

Inventory of Sensitive Fungal Species in the
Southern Oregon Coast Range and Siskiyou Mountains
Gold Beach and Powers Ranger Districts
Rogue River-Siskiyou National Forest

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Introduction

Surveys were conducted in the Fall of 2009 for Sensitive fungal species at randomly selected Current Vegetation Survey (CVS) plots located on the Gold Beach and Powers Ranger District's of the Rogue River-Siskiyou National Forest. Twelve randomly selected 10 acre square shaped plots were visited twice each in November and December, 2009. Table 1 describes the basic ecological and environmental variables at each plot.

Table 1. CVS Plot Numbers and Corresponding Vegetation Data

Plot Number	General Condition Description
2015032	This plot falls in a mature stand of <i>Lithocarpus densiflorus</i> (LIDE3) w/< <i>Pseudotsuga menziesii</i> (PSME) and <i>Arbutus menziesii</i> (ARME). The 2002 Biscuit fire backburn leveled all vegetation which is slow to recover. Fire intensity was low with only snags and suppressed saplings consumed.
2017024	The plot is composed of a heavily stocked mixed conifer and hardwood forest. The dominant layer is composed of vigorous PSME and decadent <i>Pinus attenuata</i> (PIAT) with remnant PSME along the 211 roadside. The co-dominant layer is composed of LIDE3 >> ARME > and <i>Quercus chrysolepis</i> (QUCH).
2038042	This sample unit lands on the edge of mature mixed conifer forest and PSME plantation. Overstory of PSME with a lot of <i>Tsuga heterophylla</i> (TSHE) in the understory. Some fire scars on older residual trees were observed.
2025024	Plot is in a PSME stand which has a few large remnant PSME in it. The remnant PSME have old fire scars from a wildfire approx. 100 years ago. The understory is mixed PSME and LIDE3. Armillaria root rot was found in one snag at SP01. Slopes are moderate and soils are gravelly.

2035028	This plot falls in a stand of TSHE with an overstory of old growth PSME. The PSME have old fire scars indicating wildfire approx. 100 years ago. Some of the PSME have conks or stem rot or broken tops. A few <i>Castanopsis chrysophyllus</i> var. <i>chrysophyllus</i> (CHCHC4) are growing around SP04. Ground vegetation is sparse.
2019028	The entire plot was burned in the 2002 Biscuit fire resulting in heavy mortality on all points. Point 5 was previously well stocked but 85% of the tally is now dead. All other points were on more ultra-basic soils (serpentine) with lower stocking but similar mortality was observed.
2011030	This stand is dominated by old tan oak with PSME and <i>Sequoia sempervirens</i> (SESE2) present in the overstory. Some <i>Umbellularia californica</i> (UMCA) and ARME are present in the understory. Soils are deep. The plot is near a small draw. Litter layer is variable with some good deep duff layer. Some of the redwood trees appear to have dead tops.
2037032	Plot falls in a PSME plantation adjacent to a mature PSME stand at Pt. 2. Plantation PSME relatively healthy with a closed canopy and relatively sparse under story vegetation with the exception of pockets of RHMA3. LIDE3 > CHCHC4 << ARME are scattered throughout.
2018026	The plot falls in a site stocked with PSME and LIDE3 with scattered ARME and PIAT. Stand age is mostly between 50 and 110 years old. Soils are mostly fine to rocky (.2"-1" particles). Fire scars and rot common LIDE3 and surviving firs.
2017026	The sample unit falls in a stand of PSME with scattered stocking. ARME, LIDE3 and QUCH make up the understory. No management activity or sign of fire although the stand was probably created by a wildfire about 60-70 years ago.
2033028	The plot falls in a PSME, <i>Chamaecyparis lawsoniana</i> (CHLA) and <i>Pinus monticola</i> (PIMO) stand on a brushy moderately steep slope. Wildfire occurred 50-100 years ago and all the CHLA have old fire scars. Blister rust is widespread and many PIMO have been killed. The stand is open with a variety of age classes. This site is serpentine influenced.
2015030	The plot is located in a stand of old growth PSME with LIDE3 and ARME scattered in the understory. No evident management. Fire history is apparent and some trees are severely damaged with fire scars. Soils are fine and well drained. The litter layer is thin.

The plots represented several different plant communities. Stand age and structure were also variable; everything from young plantation to late-seral climax forest was represented. Some of the plots had experienced recent fire. Elevations ranged from 400-3500ft. All aspects were represented, but southerly aspects dominated. Slopes tended to be steep generally exceeding 30%. Soils tended to be thin, rocky and well-drained. Coarse woody debris was generally low in abundance. All size and decay classes were present, but smaller sizes and early decay classes dominated.

The general paucity of sporocarp production this year within the CVS plots, left time to visit four other parcels within the forest including: the Port Orford Cedar (POC) RNA, South Coquille RNA and late-seral parcels along the Elk and Sixes Rivers. The four areas totaled about 300 acres of additional survey. The POC RNA and S. Fork Coquille RNA are dominated by old growth *Pseudotsuga menziesii* and *Chamaecyparis lawsoniana* forest. Fungi habitat is very good and during a season when the climate is right these areas would likely produce a lot of sporocarps from a variety of species. The Elk River and Sixes River sites are more coastal though no *Picea sitchensis* was found. They are dominated by old growth *Pseudotsuga menziesii* and *Tsuga heterophylla* with portions covered by a very dense understory of *Vaccinium ovatum*. Due to the dense underbrush these areas don't seem as likely to produce an abundance of sporocarps as the other areas, but nonetheless the habitat is good and these areas represent some of the last coastal old growth forests in the area.

Methods and Results

The Sporocarp Survey Protocol for Macrofungi V1.0 was followed. Plots were prioritized according to elevation, aspect and proximity to other plots. Survey was conducted by locating plot center and working out from there in a transect pattern. Hypogeous fungi were located by investigating recent animal digs and randomly selected locations in likely habitat. All epigeous and hypogeous fungi were either collected if unknown or noted if readily identified in the field.

The first visit in November for most plots located very few macrofungi. Weather throughout the summer and fall led to much drier conditions than are usually found in this part of the state. On some of the steeper southerly plots, few to no sporocarp were located. Sometimes, this may have also been a product of stand composition and geology. For example, the plot adjacent to The Iron Mountain Botanical Area was located on ultra-mafic (serpentine parent material) rock in a shrub community with very little organic material at the surface. Other plots which had recently experienced fire had no duff layer.

A hard freeze between the first and second visits made for even poorer conditions for the second visit. No fleshy sporocarps were located on some plots and very few were located overall.

There were no fungi listed as Sensitive or Strategic found during either of the fall visits. Several former Survey and Manage species were located, but were not collected or mapped because the contract took place prior to the return of this program.

The following species were located and identified by the contractor. A majority of them are from the four additional survey areas. Very few sporocarps were seen within the plots.

Table 2. Fungal Species List for All Areas Surveyed

<i>Agaricus moelleri</i>	<i>Heterotextus alpinus</i>	<i>Phaeolus schweinitzii</i>
<i>Agaricus smithii</i>	<i>Hygrophoropsis auriantiacae</i>	<i>Phellinus pini</i>
<i>Amanita muscaria</i>	<i>Hygrophorus chrysodon</i>	<i>Pholiota highlandensis</i>
<i>Amanita vaginata</i> gp.	<i>Hygrophorus conica</i>	<i>Pholiota limonella</i>
<i>Amanita gemata</i>	<i>Hygrophorus psittacina</i>	<i>Pisolithus tinctorum</i>
<i>Armillaria ostoyae</i>	<i>Hypholoma capnoides</i>	<i>Pleurocybella porrigens</i>
<i>Bisporella citrina</i>	<i>Hypholoma dispersum</i>	<i>Pluteus cervinus</i>
<i>Boletus chrysenteron</i>	<i>Hypholoma fasciculare</i>	<i>Pluteus longistriata</i>
<i>Boletus smithii</i>	<i>Hysterangium coriaceum</i>	<i>Pseudohydnum gelatinosum</i>
<i>Boletus zelleri</i>	<i>Hysterangium setshellii</i>	<i>Pseudopithyella miniscula</i>
<i>Calocera viscosa</i>	<i>Inocybe mixtilis</i>	<i>Psilocybe montana</i>
<i>Camarophyllus virgineus</i>	<i>Inocybe rimosa</i>	<i>Ramaria araiospora</i>
<i>Cantharellus formosa</i>	<i>Laccaria amythesto-occidentalis</i>	<i>Ramaria stricta</i>
<i>Cantharellus subalbidus</i>	<i>Laccaria bicolor</i>	<i>Rhizopogon evadens</i>
<i>Chroogomphus tomentosus</i>	<i>Lachnum bicolor</i>	<i>Rhizopogon roseolus</i>
<i>Chrysomphalina auriantiacae</i>	<i>Lactarius chrysorheus</i>	<i>Rhizopogon villosulus</i>
<i>Coprinus lagopus</i> gp.	<i>Lactarius deliocius</i>	<i>Rhizopogon vinicolor</i>
<i>Craterellus cornucopoides</i>	<i>Lactarius pallescens</i>	<i>Russula emetica</i>
<i>Craterellus tubaeformis</i>	<i>Lactarius rubrilacteus</i>	<i>Russula nigricans</i>
<i>Crepidotus herbarum</i>	<i>Lactarius rufus</i>	<i>Russula xerampelina</i>
<i>Crepidotus mollis</i>	<i>Lactarius uvidus</i>	<i>Stropharia ambigua</i>
<i>Cryptoporus volvatus</i>	<i>Leucoagaricus rubrotinctoides</i>	<i>Stropharia hornemannii</i>
<i>Cystoderma fallax</i>	<i>Leucogaster rubescens</i>	<i>Suillus fuscotomentosus</i>

<i>Dacrymyces palmatus</i>	<i>Lycoperdon foetidum</i>	<i>Suillus lakeii</i>
<i>Fomitopsis cajanderii</i>	<i>Lycoperdon perlatum</i>	<i>Suillus tomentosus</i>
<i>Fomitopsis pinicola</i>	<i>Lyophyllum decastes</i>	<i>Suillus caerulescesens</i>
<i>Galerina marginata</i>	<i>Macowanites chlorinosmus</i>	<i>Suillus luteus</i>
<i>Ganoderma oregonense</i>	<i>Micromphale sequoiae</i>	<i>Tapinella atrotomentosum</i>
<i>Gomphidius glutinosus</i>	<i>Mycena alkalina</i>	<i>Tremetes hirsutum</i>
<i>Gomphidius oregonense</i>	<i>Mycena aurantiidisca</i>	<i>Tremetes versicolor</i>
<i>Gomphidius subroseus</i>	<i>Mycena epiterygia</i>	<i>Tricholoma inamoenum</i>
<i>Gomphus floccosus</i>	<i>Mycena pura</i>	<i>Tricholoma pardinum</i>
<i>Gyromitra infula</i>	<i>Mycena purpureo-fusca</i>	<i>Tricholoma saponaceum</i>
<i>Hebaloma crustuliniforme</i>	<i>Mycena rosella</i>	<i>Tricholoma virgata</i>
<i>Helvella compressa</i>	<i>Mycena strobilinoides</i>	<i>Truncocolumella citrina</i>
<i>Helvella lacunosa</i>	<i>Myxomphalina maura</i>	

Discussion

Determining the best way to sample for Survey and Manage fungi, and now Sensitive species of fungi, has been discussed for over a decade in Region 6 of the Pacific Northwest. The Northwest Forest Plan triggered the need to gain a better understanding of the rarity and sensitivity of fungi in the region. Previously, in 2002, sampling CVS plots using belt transects was attempted as a way to collect fungi data that would be statistically valid so that inferences could be made from the data. The sampling area was region wide and allowed for a large set of data. However the sampling method used had its limitations as many rare fungi that may have been 10 feet away from the transect line were overlooked and missed or were collected as “incidentals.” When considering that fungi listed as Sensitive are actually much rarer than many of the species on the previously used Survey and Manage list, it was determined that larger sample sizes would be needed in order to detect listed species. The method implemented in this project sought to sample a 10-acre area around the plot center instead of only a 100m x 1m transect in hopes that many more sporocarps could be located and the data would still be statistically valid. Unfortunately, either due to weather conditions in this particular season, or the types of habitat that were randomly chosen this method did not prove to be anymore useful. This method may be useful in the future but should probably be done as a stratified random sample. Stratifying the plots within certain types of habitat will increase the likelihood of encountering a large amount of fruiting. Eliminating the potential to draw a group of plots that all have shallow soils on steep south facing slopes would likely increase the amount of rare fungi data collected. The yearly variability in fruiting patterns

is very difficult to predict and the way inventory projects are funded does not allow a lot of flexibility on whether to proceed or stop in a given year. The fall of 2009 was a very poor year for fungal fruiting whereas the fall of 2010 was one of the best seasons in over a decade. There may be a positive correlation between the El Nino weather pattern and fruiting. The last strong El Nino occurred in 1996/1997 and the fall of 1997 saw an extraordinary amount of fungi throughout the Pacific Northwest. In addition fruiting patterns are not the same within different regions of the Pacific Northwest. The southwest Oregon Coast and Siskiyou Mountains exhibit a different pattern than the mid elevation Cascades which in turn fruit at different times than the high Cascades. When considering all these variables plus a host of others not mentioned here, it is not surprising how difficult it is to find Sensitive listed fungal species. A cooperative effort by all the botanists/mycologists in the Pacific Northwest is needed to determine the best sampling method, timing of survey and habitat to inventory. Conducting complete "biodiversity" inventories is also necessary because of the likelihood of finding new species to science or identifying considerable range extensions for species that may not show up on current lists.

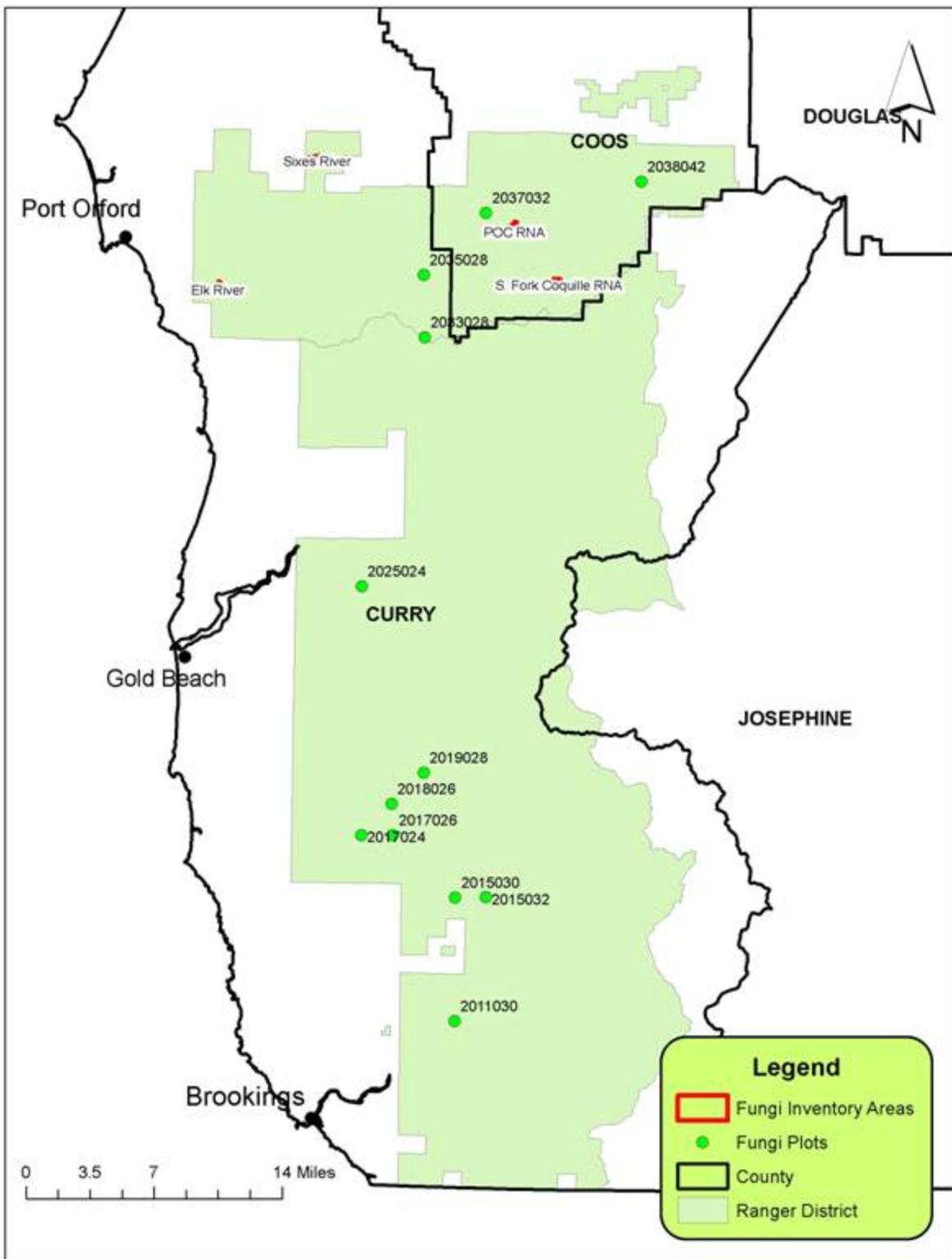


Figure 1. Map of Project Area

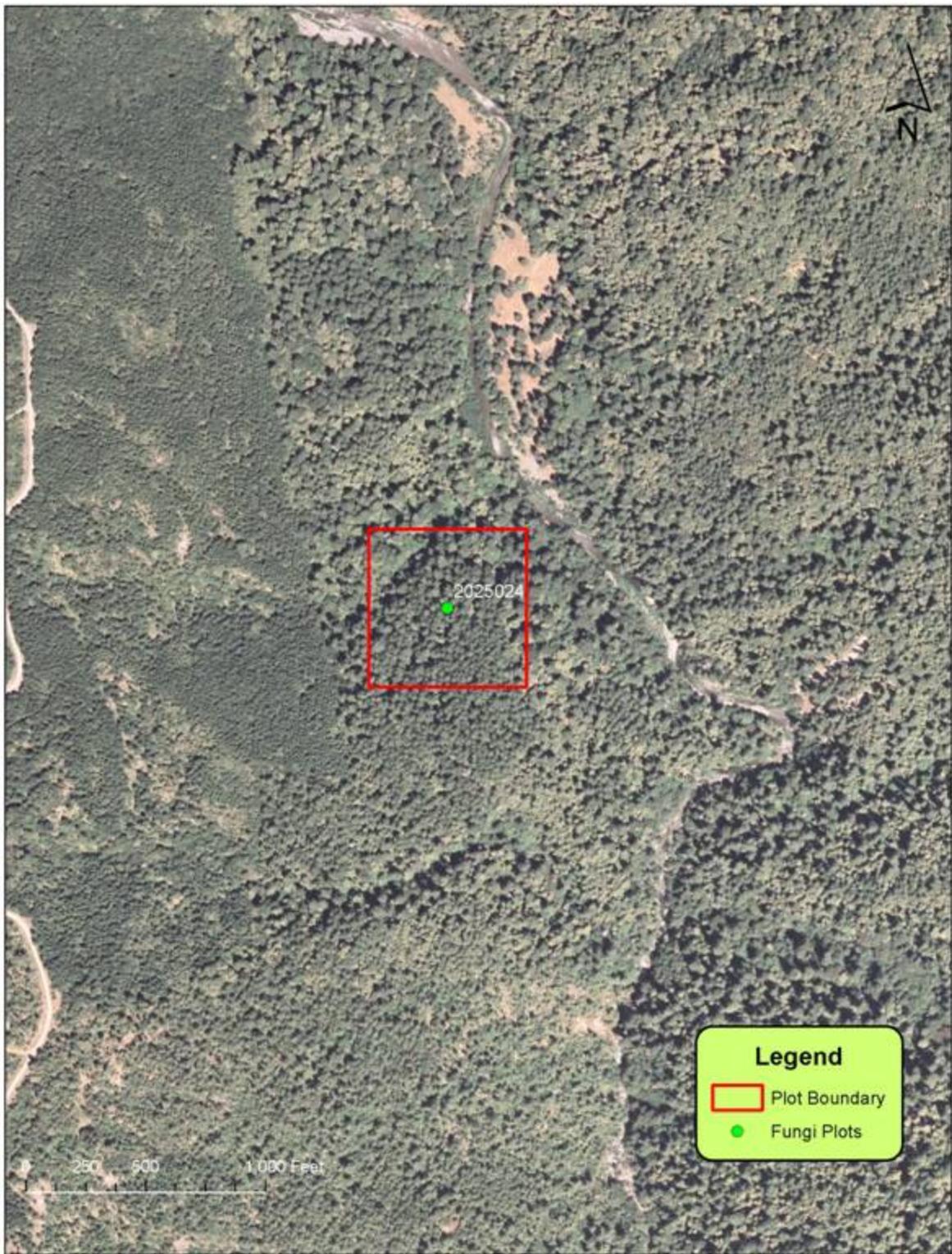


Figure 2. Example of Plot Surveyed