



Invasive Species Control Plan

Assessor Parcel Number (APN):
107 - 091 - 003

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Section 1 Introduction

1.1 Purpose and Need

Section 55.4.12.16 of the Humboldt County Commercial Cannabis Land Use Ordinance (CCLUO), Ordinance 2599, states that “[i]t is the responsibility of a certificate or permit holder to work to eradicate invasive species. As part of any application, the existence of invasive species on the project parcel need to be identified, including the type(s) of invasive plant species, where they are located, and a plan to control their spread. All invasive plant species shall be removed from the cultivation site and associated infrastructure using measures appropriate to the species. Removal shall be confirmed during subsequent annual inspection. Corrective action may be required if invasive species are found to have returned.”

1.2 Biologist’s Qualifications

The Invasive Species Control Plan was prepared by Mason London. Mason holds an MSc in Biology with a concentration in aquatic ecology from Humboldt State University. Mason also has 10 collective years of experience working professionally as a botanist, wildlife biologist, and aquatic ecological research scientist. Mason has worked in both Northern California and Southern Oregon targeting and eradicating invasive species for nonprofit land stewardship councils and government agencies.

1.3 Invasive Species Information

Not all non-native species are necessarily invasive species. For a species to be considered non-native, it means it has been introduced with human help (intentionally or accidentally) to a new place or new type of habitat where it was not previously found. Whereas, according to the USDA National Invasive Species Information Center, Executive Order 13112 (February 1999), “[a]n invasive species is defined as a species that is 1) non-native (or alien) to an ecosystem under consideration *and* 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.”

The invasive species list used for this Invasive Species Control Plan was derived from the California Invasive Plant Council (Cal-IPC), as required by the Humboldt County Board of Supervisors, in the Mitigation Monitoring and Reporting Program – Proposed Amendments to

Humboldt County Code Regulating Commercial Cannabis Activities (Mitigation 3.4-3b: Invasive plant species).

1.4 Assessment and Control Options

A physical survey of the parcel to determine the scope of the present invasive species will create a comprehensive starting point for management techniques. Several control options exist for eradicating invasive species; including biological, mechanical and chemical.

1.4.1 Biological Eradication

This option is generally used as a first line of defense for control of invasive species. The reintroduction of native species can, in some cases, create a host for insects and microorganisms which will feed on the invasive species and/or create an environment which will discourage new growth of the invasive plant. Because of this, competitive planting of non-invasive species can help to cultivate an environment which will discourage new growth of invasive plants.

Many invasive species become introduced to an area after a recent disturbance. By using native grasses or plants, in a restoration style planting or seeding, many invasive species will become unable to establish and entrench the exposed soils.

1.4.2 Mechanical Eradication

This option is the most common short-term option for the eradication of invasive species. Hand pulling, or with use of tools such as a weed wrench, can be done easily during certain times of year when the soils are still moist, and roots are easily removed. Depending on the species, it can be important to remove the entire root because some species can regenerate from roots left in the soil. Other species need to be removed before their seeds fully mature in order to not promote aerial spreading of fertile seeds. In some of these cases, the removed plant matter will need to be removed from the property since some seeds are able to mature on a plant even when the plant has been removed from the ground. This method is ideal for populations of invasive plants that are smaller and can be easily managed with hands or hand tools.

For populations of invasive plants that cannot be easily or affectively managed by hand, use of weed whackers, tractors, or cutting tools may be required to eradicate or control the spread of certain species.

1.4.3 Chemical Eradication

This method is considered only as a last resort, if at all, since most commercial cannabis projects are operating under organic and/or natural growing techniques that never include the use of chemicals.

Section 2 Methods

2.1 Field Observations

On January 30th, 2020 the parcel of proposed cultivation (APN: 107-091-003) was visited in order to observe the presence of invasive species (Map 1). The parcel is located approximately 1.90 air miles west of Honeydew in Humboldt County, California within the Shubrick Peak 7.5 minute quadrangle (Quad code: 4012422) in the in the Mattole River watershed (CDFW Region: 1). The center location of this parcel is 40°14'34.1"N 124°09'37.4"W.

The project sites (proposed cultivation areas) occur over two locations and are referred throughout the rest of this report as *Site 1* and *Site 2* (Map 2). *Site 3* is also a cultivation site, but is preexisting and already permitted. All sites occur in locations that have been heavily disturbed by grazing livestock for at least the last 150 years. The project sites, as well as the surrounding area/habitat, was investigated and surveyed for invasive species presence during this visit.

2.2 Invasive Species Assessment

The Cal-IPC Inventory was used to determine invasive species of concern for the site visit investigation. The *Weed Control in Natural Areas in the Western United States* (UC Davis Weed Research and information Center, 2013) was utilized to determine specific species information and adequate eradication and management methods, as recommended by Cal-IPC.

Section 3 Results

3.1 Parcel Habitat

The habitat on the parcel is dominated by a thin corridor of mixed hardwood and coniferous forest, open grazed pasture, riparian habitat, open river terrace/floodplain and alluvial gravel bed (See Map 1 & Map 2 for aerial reference). The project site is to exist entirely within the open grazed pasture habitat.

3.2 Observed Invasive Species

Many non-native species were observed during the site visit investigation throughout the project sites and the surrounding area, however, only a few invasive species were observed.

The invasive species observed in the project areas, listed on the CAL-IPC inventory, were bull thistle (*Cirsium vulgare*), Himalayan blackberry (*Rubus armeniacus*), Scotch broom (*Cytisus scoparius*), pennyroyal (*Mentha pulegium*), big quaking-grass (*Briza maxima*), hedgehog dogtail (*Cynosurus echinatus*), common mullein (*Verbascum thapsus*), curly dock (*Rumex crispus*), fennel (*Foeniculum vulgare*), and meduseahead (*Elymus caput-medusae*).

3.3 Invasive Species Information, Management and Removal Recommendations

3.3.1 Bull thistle (*Cirsium vulgare*)

Cirsium vulgare (Figure 1) was observed in sparsely isolated populations throughout Site 2 and in scattered clustered in Site 3 (Map 2). *Cirsium vulgare* is found everywhere in the United States, favors disturbed areas including rangeland, pastures, forest clear-cuts, roadsides and waste areas, and can also be seen in foothills, dry meadows and riparian areas. This species was introduced from Europe. *Cirsium vulgare* is not palatable to livestock and reduces the forage potential of infested pasture. Once *Cirsium vulgare* becomes established it can easily outcompete native plants.

Cirsium vulgare is considered to have ranking of *Moderate Invasiveness* by the Cal-IPC Inventory. The most feasible method of eradication for this species is by mechanical methods. According to the Weed Report from the Weed Control in Natural Areas in the Western United States, *Cirsium vulgare* can be effectively removed by “[t]illage, hoeing, and hand pulling... as

long as they are done before flowering to prevent seed production. Any mechanical or physical control measure that severs the root below the soil surface is very effective...[however], the plant must be cut off below the soil surface and no leaves should remain attached, or the plant will recover.”

The removed plants should be bagged up and removed from the property to make sure plant material and fertile seeds do not promote repropagation.

3.3.2 Himalaya blackberry (*Rubus armeniacus*)

Rubus armeniacus (Figure 2) is common throughout the western United States and favors disturbed, open, most sites. This species originally came from Eurasia and is a highly competitive plant with a growth form that allows it to quickly crowd out native species. Its thickets have dense canopies allowing little light penetration and reducing the growth of understory plants. This species is given the ranking of *High Invasiveness* by the Cal-PIC Inventory.

According to the Weed Report, from the Weed Control in Natural Areas in the Western United States, “[h]and pulling can be an effective control method for small populations. To successfully control populations with mechanical removal, it is important to remove the canes, roots and the root crowns to prevent resprouting. A Pulaski, mattock or similar device can be used to remove plants. Bulldozing may cause resprouting and can spread the weed by fragmenting roots and stems.”

This species was not observed in any of the proposed project site locations but it was observed in a dense thicket in the riparian area, along the Mattole River south east of the project sites. If the applicant plans to attempt to eradicate or control the dominate presence of *Rubus armeniacus*, it is important to remove the entire plant since, according to the Weed Report, “[c]utting and removing only the aboveground biomass will result in the stimulated growth of root sprout. The root sprouts must be controlled and repeated cutting of the above-ground biomass during flowering time will exhaust the root stores.”

3.3.3 Scotch broom (*Cytisus scoparius*)

Cytisus scoparius (Figure 3) was found throughout the parcel at the perimeter of the forested openings and in the riparian areas. *Cytisus scoparius* is common throughout the western United States and favors grasslands, shrublands, oak woodlands, forest margins, coastal habitats, riparian corridors; disturbed sites such as roadsides, pasture, gravelly floodplains, burned areas, cleared forests and is typically found in mountain regions and cool coastal areas with dry summers. It is a fast-growing deciduous shrub that can reach 5 to 10 ft tall. *Cytisus scoparius* forms dense stands that most wildlife finds impenetrable and unpalatable. These dense stems limit regeneration of most other plant species and the accumulation of woody biomass creates a dangerous fire hazard. This species is given the ranking of *High Invasiveness* by the Cal-PIC Inventory.

According to the Weed Report, from the *Weed Control in Natural Areas in the Western United States*, “[s]eedlings and small shrubs can be hand pulled. For larger established shrubs, a weed wrench or other woody weed extractor can be used. Extract the entire root or resprouting will occur.” The report goes on to point out that the “[b]est results are achieved when soil is moist...” but the technician completing this mechanical control needs to be careful because “[d]isturbing the soil can stimulate the seedbank.”

Given the abundant population of *Cytisus scoparius* it is recommended that the applicant focuses on the control of the individuals at the margins of forested areas in order to keep the spread of this population at bay. The Weed Report points out that “[c]utting broom off before it flowers will reduce seed production and will deplete the plant’s energy reserves...” and that “[r]sprouting is common after treatment, but can be reduced by cutting broom at the beginning of the dry season.” It is recommended that the applicant follows these methods of control in order to keep the spread of *Cytisus scoparius* at bay.

3.3.4 Pennyroyal (*Mentha pulegium*)

Mentha pulegium (Figure 4) was in very limited numbers near the rainwater catch storage tanks (Map 2). *Mentha pulegium* is common as an obligate wetland indicator species in seasonally inundated soils of valleys and bottomlands, usually below 1,640 feet elevation. The presence of

these species is not always representative of a wetland. This parcel is located within the USACE Land Resource Region A (LRR:A) within the western mountains, valleys and coast region. LRR:A, or the northwest forests and coast sub region, often experiences frequent and heavy rainfall events that create ample opportunities for wetland vegetation to propagate.

Even though pennyroyal is considered uncommon in much of California, it occurs in the sierra foothills, Central Valley, and most coastal counties from the Mexican border to Oregon. Pennyroyal favors disturbed sites, seeps, stream sides, vernal pools, marches and ditches. This species is given the ranking of *High Invasiveness* by the Cal-PIC Inventory.

According to the Weed Report, from the *Weed Control in Natural Areas in the Western United States*, “[p]ennyroyal infestations can be suppressed by manual removal of individual plants and small patches before flowering... below-ground reproductive tissues should be severed approximately 3 inches below the soil surface when the plants are beginning to bolt.”

The report goes on to explain that “[t]illage can be an effective control strategy for rosettes and bolting plants.” This species should be combated in order to prevent any potential spreading.

3.3.5 Big quaking-grass (*Briza maxima*).

Briza maxima (Figure 5) was only observed in a few patches within cultivation *Site 1* and *Site 2* (Map 2). It is likely that this species exists in greater numbers throughout other habitats on the parcel, but was not observed during the site visit. *Briza maxima* is a winter annual grass and is found in coastal ranges throughout of California. This species is given the ranking of *Limited Invasiveness* by the Cal-PIC Inventory.

The mechanical eradication that is recommended by the Weed Report from the *Weed Control in Natural Areas in the Western United States*, is to till or pull the species “just before viable seed production.” This is the only mechanical control recommendation that is considered to be “excellent,” meaning that in general its success in eradicating the species is greater than 95%. Other “good” mechanical control recommendations, meaning its success of eradication is 80-95%, include grazing, prescribed burning, and mowing or cutting “...before seed drop[s].”

3.3.6 Hedgehog dogtail (*Cynosurus echinatus*)

Cynosurus echinatus (Figure 6) was observed in a few patches in cultivation *Site 1* and in a few scattered patches in the river terrace/floodplain habitat (Map 2). It is likely that this species exists in greater number throughout the large grassy river terrace, but was not observed during the site visit. *Cynosurus echinatus* is a grass (family *Poaceae*) that flowers June through August and can be found at lower elevations along trails and disturbed areas in both open and wooded areas. This species is given the ranking of *Moderate Invasiveness* by the Cal-PIC Inventory.

The recommended mechanical eradication, by the Weed Report from the Weed Control in Natural Areas in the Western United States, for this species is to mow, but must be done “done before seed sets in the early summer.” The report goes on to explain how “[h]and pulling of annual grasses such as hedgehog dogtail may be effective early in spring before seed set, but is very labor-intensive and is only used on small infestations.” It is also important to “[m]inimize soil disturbance when hand pulling to minimize new seed germination.”

3.3.7 Common mullein (*Verbascum thapsus*)

Verbascum thapsus (Figure 7) was found in few numbers throughout the river terrace/floodplain habitat (Map 2). *Verbascum thapsus* can be found in open areas and prefers, but is not limited to, disturbed sites with well-drained soils. It is a short-lived perennial and can get up to 7 ft tall. This species originally came from Eurasia and can spread rapidly. Established stands are extremely difficult to control due to their abundance, long lived seed bank. This species is given the ranking of *Limited Invasiveness* by the Cal-PIC Inventory.

According to the Weed Report, from the Weed Control in Natural Areas in the Western United States, “[h]and pulling before seed set is an effective control method for mullein plants growing on loose soils. When digging, sever the root below the soil surface. Soil disturbance stimulates recruitment.” It is also noted that “[t]illage is effective for controlling existing plants, but soil disturbance stimulates recruitment.”

Given the scarce numbers of the plants observed, it is likely that the spread of *Verbascum thapsus* on the parcel can be controlled. It is recommended that the applicant pulls the

individual plants out of the ground in spring before the seed matures and remove the vegetation from the site.

3.3.8 Curly dock (*Rumex crispus*)

Rumex crispus (Figure 8) is found throughout the United States, including every western state. This species can be found in ditches, roadsides, wetlands, meadows, riparian areas, alfalfa and pasture fields, orchards and other disturbed moist areas. *Rumex crispus* was found along the margins of the road through the forested habitat that leads down to river terrace/floodplain habitat. This species can be competitive and outcompete more desirable vegetation for water, nutrients and light. The Cal-IPC Inventory considers *Rumex crispus* to have ranking of Limited Invasiveness.

According to the Weed Report, from the Weed Control in Natural Areas in the Western United States, “[c]urly dock are difficult to control by hand-pulling because of their deep taproot.” It is stated that “[c]ontinual mowing before seeding can be effective in reducing seed production.” The applicant is recommended to mow *Rumex crispus* early in the season in order to suppress the seeds reaching maturity. Due to the low numbers of observed individuals, the applicant has a very good chance at successfully eradicating this species from the cultivation site.

3.3.9 Fennel (*Foeniculum vulgare*)

Foeniculum vulgare (Figure 9) is particularly a problem in California but can be found throughout many western states. This species prefers open disturbed areas and has invaded roadsides, slopes, fields, grasslands, coastal scrub, riparian and wetlands areas and other natural communities. *Foeniculum vulgare* is native to southern Europe and is easily spread by birds and rodents consuming the seeds. It was found in very few numbers along the road going from the upper pasture down to the river terrace/floodplain.

Foeniculum vulgare are competitive and since they establish in disturbed soils, they exclude native vegetation. This species is considered to have ranking of High Invasiveness by the Cal-IPC Inventory. Mechanical eradication is recommended by the Weed Report from the Weed Control in Natural Areas in the Western United States, stating that one should “[h]and chop

small infestations. Slashing just before flowering may kill the plants, or repeat slashing of regrowth may be needed. Even if plants recover, slashing the stems at flowering will prevent seed set. The use of a mattock or remove the plant can also be successful.”

The report goes on to include that “deep cultivation will also kill the plants but is not practical in most situations.” Since this applicant is proposing to cultivate within an agricultural field, deep cultivation is a feasible approach and should be utilized if *Foeniculum vulgare* is spread into the project site.

3.3.10 Medusahead (*Elymus caput-medusae*)

Elymus caput-medusae (Figure 10) was observed in a few patches in cultivation *Site 1* and in a few scattered patches in the river terrace/floodplain habitat (Map 2). It is likely that this species exists in greater number throughout the large grassy river terrace, but was not observed during the site visit. *Elymus caput-medusae* is a grass (family *Poaceae*) that is found in disturbed sites, grassland, rangeland, openings in chaparral, oak woodlands, and rarely in agronomic fields. This species is unpalatable to livestock except during the early growth stages. This species is given the ranking of *High Invasiveness* by the Cal-PIC Inventory.

The recommended mechanical eradication, by the Weed Report from the Weed Control in Natural Areas in the Western United States, for this species is not to mow, because “[e]arly-season mowing is likely to be ineffective and may harm other species”. However, “[l]ate-season mowing, at the boot to early flowering stage, may help to suppress medusahead” but “...mowing after seed set will disperse the seeds.” The report goes on to recommend tillage as the best option because “[t]illage (disking and plowing) will control existing medushead plants, as well as burying seed and breaking up deep thatch layers.” But it is noted that “[t]illage should be accomplished before seed set.”

Section 4 Conclusion and Discussion

The applicant can control the spread of the invasive species previously listed if the recommended mitigation and control methods are followed. If the applicant follows the “early detection rapid response” approach before the plants can flower and seed, the current state of the cultivation area should be easily treatable. Due to the clustering of the invasive species observed within the proposed project site locations, and given that many of these species do not favor the surrounding forested habitat, the applicant can halt the invasion of these species spreading throughout the surrounding habitats if action is taken.

Section 5 References

California Invasive Plant Council (Cal-IPC) Inventory: <https://www.cal-ipc.org/plants/inventory/>.

Accessed January 2020.

Ordinance No. 2599, amending sections 314-55.4, 314-55.3.11.7, 314-55.3.7 and 314-55.3.15 of Chapter 4 of Division 1 of Title III of the County Code (CCLUP for Areas Outside the Coastal Zone). Board of Supervisors, County of Humboldt, State of California, May 2018. Accessed June 2019.

Weed Control in Natural Areas in the Western United States. UC Davis Weed Research and Information Center, 2013. Accessed January 2020.

Appendix A: Photos



Figure 1. Bull thistle (*Cirsium vulgare*)



Figure 2. Himalaya blackberry (*Rubus armeniacus*)

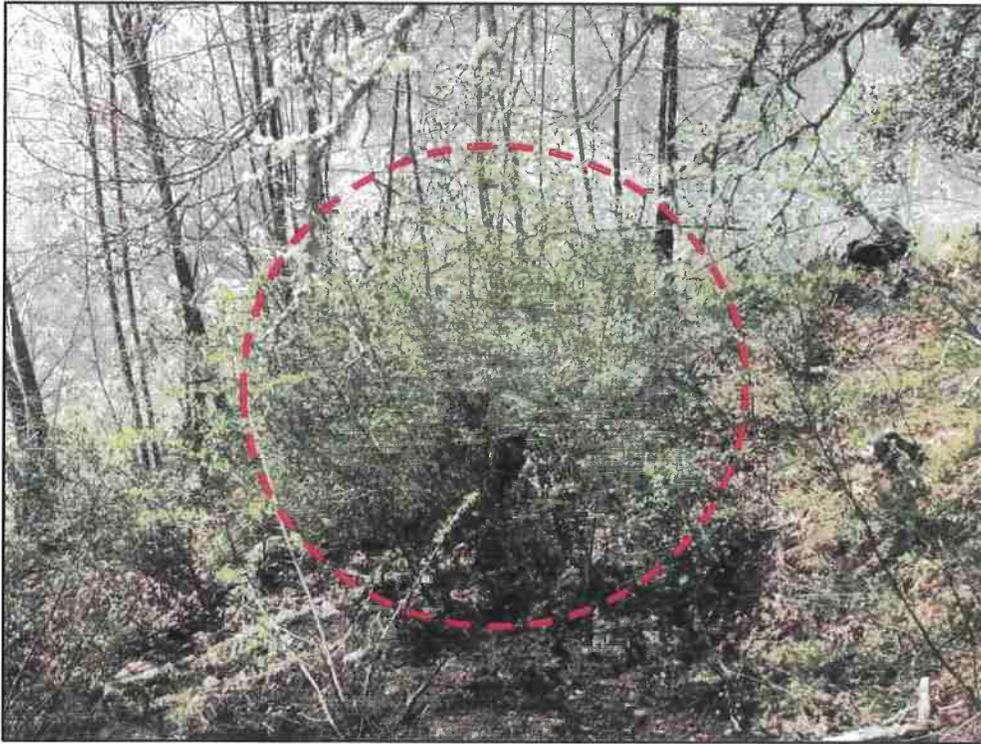


Figure 3. Scotch broom (*Cytisus scoparius*)

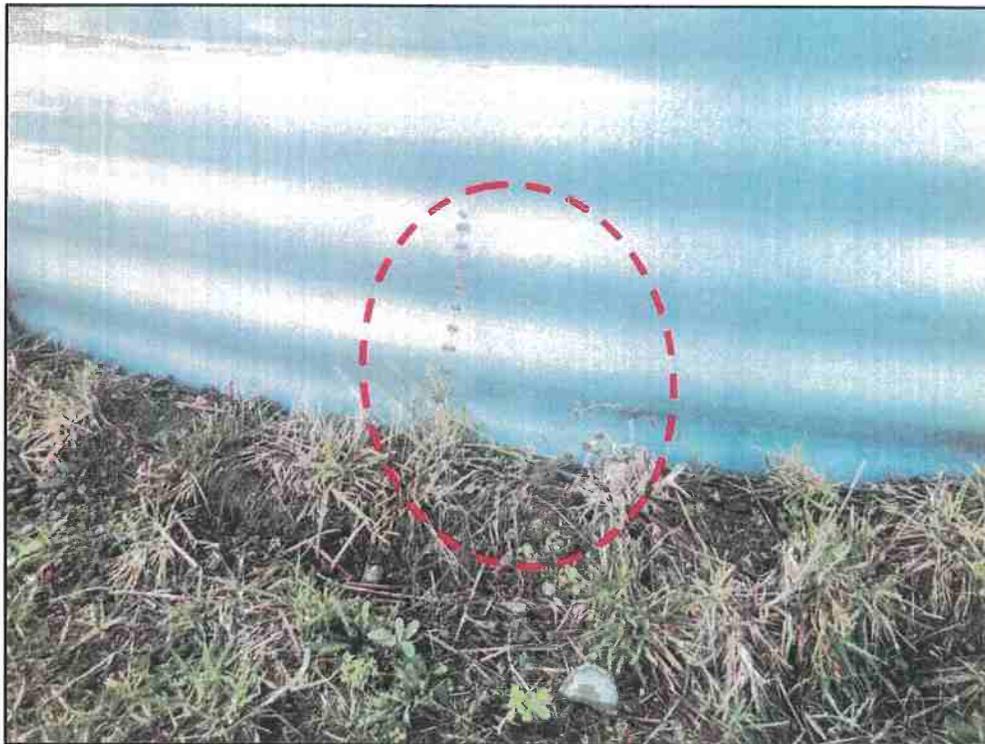


Figure 4. Pennyroyal (*Mentha pulegium*)



Figure 5. Big quaking-grass (*Briza maxima*)



Figure 6. Hedgehog dogtail (*Cynosurus echinatus*)



Figure 7. Common mullein (*Verbascum thapsus*)



Figure 8. Curly dock (*Rumex crispus*)



Figure 8. Fennel (*Foeniculum vulgare*)

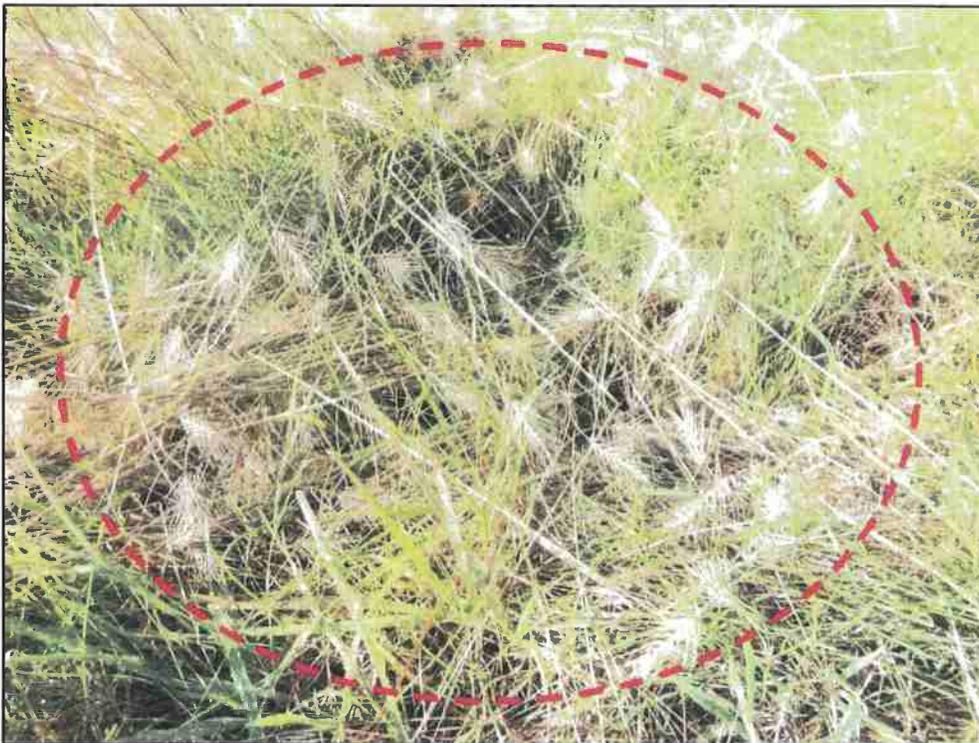
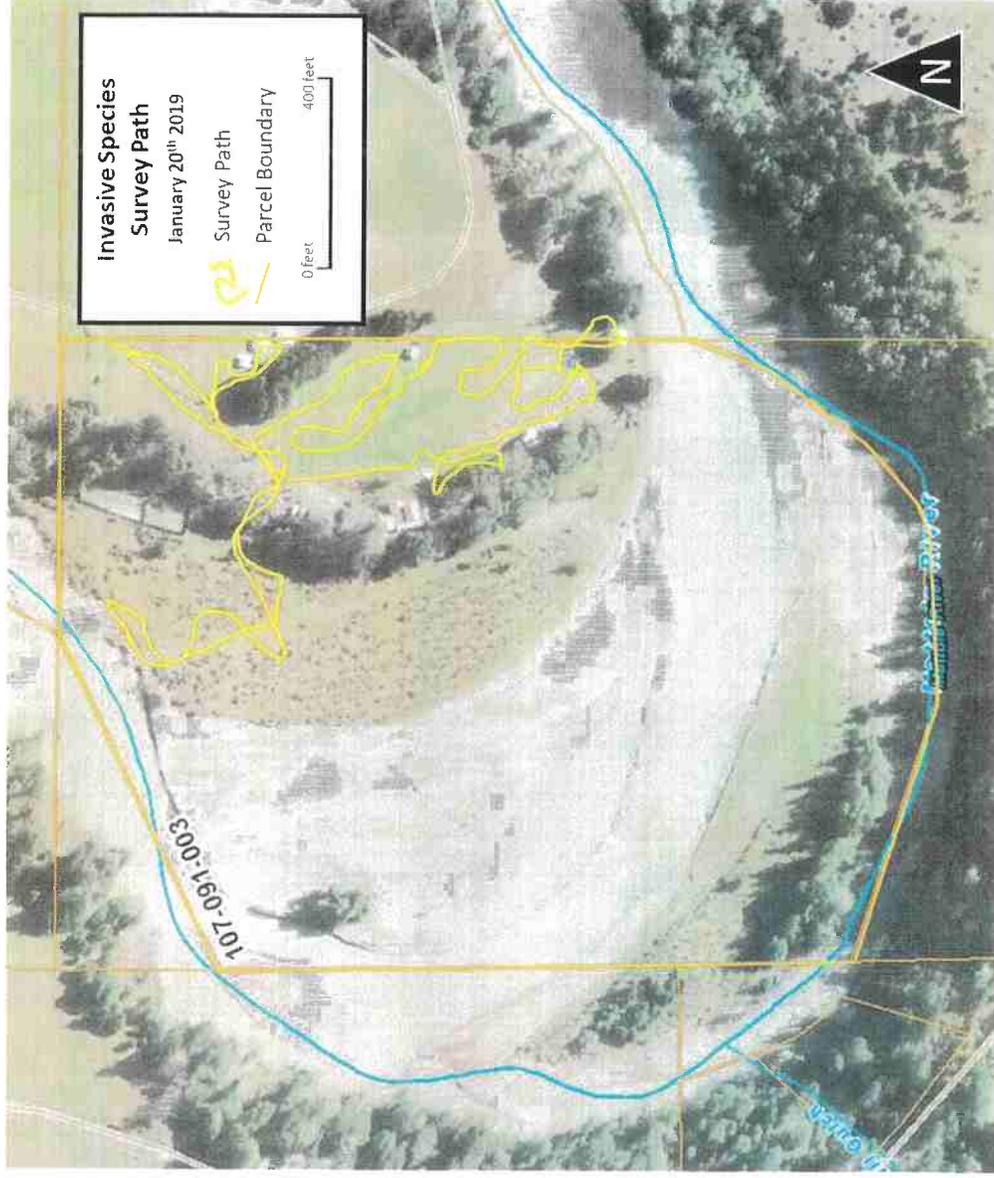
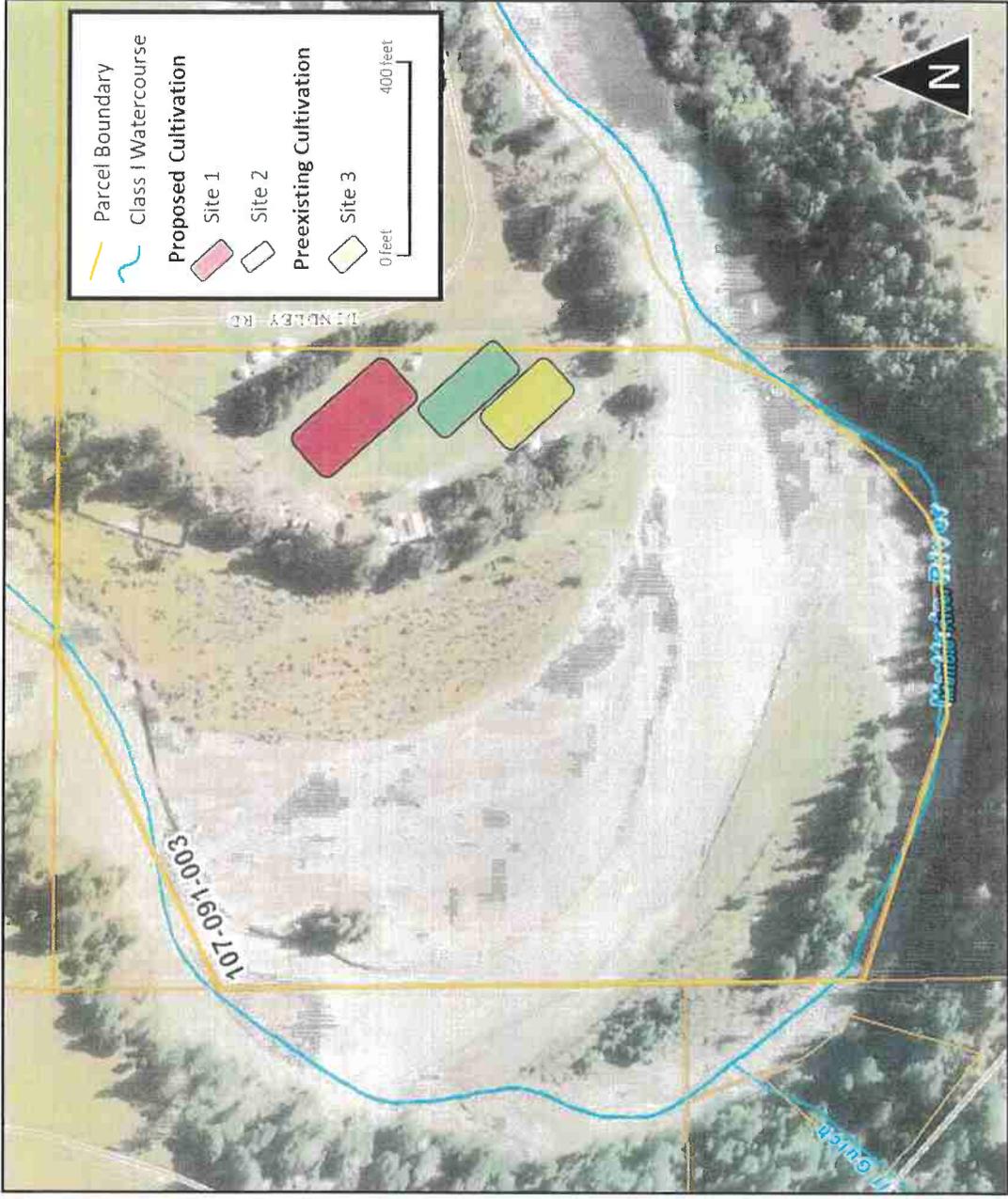


Figure 8. Medusahead (*Elymus caput-medusae*)

Appendix B: Maps



Map 1. The general path taken during the Invasive Species Survey, conducted on January 20th, 2020 on APN 107-091-003. (This is not a boundary survey, property lines shown here are approximated and taken from Humboldt County Web GIS)



Map 2. Map showing the proposed, and preexisting, cultivation site locations for reference for location of invasive species observed. (This is not a boundary survey, property lines shown here are approximated and taken from Humboldt County Web GIS)