VEGETATION AND INTEGRATED PEST MANAGEMENT PLAN

BIG CREEK HYDROELECTRIC SYSTEM

MAMMOTH POOL
BIG CREEK Nos. 1 AND 2
BIG CREEK Nos. 2A, 8, AND EASTWOOD
BIG CREEK No. 3

FERC Project Nos. 2085, 2175, 67, and 120

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SUBMITTED BY SOUTHERN CALIFORNIA EDISON COMPANY

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1.0 INTRODUCTION

This Vegetation and Integrated Pest Management Plan (Plan) has been developed for four Southern California Edison Company (SCE) hydroelectric projects included in the Big Creek Hydroelectric System, which is located in the Upper San Joaquin River Watershed. The Big Creek Hydroelectric System is comprised of four FERC licenses: Mammoth Pool (FERC No. 2085), Big Creek Nos. 1 and 2 (FERC No. 2175), Big Creek Nos. 2A, 8, and Eastwood (FERC No. 67), and Big Creek No. 3 (FERC No. 120). These Projects consist of seven powerhouses and four major reservoirs, and have a combined dependable operating capacity of about 890 megawatts (MW).

1.1 PREPARATION OF THE VEGETATION AND INTEGRATED PEST MANAGEMENT PLAN

SCE has prepared this Plan in consultation with U.S. Fish and Wildlife Service (USFWS), United States Department of Agriculture-Forest Service (USDA-FS), California Department of Fish and Game (CDFG) and other stakeholders involved in the Big Creek Alternative Licensing Process (ALP). The Plan is consistent with the Standards and Guidelines for Affected Management Areas in the Sierra National Forest Land and Resource Management Plan (USDA-FS 1991a) and the Sierra Nevada Forest Plan Amendment (USDA-FS 2004). This Plan covers only vegetation management. Road maintenance, sediment management, and transportation systems are covered in other plans developed for the four Big Creek Projects. This Plan, including the specified avoidance, protection, and mitigation measures, will supersede all previous documents developed by SCE for the four Big Creek Projects. The Plan will become effective upon the Federal Energy Regulatory Commission (FERC or Commission) approval.

The Draft Vegetation and Integrated Pest Management Plan was submitted to agencies and stakeholders on July 22, 2005. Comments on the plan were received from USDA-FS, CDFG, and USFWS.

2.0 EVALUATION AND IMPLEMENTATION OF MANAGEMENT ACTIVITIES

The following section describes the vegetation management and pesticide use that occurs in the vicinity of the four Big Creek Projects, the location of biological and cultural resources, noxious weeds and invasive ornamentals, and the potential effects of vegetation management on those resources. Additionally, this section identifies the appropriate measures to be implemented during the term of the license to avoid or protect resources.

2.1 VEGETATION MANAGEMENT

Vegetation management, including measures to prevent the establishment of noxious weeds, occurs at several locations in the vicinity of the four Big Creek projects (i.e., Project facilities, recreation facilities, roads, and trails). SCE conducts vegetation management in these areas in association with on-going operations and maintenance. Vegetation management includes trimming of vegetation by hand or equipment and the

use of herbicides. Refer to Attachment A, Vegetation Management in the Vicinity of the Big Creek Projects, for a list of vegetation management activities that occur at Project facilities, recreation facilities, roads, and trails, as well as the frequency at which a management activity typically occurs at a specific location. This list includes only locations where SCE implements vegetation management activities. A description of vegetation management activities is provided below. In general vegetation management activities occur during the spring and early summer to avoid work during high fire danger periods. Vegetation management implemented on a regular basis typically occurs one or more times in a 5-year period. Activities implemented on an infrequent basis tend to occur at least once during a 20-year period, but less than once every 5 years.

Vegetation management around Project facilities, recreation facilities, roads, and trails is limited to the area necessary to reduce fire hazard and provide worker/public health and safety. In general, vegetation management occurs within a 150 foot radius around Project facilities (dams, small and moderate diversions, gaging stations, powerhouses, transmission lines) and recreation facilities. Vegetation management occurs within 10 feet of roads and within 2 feet of trails.

SCE implements a combination of manual, mechanical, and chemical methods to control vegetation in the vicinity of the Big Creek Projects. Selection of an appropriate control method is based on an evaluation of worker/public health and safety, potential environmental effects, effectiveness of methods based on site characteristics, and economics. The methods used for general vegetation management are also useful for noxious weed control, when timed correctly and combined appropriately. The goal of noxious weed control efforts is to physically remove noxious weed plants and to prevent seed set for several consecutive years until there are no viable seeds remaining in the soil. Following is a summary of manual and mechanical management methods used in the vicinity of the Big Creek Projects. Chemical control (e.g., herbicide use) is described in Section 2.2, Pesticides.

2.1.1 VEGETATION TRIMMING BY HAND

One of the methods used to trim vegetation in the vicinity of the Big Creek Projects is with hand tools. This includes trimming of grasses and forbs with a string trimmer as well as removing or trimming of overhanging limbs of shrubs and trees with a chain saw or other handheld saw. This management activity is implemented on an as-needed basis in conjunction with facility inspections.

2.1.2 VEGETATION TRIMMING WITH EQUIPMENT

Vegetation in the vicinity of the Projects is also trimmed using mechanical equipment, including a flail-type mower. A flail mower is a cutting device attached to a tractor that is used to cut brush along roadsides. As with trimming of vegetation by hand, this activity is implemented on an as-needed basis.

2.2 PESTICIDES

SCE uses pesticides, in combination with other methods, to control unwanted vegetation and vertebrate pests at its Project facilities. The term pesticide refers to any substance or mixture of substances intended to prevent, destroy, or repel any pest, and for SCE includes herbicides and rodenticides. The use of pesticides at Project facilities is regulated by the U.S. Environmental Protection Agency (EPA), USDA-FS California Environmental Protection Agency (CEPA), California Department of Pesticide Regulation (CDPR), and local County Agricultural Commissioners.

2.2.1 HERBICIDE USE

Because the terrain in the vicinity of the Big Creek Projects is steep and difficult to walk, and hand-pulling or mowing are impractical and less safe in some areas, herbicides may be necessary in addition to manual and mechanical methods to effectively control weeds. Additionally, although there is sufficient vegetative cover on some of the slopes where noxious weeds are present, the soil on other slopes may be loose and easily dislodged, resulting in erosion or sedimentation into the San Joaquin River and other rivers and creeks in the vicinity of the Big Creek Projects. Manual and mechanical methods of vegetation control are described in Section 2.1, Vegetation Management. Application of herbicides requires far less time be spent walking these steep slopes, resulting in less risk to workers, and less soil disturbance including erosion and sedimentation. A description of herbicide use is provided below.

After vegetation has been cleared by manual or mechanical methods, herbicides may also be applied. Two methods of herbicide application—basal and foliar application—are utilized. Basal application is used for shrub species and includes cutting of a shrub and applying an oil-based herbicide directly to the stump. Foliar application techniques include hand spraying of an herbicide, with an additive or other agent, to control overspray. The herbicides and other agents used in the vicinity of the four Big Creek Projects are listed in Table 1. The label or Material Safety Data Sheet (MSDS) for each herbicide or other agent is provided as Attachment B. If more effective herbicides become available in the future, SCE will consult with USDA-FS and USFWS to obtain permission to substitute the herbicides listed in Table 1. The application of all herbicides is completed or supervised by a certified pesticide applicator in compliance with the specified herbicide application prescription.

Herbicides and other chemical agents used in the vicinity of the Big Creek Projects are as follows:

- Garlon 4® and Hasten® (a vegetable oil-based additive) are combined and applied using a basal bark application technique.

- Garlon 4® and Accord® are combined and applied using a foliar application technique.

- Accord® is used by itself or combined with either R-11® or In-Place® and applied using basal bark and foliar techniques.

- Pathfinder® is used as a spot treatment for individual plants.

- Velpar® is used as a pre-emergent and is applied directly to moist soil to treat grasses and broad-leaved plants.

2.2.2 RODENTICIDE USE

Regulations and requirements developed by the EPA, USDA-FS, CEPA, CDPR and local County Agricultural Commissioners allow for the use of rodenticides, including toxicants, anticoagulants and fumigants, for vertebrate pest control. SCE currently implements rodent control in the vicinity of the four Big Creek Projects under a 1993 Memorandum (*Rodent Control on Earth Filled Dams—Northern Hydro Region—Environmental Compliance*) and a Fresno County Agricultural Commissioner Operator Identification Number. Rodenticide use at the four Big Creek Projects is restricted to earthen dams and the interior of Project facilities, as described below.

Earthen Dams

Rodent control may be necessary on Project earthen dams, where rodent burrowing activity is considered a threat to dam integrity. Rodent control is implemented on the Mammoth Pool Spillway and Balsam Dam Diversion using habitat modification (vegetation control) in combination with rodenticide treatments including fumigants (i.e., gas cartridges) and anticoagulant-treated oats and grains, specifically 0.005% diphacinone. Attachment C provides the specimen label or MSDS for both gas cartridges and diphacinone.

Facility Interiors

Rodent populations inside Project facilities can pose a human health risk and may damage interior project components (control panels, wiring, etc). Therefore, rodent control is currently implemented in powerhouses, gaging stations, and other facilities in the vicinity of the four Big Creek Projects. SCE implements rodent control in facility interiors using non-restricted rodenticides and trapping (e.g., snap traps).

2.3 RESOURCES POTENTIALLY AFFECTED BY VEGETATION MANAGEMENT

This section provides information on resources potentially affected by vegetation management activities, including special-status terrestrial species and Native American plants of cultural concern. This section also addresses noxious weeds and invasive ornamental species. The presence of special-status resources, noxious weeds and invasive ornamental species in the vicinity of the four Big Creek Projects was determined based on extensive field surveys conducted in the Project area as part of the Big Creek ALP (SCE 2001; SCE 2003; SCE 2004; and SCE 2005).

Following completion of surveys, SCE and USDA-FS identified additional facilities (including roads and helicopter landing sites) to be included as Project facilities and/or to be included within FERC Project boundaries under the new license. These additional facilities are listed in Attachment D. SCE will survey these facilities within one year of FERC approval of this Plan to identify any special-status species (i.e., special-status plants and wildlife and Native American plants of cultural concern) that may be affected by vegetation management activities, and to identify the location of noxious weeds and invasive ornamental species.

2.3.1 TERRESTRIAL RESOURCES

Terrestrial resources present in the vicinity of the four Big Creek Projects include both special-status plant and wildlife species. Only those species identified as potentially being affected by on-going vegetation management are discussed further in this Plan.

Special-Status Plant Species

Vegetation management activities potentially affecting special-status plant species include trimming of vegetation by hand and equipment and herbicide use. There are known occurrences of upland special-status plant species which may be affected by vegetation management at several locations in the Mammoth Pool, Big Creek Nos. 1 and 2 and Big Creek Nos. 2A, 8, and Eastwood Project vicinities. There are known occurrences of aquatic, wetland, and riparian special-status plant species which may be affected by vegetation management in the Big Creek Nos. 2A, 8, and Eastwood Project vicinity. Refer to Attachment E for a list of specific facilities and management activities.

Special-Status Wildlife Species

Three special-status wildlife species could potentially be affected by vegetation management implemented in the vicinity of the four Big Creek Projects. These include the valley elderberry longhorn beetle (VELB), peregrine falcon, and osprey. The locations where vegetation management may affect these species (by Project) and potential effects are summarized below.

Valley Elderberry Longhorn Beetle

USFWS identifies potential VELB habitat as elderberry shrubs below 3,000 feet elevation. Implementation of vegetation management activities, including trimming of vegetation by hand and equipment and the use of herbicides, could result in adverse effects to VELB. Potential VELB habitat and vegetation management occurs in the vicinity of Mammoth Pool, Big Creek No. 3, and Big Creek Nos. 2A, 8 and Eastwood Projects. Refer SCE's VELB Management Plan (SCE 2007a) for the specific facilities and management activities.

Peregrine Falcon

There are several known peregrine falcon nests in the Big Creek Nos. 1 and 2 Project vicinity. However, only two nests were identified as being potentially disturbed by

vegetation management, if those management activities are implemented with equipment during the nesting season. These nests are located in the vicinity of Project roads 8S301, from the gate at 8S66T to penstock surge pipes and 8S302, from 8S66 (near Dam 2) to Big Creek No. 1 42-inch gate house.

Osprey

Several osprey nests are present in the vicinity of the Big Creek Projects. However, only two nests were identified as being potentially disturbed by vegetation management, if those management activities are implemented with equipment during the nesting season. These nests are located along the two Big Creek No. 2A, 8 and Eastwood access roads to Shaver Dam from Highway 168.

2.3.2 Native American Plants of Cultural Concern

Native American plants of cultural concern are considered to be cultural resources that may be potentially affected by vegetation management activities including trimming of vegetation by hand and equipment and herbicide use. A list of Native American plants of cultural concern and the location of gathering sites was developed through consultation with local tribes (SCE 2001; SCE 2003; SCE 2004; and SCE 2005). Because of the sensitive and confidential nature of all of these plant species, including two noxious weeds that are also considered to be Native American plants of cultural concern, a summary of the location of these resources is not provided in this Plan.

2.3.3 Noxious Weeds and Invasive Ornamentals

Several noxious weed infestations are present in the vicinity of the four Big Creek Projects. Vegetation management activities that could result in the spread or introduction of these species include trimming of vegetation by hand and equipment, and the entrance of SCE vehicles and equipment into the Project area from outside the watershed, or traveling through an existing infestation within the watershed. Refer to Attachment E for a list of facilities where vegetation management could result in the spread or introduction of noxious weeds. Invasive ornamental plant species, some of which are also considered noxious weeds, have also been identified at several locations in the vicinity of the four Big Creek Projects.

2.4 Avoidance and Protection Measures

SCE proposes to continue implementation of vegetation management practices, as needed, at the four Big Creek Projects. Avoidance and protection measures that SCE will implement during the term of the license are provided below.

2.4.1 Pesticide Use

SCE currently conducts pesticide (herbicide and rodenticide) management in accordance with Best Management Practices (BMPs). These BMPs are non-point source pollution control measures that were developed and documented cooperatively between the California Water Quality Control Board and Sierra National Forest (*Water*

Quality Management for Forest System Lands in California: Best Management Practices) (USDA-FS 2000). BMPs that are applicable and will continue to be implemented during the license for the four Big Creek Projects are listed below.

- **BMP 5.8—Pesticide Application According To Label Directions and Applicable Legal Requirements**

  This measure is designed to prevent water contamination by complying with all label instructions and restrictions. The Pesticide Applicator licensed by the State of California and assigned to supervise the project is responsible for ensuring that label directions are followed.

- **BMP 5.9—Pesticide Application Monitoring and Evaluation**

  This measure requires documentation of the amount and accuracy of pesticide application to help ensure that the pesticide has been applied safely to the intended target area and that there are no unexpected non-target results.

- **BMP 5.10—Pesticide Spill Contingency Planning**

  This measure is designed to ensure that contingency plans are prepared before project implementation in order to minimize contamination of water or non-target areas from accidental pesticide spills.

- **BMP 5.11—Cleaning and Disposal of Pesticide Containers and Equipment**

  This measure is intended to prevent the contamination of water or non-target areas from cleaning or disposal of pesticide containers. The Pesticide Applicator licensed by the State of California and assigned to supervise the project is responsible for ensuring that label directions are followed regarding cleaning and disposal of pesticide containers.

- **BMP 5.12—Streamside Wet Area Protection During Pesticide Spraying**

  This measure requires that an untreated buffer strip is left alongside Riparian Management Areas (RMAs) and Stream Management Zones (SMZs) when applying pesticides to minimize the risk of pesticide inadvertently entering water or unintentionally altering the RMA or SMZ.

- **BMP 5.13—Controlling Pesticide Drift During Spray Application**

  This measure is designed to minimize the risk of pesticide drift falling directly into water or non-target areas by using prescriptions that specify wind speed, application equipment and pattern, and pesticide formulation. The Pesticide Applicator licensed by the State of California and assigned to supervise the project is responsible for ensuring that the prescriptions for application are followed.

2.4.2 TERRESTRIAL RESOURCES

Special-Status Plant Species

To avoid and minimize impacts to upland, aquatic, wetland, and riparian special-status plant populations documented in the Project area, the following measures will be implemented.

- Prior to vegetation management activities, flagging will be placed forming a buffer area of at least 5 feet around documented special-status plant populations that are present in areas where vegetation management will occur.
- No herbicide use will occur within the 5-foot buffer area (flagged area).
- No mechanical vegetation removal will be implemented within 5 feet of a documented special-status plant population.

Special-Status Wildlife Species

Valley Elderberry Longhorn Beetle

To avoid and minimize impacts to VELB and their habitat (elderberry shrubs below 3,000 feet elevation), the following avoidance and protection measures will be implemented.

Protected Areas

- Each elderberry shrub, or group of shrubs, potentially affected by Project operation or management activities, with one or more stems measuring 1 inch in diameter or greater (≥1) at ground level, will be flagged prior to implementation of management activities.
- Signage will be installed in areas where elderberry shrubs are known to occur.

Vegetation Control

- No elderberry shrub with at least one stem ≥ 1" in diameter at ground level will be removed.
- No elderberry shrub branches or stems ≥ 1" will be trimmed.
- No flail-type mower will be used within an elderberry shrub dripline with one or more stems measuring ≥1 inch in diameter at ground level.
- Basal bark or foliar techniques will be utilized when herbicide application must occur within 100 feet of the dripline of an elderberry shrub with one or more stems measuring ≥1 in diameter or greater at ground level. Basal application techniques include cutting of a non-elderberry shrub and applying an oil-based herbicide

directly to the stump. Foliar application techniques include hand spraying of an herbicide with a deposition/retention additive to control overspray. The application of herbicides will be completed or supervised by a certified pesticide applicator in compliance with the herbicide application prescription. Herbicide application will occur from July through April on an as-needed basis.

Avoidance and protection measures for VELB and potential VELB habitat that cover all aspects of Project operations and management activities are included the VELB Management Plan (SCE 2007a) for the four Big Creek Projects.

American Peregrine Falcon

To avoid and minimize impacts to American peregrine falcon, the following measures will be implemented:

- Prior to initiating mechanical vegetation management with ¼ mile of a peregrine falcon nest, SCE will contact USDA-FS to obtain information on the status of the nest.

- If USDA-FS provides information that the nest in inactive, no further avoidance or protection measures are necessary.

- If USDA-FS provides information that the nest is active, and mechanical vegetation management must occur between February 15 and August 31 (peregrine falcon nesting season) within ¼ mile of the active nest, the following will be implemented.

  - All vegetation management activity, once begun, will continue without stopping, until maintenance personnel have left the bounds of the sensitive area (¼ mile around the nest).

  - All equipment staging areas will be located outside of the sensitive area.

Osprey

To avoid and minimize impacts to osprey, the following measures will be implemented.

- If mechanical vegetation management (use of a flail-type mower) must occur between March through September (osprey nesting season) within 500 feet of a known nest, SCE will locate equipment staging areas outside of the sensitive area and all vegetation management activity, once begun, will continue without stopping until maintenance personnel have left the bounds of the sensitive area (500 feet around the nest).

- Osprey nest surveys will be conducted in conjunction with bald eagle nest surveys. Refer to the Bald Eagle Management Plan (SCE 2005b) for nest survey schedules for the term of the license.

2.4.3 CULTURAL RESOURCES

To avoid and minimize impacts to Native American plants of cultural concern, the following measures will be implemented.

- SCE will schedule and attend an annual meeting with interested Native Americans to discuss vegetation management in the vicinity of the four Big Creek Projects. Refer to Section 3.3, Consultation, for more detail.

- SCE will implement Standard Operating Procedures (SOPs), as described in the Historic Properties Management Plan (HPMP), for the protection of Native American plants of cultural concern (SCE 2007c).

2.4.4 NOXIOUS WEEDS AND INVASIVE ORNAMENTALS

The USDA-FS Guide to Noxious Weed Prevention Practices was considered in the development of specific methods to control and prevent the spread of noxious weeds and the treatment of established infestations (USDA-FS 2001). Measures for preventing the spread of noxious weeds, treating new and existing noxious weed populations, preventing the spread of invasive ornamental plants, revegetating, and controlling erosion for the four Big Creek Projects are provided below.

Prevention of the Spread of Noxious Weeds

The following measures will be implemented to prevent the spread of noxious weeds in the vicinity of the four Big Creek Projects.

- All SCE field vehicles and equipment previously used on non-paved surfaces outside of the watershed will be thoroughly cleaned before entering the Project area. SCE will wash all vehicles/equipment with power or high pressure washers to remove soil, seeds, vegetation, or other seed bearing material before the equipment enters Project areas. However, this cleansing action is not required in an emergency. Instead, SCE will notify the USDA-FS of the location after the emergency so that the site can be checked for the introduction of noxious weeds the following year. Notification will include identifying the location of the equipment's most recent operations.

- SCE vehicles traveling through noxious weeds within the watershed will be cleaned as soon as practicable after leaving the infested area. Following washing of the vehicle/equipment, SCE will confirm through visual inspection that noxious weed material has been removed from the vehicle.

Treatment of New and Established Infestations

The Principles of Integrated Weed Management were considered in the development of specific treatment methods for noxious weeds and invasive non-native plants. Table 2 lists noxious weeds and invasive non-native plants of highest concern in the Sierra National Forest. Tables 3 and 4 list noxious weeds and invasive ornamental plants

(respectively) specific for the four Big Creek Projects. It should be noted that some invasive ornamentals are also considered to be noxious weeds. These species are indicated on the tables. The tables include a management priority for each species as follows:

- **Priority Level 1—**SCE will implement treatment immediately following FERC approval of this Plan. Management focus is the eradication of these species.
- **Priority Level 2—**SCE will implement treatment within one year of FERC approval of this Plan. Management focus is the eradication of these species.
- **Priority Level 3—**SCE will implement treatment prior to any vegetation management activity. Management focus is the eradication of this species.
- **Priority Level 4—**SCE will implement treatment in conjunction with regularly scheduled vegetation management at the Project facility, recreational feature, road or trail. Because these species are extremely widespread and impossible to eradicate, management focus is reducing abundance.

The specific treatment method to be implemented to eradicate or reduce the abundance of a noxious weed/invasive ornamental is highly dependent on the species and location. Attachment F provides examples of species-specific treatment methods for the reduction and/or eradication of these plant populations.

Prevention of the Spread of Invasive Ornamentals

Invasive ornamental plant species, some of which are also considered noxious weeds, have been planted around several of SCE's project facilities and roads. USDA-FS highest-priority invasive ornamentals are listed in Table 4. To prevent the spread of ornamental plant species to native habitat, the following measures will be implemented.

- SCE will not plant invasive ornamental plant species (including, but not limited to species shown in Table 4) at Project facilities during the term of the license.
- SCE will remove any invasive ornamental plant species (Table 4) which already exist around SCE's project facilities and recreation facilities. The schedule for the removal of these plants is dependent upon the management priority (Level 1 through Level 3) assigned to the particular plant species. The preceding section, Treatment of New and Established Infestations, provides a definition for each priority level.

Revegetation

When necessary and as approved by USDA-FS, SCE will revegetate all appropriate sites disturbed by Project operations and maintenance activities as defined below. Additionally, if new construction is proposed, revegetation will occur at sites disturbed by construction. Revegetation can be important in preventing the establishment of noxious weeds in areas that have been cleared or are subject to ground disturbance depending on the existing seed bank on the site. The Forest Service Manual, Pacific

Southwest Region (R5) Botanical Program Management Handbook, Chapter 50 (Revegetation) and USDA-FS Regional Native Plant Policy was used in development of specific revegetation measures (Attachments G and H).

- Revegetation or seeding conducted in the Project area will be approved by the USDA-FS, and will be implemented in accordance with the USDA-FS Regional Native Plant Policy and Botanical Program Management Handbook. Where appropriate and as available, culturally significant plants will be used for revegetation.

- SCE will use locally native species pre-approved by the USDA-FS for revegetation and seeding conducted in the Project area. Occasionally, it may be necessary to use a cereal grain or a sterile hybrid to accomplish erosion control objectives, but this exception will be approved by the USFS botanist. A good faith effort will be made to ensure a supply of locally native plant material is available over the long-term; and to plan at least a year ahead for known large construction projects where plant material will need to be collected and grown.

- Sources for lower elevation revegetation projects from which locally native plant material may be obtained include, but are not limited to:

SCE Nursery
(559) 841-3194
Contact: Terry Sandridge

Intermountain Nursery
30433 North Auberry Road
Prather, CA 93651
(559) 855-3113

Welker's Grove Nursery
42170 Cedar Springs Road
Auberry, CA 93602
(559) 855-3521

- If locally native plant materials are not available, SCE will consult with USDA-FS to identify alternatives.

- SCE will plan for and discuss the process to obtain locally native species for revegetation during the annual meeting with USDA-FS.

Erosion Control

SCE will use only certified weed-free products when mulch is required for erosion control. If certified weed-free products are not available, SCE will consult with USDA-FS to identify an alternative. Whether or not certified weed-free material is available, a

good-faith effort should be made and documented to obtain a mulch supply that is free of weeds.

2.5 SCE PROGRAMS

In addition to the above avoidance and protection measures, SCE also has established several programs to train personnel on the presence of special-status resources in the vicinity of the four Big Creek Projects. These programs will continue to be implemented during the term of the license. Each program is described below.

2.5.1 ENDANGERED SPECIES ALERT PROGRAM

The Endangered Species Alert Program (ESAP) was developed to provide SCE personnel with a means for identifying when they may be working within an area with the potential for occurrence of legally protected plants and animal species in the SCE Service Territory. This training is conducted on an annual basis. For each of these species within the SCE Service Territory, the ESAP Manual (SCE 2006a) includes a photograph, description, natural history information, and map showing the species' distribution in relation to SCE facilities. This manual and maps (or Geographic Information System (GIS) database) are reviewed prior to implementing any project that involves ground disturbing activities within the Project area. Should a proposed activity have the potential to conflict with a known sensitive species population, SCE's Northern Hydro Division Environmental Manager, SES, or other qualified personnel will be notified to evaluate the situation and, if needed, coordinate with and obtain appropriate permits from regulatory agencies.

2.5.2 NORTHERN HYDRO SPECIAL-STATUS SPECIES INFORMATION PROGRAM

SCE's Northern Hydro Division has developed a Special-Status Species Information Program (NHSSIP) to provide SCE personnel with a means of identifying when they may be working within an area that could support a Forest Service Sensitive (FSS) species. This Program will require the use of the Environmental Compliance Program described below and will enhance the ESAP described above. This program includes a photograph or line drawing, description, natural history information, and map showing the species' distribution in relation to SCE facilities for all FSS species potentially occurring in the Project vicinity (SCE 2006b).

2.5.3 AVIAN PROTECTION PROGRAM

SCE employees are informed about the SCE Avian Protection Program (APP) through posters, written literature, wallet-sized cards, formal training that discusses pertinent environmental regulations, general raptor identification, reporting procedures for the discovery of a dead raptor, protocols for how to deal with avian nests, and modifications that can be made to power line structures to lower the risk of avian electrocutions. A copy of SCE's Avian Protection (Specific Order) and Animal/Bird Mortality Reporting Form is provided as Attachment I. This training is conducted annually as part of the ESAP described above.

2.5.4 CULTURAL RESOURCES ENVIRONMENT AWARENESS PROGRAM

A Cultural Resources Environment Awareness Program will be conducted on an annual basis in conjunction with the ESAP program described above. The training would include personnel working in the vicinity of the four Big Creek Projects from Northern Hydro, Transmission and Distribution, and Carrier Solutions. The cultural resources component would include procedures for implementation of the HPMP and a section on awareness of Native American traditional cultural values.

2.5.5 ENVIRONMENTAL TRAINING PROGRAM

SCE employees attend environmental training sessions on a regular basis as well as on an as-needed basis. These training sessions include a review of background material, permit conditions, and instructions on how to avoid impacts on biological resources. Project-specific meetings may also be conducted in the field on a job-specific or activity-specific basis to review appropriate management protocols (avoidance and protection measures) in environmentally sensitive areas.

2.5.6 NOXIOUS WEED TRAINING PROGRAM

SCE personnel will receive training on the importance of noxious weed control in the Project area. Specifically, the Sierra-San Joaquin Noxious Weed Alliance's *Field Guide to Invasive Non-Native Weeds of Mariposa, Madera, and Fresno Counties* will be reviewed and provided to SCE personnel. This field guide is focused on prominent weed species in the Project vicinity and provides photographs, visual characteristics, a description of each species, mechanism of spread, impacts as a result of the species, origin of distribution, and important control measures. Personnel will also be trained on the measures which individual staff can implement to prevent the spread of noxious weeds. These include:

- Removal of weed seeds from clothing before leaving jobsites.
- Use of leather boots or gators over boots to shed weeds and their seeds.

2.5.7 COMPLIANCE PROGRAM

SCE will develop a compliance program that includes a process that must be followed prior to implementation of specific O/M activities. This is a program designed to track O/M activities implemented, update resource information, and guide personnel in implementation of O/M activities in compliance with A/P measures developed for the Big Creek Hydroelectric System. The compliance program consists of three components, the Northern Hydroelectric Environmental Compliance Database, GIS Database, and the Compliance Process, as described below.

<u>Northern Hydroelectric Environmental Compliance Database</u>

The Northern Hydroelectric Environmental Compliance Database (Compliance Database) will be developed and integrated with SCE's existing databases.

A component of the database will be designed for tracking the training records of SCE personnel, O/M activities that have been planned and completed, and noxious weed populations that have been identified and treated. The database will also include all A/P measures associated with this Plan. This database will be queried prior to implementation of specified O/M activities.

Geographic Information System Database

Several studies have been conducted for the Big Creek Hydroelectric System. The results of these studies, data obtained from the USDA-FS Special-status Species Database, the CNDDB, and other biological studies were incorporated into a GIS database. This information includes the locations of special-status species and their habitats, noxious weed population, and cultural resources in the vicinity of the Project. Because of the sensitive nature of the locations of some special-status species and cultural resources, some GIS data layers are confidential. Therefore, access to these layers will be limited to SCE employees who are trained in the sensitivity and proper use of the information.

Updating GIS Database

The GIS database will be evaluated annually during the term of the license to determine if updates are needed. Prior to updating the database, SCE will contact USDA-FS for the most recent version of its Special-status Species Database. SCE will also contact the USFWS for the current list of Threatened and Endangered Species and obtain any new versions of the CNDDB when they become available. Any new data on the location of resources (i.e., special-status species, cultural resources, and noxious weed populations) in the vicinity of the Project that are obtained during implementation of O/M activities or required monitoring will also be incorporated into the database on a regular basis. SCE will contact the agencies and obtain approval to use the newest available data sources if they become available.

Compliance Process

SCE will review all O/M work activity requests that are determined to be subject to environmental regulation. They will use the Database to determine which A/P measures are appropriate, given the timing and nature of the work to be conducted, and the proximity of special-status biological resources and/or cultural resources to the work location. SCE will require that contractors comply with all applicable A/P measures.

3.0 MITIGATION AND MITIGATION/RESOURCE MONITORING

The following section defines the mitigation and mitigation/resource monitoring and reporting requirements that will be implemented for the four Big Creek Projects. Additionally, agency consultation is also described.

3.1 MITIGATION

3.1.1 VALLEY ELDERBERRY LONGHORN BEETLE

Measures to mitigate impacts to VELB are included in the VELB Management Plan (SCE 2007a). These include replacement of branches and stems greater than or equal to 1 inch in diameter that would be trimmed during the term of the license with seedlings that will develop new branches and stems. The mitigation site for elderberry seedlings will be located on USDA-FS property adjacent to the elderberry shrubs, and will be selected through consultation with SCE, USFWS, and USDA-FS. Refer to the VELB Management Plan for a more detailed description of VELB mitigation measures.

3.2 MITIGATION/RESOURCE MONITORING AND REPORTING

Mitigation/resource monitoring and reporting will be completed for terrestrial species and noxious weeds. The methods and reporting requirements by resource are described below.

3.2.1 TERRESTRIAL RESOURCES

Special-status Plants

SCE will monitor the effectiveness of avoidance and protection measures for special-status plants in conjunction with long-term monitoring of noxious weeds. In addition, during surveys for noxious weeds, SCE will conduct special-status plant surveys within the boundaries of the four Big Creek Projects every 10 years, in accordance with *Guidelines for Assessing Effects of Proposed Projects on Rare Plants and Plants and Plant Communities* (CDFG 2000). Surveys will be initiated 10 years following FERC approval of this Plan.

Valley Elderberry Longhorn Beetle

Monitoring of the VELB mitigation site will be conducted in accordance with the VELB Management Plan (SCE 2007a). This includes monitoring the general condition of the mitigation site and the condition of the elderberry plantings. SCE elected to monitor the site seven times over a 15-year period. Refer to the VELB Management Plan for a more detailed description of VELB mitigation monitoring.

3.2.2 CULTURAL RESOURCES

Refer to the HPMP for a description of SOPs for the protection of Native American plants and cultural resources.

3.2.3 NOXIOUS WEEDS AND INVASIVE ORNAMENTALS

SCE will conduct monitoring of noxious weed treatment areas, erosion control and revegetation areas, and conduct long-term monitoring of noxious weeds in the Project area during the term of the license. Specific methods for each are described below.

Monitoring of Treatment Areas

SCE will monitor areas where manual, mechanical, or herbicide treatments have been implemented on noxious weed infestations to determine the effectiveness of the treatment. Monitoring will be conducted within one year of implementation of the initial treatment. If it is determined that the initial treatment method was not successful, SCE will consult with USDA-FS to identify an alternative or additional treatment. An annual report will be provided to USDA-FS that identifies the location of treatment areas, the treatment methods implemented, and the success of the treatments.

Long-term Monitoring of Noxious Weeds

SCE will conduct surveys to identify and record the presence of noxious weeds within the boundaries of the four Big Creek Projects every 10 years. Surveys will be conducted in accordance with Section 2083 of the Forest Service Manual *Information and Reporting Guidelines for Noxious Weeds* (USDA-FS 1991b). See Attachments A and D for a complete list of locations to be surveyed. Surveys will be initiated 10 years following FERC approval of this Plan. Additionally, SCE will provide a survey report to USDA-FS that identifies the location of noxious weed infestations in the Project area, proposed treatment methods, and an implementation schedule. The report will include the number of noxious weeds species, the locations of infestations, and acreage occupied as compared to results from all previous surveys.

3.2.4 Erosion Control and Revegetation Areas

SCE will monitor areas where erosion control or revegetation has been implemented to determine if noxious weeds have become established. Monitoring will be conducted within one year of completion of the activity. If noxious weeds have become established, SCE will implement an appropriate treatment method based on the species present and the location. An annual report will be provided to USDA-FS that identifies all erosion control and revegetation areas, plant materials used, and results of monitoring.

3.3 Agency Consultation

SCE will continue to schedule and attend an annual coordination meeting with USDA-FS. The focus of this meeting will be to inform the USDA-FS of proposed vegetation management activities (e.g., treatment methods), including the location and time of year the activities are to be implemented. In addition, every five years SCE will, in cooperation with USDA-FS, review the Vegetation and Integrated Pest Management Plan for adequacy.

SCE will also schedule and attend an annual consultation meeting with interested Native Americans as identified in the HPMP SOPs.

4.0 LITERATURE CITED

California Department of Fish and Game. 2000. *Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities*. Guidelines produced for CDFG December 9, 1983; revised May 8, 2000.

Southern California Edison Company (SCE). 2001. Final Technical Study Plan Package for the Big Creek Hydroelectric System Alternative Licensing Process prepared by Southern California Edison. August 3, 2001. *In* SCE's Amended Preliminary Draft Environmental Assessment (APDEA) for the Big Creek Alternative Licensing Process (ALP). Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (Supporting Document (SD)-B, Volume 4, Books 6 and 21).

SCE. 2003. 2002 Technical Study Report Package for the Big Creek Hydroelectric System Alternative Licensing Process prepared by Southern California Edison. October 10, 2003. *In* SCE's APDEA for the Big Creek ALP. Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (SD-C, Volume 4, Books 7-10, 21 and 22).

SCE. 2004. 2003 Technical Study Reports (First Distribution) for the Big Creek Hydroelectric System Alternative Licensing Process prepared by Southern California Edison. August 20, 2004. *In* SCE's APDEA for the Big Creek ALP. Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (SD-D, Volume 4, Books 11-17 and 23).

SCE. 2005. 2004 Draft Technical Study Reports for the Big Creek Hydroelectric System Alternative Licensing Process prepared by Southern California Edison. *In* SCE's APDEA for the Big Creek ALP. Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (SD-D, Volume 4, Books 18 and 24).

SCE. 2006a. Endangered Species Alert Program Manual; Species Accounts and Procedures. Environmental Affairs Division. *In* SCE's SCE Response to FERC's Additional Information Request (AIR) No. 6 (Schedule B). August 2006.

SCE. 2006b. Northern Hydro Special-Status Species Information Program. Environmental Affairs Division. *In* SCE's SCE Response to FERC's AIR No. 6 (Schedule B). August 2006.

SCE. 2007a. Valley Elderberry Longhorn Beetle (VELB) Management Plan, Big Creek Hydroelectric System, FERC Project Nos. 2085, 2175, 67, and 120. *In* SCE's APDEA for the Big Creek ALP. Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (SD-G, Volume 4, Books 18 and 24).

SCE. 2007b. Bald Eagle Management Plan, Big Creek Hydroelectric System, FERC Project Nos. 2085, 2175, 67, and 120. *In* SCE's APDEA for the Big Creek ALP. Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (SD-G, Volume 4, Books 18 and 24).

SCE. 2007c. Historic Properties Management Plan, Big Creek Hydroelectric System, FERC Project Nos. 2085, 2175, 67, and 120. *In* SCE's APDEA for the Big Creek ALP. Mammoth Pool Project (FERC Project No. 2085), Big Creek Nos. 1 and 2 (FERC Project No. 2175), Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67), and Big Creek No. 3 (FERC Project No. 120). February 2007 (Volume 4, Book 26).

United States Department of Agriculture-Forest Service (USDA-FS). 1991a. Forest Land and Resource Management Plan (Sierra National Forest). Pacific Southwest Region.

USDA-FS. 1991b. Information and Reporting Guidelines for Noxious Weeds. Section 2083 in Forest Service Manual, June 1991.

USDA-FS. 2000. Water Quality Management for Forest System Lands in California: Best Management Practices, September 2000.

USDA-FS. 2001. USDA-Forest Service Guide to Noxious Weed Prevention Practices.

USDA-FS. 2004. Sierra Nevada Forest Plan Amendment – Final Supplemental Environmental Impact Statement. Record of Decision, January 21, 2004. USDA-FS, Pacific Southwest Region and Intermountain Region.

TABLES

Table 1. Herbicides and Other Agents Used in the Vicinity of the Big Creek Projects.

Herbicides				
	Garlon 4® at 0.6-1.5 lbs/ acre [1]	**Pathfinder II®**	**Accord® at 0.6-1.0 lbs/acre [2]**	**Velpar® at 2 lbs/acre**
Active Ingredient	triclopyr	triclopyr	glyphosate	Hexazinone
Other Agents				
	Hasten®	**R-11®**	**In-Place®**	
Properties	Spray Adjuvant Nonionic surfactant and esterified vegetable oils	Wetting Agent Nonionic surfactant Spreader Activator	Deposition and Retention Agent	

[1] These rates represent average coverage (20%) to maximum expected coverage (50%) using a 3.0 lbs. per acre mixture.

[2] These rates represent average coverage (30%) to maximum expected coverage (50%) using a 2.0 lbs. per acre mixture.

Table 2. Noxious Weeds and Invasive Non-native Plants of Highest Concern in the Sierra National Forest.

Common Name	Scientific Name	CDFA Rating[1]	Cal IPC Rating[2]
Bermudagrass	*Cynodon dactylon*	C	Moderate
Black locust	*Robinia pseudoacacia*	-	Limited
Black mustard	*Brassica nigra*	-	Moderate
Bull thistle	*Cirsium vulgare*	C	Moderate
Canada thistle	*Cirsium arvense*	B	Moderate
Cheatgrass	*Bromus tectorum*	-	High
Diffuse knapweed	*Centaurea diffusa*	A	Moderate
French broom	*Genista monspessulana*	C	High
Himalayan blackberry	*Rubus discolor*	-	High
Hydrilla	*Hydrilla verticillata*	A	High
Iberian starthistle	*Centaurea iberica*	A	-
Italian thistle	*Carduus pycnocephalus*	C	Moderate
Klamath weed	*Hypericum perforatum*	C	Moderate
Lens-podded hoary cress	*Cardaria chalepensis*	B	Moderate
Medusahead	*Taeniatherum caput-medusae*	C	High
Milk thistle	*Silybum marianum*	-	Limited
Oxeye daisy	*Leucanthemum vulgare*	-	Moderate
Perennial pepperweed	*Lepidium latifolium*	B	High
Periwinkle	*Vinca major*	-	Moderate
Puncture vine	*Tribulus terrestris*	C	-
Purple loosestrife	*Lythrum salicaria*	B	High
Purple starthistle	*Centaurea calcitrapa*	B	Moderate
Rush skeletonweed	*Chondrilla juncea*	A	Moderate
Russian knapweed	*Acroptilon repens*	B	Moderate
Russian thistle	*Salsola tragus (= S. iberica)*	C	Limited
Scotch broom	*Cytisus scoparius*	C	High
Spanish broom	*Spartium junceum*	-	High

Table 2. Noxious Weeds and Invasive Non-native Plants of Highest Concern in the Sierra National Forest.

Common Name	Scientific Name	CDFA Rating[1]	Cal IPC Rating[2]
Spotted knapweed	*Centaurea maculosa*	A	High
Tocalote	*Centaurea melitensis*	C	Moderate
Tree-of-heaven	*Ailanthus altissima*	C	Moderate
Tumbleweed	*Salsola paulsenii*	C	Limited
Woolly mullein	*Verbascum thapsus*	-	Limited
Yellow starthistle	*Centaurea solstitialis*	C	High

Based on materials provided by Joanna Clines, Sierra National Forest (November 18, 2004)

[1]**California State Department of Food and Agriculture Pest Ratings of Noxious Weeds (http://www.cdfa.ca.gov/phpps/ipc/encycloweedia/pdfs/noxiousweed_ratings.pdf) (CDFA 2006)**

A-rated pests: Weeds of known economic significance, subject to action by CDFA including eradication, quarantine, containment, rejection of shipments, or other holding action at the state-county level. Quarantine interceptions are to be rejected or treated at any point in the state.

B-rated pests: Weeds subject to action by CDFA only when found in a nursery, and otherwise subject to eradication, containment, control, or other holding action at the discretion of the local county agricultural commissioner.

C-rated pests: Not subject to state action except to provide for general pest cleanliness in nurseries; reject by CDFA only when found in a cropseed for planting or at the discretion of the commissioner, action to retard spread outside of nurseries at the discretion of the county agricultural commissioner.

[2]**California Invasive Plant Council Invasive Plant Inventory (http://www.cal-ipc.org/ip/index.php) (Cal-IPC 2006)**

High: These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate: These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited: These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

Table 3. USDA-FS Noxious Weed Priority List for the Big Creek Projects.

Scientific Name	Common Name	CDFA[1]	Cal-IPC rating[2]
Priority Level 1			
SCE will implement treatment immediately following FERC approval of Plan. Management focus: Eradication of species.			
Centaurea solstitialis	Yellow starthistle	C	High
Taeniatherum caput-medusae	Medusahead	C	High
Tribulus terrestris	Puncture vine	C	Not rated
Priority Level 2			
SCE will implement treatment within one year of FERC approval of Plan. Management focus: Eradication of species.			
Ailanthus altissima	Tree-of-heaven	C	Moderate
Carduus pycnocephalus	Italian thistle	C	Moderate
Centaurea melitensis	Tocalote	C	Moderate
Cytisus scoparius	Scotch broom	C	High
Genista monspessulana	French broom	C	High
Hypericum perforatum	Klamath weed	C	Moderate
Lepidium latifolium	Perennial pepperweed	B	High
Leucanthemum vulgare	Oxeye daisy	Not rated	Moderate
Vinca major	Periwinkle	Not rated	Moderate
Priority Level 3			
SCE will implement treatment prior to any vegetation maintenance activity. Management focus: Eradication of species.			
Brassica nigra	Black mustard	Not rated	Moderate
Cirsium vulgare	Bull thistle	C	Moderate
Robinia pseudoacacia	Black locust	Not rated	Limited
Rubus discolor	Himalayan blackberry	Not rated	High
Verbascum thapsus	Woolly mullein	Not rated	Limited
Priority Level 4			
SCE will implement treatment prior to any vegetation maintenance activity. Species extremely widespread and impossible to eradicate. Management focus: Reduction in species abundance			
Bromus tectorum	Cheatgrass	Not rated	High

[1]California State Department of Food and Agriculture, 2006

[2]California Invasive Plant Council, 2006

Table 4. USDA-FS Invasive Ornamental Do-Not-Plant List and Removal Schedule.[1]

Scientific Name	Common Name	Observed During Surveys
Priority Level 1		
SCE will implement treatment (removal) immediately following FERC approval of Plan		
Ailanthus altissima[2]	Chinese tree-of-heaven	Yes
Cytisus scoparius[2]	Scotch broom	Yes
Genista monspessulana[2]	French broom	Yes
Hypericum perforatum[2]	Klamathweed, St John's Wort	Yes
Leucanthemum vulgare[2]	Oxeye daisy	Yes
Pennisetum setaceum	Fountain grass	No
Spartium junceum	Spanish broom	Yes
Tanacetum vulgare	Common tansy	Yes
Cortaderia jubata	Jubata grass	No
Cortaderia selloana	Pampas grass	No
Lythrum salicaria	Purple loosestrife	No
Priority Level 2		
SCE will implement treatment (removal) within one year of FERC approval of Plan.		
Centaurea cyana	Bachelor's buttons, cornflower	Yes
Digitalis purpurea	Foxglove	Yes
Hedera helix	English ivy	Yes
Lathyrus latifolius	Perennial sweet pea	Yes
Lathyrus tingitanus	Tangier pea	Yes
Lychnis coronaria	Rose campion	Yes
Vinca major[2]	Periwinkle	Yes
Verbascum thapsus	Common mullein	Yes
Rubus discolor[2]	Himalayan blackberry	Yes
Priority Level 3		
SCE will implement treatment (removal) prior to any vegetation management activity.		
Robinia pseudoacacia[2]	Black locust	Yes

[1]If additional invasive ornamental plant species are identified during the term of the license, appropriate removal methods will be developed with USDA-FS during the annual meeting.
[2]This species is considered both an invasive ornamental and a noxious weed.

ATTACHMENT A

VEGETATION MANAGEMENT IN THE VICINITY OF THE FOUR BIG CREEK ALP PROJECTS

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Mammoth Pool (FERC Project No. 2085)			
Dams and Diversions			
Mammoth Pool	A		A
Rock Creek		R	
Ross Creek	R	R	
Power Generation			
Mammoth Pool PH	R		R
Mammoth Pool Fish Water Generator	R		R
Gaging Stations			
Mammoth Pool Fish Water Generator	R		
Water Conveyance - Mammoth Pool Powerhouse			
Intake Gate House	R		R
Surge Chamber, Rock Trap	R		
Rock Trap Flushing Channel	I		
Valve House	R		
Penstocks	R		R
Power Transmission Lines			
MPPH - BC3 220KV	A		
Helicopter Landing Sites			
San Joaquin River above Shakeflat Creek	R	R	R
Mammoth Pool Dam	R	R	R
Project Roads			
6S25 Mammoth Pool Road, from 7S20, Shake Flat Creek access to end at east abutment (#30) *	R	R	R
6S25DA Spur to Windy Point Picnic Area from 6S25D (#164) *	I	I	I
6S25G Mammoth Pool Fish Water Generator access road from 6S25 (Mammoth Pool Road) to Base of Mammoth Pool Dam (#6)	R	R	R
7S47B Access road to Rock Creek Tunnel Muck Pile (#102) *	R	R	I
8S03 from PH No. 8 to Mammoth Pool PH (#33)	R	R	R
8S03B Access road from 8S03 to Mammoth Pool penstock (#80) *	R	R	R
8S03B Access road to Mammoth Pool Transmission Line from 8S03C (#145)	R	R	I
8S03C Access road from 8S03 to Mammoth Pool transmission line (#79)	R	R	
8S03CA Spur road to Mammoth Pool Transmission Line (#144) *	R	R	I
8S03CC Access road to Mammoth Pool Transmission Line from 8S03C (#146)	R	R	I
8S03D Access road from 8S03 to Mammoth Pool PH Surge Chamber (#78)	R	R	

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Mammoth Pool (FERC Project No. 2085) (continued)			
Project Roads (continued)			
8S44 Mammoth Pool transmission line access road (#213)	R	R	
8S44Y Mammoth Pool PH Transmission Line access road from gate near 8S03 to 9S42 (#37)	R	R	
8S44YA Mammoth Pool transmission line access road (#138)	R	R	
8S44YB Mammoth Pool Transmission Line access road (#136) *	R	R	I
9S42 Mammoth Pool PH Transmission Line access road from gate near County Road 225, Italian Bar Road, to 8S44 (#18)	R	R	
9S42A Access road to Mammoth Pool transmission line from 9S42 (#135)	R	R	
Project Trail			
Trail to San Joaquin River Gage above Shakeflat Creek (#75)	I	I	I
Big Creek Nos. 1 and 2 (FERC Project No. 2175)			
Dams and Diversions			
Huntington Lake Dams 1, 2, 3, 3a	A		A
Dam 4	A		A
Balsam Creek	R	R	R
Ely Creek	R	R	R
Power Generation			
Big Creek PH No. 1	R		R
Big Creek PH No. 2	R		R
Gaging Stations			
Big Creek below Huntington Lake at Dam 1	R		
Balsam Creek at Diversion Dam	A		
Water Conveyance - Powerhouse No. 1			
Upper 84" Valve House below Huntington Lake	R		R
Upper 60" Valve House below Huntington Lake	R		R
60" & 84" Flowlines below Huntington Lake	R		R
Lower 84" Valve House at top of Ph 1 penstock	R		R
Lower 60" Valve House at top of Ph 1 penstock	R		R
42" Valve House at top of Ph 1 penstock	R		R
Vent Stacks	R		R
Penstocks	R		R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 1 and 2 (FERC Project No. 2175) (continued)			
Water Conveyance - Powerhouse No. 2			
Vent Stacks below railroad grade	R		R
Penstocks	R		R
Adit 7&1/2, Tunnel 2	R		
Adit 8, Tunnel 2	R		R
Adit 7&1/2 Leakage Weir	R		
Balsam Creek Diversion Piping (Adit 3)	R		A
Ely Creek Diversion Piping (Adit 6)			R
Rock Trap/Surge Chamber (9' Gate House) on the railroad grade	R		R
42" Valve House and valves below railroad grade	R		R
Drain piping & Valves (10" & 24") from Surge Chamber, below railroad grade	R		R
Water Conveyance - Huntington-Pitman-Shaver			
Inlet Structure & Gate 1A and 1B at Dam 2 (10' Gate House)	R		
Weather Stations			
Big Creek No. 1	R		R
Huntington Lake	R		R
Buildings/Camps			
Big Creek PH No.1 Facilities	R		R
Storage Yards			
Big Creek PH No. 1	I		I
Utilities – Water Supply/Treatment			
Big Creek PH No. 1	R		R
Utilities – Sewage Treatment			
Big Creek PH No. 1 Community	A		A
Project Power Lines Less than 33kV			
Musick 7KV	A		A
East Incline 7KV (Not in Service)	A		A
Miscellaneous			
Fish Hatchery	R		
Helicopter Landing Sites			
Hodges (Big Creek) Heliport	R	R	R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 1 and 2 (FERC Project No. 2175) (continued)			
Project Roads			
8S05 Canyon Road (from Huntington Lake Road to PH No. 2 and 8S05E) (#21)	R	R	
8S05C PH No.2 access road from Canyon Road (#81)	R	R	
8S05C Powerhouse No.2 access road from Canyon Road (#81)	R	R	R
8S05CA Access to Big Creek No. 2 switchyard (#160) *	R	R	R
8S05E Old housing road 1 adjacent to Powerhouse No. 2 from 8S05, Canyon Road (#16)		I	
8S05EA Old housing road 2 adjacent to Powerhouse No. 2 from 8S05E (#159)		I	
8S05EC Old housing road 3 adjacent to Powerhouse No. 2 from 8S05E (#158)		I	
8S082 Access to Hydro offices at Big Creek (#186) *	R		I
8S082A Access to Hydro offices at Big Creek (#1)	R		I
8S082B Access to Hydro offices at Big Creek (#185) *	R		I
8S082C Access to Hydro offices at Big Creek (#188) *	R		I
8S082D Access to Hydro offices at Big Creek (#187) *	R		I
8S082X Access to Hydro offices at Big Creek (#189) *	R		I
8S08A Access road south from Railroad Grade to West Portal (#69) *	R	R	R
8S13 from the gate to 8S05, the Canyon Road (#41)	R	R	
8S13K Access road to Powerhouse No. 2 penstock (#168) *	R	R	R
8S301 From gate with 8S66C to penstock surge pipes (#28)	R	R	R
8S302 Access to Big Creek No. 1 42-inch gatehouse (#47)	R	R	R
8S66 from gate to west end of Dam 2 (#23)	R	R	R
8S66 West end of Dam 2 to 8S66A (#22)	R	R	
8S66A Access road to gaging station on Big Creek below Huntington Lake (#207)	R	R	
8S66B from Dam 2 to end (#42)	R	R	R
8S66BA Short road between 8S66B and 8S66BC (#171) *	R	I	R
8S66BC East end of Dam 1 to Dam 1 drainage gates (#99) *	R	R	R
8S66C on public lands from 8S301 to gate to 8S302 (#107) *	R	R	R
8S66X Road over Dam 2 (#184)	R		R
8S82AA Access road to Warehouse (#249) *	R		I
8S82BA Upper access road to Wastewater treatment plant from 8S82B (#248) *	R	R	R
8S82BB Lower access road to Wastewater treatment plant from 8S82B (#247) *	R	R	R
8S82BC Access road to Fish Farm upper gate (#245) *	R		R
8S82E Upper access road to SCE company housing (#250) *	R		I
8S82EA Lower access road to SCE company housing (#252) *	R		I

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 1 and 2 (FERC Project No. 2175) (continued)			
Project Roads (continued)			
8S82F Access road to Domestic water treatment plant from FRE 2710 (#251) *	R		I
8S82J Upper access road to Powerhouse No. 1 from FRE 2710 (#246) *	R		I
8S83 segment from 8S66 to 8S83A (#48)	R	R	R
8S83A Connector road between 8S66C and 8S83 (#200)	R	R	R
Project Trail			
Trail to Scott Lake Domestic Diversion (#261)	I		I
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67)			
Dams and Diversions			
Florence Lake	A		A
Shaver Lake	A		A
Bear Creek Diversion	R		
Mono Creek Diversion	R		
Pitman Creek	R		
Balsam	A		A
Dam 5	A		A
Camp 62 Creek	R		A
Bolsillo Creek	R		
Power Generation			
Big Creek PH No. 2A	R		R
Big Creek PH No. 8	R		R
Gaging Stations			
Camp 62 Creek below Diversion Dam	R		
Huntington-Shaver Conduit gate 2 release	R		
Middle Fork Balsam Creek below Balsam Meadows Forebay	R		
Stevenson Creek below Shaver Lake	R		R
South Fork San Joaquin River above Hooper Creek (with cable crossing)	R		
Water Conveyance - Powerhouse No. 2A			
Intake Gate House at Shaver Lake	I		
Surge Chamber, Rock Trap	I		
102" Valve House	R		R
Penstocks	R		R
Water Conveyance - Powerhouse No. 8			
Intake structure at Dam 5	R		R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (continued)			
Water Conveyance - Powerhouse No. 8 (continued)			
Adit 1, Tunnel 8		R	
Surge Chamber - includes trash drain and penstocks valves	R		R
Penstocks	R		R
Water Conveyance - Eastwood Power Station			
Inlet Structure (Gate 4)	R		R
Surge Chamber	R		A
Water Conveyance - Mono-Bear Siphon			
Combined Flow Line (siphon)	I		
Water Conveyance - Huntington-Pitman-Shaver			
Siphon w 4" and 10" Drain Valves	R		R
Vent Stacks	R		R
Gate 3 Outlet to Balsam Forebay	R		R
Gate 2 Outlet to NF Stevenson Creek	R		
Water Conveyance - Diversion Channel			
Crater Creek	I		
Water Conveyance - HB Valves			
Shaver Lake	R		R
Weather Stations			
Florence Lake	R		R
Kaiser Ridge/Mt Givens	R		R
Shaver Lake	R		R
Buildings/Camps			
Florence Work Camp	R		R
Big Creek 8 Facilities	R		R
Storage Yards			
Florence Lake Work Camp	I		
Camp 62	I		
Big Creek PH No.2 & PH No.2A	I		I
Eastwood School Site	I		I
Utilities - Water Supply/Treatment			
Camp Edison	R		R
Florence Work Camp	R		R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (continued)			
Utilities - Fuel/Gasoline/Diesel			
Big Creek PH No. 8	A		A
Florence Work Camp	R		
Project Power Lines Less than 33kV			
Jumbo 12KV	A		A
Pitman 33KV (to diversion)	A		A
Power Transmission Lines			
EPS - BC1 220KV	A		
Switchyards			
Eastwood Switchyard	A		A
Recreation - Shaver Lake			
Camp Edison Campground	A	A	A
Camp Edison Boat Ramp/Launch	A	A	A
Day Use Areas on North Shore Roads 1 & 2	A	A	A
Day Use Area off Hwy 168 (The Point)	A	A	A
Eagle Point Boat Only Day-Use Area	A	A	A
Balsam Meadow Forebay			
Balsam Meadow Forebay Day-Use Picnic Area	A	A	A
Balsam Meadow Trailhead and Parking	A	A	A
Helicopter Landing Sites			
Eastwood School	R	R	R
Camp 62 at junction of Kaiser Pass Road	R	R	R
Bear Creek Diversion	R	R	R
Florence Lake Camp	R	R	R
Florence Lake Dam	R	R	R
Florence Lake Gaging Station	R	R	R
South Fork San Joaquin River Florence Spill Station	R	R	R
South Fork San Joaquin River below Hooper	R	R	R
Hooper Creek at Diversion	R	R	R
Mono Creek at Diversion	R	R	R
Mono Creek below Lake T.A. Edison	R	R	R
Mt. Givens Telecom Site	R	R	R
Summit at Shaver Hill	R	R	R
Tiffany Pines at Camp Edison	R	R	R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (continued)			
Project Roads			
5S80Z Mono Creek Diversion access road (#68)	I	I	I
7S01B Florence Work Camp access road from gate on 7S01 near picnic area (#4)	R	R	
7S01BA Florence Work Camp road from 7S01B (#219) *	I	I	I
7S370D Access road to Florence Dam and water storage tank from 7S370 (#71) *	I	I	I
7S370F Access road to Florence Dam from 7S370 (#237) *	I	I	I
8S02 from Highway 168 to 8S02B (#54) *	I	I	I
8S02B Access to Huntington-Pitman-Shaver tunnel adit (#197) *	I	I	I
8S03, Canyon Road from PH No. 8 to Mammoth Pool PH (#33)	R	R	R
8S03A Access road to Powerhouse No. 8 from 8S03 (#166) *	R	R	R
8S05, Canyon Road (from PH No. 2 and 8S05E to 8S05A PH No. 8 access road) (#21)	R	R	R
8S05F Access road off 8S05, Canyon Road, that accesses Powerhouse No. 8 penstock (#77)	R	R	R
8S05FB Access road to Powerhouse No. 8 penstock from 8S05 (#157)	R	R	R
8S05L Road to communication line near Powerhouse No. 8 (#167) *	I	I	I
8S08A Access road south from Railroad Grade to West Portal (#69)	R	R	R
8S13 from the gate to 8S05, Canyon Road (#41)	R	R	R
8S13 from the gate to 8S05, the Canyon Road (#41)	R	R	
8S303 Access road to Eastwood Overflow Campground (#174) *	I	I	I
8S47 Access road to Eastwood Powerstation Transmission Line tower - from gate to end (#258) *	R	R	R
8S83 segment from 8S83A to Huntington-Shaver Siphon (#48)	R	R	R
8S94 Pitman Creek Diversion access road (#56)	I	I	I
9S03 from 8S08 to FRE 2710 (non-project segment on SCE private lands) (#156) *	I	I	I
9S17 Access road to Eastwood Transmission line from Hwy 168 (#262) *	I	I	I
9S24 from Hwy 168 to North Fork Stevenson Creek gate No. 2 (Tunnel No. 7 Outlet) (#55)	R	R	R
9S311 Access to Eastwood Powerstation Transmission Line tower (#243) *	R	R	R
9S311A Access to Eastwood Powerstation Transmission Line tower (#244) *	R	R	R
9S312 Access to Eastwood Substation from Highway 168 (#19)	R	R	R
9S32 from gate near Highway 168 to EPH Transmission Line (#89)	I	I	I
9S32A Spur from 9S32 to east side of Balsam Forebay (#50)	R	R	R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (continued)			
Project Roads (continued)			
9S32AB Spur from 9S32A to Balsam Forebay (#153) *	R	R	R
9S32C Road below Balsam Forebay Dam to EPH transmission line (#170)	I	I	I
9S32CA Access road to Eastwood Powerstation Transmission Line tower (#208) *	R	R	R
9S32CB (#232) *	R	R	R
9S32CC (#242) *	R	R	R
9S32CD (#231) *	R	R	R
9S32CE (#230) *	R	R	R
9S32CF (#241) *	R	R	R
9S58 from Shaver Marina to NF Stevenson gage (#84)	R	R	R
9S58K Access road to Eastwood Power Tunnel entrance (#114)	R	R	R
Access road to Eagle Point Boat Only Day Use Area (off of 9S58) (#109)	R	R	
Access road to Eastwood Tailrace (off of 9S58) (#110)	I	I	I
Access road to Shaver Dam north (#83)	R	R	R
Access road to Shaver Dam south (#49)	R	R	
Camp Edison Roads (#2)	R	R	
Project Trails			
Trail to Big Creek Gage below Dam 5 (#74) *	R		R
Two trails to Stevenson Creek Gage below Shaver Lake Dam (#17)	R		R
Trail to Pitman Creek Gage near Tamarack Mountain (below shaft) (#108)	I		I
Trail to Bolsillo Creek Gage above Intake (#91)	I		I
Trail to Camp 62 Creek Gage and Diversion Dam (#12)	I		I
Trail to Chinquapin Creek Gage and Diversion Dam (#260)	I		I
Trails to North-South Slide Creek Diversions (#265)	I		I
Trail to South Fork San Joaquin River Gage downstream of Jackass Meadow (#259) *	I		I
Trail to Bear Creek Gage upstream of Bear Forebay (#92)	I		
Trail to Tombstone Creek Diversion (#14)	I		
Trail to Crater Creek Diversion Ditch (off of the Dutch Lake Trail) (#86)	I		
Big Creek No. 3 (FERC Project No. 120)			
Dams and Diversions			
Dam 6	R		R
Power Generation			
Big Creek PH No.3	R		R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek No. 3 (FERC Project No. 120) (continued)			
Water Conveyance - Powerhouse No. 3			
Valve House	R		R
Penstocks	R		R
Adit 1, Tunnel 3		R	
Adit 2, Tunnel 3		R	
Adit 3, Tunnel 3		R	
Rock/Sand Trap Drain Piping & Valves	R		R
Manifold Structure	R		R
Buildings/Camps			
Big Creek PH No.3 Facilities	R		R
Storage Yards			
Big Creek PH No.3	I		I
Utilities - Water Supply/Treatment			
Big Creek PH No. 3	R		R
Project Power Lines Less than 33kV			
Manifold 2.4KV	A		A
Project Roads			
8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road) (#21)	R	R	R
8S05A Access road to Powerhouse No. 3 penstocks and gate house downhill from 8S05 (#72)	R	R	R
8S05B Access road to Powerhouse No. 3 penstock from 8S05 Canyon Road (#217) *	R	R	R
8S05G Access road to Powerhouse No. 3 penstocks and gate house uphill from 8S05 (#119)	R	R	R
8S05T Access to tailings (#24) *		I	
8S05TA Access to tailings (#29) *		I	
9S20 Access to Carpenter shop (#216) *	R		R
9S20A (#85) *	R		R
9S20B Access road to carpenter shop from Italian Bar Road (#62) *	R		R
9S20C Connector road between 9S20B loop (#64) *	R		R
9S20D Access to Carpenter Shop (#13) *	R		R
9S20DA Access to garage and shops (#257) *	R		R
9S20E (#52) *	R		R

Attachment A

Vegetation Management in the Vicinity of the Four Big Creek ALP Projects.

	Vegetation Control		
	Trimming		
	Hand	Equipment	Herbicides
Big Creek No. 3 (FERC Project No. 120) (continued)			
Project Roads (continued)			
9S20F Connector road between 9S20 loop (#87) *	R		R
9S88 from Italian Bar Road to old company housing (#127)	I		I
9S88A Access to old company housing (#5)	R		R
9S88X Access road to PH No. 3 water tank and shop (#256)	R	R	R
9S88XA Access road to old company housing from 9S88X (#215) *	R		R
9S89 Access road to Big Creek Powerhouse No. 3 and administrative buildings from Italian Bar Road (#61)	R	R	R
9S89BA Access road to PH3 and switchyard (#59) *	R		R

Notes:

A = Annual (activity typically occurs each year)

R = Regular (activity will occur one or more times in a 5-year period)

I = Infrequent (activity typically will occur during a 20-year period but less than once every 5 years)

Note: Only Project facilities, Project-related recreation features, Project roads, and trails where SCE currently implements vegetation management are included.

* Indicates Project roads and helicopter landing sites that were added to the Project after resource surveys for the Big Creek ALP Projects were conducted.

ATTACHMENT B

MATERIAL SAFETY DATA SHEETS OR LABELS FOR HERBICIDES AND OTHER AGENTS

ATTACHMENT B1

GARLON 4®

Specimen Label

Dow AgroSciences™

Garlon* 4

Specialty Herbicide

*Trademark of Dow AgroSciences LLC

For the control of woody plants and broadleaf weeds on rights-of-way, industrial sites, non-crop areas, non-irrigation ditch banks, forests, and wildlife openings, including grazed areas on these sites.

Active Ingredient:	
triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	61.6%
Inert Ingredients	38.4%
Total	100.0%

Contains petroleum distillates
Acid Equivalent:
triclopyr - 44.3% - 4 lb/gal

EPA Reg. No. 62719-40

Precautionary Statements

Hazards to Humans and Domestic Animals

Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Harmful If Swallowed, Inhaled, Or Absorbed Through Skin

Avoid contact with eyes, skin, or clothing. Avoid breathing mists or vapors. Avoid contamination of food.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

WPS Uses: Applicators and other handlers who handle this pesticide for any use covered by the Worker Protection Standard (40 CFR Part 170) – in general, agricultural-plant uses are covered – must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Non-WPS Uses: Applicators and other handlers who handle this pesticide for any use NOT covered by the Worker Protection Standard (40 CFR Part 170) – in general, only agricultural-plant uses are covered by the WPS – must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:
- Wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If on skin: Flush skin with plenty of water. Get medical attention if irritation persists.
If swallowed: Do not induce vomiting. Call a physician.

Environmental Hazards

This pesticide is toxic to fish. Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Do not use or store near heat or open flame. Do not cut or weld container.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Do not use for manufacturing or formulating.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited.

Storage: Store above 28°F or agitate before use.

Pesticide Disposal: Pesticide, spray mixture, or rinse water that cannot be used according to label instructions must be disposed of according to applicable federal, state, or local procedures.

Plastic Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

Metal Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Container Disposal for Refillable Containers: Replace the dry disconnect cap, if applicable, and seal all openings which have been opened during use. Return the empty container to a collection site designated by Dow AgroSciences. If the container has been damaged and cannot be returned according to the recommended procedures, contact the Dow AgroSciences Customer Service Center at 1-800-258-1470 to obtain proper handling instructions.

General: Consult federal, state, or local disposal authorities for approved alternative procedures.

General Information

Garlon* 4 herbicide is recommended for the control of unwanted woody plants and annual and perennial broadleaf weeds in forests, and on non-crop areas including industrial manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, roadsides and railroads, fence rows, non-irrigation ditch banks, and around farm buildings. Use on these sites may include application to grazed areas as well as establishment and maintenance of wildlife openings.

General Use Precautions

Agricultural Use Requirements for Forestry Uses: For use of this product on forestry sites, follow PPE and Reentry restrictions in the Agricultural Use Requirements section of this label.

Use Requirements for Non-cropland Areas: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is applied to non-cropland.

In Arizona: The state of Arizona has not approved Garlon 4 for use on plants grown for commercial production; specifically forests grown for commercial timber production, or on designated grazing areas.

Chemigation: Do not apply this product through any type of irrigation system.

Other Precautions:

- When applying this product in tank mix combination, follow all applicable use directions and precautions on each manufacturer's label.
- Do not apply on ditches used to transport irrigation water. Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result.
- Do not apply this product using mist blowers unless a drift control additive, high viscosity inverting system, or equivalent is used to control spray drift.
- Sprays applied directly to Christmas trees may result in conifer injury. When treating unwanted vegetation in Christmas tree plantations, care should be taken to direct sprays away from conifers.
- Do not apply Garlon 4 directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers, or other desirable broadleaf plants and do not permit spray mists containing it to drift onto them.
- It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Do not apply to open water such as lakes, reservoirs, rivers, streams, creeks, salt water bays, or estuaries.

Avoid Injurious Spray Drift

Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants near enough to be injured. It is suggested that a continuous smoke column at or near the spray site or a smoke generator on the spray equipment be used to detect air movement, lapse conditions, or temperature inversions (stable air). If the smoke layers or indicates a potential of hazardous spray drift, do not spray.

Aerial Application (Helicopter Only): For aerial application on rights-of-way or other areas near susceptible crops, use an agriculturally registered spray thickening drift control additive as recommended by the manufacturer or apply through the Microfoil® boom, Thru-Valve boom, or equivalent drift control system. Thickened sprays prepared by using high viscosity invert systems or other drift reducing systems may be utilized if they are made as drift-free as are mixtures containing an agriculturally registered thickening agent or applications made with the Microfoil boom or Thru Valve boom. If a spray thickening agent is used, follow all use recommendations and precautions on the product label. Do not use a thickening agent with the Microfoil boom, Thru Valve boom, or other systems that cannot accommodate thick sprays.

†Reference within this label to a particular piece of equipment produced by or available form other parties is provided without consideration for use by the reader at its discretion and subject to the reader's independent circumstances, evaluation, and expertise. Such reference by Dow AgroSciences is not intended as an endorsement of such equipment, shall not constitute a warranty (express or implied) of such equipment, and is not intended to imply that other equipment is not available and equally suitable. Any discussion of methods of use of such equipment does not imply that the reader should use the equipment other than is advised in directions available from the equipment's manufacturer. The reader is responsible for exercising its own judgment and expertise, or consulting with sources other than Dow AgroSciences, in selecting and determining how to use its equipment.

With aircraft, drift can be lessened by applying a coarse spray; by using a spray boom no longer than 3/4 the rotor length; by spraying only when wind velocities are low; or by using an approved drift control system. Keep operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used. Low pressure nozzles are available from spray equipment manufacturers. Select nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles.

Ground Equipment: To aid in reducing spray drift potential when making ground applications near susceptible crops or other desirable broadleaf plants, Garlon 4 should be applied through large droplet producing equipment, such as the Radiarc sprayer or in thickened spray mixtures using an agriculturally registered drift control additive, or high viscosity invert systems. When using a spray thickening or inverting additive, follow all use directions and precautions on the product label. With ground equipment, spray drift can be reduced by keeping the spray boom as low as possible; by applying 20 gallons or more of spray per acre; and by spraying when wind velocity is low. Do not apply with nozzles that produce a fine droplet spray. Keep operating spray pressures at the lower end of the manufacturer's recommended pressures for the specific nozzle type used. Low pressure nozzles are available from spray equipment manufacturers. Select nozzles and pressures which provide adequate plant coverage, but minimize the production of fine spray particles.

High Volume Leaf-Stem Treatment: To minimize spray drift, keep sprays no higher than brush tops and keep spray pressures low enough to provide coarse spray droplets. A spray thickening agent may be used to reduce spray drift.

Grazing and Haying Restrictions

Grazing or harvesting green forage:

1) Lactating dairy animals
   Two quarts per acre or less: Do not graze or harvest green forage from treated area for 14 days after treatment.
   Greater than 2 to 6 quarts per acre: Do not graze or harvest green forage until the next growing season.
2) Other Livestock
   Two quarts per acre or less: No grazing restrictions.
   Greater than 2 to 6 quarts per acre: Do not graze or harvest green forage from treated area for 14 days after treatment. **Note:** If less than 25% of a grazed area is treated, there is no grazing restriction.

Haying (harvesting of dried forage):

1) Lactating dairy animals
   Do not harvest hay until the next growing season.
2) Other Livestock
   Two quarts per acre or less: Do not harvest hay for 7 days after treatment.
   Greater than 2 to 4 quarts per acre: Do not harvest hay for 14 days after treatment.
   Greater than 4 quarts per acre: Do not harvest hay until the next growing season.

Slaughter Restrictions:
Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.

Plants Controlled by Garlon 4

Woody Plants Controlled

alder	chinquapin	madrone	scotch broom
arrowwood	choke cherry	maples	sumac
ash	cottonwood	mulberry	sweetbay magnolia
aspen	Crataegus (hawthorn)	oaks	sweetgum
bear clover (bearmat)	dogwood	persimmon	sycamore
beech	Douglas-fir	pine	tanoak
birch	elderberry	poison ivy	thimbleberry
blackberry	elm	poison oak	tree-of-heaven (*Ailanthus*)†
blackgum	gallberry	poplar	tulip poplar
boxelder†	gorse	salmonberry	wax myrtle
Brazilian pepper	hazel	salt-bush	wild rose
buckthorn	hickory	(*Braccharis* spp.)	willow
cascara	hornbeam	salt-cedar†	winged elm
Ceanothus	kudzu††	sassafras	
cherry	locust		

†For best control, use either a basal bark or cut stump treatment.
††For complete control, retreatment may be necessary.

Annual and Perennial Broadleaf Weeds Controlled

black medic	curly dock	matchweed	sweet clover
bull thistle	dandelion	mustard	vetch
burdock	field bindweed	Oxalis	wild carrot (Queen Anne's lace)
Canada thistle	goldenrod	plantain	wild lettuce
chicory	ground ivy	purple loosestrife	wild violet
clover	lambsquarters	ragweed	yarrow
creeping beggarweed	lespedeza	smartweed	

Table 1 (Maximum Application Rate): The following table is provided as a guide to the user to achieve the proper rate of Garlon 4 without exceeding the maximum use rate of 8 quarts per acre:

Spray Volume Per Acre	Quarts of Garlon 4 Per 100 Gallons of Spray (Not to Exceed 8 qt/Acre)
400	2
300	2.7
200	4
100	8
50	16
20	40
10	80

Approved Uses

Foliar Applications

Use Garlon 4 at rates of 1 to 8 quarts per acre to control broadleaf weeds and woody plants. In all cases use the amount specified in enough water to give uniform and complete coverage of the plants to be controlled. The recommended order of addition to the spray tank is water, spray thickening agent (if used), surfactant (if used), additional herbicide (if used), and Garlon 4. If a standard agricultural surfactant is used, use at a rate of 1 to 2 quarts per acre. Use continuous adequate agitation.

Before using any recommended tank mixtures, read the directions and all precautions on both labels.

For best results applications should be made when woody plants and weeds are actively growing. When hard-to-control species such as ash, blackgum, choke cherry, elm, maples (other than vine or big leaf), oaks, pines, or winged elm are prevalent, and during applications made during late summer when the plants are mature, or during drought conditions, use the higher rates of Garlon 4 alone or in combination with Tordon* 101 Mixture herbicide.

When using Garlon 4 in combination with 3.8 pounds per gallon 2,4-D low volatile ester herbicide generally the higher rates should be used for satisfactory brush control.

Use the higher dosage rates when brush approaches an average of 15 feet in height or when the brush covers more than 60% of the area to be treated. If lower rates are used on hard-to-control species, resprouting may occur the year following treatment.

On sites where easy to control brush species dominate, rates less than those recommended may be effective. Consult state or local extension personnel for such information.

Foliar Treatment With Ground Equipment

High Volume Foliar Treatment
For control of woody plants, use Garlon 4 at the rate of 1 to 3 quarts per 100 gallons of spray mixture, or Garlon 4 at 1 to 3 quarts may be tank mixed with labeled rates of 2,4-D low volatile ester herbicide, Tordon 101 Mixture herbicide, or Tordon K herbicide and diluted to make 100 gallons of spray. Apply at a volume of 100 to 400 gallons of total spray per acre depending on size and density of woody plants. Coverage should be thorough to wet all leaves, stems, and root collars. See Table 1 for relationship between spray volume and maximum application rate. When tank mixing, follow applicable use directions and precautions on each manufacturer's label.

Low Volume Foliar Treatment
To control susceptible woody plants, mix up to 20 quarts of Garlon 4 in 10 to 100 gallons of finished spray. The spray concentration of Garlon 4 and total spray volume per acre should be adjusted according to the size and density of target woody plants and kind of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars (See General Use Precautions). For best results, a surfactant should be added to all spray mixtures. Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a truck mounted spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 psi may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush. See Table 1 for relationship between mixing rate, spray volume and maximum application rate.

Tank Mixing: As a low volume foliar spray, up to 12 quarts of Garlon 4 may be applied in tank mix combination with labeled rates of Tordon K or Tordon 101 Mixture in 10 to 100 gallons of finished spray.

Broadcast Applications With Ground Equipment

Make application using equipment that will assure thorough and uniform coverage at spray volumes applied.

Woody Plant Control

Foliage Treatment: Use 4 to 8 quarts of Garlon 4 in enough water to make 5 or more gallons per acre of total spray, or Garlon 4 at 1 1/2 to 3 quarts may be combined with labeled rates of 2,4-D low volatile ester, Tordon 101 Mixture, or Tordon K in sufficient water to make 5 or more gallons per acre of total spray.

Broadleaf Weed Control
Use Garlon 4 at rates of 1 to 4 quarts in a total volume of 5 or more gallons per acre as a water spray mixture. Apply at any time weeds are actively growing. Garlon 4 at 0.25 to 3 quarts may be tank mixed with labeled rates of 2,4-D amine or low volatile ester, Tordon K, or Tordon 101 Mixture to improve the spectrum of activity. For thickened (high viscosity) spray mixtures, Garlon 4 can be mixed with diesel oil or other inverting agent. When using an inverting agent, read and follow the use directions and precautions on the product label.

Aerial Application (Helicopter Only)

Aerial sprays should be applied using suitable drift control (See "General Use Precautions").

Foliage Treatment (Utility and Pipeline Rights-of-Way)
Use 4 to 8 quarts of Garlon 4 alone, or 3 to 4 quarts Garlon 4 in a tank mix combination with labeled rates of 2,4-D low volatile ester Tordon 101 Mixture or Tordon K and apply in a total spray volume of 10 to 30 gallons per acre. Use the higher rates and volumes when plants are dense or under drought conditions.

Basal Bark and Dormant Brush Treatments

To control susceptible woody plants in rights-of-way, and other non-crop areas, and in forests, use Garlon 4 in oil or oil-water mixtures prepared and applied as described below. When preparing mixtures, use as oils either a commercially available basal oil, diesel fuel, No. 1 or No. 2 fuel oil, or kerosene. Substitute other oils or diluents only as recommended by the oil or diluent's manufacturer. When mixing with a basal oil or other oils or diluents, read and follow the use directions and precautions on the product label prepared by the oil or diluent's manufacturer.

Oil Mixture Sprays
Add Garlon 4 to the required amount of oil in the spray tank or mixing tank and mix thoroughly. If the mixture stands over 4 hours, reagitation is required.

Oil Mixtures of Garlon 4 and Tordon K: Tordon K and Garlon 4 may be used in tank mix combination for basal bark treatment of woody plants. These herbicides are incompatible and will not form a stable mixture when mixed together directly in oil. Stable tank mixtures for basal bark application can be made if each product is first combined with a compatibility agent prior to final mixing in the desired ratio.
(See product bulletin for mixing instructions.)

Oil-Water Mixture Sprays
First, premix the Garlon 4, oil and surfactant in a separate container. Do not allow any water or mixtures containing water to get into the Garlon 4 or the premix. Fill the spray tank about half full with water, then slowly add the premix with continuous agitation and complete filling the tank with water. Continue moderate agitation.

Note: If the premix is put in the tank without any water, the first water added may form a thick "invert" (water in oil) emulsion which will be hard to break.

Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 1 to 5 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with knapsack sprayer or power spraying equipment using low pressure (20-40 psi). Spray the basal parts of brush and tree trunks to a height of 12 to 15 inches from the ground. Thorough wetting of the indicated area is necessary for good control. Spray until runoff at the ground line is noticeable. Old or rough bark requires more spray than smooth young bark. Apply at any time, including the winter months, except when snow or water prevent spraying to the ground line.

Low Volume Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Spray the basal parts of brush and tree trunks in a manner which thoroughly wets the lower stems, including the root collar area, but not to the point of runoff. Herbicide concentration should vary with size and susceptibility of species treated. Apply at any time, including the winter months, except when snow or water prevent spraying to the ground line or when stem surfaces are saturated with water.

Garlon 4 Plus Tordon K in Oil Tank Mix: Garlon 4 and Tordon K may be applied as a low volume basal bark treatment to improve control of certain woody species such as ash, elm, maple, poplar, aspen, hackberry, oak, oceanspray, birch, hickory, pine, tanoak, cherry, locust, sassafras, and multiflora rose. (See product bulletin for mixing instructions.)

Streamline Basal Bark Treatment (Southern States)
To control or suppress susceptible woody plants for conifer release, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using equipment which provides a directed straight stream spray. Apply sufficient spray to one side of stems less than 3 inches in basal diameter to form a treated zone that is 6 inches in height. When the optimum amount of spray mixture is applied, the treated zone should widen to encircle the stem within approximately 30 minutes. Treat both sides of stems which are 3 to 4 inches in basal diameter. Direct the spray at bark that is approximately 12 to 24 inches above ground. Pines (loblolly, slash, shortleaf, and Virginia) up to 2 inches in diameter breast height (dbh) can be controlled by directing the spray at a point approximately 4 feet above ground. Vary spray mixture concentration with size and susceptibility of the species being treated. Best results are achieved when applications are made to young vigorously growing stems which have not developed the thicker bark characteristic of slower growing, understory trees in older stands. This technique is not recommended for scrub and live oak species, including blackjack, turkey, post, live, bluejack and laurel oaks, or bigleaf maple. Apply from approximately 6 weeks prior to hardwood leaf expansion in the spring until approximately 2 months after leaf expansion is completed. Do not apply when snow or water prevent spraying at the desired height above ground level.

Low Volume Stem Bark Band Treatment (North Central and Lake States)
To control susceptible woody plants with stems less than 6 inches in basal diameter, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Apply the spray in a 6 to 10 inch wide band that completely encircles the stem. Spray in a manner that completely wets the bark, but not to the point of runoff. The treatment band may be positioned at any height up to the first major branch. For best results apply the band as low as possible. Spray mixture concentration should vary with size and susceptibility of species to be treated. Applications may be made at any time, including winter months.

Thinline Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in diameter, apply Garlon 4 either undiluted or mixed at 50-75% v/v with oil in a thin stream to all sides of the lower stems. The stream should be directed horizontally to apply a narrow band around each stem or clump. Use a minimum of 2 to 15 milliliters of Garlon 4 or oil mixture with Garlon 4 to treat single stems and from 25 to 100 milliliters to treat clumps of stems. Use an applicator metered or calibrated to deliver the small amounts required.

Dormant Stem Treatment
Dormant stem treatments will control susceptible woody plants and vines with stems less than 2 inches in diameter. Plants with stems greater than 2 inches in diameter may not be controlled and resprouting may occur. This treatment method is best suited for sites with dense, small diameter brush. Dormant stem treatments of Garlon 4 can also be used as a chemical side-trim for controlling lateral branches of larger trees that encroach onto roadside, utility, or other rights-of-way.

Mix 4 to 8 quarts of Garlon 4 in 2 to 3 gallons of crop oil concentrate or other recommended oil and add this mixture to enough water to make 100 gallons of spray solution. Use continuous adequate agitation. Apply with Radiarc, OC or equivalent nozzles, or handgun using 70 to 100 gallons of spray per acre to ensure uniform coverage of stems. Garlon 4 may be mixed with 4 quarts of Weedone 170 herbicide to improve the control of black cherry and broaden the spectrum of herbicidal activity. In western states, apply anytime after woody plants are dormant. In other areas apply anytime within 10 weeks of budbreak, generally February through April. Do not apply to wet or saturated bark as poor control may result.

Cut Stump Treatment
To control resprouting of cut stumps of susceptible species, mix 20 to 30 gallons of Garlon 4 in enough oil to make 100 gallons of spray mixture. Apply with a backpack or knapsack sprayer using low pressures and a solid cone or flat fan nozzle. Spray the root collar area, sides of the stump, and the outer portion of the cut surface including the cambium until thoroughly wet, but not to the point of runoff. Spray mixture concentration should vary with size and susceptibility of species treated. Apply at any time, including in winter months, except when snow or water prevent spraying to the ground line.

Treatment of Cut Stumps in Western States
To control resprouting of salt-cedar and other *Tamarix* species, bigleaf maple, tanoak, Oregon myrtle, and other susceptible species, apply undiluted

Garlon 4 to wet the cambium and adjacent wood around the entire circumference of the cut stump. Treatments may be applied throughout the year; however, control may be reduced with treatment during periods of moisture stress as in late summer. Use an applicator which can be calibrated to deliver the small amounts of material required.

Note: All basal bark and dormant brush treatment methods may be used to treat susceptible woody species on range and permanent pasture land provided that no more than 1.5 quarts of Garlon 4 are applied per acre. Large plants or species requiring higher rates of Garlon 4 may not be completely controlled.

Forest Management Applications

For broadcast applications apply the recommended rate of Garlon 4 in a total spray volume of 5 to 25 gallons per acre by air or 10 to 100 gallons per acre by ground. Use spray volumes sufficient to provide thorough coverage of treated foliage. Use application systems designed to prevent spray drift to off-target sites. Nozzles or additives that produce larger droplets may require higher spray volumes to provide adequate coverage.

Plant Back Interval for Conifers: Conifers planted sooner than 1 month after treatment with Garlon 4 at less than 4 quarts per acre or sooner than 2 months after treatment at 4 to 8 quarts per acre may be injured. When tank mixtures of herbicides are used for forest site preparation, labels for all products in the mixture should be consulted and the longest recommended waiting period observed.

Broadcast Treatments for Forest Site Preparation (Not For Conifer Release)

Southern States Including Alabama, Arkansas, Delaware, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia: To control susceptible woody plants and broadleaf weeds, apply Garlon 4 at a rate of 4 to 8 quarts per acre. To broaden the spectrum of woody plants and broadleaf weeds controlled, apply 2 to 4 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Tordon 101 Mixture or Tordon K. Tordon 101 Mixture and Tordon K are not registered for use in the states of California and Florida. Where grass control is also desired, Garlon 4, alone or in combination with Tordon K or Tordon 101 Mixture, may be tank mixed with labeled rates of other herbicides registered for grass control in forests. Use of tank mix products must be in accordance with the most restrictive of label limitations and precautions. No label application rates should be exceeded. Garlon 4 cannot be tank mixed with any product containing a label prohibition against such mixing.

In Western, Northeastern, North Central, and Lake States (States Not Listed Above As Southern States): To control susceptible woody plants and broadleaf weeds, apply Garlon 4 at a rate of 3 to 6 quarts per acre. To broaden the spectrum of woody plants and broadleaf weeds controlled, apply 1.5 to 3.0 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Tordon 101 Mixture, Tordon K, or 2,4-D low volatile ester. Tordon 101 Mixture and Tordon K are not registered for use in the states of California and Florida. Where grass control is also desired, Garlon 4, alone or in tank mix combination with Tordon 101 Mixture or Tordon K, may be applied with labeled rates of other herbicides registered for grass control in forests. When applying tank mixes, follow applicable use directions and precautions on each product label.

Applications for Site Preparation in Southern Coastal Flatwoods: To control susceptible broadleaf weeds and woody species such as gallberry and wax-myrtle, and for partial control of saw-palmetto, apply 2 to 4 quarts per acre of Garlon 4. To broaden the spectrum of species controlled to include fetterbush, staggerbush, titi, and grasses, apply 2 to 3 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Arsenal Applicator's Concentrate herbicide. Where control of gallberry, wax-myrtle, broadleaf weeds, and grasses is desired, 2 to 3 quarts per acre of Garlon 4 may be applied in tank mix combination with labeled rates of Accord herbicide.

These treatments may be broadcast during site preparation of flat planted or bedded sites or, on bedded sites, applied in bands over the top of beds. For best results, make applications in late summer or fall. Efficacy may not be satisfactory when applications are made in early season prior to August. **Note: Do not apply after planting pines.**

Applications for Conifer Release

Note: Applications for conifer release may cause temporary damage and growth suppression where contact with conifers occurs; however, injured conifers should recover and grow normally. Over-the-top spray applications can kill pines.

Directed Sprays
To release conifers from competing hardwoods and brush such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, hickory, alder, birch, aspen, pin cherry, *Ceanothus* spp., blackberry, chinquapin, and poison oak, mix 4 to 20 quarts of Garlon 4 in enough water to make 100 gallons of spray mixture. This spray should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after the hardwoods and brush have reached full leaf size, but before autumn coloration. The majority of treated hardwoods and brush should be less than 6 feet in height to ensure adequate spray coverage. Care should be taken to direct spray solutions away from conifer foliage, particularly foliage of desirable pines. See Table 1 for relationship between mixing rate, spray volume and maximum application rate.

Broadcast Applications for Mid-Rotation Understory Brush Control in Southern Coastal Flatwoods Pine Stands (Ground Equipment Only)
For control of susceptible species such as gallberry and wax-myrtle and broadleaf weeds, apply 2 to 4 quarts per acre of Garlon 4. To broaden the spectrum of woody plants controlled to include fetterbush, staggerbush, and titi, apply 2 to 3 quarts per acre of Garlon 4 in tank mix combination with labeled rates of Arsenal Applicator's Concentrate. Saw-palmetto will be partially controlled by use of Garlon 4 at 4 quarts per acre or by mixtures of Garlon 4 at 2 to 3 quarts per acre in tank mix combination with either Arsenal Applicator's Concentrate or Escort herbicide.

These mixtures should be broadcast applied over target understory brush species, **but to prevent injury to pines, make applications underneath the foliage of pines.** It is recommended that sprays be applied in 30 or more gallons per acre of total volume. For best results, make applications in late summer or fall. Efficacy may not be satisfactory when applications are made in early season prior to August.

Broadcast Applications for Conifer Release in the Pacific Northwest and California

On Dormant Conifers Before Bud Swell (Excluding Pines): To control or suppress deciduous hardwoods such as vine maple, bigleaf maple, alder, scotch broom, or willow **before leaf-out** or evergreen hardwoods such as madrone, chinquapin, and *Ceanothus* spp., use Garlon 4 at 1 to 2 quarts per acre. Diluents used may be diesel or fuel oil. Or, water plus 1 to 2 gallons per acre of diesel oil or a suitable surfactant or oil substitute at manufacturer's recommended rates may be used.

On Conifer Plantations (Excluding Pines) After Hardwoods Begin Growth and Before Conifer Bud Break ("Early Foliar" Hardwood Stage): Use Garlon 4 at 1.0 to 1.5 quarts alone or plus 2,4-D low volatile ester herbicide in water carrier to provide no more than 3 pounds acid

equivalent per acre from both products. After conifer bud break, these sprays may cause more serious injury to the crop trees. Use of a surfactant may cause unacceptable injury to conifers especially after bud break.

On Conifer Plantations (Excluding Pines) After Conifers Harden Off In Late Summer and While Hardwoods Are Still Growing Actively: Use Garlon 4 at rates of 1.0 to 1.5 quarts per acre alone or plus 2,4-D low volatile ester to provide no more than 3 pounds acid equivalent per acre from both products. Treat as soon after conifer bud hardening as possible so that hardwoods and brush are actively growing. Use of oil, oil substitute, or surfactant may cause unacceptable injury to the conifers.

Broadcast Applications for Conifer Release in the Eastern United States
To release spruce, fir, red pine, and white pine from competing hardwoods such as red maple, sugar maple, striped maple, alder, birch (white, yellow, and grey), aspen, ash, pin cherry, and *Rubus* spp. and perennial and annual broadleaf weeds, use Garlon 4 at rates of 1.5 to 3.0 quarts per acre alone or plus 2,4-D amine or low volatile ester to provide no more than 4 pounds acid equivalent per acre from both products. Applications should be made in late summer or early fall after conifers have formed their overwintering buds and hardwoods are in full leaf and prior to autumn coloration.

Broadcast Applications for Conifer Release in the Lake States Region
To release spruce, fir, and red pine from competing hardwoods such as aspen, birch, maple, cherry, willow, oak, hazel, and *Rubus* spp. and perennial and annual broadleaf weeds, use Garlon 4 at rates of 1.5 to 3.0 quarts per acre. Applications should be made in late summer or early fall after conifers have formed their overwintering buds and hardwoods are in full leaf and prior to autumn coloration.

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. In no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the "Warranty Disclaimer" above and this "Limitation of Remedies" cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the "Warranty Disclaimer" or this "Limitation of Remedies" in any manner.

*Trademark of Dow AgroSciences LLC
Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.

Label Code: D02-102-023
Replaces Label: D02-102-022

EPA-Accepted 07/22/97

Revisions:
Minor corrections to EPA accepted text dated 7-22-97

ATTACHMENT B2

PATHFINDER II®

Specimen Label

Dow AgroSciences

Pathfinder* II

Specialty Herbicide

*Trademark of Dow AgroSciences LLC

A ready-to-use herbicide for the control of woody plants on:

- **Forests**
- **Non-crop areas including: Industrial manufacturing and storage sites, rights-of-way, non-irrigation ditch banks**
- **Rangeland and permanent pastures**
- **Grazed areas and maintenance of wildlife openings on those sites**

Active Ingredient:	
triclopyr: 3,5,6-trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester	13.6%
Inert Ingredients	86.4%
Total	100.0%

Acid Equivalent: triclopyr – 9.81% – 0.75 lb/gal

EPA Reg. No. 62719-176

Keep Out of Reach of Children

CAUTION PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

Precautionary Statements

Hazards to Humans and Domestic Animals

Harmful If Swallowed, Inhaled Or Absorbed Through The Skin

Avoid contact with skin, eyes or clothing. Avoid breathing vapor or spray mist. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

Personal Protective Equipment (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category E on an EPA chemical resistance category selections chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

First Aid

If on skin: Wash with plenty of soap and water. Get medical attention.
If inhaled: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.
If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.

Environmental Hazards

This pesticide is toxic to fish. Keep out of lakes, ponds or streams. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.

Physical or Chemical Hazards

Combustible - Do not use or store near heat or open flame. Do not cut or weld container.

Notice: Read the entire label. Use only according to label directions. **Before buying or using this product, read "Warranty Disclaimer" and "Limitation of Remedies" elsewhere on this label.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our web site at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
Read all Directions for Use carefully before applying.

Ready-To-Use, No Mixing Required.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Chemical-resistant gloves such as Barrier Laminate, Nitrile Rubber, Neoprene Rubber, or Viton
- Shoes plus socks

Storage and Disposal

Do not contaminate water, food or feed by storage or disposal. Open dumping is prohibited.
Storage: Store above 28°F or agitate before use.
Pesticide Disposal: Pesticide, spray mixture, or rinsate that cannot be used according to label instructions must be disposed of according to applicable federal, state, or local procedures.
Container Disposal: Triple rinse (or equivalent) with 10 drops or more of a liquid hand soap and water or an oil basal product such as kerosene or diesel fuel and spray rinsate on undesirable vegetation, in target area. Offer containers for recycling or reconditioning where allowed, or puncture and dispose of in a sanitary landfill, or by incineration if approved by state and local procedures.
Container Disposal for Refillable Containers: Close all openings which have been opened during use and replace all caps. Return the empty container to a collection site designated by Dow AgroSciences. If the container has been damaged and cannot be returned according to the recommended procedures, contact the Dow AgroSciences Customer Service Center at 1-800-258-1470 to obtain proper handling instructions.
General: Consult federal, state, or local disposal authorities for approved alternative procedures.

General Information

Pathfinder II herbicide is a ready-to-use product which is recommended for the control of unwanted woody plants through the use of basal bark application techniques in forests, rangeland and permanent pastures, and on non-crop areas including industrial manufacturing and storage sites, rights-of-way such as electrical power lines, communication lines, pipelines, road sides and railroads, fence rows, non-irrigation ditch banks and around farm buildings. Use on these sites may include application to grazed areas as well as establishment and maintenance of wildlife openings.

General Use Precautions

The state of Arizona has not approved Pathfinder II for use on plants grown for commercial production; specifically forests grown for commercial timber production, or on designated grazing areas.

Apply this product only as specified on this label.

Do not apply this product through any type of irrigation system.

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Do not apply to open water (such as lakes, reservoirs, rivers, streams, creeks, salt water bays or estuaries) nor to water present in fresh water wetlands, deltas, marshes, swamps, bogs or potholes, or to salt water marshes below the mean high water mark.

Do not apply Pathfinder II herbicide directly to, or otherwise permit it to come into direct contact with grapes, tobacco, vegetable crops, flowers or other desirable broadleaf plants, and do not permit spray mists containing it to drift onto them.

Avoid Injurious Spray Drift: Applications should be made only when there is little or no hazard from spray drift. Very small quantities of spray, which may not be visible, may seriously injure susceptible plants. Do not spray when wind is blowing toward susceptible crops or ornamental plants near enough to be injured.

With ground equipment, spray drift can be reduced by using spray pressures no greater than are required to obtain adequate coverage; by using large droplet producing nozzle tips; and by spraying when wind velocity is low. Do not apply with nozzles that produce a fine droplet spray. Do not apply with an orchard type mist blower.

Do not apply on snow or frozen ground.

Untreated trees occasionally can be affected by movement of the herbicide through root grafting with the treated trees.

Since this herbicide moves within the treated plant, do not use Pathfinder II on parts of a multiple stem plant if injury to the untreated portions (cut or standing stems) cannot be tolerated.

Do not apply on ditches used to transport irrigation water. Do not apply where runoff or irrigation water may flow onto agricultural land as injury to crops may result.

Be sure that use of this product conforms to all applicable regulations.

Grazing and Haying Restrictions

Grazing or harvesting green forage:

1) Lactating dairy animals
   - 2.5 gallons/acre or less: Do not graze or harvest green forage from treated area for 14 days after treatment.
   - Greater than 2.5 gallons/acre: Do not graze or harvest green forage until the next growing season.
2) Other Livestock
   - 2.5 gallons/acre or less: No grazing restrictions.
   - Greater than 2.5 to 7.5 gallons/acre: Do not graze or harvest green forage from treated area for 14 days after treatment. **Note:** If less than 25% of a grazed area is treated, there is no grazing restriction.

Haying (harvesting of dried forage):

1) Lactating dairy animals
   - Do not harvest hay until the next growing season.

2) Other Livestock
   - 2.5 gallons/acre or less: Do not harvest hay for 7 days after treatment.
   - Greater than 2.5 to 5 gallons/acre: Do not harvest hay for 14 days after treatment.
   - Greater than 5 gallons/acre: Do not harvest hay until the next growing season.

Slaughter Restrictions: Withdraw livestock from grazing treated grass or consumption of treated hay at least 3 days before slaughter. This restriction applies to grazing during the season following treatment or hay harvested during the season following treatment.

Among The Woody Plant Species Controlled Are:

ailanthus	hackberry	oak, water
alder, red	hazel	oak, white
alder, speckled	hercules club	olive, autumn
ash, green	hickory, mockernut	olive, Russian
ash, white	hickory, pignut	persimmon, common
aspen†	honeylocust	pine, jack
Australian pine	hornbeam (blue beach)	pine, loblolly
basswood	locust, black†	pine, ponderosa
beech, American	madrone, Pacific	pine, red
birch, black	manzanita, greenleaf	pine, white
birch, gray	maple, bigleaf†	poison ivy
birch, paper	maple, mountain	poison oak
blackberry	maple, red	poplar, balsam
black locust	maple, silver	redcedar, eastern
blackgum	maple, striped	salt cedar†
boxelder	maple, sugar	sassafras†
Brazilian pepper	maple, vine	sumac, smooth†
cherry, black†	mesquite†/†††	sumac, staghorn†
cherry, choke	mountain-laurel	sweetgum
cherry, pin	oak, black††	sycamore
cottonwood	oak, blackjack††	tamarack
dogwood, flowering	oak, chestnut	tanoak
dogwood, red-osier	oak, post††	walnut
elm, American	tanoak	waxmyrtle
elm, winged†	walnut	willow
gallberry	oak, red	yaupon
guava	oak, scarlet	yellow poplar

† Some resprouting may occur.
†† Not recommended for streamline basal treatment.
††† Suppression only with streamline basal bark treatment.

Approved Uses

Forest Uses

Agricultural Use Requirements for Forest Use: For the following crop and forestry uses, follow PPE and Reentry instructions in the "Agricultural Use Requirements" section of this label.

Non-crop Uses Such As Rights-of-Way, Industrial Sites, Rangeland and Permanent Pastures, Non-irrigation Ditch Banks and Wildlife Openings.

Use Requirements for Non-cropland Areas: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is applied to non-cropland areas.

Low Volume Basal Bark Treatment
To control susceptible woody plants with stems less than 6 inches in basal diameter, apply Pathfinder II with a backpack or knapsack sprayer using low pressure and a solid cone or flat fan nozzle. Spray the basal parts of brush and tree trunks in a manner which thoroughly wets the lower 12 to 15 inches of stems, including the root collar area, but not to the point of runoff. Herbicide concentration should vary with size and susceptibility of species treated. Apply at any time, including the winter months, except when snow or water prevent spraying to the ground line.

Treatment of Cut Stumps
To control resprouting, apply undiluted Pathfinder II to wet the area adjacent to the cambium and bark around the entire circumference and the sides of cut stumps. Sides of stumps should be thoroughly wetted down to the root collar area, but not to the point of runoff. Treatments may be applied throughout the year, except when snow or water prevent spraying to the ground line. Control may be reduced with treatment during periods of moisture stress as in late summer.

Streamline Basal Bark Treatment (Southern States)
To control or suppress susceptible woody plants for conifer release or in rangeland and pasture, apply Pathfinder II with a backpack or knapsack sprayer using equipment which provides a directed straight-stream spray. Apply sufficient spray to one side of stems less than 3 inches in basal diameter to form a treated zone that is 6 inches in height. When the optimum amount of spray mixture is applied, the treated zone should widen to encircle the stem within approximately 30 minutes. Treat both sides of stems which are 3 to 4 inches in basal diameter. Direct the spray at bark that is approximately 12 to 24 inches above ground. Pines (loblolly, slash, shortleaf, and Virginia) up to 2 inches in diameter breast height (dbh) can be controlled by directing the spray at the point approximately 4 feet above ground. Best results are achieved when applications are made to young vigorously growing stems which have not developed the thicker bark characteristic of slower growing, understory trees in older stands. This technique is not recommended for scrub and live oak species, including blackjack, turkey, post, live, bluejack and laurel oaks. Apply from approximately 6 weeks prior to hardwood leaf expansion in the spring until approximately 2 months after leaf expansion is completed. Do not apply when snow or water prevent spraying at the desired height above ground level.

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperature, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. All such risks shall be assumed by buyer.

Limitation of Remedies

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used

Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. In no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the "Warranty Disclaimer" above and this "Limitation of Remedies" cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the "Warranty Disclaimer" or this "Limitation of Remedies" in any manner.

*Trademark of Dow AgroSciences LLC
Dow AgroSciences LLC • Indianapolis, IN 46268 U.S.A.

Label Code: D02-104-007
Replaces Label: D02-104-006

EPA Accepted 05/17/94

Revisions:

1. General Use Precautions (The following statement was deleted from this section): "Do not use for manufacturing or formulating."

ATTACHMENT B3

ACCORD®

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

ACCORD* CONCENTRATE HERBICIDE

Effective Date: 3/23/04
Product Code: 84820
MSDS: 006694

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Accord* Concentrate Herbicide

COMPANY IDENTIFICATION:
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

Glyphosate IPA: N-(phosphono-methyl) glycine, Isopropylamine Salt	CAS # 038641-94-0	53.8%
Balance, Total		46.2%

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Clear, pale yellow liquid. May cause eye irritation. Slightly toxic to aquatic organisms.
EMERGENCY PHONE NUMBER: 800-992-5994

4. FIRST AID:

EYE: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: No emergency medical treatment necessary.

INHALATION: Remove person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: >214°F (>101°C)
METHOD USED: Setaflash

FLAMMABLE LIMITS:
LFL: Not applicable
UFL: Not applicable

EXTINGUISHING MEDIA: Foam, CO_2, Dry Chemical

FIRE AND EXPLOSION HAZARDS: Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

FIRE-FIGHTING EQUIPMENT: Use positive-pressure, self-contained breathing apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS: Absorb small spills with an inert absorbent material such as Hazorb, Zorball, sand, or dirt. Report large spills to Dow AgroSciences on 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors and spray mist. Handle concentrate in ventilated area. Wash thoroughly with soap and water after handling and before eating, chewing gum, using tobacco, using the toilet or smoking. Keep away from food, feedstuffs, and water supplies. Store in original container with the lid tightly closed. Store above 10°F (-12°C) to keep from crystallizing.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINES: None established

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

RESPIRATORY PROTECTION: For most conditions, no respiratory protection should be needed; however, if discomfort is experienced, use a NIOSH approved air-purifying respirator.

APPLICATIONS AND ALL OTHER HANDLERS: Please refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE: Clear, pale yellow liquid
DENSITY: 10.0 - 10.5 lbs/gal
pH: 4.8 – 5.0
ODOR: None
SOLUBILITY IN WATER: Miscible
SPECIFIC GRAVITY: 1.21 gm/L
FREEZING POINT: -7°F - -10°F (-21°C - -25°C)

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Stable under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Galvanized or unlined steel (except stainless steel) containers or spray tanks may produce hydrogen gas which may form a highly combustible gas mixture.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

EYE: May cause slight temporary eye irritation. Corneal injury is unlikely.

SKIN: Essentially non-irritating to skin. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD_{50} for skin absorption in rabbits is >5000 mg/kg. Did not cause allergic skin reactions when tested in guinea pigs.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD_{50} for rats is >5000 mg/kg.

INHALATION: Brief exposure (minutes) is not likely to cause adverse effects. The aerosol LC_{50} for rats is >6.37 mg/L for 4 hours.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: For a similar material, glyphosate, in animals, effects have been reported on the following organ: liver.

CANCER INFORMATION: A similar material, glyphosate, did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): For glyphosate IPA, available data are inadequate for evaluation of potential to cause birth defects.

REPRODUCTIVE EFFECTS: For glyphosate IPA, available data are inadequate to determine effects on reproduction.

MUTAGENICITY: For a similar material, glyphosate, in-vitro and animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL DATA:

ECOTOXICOLOGY:
Material is practically non-toxic to aquatic organisms on an acute basis (LC_{50} or EC_{50} is >100 mg/L in most sensitive species tested).
Acute LC_{50} for rainbow trout *(Oncorhynchus mykiss)* is >2500 mg/L.
Acute immobilization EC_{50} in water flea *(Daphnia magna)* is 918 mg/L.
Material is practically non-toxic to birds on an acute basis (LD_{50} is >2000 mg/kg).
Acute oral LD_{50} in bobwhite *(Colinus virginianus)* is >2000 mg/kg.
The LC_{50} in earthworm Eisenia foetida is >1000 mg/kg.
Acute contact LD_{50} in honey bee *(Apis mellifera)* is >100 µg/bee.
Acute oral LD_{50} in honey bee *(Apis mellifera)* is >100 µg/bee.
Growth inhibition EC_{50} in green alga *(Selenastrum capricornutum)* is 127 mg/L.
Growth inhibition EC_{50} in duckweed *(Lemna sp.)* is 24.4 mg/L.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities.

MATERIAL SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

ACCORD* CONCENTRATE HERBICIDE

Effective Date: 3/23/04
Product Code: 84820
MSDS: 006694

This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For all package sizes and modes of transportation:
This material is not regulated for transport.

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: This product is not known to contain any substances subject to the disclosure requirements of

New Jersey
Pennsylvania

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

CATEGORY	RATING
Health	1
Flammability	1
Reactivity	0

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 3,4,11,12,13,14 & 15
Reference: DR-0361-8028
Replaces MSDS Dated: 1/12/00
Document Code: D03-145-002
Replaces Document Code: D03-145-001

The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult Dow AgroSciences For Further Information.

*Trademark of Dow AgroSciences LLC

ATTACHMENT B4

VELPAR®

The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

"DuPont" "VELPAR" DF HERBICIDE
M0000325 Revised 25-JUN-2003

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

VELPAR is a registered trademark of DuPont.

"DuPont" is a trademark of DuPont.

Corporate MSDS Number : DU008210

Tradenames and Synonyms

"Velpar" F
"VELPAR" 75WG
DUPONT VELPAR 75WG

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS
Product Information : 1-800-441-7515 (outside the U.S. 302-774-1000)
Transport Emergency : CHEMTREC 1-800-424-9300(outside U.S. 703-527-3887)
Medical Emergency : 1-800-441-3637 (outside the U.S. 302-774-1000)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
*HEXAZINONE (3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H,3H)-dione)	51235-04-2	75
INERT INGREDIENTS		25

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Emergency Overview

DANGER Corrosive, causes irreversible eye damage. Harmful if swallowed. Do not get in eyes or on clothing. Avoid contact with skin. Wash thoroughly with soap and water after handling.

Potential Health Effects

HUMAN HEALTH EFFECTS OF OVEREXPOSURE TO HEXAZINONE:

Overexposure to hexazinone by eye contact may initially include eye irritation with discomfort, tearing, or blurring of vision.

Ingestion may include abnormal liver function as detected by laboratory tests.

Significant skin permeation and systemic toxicity after contact appears unlikely. Individuals with preexisting diseases of the liver may have increased susceptability to the toxicity of excessive exposures.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

INHALATION: No specific intervention is indicated, as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary.

(FIRST AID MEASURES - Continued)

Notes to Physicians

Probable mucosal damage may contraindicate the use of gastric lavage.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-441-3637 for emergency medical treatment information.

FIRE FIGHTING MEASURES

Flammable Properties

Not a fire or explosion hazard.

Extinguishing Media

Use media appropriate for surrounding material.

Fire Fighting Instructions

Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus. Wear full protective equipment.

If area is exposed to fire and conditions permit, let fire burn itself out. Burning chemicals may produce by-products more toxic than the original material. If product is on fire, wear self-contained breathing apparatus and full protective equipment. Use water spray. Control runoff.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Emergency Response - Chemical resistant coveralls, waterproof gloves, waterproof boots and face/eye protection. If dusting occurs, use NIOSH approved respirator protection.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas.

Spill Clean Up

Shovel or sweep up.

HANDLING AND STORAGE

Handling (Personnel)

Do not get in eyes. Avoid breathing dust. Avoid contact with skin. Avoid contact with clothing.

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Storage

Store product in original container only. Do not contaminate water, other pesticides, fertilizer, food or feed in storage.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation.

Personal Protective Equipment

Applicators and other handlers must wear:

Long-sleeved shirt and long pants.
Shoes plus socks.
Protective eye wear

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Follow manufacturer instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls.
- Chemical resistant gloves in Category A (such as
- butyl rubber, natural rubber, neoprene rubber, or
- Nitrile rubber) all greater than or equal to 14
- mils.
- Shoes plus socks.
- Protective eyewear.

Exposure Guidelines

Applicable Exposure Limits
HEXAZINONE

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 10 mg/m3, 8 Hr. TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Odor	: Acrid (slight).
Form	: Dry Flowable Granules.
Color	: Tan (light).
pH	: 8.4 (1% wt/wt in water)
Density	: 0.58 g/mL
Solubility in Water¸	: Water Dispersible

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Incompatibility with Other Materials

Incompatible or can react with strong bases.

Decomposition

Decomposition will not occur.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

Acute Oral LD50¸: calculated to be 1310 mg/kg in rats.

Acute Dermal LD50¸: > 5000 mg/kg in rabbits.

Inhalation 4 hour LC50¸: > 5.2 mg/L in rats.

Eye Irritation: In tests with rabbits, product caused conjunctival chemosis, conjunctival redness, and corneal opacity. Positive irritant effects were present in 1 rabbit

(TOXICOLOGICAL INFORMATION - Continued)

21 days after treatment.

Skin irritation and Sensitization: According to criteria established by the U.S. EPA this product is considered to be a moderate skin irritant. According to criteria established by EEC Directive 93/21 this product can be classified a non-irritant. Product is not a skin sensitizer in tests on guinea pigs.

OTHER STUDIES - Hexazinone

Oral (rat): In a 2-year feeding study with the 90% powder, the no-observable-effect level (NOEL) was 200 ppm a.i.; nutritional and body weight effects were seen in females at 1000 ppm a.i. and in both sexes at 2500 ppm a.i. Biochemical effects were noted in both sexes at 2500 ppm a.i.

Oral (mouse): In a 2-year feeding study with technical material, the no-observable-effect level (NOEL) was 200 ppm. Decreased body weight gain was observed in both sexes at 2500 ppm and 10000 ppm. This effect was severe at 10000 ppm, the highest level tested. Non-neoplastic liver effects were noted in males at 2500 ppm and in both sexes at 10000 ppm. Based on recent pathology review, hyperplastic liver nodules diagnosed at 10000 ppm when this study was initially conducted have been reclassified as liver adenomas. This effect was only significant among female mice in this dose group. This change reflects the current scientific concensus regarding the classification of this benign lesion in the mouse liver.

Oral (dog): In a 1-year feeding study with technical material, the NOEL was 200 ppm. Reduced food consumption and body weight gains were significant at the high dose, 6000 ppm. These nutritional effects were associated with mild but reversible changes in hematological parameters at the high dose. Increased liver weights and other non-neoplastic liver effects as indicated by histopathology and changes in clinical chemical parameters were observed at 1500 and/or 60000 ppm.

Reproduction (rat): In a 3-generation, 3-litter study with 90% powder, no adverse reproduction or lactation effects were seen at any level; slightly depressed average weanling weights were noted in the second and third litters at the high dose, 2500 ppm. A second rat reproduction study (2-generation, 3-litter study) was conducted at dietary doses from 200 to 5000 ppm. There were no adverse effects on fertility. The NOEL was 200 ppm. Decreased food consumption, parental body weight gain and decreased offspring weights were observed at the higher doses.

Teratogenicity: Not teratogenic or embrryo-fetal toxic to

(TOXICOLOGICAL INFORMATION - Continued)

rats by dietary administration at levels as high as 5000 ppm, the highest dose tested. Administration to rats by oral intubation resulted in a NOEL for maternal and fetal effects of 100 mg/kg body wt./day. Maternal toxicity (reduced food consumption and lower body weights) was observed at 400 and 900 mg/kg. Lower fetal weights and indications of general delayed development associated with maternal toxicity were also observed at these doses. When hexazinone was administered to rabbits via oral intubation, there were no teratogenic or embryo-fetal toxic effects at the highest dose tested, 125 mg/kg/day. Only a transient reduction in maternal food consumption was observed at the high dose. The maternal and fetal NOELs are considered to be 125 mg/kg.

Mutagenicity: Not mutagenic in Ames bacterial assay, Chinese hamster ovary cell point mutation assay, or rat liver DNA repair assay; positive in the in vitro Chinese hamster ovary cell cytogenetic assay but negative in the in vivo rat bone marrow cytogenic assay.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

For the active ingredient hexazinone:

- 96 Hour LC50, bluegill sunfish: >370 ppm
  96 Hour LC50, rainbow trout : >320 ppm
- 96 hour LC50, fathead minnow : 274 ppm

DISPOSAL CONSIDERATIONS

Waste Disposal

Do not contaminate water, food, or feed by disposal. Waste resulting from the use of this product may be disposed of on the site or at an approved waste disposal facility.

Environmental Hazards
Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters.
The active ingredient, hexazinone, in this product is known to leach through soil into ground water under certain conditions as a result of agricultural use. Use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water

(DISPOSAL CONSIDERATIONS - Continued)

contamination.

Container Disposal

For Plastic Containers: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

For Fiber Sacks: Completely empty fiber sack by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into manufacturing or application equipment. Then dispose of sack in a sanitary landfill or by incineration if allowed by State and local authorities.

For Fiber Drums with Liners: Completely empty liners by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into manufacturing or application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by State and local authorities. If the drum is contaminated and cannot be reused, dispose of in the same manner.

For Paper and Plastic Bags: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO
Proper Shipping Name : Not Regulated

REGULATORY INFORMATION

U.S. Federal Regulations

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes
Chronic : No
Fire : No
Reactivity : No
Pressure : No

(REGULATORY INFORMATION - Continued)

In the United States this product is regulated by the US Environmental Protection Agency under the Federal Insecticide, Fungicide and Rodenticide Act. It is a violation of federal law to use this product in a manner inconsistent with its labeling.

EPA Reg. No. 352-581

OTHER INFORMATION

NFPA, NPCA-HMIS

NFPA Rating
Health : 2
Flammability : 1
Reactivity : 0

NPCA-HMIS Rating
Health : 2
Flammability : 1
Reactivity : 0

Personal Protection rating to be supplied by user depending on use conditions.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : DuPont Crop Protection
Address : Wilmington, DE 19898
Telephone : 1-888-638-7668

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

ATTACHMENT B5

HASTEN®

WILBUR-ELLIS
IDEAS TO GROW WITH®
PO BOX 16458 • FRESNO CA 93755

MATERIAL SAFETY DATA SHEET

PRODUCT/TRADE NAME:

HASTEN

I. NAME

PRODUCT/TRADE NAME: HASTEN
EPA REGISTRATION #: NONE
CHEMICAL NAME/COMMON NAME:
Nonionic Surfactant/Nonionic Surfactant

II. HAZARDOUS INGREDIENTS

	CAS#	OSHA PEL	ACGIH TLV
Nonionic Surfactant	Mixture	NE	NE

III. PHYSICAL DATA

SPECIFIC GRAVITY (H2O = 1): .9
MELTING POINT: NA
VAPOR DENSITY (AIR = 1): NE
% VOLATILES BY VOL.: NE
ODOR: Fatty
APPEARANCE: Amber Liquid
FLASH POINT/METHOD: >150 Deg. C
VAPOR PRESSURE (mmHg): NE
SOLUBILITY IN H2O: Emulsifiable

IV. FIRE & EXPLOSION HAZARD

EXTINGUISHING MEDIA: [ ] Water Fog [X] Foam [ ]Alcohol Foam
[X] CO2 [X] Dry Chemical [ ] Other
FIRE FIGHTING PRECAUTIONS & HAZARDS:
Fight fire upwind. Wear positive pressure self-contained breathing apparatus and full protective clothing. Do not breathe smoke or spray mist. Avoid fallout and runoff. Dike to prevent entering drains, sewers, or water courses. Evacuate people downwind from fire.

V. CARCINOGEN STATUS

[ ] OSHA [ ] NTP [ ] IARC [X] No Listing Type

VI. REACTIVITY

[X] Stable HAZARDOUS POLYMERIZATION
[ ] Unstable [ ] May Occur [X] Will Not Occur
AVOID: Strong oxidizers, organic material
HAZARDOUS DECOMPOSITION PRODUCTS: COx

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE OF SPILL: Absorb with inert material and sweep or vacuum into disposal container.
DECONTAMINATION: Treat spill area with detergent and water. Absorb with inert material. Place in disposal container and repeat procedure as necessary until area is clean.
ENVIRONMENTAL HAZARDS: Dike to prevent entering drains, sewers or water courses.
DISPOSAL: Dispose of in accordance with Federal, State and local regulations.

VIII. HEALTH PRECAUTION DATA

INGESTION: Do not ingest. Acute Oral LD50 (Rat) >5000 mg/kg (WECO). Wash thoroughly before eating, drinking or smoking.
INHALATION: No PEL/TLV established for this product. Do not inhale mist. Use proper respiratory protective equipment for the exposures encountered.
SKIN ABSORPTION: Acute Dermal LD50 (Rabbit) >2000 mg/kg (WECO). May cause slight skin irritation. Wear proper personal protective equipment to reduce skin exposure.
EYE EXPOSURE: Keep out of eyes. Minimally irritating to the eyes. If exposed, flush eyes for a minimum of 15 minutes with water. Wear proper eye protection to reduce splash exposure.
EFFECTS OF OVEREXPOSURE: Material is not toxic or irritating to the skin. No known chronic effects. No known preexisting medical conditions will be aggravated by exposure.
FIRST AID: In all cases, get prompt medical attention. If ingested, give several glasses of water and induce vomiting. Do not induce vomiting if person is unconscious. For skin exposure, remove contaminated clothing and wash with soap and water. For eye contact, irrigate for a minimum of 15 minutes with water. If inhaled, remove victim to fresh air, and administer CPR if necessary.

IX. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use NIOSH/MSHA - approved respirator for organic vapors for the exposures encountered. Positive pressure self-contained breathing apparatus should be used for confined space entry and excessive exposures.
PERSONAL PROTECTIVE EQUIPMENT: Neoprene or rubber gloves and safety goggles.
VENTILATION: General ventilation.

X. SPECIAL PRECAUTIONS

Keep out of the reach of children. Read and follow all label instructions.

XI. REGULATORY DATA

SARA HAZARD CLASS: [X] Acute [ ] Chronic [ ] Flammable
[ ] Pressure [ ] Reactive [ ] None
SARA 313: [ ] Yes [X] No Chemical:
SARA 302: [ ] Yes [X] No Chemical:
TPQ:
CERCLA: [ ] Yes [X] No Chemical:
RQ:
RCRA: [ ] Yes [X] No

NFPA HAZARD RATING:
Health: [1]
Fire: [1]
Reactivity: [0]
Special: [ ]

NFPA HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

HMIS CODES:
Health: [1]
Fire: [1]
Reactivity: [0]

HMIS HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

DATE PREPARED: March 22, 1994
REVISED DATE: July 22, 2005

Notice: This information was developed from information on the constituent materials. No warranty is expressed or implied regarding the completeness or continuing accuracy of the information contained herein, and Wilbur-Ellis disclaims all liability for reliance thereon. The user should satisfy himself that he has all current data relevant to his particular use.

*Technical Material NE - Not Established NA - Not Applicable

24 Hour Emergency Phone Number
CHEMTREC: (800) 424-9300

ATTACHMENT B6

R-11®

WILBUR-ELLIS

IDEAS TO GROW WITH®

PO BOX 16458 • FRESNO CA 93755

MATERIAL SAFETY DATA SHEET

PRODUCT/TRADE NAME:

R-11

I. NAME

PRODUCT/TRADE NAME: R-11
EPA REGISTRATION #: NONE
CHEMICAL NAME/COMMON NAME:
1-Butanol/Butyl Alcohol
Octyl Phenoxy Polyethoxy Ethanol/Nonionic Surfactants

II. HAZARDOUS INGREDIENTS

	CAS#	OSHA PEL	ACGIH TLV
Butyl Alcohol	71-36-3	50 ppm c	50 ppm c
Nonionic Surfactants	Mixture	NE	NE

III. PHYSICAL DATA

SPECIFIC GRAVITY (H2O = 1): 1.02
MELTING POINT: NA
VAPOR DENSITY (AIR = 1): NE
% VOLATILES BY VOL.: NE
ODOR: Alcohol
APPEARANCE: Clear Liquid
FLASH POINT/METHOD: 130 Deg. F TCC
VAPOR PRESSURE (mmHg): NE
SOLUBILITY IN H2O: 10%

IV. FIRE & EXPLOSION HAZARD

EXTINGUISHING MEDIA: [X] Water Fog [X] Foam [ ]Alcohol Foam
[X] CO2 [X] Dry Chemical [ ] Other

FIRE FIGHTING PRECAUTIONS & HAZARDS:
Fight fire upwind. Wear positive pressure self-contained breathing apparatus and full personal protective equipment. Cool exposed containers with water. Dike area to prevent entering drains, sewers or water courses. Evacuate people downwind from fire.

V. CARCINOGEN STATUS

[ ] OSHA [ ] NTP [ ] IARC [X] No Listing Type

VI. REACTIVITY

[X] Stable HAZARDOUS POLYMERIZATION
[ ] Unstable [ ] May Occur [X] Will Not Occur

AVOID: Oxidizers, Liquid chlorine and Concentrated 02
HAZARDOUS DECOMPOSITION PRODUCTS: COx

VII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE OF SPILL: Wear appropriate respiratory and personal protective equipment. Absorb with inert material and sweep or vacuum into approved disposal container.
DECONTAMINATION: Treat area with detergent and water. Absorb with inert material and place in approved container. Repeat as necessary until area is clean.
ENVIRONMENTAL HAZARDS: Dike to prevent entering drains, sewers or water courses.
DISPOSAL: Place in DOT-approved container and dispose of in an approved disposal site.

VIII. HEALTH PRECAUTION DATA

INGESTION: Acute oral LD50 (rat) Butyl Alcohol 790 mg/kg (SAX*). Wash thoroughly before eating, drinking or smoking. Do not ingest. Do not store near food or feed.
INHALATION: PEL/TLV Butyl Alcohol 100 ppm. Can cause respiratory irritation in high concentrations. Wear appropriate respiratory protection for exposures above the PEL/TLV.
SKIN ABSORPTION: Acute dermal LD50 (rabbit) for Butyl Alcohol 4200 mg/kg (SAX*). Can cause mild skin irritation or dermatitis. Wear proper personal protective equipment to reduce exposure.
EYE EXPOSURE: May be mildly irritating to the eyes. If exposed, flush eyes a minimum of 15 minutes with water. Wear proper eye protection to reduce splash exposure.
EFFECTS OF OVEREXPOSURE: May cause eye irritation and corneal inflammation. High concentrations can cause respiratory irritation. May cause skin irritation, scaling or dermatitis. No known chronic effects. Preexisting medical conditions involving the above symptoms may be aggravated by exposure.
FIRST AID: In all cases, get prompt medical attention. If ingested, give several glasses of water. Do not induce vomiting. For skin exposure, remove contaminated clothing and wash with soap and water. For eye contact, irrigate eyes a minimum of 15 minutes with water. For inhalation, remove victim to fresh air, and administer CPR if necessary.

IX. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Use only NIOSH/MSHA - approved respiratory protection for organic vapors up to 10 times the PEL/TLV. Positive pressure self-contained breathing apparatus should be used for confined space entry and high exposures above 10 times the PEL/TLV.
PERSONAL PROTECTIVE EQUIPMENT: Not normally required for this product. Recommend chemical goggles, long-sleeved coveralls and rubber or neoprene boots, Nitrile gloves.
VENTILATION: Local exhaust ventilation recommended for manufacture and formulation operations.

X. SPECIAL PRECAUTIONS

Keep out of the reach of children. Read and follow all label instructions.
Keep away from open flame, heat or ignition sources.

XI. REGULATORY DATA

SARA HAZARD CLASS: [ ] Acute [ ] Chronic [X] Flammable
[ ] Pressure [ ] Reactive [ ] None
SARA 313: [X] Yes [ ] No Chemical: Butyl Alcohol
SARA 302: [ ] Yes [X] No Chemical:
TPQ:
CERCLA: [X] Yes [ ] No Chemical: Butyl Alcohol
RQ: 1*
RCRA: [X] Yes [ ] No

NFPA HAZARD RATING:
Health: [1]
Fire: [2]
Reactivity: [0]
Special: [0]

HMIS CODES:
Health: [1]
Fire: [2]
Reactivity: [0]

NFPA HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

HMIS HAZARD RATING SCALE:
0 = Minimal 3 = Serious
1 = Slight 4 = Severe
2 = Moderate

DATE PREPARED: May 8, 1985
REVISED DATE: July 21, 2005

Notice: This information was developed from information on the constituent materials. No warranty is expressed or implied regarding the completeness or continuing accuracy of the information contained herein, and Wilbur-Ellis disclaims all liability for reliance thereon. The user should satisfy himself that he has all current data relevant to his particular use.

*Technical Material NE - Not Established NA - Not Applicable

24 Hour Emergency Phone Number
CHEMTREC: (800) 424-9300

ATTACHMENT B7

IN-PLACE®

PRECAUTIONARY STATEMENTS

Causes eye irritation. In case of contact with eyes, immediately flush with water for at least 15 minutes. If irritation persists, get medical attention. May cause skin irritation. Harmful if swallowed. COMBUSTIBLE LIQUID. Keep away from heat, sparks and fire.

Do not cut or weld this container of IN-PLACE™. Combustible. Do not use this container or equipment contaminated with this product as a container for water to be used for domestic purposes, feed or food stuff.

NOTE: When using chemical mixture that has not been used before with IN-PLACE™ always try a small sample mix before making a full batch. Different adjuvants in the chemicals and salt in some water can cause flocking or excess thickening. If this occurs, add ammonia.

Follow mixing procedures, dose rates and cautions on all chemical labels.

Wilbur-Ellis Company warrants that this material conforms to the chemical description on the label and is reasonably fit for use as directed herein.

The use of this product is beyond the control of Wilbur-Ellis Company, therefore, Wilbur-Ellis Company urges that all chemicals be checked with Insist® before full scale use.

Buyer assumes all risks of use, storage and handling of this material not in strict accordance with directions given herewith. Buyer further agrees in event of damage arising from the use of this product to accept a replacement of the product or a refund of the purchase price of the product, at buyer's option, as full discharge of seller's liability.

NOTICE

U.S. Patent numbers, 3, 479, 176 and 4, 115, 098 covers use, other patent pending.

STORAGE AND DISPOSAL

1. PROHIBITIONS: Do not contaminate water, food or feed by storage, disposal or cleaning of equipment.
2. STORAGE: Store in original container only and keep sealed. Store in closed storage areas. Use caution when moving, opening, closing or pouring.
3. PESTICIDE DISPOSAL: Improper disposal of excess spray mixtures or rinsate is a violation of Federal Law. Wastes resulting from use of this product should be disposed of through on-site spray application or at an approved waste disposal facility.
4. CONTAINER DISPOSAL: Triple rinse (or equivalent), then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or other procedures approved by State and local authorities.

CONTENTS 1 U.S. GALLON (3.75 Liters)

WILBUR-ELLIS

IDEAS AT WORK WITH®

IN-PLACE™

DEPOSITION AND RETENTION AGENT

HERBICIDES, INSECTICIDES, FUNGICIDES AND HARVEST AIDS

*DRIFT RETARDANT

PRINCIPAL FUNCTIONING AGENTS	100%
Amine salts of organic acids	
Aromatic Acid	
Aromatic and Aliphatic petroleum distillate	

KEEP OUT OF REACH OF CHILDREN

CAUTION

CA Reg. No. 2935-50169 - WA Reg. No. AW2935-01003

WARRANTY STATEMENT

WILBUR-ELLIS COMPANY warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for purposes stated on such label only when used in accordance with directions under normal use conditions. It is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials or the manner of use or application, all of which are beyond the control of WILBUR-ELLIS COMPANY. In no case shall WILBUR-ELLIS COMPANY be liable for consequential, special or indirect damages resulting from the use or handling of this product. All such risks shall be assumed by the Buyer. The exclusive remedy of any buyer or user of this product for any and all losses, injuries, or damages resulting from or in any way arising from the use, handling or application of this product, whether in contract, warranty, tort, negligence, strict liability or otherwise, shall not exceed the purchase price paid for this product or at WILBUR-ELLIS COMPANY'S election, the replacement of this product. WILBUR-ELLIS COMPANY MAKES NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.

GENERAL INFORMATION

IN-PLACE™ is specially formulated for use with conventional spray mixtures. IN-PLACE™ is a deposition and retention agent which reduces evaporation and drift of chemicals while increasing coverage and adherence on the target area.

GENERAL MIXING PROCEDURE

Mix the IN-PLACE™ and EMULSIFIABLE CONCENTRATE or AQUEOUS SOLUTION together; 1 part IN-PLACE™ to 4 parts chemical. Add to the total volume of water. (If some water is required for mixing with the emulsifiable concentrate or aqueous solution, DO NOT USE OVER 1 quart of water on a per acre basis.)

Mix the WETTABLE POWDER, SOLUBLE POWDER, FLOWABLE or SOLUBLE BAG in the total volume of WATER. Add the IN-PLACE™ last; 2 ozs. IN-PLACE™ to 1 pound or 1 quart of chemical.

Combinations of Emulsifiable Concentrates and/or Aqueous Solutions with Wettable Powders, Soluble Powders, Flowables, and/or Soluble Bags – should be added to the water first and mixed. Mix the IN-PLACE™ and the Emulsifiable Concentrate and/or Aqueous Solution together. Add to the total volume of water and powders. Always try a small sample mix before making a full batch.

When mixing multiple-loads at one time, RE-BLEND BEFORE EACH LOAD IS DRAWN OFF.

Small mixes in closed-systems: Put required IN-PLACE™ in can opener-portion. Add emulsifiable concentrate or aqueous solution to IN-PLACE™ and flush into closed mixing tank.

Large or multiple loads in closed-systems: Keep the initial water to a maximum of 1 quart on a per acre basis in the closed mixing tank. Add all of the emulsifiable concentrates or aqueous solutions to the closed mixing tank, followed by the required IN-PLACE™. BLEND VERY LIGHTLY, and add to the total volume of water. If a thick or lumpy load occurs from over-agitation or the wrong rate of IN-PLACE™, add HOUSEHOLD AMMONIA through the agitation system to break the condition and continue with normal spray activities.

FOR PESTICIDES/HERBICIDES THAT PERMIT USE OF AN ADJUVANT AT A HIGHER RATE, FOLLOW INSTRUCTIONS ON THAT PESTICIDE/HERBICIDE LABEL. HOWEVER, DO NOT ADD THIS PRODUCT AT A RATE WHICH EXCEEDS 5% OF THE FINISHED SPRAY VOLUME.

Use caution at the higher application rates. When applying to a sensitive crop, first treat a small area to determine if there may be adverse effects on the crop.

FOR AQUATIC USE: (EXCEPT IN WASHINGTON) Can be used with labeled aquatic products. Not to exceed 1 quart per surface acre of water.

STANDARD MIXING RATES

Liquid Chemicals - Emulsifiable Concentrates - EC
(Those not available as Wettable Powders)

Chemical Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Parts Chemical
Ounces IN-PLACE™	8	16	24	32	40	48	56	64	72	80	1 Part IN-PLACE™

Mix E.C. and IN-PLACE™ together. Add to water

Liquid Chemicals - Flowables
(Those not available as Wettable Powders)

Chemical Quarts	1	2	3	4	5	6	7	8	9	10	Example: 1 Gallon (128 oz.) Chemical
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	½ Pint (8 oz.) IN-PLACE™

Mix Flowables in the water. Add IN-PLACE™ last.

Wettable Powders

Chemical Pounds	1	2	3	4	5	6	7	8	9	10	Example: 8 Pounds Chemical
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	1 Pint (16 oz.) IN-PLACE™

Mix Wettable Powders in water. Add IN-PLACE™ last

RATE EXCEPTIONS

ROUNDUP®

Roundup Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Quarts (128 oz.) Roundup
Ounces IN-PLACE™	16	32	48	64	80	96	112	128	144	160	2 Quarts (64 oz.) IN-PLACE™

Pyrethroids (Ambush®, Pounce®, Ammo®, Etc.)

Pyrethroids Pints	1	2	3	4	5	6	7	8	9	10	Example: 1 Pint (16 oz.) Pyrethroids
Pints IN-PLACE™	1	2	3	4	5	6	7	8	9	10	1 Pint (16 oz.) IN-PLACE™

Asulox®

Asulox Gallons	1	2	3	4	5	6	7	8	9	10	Example: 1 Gallon (128 oz.) Asulox
Ounces IN-PLACE™	5	10	15	20	25	30	35	40	45	50	5 Ounces IN-PLACE™

Liquid Foliar Fertilizer

Liquid Fertilizer Quarts	1	2	3	4	5	6	7	8	9	10	Example: 8 Quarts (256 oz.) Liquid Fertilizer
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	1 Pint (16 oz.) IN-PLACE™

Dipel®-4L, Thuricide

Chemical Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Quarts (128 oz.) Chemical
Ounces IN-PLACE™	8	16	24	32	40	48	56	64	72	80	1 Quart (32 oz.) IN-PLACE™

Dimilin®

Dimilin Ounces	1	2	3	4	5	6	7	8	9	10	Example: Premix 2 oz. Dimilin per 16 oz. water. Then add proper rate of IN-PLACE™. Add premix to tank at total volume of water.
Ounces IN-PLACE™	1	2	3	4	5	6	7	8	9	10	

Granular Foliar Fertilizer

Granular Fertilizer Pounds	1	2	3	4	5	6	7	8	9	10	Example: 8 Pounds Granular Fertilizer
Ounces IN-PLACE™	2	4	6	8	10	12	14	16	18	20	1 Pint (16 oz.) IN-PLACE™

Zorial®

Zorial Pounds	1	2	3	4	5	6	7	8	9	10	Example: 16 Pounds Zorial
Ounces IN-PLACE™	1	2	3	4	5	6	7	8	9	10	1 Pint (16 oz.) IN-PLACE™

Sulfur Compounds

Sulfur Compounds Pounds	5	10	15	20	25	30	35	40	45	50	Example: 20 Pounds Sulfur
Ounces IN-PLACE™	4	8	12	16	20	24	28	32	36	40	1 Pint (16 oz.) IN-PLACE™

Propanil

Propanil Quarts	1	2	3	4	5	6	7	8	9	10	Example: 4 Quarts (128 oz.) Propanil
Ounces IN-PLACE™	4	8	12	16	20	24	28	32	36	40	1 Pint (16 oz.) IN-PLACE™

Furadan-4F®

Furadan-4F Pints	1	2	3	4	5	6	7	8	9	10	Example: 1 Pint (16 oz.) Furadan-4F
Pints IN-PLACE™	1	2	3	4	5	6	7	8	9	10	1 Pint (16 oz.) IN-PLACE™

Phenoxy Herbicides

Phenoxy Herbicides Pounds	1	2	3	4	5	6	7	8	9	10	Example: 4 Pounds Herbicide
Ounces IN-PLACE™	16	32	48	64	80	96	112	128	144	160	2 Quarts (64 oz.) IN-PLACE™

F-1003

Combinations:
Mix all Flowables and Wettable Powders in the water first.
Mix E.C.'s and IN-PLACE™ together. Add last.

1 Gallon = 4 Quarts = 8 Pints = 128 Fluid Ounces = 3.785 Liters
2 Tablespoons = 1 Fluid Ounce
1 U.S. Pound = 16 Ounces = .454 Kilograms

For more IN-PLACE™ Information Call
1-800-221-6580

Manufactured in the USA by:
WILBUR-ELLIS COMPANY
P.O. Box 16458 – Fresno, California 93755

ATTACHMENT C

MATERIAL SAFETY DATA SHEETS OR LABELS FOR RODENTICIDES

E X T O X N E T

Extension Toxicology Network

A Pesticide Information Project of Cooperative Extension Offices of Cornell University, Michigan State University, Oregon State University, and University of California at Davis. Major support and funding was provided by the USDA/Extension Service/National Agricultural Pesticide Impact Assessment Program.

Pesticide
Information
Profile

Diphacinone

Publication Date: 9/93

TRADE OR OTHER NAMES

Common names include diphacin (Italy and Turkey), ratindan (USSR), dipazin, diphenadione and diphenacin (2). Trade names include Diphacine, Ditrac, Gold Crest, Kill-Ko, P.C.Q., Promar, Ramik, Rat Killer, Rodent Cake.

REGULATORY STATUS

All formulations containing 3% or more of diphacinone are classified as Restricted Use Pesticides (RUP) by the EPA. RUPs may be purchased and used only by certified applicators. The signal word required on products containing diphacinone varies, depending on the type of formulation. "Danger" is required for the technical material. "Warning" is required for concentrate formulations and "Caution" is required for bait formulations (3).

INTRODUCTION

Diphacinone is an anti-coagulant rodenticide bait used for control of rats, mice, voles and other rodents. It is available in meal, pellet, wax block, and liquid bait formulations, as well as in tracking powder and concentrate formulations.

TOXICOLOGICAL EFFECTS

ACUTE TOXICITY

Diphacinone is highly toxic to humans and other mammals by inhalation, dermal absorption, and ingestion (4). It causes internal hemorrhaging that can lead to death. It acts by inhibiting enzymes involved in blood clotting (2). Animals given lethal doses exhibited labored breathing, muscular weakness, excitability, fluid in the lungs, and irregular heartbeats. Other signs of poisoning include spitting of blood, bloody urine or stools, internal hemorrhaging, and widespread bruising or bleeding into the joints. When a lethal dose does not cause immediate death, then death tends to be delayed and due to massive hemorrhage (4).

Diphacinone does not irritate the skin and it is not a skin sensitizer (2). It is a mild eye irritant.

The amount of a chemical that is lethal to one-half (50%) of experimental animals fed the material is referred to as its acute oral lethal dose fifty, or LD50. The oral LD50 for technical diphacinone in rats is 0.3 to 7 mg/kg, 3.0 to 7.5 mg/kg in dogs, 14.7 mg/kg in cats, 150 mg/kg in pigs, 50 to 300 mg/kg in mice, and 35 mg/kg in rabbits (2, 3, 4). The dermal LD50 in rats is 200 mg/kg (4), and in rabbits is greater than 3.6 mg/kg. The lethal concentration fifty, or LC50, is that concentration of a chemical in air or water that kills half of the experimental animals exposed to it for a set time period. The 4-hr inhalation LC50 in rats is 2 mg/m3 (4, 6).

CHRONIC TOXICITY

EPA does not require data on the chronic health effects of diphacinone because this pesticide is used in a manner which poses only a minimal hazard of chronic human exposure.

Reproductive Effects

Because diphacinone is used in a manner which poses no hazard of chronic exposure to humans, EPA does not require testing for potential effects on reproduction.

Teratogenic Effects

Tests results regarding potential teratogenicity of diphacinone will be submitted to EPA by June of 1993.

Mutagenic Effects

Diphacinone was not mutagenic in the Ames test (2). Mutagenicity data was under review by EPA during October 1992.

Carcinogenic Effects

Because diphacinone is used in a manner which poses only a minimal hazard of chronic exposure to humans, EPA does not require testing for potential carcinogenic effects.

Organ Toxicity

Poisoning by diphacinone may affect the heart and gastrointestinal system (4).

Fate in Humans and Animals

Three to 7.5 hours after radio-labeled diphacinone was given orally to mice, the highest concentrations appeared in the liver and lungs. In another study, rats given oral doses eliminated 70% of the dose in the feces and 10% in the urine within 8 days. A similar pattern of elimination occurred in mice given the same treatment. Levels of diphacinone were highest in the liver and significant in the kidneys and lungs 4 and 8 days after treatment for rats and mice respectively. Diphacinone is not extensively metabolized in rats, with less than 1% of the dose expired as carbon dioxide (2).

The half-life of diphacinone in humans is 15 to 20 days (2).

ECOLOGICAL EFFECTS

Effects on Birds

Diphacinone is slightly toxic to birds. The oral LD50 for diphacinone in mallard ducks is 3158 mg/kg (2, 5), and in bobwhite quail is 1630 mg/kg.

Effects on Aquatic Organisms

Diphacinone is slightly to moderately toxic to fish. The 96-hour LC50 for technical diphacinone in channel catfish is 2.1 mg/l, for bluegills is 7.6 mg/l, and for rainbow trout is 2.8 mg/l (1, 5). The 48-hour LC50 in Daphnia, a small freshwater crustacean, is 1.8 mg/l.

Effects on Other Animals (Nontarget species)

No information available.

ENVIRONMENTAL FATE

Breakdown of Chemical in Soil and Groundwater

Diphacinone has a low potential to leach in soil (6).

Breakdown of Chemical in Water

Diphacinone is rapidly decomposed in water by sunlight (2).

Breakdown of Chemical in Vegetation

No information available.

PHYSICAL PROPERTIES AND GUIDELINES

Technical diphacinone is an odorless, pale yellow powder (3). Diphacinone is stable under normal temperatures and pressures. It may burn, but does not ignite readily. Thermal decomposition of diphacinone may release carbon monoxide and carbon dioxide (4, 1).

Exposure Guidelines:

No occupational exposure limits have been established for diphacinone by OSHA, NIOSH or ACGIH (4).

Physical Properties:

CAS #:	82-66-6
Specific gravity:	1.6

H20 solubility:	almost insoluble; 0.3 mg/l (2, 4)
Solubility in other solvents:	soluble in acetone (29 gm/l), acetic acid and toluene (73 gm/l). slightly soluble in benzene (2, 4)
Melting point:	295-297 degrees F (146-147 degrees C) (4)
Decomposition temperature:	Technical material decomposes at 338 degrees C without boiling (5)
Vapor pressure:	13.7 mm Hg at 25 degrees C (technical) (5)
Chemical Class/Use:	anticoagulant rodenticide

BASIC MANUFACTURER

Bell Laboratories, Inc.
3699 Kinsman Blvd.
Madison, WI 53704

Hacco Inc.
P.O. Box 7190
537 Atlas Ave.
Madison, WI 53707
Telephone: 608-221-6200

Review by Basic Manufacturer - Bell Labs:

Comments solicited: October, 1992.
Comments received: November, 1992.

Review by Basic Manufacturer - Hacco Inc.:

Comments solicited: October, 1992.
Comments received: November, 1992.

REFERENCES

1. Bell Laboratories, Inc. July, 1990. Diphacinone Technical: MSDS. Bell Labs, Madison, WI.
2. Hayes, W.J. and E.R. Laws (ed.). 1990. Handbook of Pesticide Toxicology, Vol. 3, Classes of Pesticides. Academic Press, Inc., NY.
3. Meister, R.T. (ed.). 1992. Farm Chemicals Handbook '92. Meister Publishing Company, Willoughby, OH.
4. Occupational Health Services, Inc. 1991 (Sept. 16). MSDS for Diphacinone. OHS Inc., Secaucus, NJ.
5. Worthing, C.R., ed. 1983. The Pesticide Manual: A World Compendium, 7th Ed. British Crop Protection Council, Croydon, England.
6. US Environmental Protection Agency. 1991 (Feb 25). Pesticide Environmental Fate One Line Summary: Diphacinone. Environmental Fate and Effects Div., US EPA, Washington DC.

To Top

For more information relative to pesticides and their use, please contact the PMEP staff at:

5123 Comstock Hall
Cornell University
Ithaca, New York 14853-0901
(607)-255-1866

Last Modified: 12/18/2001
Questions regarding the development of this web site should be directed to the PMEP Webmaster.

Disclaimer: Please read the pesticide label prior to use. The information contained at this web site is not a substitute for a pesticide label. Trade names used herein are for convenience only. No endorsement of products is intended, nor is criticism of unnamed products implied.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

WARNING

After ignition, cartridge produces toxic gases. Fumes may be harmful if inhaled.

ENVIRONMENTAL HAZARDS

This product is highly toxic to wildlife. Check all burrows for signs of nontarget species. If present, do not treat burrows.

CHEMICAL HAZARDS

Once ignited by the fuse, this cartridge will burn vigorously until completely spent and is capable of causing severe burns to exposed skin and clothes, and of igniting dry grass, leaves and other combustible materials.

ENDANGERED SPECIES CONSIDERATIONS

NOTICE: It is a Federal offense to use any pesticide in a manner that results in the death of a member of an endangered species.

Black-Footed Ferret: Do not use this product in the range of the black-footed ferret. Contact the nearest U.S. Fish and Wildlife Service office (Endangered Species Specialist) before the product is used. They will arrange for a survey of the proposed use site.

Utah Prairie Dog: Do not use this product in the range of the Utah prairie dog. (Garfield, Iron, Kane, Piute, Sevier, and Wayne Counties, Utah).

San Joaquin Kit Fox: This pesticide should not be used within 1 mile of active dens of the San Joaquin Kit Fox in the following California counties: Kern, Kings, Fresno, San Luis Obispo, Merced, Monterey, Santa Barbara, Ventura, Tulare, and San Benito. Prior to use, contact the California Department of Fish and Game for recommendations.

Blunt-Nosed Leopard Lizard: This pesticide should not be used in the range of the blunt-nosed leopard lizard in the following California counties: Kern, Fresno, Kings, Madera, Merced, and Tulare. Prior to use, contact the California Department of Fish and Game for recommendations.

Eastern Indigo Snake: Do not use this product in the range of the eastern indigo snake in the following states: Mississippi, Alabama, South Carolina, Georgia, and Florida.

Desert Tortoise: This pesticide should not be used in the critical habitat of the Beaver Dam Slope population of the desert tortoise in Utah. This comprises an area extending from the southwest facing slope of the Beaver Dam Mountains, across Highway 91, west along the Arizona border and 10 miles to the Nevada border.

GAS CARTRIDGE

For control of woodchucks, ground squirrels, prairie dogs and pocket gophers.

NOT FOR SALE TO PERSONS UNDER 16 YEARS OLD

ACTIVE INGREDIENTS:

Sulphur	10.84%
Charcoal	17.34%
Red Phosphorus	3.25%
Sodium Nitrate	43.36%
Sawdust	3.52%
Total	78.31%
INERT INGREDIENTS:	21.69%
TOTAL	100.00%

KEEP OUT OF REACH OF CHILDREN

WARNING

STATEMENT OF PRACTICAL TREATMENT

CALL A PHYSICIAN OR POISON CONTROL CENTER IMMEDIATELY!

If inhaled and person has poisoning symptoms (headache, nausea, dizziness, weakness), transfer victim to fresh air. Have victim lie down and keep warm. If respiration is adequate, recovery will be rapid. If breathing has stopped, use artificial respiration. If available, pure oxygen should be given.

SEE LEFT SIDE PANEL FOR ADDITIONAL PRECAUTIONARY STATEMENTS

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
ANIMAL DAMAGE CONTROL
Hyattsville, MD 20782
EPA Est. No. 58228-ID-1
EPA Reg. No. 58228-2
Net Weight 85 grams

20
Rev. 1/91

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

STORAGE: Store in cool, dry place away from fire, heat and direct sunlight.

PESTICIDE DISPOSAL: To dispose of unused cartridges, soak in water, crush and bury at least 6" in loose soil.

CONTAINER DISPOSAL: Place in trash collection.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

USE RESTRICTIONS

For control of woodchucks, ground squirrels, prairie dogs, and pocket gophers in open fields, non-crop areas, rangelands, reforested areas, lawns, and golf courses. For use only inside of burrows. Do not use near flammable material or inside buildings.

APPLICATION DIRECTIONS

Select burrow for treatment and obtain material to plug the entrance. Then, with a nail at least 1/8" in diameter, puncture cap at end of cartridge at points marked. Insert fuse in one of center holes. Insure that there is a minimum of 3 inches of exposed fuse. Hold cartridge away from face and body, then light.

NOTE: The minimum burn time for these fuses is 5 seconds.

Place cartridge, fuse-end first, as far into the burrow as possible. Close entrance to burrow immediately.

TARGET-SPECIFIC DIRECTIONS FOR USE

WOODCHUCKS: Locate all burrow entrances if possible. Select one for treatment and close all others with rock and soil. Light fuse and insert cartridge fuse-end first. Cover opening with rock and soil, being careful not to smother cartridge. Consult state game laws before using this product for woodchuck control.

GROUND SQUIRRELS and PRAIRIE DOGS: Collect soil and other material to close burrow openings. Treat each burrow opening by lighting fuse and inserting cartridge into burrow, fuse-end first (make sure burrow is large enough for easy insertion of cartridge before lighting fuse). Cover burrow immediately, taking care not to smother cartridge with loose soil. Immediately cover all nearby cracks in soil of openings from which gases escapes. Proceed to nearest open burrow and follow same procedure.

POCKET GOPHERS: Locate fan-shaped soil mounds with signs of recent activity. Find the horseshoe-shaped depression on one side of the mound. To locate the main runway, probe ground 15-18 inches from mound on the same side as depression. The main runway has been located when friction on probe is released and it falls into runway. Dig down to main runway, taking care not to block it with soil. Locate an opening large enough for easy insertion of the cartridge. Collect enough soil and other material to close opening. Light fuse and insert cartridge fuse-end first. Immediately cover opening, taking care not to smother cartridge with loose soil. Cover all nearby cracks in soil where gas escapes. Treat all active mounds.

ATTACHMENT D

BIG CREEK ALP PROJECT ROADS, TRAILS, AND HELICOPTER LANDING SITES NOT YET SURVEYED

Attachment D

Big Creek ALP Project Roads, Trails, and Helicopter Landing Sites Not Yet Surveyed.

Mammoth Pool (FERC Project No. 2085)
Roads
6S25DA, Spur to Windy Point Picnic Area from 6S25D (#164)
7S47B Access road to Rock Creek Tunnel Muck Pile (#102)
8S03B Access road from 8S03 to Mammoth Pool penstock (#80)
8S03CA, Spur road to Mammoth Pool Transmission Line (#144)
8S44YB, Mammoth Pool Transmission Line access road (#136)
Helicopter Landing Sites
San Joaquin River above Shake Flat Creek
Mammoth Pool Dam
Big Creek Nos. 1 and 2 (FERC Project No. 2175)
Roads
8S05CA Access to Big Creek No. 2 switchyard (#160)
8S082 Access to Hydro offices at Big Creek (#186)
8S082B Access to Hydro offices at Big Creek (#185)
8S082C Access to Hydro offices at Big Creek (#188)
8S082D Access to Hydro offices at Big Creek (#187)
8S082X Access to Hydro offices at Big Creek (#189)
8S08A Access road south from Railroad Grade to West Portal (#69)
8S13K Access road to Powerhouse No. 2 penstock (#168)
8S66BA Short road between 8S66B and 8S66BC (#171)
8S66BC East end of Dam 1 to Dam 1 drainage gates (#99)
8S66C On public lands from 8S301 to gate to 8S302 (#107)
8S82AA Access road to Warehouse (#249)
8S82BA Upper access road to Wastewater treatment plant from 8S82B (#248)
8S82BB Lower access road to Wastewater treatment plant from 8S82B (#247)
8S82BC Access road to Fish Farm upper gate (#245)
8S82E Upper access road to SCE company housing (#250)
8S82EA Lower access road to SCE company housing (#252)
8S82F Access road to Domestic water treatment plant from FRE 2710 (#251)
8S82J Upper access road to Powerhouse No. 1 from FRE 2710 (#246)
Helicopter Landing Sites
Hodges (Big Creek Heliport)
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67)
Roads
7S01BA Florence Work Camp road from 7S01B (#219)
7S370D Access road to Florence Dam and water storage tank from 7S370 (#71)
7S370F Access road to Florence Dam from 7S370 (#237)
8S02 From Highway 168 to 8S02B (#54)

Attachment D

Big Creek ALP Project Roads, Trails, and Helicopter Landing Sites Not Yet Surveyed.

Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (continued)
Roads (continued)
8S02B Access to Huntington-Pitman-Shaver tunnel adit (#197)
8S03A Access road to Powerhouse No. 8 from 8S03 (#166)
8S05L Road to communication line near Powerhouse No. 8 (#167)
8S303 Access road to Eastwood Overflow Campground (#174)
8S47 Access road to Eastwood Powerstation Transmission Line tower - from gate to end (#258)
9S03 From 8S08 to FRE 2710 (non-project segment on SCE private lands) (#156)
9S17 Access road to Eastwood Transmission line from Hwy 168 (#262)
9S311 Access to Eastwood Powerstation Transmission Line tower (#243)
9S311A Access to Eastwood Powerstation Transmission Line tower (#244)
9S32AB, Spur from 9S32A to Balsam Forebay (#153)
9S32CA Access road to Eastwood Powerstation Transmission Line tower (#208)
9S32CB (#232)
9S32CC (#242)
9S32CD (#231)
9S32CE (#230)
9S32CF (#241)
Trail to South Fork San Joaquin River Gage downstream of Jackass Meadow (#259)
Helicopter Landing Sites
Eastwood School
Camp 62 at junction of Kaiser Pass Road
Bear Creek Diversion
Florence Lake Camp
Florence Lake Dam
Florence Lake Gauging Station
South Fork San Joaquin River Florence Spill Station
South Fork San Joaquin River Below Hooper
Hooper Creek at Diversion
Mono Creek at Diversion
Mono Creek below Lake T.A. Edison
Mt. Givens Telecom Site
Summit at Shaver Hill
Tiffany Pines at Camp Edison
Big Creek No. 3 (FERC Project No. 120)
Roads
8S05B Access road to Powerhouse No. 3 penstock from 8S05 Canyon Road (#217)
8S05T Access to tailings (#24)
8S05TA Access to tailings (#29)

Attachment D

Big Creek ALP Project Roads, Trails, and Helicopter Landing Sites Not Yet Surveyed.

Big Creek No. 3 (FERC Project No. 120) (continued)
Roads (continued)
9S20 Access to carpenter shop (#216)
9S20B Access road to carpenter shop from Italian Bar Road (#62)
9S20BA (#85)
9S20BC Connector road between 9S20B loop (#64)
9S20D Access to carpenter shop (#13)
9S20DA Access to garage and shops (#257)
9S20E (#52)
9S20F Connector road between 9S20 loop (#87)
9S88A Access to old company housing (#5)
9S88XA Access road to old company housing from 9S88X (#215)
9S89BA Access road to PH 3 and switchyard (#59)

ATTACHMENT E

LOCATION OF SPECIAL-STATUS AND NOXIOUS WEEDS AND INVASIVE ORNAMENTAL SPECIES WHERE VEGETATION MANAGEMENT OCCURS

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Mammoth Pool (FERC Project No. 2085)						
Large Dams						
Mammoth Pool				Noxious weed species known to occur; trimming by hand and herbicide use		
Power Generation						
Mammoth Pool Powerhouse				Noxious weed species known to occur; trimming by hand and herbicide use		
Mammoth Pool Fishwater Generator				Noxious weed species known to occur; trimming by hand and herbicide use		
Gaging Stations–Streams						
Mammoth Pool Fish Water Generator				Noxious weed species known to occur; trimming by hand		
Water Conveyance–Mammoth Pool Powerhouse						
Intake Gate House				Noxious weed species known to occur; trimming by hand and herbicide use		
Rock Trap Flushing Channel				Noxious weed species known to occur; trimming by hand		
Valve House				Noxious weed species known to occur; trimming by hand		
Penstocks				Noxious weed species known to occur; trimming by hand and herbicide use		
Power Transmission Lines						
MPPH - BC3 220kV				Noxious weed species known to occur; trimming by hand		

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Mammoth Pool (FERC Project No. 2085) (Continued)						
Project Roads						
6S25 Mammoth Pool Road, from 7S20, Shakeflat Creek access, to end at east abutment				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
6S25G Mammoth Pool Fishwater Generator access road from 6S25, Mammoth Pool Road, to base of Mammoth Pool Dam				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S03 from Powerhouse No. 8 to Mammoth Pool Powerhouse	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and with equipment, herbicide use			Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S44 Mammoth Pool Transmission Line access road				Noxious weed species known to occur; trimming by hand and with equipment		
9S42 Mammoth Pool Powerhouse Transmission Line access road from gate near County Road 225, Italian Bar Road, to 8S44				Noxious weed species known to occur; trimming by hand and with equipment		
Big Creek Nos. 1 and 2 (FERC Project No. 2175)						
Large Dams						
Huntington Lake Dams 1, 2, 3, & 3a				Noxious weed species known to occur; trimming by hand and with equipment		
Moderate Diversion Dams						
Dam 4	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use			Noxious weed species known to occur; trimming by hand and with equipment		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Power Generation						
Big Creek Powerhouse No. 1	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Big Creek Powerhouse No. 2				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Gaging Stations–Streams						
Big Creek below Huntington Lake at Dam 1				Noxious weed species known to occur; trimming by hand		

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 1 and 2 (FERC Project No. 2175) (Continued)						
Water Conveyance–Powerhouse No. 1						
60" & 84" Flowlines below Huntington Lake	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					
Lower 84" Valve House at top of Powerhouse No.1 Penstock	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					
Lower 60" Valve House at top of Powerhouse No.1 Penstock	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					
42" Valve House at top of Powerhouse No.1 Penstock	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					
Vent Stacks	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					
Penstocks	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use			Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Water Conveyance–Powerhouse No. 2						
Penstocks				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Water Conveyance–Huntington-Pitman-Shaver						
Inlet Structure & Gate 1A and 1B at Dam 2 (10' Gate House)				Noxious weed species known to occur; trimming by hand		
Weather Stations						
Big Creek No. 1	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use			Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 1 and 2 (FERC Project No. 2175) (Continued)						
Buildings/Camps						
Big Creek Powerhouse No.1 Facilities	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use			Noxious weed species known to occur; trimming by hand and herbicide use	Potential resource issue: If construction equipment from outside of the watershed is transported into the watershed, it could potentially introduce new invasive exotic species or populations	Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Storage Yards						
Big Creek Powerhouse No. 1	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					
Utilities–Water Supply/Treatment						
Big Creek Powerhouse No. 1	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use			Noxious weed species known to occur; trimming by hand and herbicide use		
Utilities–Sewage Treatment						
Big Creek Powerhouse No. 1 Community	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use			Noxious weed species known to occur; trimming by hand and herbicide use		
Project Power Lines Less Than 33kV						
Musick 7kV				Noxious weed species known to occur; trimming by hand and herbicide use		
Project Roads						
8S05 Canyon Road (from Huntington Lake Road to Powerhouse No. 2 and 8S05E)				Noxious weed species known to occur; trimming by hand and with equipment		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
8S05C Powerhouse No. 2 access road from Canyon Road				Noxious weed species known to occur; trimming by hand and with equipment		
8S05EA Old housing road 3 adjacent to Powerhouse No. 2 from 8S05E				Noxious weed species known to occur; trimming with equipment		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
8S082A Access to Hydro offices at Big Creek				Noxious weed species known to occur; trimming by hand and herbicide use		

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 1 and 2 (FERC Project No. 2175) (Continued)						
Project Roads (Continued)						
8S13 from the gate to 8S05, the Canyon Road				Noxious weed species known to occur; trimming by hand and with equipment		
8S302 Access to Big Creek No. 1 42" gatehouse	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use					
8S66 from gate to west end of Dam 2				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S66 from west end of Dam 2 to 8S66A				Noxious weed species known to occur; trimming by hand and with equipment		
8S66B from Dam 2 to end				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S66X Road over Dam 2				Noxious weed species known to occur; trimming by hand and herbicide use		
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67)						
Large Dams						
Florence Lake	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and use of herbicides			Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Shaver Lake				Noxious weed species known to occur; trimming by hand and herbicide use		
Moderate Diversion Dams						
Bear Creek Diversion	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand			Noxious weed species known to occur; trimming by hand		
Mono Creek Diversion				Noxious weed species known to occur; trimming by hand		
Pitman Creek						Invasive ornamentals are known to occur and could or have spread to adjacent native habitats

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (Continued)						
Small Diversions						
Camp 62 Creek						Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Power Generation						
Big Creek Powerhouse No. 2A				Noxious weed species known to occur; trimming by hand and herbicide use		
Big Creek Powerhouse No. 8				Noxious weed species known to occur; trimming by hand and herbicide use		
Gaging Stations–Streams						
Camp 62 Creek below Diversion Dam						Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Huntington-Shaver Conduit gate 2 release				Noxious weed species known to occur; trimming by hand		
Middle Fork Balsam Creek below Balsam Meadows Forebay				Noxious weed species known to occur; trimming by hand		
South Fork San Joaquin River above Hooper Creek (with Cable Crossing)				Noxious weed species known to occur; trimming by hand		
Stevenson Creek below Shaver Lake				Noxious weed species known to occur; vegetation control, trimming by hand		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Water Conveyance–Powerhouse No. 2A						
Intake Gate House at Shaver Lake				Noxious weed species known to occur; trimming by hand		
Surge Chamber, Rock Trap				Noxious weed species known to occur; trimming by hand		
Penstocks				Noxious weed species known to occur; trimming by hand		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (Continued)						
Water Conveyance–Powerhouse No. 8						
Adit 1, Tunnel 8				Noxious weed species known to occur; trimming with equipment		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Penstocks				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Water Conveyance–Eastwood Power Station						
Inlet Structure (Gate 4)				Noxious weed species known to occur; Trimming by hand and herbicide use		
Surge Chamber				Noxious weed species known to occur; trimming by hand and herbicide use		
Water Conveyance–Mono-Bear Siphon						
Combined Flow Line (Siphon)	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand			Noxious weed species known to occur; trimming by hand		
Water Conveyance–Huntington-Pitman-Shaver						
Gate 3 Outlet to Balsam Forebay				Noxious weed species known to occur; trimming by hand and herbicide use		
Water Conveyance–Diversion Channels						
Crater Creek	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand			Noxious weed species known to occur; trimming by hand		
Water Conveyance–HB Valves						
Shaver Lake				Noxious weed species known to occur; trimming by hand and herbicide use		
Weather Stations						
Florence Lake	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and use of herbicides			Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (Continued)						
Weather Stations (Continued)						
Shaver Lake				Noxious weed species known to occur; trimming by hand and herbicide use		
Buildings/Camps						
Florence Work Camp	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and use of herbicides			Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Big Creek 8 Facilities				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Storage Yards						
Florence Lake Work Camp	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand			Noxious weed species known to occur; trimming by hand	Potential resource issue: If construction equipment from outside of the watershed is transported into the watershed, it could potentially introduce new invasive exotic species or populations.	Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Big Creek Powerhouse No. 2 & Powerhouse No. 2A				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Utilities–Water Supply/Treatment						
Camp Edison				Noxious weed species known to occur; trimming by hand and herbicide use		
Florence Work Camp	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and use of herbicides			Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Utilities–Fuel- Gasoline & Diesel						
Big Creek Powerhouse No. 8				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Florence Work Camp	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand			Noxious weed species known to occur; trimming by hand		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (Continued)						
Project Power Lines Less Than 33KV						
Jumbo 12kV				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Power Transmission Lines						
EPS - BC1 220kV	*Hulsea brevifolia* and *Leptosiphon serrulatus* known to occur; trimming by hand			Noxious weed species known to occur; trimming by hand		
Switchyards						
Eastwood Switchyard				Noxious weed species known to occur; trimming by hand and herbicide use		
Recreation–Shaver Lake						
Camp Edison Campground				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Camp Edison Boat Ramp/Launch				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Day Use Areas on North Shore Roads 1 & 2				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Day Use Area off Hwy 168 (The Point)				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Eagle Point Boat Only Day-Use Area				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Balsam Meadow Forebay						
Balsam Meadow Forebay Day-Use Picnic Area				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Balsam Meadow Trailhead and Parking						

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (Continued)						
Project Roads						
7S01B Access road to Florence Work Camp	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and with equipment			Noxious weed species known to occur; trimming by hand and with equipment		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
7S01BA Florence Work Camp road from 7S01B	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and with equipment, herbicide use			Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
7S370F Access road to Florence Dam from 7S370	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and with equipment, herbicide use	*Utricularia intermedia* known to occur; trimming by hand and with equipment, herbicide use				
8S03 Canyon Road from Powerhouse 8 to Mammoth Pool Powerhouse				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S05 Canyon Road (from Powerhouse No. 2 and 8S05E to 3S05A Powerhouse No.8 access road)				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
8S05F Access road to Powerhouse No. 8 penstock from 8S05				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S08A Access road south from railroad grade to West Portal				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S094 Pitman Creek Diversion access road	*Hulsea brevifolia* known to occur; trimming by hand and with equipment, herbicide use			Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
8S13 from the gate to 8S05, the Canyon Road				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
9S32 from gate near Highway 168 to EPH Transmission Line				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
9S32A spur from 9S32 to east side of Balsam Forebay				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (Continued)						
Project Roads (Continued)						
9S58 from Shaver Marina to North Fork Stevenson Gage				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Access road to Eagle Point Boat Only Day Use Area from 9S58				Noxious weed species known to occur; trimming by hand and with equipment		
Access road to Eastwood Tailrace				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Access road to Shaver Dam north				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Access road to Shaver Dam south				Noxious weed species known to occur; trimming by hand and with equipment		
Camp Edison Roads				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		
Trails						
Trail to South Fork San Joaquin River gage downstream of Jackass Meadow		*Utricularia intermedia* known to occur; trimming by hand and herbicide use				
Trail to Bear Creek Gage upstream of Bear Forebay	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand			Noxious weed species known to occur; trimming by hand		
Trail to Big Creek Gage below Dam 5	*Leptosiphon serrulatus* known to occur; trimming by hand and herbicide use			Noxious weed species known to occur; trimming by hand and herbicide use		
Trail to Chinquapin Creek Gage and Diversion Dam						Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Trails to North-South Slide Creek Diversions	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand and herbicide use					

Attachment E. Location of Special-status and Noxious Weeds and Invasive Ornamental Species Where Vegetation Management Occurs.

	Upland Special-status Plant Species	Aquatic, Wetland, and Riparian Special-status Plant Species		Noxious Weeds and Invasive Ornamental Species		
	Loss of Individuals	Loss of Individuals	Substantial Change in Habitat	Spread of Existing Populations	Introduction of New Species/ Individuals/Populations	Introduction of Invasive Ornamental Plant Species
Big Creek Nos. 2A, 8 and Eastwood (FERC Project No. 67) (Continued)						
Trails (Continued)						
Trail to Tombstone Creek Diversion	*Camissonia sierra* ssp. *alticola* known to occur; trimming by hand					
Two trails to Stevenson Creek Gage below Shaver Lake Dam				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Trail to Camp 62 Creek Gage and Diversion Dam				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Big Creek No. 3 (FERC Project No. 120)						
Moderate Diversion Dams						
Dam 6				Noxious weed species known to occur; trimming by hand and herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
Storage Yards						
Big Creek Powerhouse No.3				Noxious weed species known to occur; trimming by hand and herbicide use		
Project Roads						
8S05, Canyon Road (from junction with 8S03 to junction with Italian Bar Road)				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats
9S88 from Italian Bar Road to old company housing				Noxious weed species known to occur; trimming by hand and herbicide use		
9S89 from Italian Bar Road east to Powerhouse No. 3 and administrative building				Noxious weed species known to occur; trimming by hand and with equipment, herbicide use		Invasive ornamentals are known to occur and could or have spread to adjacent native habitats

ATTACHMENT F

TREATMENT METHODS FOR NOXIOUS WEEDS AND NON-NATIVE PLANTS OF HIGHEST CONCERN IN THE SIERRA NATIONAL FOREST

Attachment F

Treatment Methods for Noxious Weeds and Non-native Plants of Highest Concern in the Sierra National Forest

Noxious weed is a term used by government agencies which applies to invasive plants that have been defined as pests by law or regulation (California Department of Food and Agriculture (CDFA) 2000). Invasive plants are defined as those exotic species, which are not native to a region, persist without human intervention, and have serious impacts on their environment (Simberloff et al. 1997, Davis and Thompson 2000).

The following provides a summary of treatment methods (manual, mechanical, and herbicide use) for noxious weeds and invasive non-native plants species of highest concern in the Sierra National Forest (SNF). The specific treatment method to be implemented in the Big Creek ALP study area is dependent on the species and location in the study area.

KNAPWEED

Several species of knapweed are of high concern in the SNF. Specific control measures differ by species and the sensitivity of the location of the species. Control measures include chemical application, bio-control, and manual plant removal. Species specific control measures are defined below.

Russian knapweed (*Acroptilon repens*). Russian knapweed is the only perennial of the noxious knapweeds and is the most difficult to control. Russian knapweed emerges in the spring from roots and, once established, spreads mainly by underground root stocks, as seed production is limited compared to other knapweed species. Flowering occurs from June to September. The key to Russian knapweed control is to stress the weed and cause it to expend nutrient stores in its root system. Hand pulling and mowing are not effective because Russian knapweed roots can grow 6 to 8 feet deep the first season, and deeper the second season. Most of the root system must be removed or plants will re-sprout. Seeding competitive, perennial grass species after Russian knapweed has been stressed by other control measures is essential. Treatments may include chemical or mechanical methods. Research has shown that chemical treatments are superior to mowing. Sow perennial grasses in late fall as a dormant seeding. Tillage is necessary to overcome the residual allelopathic (the suppression of growth of one plant species by another due to the release of toxic substances) effects of Russian knapweed. Apply chemicals at the bud-growth stage and again about 8 weeks later.

Diffuse knapweed *Centaurea diffusa*) and **Spotted knapweed** (*Centaurea maculosa*). Diffuse knapweed is generally a short-lived perennial or biennial and invades habitats similar to spotted knapweed. The physical appearance of diffuse knapweed is similar to spotted knapweed, except diffuse knapweed is generally shorter and more highly branched. Also, rosettes of diffuse knapweed have more finely divided leaves than those of spotted knapweed. Spotted knapweed is a short-lived perennial, reproducing solely by seeds. It is a prolific seed producer, with 1,000 or more seeds per plant. Seeds remain viable in the soil five years or more, so knapweed infestations may occur a number of years after vegetative plants have been eliminated. The seeds can germinate from spring through early fall. Seedlings emerging in the fall often overwinter as a rosette of leaves, resuming growth again in the spring. Spotted and diffuse knapweed confined to small, well-defined areas should be pulled by hand or treated with a herbicide as soon as detected to avoid spread of the weed. First, all visible knapweed plants should be removed and destroyed. Then the areas should be treated with a herbicide to prevent reinfestation from seedlings.

THISTLES

Four species of thistles are of high concern in the SNF. The primary control strategy for annual and biennial thistles is seed management, while the control strategy for perennials must include depletion of plant reserves. A brief summary of the life history and control methods for each species is provided below.

Italian thistle (*Carduus pycnocephalus*). Italian thistle is a summer annual or may be biennials in dry habitats. Flowering is May–July.

Canada thistle (*Cirsium arvense*). Canada thistle is a perennial that flowers June–October.

Bull thistle (*Cirsium vulgare*). Bull thistle is a biennial that flowers July–September.

Milk thistle (*Silybum marianum*). Milk thistle is an annual thistle that flowers June–September.

Cutting or removing thistles (where feasible) can be effective in reducing thistle populations. Annual and biennial thistles, if mowed within two days of flowering of the terminal blooms, will not produce seed or regenerate significantly. Timing in mowing is important; if mowing occurs four days after terminal bloom antithesis (full flowering), significant amounts of seed are produced. Since thistle stands mature at different times, careful monitoring and proper timing are necessary for mowing to be a viable option. However, even if mowing is done late and seed is produced, mowing the stalks will reduce seed dispersal and seed production, keeping infestations from spreading widely.

Canada thistle, a perennial, is difficult to control by mechanical methods. Occasional cultivation (soil tillage) may increase sprouting from broken roots due to its ability to propagate vegetatively. However, repeated cultivation can significantly reduce infestations if begun when plant reserves are at their lowest stage in early spring (early bud stage), before the shoot leaves can furnish energy to the roots in amounts greater

than the roots require for production of new growth. Cultivation should start in early spring by plowing and disking. When new shoots appear, the area should be cultivated 3 to 4 inches deep every 20 to 21 days to destroy new shoots. Up to 90% or more of a Canada thistle infestation can be eliminated in a single season of cultivation when properly performed.

Several herbicides are useful for thistle control. Chemical control for annuals, biennials, and perennials must be initiated before the plants blossom and produce seeds. Young plants are most susceptible to control with chemicals. Best results are obtained when plants are in their initial and heaviest growth stage. The use of herbicides provides a quick and easy method to control thistles.

STARTHISTLE

Four species of star-thistle are of high concern in California. Treatment methods differ among these species and are described below.

Yellow starthistle (*Centaurea solstitialis*). Yellow starthistle typically begins flowering in late May and continues through September and sometimes much later

Starthistle is widespread and difficult to control. There are entire websites dedicated to the subject. Visit http://wric.ucdavis.edu/yst/yst.html for more information. Control of yellow starthistle cannot be accomplished with a single treatment or in a single year. Effective control requires suppression of the weed combined with establishment of competitive desirable vegetation. Cultivation and deep tillage with fall rain effectively controls seedlings of yellow starthistle. Repeated cultivations are generally needed to control each new flush of seedlings. Mowing can be used to manage yellow starthistle provided it is well timed and repeated as needed. Mowing early growth stages results in regrowth of the weed and additional mowing will be needed a second time, about 4 to 6 weeks later. To encourage growth of desirable vegetation, let the desirable vegetation set seed before mowing, but be sure to mow well before starthistle is in full flower. In general, mowing is most effective when soil moisture is low and no irrigation or rainfall follows the mowing.

Both post- and pre-emergent herbicides are available to control starthistle. Post-emergent herbicide treatments generally work best on seedlings. Follow an initial treatment with successive applications when new rosettes appear. The long germination period of yellow starthistle requires that a pre-emergent material have a lengthy residual activity. Herbicide applications should occur before a rainfall, which will move the material into the soil.

Purple starthistle (*Centaurea calcitrapa)*. Purple starthistle is a biennial that flowers from June to August. Under some conditions they may behave as annuals or short-lived perennials.

Iberian starthistle (*Centaurea iberica*). Iberian starthistle is a biennial that flowers July-October. Under some conditions they may behave as annuals or short-lived perennials.

Tocalote (*Centaurea melitensis*). Also known as Malta or Napa starthistle, tocalote is a winter annual that flowers April–September.

Grubbing or digging can control small infestations. This is most effective for young rosettes. To control these species, cut plants at least 2 inches below the soil surface early in the growing season after seed head production but before flowering. Root pulling is not generally successful. Remove and destroy plants. Do not mow purple or Iberian starthistles. Rosettes are too low to be mowed. Mowing older plants encourages development of multiple rosettes from one root base, and spreads purple starthistle by throwing seed heads. Herbicides are most effective if applied in the spring when plants are in the sensitive seedling or rosette stages, are actively growing, and soil moisture is high.

OTHERS NOXIOUS WEEDS

Black mustard (*Brassica nigra*). Black mustard can be removed from small areas by pulling or cutting with hand tools. However, hand removal alone must be performed more than once in a growing season. Best timing for hand removal is after seed head production but before flowering. Hand removal will stop seed production and remove the vegetative portions of the plant. Mechanical removal with ground-mowing or tilling equipment will remove foliage and prevent the plant from setting viable seed, as well as inhibiting the plant's ability to produce food and weakening the root stocks. Repeated herbicide applications have failed to exhaust the seed bank. Flail-mowing, followed by raking into windrows or leaving the stems in place does not control black mustard. Herbicide application from sprayers and from a tractor-mounted wick applicator does not control black mustard. Visit (http://www.landandwater.com/features/vol42no4 /vol42no4_1.html) for information on herbicide application, flail-mowing, imprinting, organic mulching, and removal of soluble nitrogen through microbial immobilization.

Black locust (*Robinia pseudoacacia*). Black locust is a tree that blooms in late spring and reproduces through distinct hanging pods. Every part of the tree is considered toxic. Non-chemical control of black locust is largely ineffective because of the plant's vigorous re-sprouting ability and suckering from stumps and roots. Cutting or burning generally increase sucker and sprout productivity. Most management efforts have concentrated on the use of chemical controls. However, seedlings may be hand-pulled if the entire root is removed. Repeated cutting or mowing may achieve some level of control but likely will not result in eradication. Some herbicides are more effective than others. Where possible, use of foliar sprays is effective when the leaves are fully expanded. Larger trees should be cut down and an undiluted herbicide applied to the freshly cut surfaces of the stump; or the tree should be girdled and undiluted herbicide applied to the cut encircling the trunk. Repeated treatments will likely be necessary.

Bermuda grass (*Cynodon dactylon*). Bermuda grass reproduces by seed, rhizome and underground runners. Control requires killing the whole plant, roots and all. Application of a non-selective herbicide in July and August, with two follow-up applications, is the most effect method to eliminate this species. Various mulching methods may also control this species if diligently applied.

Cheatgrass (*Bromus tectorum*). Cheatgrass, also known as downy brome, is a winter annual grass that germinates in the early spring. Mow to prevent the formation of the seed head and seed production. Use a post-emergent herbicide when downy brome is young and actively growing.

Common or woolly mullein (*Verbascum thapsus*). Woolly mullein is a biennial. Its first year is spent as a rosette and no seeds are produced. In the second year, it produces a single, thick stem with yellow flowers from the center of the rosette. This plant is a prolific seed-producer and thus control requires prevention of seed production by spraying with an herbicide during the rosette stage. Herbicide uptake by this plant is difficult due to the woolly leaves. Use of mechanical control such as mowing or handpulling before seed production (early bud stage) is also an important treatment method.

Lens-podded hoary cress (*Cardaria chalepensis*). Hoary cress is an herbaceous, relatively long-lived, rhizomatous perennial weed that blooms in April and May and begins producing seeds about a month later. Hand pulling and mowing are not effective controls for hoary cress. Cultivation (soil tillage) may spreads root pieces that will later sprout. A better control method is to combine mowing, chemical use, and planting grasses and shrubs. Successful cultivation requires removal of the plant within 10 days after weed emergence throughout the growing season for two to four years. Cultivation 6 inches deep must be repeated within 10 days of weed emergence throughout the growing season for two to four years. Effective chemical control requires multiple applications. Timing and application rate are crucial for successful control. Chemical control can be effective, but must be maintained for several years to obtain long-term control. The most effective timing of herbicide application appears to be in the bud to early flower stage.

Himalayan blackberry (*Rubus discolor*). Himalayan blackberries are able to regenerate from the crown or rhizomes following mowing, burning, or herbicide treatment. This makes them difficult to control, and control measures often require follow-up treatment. Because of the extensive underground root system, digging is not an alternative. Mowing is not effective as it stimulates sucker growth from lateral roots and induces branching. Burning, like mowing, is not an effective long-term strategy because wild blackberry plants vigorously resprout from rhizomes. Biocontrol is not a practical method of control and plants usually regrow following herbicide application; and repeated treatments may be necessary for effective long-term control. Large stands of blackberry are difficult to control due their impenetrability and the plant's variety of reproductive tactics, but with proper management, infested areas can be restored to desirable vegetation. Control is usually a two phase process which includes removal of above ground vegetation, and killing or removing the root crowns and major side roots (not necessarily in that order). Mechanical removal, whether by hand or machine, and burning, are effective options for removing the above ground portion of mature plants. There are six primary options for long-term (i.e. root) control:

- Grubbing out the root crowns and major roots has proven to be effective but expensive.

- Repeated cutting of above-ground vegetation can also be effective but is expensive and requires multiple years of treatment.

- Foliar treatment in the fall following summer clearing has proven effective in some cases.

- Treating freshly cut stumps with appropriate concentrated herbicide.

- Uncut Himalayan blackberry can be effectively treated in late summer or fall with broadcast application of a variety of herbicides including triclopyr and/or glyphosate. Although effective control can be achieved by this method, the extensive, standing, dry and hard canes then need to be removed to allow access for effective restoration.

- Dense planting of shade-producing vegetation is a long-term solution for some instances. Planted vegetation may need to be protected from being overtopped by blackberry.

Hydrilla (*Hydrilla verticillata*). California law requires the control hydrilla, which is not an easy job. Scientific research and 30 years of practical experience by aquatic plant managers using herbicides, biological agents, mechanical removal, and physical habitat manipulation have produced relatively successful management programs in other states. However, in spite of long-term intensive management efforts, hydrilla is still a major weed problem in the states where it has become well established. Some common eradication methods such as cutting should not be used and only hydrilla-specific herbicides should be used. Visit the many websites dedicated to hydrilla control for more information.

Klamath weed (*Hypericum perforatum*). Klamath weed, also known at St. John's wort (used in herbal medicine), is a difficult weed to eradicate because of its extensive root system and long lived seeds. A perennial that flowers from June–September, Klamath weed is difficult to eradicate because of its extensive root system and long lived seeds. Small infestations may be controlled by repeatedly hand-pulling or digging. Mowing has little effect on existing plants, but may reduce seed production. Burning favors the further spread of Klamath weed.

Medusahead (*Taeniatherum caput-medusae*). Medusahead is a winter annual with seedling stages occurring in late or early spring. Seedbed tillage will control existing medusahead plants but may also bury seeds and break up deep thatch layers. Therefore careful consideration should be made before utilizing tillage. Mowing is not recommended after seed set due to the increased potential for seed dispersal. Very little work has focused on utilizing classical biological control for medusahead. Chemical control options for medusahead are currently very limited, but are likely the best treatment method.

Oxeye daisy (*Leucanthemum vulgare*). Oxeye daisy is a perennial herb that can spread both vegetatively and by seed. The plant flowers during its second year.

Flowering occurs June to August, with seeds dispersing in August and September. Seeds will germinate as soon as they are dispersed. Because of its shallow root system, oxeye daisy is easily killed by intensive cultivation. Mowing as soon as the first flowers open can eliminate seed production. However, mowing may stimulate shoot production and subsequent flowering in areas with adequate growing seasons. Seeds germinate readily on bare soil. Some herbicides are effective; however, application of nitrogen fertilizer is almost as effective as the herbicides at reducing canopy cover of oxeye daisy.

Perennial pepperweed (*Lepidium latifolium*). Pepperweed is a perennial with dense clusters of white flowers that are produced from late spring and throughout summer. Although perennial pepperweed produces viable seed, there is little evidence of seedling germination in the field. Its main method of spread appears to be the lateral production of new shoots via the root system**.** Established perennial pepperweed populations are difficult to control and require multiple years of intensive management. Suppressing the extensive root system is critical for successful control. Establishing and maintaining competitive perennial vegetation can dramatically slow the introduction and spread of perennial pepperweed. Seedlings are easily controlled by hand-pulling or tillage, but these techniques do not control established plants because shoots quickly resprout from vast root reserves. Root segments as small as 1 inch are capable of producing new shoots. Mowing and burning are not effective at reducing perennial pepperweed stands. Combining mowing with herbicides has been shown to be an effective control strategy. For best results, mow plants at the flower bud stage and apply herbicides to resprouting shoots once they have reached the flower bud stage. Several post-emergent herbicides control perennial pepperweed, but repeat applications are usually necessary for several years to treat resprouting shoots and seedlings. Extended control with herbicides is greatly enhanced by establishing competitive vegetation at the site. In areas with a dense buildup of thatch, mow or burn old shoots before applying herbicides. Herbicide application timing is critical. Herbicides work best when applied at the flower bud stage and worst at the rosette or early bolting stage.

Periwinkle (*Vinca major*). Periwinkle is a common garden plant that has spread to forested areas. It is a scrambling, low-growing perennial, with long trailing stems which may root at the nodes. Small infestations should be dug up and disposed of. Roots and rhizomes can resprout if material is left lying about. Check cleared sites for regrowth. Because this plant is extremely hard to kill or control with herbicides, multiple applications will be necessary.

Puncture vine (*Tribulus terrestris)*. This plant is a summer annual that blooms from July to September and matures from August to October. Puncture vine can be controlled by hand pulling in moist soil. Mowing is not effective because the plants grow close to the ground. Herbicides can also provide effective control if they're applied when the plants are young and small. Certain pre-emergent herbicides, if applied in early April, can kill seedlings as they germinate. Annual re-application may be necessaryl to achieve good control.

Biocontrol has been very successful in reducing large puncture vine populations. There are two biocontrol organisms available for purchase; *Microlarinus lareynii*, a seed-feeding weevil, and *Microlarinus lypriformis,* a stem- and crown-mining weevil, both collected from wild populations near the Mediterranean Sea in Europe and northern Africa. The two biocontrol weevils have been successfully released in Arizona, Nevada, and California.

Purple loosestrife (*Lythrum salicaria*). Purple loosestrife is an herbaceous, wetland perennial that grows in a wide range of habitats. Small infestations can be controlled by removing all roots and underground stems. This method is most useful on young infestations. Removal of all plant material is important. Small segments of purple loosestrife stems can become rooted and reestablish the infestation. Herbicides can be used to control purple loosestrife in areas too large to be controlled by digging.

Rush skeletonweed (*Chondrilla juncea*). Rush skeletonweed is an herbaceous perennial or biennial with a long taproot. Herbicide treatment and planting of competitive vegetation are critical for effective management of this species. Herbicides, if applied consistently each year, can control this weed after 3 to 5 years.

Scotch broom (*Cytisus scoparius*) and **Spanish broom** (*Spartium junceum*). An aggressive, deciduous, perennial shrub often started as an ornamental, broom is now listed as a noxious weed. Broom may be controlled by hand pulling, digging, hoeing, or by cutting the above-ground portion (about half the roots will resprout, but if cutting is done before seeds are set, spreading will be contained). Chopping or mowing has been used in some locations; however, this treatment is likely to result in pastures of broom because of resprouting of the roots. Spot herbicides, applied to either stems or cut stumps, are labor intensive but have proven effective. Various broadcast herbicides have also been effective in controlled circumstances.

Russian thistle (*Salsola tragus*) and **Tumbleweed** (*Salsola paulsenii*). Both Russian thistle and tumbleweed members of the Goosefoot family. The plant has inconspicuous green flowers from March–April

Control methods such as mowing or destroying young plants can prevent seed production. However, it is important to avoid disking or loosening the soil in because loose soil is necessary for Russian thistle germination. Planting competitive, more desirable species can be an effective method of preventing Russian thistle. There are many herbicides that will control Russian thistle. Many of these herbicides are focused on controlling the immature plants and preventing them from reaching the seed production stage. The selection of an appropriate herbicide is site and growth stage dependent (preemergent or postemergent). Herbicide application during these growth stages is summarized below.

For best results, post-emergent herbicides must be applied while the weed is in its early growth stages (preferably the early seedling stage) before it starts producing its spiny branches. Post-emergent herbicides are not effective in the control of these species. If

rain or irrigation occurs after a post-emergent application, additional seedlings may emerge and require future treatments.

Tree of heaven (*Ailanthus altissima*). Tree of heaven is a dioecious species which bears yellowish-green flowers from mid-April to July. The flowers are arranged in large panicles at the ends of new shoots. Male trees produce three to four times more flowers than are female trees. Furthermore, male flowers are more conspicuous and emit a disagreeable odor that attracts numerous insects.

Elimination of this species requires diligence, due to its abundant seed production, high seed germination rate, and vegetative reproduction. Targeting large female trees for control will help reduce spread of seed. Young seedlings may be pulled or dug up, preferably when soil is moist. Care must be taken to remove the entire plant including all roots and fragments, as these will almost certainly regrow. Treatment of this species by cutting alone is usually counterproductive because it produces large numbers of stump sprouts and root suckers. Effective treatment will include an initial cutting in early summer followed by herbicide application. Foliar, basal bark, or injection herbicide application will damage the root system. Basal bark application of herbicides is most effective late winter/early spring and in summer on trees that are less than 6 inches in diameter. The injection method is very effective and minimizes sprouting and suckering when applied during the summer.

References

Davis, M.A. and K Thompson. 2000. Eight ways to be a colonizer; two ways to be an invader: A proposed nomenclature scheme for invasion ecology. *Bulletin of the Ecological Society of American 81: 226-230.*

Simberloff, D. D. C. Schmitz, and T.C. Brown. 1997. Strangers in Paradise: Impact and Management of Non-indigenous species in Florida. Island Press, Washington D.. U.S.D.A. Forest Service (USDA-FS). 1991. Section 2083, Information and Reporting Guidelines for Noxious Weeds. *In*: Forest Service Manual Section 2080, dated June 1991.

The following websites were accessed on June 23 and 24, 2005:

http://cru.cahe.wsu.edu/CEPublications/pnw0350/pnw0350.html

http://danr.ucop.edu/uccelr/range01.htm

http://www.co.larimer.co.us/publicworks/weeds/askedweeds/mullein.htm

http://tncweeds.ucdavis.edu/esadocs/documnts/arundon.html

http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7486.html

http://el.erdc.usace.army.mil/pmis/mechanical/html/brassica.html

http://www.landandwater.com/features/vol42no4/vol42no4_1.html

http://www.nwcb.wa.gov/weed_info/Written_findings/ Hydrilla_verticillata.html

http://wric.ucdavis.edu/yst/yst.html

ATTACHMENT G

THE FOREST SERVICE MANUAL
PACIFIC SOUTHWEST REGION (R5)
BOTANICAL PROGRAM MANAGEMENT HANDBOOK
CHAPTER 50 (REVEGETATION)

FOREST SERVICE MANUAL
PACIFIC SOUTHWEST REGION (R5)
VALLEJO, CA

FSH 2609.25 – BOTANICAL PROGRAM MANAGEMENT HANDBOOK

CHAPTER 50 – REVEGETATION

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This directive formalizes the Native Plant Policy Letter, reference 1330/2070, written to Forest Supervisors, Staff Directors, and the Pacific Southwest Research Station Director on June 30, 1994.

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50 - REVEGETATION.

50.01 - AUTHORITY.

1. The National Forest Management Act of 1976 (Sec. 6, 90 Stat. 2949) is the principal legislative mandate that directs the conservation of biological diversity and thus recognizes the value of adapted plant and animal communities.

2. Further direction is provided in Title 36, Code of Federal Regulations, Part 219, Section 27, Subsection G which states: "Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemics and desirable naturalized plant and animal species, so that it is at least as great as that which would be expected in a natural forest and the diversity of tree species similar to that existing in the planning area. Reductions in diversity of plant and animal species from that which would be expected in a natural forest, or from that similar to the existing diversity in the planning area, may be prescribed only where needed to meet overall multiple-use objectives. Planned site conversion shall be justified by an analysis showing biological, economic, social, and environmental design consequences, and the relation of such conversions to the process of natural change."

50.02 - OBJECTIVES

1. To conserve the native biological diversity and adaptive capacity of plant and fungi communities, species, and populations. This includes maintaining the integrity of the natural pattern of adaptive genetic structure within and among populations of a species.

2. To reduce the adverse impacts of management activities on the basic natural resources of soil, water, and plant and fungi gene pool diversity.

3. To stabilize soil after major disturbances while concurrently avoiding long-term adverse effects on the composition, structure, and function of natural plant and fungi communities.

4. To maintain or enhance water quality by controlling the composition and structure of plant and fungi communities through use of appropriate plant materials.

5. To prevent the displacement of native species through the introduction of aggressive, long lasting, undesirable vegetation into managed or natural plant communities.

6. To move rapidly toward the general use of locally adapted native plant species in ecosystem management.

7. To guide the program development for acquiring, propagating, and using native plant materials for interdisciplinary ecosystem management projects. These include wildlife, riparian, watershed, road-side, emergency post-fire soil stabilization, and other revegetation and restoration projects.

8. To stimulate development of new ways to achieve ecosystem management objectives that consider multidisciplinary long-term effects. This includes the evaluation of alternatives that provide economical as well as practical means to restore plant and fungi communities.

50.03 - POLICY.

Maintaining the rich native flora and associated vegetative communities of the Pacific Southwest Region is a critical element of ecosystem management. The use of native plants for revegetation and restoration is integral to the overall national goal of conserving the biodiversity, health, productivity, and sustainable use of forest, rangeland and aquatic ecosystems. Maintaining biodiversity includes retaining the inherent genetic variability within plant populations. Therefore, conservation of local germplasm is a desired outcome of our activities.

To the extent practicable, seeds and plants used in erosion control, fire rehabilitation, riparian restoration, forage enhancement, and other vegetation projects shall originate from genetically local sources of native plants. Native plants are intrinsically valuable, biologically diverse, and ecologically adapted to their habitats. They are key factors in sustaining resilient, healthy, and productive ecosystems. This policy supports management for sustainable use of ecosystems. A key element of sustainability is the conservation of natural biological diversity.

1. Prescriptions for use of plant materials must be developed for revegetation by knowledgable plant resource specialists prior to implementation to ensure that the project is feasible and that suitable plant material is used.

2. All revegetation facets must be evaluated EARLY in the planning process for Forest projects. For projects that involve soil disturbance, special consideration must be given to stockpiling of duff or topsoil (with seedbank and mycorrhizae) for later use in restoration of soil and vegetation, and where erosion control is required, mechanical methods must also be evaluated. All revegetation projects must consider both natural and artificial regeneration alternatives including collection of local sources of suitable native plant seed or cuttings, nursery propagation, and on-site planting and maintenance activities.

3. To the extent practicable, plant materials (seed, cuttings, and whole plants) used in all revegetation projects shall originate from genetically local sources of native species.

a. Encourage natural regeneration where seed source and soil conditions are favorable. Where natural regeneration is likely to fail within the desired time frame and soil protection is necessary, evaluate the use of non-vegetative techniques that

allow natives to return, *e.g.* weed- and disease-free mulching, erosion blankets, or sterile straw waddles.

b. Alternatively, collect seed as near to the site as possible within an adaptive (seed) zone, follow genetic guidelines, and grow in the appropriate nursery. If a genetically local or similarly adapted stock of native species is not available for revegetation, consider either eliminating, delaying, or modifying the project to plant natives in stages as they become available.

c. When project objectives justify the use of non-native plant materials, documentation explaining why non-natives are preferred must be part of the project planning process.

4. Do not use plant materials of species sold as natives if the genetic origin and physiological quality is not known. Use only those commercial sources of native plant materials collected within the same ecological section (National Hierarchy of Ecological Units) or geographic district level, as mapped in the Jepson Manual (1993), as the project area. Use the seed zoning rules and the genetic guidelines (see Exhibit 01.) for further guidance. Avoid the use of plant material bred and/or grown outside of California.

5. Carefully evaluate plant materials collected or purchased for Forest projects to ensure that these materials are healthy, free of pests, and that they are properly handled, stored, and conditioned for successful use.

6. Constraints to use of natives species. Many factors such as: cost; availability of plant materials; the capability of propagating a wide variety of native plants; as well as budgeting constraints where the project spans multiple years, yet funding is linked to a single year target; may be barriers to the use of native species. If after other alternatives have been thoroughly evaluated, the use of exotics is deemed necessary, the revegetation plan must include a justification for the use of non-native species. In such circumstances, favor exotics with low reproductive fitness, short longevity, or self-pollination to reduce gene pollution and undesirable long-term effects on the ecosystem.

50.04 - RESPONSIBILITIES

1. Forest Botanist or Forest Sensitive Plant Coordinator.

The Forest Botanist or Forest Sensitive Plant Coordinator shall develop the botanical section of all revegetation plans developed on a Forest.

50.05 - DEFINITIONS.

1. Revegetation - a general term for renewing the vegetation on a project site, which may include restoration and rehabilitation.

2. Rehabilitation - improving a project site to a more desired condition than previously existed usually as a result of a major disturbance.

3. Restoration - reestablishing a project site to a previously existing natural condition using similar or identical native vegetation.

4. Native plant - one that occurs and has evolved naturally in the Region as determined by climate, soil, and biotic factors.

5. Genetically local source - plant materials that originated at or within the same seed zone and elevation band as the project site.

6. Exotic or non-native species - one that was introduced through human activity.

7. Undesirable plant - may be non-native species, non-adapted source, genetically changed through selection in a foreign dissimilar environment, or possesses trait(s) that conflict with accomplishment of objectives.

Exhibit 01. Genetic Guidelines for Plant Collections

Genetic Guidelines for Plant Collections

1) Origin is known

a) Document location of parent plants (see FSH 2409.42)
b) Identify and track collections from origin to nursery and back to field using a database management system.
c) Monitor survival, health, and growth performance over time.

2) Locally adapted

a) Seed origin should be as close as possible to the project site.
b) Use California tree seed zones to guide the transfer of plant materials.

1. For grasses, forbs, and shrubs, follow locally developed transfer guidelines where available, such as *Native Plant Seed Zones of the Klamath Mountains and Southern Cascades Section.*

2. Where locally developed guidelines are not available and for conifers or other trees, see California tree seed zone map and rules established in 1970 (Buck, *et. al.).* These provide a framework for determining gene transfer priorities based on geoclimatic factors, when other information is lacking.

2. Collect and use plant materials within local 500 ft elevation bands where possible and never transfer woody plants more than 1000 ft up or down in elevation in the same seed zone.

3. Avoid transferring plant materials from one geographic district to another. Geographic districts are those described in the Jepson Manual.

c) Where possible, within seed zones and elevation bands collect and use plant materials within the same vegetation series, or for riparian species, within watershed delineations.

d) Collect and use plant materials in more localized area in certain situations where site-specific ecotypes may develop, including:

1. populations on unusual soils (e.g. serpentine)

2. populations from extreme or marginal environments for the species (tolerance limits to temperature, precipitation, nutrients, etc).

3. populations with known or suspected unique genetic characteristics.

3) <u>Genetically diverse</u>

a) Plant materials should be collected from the project site. If not possible, plant materials should be collected from several sub-populations that are well-distributed within an adaptive (seed) zone.

b) Separate collections by 100 ft or greater for most outcrossing woody plants to ensure unrelatedness. Note: closer spacing may be appropriate for certain forbs and grasses that are highly specialized to their microenvironments.

c) Collect an approximately equal number of seeds/cuttings from each parent representative of that population. Ensure that the collection comes from a large number (30-50 but number depends on exact species) unrelated parents.

4) <u>High quality</u>

a) Select healthy, vigorous parent stock.

b) Collect at appropriate time (e.g. when seeds are mature and cuttings are dormant).

c) Use optimal collection, processing, and storage procedures.

d) Use cultural practices that will maximize the success rate (minimize losses) from collection to nursery and on through project completion.

Exhibit 02. Quality Control Guidelines

Quality Control Guidelines

1) Acquisition of plant material

a) Nursery and other appropriate resource personnel provide advice on quality standards for the acquisition of plant materials (force account, contract, or purchase) that will ensure that the plant materials are in a suitable physiological condition when delivered for whatever cultural activity (sowing, growing, storing, outplanting, etc) is required.

2) Plans for using plant material

a) Prior to receipt of plant material, handling procedures must be "in place" to ensure proper storage conditions for seeds, cuttings, or plants and to ensure proper care and tending during seeding, grafting, or planting operations.

Exhibit 03. Project Coordination Guidelines

Project Coordination Guidelines

1) Project Implementation

a) All projects should be carefully reviewed prior to implementation by appropriate biological professionals for advice on how to obtain suitable genetic sources and how to care for local, native plant materials (geneticists, nursery managers), on help to prepare and administer contracts for planting (contracting personnel), and to ensure the suitability of species and resource objectives (botanists, ecologists, silviculturists, etc.).

b) The review process should evaluate whether objectives are sound and that they can feasibly be met.

2) Monitoring process

a) Project monitoring should include assessing the effectiveness of the use of native plants for restoration and/or rehabilitation.

ATTACHMENT H

USDA-FS REGIONAL NATIVE PLANT POLICY

United States Department of Agriculture
Forest Service
Pacific Southwest Region
Regional Office, R5
630 Sansome Street
San Francisco, CA
94111-2214

415-705-1098 Text

(TTY)

Reply To: 1330/2070

Date: June 30, 1994

Subject: Policy on the Use of Native Plant Material in Restoration other Revegetation Projects

To: Forest Supervisors, Staff Directors and Station Director, PSW

Maintaining the rich native flora and associated vegetative communities of the Pacific Southwest Region is a critical element of Ecosystem Management. The use of native plants for revegetation and restoration is integral to the overall national goal of conserving the biodiversity, health, productivity, and sustainable use of forest, rangeland, and aquatic ecosystems. Maintaining biodiversity includes retaining the inherent genetic variability within plant populations. Therefore, conservation of local germplasm is a desired outcome of our activities.

We will begin to broaden the base of local native plant materials through careful collection, storage, and production efforts to meet current need and to anticipate the future demand for revegetation. We must move as rapidly as possible toward the use of local native plant material and away from the use of exotics and non-local sources. Forests will follow the set of operational guides (enclosed) to avoid irreversible impacts on native ecosystems. This policy includes the restoration of historic ranges.

The following policy supports ecosystem management efforts. A key element of sustainability is the conservation of natural biological diversity. Native plants are intrinsically valuable, biologically diverse, and ecologically adapted to their habitats. They are key factors in sustaining resilient, healthy, and productive ecosystems.

Effective immediately, R5 policy on the use of native vegetative materials on National Forests will be:

> To the extent practicable, seeds and plants used in erosion control, fire rehabilitation, riparian restoration, forage enhancement, and other vegetation projects shall originate from genetically local sources of native plants.

1. Prescriptions for use of plant materials for revegetation must be developed by knowledgable plant resource specialists prior to implementation to ensure that the project is feasible and suitable plant material is used.

2. All revegetation facets must be evaluated early in the planning process for Forest projects.

3. Plant materials (seed, cutting, and whole plants) used in all revegetation projects shall originate from genetically local sources of native species, to the extent practicable.

4. Do not use plant materials of species sold as natives if the genetic origin is not known.

5. Plant materials collected or purchased for Forest projects must be carefully evaluated to ensure that these materials are healthy, free of pests, and that they are properly handled, stored, and conditioned for successful use.

The enclosed document is further guidance for implementing this policy. Much of the enclosed material will become part of the Forest Service manual as an R5 supplement. Questions regarding this policy should be referred to David Diaz at D.Diaz:R05a (415-705-1891) or Jay Kitzmiller, Genetic Resource Center Chico at J.Kitzmiller:R05f08d52a (916-895-1176).

/s/ Joyce T. Muraoka, for
RONALD E. STEWART
Regional Forester

Enclosure

Use of Native Vegetative Materials on National Forests

Maintaining the rich native flora and associated vegetative communities of the Pacific Southwest Region is a critical element of ecosystem management. The use of native plants for revegetation and restoration is integral to the overall national goal of conserving the biodiversity, health, productivity, and sustainable use of forest, rangeland and aquatic ecosystems. Maintaining biodiversity includes retaining the inherent genetic variability within plant populations. Therefore, conservation of local germplasm is a desired outcome of our activities. These guidelines provide direction for planning and implementing revegetation projects including rehabilitation and restoration of forest, range, and aquatic ecosystems.

1 - Authority.

1. The National Forest Management Act of 1976 (Sec. 6, 90 Stat. 2949) is the principal legislative mandate that directs the conservation of biological diversity and thus recognizes the value of adapted plant and animal communities.

2. Further direction is provided in Title 36, Code of Federal Regulations, Part 219, Section 27, Subsection G which states: "Management prescriptions, where appropriate and to the extent practicable, shall preserve and enhance the diversity of plant and animal communities, including endemics and desirable naturalized plant and animal species, so that it is at least as great as that which would be expected in a natural forest and the diversity of tree species similar to that existing in the planning area. Reductions in diversity of plant and animal species from that which would be expected in a natural forest, or from that similar to the existing diversity in the planning area, may be prescribed only where needed to meet overall multiple-use objectives. Planned site conversion shall be justified by an analysis showing biological, economic, social, and environmental design consequences, and the relation of such conversions to the process of natural change."

2 - Goals.

1. To conserve the native biological diversity and adaptive capacity of plant communities, species, and populations. This includes maintaining the integrity of the natural pattern of adaptive genetic structure within and among populations of a species.

2. To reduce the adverse impacts of management activities on the basic natural resources of soil, water, and plant gene pool diversity.

3. To stabilize soil after major disturbances while concurrently avoiding long-term adverse effects on the composition, structure, and function of natural plant communities.

4. To maintain or enhance water quality by controlling the composition and structure of plant communities through use of appropriate plant materials.

5. To prevent the displacement of native species through the introduction of aggressive, long lasting, undesirable vegetation into managed or natural plant communities.

6. To move rapidly toward the general use of locally adapted native plant species in ecosystem management.

7. To guide the program development for acquiring, propagating, and using native plant materials for interdisciplinary ecosystem management projects. These include wildlife, riparian, watershed, road-side, emergency post-fire soil stabilization, and other revegetation and restoration projects.

8. To stimulate development of new ways to achieve ecosystem management objectives that consider multidisciplinary long-term effects. This includes the evaluation of alternatives that provide economical as well as practical means to restore plant communities.

3 - Policy.

To the extent practicable, seeds and plants used in erosion control, fire rehabilitation, riparian restoration, forage enhancement, and other vegetation projects shall originate from genetically local sources of native plants. Native plants are intrinsically valuable, biologically diverse, and ecologically adapted to their habitats. They are key factors in sustaining resilient, healthy, and productive ecosystems. This policy supports management for sustainable use of ecosystems. A key element of sustainability is the conservation of natural biological diversity.

1. Prescriptions for use of plant materials must be developed for revegetation by knowledgable plant resource specialists prior to implementation to ensure that the project is feasible and that suitable plant material is used.

2. All revegetation facets must be evaluated EARLY in the planning process for Forest projects. For projects that involve soil disturbance, special consideration must be given to stockpiling of duff or topsoil (with seedbank and mycorrhizae) for later use in restoration of soil and vegetation, and where erosion control is required, mechanical methods must also be evaluated. All revegetation projects must consider both natural and artificial regeneration alternatives including collection of local sources of suitable native plant seed or cuttings, nursery propagation, and on-site planting and maintenance activities.

3. Plant materials (seed, cuttings, and whole plants) used in all revegetation projects shall originate from genetically local sources of native species, to the extent practicable.

a. Encourage natural regeneration where seed source and soil conditions are favorable. Where natural regeneration is likely to fail within the desired time frame and soil protection is necessary, evaluate the use of non-vegetative techniques that

allow natives to return, such as weed- and disease-free mulching, erosion blankets, or sterile straw waddles.

b. Alternatively, collect seed as near to the site as possible within an adaptive (seed) zone, follow genetic guidelines, and grow in the appropriate nursery. If a genetically local or similarly adapted stock of native species is not available for revegetation, consider either eliminating, delaying, or modifying the project such as planting natives in stages as they become available.

c. When project objectives justify the use of non-native plant materials, documentation explaining why non-natives are preferred will be part of the project planning process.

4. Do not use plant materials of species sold as natives if the genetic origin and physiological quality is not known. For now use only those commercial sources of native plant materials collected within the same ecological section (National Hierarchy of Ecological Units) or geographic subdivisions at the district level as mapped in the Jepson Manual (1993) as your project area. Refer to the genetic guidelines and the use the seed zoning rules for further guidance. Avoid the use of plant material bred and/or grown outside of California.

5. Plant materials collected or purchased for Forest projects must be carefully evaluated to ensure that these materials are healthy, free of pests, and that they are properly handled, stored, and conditioned for successful use.

4 - Explanation.

1. Intent. Policies and procedures for reforestation of conifer trees are well documented and are based on decades of research and practice. In addition, seeds are now readily available for most local sources of native conifers due to on-going seed collection and storage practices. However, for other native plant species such documentation and seed availability do not generally exist. This new policy is aimed at moving rapidly toward the general use of locally adapted native plant species in ecosystem management and for revegetation of any project area that has reasonable reestablishment potential. Through natural selection, native species have become well-adapted to their native environments, including both the biotic and abiotic elements.

2. Use of Exotics. Non-native species or populations of natives that are adapted to a different locale may sometimes be extremely useful, especially in the short-term for revegetating to stabilize severely disturbed sites. Common examples include wildfires, road-building, and mining activities. However, selection of the proper species and genetic source for use in these situations should be carefully decided, because many commercially available stocks are

persistent, invasive, and also may have great potential for disrupting natural communities and processes for a long time. For example, certain non-native grass species have been selectively bred for rapid establishment which makes them aggressive competitors and causes displacement of native woody plant species.

The introduction of plant species or seed sources that are not adapted to the planting site or are not compatible with the native species may adversely affect ecosystem integrity. Exotics or non-locally adapted populations may be poorly adapted to certain locales, resulting in low survival, slow growth, and high susceptibility to environmental extremes and to endemic pests. Furthermore, new insects or diseases may be unknowingly introduced into our forest ecosystems by use of non-native species or by use of native stock grown in foreign nurseries. Such events could permanently alter ecosystems beyond the range of natural variability.

3. Constraints to Use of Natives. In certain cases, reliance on non-native species can be reduced only gradually over time. Major barriers to the use of natives may exist. Cost factors, availability of plant materials, and capability of propagating a wide variety of native plants will have to be developed through experience and research. Current budgeting constraints present a challenge because project planning, seed collection, and nursery propagation span multiple years, yet funding linked to targets involves a single year perspective. In the short term, these limitations could lead to a decision to use alternative methods for a project. After other alternatives have been thoroughly evaluated, if use of exotics is deemed necessary, favor exotics with low reproductive fitness, short longevity, or self-pollination to reduce gene pollution and undesirable long-term effects on the ecosystem.

5 - Definitions.

1. Revegetation - a general term for renewing the vegetation on a project site, which may include restoration and rehabilitation.

2. Rehabilitation - improving a project site to a more desired condition than previously existed usually as a result of a major disturbance.

3. Restoration - reestablishing a project site to a previously existing natural condition using similar or identical native vegetation.

4. Native plant - one that occurs and has evolved naturally in the Region as determined by climate, soil, and biotic factors.

5. Genetically local source - plant materials that originated at or within the same seed zone and elevation band as the project site.

6. Exotic or non-native species - one that was introduced through human activity.

7. Undesirable plant - may be non-native species, non-adapted source, genetically changed through selection in a foreign dissimilar environment, or possesses trait(s) that conflict with accomplishment of objectives.

Genetic Guidelines for Plant Collections

1) Origin is known

a)Document location of parent plants (see FSH 2409.42)
b)Identify and track collections from origin to nursery and back to field using a database management system.
c)Monitor survival, health, and growth performance over time.

2) Locally adapted

a)Seed origin should be as close as possible to the project site.
b)Use California tree seed zones to guide the transfer of plant materials.

1.See California tree seed zone map and rules established in 1970 (Buck, et. al.). These provide a framework for determining gene transfer priorities based on geoclimatic factors, when other information is lacking.
2.Collect and use plant materials within local 500 ft elevation bands where possible and never transfer woody plants more than 1000 ft up or down in elevation in the same seed zone.
3.Avoid transferring plant materials from one geographic district to another. Geographic districts are those described in the Jepson Manual.

c)Where possible, within seed zones and elevation bands collect and use plant materials within the same vegetation series, or for riparian species, within watershed delineations.
d)Collect and use plant materials in more localized area in certain situations where site-specific ecotypes may develop, including:

1.populations on unusual soils (e.g. serpentine)
2.populations from extreme or marginal environments for the species (tolerance limits to temperature, precipitation, nutrients, etc).
3.populations with known or suspected unique genetic characteristics.

3) Genetically diverse

a)Plant materials should be collected from the project site. If not possible, plant materials should be collected from several sub-populations that are well-distributed within an adaptive (seed) zone.
b)Separate collections by 100 ft or greater for most outcrossing woody plants to ensure unrelatedness. Note: closer spacing may be appropriate for certain forbs and grasses that are highly specialized to their microenvironments.

c)Collect an approximately equal number of seeds/cuttings from each parent representative of that population. Ensure that the collection comes from a large number (30-50 but number depends on exact species) unrelated parents.

4) High quality

a)Select healthy, vigorous parent stock.
b)Collect at appropriate time (e.g. when seeds are mature and cuttings are dormant).
c)Use optimal collection, processing, and storage procedures.
d)Use cultural practices that will maximize the success rate (minimize losses) from collection to nursery and on through project completion.

Quality Control Guidelines

1) Acquisition of plant material

a)Nursery and other appropriate resource personnel provide advice on quality standards for the acquisition of plant materials (force account, contract, or purchase) that will ensure that the plant materials are in a suitable physiological condition when delivered for whatever cultural activity (sowing, growing, storing, outplanting, etc) is required.

2) Plans for using plant material

a)Prior to receipt of plant material, handling procedures must be "in place" to ensure proper storage conditions for seeds, cuttings, or plants and to ensure proper care and tending during seeding, grafting, or planting operations.

Project Coordination Guidelines

1) Project Implementation

a)All projects should be carefully reviewed prior to implementation by appropriate biological professionals for advice on how to obtain suitable genetic sources and how to care for local, native plant materials (geneticists, nursery managers), on help to prepare and administer contracts for planting (district reforestation personnel), and to ensure the suitability of species and resource objectives (botanists, ecologists, silviculturists, etc.).

b)The review process should evaluate whether objectives are sound and that they can feasibly be met.

2) Monitoring process

a)Project monitoring should include assessing the effectiveness of the use of native plants for restoration and/or rehabilitation.

ATTACHMENT I

SCE AVIAN PROTECTION (SPECIFIC ORDER) AND ANIMAL/BIRD MORTALITY REPORTING FORM

Avian Protection
(Specific Order)

1. PURPOSE

The purpose of this Department Order is to:

- Provide a standard procedure for reporting and monitoring avian mortality or other activities (i.e., nesting) in the vicinity of Power Production Department (PPD) structures;
- Facilitate efficient communication among the PPD Divisions (Eastern and Northern Hydro, Mohave and Mountainview Generating Stations), other entities within SCE [i.e., the Corporate Environment, Health, and Safety Division (EH&S)], and appropriate regulatory agencies;
- Ensure PPD structures are maintained in a manner that reduces adverse effects on bird species in accordance with federal and state regulations, while protecting public health and safety.

2. RAPTOR MORTALITY REPORTING

Raptor electrocutions and power line collisions shall be reported via telephone to the Division's Environmental Manager or Safety and Environmental Specialist (SES) within 24 (twenty-four) hours of discovery of a carcass. Either the Environmental Manager or SES will in turn promptly notify EH&S by telephone and will immediately follow up that notification with a written raptor mortality report. (See Attachment A)

3. RETROFITTING OF EXISTING STRUCTURES

Any PPD structure involved in the electrocution of any raptor, or other endangered/threatened bird species, will be evaluated to determine the feasibility of retrofitting or modifying that structure so that the probability of future bird electrocutions is minimized. Such evaluation of that structure will be performed within 30 (thirty) business days or sooner (for eagles or listed species), and the results of that evaluation will be reported to either the Division's Environmental Manager or SES, and EH&S. If structures of a similar design and in similar habitat are located in the same vicinity of any electrocution, the responsible Manager will determine if these other structures should also be retrofitted to make them more raptor safe. All other electrical structures in any area where clusters of electrocutions have occurred will be examined for possible retrofitting. Each Division, in consultation with EH&S, will identify these clusters and determine which structures may need to be retrofitted and the appropriate retrofit required. As opportunities arise during routine operation and maintenance activities, field personnel will assess

exposed wires and surfaces for possible retrofitting if they are capable of electrocuting raptors and other birds/wildlife. The Division's Environmental Manager or SES must be advised of any retrofitting activity. Retrofits may include, but are not limited to, installing approved bushing covers on transformers, insulator hoods, protective covering on jumper wires or taps, and making other modifications.

4. NEW CONSTRUCTION

All new or rebuilt structures within Raptor Concentration Areas (RCAs) will be of a raptor-safe construction. An RCA is an area designated by EH&S as likely to have a high concentration of raptors. All new or rebuilt structures on land administered by the federal government (USFS, BLM, etc.) shall be designed to be raptor safe whenever possible. Each new structure installed that has potential to electrocute birds and other wildlife will be evaluated by both the Division and EH&S to determine if the structure can be made raptor-safe. The Division's Environmental Manager or SES will be contacted regarding the replacement of structures.

5. NEST PROTECTION

Protected nests include:

- Active nests (nest contains eggs, young birds or adult birds sitting on the nest) of raptors and other bird species protected by the Migratory Bird Treaty Act;
- Active and inactive nests of all eagles and other threatened or endangered bird species.

All vegetation maintenance and work activities involving protected nests on PPD structures will be coordinated with the Division's Environmental Manager or SES. The Division's Environmental Manager or SES will assess the work activity and, if deemed necessary, coordinate with EH&S and appropriate governmental agencies in accordance with SCE's Federal Fish and Wildlife Permit (See Attachment B).

In the event of an emergency (threat to public health or safety, or to the safety of the birds and nests), nesting material and/or nearby trees may be trimmed, conductors or other structures may be moved away from the nest, or other appropriate measures taken as listed in SCE's Federal Fish and Wildlife Permit, to ensure safety of birds and provide safe electrical operations. The Division's Environmental manager or SES shall be contacted before conducting these emergency activities, whenever possible. Contact with the agencies is required before the relocation of any protected bird nest. All personnel with potential to discover birds injured or killed by SCE facilities or with potential to work near active or inactive nests in the course of their work should carry the current Federal Fish and Wildlife and Permit in their

possession. A copy of the valid permit is necessary to carry out procedures outlined in this avian protection department order.

6. TRAINING

All PPD personnel whose jobs may have some involvement with environmental resources such as wildlife habitat or water quality will receive regular training on special-status species, including avian protection issues, at a frequency to be determined by each Division. All contractors will receive training on environmental resource issues depending on the work to be performed, and will have contractual obligations to abide by applicable laws, regulations and SCE permits.

Appropriate personnel will receive guidance on correct measures to take should an encounter with protected nests impact project activities.

Animal/Bird Mortality Report

To: Jill Fariss Date: _____
Biological & Archaeological Resources Group
Corporate EH&S Division, RP&A Department
Quad 3A, G.O.1

From: Name _____
Work Location _____ PAX _____

Describe the species of the Animal or Bird that was mortally injured by SCE facilities (electrocuted/hit by a SCE vehicle, etc.).

_____
_____

Describe how the Animal or Bird was mortally injured by SCE facilities (bird contacted transformer bushings, etc.).

_____
_____
_____
_____

Weather Conditions (e.g. rainy and cold, sunny and warm, etc.)

_____
_____
_____

Circuit Name & Voltage _____

Specific Problem Location (e.g. Pole #/Address/Cross Streets, etc.)

_____
_____
_____

Description of Terrain and Vegetation in Area (e.g. near agriculture area, dense city area, residential housing, etc.)

_____

_____

_____

Please attach picture of the Bird or Animal, if possible.