Kaniksu Complex (Tower, Baldy, & Grease Fires)— Botanic BAER Report

October 2015

Submitted by:

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Resource Specialty: Botany (including native vegetation; Threatened, Endangered, and Sensitive plants [TES]; non-native invasive plants)

Potential Values At Risk

Critical Values

A) Native Vegetation Recovery: In areas where the fires burned at high or moderate-high intensity or where fire suppression activities disturbed soils, the ability of native vegetation to rapidly recover may be reduced. Such areas are also at increased risk for non-native invasive plant (weed) establishment or spread, which could further reduce native vegetation recovery and diversity.

B) Threatened and Endangered Plants Species: No federally-listed plant species or suitable habitat for T&E plants are known to occur in the fire-affected areas. However, sub-populations of whitebark pine (*Pinus albicaulis*), a candidate T&E species, were known to occur within the Tower Fire area. Sub-populations were previously found on both South Baldy and North Baldy mountains.

C) Non-native Invasive Weeds: Burned areas (especially those which have a high or moderate burn soil severity rating) are even more pre-disposed to new weed introduction/establishment, as well as spread of existing populations. Non-native invasive plants interfere with natural successional processes and further diminish the ability of native plant communities to recover and revegetate areas following fire.

Resource Condition Assessment

A) Background: The BAER team assessed impacts from portions of the Kaniksu Complex, specifically the Tower, Baldy, and Grease Creek fires. The Tower Fire ignited from lightning on August 12, 2015 and burned 24,702 acres of mixed ownership, including National Forest System (NFS) lands administered by two forests on two different regions (Colville National Forest, R6; Idaho Panhandle National Forests, R1). The Baldy Fire ignited from lightning on August 1, 2015 and burned 514 acres on NFS lands administered by the Colville National Forest. The Grease

Creek Fire ignited from lightning on August 14, 2015 and burned 717 acres on NFS lands administered by the Colville National Forest.

Most of the fire areas have impacted various habitat types within mixed coniferous or montane coniferous forest communities. Vegetation types vary widely depending upon elevation, aspect, soil types, and moisture availability. Elevations range from 2540 to 6180 feet above sea level.

Pre-fire, the affected area was primarily vegetated by mixed conifer stands, subalpine/montane conifer stands, montane shrub communities, and montane bunchgrass meadows. Although habitat typing systems are different within each different forest, the primary habitat series observed in the area include: Douglas-fir, Western Red Cedar, Western Hemlock, and Subalpine Fir. Generally, south and southwest aspects below 4,500 feet elevation or microsites of vegetation occurring on shallow soils over exposed bedrock outcrops tend to be comprised of drier Douglas-fir, ponderosa pine, and grand fir dominated communities. North and eastern aspects below 5,000 feet elevation and forested riparian corridors tend to be comprised of western red cedar or western hemlock dominated communities. Higher elevation sites tend to be dominated by subalpine fir and lodgepole pine communities.

Both the Colville National Forest (CNF) and Idaho Panhandle National Forests (IPNF) have road-side weed-spraying programs and noxious weed management decisions, so many of the Forest Service Roads in the area have been treated for weeds in the past. However, in recent years, budgets have somewhat limited treatment opportunities in the area. Although weed wash stations were utilized by some Incident Command Teams during the course of the fire suppression operations, adherence to that policy and efficacy are unknown.

B) Post-Fire Assessment/ Consequences

a. **Native Vegetation:** The effects of fire on native vegetation and recovery of native vegetation following fire depends upon many variables, including soil burn severity (both maximum soil temperature/heating during fire and loss of organic and soil horizons), pre-fire vegetation composition, proximity of unburned native seed sources, aspect, elevation, and presence of non-native invasive species.

   Botanical assessments were conducted based on numerous site visits and walk-throughs of various soil burn severity areas within the different fire areas.

   Most of the fire areas with low soil burn severity (see Soils Report) should revegetate or recover with native plants fairly rapidly, likely to acceptable levels within 1-3 years. In these areas, much of the organic/duff layer is still present on the site (which also tends to equate to somewhat lower maximum soil temperature and potential for unburned seeds still in the soil profile.) Scattered, residual islands of minimally-impacted vegetation are present within these low soil burn severity areas. Furthermore, although much of the understory vegetation component was top-killed in the lower burn soil severity areas, most of the perennial plants will likely re-sprout from the crowns or

rhizomes. A high portion of the shrubs in the low-mid elevation areas which incurred low fire severity are already re-sprouting from crowns.

Figure 1. Shiny leaf ceanothus (*Ceanothus velutinus*) , pin cherry (*Prunus emarginatus*), and thimbleberry (*Rubus parviflorus*) resprouting six weeks post-fire in low and moderate soil burn severity areas.

Within moderate and high soil burn severity areas, some hydrophobic soils are present, there were substantial losses of the organic soil horizons, and the maximum soil temperatures were likely high enough to destroy much of the natural seed bank within the profile. During assessments, although there is already some crown re-sprouting of shrubs, the survival appears to be sporadic and primarily associated with the very fire-adapted species, such as shiny leaf and red-stem ceanothus (*Ceanothus velutinus* and *C. sanguineus.*) In moderate soil burn severity areas, scattered duff layers are still present, as are isolated patches of surviving native plants, resulting in the ability to re-establish forbs and graminoids via natural seeding/succession over much of the burn area fairly readily, likely within 3-5 years, except in high elevation zones, harsh sites (southwest aspects or thin soils) or where soil mass failures in the area. In high soil burn severity areas, especially those that are extensive (i.e. within the Tower Fire: the basin near the northwest side of Browns Lake, the upper basin of the head of Mill Creek, and the east

side of the ridgeline north of South Baldy) or in high elevation areas, native recovery will likely take some time to successfully re-establish (potentially 3-8 years for forbs or graminoids, but up to 8-15 years for shrubs or on harsh sites, such as high elevations, thin-soils, or low elevation southwest aspects.)

Figure 2. High soil burn severity area with minimal native vegetation survival.

Additionally, some of the higher soil burn severity areas within the Tower Fire occur where existing non-native invasive plants already occur. As a result, many of these sites will not only be slower to recover, but will also have a high likelihood of non-native invasive plant encroachment and spread within the burned area.

b. Threatened and Endangered Plant Species Assessment: Botanists utilized a combination of existing elemental occurrence data for each forest, personal knowledge of the sites, and walk-through assessments of the burned areas to assess fire effects to rare plant species.

As stated before, no currently federally-listed threatened or endangered plant species are known to occur within the Tower, Baldy, or Grease Creek fire areas. However, occurrences of the candidate T&E species whitebark pine (*Pinus albicaulis*) were known in the Tower Fire area, around North Baldy and the ridgeline north of South Baldy.

Post-fire assessments confirmed that all known occurrences of whitebark pine were killed from the fire. Furthermore, although the coarse BARC remote sensing map indicated low severity in the North Baldy area, ground-truthing in the area revealed nearly a complete loss of the soil organic horizon where the whitebark pine were established. Some empty whitebark pine cones, with evidence of Clark's nutcracker feeding were found partially burned on the site. However, no seed caches (cached by Clark's nutcrackers or hoard-cached by chipmunks or squirrels) were located during walk-through assessments. Although it is possible that some cached whitebark pine seeds (cached by Clark's nutcrackers or hoard-cached by chipmunks and squirrels) may have survived in some portion of the fire area, it is unlikely that whitebark pine will be capable of re-establishing in the area at a high enough rate to be a self-sustaining population, without restoration efforts.

Figure 3. Assessing whitebark pine cone trees lost in the Tower Fire (North Baldy).

Figure 4. Moderate soil burn severity area within whitebark pine stand, North Baldy.

c. **Non-native Invasive Plants:** A botanist and range/invasives technician performed numerous site visits and walk-through assessments to help determine potential fire effects on non-native invasive plants (noxious weeds). New weed invader introduction or establishment, as well as spread of existing weed infestations is influenced by several factors, including: changes to forest canopy cover, soil disturbance, existing native vegetation composition, site productivity, and adjacency of weed sources. The primary effects of fire on weed introduction and spread include changes to forest canopy cover, soil disturbance, and the loss of native vegetation.

Non-native invasive plant spread and new invader introduction/establishment into previously-uninfested areas (such as burn areas) is a potential risk, primarily because of the exposure of bare mineral soil and the loss of native plant cover. The risk is especially high where roads and/or fire suppression activities (firelines, helispots, drop points, etc.) are immediately adjacent to a burned area- because these areas often serve as conduits for weed transport into the disturbed burn area.

Figure 5. Spotted knapweed in foreground along a road prism adjacent to a moderate soil burn severity area, Tower Fire, Browns Lake area.

Figure 6. Canada thistle (*Cirsium arvense*) resprouting six weeks post-fire, Tower Fire, Browns Lake area.

Numerous roads and trails, as well as fire suppression activities, intersect the Tower Fire burned area. Furthermore, non-native invasive plants are prolific along many road corridors and some weeds are present within adjacent private lands (that incurred previous harvest entries.) However, weed concentrations generally occur on harsh sites (low elevation, droughty sites, such as south and southwest aspects) and disturbed sites less than approximately 5000' elevation. Non-native invasives have fewer competitive advantages in high elevation sites in this area and are sporadic, though not as prolific as they occur at lower elevations.

No roads occur immediately adjacent to the Baldy Fire burned area. However, fuel breaks and limited dozer lines were constructed from an existing road up within close proximity to the burned area. One of the dozer lines leaves the existing FSR421, near N 48 48’ 29.684”, W117 30’ 24.814”, crossing an old landing and mine tailings through a very dense noxious weed infestation. This area will definitely require weed treatments in order to reduce the potential for spread into the fire area.

Figure 7. Non-native invasives present on dozer line and mine tailings, Baldy Fire, FSR421.

Although no “open” roads are present adjacent to the Grease Creek Fire, several previously-closed roads were opened in order to aid with fire suppression activities. Most of those roads were brushed in with alder; however, the roads leading to the access point of the previously-closed roads have high weed infestation rates. Therefore, these re-opened roads could now serve as a conduit for weed dispersal into the burned area if weeds are not controlled on the open roads and on the re-opened roads as weeds establish there.

Non-native invasive species present in the fire areas, as well as associated access roads and suppression activities include:

Species	Tower Fire Infestation Level	Baldy Fire Infestation Level	Grease Creek Fire Infestation Level	Idaho Noxious Weed Classification	Washington Noxious Weed Classification
spotted knapweed (*Centaurea stoebe*)	high	moderate	moderate	Containment	Class B
Canada thistle (*Cirsium arvense* (L.) Scop.)	low	low	moderate	Containment	Class C
bull thistle (*Cirsium vulgare* Savi Ten.)	low	low	low	Not classified	Class C
orange hawkweed (*Hieracium aurantiacum*)	low	-	low-moderate	Control	Class B
meadow hawkweed (*Hieracium caespitosum* Dumort.)	moderate	low-moderate	moderate	Control	Class B
St. Johnswort (*Hypericum perforatum* L.)	high	high	moderate	Not classified	Class C
oxeye daisy (*Leucanthemum vulgare* L.)	moderate	low	low	Containment	Class C
Dalmation toadflax (*Linaria dalmatica* L. Mill)	low	-	-	Containment	Class B
common tansy (*Tanacetum vulgare* L.)	low	low	low	Not classified	Class C

Emergency Determination

The following tables helped to determine the level of risk associated with botanical critical values at risk as a result of the Tower, Baldy, and Grease Creek fires.

Tower Fire

Critical Values	Threat	Probability	Magnitude	Risk	Mitigation
Critical Habitat - Plant (White Bark Pine)	Loss of a self-sustaining population (T&E candidate).	Very Likely	Moderate	very high	Long Term Restoration Actions are needed.
Native Vegetation Recovery	Lack of recovery, introduction of invasives, loss of seed sources in high soil burn severity areas.	Very Likely	Moderate	very high	Mitigate risks were consequences are unacceptable.
Native Vegetation Recovery	OHV intrusions in high and moderate soil burn severity areas.	Possible	Moderate	intermediate	Natural Recovery
Non-Native Invasive	Establishment or spread if invasive weeds along access roads.	Very Likely	Moderate	very high	EDRR/Treatment of Invasive Conduits.

Baldy Fire

Critical Values	Threat	Probability	Magnitude	Risk	Mitigation
Native Vegetation Recovery	Lack of recovery, introduction of invasives, loss of seed sources in high soil burn severity areas.	Possible	Moderate	intermediate	
Non-Native Invasive	Establishment or spread if invasive weeds along access roads.	Very Likely	Moderate	very high	EDRR/Treatment of Invasive Conduits.

Grease Creek Fire

Critical Values	Threat	Probability	Magnitude	Risk	Mitigation
Native Vegetation Recovery	Lack of recovery, introduction of invasives, loss of seed sources in high soil burn severity areas	Possible	Moderate	intermediate	Mitigate risks were consequences are unacceptable.
Non-Native Invasive	Introduction and spread of invasives	Likely	Moderate	high	EDRR/Treatment of Invasive Conduits.

Treatments to Mitigate Emergency

KANIKSU COMPLEX- Tower Fire

Non-native Invasives Treatment Plan

The following non-native invasive plant (noxious weed) treatments are proposed on those segments of road that were used for fire suppression activities or that would serve as a conduit for weed spread and establishment into high and moderate soil burn severity areas located on the Tower Fire. The roads considered for this treatment currently have known weed populations. Due to the fire disturbance and disturbance from suppression activities treatment of existing and transported weed populations is essential to reduce spread across the affected landscape.

Contract costs are based on an average of four bid from vendors on the 2015 weed spraying contract on the Newport and Sullivan Lake Ranger Districts. All areas identified on the Colville portion of the Tower Fire can be treated as road side treatment by truck.

The total proposed treatment area is 93.1 acres. Acres are based on an average treatment width of 25’ feet, which equates to three acres per mile.

ROADSIDE INVASIVES SPREAD CONTAINMENT TREATMENT COSTS FOR COLVILLE NF TOWER FIRE BURNED LANDS REDACTED

ROADSIDE INVASIVES SPREAD CONTAINMENT TREATMENT COSTS FOR IDAHO PANHANDLE NF TOWER FIRE BURNED LANDS REDACTED

The following constitutes an early detection/ rapid response (EDRR) plan for non-native invasives treatments on disturbed sites. These disturbed sites include closed roads which were re-opened for fire suppression and closed following use, as well as dozer lines and handlines at high risk for weed encroachment and providing conduits into high and moderate soil burn severity areas located on the Tower Fire. The surveys and treatments detailed below should allow for one year of EDRR in the highest risk areas. (See Lands Treatment map for locations.)

EARLY DETECTION RAPID RESPONSE SURVERY AND TREATMENT COSTS FOR COLVILLE NF TOWER FIRE BURNED LANDS REDACTED

EARLY DETECTION RAPID RESPONSE SURVERY AND TREATMENT COSTS FOR IDAHO PANHANDLE NF TOWER FIRE BURNED LANDS REDACTED

KANIKSU COMPLEX- Baldy Fire

The following non-native invasive plant (noxious weed) treatment is proposed on those segments of road and associated drop points/dozer disturbance that were used for fire suppression activities or that would serve as a conduit for weed spread and establishment into high and moderate soil burn severity areas located on the Baldy Fire on the Colville National Forests. The road considered for this treatment currently has known weed populations. Due to the fire disturbance and disturbance from suppression activities, treatment of existing and transported weed populations is essential to reduce spread across the affected landscape.

Contract costs are based on an average of four bid from vendors on the 2015 weed spraying contract on the Newport and Sullivan Lake Ranger Districts. Areas identified on the Baldy Fire can be treated as road side treatment by truck.

The total proposed treatment area is 8.4 acres. Acres are based on an average treatment width of 25' ft. for 1 mile equaling 3 acres per mile.

ROADSIDE INVASIVES SPREAD CONTAINMENT TREATMENT COSTS FOR COLVILLE NF BALDY FIRE BURNED LANDS REDACTED

The following constitutes an early detection/ rapid response (EDRR) plan for non-native invasives treatments on disturbed sites. These disturbed sites include closed roads which were re-opened for fire suppression and closed following use, as well as dozer lines and handlines at high risk for weed encroachment and providing conduits into high and moderate soil burn severity areas located on Baldy Fire. The surveys and treatments detailed below should allow for one year of EDRR in the highest risk areas. (See Lands Treatment map for locations.)

EARLY DETECTION RAPID RESPONSE SURVERY AND TREATMENT COSTS FOR COLVILLE NF BALDY FIRE BURNED LANDS REDACTED

KANIKSU COMPLEX- Grease Creek Fire

The following noxious weed treatment is proposed on those segments of road that were used for fire suppression activities or that would serve as a conduit for weed spread and establishment into high and moderate soil burn severity areas located on the Grease Creek Fire on the Colville National Forest. The roads considered for this treatment currently have known weed populations. Due to the fire disturbance and disturbance from suppression activities, treatment of existing and transported weed populations is essential to reduce spread across the affected landscape.

Contract costs are based on an average of four bid from vendors on the 2015 weed spraying contract on the Newport and Sullivan Lake Ranger Districts.

The total proposed treatment area is 58.3 acres. Acres are based on an average treatment width of 25' feet, which equates to three acres per mile. This project will have 14.1 miles of truck spraying and 5.3 miles of backpack spraying.

ROADSIDE INVASIVES SPREAD CONTAINMENT TREATMENT COSTS FOR COLVILLE NF GREASE CREEK FIRE BURNED LANDS REDACTED

The following constitutes an early detection/ rapid response (EDRR) plan for non-native invasives treatments on disturbed sites. These disturbed sites include closed roads which were re-opened for fire suppression and closed following use, as well as dozer lines and handlines at high risk for weed encroachment and providing conduits into high and moderate soil burn severity areas located on the Grease Creek Fire. The surveys and treatments detailed below should allow for one year of EDRR in the highest risk areas. (See Lands Treatment map for locations.)

EARLY DETECTION RAPID RESPONSE SURVERY AND TREATMENT COSTS FOR COLVILLE NF GREASE CREEK FIRE BURNED LANDS REDACTED

Discussions/ Summary Recommendations

- Non-native invasive plant control will be an on-going concern for some time, as it may take several years for native vegetation to recover in moderate to high soil burn severity areas.
- BAER emergency response will cover one year of EDRR surveys and treatments. However, we recommend both forests continue performing EDRR surveys and follow-up treatments for 2-3 years (minimum), followed by a rotational weed control program.
- Although some high soil burn severity areas (especially within the Tower Fire area) would have benefited from augmented seeding or propagules to help hasten vegetation recovery, slopes in the area prohibited feasible application of seed and mulch.
- We recommend continued monitoring to evaluate speed of native vegetation recovery, species composition, percent plant cover, and non-native invasive plant spread compared to soil burn

severity coarse map. A monitoring plan could help address long-term restoration needs if recovery is delayed markedly.

- We also recommend that recovery in subalpine park balds and high soil burn severity areas be assessed.

- After the public safety/area closure is lifted, evaluate the need for interpretive signage. Suggested interpretive signs include:
    - Native ecosystems and succession/recovery following fire
    - Fragility of certain ecosystems (harsh/dry sites, subalpine/alpine environments, cryptogrammic lichen crusts, etc.)
- We highly recommend that both the IPNF and CNF consider a comprehensive, cooperative whitebark pine recovery plan within suitable habitats (in the North Baldy, South Baldy, and adjacent saddles). Such an effort could also be conducted jointly to improve efficiency, especially since historically the population in the area would have shared genetics, and the CNF has collected whitebark pine seed from the general area that could be used on both forests.
- Additionally, some fire suppression activity areas were not fully rehabilitated, including a large excavated safety zone, some large drop sites, and hazard tree decking areas. These areas are fairly small in nature (except for the safety zone which is probably at least one acre). Seeding of native and native cultivar grasses/forbs helps to take up growing space, which would otherwise likely be established and occupied by invasive species (which would further put burned areas at risk of weed establishment and spread). (See Lands Treatment map for locations.) Some scarification (using rakes) is likely warranted to facilitate seed bed preparation. Native/Native cultivar seeding is recommended to help reduce potential of non-native invasive plant establishment on these disturbed sites. Following seeding, fertilization and mulching is recommended, which could be completed by hand (either utilizing local botany staff and/or fire READs).

  Recommended seed mix:

  NATIVE CULTIVAR MOIST SITE OFF-ROAD MIX

SPECIES*	PLS** LBS/AC	Estimated COST
*Mountain brome "Bromar" (*Bromus marginatus*)	7.5	REDACTED
*Blue wildrye "Arlington" or "Elkton" (*Elymus glaucus*)	7.5	REDACTED
[1]Rough bentgrass (*Agrostis scabra*)	0.05	REDACTED
[1]Quickguard Sterile Triticale (*Triticum aestivum x Secale cereal*)	10.0	REDACTED
[1]Pearly everlasting (*Anaphalis margaritacea*)		+ mixing fees
[1]Canada goldenrod (*Solidago canadensis*)		+mixing fees
[1]Fireweed (*Chamerion angustifolium*)		+mixing fees
TOTAL	**25.20**	**REDACTED**

*All seed is required to be Blue Tag Certified ("Blue Tagged") and certified noxious weed free.

[1] This seed may either be provided by the home unit (as locally-collected seed available from the seed bank) or should be commercially-available as "Source Identified" or "Uncertified" (but if commercially-purchased must have lab inspections indicating it meets certification standards for seed purity and can not have noxious weed species.)

**Refers to "Pure Live Seed."

Local FS Botanist may provide acceptable substitutions specifications when certain cultivars or species are unavailable. Pounds of seed to be furnished per acre shall be obtained by dividing the pounds of pure live seed (PLS) required per acre by the product of the percent purity and percent germination.

Example: $\frac{5(\text{\# PLS/acre})}{0.90 \times 0.85}$ = 6.55 pounds commercial seed per acre (where purity=90% and germination=85%)

Recommended treatments:

The following seeding plan is recommended to help prevent potential non-native invasive plant introductions or establishment on severely disturbed sites (primarily large, dozer created safety zones, drop points, and hazard tree decking locations).

COSTS FOR SEEDING DISTURBED SITES FOR NON-NATIVE INVASIVES PREVENTION FOR THE TOWER FIRE, COLVILLE NF REDACTED

COSTS FOR SEEDING DISTURBED SITES FOR NON-NATIVE INVASIVES PREVENTION FOR THE TOWER FIRE, IDAHO PANHANDLE NF REDACTED