Vegetation, weeds and botanical resources

Dominant vegetation:
The primary plant communities within the perimeter of the Telegraph Fire as mapped by the USDA Forest Service Remote Sensing Lab (November 2006) are chamise chaparral (39.0%), lower montane mixed chaparral (12.2%), interior live oak woodland (14.4%), blue oak savannah (5.8%), canyon live oak woodland (3.6%), black oak woodland (0.9%), mixed hardwood (0.8%), non-native annual grassland (5.1%), gray pine (9.0%), west side ponderosa pine forest (7.9%), and valley-foothill riparian forest (0.1%). Lumping these figures into broader classes, 51% of the lands within the fire were chaparral, 25% oak woodlands or savannah, 17 % was dominated by pines and 5% supported mostly herbaceous vegetation. Because the Forest Service lands within the fire boundary have more forest and woodlands, the vegetation distribution of the BLM public lands were even more heavily weighted to chaparral than the above figures would suggest.

Chamise dominates on south facing slopes. Forest and hardwood communities dominate on north facing slopes and at higher elevations. Few of the drainages are truly perennial, but many have substantial reaches with riparian vegetation. Apparently some riparian areas are spring-fed, forming static pools or providing subsurface water for vegetation after flow has ceased in the spring or summer.

Chaparral species in the fire area include chamise, white leaf manzanita, mewukka manzanita, buckbrush, toyon, western mountain mahogany, flowering ash, golden fleece, blue elderberry, keckiella, holly-leaf redberry, poison oak. Associated tree species include knobcone pine, gray pine, sugar pine, California juniper, interior live oak.

Many of the same species are found in the oak woodland and forest sites with additions like ponderosa pine, incense cedar, canyon live oak, black oak, blue oak, woollyleaf ceanothus.

Chaparral species are fire adapted and can generally reestablish after fires. Many dominant chaparral species are able to withstand fire by regrowth from subsurface or basal structures like burls, that are subjected to less heat than aerial structures. Latent buds in these structures are stimulated after a fire to initiate new stem growth. Among the species with this ability in the chaparral portion of the burn area are chamise, Mewukka manzanita, redbud, toyon, western mountain mahogany. Other species do not have this ability to vegetatively reproduce after fire, but reproduce abundantly from seed that is stimulated to germinate by cues provided by the fire. Among the chaparral species at the Telegraph Fire, white leaf manzanita and buckbrush have this reproductive strategy. Some species like chamise are able to both sprout and seed successfully after fire, although one of these strategies usually is more successful under specific fire conditions. Even one of the conifer species associated with chaparral in the fire area, knobcone pine, is a closed-cone pine adapted to release seed after fire. Although much of the fire area had not burned in decades, this may be a typical fire return interval according to current research. Half of the chaparral lands of southern Sierras have not

had a fire since 1910. Seed of chaparral plants maintain their viability in the seed bank. Research on a 2002 chaparral burn in Sequoia National Park where some of the stand had not burned in 150 years found no depletion of species during post-fire recovery relative to younger stands.

All of the abundant oaks in the fire area, (interior live oak, canyon live oak, blue oak, black oak), have the ability to sprout. California buckeye similarly has the ability to sprout. So again the oak woodlands are resilient to fire.

Riparian vegetation often has the ability to vegetatively reproduce because it grows in an environment with frequent disturbance events, especially flooding and sedimentation. Willows and cottonwoods have this ability for instance. On the other hand at least one set of observations indicates that white alder may be killed outright by fires under some fire conditions. The riparian vegetation at the Telegraph fire was generally burned with low severity or left untouched by the fire. Again this community should recover.

The community most susceptible to high intensity fire is the westside ponderosa pine forest. Ponderosa pine will survive low intensity ground fires and a pattern of frequent fires of this intensity is thought to have been the pre-settlement fire regime. The few observations of this community at the Telegraph Fire (with limited acreage on public land), ponderosa pine forest appears to have burned mostly with low to moderate intensity. The areas of low intensity fire may temporarily produce the open park-like hypothesized climax condition for this forest type, by sparing overstory trees and eliminating the understory. Moderate intensity fire produces overstory mortality and leaves gaps that will be occupied by a new tree seedlings, including seedlings of shade intolerant species.

Most of these communities were sufficiently mature that the species that depend on the development of seed banks, had already accumulated seed in the soil. Although this fire was a human caused ignition, it mimicked a natural fire. Because of the resilience of most of these plant communities, and the low to moderate intensity fire that generally ran through the more fire susceptible communities, it is thought that there will be good recovery of native vegetation through natural processes.

Special status plant species:

Two special status plant species are known to occur within the Telegraph Fire perimeter on public land. Both are annual *Clarkia* species. *Clarkia* species in general do not accumulate a seed bank. Seed generally germinates the first year after production. This allows little time for the incorporation of seed into the soil profile, meaning that during a fire much of the seed is near the soil surface and exposed to more intense heat than deeply buried seed. Fortunately during the Telegraph Fire most of the known habitat of these two species was burned with low intensity or not at all. (Intensity judged from observation in some areas, and from burn severity mapping in others.) It should be noted that other potential habitat in the fire area had not been surveyed for rare plant species, and so the true extent of these populations is not known. Low intensity burning may

benefit one or both of these species. At least Mariposa clarkia, *Clarkia biloba australis,* generally favors habitat with substantial bare ground, and it is often found in disturbed areas or areas with accelerated erosion like steep roadcuts.

The steep northeast facing slope on upper Mt. Bullion where beaked clarkia, *Clarkia rostrata*, occurs had low fire intensity, possibly caused in part by aspect. In contrast the lower canyon sites for Mariposa clarkia were largely on steep rocky ground, some of it a cut for the Yosemite Railroad and much of it south-facing. Fuels here are interrupted by a road and the Merced River. Here vegetation was sparse and mostly herbaceous before the fire, and the uneven low intensity burn is likely to be neutral or favorable for Mariposa clarkia.

Contingency lines away from the fire affected two special status plant species as well. Parry's horkelia, *Horkelia parryi,* was affected by dozer work on Timbrush Fuelbreak. Some areas of the plant were bladed, presumably eliminating the plants that occurred there, at least for the short term. Other plants were run over by equipment. This clonally spreading perennial is likely to rebound from injury as long as its habitat has not been too greatly altered.

A small roadside occurrence of Mariposa clarkia at the edge of the road slated to become the lower portion of Buckhorn Fuelbreak was probably affected by crews clearing brush from the road edge with chainsaws. Working with CalFire during suppression rehabilitation, the plan for the disposal of the brush that was cut during suppression was changed so the resulting chips were not distributed along the roadside in Mariposa clarkia habitat. Increased traffic on this road during suppression, including dozer traffic, may have also affected the species. Some grading may have occurred as well, though no sidecast material was observed. Further, there is the possibility that equipment or vehicles may have brought seed of non-natives not already present at the site. If this occurred, there is the possibility of new competition detrimental to Mariposa clarkia. With all of these disturbance factors, and because of the small size of this occurrence, the loss of the entire occurrence is possible.

Weeds:

Although mature stands of the plant communities affected by the Telegraph Fire are generally resistant to invasion by non-natives, disturbed stands may be invaded preventing or retarding recovery of the native plant community. Weeds in the fire area are typical of much of the Sierra foothills and are found mostly in high use areas where native vegetation has been displaced by disturbance. Existing weed occurrences will have more potential to spread in the post-burn environment because of reduced competition in burned and disturbed vegetation. Competition reduction in burned habitat likely correlates with burn severity. Dozer lines from fire suppression are even more likely to be corridors of weed spread, because equipment may have spread weed seed. If weeds were spread down dozer lines, then weeds can travel from them into burned areas. Weeds of particular concern because of their ability to displace native vegetation are yellow starthistle and Italian thistle. Others present include tocalote, fig, tree-of-heaven.

Known loci of yellow starthistle distribution are the old railroad grade along the northside of the Merced River, and the North Fork Merced River in the vicinity of a prominent road crossing (northwest corner of section 25). Another smaller occurrence of yellow starthistle is on the planned portion of the lower Buckhorn Fuelbreak. Weed occurrences on US Forest Service land may affect BLM lands because equipment moved between jurisdictions while constructing firelines. Of particular concern in this context are the areas around Black Mountain and Burma Grade/Bull Creek Road.

Weed issues:

1) Weeds already present in the Merced River corridor have the opportunity to spread into the burn area because of the reduction of competition from other vegetation and abundant bare ground produced by the fire. Weed spread can retard or prevent the natural recovery of native vegetation
2) Weed spread in the burn area can negatively impact the Merced Wild and Scenic River and the Merced River Wilderness Study Area and the Merced River Special Recreation Management Area (SRMA). The Merced SRMA has three campgrounds and high visitor use focused on white water rafting.
3) Stanislaus National Forest has applied for BAER funds for weed monitoring and control in the aftermath of the Telegraph Fire. Their lands abut BLM lands and primary weed movement corridors including roads, dozer lines and streams cross the BLM/USFS boundary. Only work on both sides of the boundary has any promise of long-term success.

Treatments:

The weeds with the most ecological impact known to occur in this area are yellow starthistle and Italian thistle. Both are annuals, so the prevention of seed set is the key to their control. An integrated pest management approach will be employed. Where large concentrations of the weeds have already established, herbicide will be used, because it is much more efficient way to eliminate dense patches of these weeds. Glyphosate is known to be effective for these species and it was recently used successfully by the US Forest Service to combat a large population of yellow starthistle at El Portal, just upstream of the Telegraph Fire on the Merced River. Transline is another BLM approved herbicide with good track record against these species and because it has a narrower spectrum, with its use even fewer non-target species would be affected. A truck mounted spray rig may be used in areas with road access; backpack sprayers will be used where roads are not available. Where small isolated patches occur, and in areas adjacent to water bodies, hand pulling will be used. As long as hand pulling occurs before seed set it can be just as effective as herbicide in controlling these annual species. Of course hand pulling is much more labor intensive in many situations.

1) Weed monitoring:

Most of the fire area on public land supported relatively undisturbed chaparral, (including a wilderness study area), with substantial oak woodland and a lesser amount of ponderosa pine forest and riparian vegetation in some of the major drainages. The chaparral

particularly resists invasion by non-native herbaceous species. Long lived shrubs like chamise so dominate their habitat that little herbaceous vegetation can survive. But areas of ongoing disturbance especially along the major drainages (e.g., Merced River and North Fork Merced River) have been invaded by common weeds of the Sierra foothills, including yellow starthistle, Italian thistle and tocalote. Suppression activities, especially equipment work, may have spread weed seed. The burn itself has increased the opportunities for the spread of weeds by exposing bare soil and reducing competition by native species, especially the woody species that dominate these communities. Also important, especially for previously disturbed areas, the burn reduced competition from non-natives like Mediterranean annual grasses that are not invasive.

Monitoring will concentrate on areas of known weed occurrence, corridors of likely weed spread (including drainages, roads and fire lines). Much of the area to be monitored is not accessible to motor vehicles and will be surveyed on foot. GPS locations will be taken and transferred to GIS. Early spring surveys will allow treatments to occur later in the growing season. For areas of weed spread associated with the fire, this early detection, rapid response scenario, will prevent the establishment of new populations that after the first year initiate seed banks making the population increasingly hard to eradicate. However new infestations are hard to detect when only rosettes are present before stem elongation. (Existing populations are easy to detect because of the presence of the previous year's skeletons.) So later season surveys will also be performed.

The weeds with the most ecological impact known to occur in this area are yellow starthistle and Italian thistle. An integrated pest management approach will be employed in their control. Where large concentrations of the weeds have already established, herbicide will be used for control. Weed prevention measures will include the closures of roads that can be corridors for the transmission of weed seed. These road closures will serve other purposes as well including the protection of cultural sites, erosion prevention, non-impairment of Merced River Wilderness Study Area, and maintenance of the Outstandingly Remarkable Values of the Merced Wild and Scenic River.

The US Forest Service did a similar integrated pest management weed control project in the vicinity of El Portal on the Merced River upstream of the Telegraph Fire area beginning in 2006. There too the focus was yellow starthistle. They used a combination of herbicide (glyphosate) and hand pulling. They had great success, with no further need for herbicide after the 2nd season of work.

Monitoring will include surveys of the immediate vicinity of known weed populations, roads and dozer lines. Surveys in the immediate vicinity of known populations will involve approximately 20 acres. Many roads were transformed into fire lines as the fire progressed. It is estimated that about 10 miles of road that did not become dozer line will need to be surveyed. A total of 34 miles of dozer line was put in on BLM public land. Most of the dozer line has been water barred and it is no longer accessible to motor vehicles. So most surveys will be on foot.

Weed monitoring costs:

Areas to be surveyed	Area or mileage of surveys	Person days to accomplish	Cost of surveys/year
Near roads and known populations	20 acres and 10 miles of road	5 person-days	$800
Near dozer lines	34 miles	10 person-days	$1600
Total		15 person-days	$2400

Weed treatment costs:

Contracting with the county for spraying, the costs will be in this range (estimated from costs charged by Calaveras County):

Cost component	Unit cost	Number of units	Total cost/yr
Labor	$16/hr	40 hrs	$640
Inspector (labor)	$25/hr	10 hrs	$250
Spray rig	$100/day	3 days	$300
Herbicide	$25/ac	15 ac	$375
Adjuvant	$3/ac	15 ac	$45
Mileage	$0.50/mi	280	$140
Subtotal			$1750
Administrative	10% of above		$175
Total			$1925

BLM will incur direct costs to control weeds in remote locations and near water where herbicide application is problematic. BLM employees will either hand pull, or apply herbicide with a backpack sprayer.

BLM direct costs for weed control:

Cost component	Unit cost	Number of units	Total cost/yr
Labor	$25/hr	80 hrs	$2000
Herbicide	$25/ac	5 ac	$125
Adjuvant	$3/ac	5 ac	$15
Total			$2140