

Objectives

The objectives of the non-native invasive plant risk assessment are to assess the effects of the fire and suppression efforts on non-native invasive plant species (including state-listed noxious weeds) establishment, abundance, and spread and their impact on the recovery of native plant communities as well as potential impacts to threatened, endangered, and sensitive plant species.

Definitions

Invasive species (non-native invasive species): An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112; FSM 2905).

Noxious weed: Any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health or the environment (Plant Protection Act of 2000; FSM 2905).

Noxious weed: Any species of plant that is, or is liable to be, troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate, which the director, by regulation, designates to be a noxious weed (California Food and Agriculture Code s. 5004).

Critical Values and Resources Threats

The Salt Creek Fire burned about 981 acres, north of Shasta Lake on the Shasta Lake National Recreation Area of the Shasta-Trinity National Forest, of which about 18% (about 180 acres) were non-National Forest System lands and 82% (about 801 acres) were National Forest System lands.

The burned area from the Salt Creek Fire includes conifer, montane hardwood, and chaparral vegetation types (see Table 1). Dozer lines and drop points outside of the fire perimeter include similar vegetation types as those within the fire perimeter. Soils over the landscape are derived from the Bragdon Formation metasedimentaries in the north and west of the burned area and Baird Formation metavolcanics in the southeast portion of the burned area. No serpentine or limestone outcrops are known within the burned area or the area of fire suppression activity. Fire intensity ranged from high (particularly in draws and areas near the fire origin on Interstate 5) to low and burned in a mosaic pattern across the landscape.

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Table 1. Land area within the burned area by land cover type and jurisdiction.

Land cover	National Forest Area	Non-NFS Area	Total Area
Montane hardwood	402 acres	81 acres	483 acres
Conifer	303	73	376
Chaparral	87	5	91
Other barren or built	10	21	31

One uncommon plant (California Native Plant Society list 4.2), *Arnica venosa* (Shasta County arnica), is known from the area along Gilman Road on the north edge of the fire perimeter. This plant has been known to respond well to fire. The area in which it is recorded to occur burned at moderate to low severity and had minimal fire suppression activity. There are no known threatened, endangered, or sensitive plant species within the fire perimeter or near drop points or other fire lines outside of the fire perimeter.

The fire occurred within a major transportation corridor that can facilitate the spread of non-native invasive plants between the agriculture-producing areas to the north and to the south of this mountainous stretch of the transportation corridor. Movement of non-native invasive plants with potentially significant economic impacts can be prevented or facilitated by activity and management that occurs within this corridor.

There was a weed washing station mobilized with the arrival of the Type 2 Incident Management Team. However, there is no assurance that units, including dozers, responding during initial attack before the weed washing station was ordered were clean before beginning suppression activities.

A total of about 2.0 miles of dozer lines were constructed on Division A and Division Z during suppression efforts. In addition, disturbance occurred along the transmission power line corridor to protect this resource and to replace power poles immediately after the burning front moved past these lines to restore power transmission capabilities.

Burned Area Characterization

The area in and around the fire had recently been surveyed for non-native invasive plants and detections from these surveys were entered into the Forest Service’s NRIS database. In addition, on August 7 and 8, all dozer lines and drop points, some roads, and parts of the power line corridor were surveyed to validate existing surveys and to assess disturbance due to fire, fire suppression, and other, unrelated activities that may have the potential to facilitate the introduction, spread, or establishment of non-native invasive plants. The surveys that occurred after fire containment on August 7 and 8 validated the completeness of surveys that had occurred previously in the area.

There were no detections or previous records of non-native invasive plants rated as A or B noxious weeds by the California Department of Food and Agriculture (CDFA). One B-rated noxious weed

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(*Euphorbia oblongata*) is known from along Salt Creek Road in the vicinity of, but outside of, the fire and fire suppression activity area. Some C-rated noxious weeds are known from the fire area and were detected during field surveys.

Most detections and records of non-native invasive plants were associated with higher-use areas, including the shoulders of I-5 and Gilman Road, the power line corridor, and the gravel yard on the west side of I-5 near the fire origin. Due to the limited travel routes and steep terrain limiting activities, much of the burned area appears to have had either minimal or no non-native invasive plant occurrences prior to this fire.

The dozer line and areas adjacent to it from drop point 2 to Division Z appeared to be free of non-native invasive plants. The dozer line on Division A also appeared to be free of non-native invasive plants, however, some C-rated noxious weeds and other non-native invasive plants were detected near the residences on private lands at the north end of the Division A dozer line, and many C-rated noxious weeds and other non-native invasive plants were found at the south end of the Division A dozer line in the gravel yard. It is possible that dozer line construction or activity along these lines following dozer line construction transported seeds or propagules from non-native invasive plants that would not be detected in these surveys immediately after disturbance. Overall, it is estimated that over 70 percent of the burned area is currently a contiguous, unfragmented area free of non-native invasive plants.

The non-native invasive plants that were detected with the greatest potential to spread and affect natural plant communities due to their ecological impacts and potential response to fire disturbance include *Genista monspessulana* (French broom), *Cytisus scoparius* (Scotch broom), and *Centaurea solstitialis* (yellow starthistle). *Carduus pycnocephalus* (Italian thistle) and *Cirsium vulgare* (bull thistle) may also have potential negative ecological effects and expand their distribution in this area as a result of this fire, but would be the next lower priority for survey and treatment. Other species that are of significant concern and could potentially be transported to the area over the course of the next year due to traffic through I-5 and other corridors include *Isatis tinctoria* (dyer's woad), *Chondrilla juncea* (rush skeleton weed), *Euphorbia virgata* (leafy spurge), and *Euphorbia oblongata* (oblong spurge). Table 2 describes these species of particular concern, their rating by CDFA and the California Invasive Plant Council (Cal-IPC) and the general locations where they were predominately detected.

Along the power line corridor, a significant amount of emergency road improvements and suppression activity created extensive ground disturbance. It is evident from records and observations from unburned and lightly burned areas of the power line corridor that parts of this area was heavily infested with *Centaurea solstitialis* before the fire and a few occurrences *Cytisus scoparius*, as well as other non-native invasive plants. The seeds of both of these C-rated noxious weeds germinate in response to fire and disturbed soil. Population growth in this area is expected for both of these species with impacts to native vegetation to the east of the power line corridor. Given erosion potential for this area, it may also be possible for seed from these species to be transported from the current site to lower parts of the drainages they occupy and establish in new locations, as well.

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Table 2. Non-native invasive plants of greatest concern detected in the fire area (n.b., this is not a complete list of non-native invasive plants recorded or detected from the area).

Scientific Name	Common Name	CDFA Noxious Weed Rating	Cal-IPC Rating	Location Detected
<i>Carduus pycnocephalus</i>	Italian thistle	C	Moderate	Division A, Gilman Road, Transmission Lines
<i>Centaurea solstitialis</i>	yellow starthistle	C	High	Division A, Transmission Lines
<i>Chondrilla juncea</i>	rush skeleton weed	A	Moderate	Not detected
<i>Cirsium vulgare</i>	bull thistle	C	Moderate	Division A, Gilman Road, Transmission Lines
<i>Cytisus scoparius</i>	Scotch broom	C	High	Division A, Gilman Road, Transmission Lines
<i>Euphorbia oblongata</i>	oblong spurge	B	Limited	Not detected (known within 1 mile)
<i>Euphorbia virgata</i>	leafy spurge	A	High	Not detected
<i>Genista monspessulana</i>	French broom	C	High	Gilman Road, 35N79A Road
<i>Isatis tinctoria</i>	dyer's woad	B	Moderate	Not detected

Cynosurus echinatus (hedgehog dogtail grass), a non-native invasive annual grass was observed along most of the roadsides and one historic trail along Division Z within the fire perimeter. This and other non-native invasive annual grasses that were observed along roadsides, including *Aira caryophylla* (silver hair grass), *Avena* sp. (oat grass), *Bromus diandrus* (ripgut brome), *Bromus hordeaceus* (smooth brome), *Bromus madritensis* ssp. *rubens* (red brome), and *Bromus tectorum* (cheatgrass) can be expected to increase in abundance and disperse along newly-opened corridors. These annual grasses may increase the probability of future ignitions and provide more continuous fine fuels over the landscape, although the overall impact may be low to moderate in the long-term. Eradication of these annual grasses is likely to be infeasible once they are established, although vegetation management may limit their abundance over the long term. Prevention measures can limit the spread of these annual grasses.

Emergency Determinations

Potential for spread and establishment of non-native invasive plants on National Forest System lands, affecting native vegetation recovery.

Probability of Damage or Loss: Likely

Given habitat disturbance from the fire and fire suppression and suppression related and other available vectors for dispersal, it is likely that non-native invasive plants will increase in abundance and spread.

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Magnitude of Consequences: Moderate

Competition from non-native invasive plants and effects from their increase in abundance and spread could include changes in soil chemistry (brooms), increased erosion (annual grasses and forbs), reduced soil water availability (yellow starthistle), and alterations in fire behavior (brooms and annual grasses) would have a moderate impact on existing, native vegetation.

Actions on National Forest System lands:

Treat dozer lines where they intersect roads and trails to prevent OHV use of these dozer lines and the introduction of additional non-native invasive plant seeds and propagules. (3 locations)

Treat dozer lines where they intersect with roads and where dozer lines cross from private lands to National Forest System lands with mulch and seed for the first 100 yards to suppress non-native invasive plants that may have been introduced to those locations and to interrupt the potential dispersal corridor that the dozer line could otherwise create from infested sites to non-infested sites. (3 locations for a total of about 0.41 acres of treated dozer line)

Survey the complete length of dozer lines and drop points to detect new introductions of non-native invasive plants and take early eradication action when detected. If any infestations detected are too large to treat at the time of discovery, request supplemental funding to return to the site with adequate resources to effectively treat the infestation. (2 dozer lines for a total of 1.1 miles of dozer line surveyed and treated)

Recommendation on non-National Forest System lands:

Treat dozer lines where they intersect roads and trails to prevent OHV use of these dozer lines and the introduction of additional non-native invasive plant seeds and propagules. (4 locations, all on Division A west of I-5)

Treat dozer lines where they intersect with roads and where dozer lines cross from private lands to National Forest System lands with mulch and seed for the first 100 yards to suppress non-native invasive plants that may have been introduced to those locations and to interrupt the potential dispersal corridor that the dozer line could otherwise create from infested sites to non-infested sites. (4 locations, all on Division A west of I-5 for a total of about 0.55 acres of treated dozer line)

Survey the complete length of dozer lines and drop points to detect new introductions of non-native invasive plants and take early eradication action when detected. If any infestations detected are too large to treat at the time of discovery, request supplemental funding to return to the site with adequate resources to effectively treat the infestation. (1 dozer line broken in 2 by land ownership on Division A for a total of 0.5 miles of dozer line surveyed and treated)

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Treat the occurrence of *Cytisus scoparius* (Scotch broom) northeast of the power line corridor in an area of high soil burn severity (at 122° 19.69' W, 40° 50.86' N) to prevent further encroachment into natural vegetation.

Treat existing and new occurrences of *Cytisus scoparius* (Scotch broom), *Genista monspessulana* (French broom), and *Centaurea solstitialis* (yellow starthistle) along the PG&E power line corridor to prevent increases in abundance of these noxious weeds and to prevent their spread into currently uninfested habitat. Particular focus should be placed on occurrences adjacent to areas of moderate and high soil burn severity.

References

Cal-IPC 2012. California Invasive Plant Inventory Database, [Online]. California Invasive Plant Council, Berkeley, California. <http://www.cal-ipc.org/ip/inventory/weedlist.php>

CDFA 2010. Pest Ratings of Noxious Weed Species and Noxious Weed Seed, [Online]. California Department of Food and Agriculture, Division of Plant Health & Pest Prevention Services, Sacramento, California. <http://cdfa.ca.gov/plant/ipc/weedinfo/winfolist-pestrating.htm>

CNPS 2012. Inventory of Rare and Endangered Plants v8-01a, [Online]. California Native Plant Society, Sacramento, California. <http://www.rareplants.cnps.org>

USDA 2007a. Existing Vegetation, [GIS dataset]. U.S. Department of Agriculture, Forest Service, Pacific Southwest Region.

USDA 2007b. Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. <http://www.fs.fed.us/database/feis/>

Cost Estimates

The following table includes cost estimates for non-native invasive plant detection surveys that allows for travel from Redding, time to spot treat non-native invasive plants that are found, and return visits within the year to detect and treat both early and late-germinating plants. This is based on expected actual costs of travel to and work at the site from the Redding office.

Resource	Cost per day	Days per visit	Visits in the year	Total cost
GS9 specialist	272.15	1	3	\$XXXXXX
GS5 specialist	130.22	1	3	\$XXXXXX
Travel from Redding	20.00	1	3	\$XXXXXX
Total	422.37	1	3	\$XXXXXX
			Miles of dozer line	1.1
			Cost per mile of survey	\$XXXXXX