Vegetation and Habitat of Grouse Mtn. Property
An OPRD Assessment of Natural Resource Values

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Introduction

George and Priscilla Meredith, owners of the subject property have approached OPRD with a concept of the OPRD acquisition of all or a portion of their property. In assessing this potential, Natural Resources and Planning staff made a site visit to the property in August of 2012. This report describes the habitat and environment of the property in broad terms, with attention to vegetation composition and general ecological setting.

Location and geographic description of the property

The subject property is located in rural Grant County, Oregon, straddling US highway 395 beginning approximately 1 mile NE of the town of Mount Vernon. The legal description of the property is T13S, R30E, Sections 1,2,11,12,13,14,15; T12S, R30E, Sections 25,35,36; T12S, R31E, Section 31; T13S, R31E, Sections 6,7,8,18. The property encompasses approximately 6524 acres of land.

In terms of landscape setting, the property encompasses low mountain peaks, ridges, broad slopes, incised canyons, and areas of broad, formerly agricultural bottomland. It spans the transition between open rangeland, woodlands, and relatively dense forests. It includes a perennial pond, several emergent marshes, several perennial creeks, numerous seasonal streams, and many springs. Elevation ranges from 2958 to 4830 feet above sea level, and topographic diversity is high. The property adjoins US Forest Service and Bureau of Land Management lands over approximately 2 miles of its perimeter (6% of total perimeter). The remaining adjacent property is private.

Historic Vegetation and Sources of Change

Historic vegetation has been mapped and modeled by both the Oregon Biodiversity Information Center (ORBIC) and by the US Forest Service LANDFIRE project. The ORBIC data was mapped from surveyors' notes in the late 1800's at a relatively coarse scale. The LANDFIRE historic vegetation mapping was based on their Biophysical settings (BiOPS) modeling. Both datasets have their advantages and disadvantages. In the case of this particular property the LANDFIRE data is probably the better dataset. It is depicted in Figure 4, but it should be regarded as only coarsely accurate. A refined historic vegetation model could be created using the mapped current vegetation as a basis for suppositions of past vegetation. This approach would likely be more accurate, but this analysis is not within the scope of this assessment.

The types of vegetation that were present on the landscape prior to agricultural modification and fire suppression were ponderosa pine forest, juniper forest, riparian forest, big sagebrush steppe, rigid sagebrush steppe, bunchgrass prairie, aspen woodland and forest, emergent marshland, and serpentine barrens. All of these types are present on

the landscape today as well. The modeled extents of these cover types given by the LANDFIRE BiOPS model is probably erroneous in areas, particularly with regard to the extent of aspen forest. Big sagebrush steppe may also have been less prominent than is shown in the model.

Change in vegetation across the landscape is due to primarily past intensive grazing by domestic livestock, seeding of pastures to palatable livestock forage, hydrological modifications, weed introduction, and fire suppression.

- Livestock grazing has left abundant signs on the landscape particularly in areas of lower, flatter ground where livestock were present for more of the year. These areas have transitioned away from the former native bunchgrass communities to introduced and invasive grass species. Even forested areas show signs of grazing history in the species composition of the grasses present – which have transitioned to having areas of non-native bluegrasses common in "improved" pastures. Some areas of open meadowland are almost entirely composed of non-native grasses that have either been directly seeded, or have occurred because of overgrazing of native bunchgrasses and passive introduction of invasive non-native grasses.
- Hydrological modifications are evident in the Gordon Lakes area, where earthmoving was used to either increase the impoundment capacity of an existing wetland or pond; or, a new impoundment altogether may have been created from a former creek, seep, or spring. Bottomland riparian areas, particularly surrounding Beech creek, have likely been narrowed through either active channelization and conversion of bottomlands to pasture, by stream downcutting due to the influence of vegetation loss due to overgrazing, or by a combination of the two forces.
- Weeds usually occur in close association with livestock grazing and agriculture, and this property is no exception. Weeds present include North Africa grass, spotted knapweed, tumblemustards, cheatgrass, medusahead, teasel, scotch thistle, Canada thistle, and forage grasses. The grass weeds are the most widespread. North Africa grass' abundance is quite high.

Figure 1. Vicinity Map

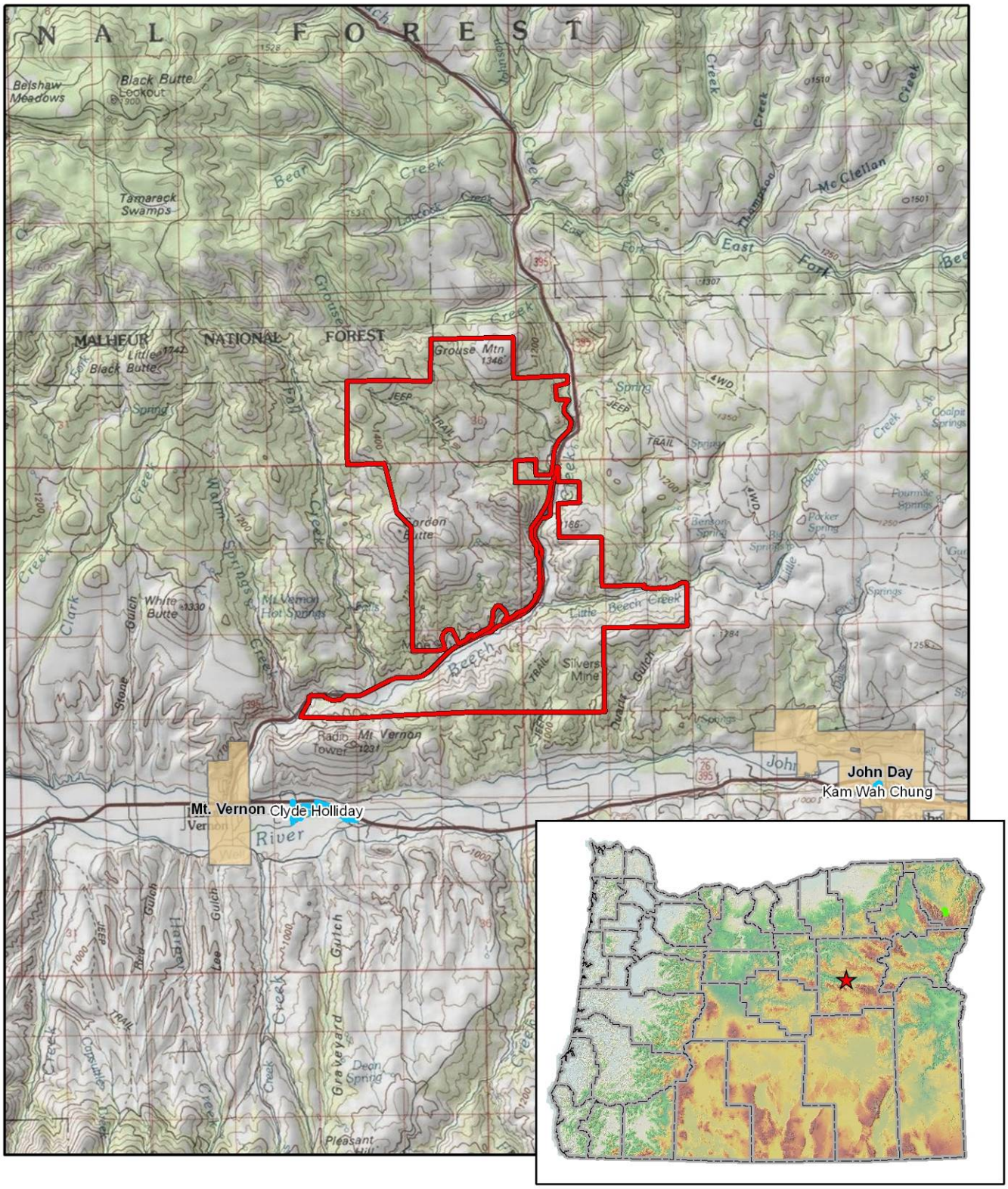


Figure 2. Topographic Setting

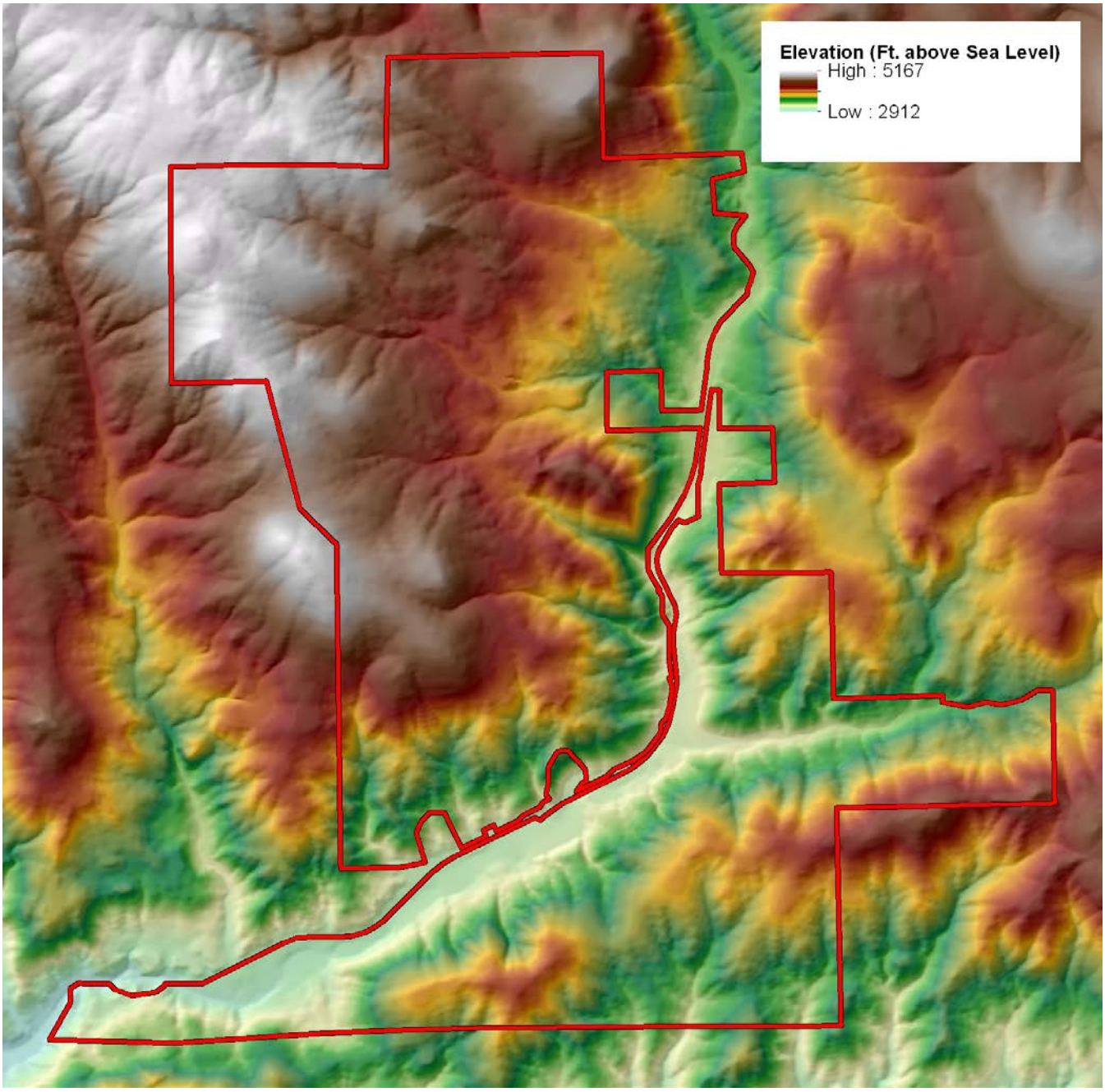
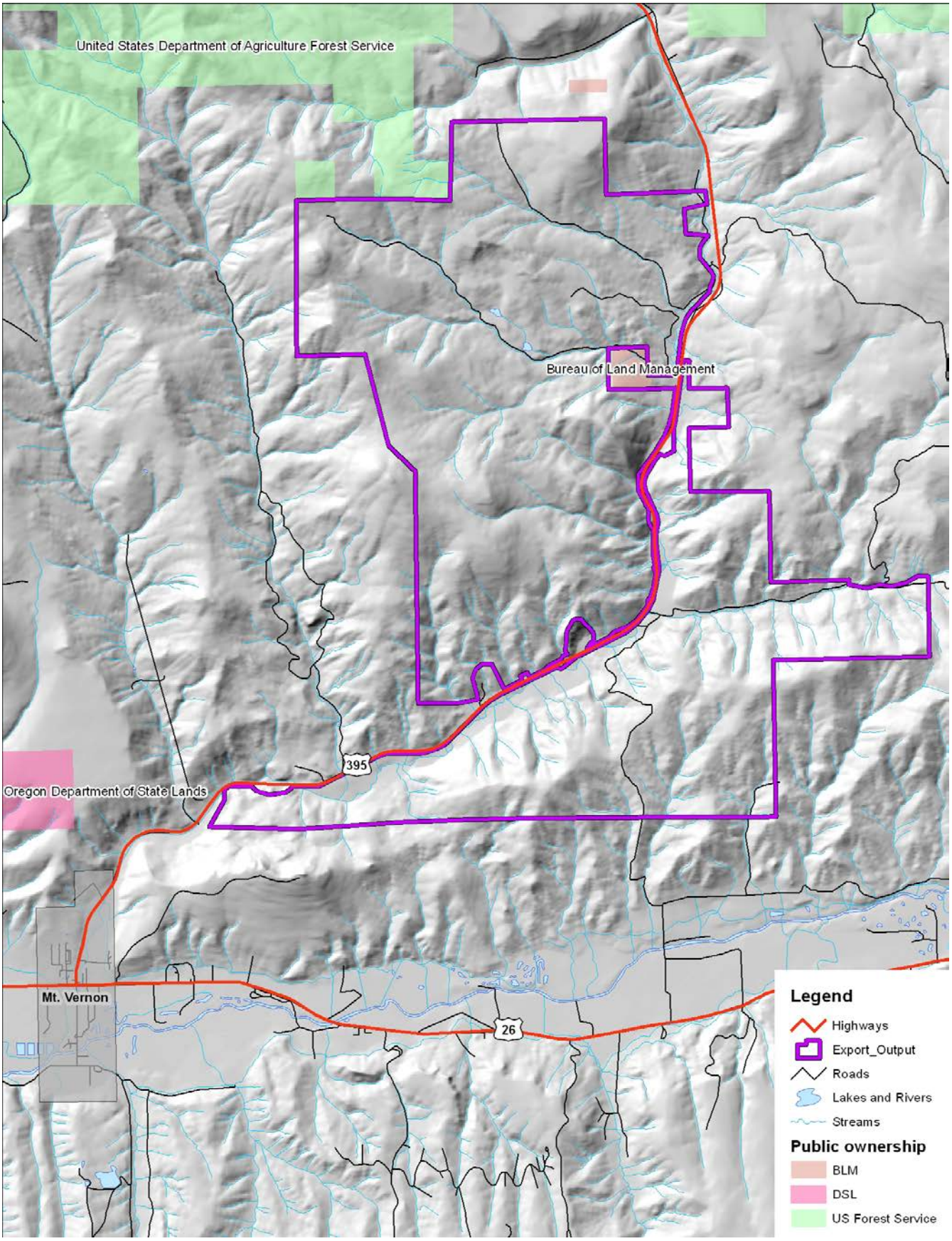


Figure 3. Landscape Settings



Current Vegetation and Landcover

Previously available current vegetation models for the site are mostly inadequate. The most accurate dataset available is the 2008 ORBIC GAP landcover data, but this dataset has some very significant inaccuracies. To improve upon available datasets, a number of plots were sampled in the field in the course of OPRD's August site-visit. A remote sensing process was undertaken to produce a more accurate model of current vegetation cover. The result is depicted in Figure 5. More work could be done to refine the detail and accuracy of the mapped vegetation types, but further work is beyond the scope of this preliminary assessment of the property.

The vegetation habitat types present on the property can be broken down into 7 main types for purposes of the general description of the site's ecology: upland forest, woodland, savanna, grassland, shrub-steppe, riparian vegetation, and agricultural/fallow. Each of these groupings and their subtypes are described in the paragraphs below.

Forests

The distribution of forests on the property is primarily dictated by moisture and topography. Trees generally grow most densely in draws, canyons, and on north slopes. Some juniper-dominated areas have reached forest-level tree densities in drier situations than those that are typically forested. This is due to juniper's ability to thrive in and colonize drier sites in the absence of fire. Forest subtypes include ponderosa pine forest, mixed coniferous forest, aspen forest, and juniper forest. The majority of the forest on the property is ponderosa pine forest. Lesser amounts of white/grand fir and douglas-fir are present in some pockets. Most forested plant associations are characterized by snowberry, woods rose, and rhizomatous bluegrasses. Some forested areas have sparse enough shrub layers such that elk sedge and pinegrass become dominant species. Where juniper is dense enough to be considered forest rather than woodland or savanna, it is generally underlain by weedy grasses, bitterbrush, and native bunchgrasses.

Woodlands

Woodlands are abundant on the property and are characterized by open stands of trees with less than 60% canopy cover. Woodlands on the property can be either predominantly western juniper or ponderosa pine. Bitterbrush, bunchgrasses, and weedy grasses are common inhabitants of the understory. The majority of the woodlands on the property are western juniper-dominated.

Savanna

Savanna habitat is that in which tree cover becomes sparse enough such that the habitat is essentially open grassland or shrub steppe with sparse individual trees or sporadic small clumps of trees. It is common in the drier portions of the property and in less fertile soils. Shrub and herbaceous vegetation is usually sagebrushes, rabbitbrush, bunchgrasses, a variety of forbs, and weedy grasses.

Figure 4. Historic Vegetation from the LANDFIRE Biophysical Settings Model

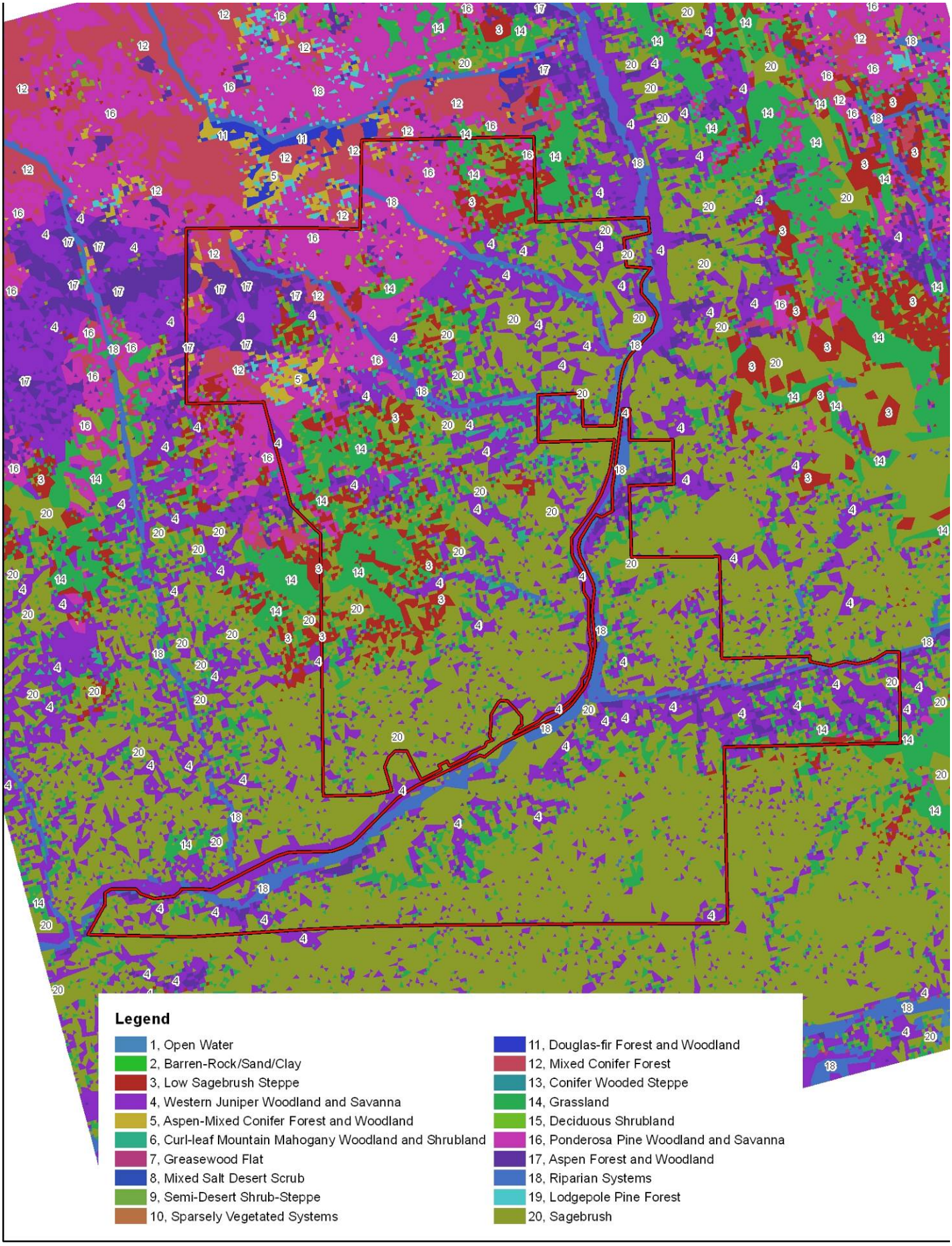

Legend
1, Open Water
2, Barren-Rock/Sand/Clay
3, Low Sagebrush Steppe
4, Western Juniper Woodland and Savanna
5, Aspen-Mixed Conifer Forest and Woodland
6, Curl-leaf Mountain Mahogany Woodland and Shrubland
7, Greasewood Flat
8, Mixed Salt Desert Scrub
9, Semi-Desert Shrub-Steppe
10, Sparsely Vegetated Systems
11, Douglas-fir Forest and Woodland
12, Mixed Conifer Forest
13, Conifer Wooded Steppe
14, Grassland
15, Deciduous Shrubland
16, Ponderosa Pine Woodland and Savanna
17, Aspen Forest and Woodland
18, Riparian Systems
19, Lodgepole Pine Forest
20, Sagebrush

Figure 5. Current Vegetation based on August 2012 Site Visit

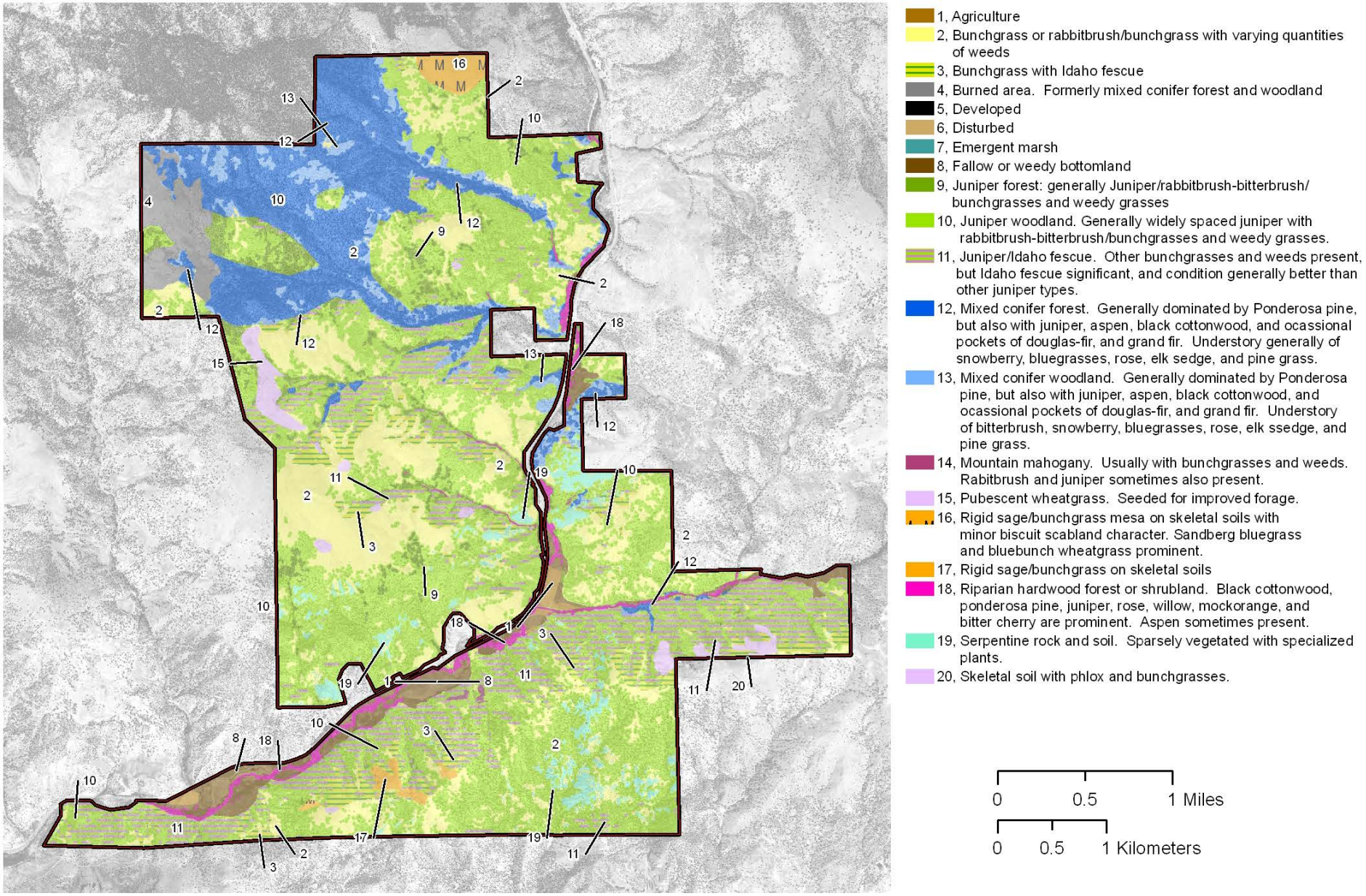
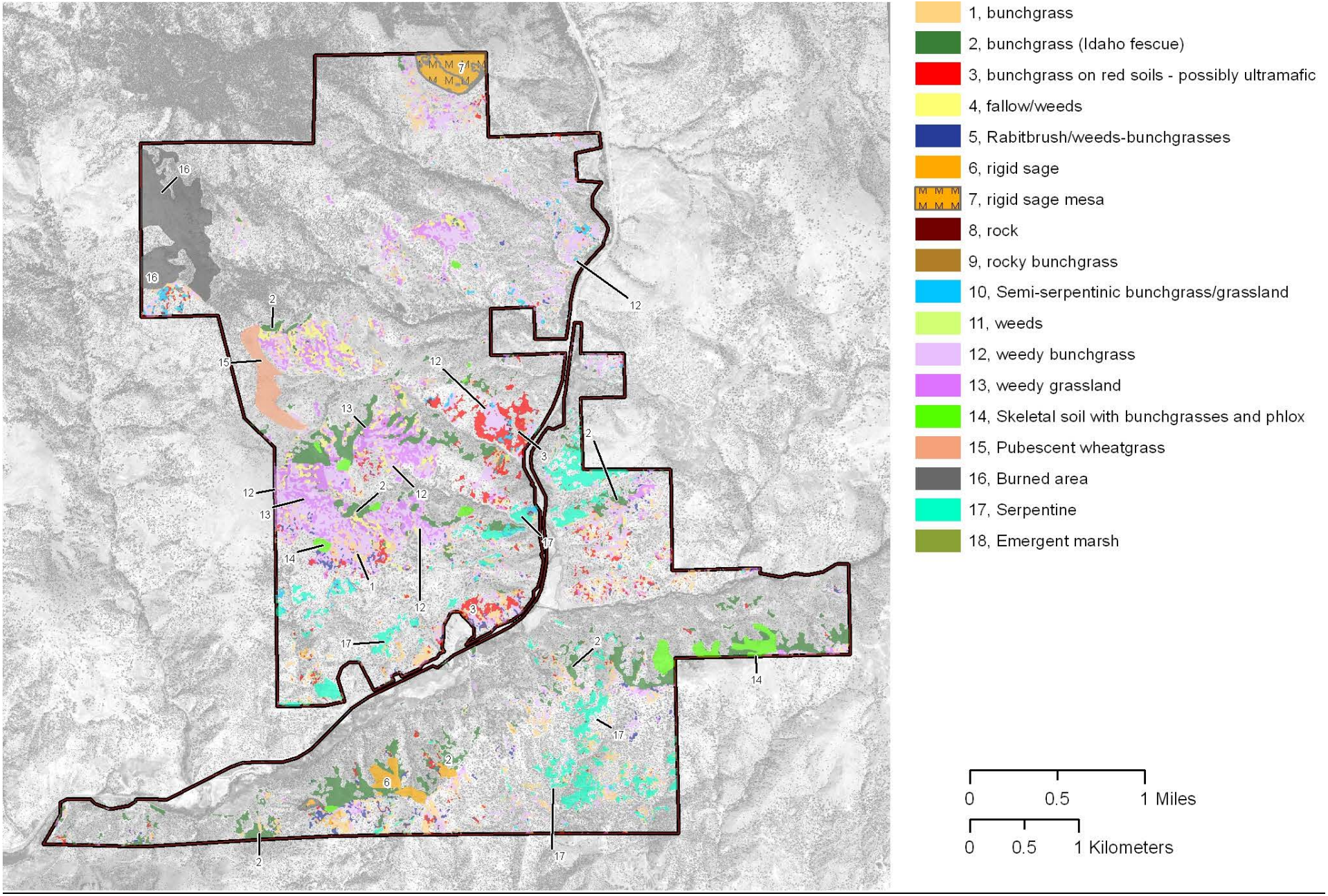


Figure 5B. Current Upland Grassland and Low-Growing Vegetation based on August 2012 Site Visit



Grasslands

This type of habitat is widespread on the property and falls into several categories: Idaho fescue dominated bunchgrass, bluebunch wheatgrass-pine bluegrass dominated bunchgrass, weedy grassland, and improved pasture/haylot. Most grasslands in the higher elevations where livestock were mostly seasonally present are at least partially native bunchgrass. Some areas of longer livestock holding are almost entirely weedy. Areas that have been tilled and managed for hay or improved pasture are usually dominated by non-native forage grasses and weeds. Generally speaking, the Idaho fescue grasslands are present and in better condition on steeper, higher, and/or more remote north slopes with either no trees or sparse juniper. Bluebunch wheatgrass-pine bluegrass communities are likewise found on steeper, higher, and/or more remote slopes where livestock have not lingered as long – but in contrast to Idaho fescue communities, these occur on aspects other than north. The lower in elevation toward the bottomland one travels, the fewer native bunchgrasses are present.

Shrub-steppe

Shrub-steppe communities are characterized by low to medium sized shrubs scattered across the landscape with less than 60% cover. The shrub component is made up of either rubber rabbitbrush, big sagebrush, bitterbrush, or rigid sagebrush. The herb and forb composition beneath the shrub overstory is generally composed of native bunchgrasses, a variety of native and weedy forbs, and weedy grasses. These communities are less abundant than grasslands, woodlands, and forest on the subject property but they are still significant enough to note.

Riparian vegetation

Riparian vegetation on the property is generally made up of a complicated mixture of black cottonwood, aspen, ponderosa pine, and juniper as overstory trees; a midstory of shrubs that include willows, woods rose, chokecherry, snowberry, and golden current; and a forb layer that includes white sweetclover, blue wildrye, Kentucky bluegrass, basin wildrye, and thickspike wheatgrass. White sweetclover and Kentucky bluegrass are non-native forage species that are sometimes very invasive in these areas.

Agricultural/fallow

These areas are almost entirely in the bottomlands along Beech Creek and Little Beech Creek. There is one area in the higher ground that was seeded to pubescent wheatgrass that fits this description as well, although pubescent wheatgrass is a native species. Most of these areas are densely infested with non-native vegetation that includes weedy grasses, knapweed, scotch thistle, Canada thistle, tumble mustard, etc. Much of the arable land in the bottomland to the south of Beech Creek has been managed to transition it away from this weedy condition, and has been seeded in some areas with an ODFW-recommended wildlife forage mix that includes both native and non-native species, but much of this ground

continues to be plagued with weeds. The Merediths cut and sell hay from some of the bottomland arable land.

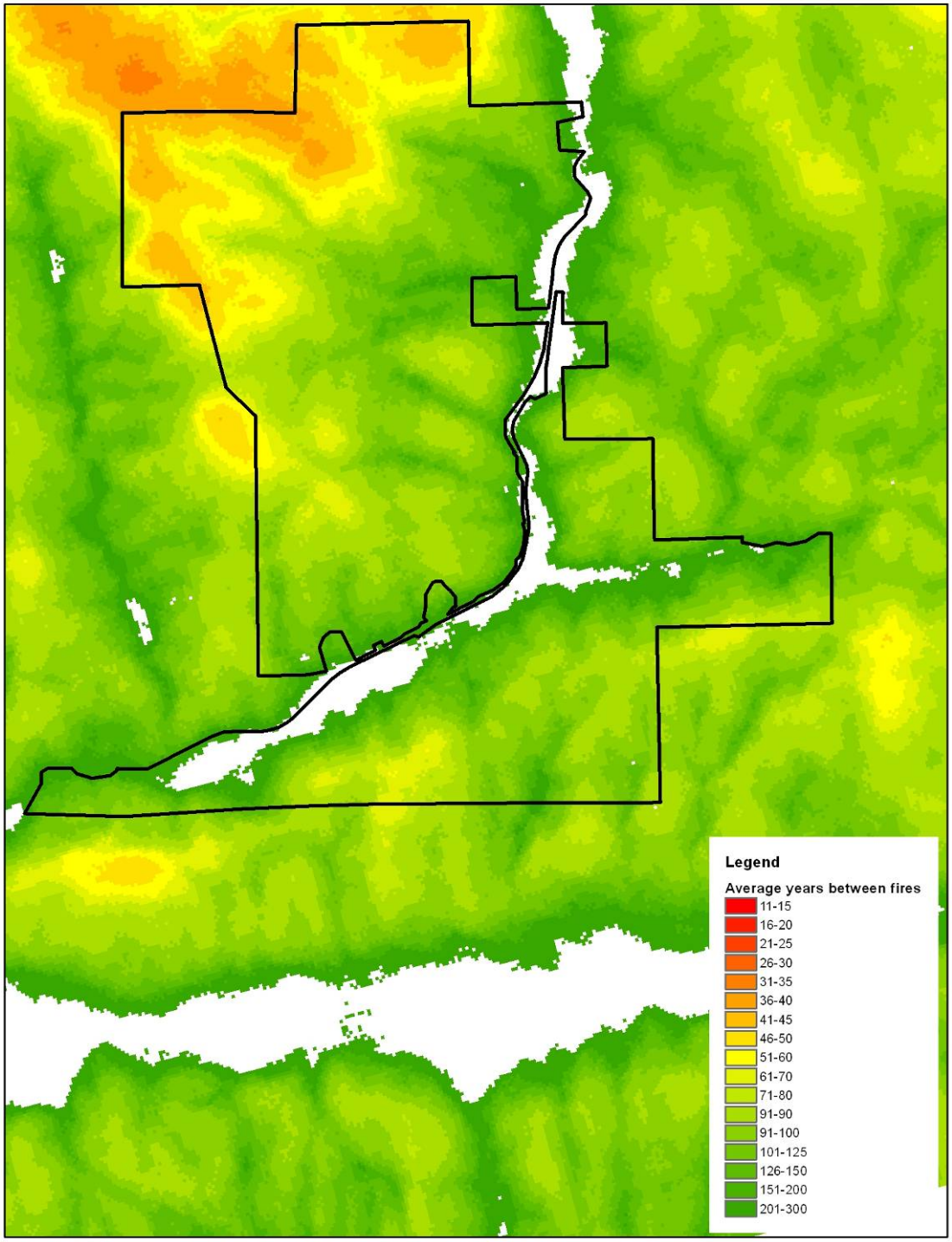
Fuels Management

The Merediths have treated 60%+ of the forested areas of the property for previously overstocked forest conditions and excessive fuel loading relative to pre-European-American settlement conditions. Fuels treatment is still needed on a maximum of 400 acres of forest.

The work done thus far has been a monumental effort that has been quite expensive. Revenues from wood products harvested have only offset costs by about 50%.

This landscape was previously subject to fairly frequent ground fires. Modeled fire return intervals are depicted in Figure 6. This fire return frequency suggests that forest thinning will need to be periodic to clear undergrowth and maintain open forest and woodland conditions. This frequency will be highest in younger stands, and should decrease as larger fire-resistant trees develop. Even in late seral woodland and forest, though, shade tolerant tree and shrub ingrowth is to be expected in the absence of ground fire and this ingrowth will need to be periodically cleared to maintain both habitat and acceptable fuel loadings.

Figure 6. Mean Fire Return interval from LANDFIRE Model



Significant Natural Features

The most unusual and significant feature of the property is arguably the serpentine/ultramafic slopes and outcrops of greenish rock. Serpentine soils contain high levels of certain minerals (such as the heavy metals nickel and chromium) and low levels of certain nutrients – which can make them toxic or infertile to many plants. The soils occurring in these outcrops favor plant species with special adaptations that allow them to tolerate the toxicity and/or infertility of the soil, and this fact accounts for their distinctive flora. These sites are generally fairly sparsely vegetated and visually striking. OPRD has no east-side serpentine in its portfolio of properties, although it does have several properties with serpentine habitats on the west side of the Cascades in Josephine and Curry counties. These sites are completely dissimilar in appearance and in associated vegetation. The serpentines/ultramafics of southwest Oregon are generally reddish in color (not metamorphic). It is likely that some of the red colored soils on the Meredith property are also non-metamorphosed ultramafic rock – such as olivinite, periodotite, and dunite.

From a wildlife perspective, Beech Creek and Little Beech Creek are highly significant for their fish habitat. Both streams support strong runs of listed and other fish species. Mature cottonwood riparian forest and relatively dense shrub associates provide nearly ideal shading conditions and wood recruitment.

Strongly red soils also appear to support stronger native bunchgrass communities and may be chemically exclusive to some extent of dense colonization by weeds.

Similarly, Grouse Mountain is rocky and shallowly soiled, and supports a relatively healthy example of a rigid sagebrush low shrub-steppe community on top. This mesa feature has distinctive flora and soils are somewhat mounded in places – suggesting biscuit and swale topography/biscuit scablands.

The property has abundant springs on the open slopes as well as in the forests that are valuable plant and animal habitat.

The State Natural Areas Plan indicates habitats that are present and significant in each ecoregion of Oregon. Table 1 presents habitats listed in the Blue Mountains ecoregion that may have significant representation on the Meredith property. Whether any or all of these potentially significant ecosystem types are present and/or significant enough for registration in the State Natural Areas Plan will require more in-depth assessment of presence, extent, and condition of these communities on the property.

Table 1. Habitats in the State Natural Areas Plan's Blue Mountains Ecoregion Section that May Have Significant Representation on the Meredith Property

System	Community	Priority
Western Juniper		
	Western juniper/stiff sagebrush.	Low
	Western juniper/mountain mahogany.	(already represented elsewhere)
	Western juniper/big sagebrush/bluebunch wheatgrass.	(already represented elsewhere)
	Western juniper/big sagebrush/Idaho fescue.	(already represented elsewhere)
	Western juniper/big sagebrush-bitterbrush/bluebunch wheatgrass & Idaho fescue vegetation.	(already represented elsewhere)
	Western juniper/bluebunch wheatgrass.	
	Western juniper/Idaho fescue.	High
Ponderosa Pine		
	Ponderosa pine-western juniper/big sagebrush-bitterbrush vegetation mosaic.	Moderate
	Ponderosa pine/pinegrass with elk sedge if possible.	(already represented elsewhere)
	Ponderosa pine/mountain snowberry.	Moderate
	Ponderosa pine/common snowberry floodplain.	High
Grassland Communities		
	Biscuit scabland grasslands.	(already represented elsewhere)
Shrubland Communities		
	Rigid sagebrush/Sandberg bluegrass scabland.	(already represented elsewhere)
	Mountain mahogany/bunchgrass.	(already represented elsewhere)
Lacustrine		
	Freshwater lake with aquatic beds and marshy shore.	Unknown
Palustrine		
	Bulrush-cattail marsh with aquatic beds.	Low
Riparian		
	Low elevation riparian dominated by coyote willow, Pacific willow, or arroyo willow.	High
	Black cottonwood/common snowberry.	Moderate
	Black cottonwood/snowberry.	Moderate

Figure 7. The Distribution of Ultramafic/Serpentine Rock Outcroppings in Oregon

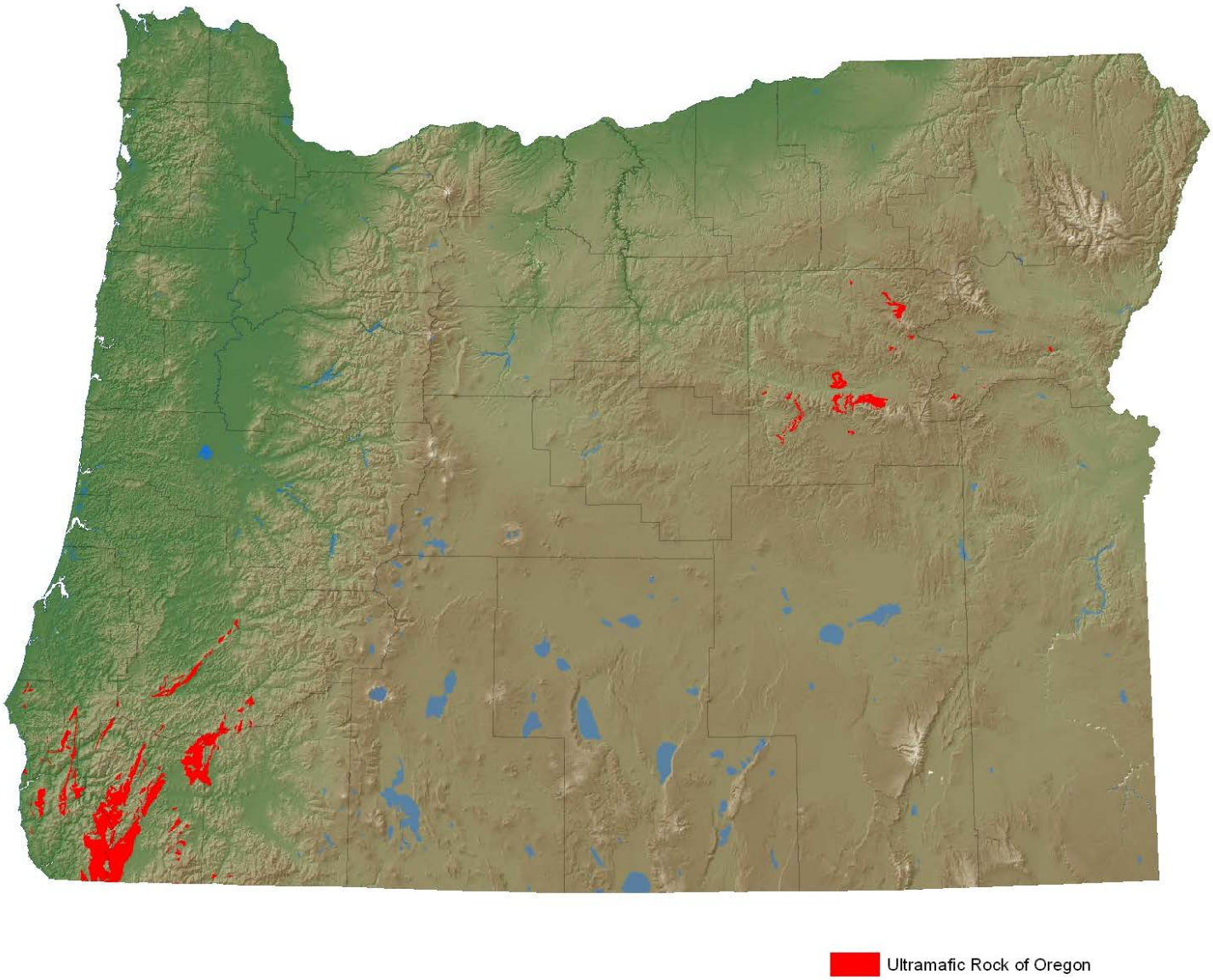
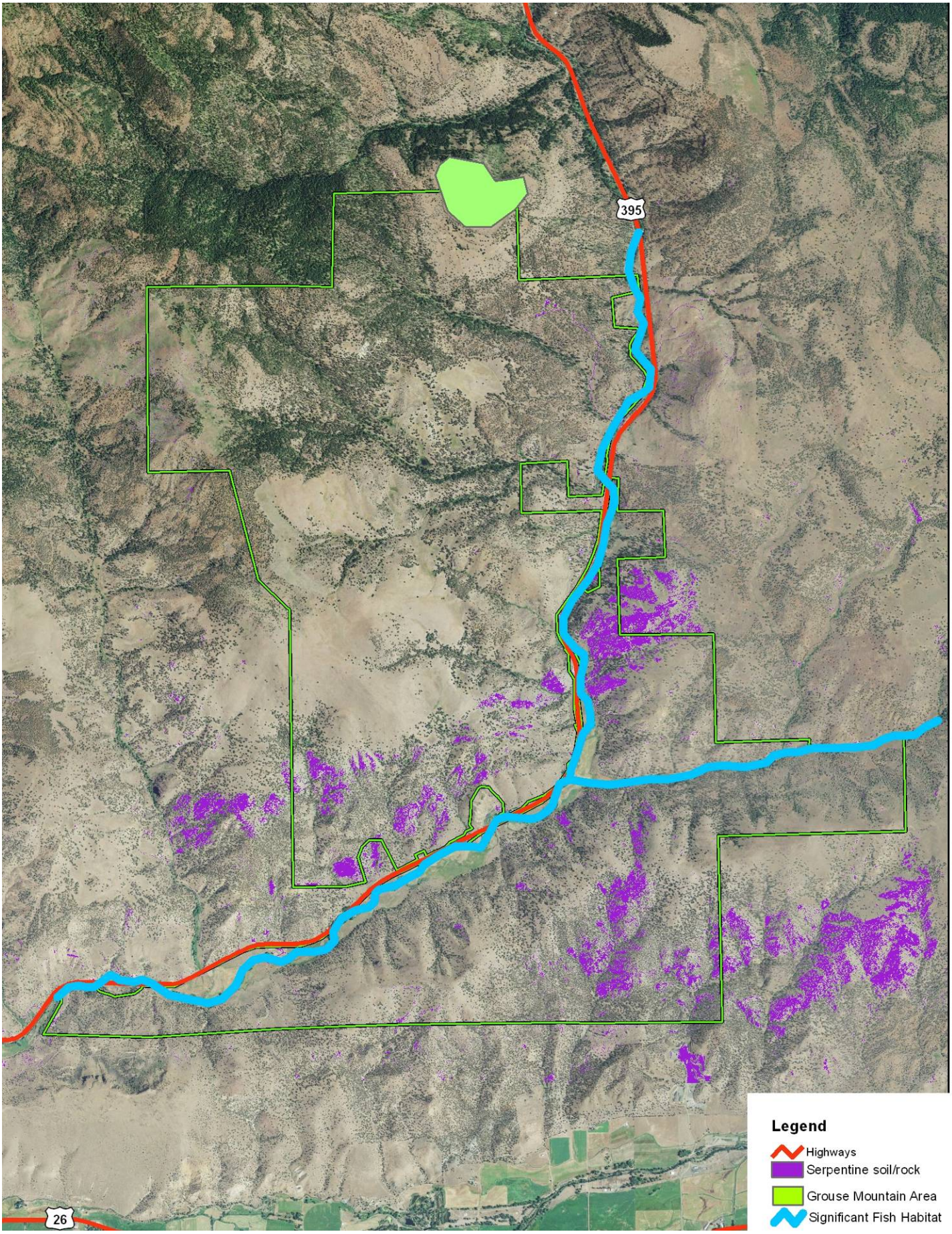


Figure 8. Highly Significant Habitats and Natural Features


395
26
Legend
Highways
Serpentine soil/rock
Grouse Mountain Area
Significant Fish Habitat

Restoration Progress and Potential

As has been described briefly in several preceding sections of this report, the Merediths have implemented several management actions that have aimed for ecological restoration of the property. Principal among these are the discontinuation of grazing, the exclusion of livestock from the creeks, conversion of some of the bottomlands to wildlife forage, fuels reduction thinning, and reclaiming Beech Creek floodplain. Each of these is described in more detail below.

Discontinuation of grazing and exclusion of livestock from the creeks
Discontinuation of grazing has had very obvious positive impacts to the riparian areas in particular. Stream banks and floodplains are generally very densely vegetated with wood and herbaceous plants that are essential to stream health in that they provide shade and woody debris recruitment. In upland areas where native bunchgrasses are still significantly present, summer grazing exclusion is presumably resulting in increased abundance of native bunchgrasses over weedy annual grasses in at least some areas. George Meredith has noticed this progression. In areas with no remaining native bunchgrasses the trajectory is less certain.

Conversion of some of the bottomlands to wildlife forage
Although not yet entirely successful, the Merediths – in cooperation with ODFW - have converted some agricultural fields to a wildlife forage "crop" that includes palatable native and non-native grasses and forbs. Weeds continue to be an issue in these fields that have forced restarting the process.

Fuels reduction thinning
60% or more of the forest on the property has been thinned for forest health and fuels reduction. Some of the wood products removed have created revenue to offset the cost of the work. There are still large debris piles that are being worked by a commercial firewood cutter. The amount of wood removed thus far has been enormous, and the associated costs correspondingly large.

Reclaiming Beech Creek floodplain
The Merediths, ODFW, and the Bureau of Reclamation are currently restoring the banks and bed of the reach of Beech Creek within the property. Work has entailed recontouring (decreasing the slope of) much of the bank and placement of woody debris structures. The goal of the work is to encourage the creek to top its banks during high water events, re-establish meanders, capture debris, restore pool/riffle structure, and reclaim flood plain dynamics. During the OPRD August 2012 visit the grading and dam construction were in progress.

Other potential restoration actions to investigate

1. Control of weedy annual grasses in the uplands
    a. Spring grazing to decrease annual grass abundances while they are actively growing and palatable (and dormant bunchgrasses are not).
    b. Herbicide applications?

i. Possible imazapic application, which selectively kills many annual grasses (along with some forbs).
ii. Canter R&P application?
iii. Low-rate pre-emergent herbicide?
iv. All potential herbicide treatments would need to be tested on the native grasses and forbs present to find a balance between target weed treatment and non-target damage to native species.

2. Restoration of fire to the landscape
3. Systematic survey and control of knapweeds, scotch thistle, and other high priority weeds.
4. Completion of fuels reduction in remaining un-treated areas.
5. Use of native bottomland seed mix in agriculturally arable land composed of basin wildrye, thickspike wheatgrass, creeping wildrye, pine bluegrass, indian ricegrass, and needle and thread grass. This grass-only mix would allow for overspraying with broadleaf specific herbicides to kill the problematic scotch thistle, knapweed, etc. that have not been controlled by pure competition from the forage seed mix used thus far. Since the forage seed mix has included broadleaf species, overspraying has not been possible. In a grass-only phased restoration, forbs can be seeded or planted when weeds are substantial controlled and the rhizomatous native grasses have occupied bare ground. It might be necessary to open patches for forb seeding with treatments such as patchy fire, tillage, or spraying to make space for incoming broadleaf species.

Potential Ecological Liabilities Associated with Acquisition

In the interest in identifying natural resource aspects of the property that could/would result in additional cost commitments and management obligations, the following items are offered as inexhaustive examples:

1. Additional fuels treatment needed. This could cost up to $125,000 ($250,000 without wood products revenue offset).
2. Weed treatment. This property, while in better condition than most similar land in the area, could require significant weed control costs, ***depending on goals***. If non-native annual grasses are tolerated for the most part, the cost would be considerably lower than if the goal were to restore the property to near-pristine conditions.
3. Agricultural/fallow field management. Long-term restoration cost estimates for grass-only native prairie would be in the vicinity of approximately $1000/ac total over the initial multi-year establishment period. Bottomland native prairie establishment areas would cover no more than 100 acres. Annual maintenance costs after the initial establishment period (which would include periodic mowing or prescribed burning, broadcast spraying, and spot spraying) would be approximately $200/ac.
4. Woody debris structures. Restoration of the floodplain of Beech Creek has included construction of woody debris structures. These may need either upkeep or removal in the future.
5. Hunting pressure. Management will need to consider potential hunting issues, including pressure to allow hunting, and potentially the need for special hunts as

elk and deer populations rise. Other parks near agricultural lands are sometimes pressured to allow hunting because of herds' damage to neighboring farms and retreat to "refuge conditions" on the park.