed cleaning protocol see Checklist E on page 43.

**CB1:** Wear clothing, boots and gear that do not retain soil and plant material.

a. Wear fabrics that do not retain invasive plant propagules:
   - Cotton duck (canvas),
   - Nylon
   - Leather
   - Fabrics such as Para-aramid Kevlar® and Meta-aramid Ripstop Nomex®

b. Avoid brushed cotton, netting, Velcro, and bulky knits like wool and fleece

c. Use special gear as appropriate:
   - Nylon gaiters to cover socks and laces
   - Leather laces on leather boots
   - Rubber boots

d. Consider dedicating a pair of shoes or boots for use only in infested sites.

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Wear fabric that does not retain plant material to reduce the spread of invasive plants. Photo: Martin Hutten, Yosemite National Park

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1. DuPont™ and Kevlar® are registered trademarks of DuPont
2. DuPont™ and Nomex® are registered trademarks of DuPont
CB2: Designate cleaning areas for clothing, boots and gear.

a. Select cleaning areas that are:
   • Easily accessible for monitoring and control
   • Located away from waterways
   • Located away from sensitive habitats or species
   • Near areas already infested with invasive plants

CB3: Clean clothing, boots and gear before leaving worksite.

a. Carry appropriate equipment to help remove soil, seed, and plant parts. This may include wire brushes, small screwdrivers, boot brushes, extra water free of invasive species, and bags for plant material.

b. Remove soil, mud, seeds, and any plant material from clothing, boots and gear before leaving a worksite infested with invasive plants.

c. Clean clothing, boots and gear at the designated cleaning area or at location of exposure to invasive plant seeds or material. In some cases it may be appropriate to bag seeds and plant parts for off-site disposal.

d. Inform coworkers about possible seeds or other propagules carried on their clothing, footwear and gear.

e. For a detailed cleaning protocol see Checklist E on page 43.
After removing invasive plants, land managers need to decide what to do with the resulting plant biomass. Our definition of waste includes invasive plant biomass, seeds and contaminated materials such as soil and mulch. These materials may spread invasive plants if they are left viable and uncovered or are transported without containment. This chapter presents guidelines for proper waste disposal to prevent the spread of viable plant material and seeds.

**WD1: Designate waste disposal areas for invasive plant materials.**

a. Select disposal areas where viable invasive plant materials will be contained, buried or destroyed.

b. Locate debris burn piles in areas that minimize the possibility of invasive plant establishment.

c. Do not dispose of viable invasive plant material that has the ability to resprout or spread at a facility that produces mulch or chipped products.

d. Do not dispose of soil, seeds, or plant material down a storm drain. This action may promote the spread of invasive plants downstream.

e. Develop a monitoring plan for waste disposal areas, including burn piles, to prevent the introduction and spread of invasive plants.
**WD2: Render invasive plant material nonviable when keeping on-site.**

a. When composting invasive plants on site, consider the reproductive biology of the invasive plants:
   - Composting will render invasive plant material nonviable only if compost piles reach very high temperatures. Finished compost should be monitored for invasive plant emergence.
   - For large amounts of invasive plant material or for invasive plants with rigid stems, contain plant materials by placing them on asphalt or black plastic (4-mm-thickness minimum), covering with black plastic (4-mm-thickness minimum), and securing the edges with landscaping staples, large rocks or sand bags. Effectiveness of this method varies by plant species.
   - For smaller amounts of plant material or for plants with pliable stems, bag the material in heavy-duty (3-mm or thicker) garbage bags. Keep plant material bagged for at least one month. Effectiveness of this method varies by plant species.
   - Keep covered or bagged materials in the sun, preferably on a dark surface such as asphalt, to accelerate the decomposition process. Material is nonviable when partially decomposed, very slimy or brittle. Once material is nonviable, it can be disposed of in a landfill or brush pile.
   - Monitor the bagged or covered material to ensure the plants do not escape through rips, tears or seams in the plastic.

b. When drying out invasive plants in piles:
   - Prevent cut surfaces of invasive plant stems from contacting soil, to avoid root growth and reestablishment.
   - Invasive plants with viable seeds or fruit attached should not be left on-site to dry out in an exposed manner.

c. When burying invasive plants on-site:
   - Contain all invasive plant material in an excavated pit, cover with woven geotextile, and cover with a minimum of 3 feet of uncontaminated fill material. Effectiveness of this method varies by plant species.

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**WD3: When disposing of invasive plant material off-site, contain it during transport.**

a. Contain invasive plant material in heavy-duty (3-mm or thicker, contractor quality plastic) garbage bags. Securely tie the bags and transport under tarps or in an enclosed truck to an appropriate disposal area.

b. Clean vehicles after transporting invasive plant material. For detailed cleaning protocol see Checklist E on page 43.

c. If invasive plant material has the ability to re-sprout or spread by seed, do not dispose of it at a facility that produces mulch or chip products. Contact your local solid waste authority for additional details.

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Photo: Courtesy of Mario Abreu, California Native Plant Society
Soil disturbance should be minimized to the extent practical. Disturbed soil should be stabilized and covered as soon as possible to prevent the germination and growth of invasive plants. If a worksite is infested with invasive plants, schedule treatment of these plants prior to ground disturbance to minimize spread of invasive plants into other uninfested areas. Project materials such as fill, aggregate and erosion control materials can also carry invasive plant seeds, which further increase the risk for infestation after soil disturbance.

In addition to the following BMPs, also refer to related BMPS in:
• Chapter 2: Project Materials for procuring and managing erosion and project materials.

SD1: Minimize soil disturbance.
   a. Retain soil and desirable vegetation in and around the activity area as much as possible to prevent the introduction and spread of invasive plants.
b. Minimize ground disturbance, as increased bare ground creates suitable habitat for invasive plant germination.

c. Consider the impacts of different types of equipment. Choose equipment that minimizes soil disturbance.

d. Minimize the frequency of soil disturbance. If a site has to be cleared of vegetation regularly (such as brush clearing), consider paving or otherwise protecting the site with weed-free materials (gravel, mulch, decomposed granite), deep mulching or planting non-invasive groundcover, or sealing bare surface with soil stabilizer. For more information on soil stabilizers see Chapter 2: Project Materials, PM2f on page 18.

e. Limit the number of roads and access points used to help minimize soil disturbance, and to limit the risk of unintentionally transporting invasive plants into uninfested areas.

SD2: Implement erosion control practices.

a. Promptly revegetate and/or mulch disturbed soil after ground disturbing activities. This will stabilize soils and reduce the likelihood of invasive plant establishment. For more details on revegetation and erosion control see Chapter 9: Revegetation and Landscaping, RL3 on page 33.

b. Use weed-free mulch, logging slash, native plant seed or a native or non-persistent cover crop as temporary cover during the delay between soil disturbance and revegetation.

c. Contain and manage water runoff, which may carry soil, seeds and plant material. Silt fences installed along perimeters of worksites can aid in preventing the spread of infested materials.

d. Seed local topsoil stockpiles that will remain in place for over six months with a fast-growing non-invasive native plant species to maintain soil microorganisms. Covering topsoil stockpiles with impermeable barriers such as plastic sheeting may destroy living soil microorganisms. For information on temporary cover materials see Chapter 2: Project Materials, PM2f on page 18.

e. Monitor stockpiles of topsoil and duff material regularly as they are highly susceptible to invasion by invasive plants. Determine management needs based on presence of invasive plants.

SD3: Manage existing topsoil and duff material to reduce contamination by invasive plants.

a. Save local existing topsoil for reuse. Plan topsoil management prior to soil disturbance.

b. Identify on the plans where local topsoil and duff material, within the worksite, should be:
   - Removed or excavated
   - Stockpiled
   - Reapplied

b. When excavating local topsoil and removing duff material, minimize handling of the material to reduce detrimental impacts to soil microorganisms.

c. Stockpile local topsoil and duff material in windrows no taller than ten feet for local topsoil and five feet for duff. Implement temporary erosion control measures to reduce the likelihood of invasive plant establishment and loss of material. For erosion considerations see Chapter 2: Project Materials, PM2 on page 18.

d. Seed local topsoil stockpiles that will remain in place for over six months with a fast-growing non-invasive native plant species to maintain soil microorganisms. Covering topsoil stockpiles with impermeable barriers such as plastic sheeting may destroy living soil microorganisms. For information on temporary cover materials see Chapter 2: Project Materials, PM2f on page 18.

e. Monitor stockpiles of topsoil and duff material regularly as they are highly susceptible to invasion by invasive plants. Determine management needs based on presence of invasive plants.
Chapter 8: Vegetation Management BMPs

Integrating prevention BMPs into vegetation management can greatly minimize the introduction and spread of invasive plants. For example, scheduling vegetation management activities prior to seed production can reduce the spread of invasive plants. Life cycles of both invasive and desirable plants should be considered when scheduling activities. Mowing invasive plants after seed production will promote seed dispersal and increase the size of infestations.

Vegetation management activities may include but are not limited to: mowing, manual clearing, trimming, mechanized clearing and trimming, herbicide application, prescribed grazing and burning.

VM1: Schedule vegetation management activities to maximize the effectiveness of control efforts and minimize introduction and spread of invasive plants.

a. Consider the timing of invasive plant control efforts based on the plant’s life cycle.
   • Schedule land-disturbing activities to occur prior to seed set to minimize spreading seeds. Keep in mind that seeds may be present in the soil.
   • Consider invasive plant reproductive biology and response to fire when planning prescribed burns.
   • Coordinate the timing of maintenance activities and invasive plant control activities. For example, delay mowing until two weeks after herbicide application and delay spraying after mowing until vegetative regrowth has occurred.

Schedule mowing of invasive plants to minimize impact on desirable plants.
Photo: Noa Rishe, California State Parks, Angeles District
• Before excavating invasive plants from drainage ditches, treat the entire infestation to ensure that the plant parts will not spread to adjacent and downstream areas. Avoid side casting (piling excavated soil on either side of a trench when digging a drainage ditch) of accumulated road materials infested with invasive plants. Stockpile in one area that can be monitored.

b. For more details on scheduling see Chapter 1: Planning, PL8 on page 13.

VM2: Manage vegetation with methods favorable to desirable vegetation.

a. Coordinate management of invasive plants and desirable plants.
   • Schedule mowing, clearing, trimming or grazing of desirable plants for after seed maturation, ensuring desirable plants grow unrestricted and produce seed.
   • Schedule management of invasive plants at early flowering stage (or well before seed development) to avoid spreading viable invasive plant seeds.

b. Limit mowing and other mechanical control to the minimum needed to control invasive plants.
   • To reduce plant shock and root dieback of desirable plant species, mowing height should not be less than six inches. Mowing too low during the growing season will increase soil exposure to sun, soil temperatures and erosion risks, and encourage invasive plant growth.

c. Identify conditions under which invasive plants should not be mowed to avoid spreading them. Some invasive plants have the ability to sprout from stem and root fragments. Mowing these plants should be avoided.

VM3: Retain existing desirable vegetation and canopy.

a. Identify and protect desirable vegetation on site to increase competition with invasive plants. Desirable vegetation should be non-invasive and suitable for the conditions.

b. Train personnel to identify invasive and non-invasive plants on-site. Provide identification guides to field staff.

c. Minimize clearing large amounts of vegetation and creating canopy openings. Increased sunlight and bare ground creates suitable habitats for invasive plant germination.

d. Consider the impacts of different types of equipment. Choose equipment that minimizes vegetation disturbance.

Flag native plants for avoidance before treating invasive plants.
Chapter 9: Revegetation and Landscaping BMPs

Revegetation and landscaping work is often derived from different needs and carried out by different staff or contractors. Revegetation is the process of replanting and rebuilding the vegetated community on disturbed land. Landscaping modifies land to meet functional, aesthetic and regulatory requirements. Despite the differences, revegetation and landscaping share the fundamental goal of creating weed-resistant plant communities.

Creating weed-resistant plant communities requires planning and a thorough understanding of site ecology including: existing soil condition, hydrology, exposure, existing plant community and habitat, invasive plant risk assessment, human impact, and the surrounding environment.

Plant selection is critical to successful revegetation projects. Revegetation and landscaping with desirable non-invasive plants suitable for local conditions can create weed-resistant communities that prevent or slow the establishment, growth, and reproduction of invasive plants. The following prevention BMPs are for revegetation and landscaping projects.

In addition to the following BMPs, also refer to related BMPs in:

- Chapter 2: Project Materials for procuring and managing erosion and project materials.

**RL1: Develop revegetation and landscaping plans that optimize resistance to invasive plant establishment.**

a. Identify areas where revegetation or landscaping is needed to improve invasive plant resistance of plant communities. Determine the goal of vegetation coverage. Evaluate annually for three years to determine if vegetation establishment is successful.
• Develop weed-resistant plant communities in disturbed areas such as roadsides. Consider using plants that have low growth forms, require no mowing, establish well, and are well adapted to disturbance.

• Revegetate or landscape with local native plants or appropriate non-invasive plants to prevent invasive plant introduction. Native species grown outside of the region may not establish well.

b. Evaluate existing soil type, texture and health to determine vegetation selection, fertilization and maintenance needs.

• Improve unhealthy soil by adding healthy topsoil, compost, fertilizer and/or using aeration to incorporate oxygen into the soil.

• Fertilization, if done improperly, can encourage weed growth and reduce the ability to establish native plants. Organic fertilizers are better suited for native plants because they release nitrogen at a very slow and stable rate.

• Do not fertilize areas treated with compost as the compost will provide the plants with the necessary micro-nutrients to support healthy growth. Compost should be supplied by participants in the US Compost Council’s Seal of Testing Assurance Program. A list of current STA program participants is available at: [http://compostingcouncil.org/participants/#CA](http://compostingcouncil.org/participants/#CA).

• If improving soil health is not possible, choose vegetation with low soil-nutrient requirements.

c. Develop a plant palette that will occupy various planting zones/ecological niches in order to create a weed-resistant landscape.

• Select plants, with the aid of a revegetation/landscaping specialist, based on existing soil conditions, drainage patterns, amount of rainfall or irrigation available, exposure and adjacent environment.

• Use native material to the greatest extent possible.

• Encourage passive regeneration of native plant cover where site conditions permit and where the risk of introducing invasive plants is low.

• Design irrigation systems with attention to irrigation timing, coverage and quantity to encourage the growth of desirable plants and discourage the growth of invasive plants. Too much water can stunt the growth of drought-tolerant plants and encourage undesirable invasive plants.

RL2: Acquire plant materials locally. Verify that species used are not invasive.

a. Identify sources of native and appropriate nonnative plant materials. Specify and use weed-free locally appropriate seed mixes that will occupy various niches in order to create weed-resistant plant communities.

b. Check seed label for purity, composition, source and germination. Confirm consistency with specifications. For seed label details see Chapter 2: Project Materials, PM1 on page 16.

c. Use local native ecotypes when feasible. Native species grown outside of the region may not establish well. Consider contract growing of local native plants.

d. When using local native species is not feasible and the risk of invasive plant infestation is high, use locally grown, non-invasive species proven to grow well locally.

e. Do not plant invasive plants. Verify plant lists do not contain invasive plant species by checking Cal-IPC’s invasive plant inventory ([www.cal-ipc.org/ip/inventory/weedlist](http://www.cal-ipc.org/ip/inventory/weedlist)) and the local Agricultural Commissioner’s Office.

f. Confirm that only selected plant species are used in the planting, especially when naming inconsistencies are possible.

g. Have extra plant materials on hand. Plan for mortality of 20-30% percentage of container plants.
**RL3:** Revegetate and/or mulch disturbed soils as soon as possible to reduce likelihood of invasive plant establishment.

a. Promptly revegetate and/or mulch disturbed areas, including new forest openings, with local native or non-invasive plants. For details on acquiring plant materials see RL2.

b. Use proper horticultural practices to promote healthy root and foliage growth that will aid in the vegetation’s ability to withstand adverse conditions and to compete with invasive plant growth.

- Avoid use of fertilizer in areas with high infestations of invasive plants where fertilizer may favor growth and spread of invasive plants over desirable species.
- Consider using compost or organic slow release fertilizer when planting native species. Excessive nitrogen availability promotes the growth of weedy annual grasses, which can dry out the site and crowd out slow-growing perennials.
- Consider soil inoculation to improve establishment success for planted species. Inoculation refers to the adding of “inoculants” which are mycorrhizal fungi that help with moisture retention and soil/root relationships in the first year of establishment.

c. When revegetation is impossible, consider limited and judicious use of paving/hardscape or otherwise protecting the site using weed-free materials (gravel, logging slash, long-fiber mulch, decomposed granite), deep mulching or using a soil stabilizer. For more information on soil stabilizers see Chapter 2: Project Materials, PM2f on page 18.

d. When using mulch:

- Use weed-free mulch. For information on weed-free mulch see Chapter 2: Project Materials, PM1, page 16.
- Consider fire risk at the application site. Some long-fiber mulches such as shredded redwood bark (gorilla hair) are highly flammable.

- Apply mulch at the recommended thickness to suppress the establishment and growth of invasive plants. Ensure mulch remains on-site. Lighter mulches will blow away in areas prone to heavy wind; mulches can move if watering results in surface flow. Consider the use of tackifiers or biodegradable netting.
- Supplement with additional mulch to retain thickness and effectiveness after it begins to decompose.

Select plant materials from local sources. Verify that all plants selected are not invasive.
Checklist Introduction

The following checklists contain only the BMP statements to provide a quick and portable reference for field activities. Checklists A, B, C and D are organized by land management activities, and Checklist E is organized by items to inspect and clean. These checklists can be attached to a field notebook, clipboard, or corkboard in an office for easy reference. BMP selection depends on the particular nature of the project or conditions. Land managers are encouraged to modify and develop their own invasive plant prevention checklists according to their specific needs.

Checklist A: Site Assessment, Field Mapping & Monitoring
This checklist is designed for those who perform site assessments, field mapping and monitoring.

Checklist B: Routine Vegetation Management
This checklist is designed for those who perform routine vegetation management.

Checklist C: New Project - Planning
This checklist is designed for those who perform planning tasks for new projects.

Checklist D: New Project - Implementation
This checklist is designed for those who perform pre-activity and implementation tasks for new projects. Some of these tasks include pre-work training, scheduling and revegetation and landscaping.

Checklist E: Inspection & Cleaning
This checklist is designed for use before entering and leaving worksites and should be used when acquiring inspection and cleaning equipment.
Key to BMP Chapter Acronyms

CB – Clothing, Boots and Gear Cleaning BMPs, Chapter 5, page 23
PL – Planning, Chapter 1, page 9
PM – Project Materials, Chapter 2, page 15
RL – Revegetation and Landscaping, Chapter 9, page 31
SD – Soil Disturbance, Chapter 7, page 27
TE – Tools, Equipment and Vehicle Cleaning, Chapter 4, page 21
TR – Travel, Chapter 3, page 19
VM – Vegetation Management, Chapter 8, page 29
WD – Waste Disposal, Chapter 6, page 25
## Checklist A: Site Assessment, Field Mapping & Monitoring

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<td>Schedule activities to minimize potential for introduction and spread of invasive plants.</td>
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<td>Inspect and clean soil and plant materials from tools, equipment, and vehicles before entering the worksite.</td>
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<tr>
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<td>--------------------------</td>
</tr>
<tr>
<td>PL6</td>
<td>Provide prevention training and appropriate invasive plant identification resources to staff and contractors prior to starting work.</td>
</tr>
<tr>
<td>PL7</td>
<td>Conduct a site assessment for invasive plant infestations before carrying out field activities.</td>
</tr>
<tr>
<td>VM1</td>
<td>Schedule vegetation management activities to maximize the effectiveness of control efforts and minimize introduction and spread of invasive plants.</td>
</tr>
<tr>
<td>PL9</td>
<td>Integrate cleaning BMPs into planning for land management activities.</td>
</tr>
<tr>
<td>PL10c</td>
<td>Treat invasive plants at access roads and staging areas before using them.</td>
</tr>
<tr>
<td>CB1</td>
<td>Plan to wear clothing, boots and gear that do not retain soil and plant material.</td>
</tr>
<tr>
<td>TR1</td>
<td>Plan travel to reduce the risk of invasive plant spread (avoid travel through infested areas, and travel from clean to infested worksites).</td>
</tr>
<tr>
<td>TR2</td>
<td>Integrate cleaning activities into travel planning.</td>
</tr>
<tr>
<td>TE1 &amp; CB2</td>
<td>Designate cleaning areas for tools, equipment, vehicles, clothing, boots and gear.</td>
</tr>
<tr>
<td>TE2 &amp; TE3</td>
<td>Inspect and clean soil and plant materials from tools, equipment, and vehicles before entering the worksite.</td>
</tr>
<tr>
<td>WD1</td>
<td>Designate waste disposal areas for invasive plant materials.</td>
</tr>
</tbody>
</table>

**BEFORE YOU START**

### Planning

- **PL6**: Provide prevention training and appropriate invasive plant identification resources to staff and contractors prior to starting work.
- **PL7**: Conduct a site assessment for invasive plant infestations before carrying out field activities.
- **VM1**: Schedule vegetation management activities to maximize the effectiveness of control efforts and minimize introduction and spread of invasive plants.
- **PL9**: Integrate cleaning BMPs into planning for land management activities.
- **PL10c**: Treat invasive plants at access roads and staging areas before using them.
- **CB1**: Plan to wear clothing, boots and gear that do not retain soil and plant material.

### Travel

- **TR1**: Plan travel to reduce the risk of invasive plant spread (avoid travel through infested areas, and travel from clean to infested worksites).
- **TR2**: Integrate cleaning activities into travel planning.

### Inspection & Cleaning

- **TE1 & CB2**: Designate cleaning areas for tools, equipment, vehicles, clothing, boots and gear.
- **TE2 & TE3**: Inspect and clean soil and plant materials from tools, equipment, and vehicles before entering the worksite.

### Waste Disposal

- **WD1**: Designate waste disposal areas for invasive plant materials.
### Checklist B: Routine Vegetation Management (continued)

<table>
<thead>
<tr>
<th>BMP #</th>
<th>Best Management Practice</th>
<th>During</th>
<th>Project Manager</th>
<th>Field Supervisor</th>
<th>Crew</th>
<th>Contractor</th>
<th>Completed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inspection &amp; Cleaning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TE2 &amp; TE3</td>
<td>Inspect and clean soil and plant materials from tools, equipment, and vehicles before leaving the worksite.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CB3</td>
<td>Clean clothing, footwear and gear before leaving the worksite.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TE4</td>
<td>Clean livestock and support animals.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vegetation Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM2</td>
<td>Manage vegetation with methods favorable to desirable vegetation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VM3</td>
<td>Retain existing desirable vegetation and canopy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Soil Disturbance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD1</td>
<td>Minimize soil disturbance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD2</td>
<td>Implement erosion control practices.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Waste Disposal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WD2</td>
<td>Render invasive plant material nonviable when keeping it on-site.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WD3</td>
<td>When disposing of invasive plant material off-site, contain it during transport.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PL11</td>
<td>Monitor the site for invasive plants after land management activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Checklist C: New Project - Planning

<table>
<thead>
<tr>
<th>BMP #</th>
<th>Best Management Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Included in Project Planning and Environmental Analysis.</strong></td>
</tr>
<tr>
<td>PL2</td>
<td>Integrate invasive plant prevention BMPs into design, construction, vegetation management and maintenance planning activities.</td>
</tr>
<tr>
<td>PL3</td>
<td>Coordinate invasive plant prevention efforts with adjacent property owners and local agencies.</td>
</tr>
<tr>
<td>PL4</td>
<td>Develop monitoring plans for BMP implementation and effectiveness.</td>
</tr>
<tr>
<td>PL5</td>
<td>Integrate cleaning BMPs into planning for land management activities.</td>
</tr>
<tr>
<td>PL9</td>
<td>Designate staff to monitor the worksite for invasive plants after land management activities.</td>
</tr>
<tr>
<td>PL11</td>
<td>Develop revegetation and landscaping plans that optimize resistance to invasive plant establishment.</td>
</tr>
<tr>
<td>PM1</td>
<td>Plan to use a weed-free source for project materials.</td>
</tr>
</tbody>
</table>
## Checklist D: New Project - Implementation

<table>
<thead>
<tr>
<th>BMP #</th>
<th>Best Management Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### BEFORE YOU START

#### Training & Scheduling

<table>
<thead>
<tr>
<th>PL6</th>
<th>Provide prevention training and appropriate invasive plant identification resources to staff and contractors prior to starting work.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL8</td>
<td>Schedule activities to minimize potential for introduction and spread of invasive plants.</td>
</tr>
<tr>
<td>TR1</td>
<td>Plan travel routes to reduce the risk of invasive plant spread.</td>
</tr>
<tr>
<td>TR2</td>
<td>Integrate cleaning activities into travel planning.</td>
</tr>
</tbody>
</table>

### Site Preparation

<table>
<thead>
<tr>
<th>PL7</th>
<th>Refer to site assessment for locations of invasive plant infestations before carrying out field activities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL10a</td>
<td>Protect likely invasive plant introduction sites such as pull-outs, trailheads, campgrounds and parking lots by mulching, planting or paving.</td>
</tr>
<tr>
<td>PL10c</td>
<td>Treat invasive plants at access roads and staging areas before using them.</td>
</tr>
</tbody>
</table>

### Project Materials

<table>
<thead>
<tr>
<th>PM1</th>
<th>Acquire weed-free project materials.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM2</td>
<td>Prevent invasive plant contamination of project materials during transport.</td>
</tr>
<tr>
<td>RL2</td>
<td>Acquire plant materials locally. Verify that species used are not invasive.</td>
</tr>
</tbody>
</table>

### Inspection & Cleaning

<table>
<thead>
<tr>
<th>CB1</th>
<th>Select clothing, boots and gear that do not retain soil and plant material.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TE1 &amp; CB2</td>
<td>Designate cleaning areas for tools, equipment, vehicles, clothing, boots and gear.</td>
</tr>
<tr>
<td>TE2 &amp; TE3</td>
<td>Inspect and clean soil and plant materials from tools, equipment, and vehicles before entering the worksite.</td>
</tr>
</tbody>
</table>

### Waste Disposal

<table>
<thead>
<tr>
<th>WD1</th>
<th>Designate waste disposal areas for invasive plant materials.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMP #</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td><strong>DURING</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Inspection &amp; Cleaning</strong></td>
</tr>
<tr>
<td>TE2 &amp; TE3</td>
<td>Inspect and clean soil and plant materials from tools, equipment, and vehicles before leaving the worksite.</td>
</tr>
<tr>
<td>TE4</td>
<td>Clean pack, grazing and support animals.</td>
</tr>
<tr>
<td>CB3</td>
<td>Clean clothing, footwear and gear before leaving the worksite.</td>
</tr>
<tr>
<td></td>
<td><strong>Project Materials</strong></td>
</tr>
<tr>
<td>PM1</td>
<td>Use a weed-free source for project materials.</td>
</tr>
<tr>
<td>PM2</td>
<td>Prevent invasive plant contamination of project materials when stockpiling and during transport.</td>
</tr>
<tr>
<td></td>
<td><strong>Vegetation Management</strong></td>
</tr>
<tr>
<td>VM2</td>
<td>Manage vegetation with methods favorable to desirable vegetation.</td>
</tr>
<tr>
<td>VM3</td>
<td>Retain existing desirable vegetation and canopy.</td>
</tr>
<tr>
<td></td>
<td><strong>Soil Disturbance</strong></td>
</tr>
<tr>
<td>SD1</td>
<td>Minimize soil disturbance.</td>
</tr>
<tr>
<td>SD2</td>
<td>Implement erosion control practices.</td>
</tr>
<tr>
<td>SD3</td>
<td>Manage existing topsoil and duff material to reduce contamination by invasive plants.</td>
</tr>
<tr>
<td></td>
<td><strong>Revegetation &amp; Landscaping</strong></td>
</tr>
<tr>
<td>RL3</td>
<td>Revegetate and/or mulch disturbed soils as soon as possible to reduce likelihood of invasive plant establishment.</td>
</tr>
<tr>
<td></td>
<td><strong>Waste Disposal</strong></td>
</tr>
<tr>
<td>WD2</td>
<td>Render invasive plant material nonviable when keeping it on-site.</td>
</tr>
<tr>
<td>WD3</td>
<td>When disposing of invasive plant materials off-site, contain it during transport.</td>
</tr>
<tr>
<td></td>
<td><strong>Monitoring</strong></td>
</tr>
<tr>
<td>PL11</td>
<td>Monitor the site for invasive plants after land management activities.</td>
</tr>
</tbody>
</table>
## Checklist E: Inspection & Cleaning

### Clothing and Gear:

<table>
<thead>
<tr>
<th>Check for soil, seeds, and plant material</th>
<th>Inspected</th>
<th>Cleaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Hoods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Collars and cuffs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Clothing folds or flaps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Ventilation openings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Pockets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Zippers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Straps or Velcro grips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Belts or buckles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Buttons, fasteners, and rivets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Laces or ties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Gloves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Pant cuffs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Socks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Boots or Shoes:

<table>
<thead>
<tr>
<th>Check for soil, seeds, and plant material</th>
<th>Inspected</th>
<th>Cleaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shoelaces or ties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Straps or Velcro grips</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Shoe tongues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Treads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hand and Power Tools:

<table>
<thead>
<tr>
<th>Check for soil, seeds, and plant material</th>
<th>Inspected</th>
<th>Cleaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chainsaw chain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Hand saw blades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Mower deck and blades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Weed-eater blades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Crevices on other tools</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Check for soil, seeds, and plant material</th>
<th>Inspected</th>
<th>Cleaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Chainsaw chain and body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Hand saw blades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Mower deck and blades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Weed-eater blades and guard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Crevices on all other tools</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Checklist E: Inspection & Cleaning (continued)

#### Vehicles and Large Equipment (including ATVs, OHVs, motorcycles and bikes):

<table>
<thead>
<tr>
<th>Check for soil, seeds, and plant material</th>
<th>Inspected</th>
<th>Cleaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Truck bed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Exhaust systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Vent openings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Grills: Front and back</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Tray under radiator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Top of transmission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Stabilizer bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Shock absorber joint with axles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Front and rear axles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Top of front suspension units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Wheel well/quarter panels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Ledges under bumper (front and rear)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Tire rims and treads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Between rear wheel brake drums and the rim of the wheel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. At the bend in the fuel inlet tube</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Spare tire and mounting area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Under the floor mat (inside cab)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Under the seat (inside cab)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Upholstery (inside cab)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Beneath foot pedals (inside cab)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Gear shift cover folds (inside cab)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Livestock and Support Animals:

<table>
<thead>
<tr>
<th>Check for soil, seeds, and plant material</th>
<th>Inspected</th>
<th>Cleaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Underbelly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Legs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Hooves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Coat or wool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Ears</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Tack (saddles, blankets, panniers)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following are websites that contain, and link to, significant amounts of information on invasive plant management.

**California Invasive Plant Council**  
http://www.cal-ipc.org  
This site provides a wide range of invasive plant information specific to California. Resources include prevention, invasive plant inventory, CalWeedMapper, invasive plant profiles with links to articles, publications, reports, and educational brochures.

**California Department of Food and Agriculture Integrated Pest Control Branch**  
http://www.cdfa.ca.gov/plant/ipc/index.html  
The Integrated Pest Control Branch conducts a wide range of pest management and eradication projects as part of the Division of Plant Health and Pest Prevention Services Pest Prevention Program. This site provides the Encycloweedia, noxious weeds and weed ratings, and the CalWeed Database.

**Center for Invasive Plant Management**  
http://www.weedcenter.org  
The Center for Invasive Plant Management (CIPM) is a hub for management information in the western U.S. Includes plant biology and management information; education information; and publications. CIPM also provides grants to weed projects in western states. Grant information is available at this site.

**Invasive.org: Center for Invasive Species and Ecosystem Health**  
http://www.invasive.org  
This site provides an easily accessible archive of high quality images of invasive and exotic species of North America with identifications, taxonomy and descriptions for use in educational applications.

**Invasive Species Council of California**  
http://www.iscc.ca.gov  
The invasive Species Council of California provides general information on invasive species in California including animals, plants, insects, and plant and animal disease.

**National Invasive Species Council**  
http://www.invasivespecies.gov  
The National Invasive Species Council (NISC) was established by Executive Order (EO) 13112 to ensure that Federal programs and activities to prevent and control invasive species are coordinated, effective and efficient.

**National Invasive Species Information Center**  
http://www.invasivespeciesinfo.gov  
This site is a gateway to invasive species information; covering Federal, State, local and international sources. The information center is maintained by the U.S. Department of Agriculture’s National Agricultural Library.

**USDA Forest Service Invasive Species Program—Control and Management**  
http://www.fs.fed.us/invasivespecies/controlmgmt/index.shtml  
This page provides links for more information on research, management planning, Forest Service activities, and pest-specific control and management.

**Weed Research and Information Center**  
http://wric.ucdavis.edu  
The University of California’s Weed RIC provides control notes and photos for invasive plants as well as agricultural weeds.
Prevention Resources

A Builder and Contractor’s Guide to Preventing the Introduction and Spread of Invasive Weeds
El Dorado County’s Invasive Weed Management Group provides an illustrated pamphlet with tips and considerations that contractors and landscapers can integrate into their general practice in order to stop unsightly and costly invasive plant infestations before they begin.

Hazard Analysis and Critical Control Point (HACCP) Planning for Natural Resource Pathways
The HACCP plan is a structured process that assesses a natural resource management activity, identifies possible risks, and facilitates the removal or reduction of non-target (i.e. invasive) species. The five-step process records important elements of who, what, where, when, how and why of each activity to help manage target problems and improve best management practices.

Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species
The U.S. Bureau of Reclamation has developed a set of procedures to address the transport of invasive species and pests through equipment movement. This manual provides guidance for inspecting and cleaning vehicles and large equipment.

This handbook provides guidance on the process and procedures for evaluating project scope and site conditions to determine the need for and feasibility of incorporating BMPs into projects. The key objective of this guide is to provide the overall process for selecting and designing BMPs within the Caltrans planning and design processes and incorporating those BMPs into the appropriate documents.

USDA Forest Service. The Early Warning System for Forest Health Threats in the United States
http://www.fs.fed.us/foresthealth/publications/EWS_final_draft.pdf
This is a monitoring framework for early detection and response to environmental threats (e.g., insects, diseases, invasive species, and fire) to forest lands. The framework is based on the following steps: 1) identify potential threats, 2) detect actual threats, 3) assess impacts, and 4) respond.

USDA Forest Service—Dangerous Travelers: Controlling Invasive Plants along America’s Roadsides (Video)
http://www.fs.fed.us/invasivespecies/
The video outlines the best management practices that road crews should be following in their day-to-day operations. This is the first in a series on “Best Management Practices for Invasive Species Prevention.” Ordered on DVD by contacting: USDA Forest Service; San Dimas Technology and Development Center; 444 East Bonita Avenue; San Dimas, CA 91773; (909) 599-1267.
**Glossary**

**Ankle-gaiters:** a protective covering for the lower leg and ankle designed to prevent snow, mud, gravel, or seeds from entering the top of the boot. Gaiters can also prevent seeds from adhering to pants, socks, boots and laces.

**Best management practices:** methods or techniques found to be the most effective and practical in achieving an objective, such as preventing or minimizing invasive plant spread, while making the optimum use of resources.

**CEQA:** California Environmental Quality Act. A statute passed in 1970 to institute a statewide policy of environmental protection. [http://ceres.ca.gov/ceqa](http://ceres.ca.gov/ceqa)

**Clean:** not contaminated with viable invasive plant propagules.

**Contaminated:** contains viable invasive plant propagules.

**Critical control point:** the best point, step, or procedure at which significant hazards can be prevented or reduced to minimum risk. Source: USFWS-NCTC. 2004. Hazard Analysis and Critical Control Point (HACCP) Planning for Natural Resource Pathways.

**Desiccate:** to kill a plant by drying it thoroughly.

**Disturbance:** any activity leading to increased sunlight and bare ground, conditions that can be suitable for invasive plant introduction.

**Early detection and rapid response (EDRR):** a cost-effective approach to invasive plant management that aims to detect newly established invasive plant infestations early and to remove them before they spread.

**Environmental stewardship:** responsible use and protection of the natural environment through conservation and sustainable practices.

**Eradicate:** the complete elimination of an invasive plant population, including all viable propagules.

**Equipment:** machinery such as mowers and bulldozers used during land management activities.

**Infested:** populated by invasive plants.

**Impact:** the cumulative effect, economic and ecological, of an invasive plant population on natural resources.

**Invasive plants:** non-native plants that cause economic or ecological harm. Used interchangeably with “weeds”.

**Land manager:** a person who manages public or private land.

**Monitoring:** evaluating the success of prevention measures and management actions; including regular inspection of worksites to detect change, in this case the presence or absence of invasive plants.

**Native plants:** plants that evolved in a particular region. Plants that evolved without human intervention in a particular region, such as a California bioregion or watershed. These are usually species that occurred naturally before European colonization of North America.

**NEPA:** National Environmental Policy Act. A national law that established a U.S. national policy promoting the enhancement of the environment. [http://ceq.hss.doe.gov](http://ceq.hss.doe.gov)

**Nonviable:** when a plant propagule is not able to produce a new plant.

**Pathways:** processes through which invasive plants can be introduced or spread.
**Project materials:** materials that soil and invasive plant parts and seeds can adhere to. These materials include soil, mulch (woody and straw), aggregate (sand and gravel), wood products (firewood and brush), landscape material (plants and seed), erosion control materials (silt fence, straw bales, straw wattles, geotextiles, and rip rap), pack animal feed, and packing/shipping materials.

**Propagule:** plant reproductive material, such as seeds, rhizomes or stolons.

**Scout:** the act of searching for, locating, and documenting invasive plants on a worksite.

**Seed set:** the plant reproductive stage during which seeds mature.

**Site assessment:** the act of scouting for invasive plant species found within the worksite, including documentation of exact locations and densities of invasive plants, and determining priority areas for implementing prevention BMPs.

**Source populations:** infestations of invasive plants which produce seed or other reproductive plant parts that can spread to new areas.

**Staging areas:** locations where tools, equipment and vehicles are assembled before and during projects.

**Sterile:** not able to reproduce.

**Support animals:** dogs that provide hearing or seeing assistance.

**Tools:** implements used during land management activities, such as shovels and chainsaws.

**Transitional pastures:** designated areas where grazing animals can graze before and after being used for vegetation management.

**Vectors:** people or things that can carry invasive plants or their propagules from one place to another inadvertently.

**Vehicle:** cars, trucks, and all terrain vehicles used during land management activities.

**Viable:** when a propagule is able to produce a new plant.

**Waste-disposal areas:** locations where waste can be disposed without the risk of spreading invasive plant materials.

**Weed-free forage:** hay, oats, and other feed for pack and grazing animals from a clean source (not contaminated with viable invasive plant propagules).

**Weed-free materials:** project materials from a clean source (not contaminated with viable invasive plant propagules).

**Weeds:** used interchangeably with “invasive plants” (non-native plants that cause economic or ecological harm). Not all weeds are considered invasive plants, but for the purpose of this document the two terms are used interchangeably.

**Worksites:** locations or properties where land management activities occur.
The following documents were used as a basis for
this manual. You may find additional information of
interest in these references.

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practices for controlling invasive plants in the Adirondacks*. 2006. Adirondack Park
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Management Guidelines for Public Lands.*
Ellen Mackey, editor. Los Angeles Weed
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Decision, Noxious Weed Management.
Appendix 4: Proto-type Weed Prevention


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DiVittorio, J., Grodowitz, M., Jeffers, L. and Whitaker,
for Equipment and Vehicles to Prevent the Spread of Invasive Species*. Bureau of


Riverside County Environmental Programs Department. Western Riverside County Multiple Species Habitat Conservation Plan. Available: http://www.tlma.co.riverside.ca.us/mshcp/volume1/index.html


The video can also be ordered on DVD by contacting: USDA Forest Service; San Dimas Technology and Development Center; 444 East Bonita Avenue; San Dimas, CA 91773; (909) 599-1267.


