

IRM Inventory Project
Area 2—Witchcraft Lake: Inventory

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Introduction

This report is an inventory with commentary of the area of land whose mean centre is approximately E 424228, N 5445869 (NAD 83), is accessible from Benson View Road in Nanaimo B.C., whose area is 76.6 ha, and which falls within Woodlot Licence 020. This area will be referred to as Area 2 throughout this report.

Field Recce Procedures

All data was collected in teams by the group. Riparian features were traversed and classified whenever encountered. Timber volumes were assessed using full measure plots on a 200m grid; this data was supplemental to existing and known stand volumes, and was primarily used to verify known data. Existing infrastructure reconnaissance (including outside road locations, park locations, and trail locations) was completed as necessary in order to determine road and cutblock opportunities. All other data was recorded during polygon walkthroughs, with other features, such as rock bluffs and wetlands, being identified and assessed as required.

BAF?

Forest Cover

Area 2 has a large pocket of high value timber that is predominately Fd and Cw, and is found in the southeast corner. There were other areas with good high value timber that unfortunately are not feasibly accessible by road. The remainder of this area is made up of rock bluffs that are not timbered or have low value timber, composed mostly of Plc. There is a small portion of high value timber in the riparian management area that is being left.

✓

Total stand volume is $538\text{m}^3/\text{ha}$ (Cw $53.8\text{m}^3/\text{ha}$; Plc $53.8\text{m}^3/\text{ha}$; Fd $432\text{m}^3/\text{ha}$).

Road and Harvest Planning

The primary harvesting opportunities in Area 2 are located in the eastern section, south of Witchcraft Lake and adjacent to Island Timberlands (IT) forested lands. Existing IT roads that lead to the shared property line provide excellent access to this timber. This area could only otherwise be accessed from Benson View Road, which is not a recommended access point due to the volume of residential and recreational traffic on this City of Nanaimo owned road. ✓

The IT owned road that would be required would require minimal resurfacing (class 1), some clearing (class 2) and potentially widening for sections of 100 to 200 metres. Most of the existing 5km road (which exits at Nanaimo Lakes Road) is currently activated and was being used for active hauling at the time of this recce.

A natural bench runs across this western section of Area 2, making road construction and block layout feasible with little to no end haul. A mix of grapple (~ 25 ha) and hoe chuck (~15 ha) is recommended. Visual quality considerations may reduce the areas given above depending on final layout and deflection. ✓

Site Series Description

Area 2 (in the CWHxm1) has a variety of site series and soil types. This is due to the range of topography and slopes on the northeast face of Mt. Benson. Five distinct site series were identified in Area 2. One soil pit and eco-plot was ~~performed~~ ^{established} whenever the type changed during the walkthrough. Because of this, the attached ecosystem map boundaries are not necessarily the same as the forest cover map. In general, Area 2 is characterised by steep slopes, coarse well-drained soils, very dry to fresh moisture, and poor to rich nutrient regimes. The drainage pattern

is marked by a significant presence of rock outcrops and cliffs—resulting in rapid response to precipitation events. The following is a description of each site series recorded.

Plot 1 – SS 01: Plot 1 is a typical zonal site of this subzone. The plot is Mid-slope, water-shedding and water-receiving, and slightly mounded with an average 18% slope. The soil is a deep loamy sand of the podzolic order with relatively high CFCs and a moder humus form. The stand structure has entered stage 6 with signs of diverse vertical canopy. Douglas-fir is dominant, followed by scattered intermediate western hemlock and western red cedar ingress. Understory composition is also typical, with a fairly even distribution of dull Oregon grape and salal; moderate distribution of swordfern, step moss, Oregon beaked moss, and red huckleberry; and the odd patch of coastal leafy moss. The site does have a noticeable amount of downed mature Fd caused by laminated root rot. Otherwise no other critical site factors were noted.

Plot 2 – SS 02: Plot 2 is on one of the many rock bluffs found throughout Area 2, and is representative of those bluffs. The soil is a sandy loam texture with high CFCs (70%) of the brunisol order. The mor forest floor is not as developed as plot 1 and indicates a higher pH content by the vegetation cover. The stand is heavily dominated by Douglas-fir and arbutus. The understory has a large component of salal and lichens, with some dull Oregon grape, and an abundance of different mosses. This site bears a range of important site values including a diverse lichen and moss community, exposed bedrock, root restricting CFC, and abundant vigorous salal.

Plot 3 – SS 03: Plot 3 is located upslope from plot 1, is drier, and the timber is not as diverse or differentiated. Douglas-fir occupies most of the canopy with a few suppressed western hemlock and Cw. The difference in size and vigour of the timber is also readily noticeable

although the area was harvested the same year as plot 1. The forest floor is a thin mor with coarse sandy loam mineral soil. No critical site factors noted.

Plot 4 – SS 05: Plot 4 is located in the west end of Area 2. This site is richer than previous plots. The soil profile here is a thick moder humus, with a fine sandy loam podzol. Stand structure is rated as 6, but captures many old growth features that are common in class 7. Abundant CWD, diverse vertical structure, strong gap dynamics, and proximity to nearby riparian areas contribute to old growth characteristics and vegetation. Dominant overstory species are composed of Fd and Cw with co-dominant and intermediate Hw. Dispersed and large red alder trees occupy canopy gaps here and there. Understory is composed of vigorous and abundant swordfern, salal, and dull Oregon grape; moderate stepmoss, and Oregon beaked moss; and traces of oceanspray. Mild root rot is present in this area.

Plot 5 – SS 01/05: Plot 5 is upslope from plot 4 and has similar characteristics but some notable differences. Douglas-fir is more prevalent here, and Cw and Hw are not as vigorous. Understory composition consists of evenly distributed dull Oregon grape, sword fern, and salal; with scattered red huckleberry. Mosses are more abundant than in plot 4, including vigorous step moss and Oregon beaked moss, and a small component of lanky moss. The soil is coarser and not as deep as plot 4. This site has developed some old growth attributes despite its young age (gap dynamics, diverse canopy, etc.). Presence of chimneys and Fd windthrow indicate the presence of root rot.

- Good descriptions
- Only 5 plots – not adequate for 76 ha area
- [OK to have a detailed plot for each SS, but should have more freq. check plots]

Sensitive Sites

A number of potentially sensitive sites exist in Area 2. Each rock outcrop bears ecologically sensitive plant communities. The dynamic topography paired with coarse soils and multiple fast-flowing streams has created numerous sections of fan terrain. These sites will be accounted for in all phases of harvesting. Otherwise, Area 2's harvest sites are free of sensitive soils/terrain and habitat.

Forest Health

Area 2 has small patches of Douglas fir root rot (*Phellinus weirii*) scattered throughout. Patches of interest are indicated where appropriate (see [#]appendix). These patches are of low concern, except for those that fall into our proposed harvesting area. Stumping may be required after harvest and prior to planting in any area where root rot is identified.

No other major forest health concerns were identified.

Stream, Lake, and Wetland Classification

Witchcraft Lake and its associated streams drain into McGarrigle Creek. McGarrigle Creek is part of the Westwood Watershed, eventually draining into the Millstone River and Nanaimo Harbour. Coho are known to travel as far as the lower portion of McGarrigle Creek due to the Millstone River Enhancement Project. Contrary to the S6 classification in the GIS database, McGarrigle Creek's average width makes it an S5. Despite development of farmland in close proximity to McGarrigle Creek, the majority of its length remains forested and undeveloped. The Millstone River is directly adjacent to farmland, eventually flowing into residential areas, Bowen Park, and into the Harbour.

Potential issues?

Downstream, the primary concerns are those related to Coho habitat. Some of the farms adjacent to the Millstone may potentially draw upon water from the river, but these residences are connected to Nanaimo's water system and are not reliant on well-water. All other users are recreational, primarily at Bowen Park. ✓

Within Area 2 there are a series of unmapped, unnamed, and unclassified streams. We have identified Stream 1 and Stream 2 as streams worthy of consideration in our planned harvest area. All other streams drain into McGarrigle Creek and are within the area we have defined as valuable retention for recreational and biodiversity attributes. Above the south-east boundary of Area 2 is a large fan. A second fan was noted close to where Stream 3 meets McGarrigle Creek. One of the official trails passes this fan placing it out of the potential harvest area.

Witchcraft Lake is classified as an L2 lake based on its size and surrounding BEC unit. The planned harvest area for Area 2 exceeds the required 10m reserve zone and 20m management zone width. Through consultation of John Morgan from VIU's RMOT department, we confirmed that Witchcraft Lake contains stickleback, but no other fish. ✓

No significant wetlands have been identified within Area 2.

See Table 1 (page 8) for the list of riparian features found in Area 2.

Good streams write-up

Wildlife

During the field recce we observed multiple signs of ungulate activity and witnessed a barred owl perching. In terms of habitat, the rocky outcrops mentioned in the site series descriptions are plentiful in lichen (both arboreal and ground) and deer droppings. Bear dens were not observed and are unlikely to be present due to the very high use recreational status of Area 2. Despite the streams being non-fish bearing, there is potential for amphibious life as each

stream has morphological features favourable for amphibian habitat. Veteran Douglas-fir trees are scattered throughout the lower sections of Area 2 and may be suitable as wildlife trees for perching/nesting. Two wildlife trees in particular were documented. Moreover, fire history, root rot, and wind events have left a component of snags around the block suitable for cavity nesters. A total of 21 snags, varying in species, diameter, height, and limbs, were documented along with coordinates throughout the 76.6-hectare area. Refer to the non-timber resources map for exact location and distribution of snags.

Table 1: Area 2 Riparian Features

Feature	Stream, Lake, Wetland	Class	Average Width (cm)	Average Depth (cm)	Bank Gradient	Flow Gradient	Substrate	Comments
Stream 1	S	S6	134	12	10%	15%	B 20% ; C 20%; G 60%.	Seasonal. High CWD.
Stream 2	S	S6	104	8	10%	18%	B 5%; C 20%; G 60%; F 15%.	Seasonal. Ripple complex.
Stream 3	S	S6	210	15	10%	35%	O 20%; F 10%; G 10%; C 30%; B 10%; R 20%.	Perennial. Several waterfalls present. Fan present at low end of stream.
Mcgarrigle Creek	S	S5	368	13	80%	10%	O 15%; F 50%; G 10%; C 15%; B 10%.	Perennial. Severe erosion and stability issues along banks. Labelled S6 but has S5 widths.
Witchcraft Lake	L	L2	N/A	N/A	N/A	N/A	N/A	Located outside of Area 2. Contains stickleback. Heavy recreational use in area.

Recreation

Area 2 contains a series of official and non-official hiking and cycling trails. The GIS database for the Woodlot 020 contained trail data from 2009 and 2012 provided by the RDN and the Nanaimo Mountain Bike Club. These trails were walked in the field to confirm their location and their apparent use, and categorized as high or low priority. Viewpoints along trails in Area 2 were given a high priority status. The majority of trails are too steep for mountain bike use, but there are trails in the mid-lower slopes of Area 2 that are suitable for mountain biking. Some trails have fallen into disrepair due to limited use. The official trails within Area 2 receive heavy foot traffic due to its connection from Witchcraft Lake Park and Mount Benson Regional Park. These were identified as highest priority for protection.

Three Geocaches have been identified to be in or adjacent to Area 2. None of these are within the planned harvest area and since Geocachers generally follow existing trails they are included as trail-users.

The location of our planned harvest area is only likely to affect two non-official trails. One was categorized as low priority, but the other is heavily used and is high priority (as it connects to Westwood Lake's trails). There is no viable alternative but to harvest around this trail. Our strategy to deal with this situation is to collaborate with stakeholders such as the Nanaimo Mountain Bike Club to provide an alternative route for users of the existing trail. By moving the trail slightly to the north, the trail would be surrounded by a forested buffer. Since there are unstable soils in the area, it is unsuitable for harvest but would suffice for recreational trail use as long as safety hazards are identified and dealt with appropriately should they exist.

With the confirmation that there are only stickleback in Witchcraft Lake, there is no concern over recreational fishing at the lake.

First Nations

No evidence of previous First Nations use, such as bark stripping or culturally modified trees, was observed during the various walkthroughs of the block. Additionally, no monumental cedars were observed in the block. However, there are a few areas containing a moderate concentration of mature western redcedar, and the Snuneymuxw First Nation (SFN) will be given the opportunity to express an interest in these (whether for timber harvesting or bark stripping use) before harvesting is performed in such areas. Various areas of high salal concentration exist within the block, and several of these areas will be protected via the recreational corridor and old growth management reserves, and these areas will be available for use by the SFN on an ongoing basis. The SFN will also be given the opportunity to remove non-timber products (such as berries) in all areas scheduled for harvest, prior to the commencement of harvesting.

*mgt
recess,
not
inventory*

Visual Quality Objectives and Strategies

Area 2 falls within a Retention ^{level} Visual Quality Objectives (VQO) as identified on the WLP for Woodlot 020. Retention ^{level} VQO “consist[s] of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is (i) difficult to see, (ii) small in scale, and (iii) natural in appearance” as per the FPPR, (Section 1.1). The identified potential harvest area is located on the lower South-east portion of Area 2 adjacent to an existing cutblock, following a natural bench. This area contains low to moderate visual concerns.

Aggregated VR was identified as the preferred silviculture system to use for the harvest area; if laid out appropriately it should deal with potential visual issues in the higher elevation areas of the harvest area.

Group retention

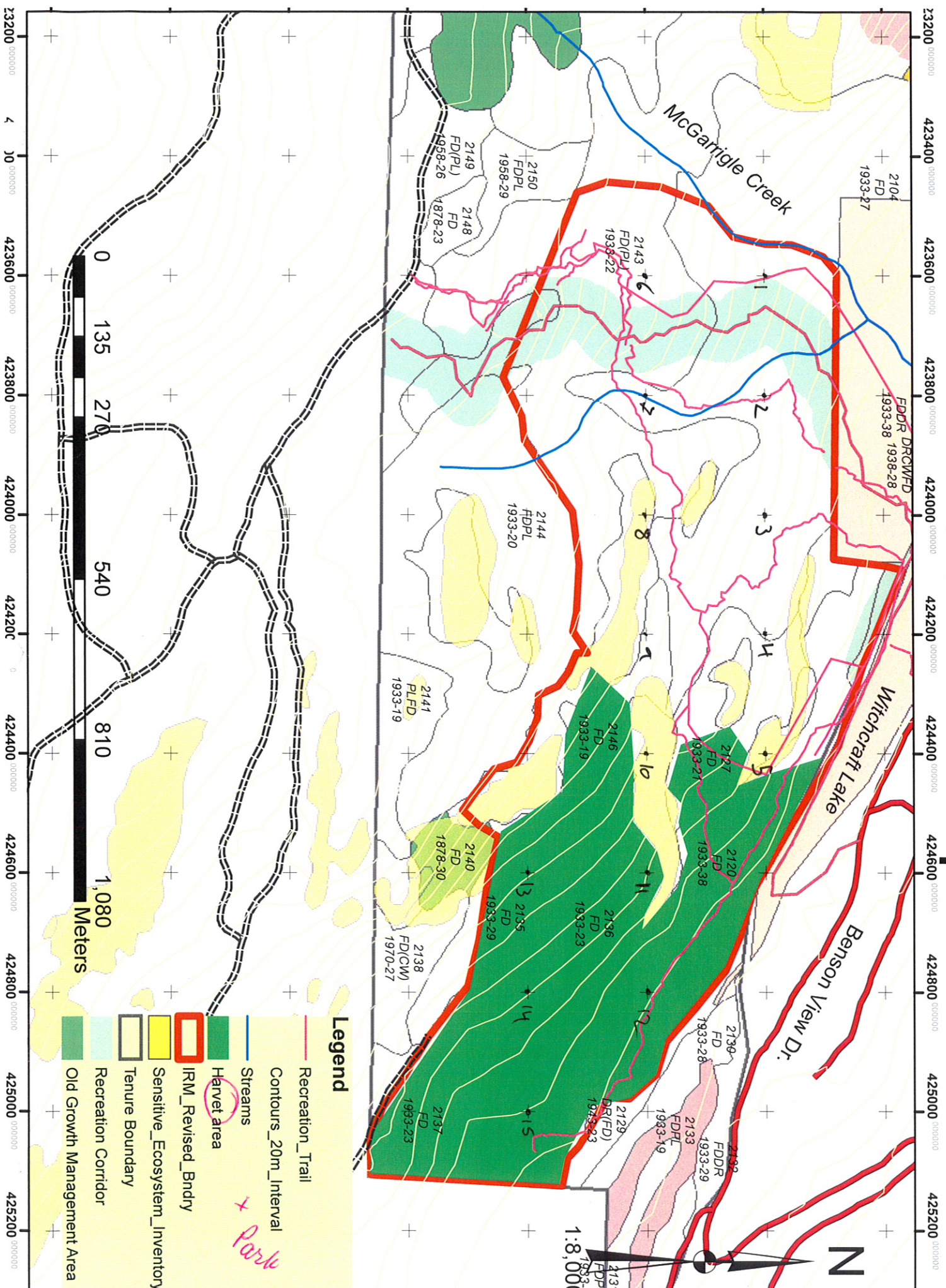
*terminology
VR = gen-approach*

The assessment conducted for visuals for Area 2 was done in two stages: in the office and in the field. Referring to the preliminary block boundary designed in ArcMap in February after the initial recce of the location, the block boundary was set into Google Earth as a semi-transparent polygon feature. By assessing the area for potential viewpoints, several locations were identified to conduct the field portion of the assessment. These areas were identified based on the significance of the potential impact on VQOs. Specific viewpoints were chosen as various representative views or broader areas. The primary viewpoints established were: Harewood/South Nanaimo, the Beacon, the Nanaimo Parkway Visitor Centre, the North Nanaimo bluffs, Westwood Lake Park, North Nanaimo Town Centre, Westwood Ridge, and Witchcraft Lake. From the ground view feature in Google Earth, Area 2 was assessed for features of low, moderate, and high concern. The locations were then visited in-person (with the exception of The Beacon and Westwood Ridge) to take picture evidence to back up the office assessment. ✓

Our strategies to deal with the VQOs are to leave a sizable buffer between Witchcraft Lake, the surrounding residences, and the harvest area. Potential and existing viewpoints for recreational users (typically found on rock bluffs) are being fully retained. Aggregated VR should minimize the impact of harvest on visual quality. Existing sparsely-treed bluffs may be used in conjunction with VR to achieve the Retention level VQOs.

** would be nice to see this in the report*

Forest Cover Map

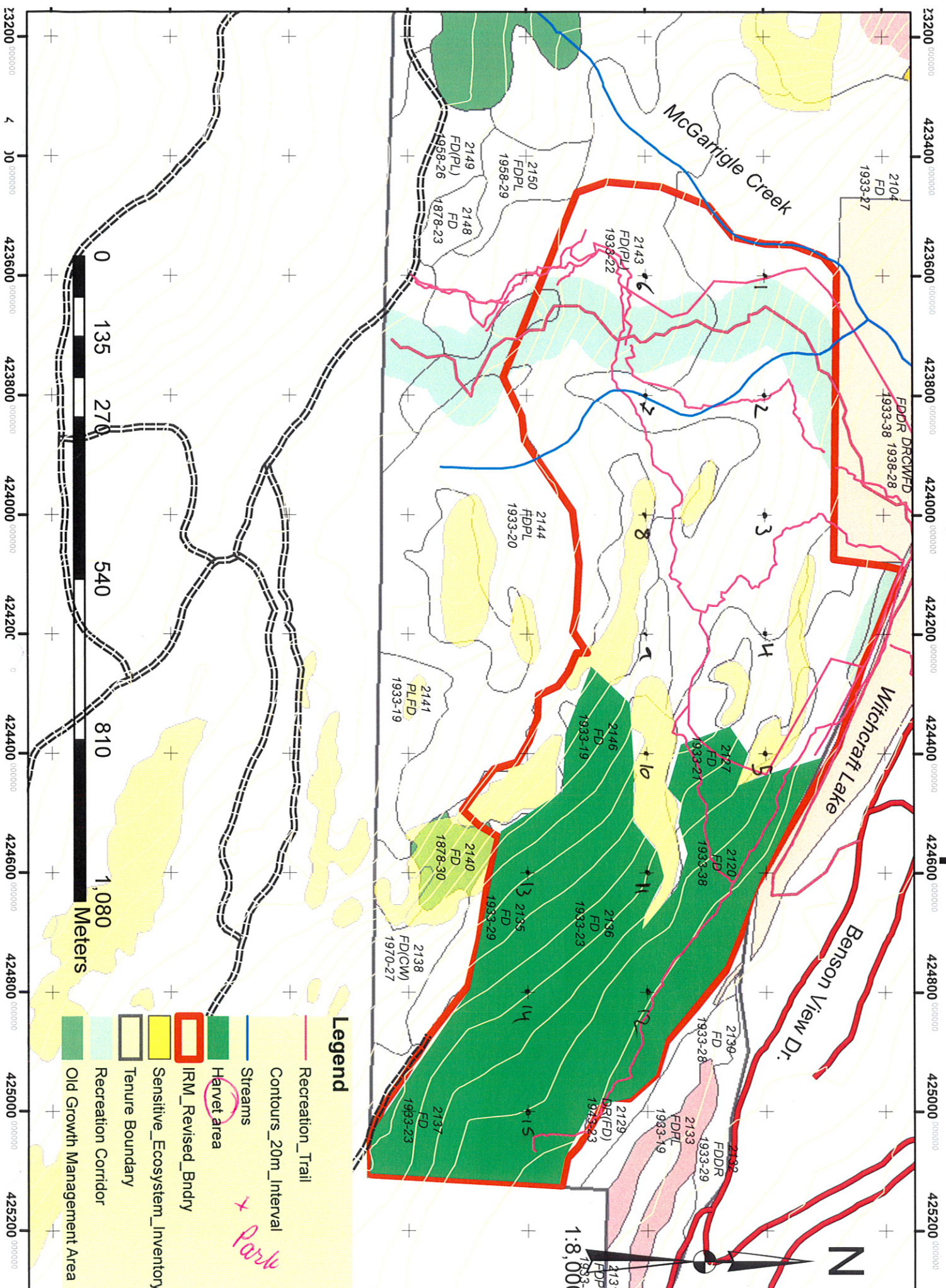


Legend

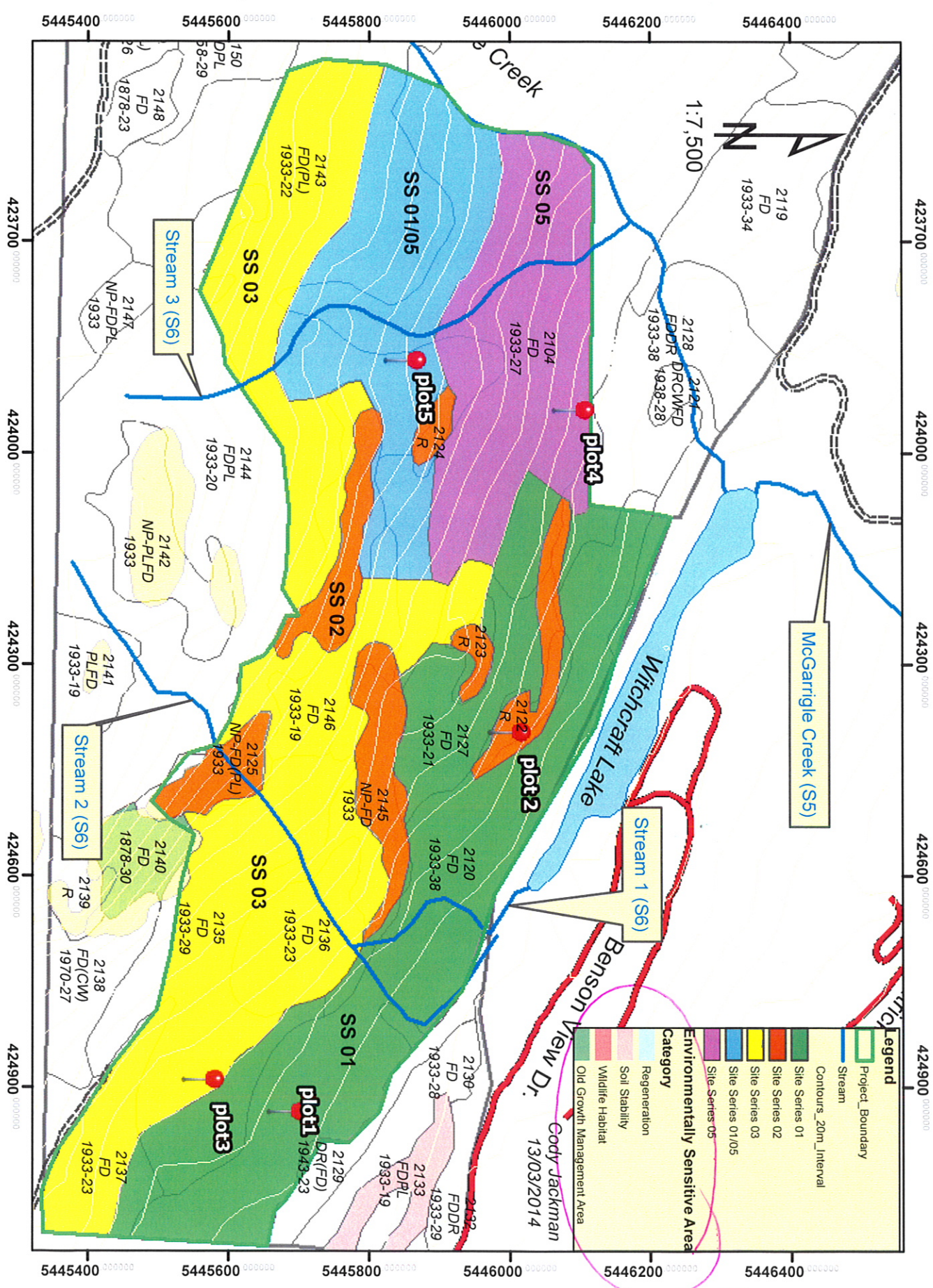
- Recreation_Trail
- Contours_20m_Interval
- Streams
- Harvet area
- IRM_Revised_Bndry
- Sensitive_Ecosystem_Inventory
- Recreation Corridor
- Old Growth Management Area

+ Park

1:8,000



Area 2 Ecosystem Map



Legend

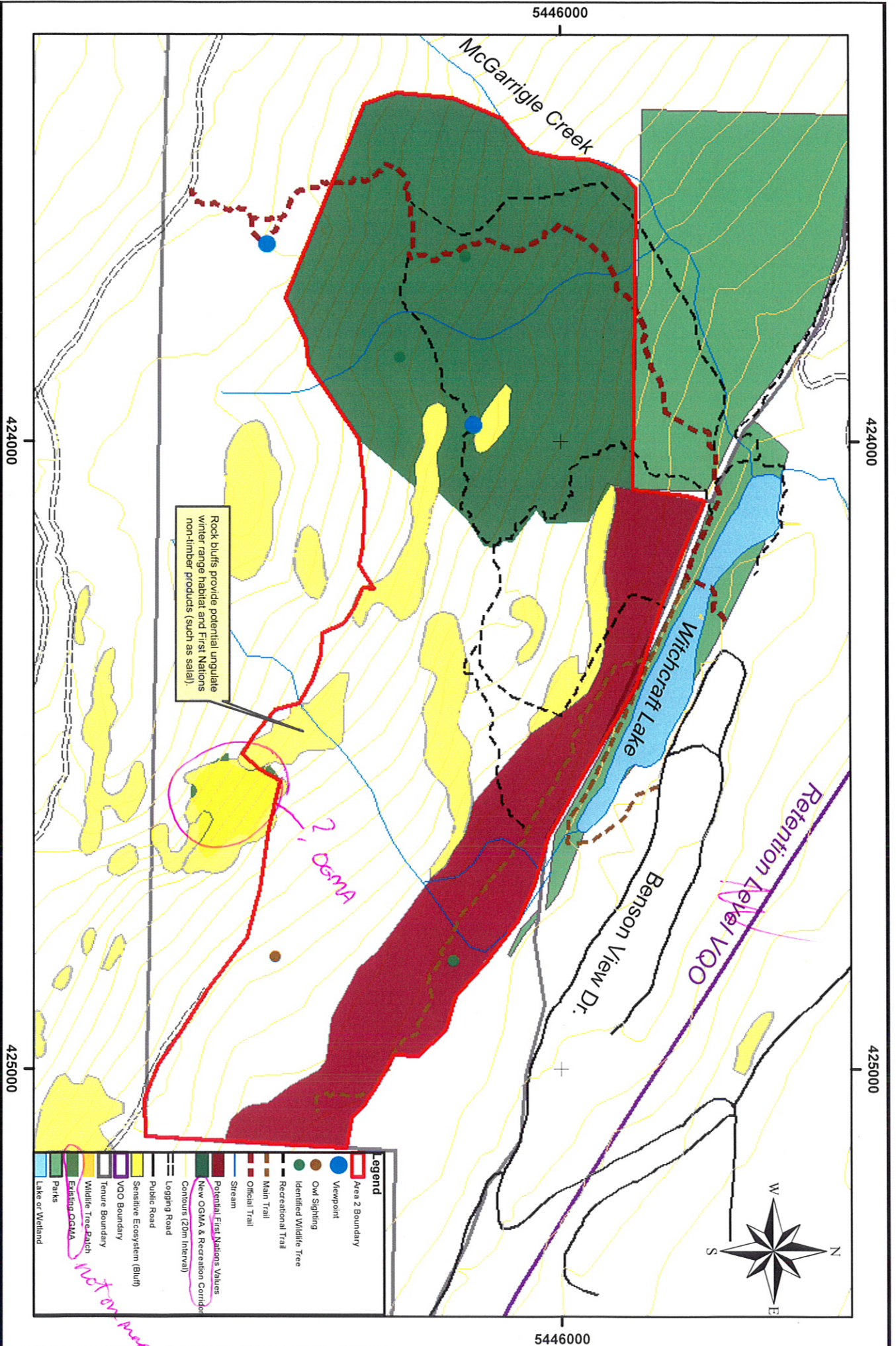
- Project_Boundary
- Stream
- Contours_20m_Interval
- Site Series 01
- Site Series 02
- Site Series 03
- Site Series 01/05
- Site Series 05

Environmentally Sensitive Area

- Regeneration
- Soil Stability
- Wildlife Habitat
- Old Growth Management Area

Not shown

Area 2: Non-Timber Resources



424000

425000

5446000

5446000

McGarrigle Creek

Witchcraft Lake

Benson View Dr.

Retention Level VGO

Rock bluffs provide potential ungulate winter range habitat and First Nations non-timber products (such as salix)

OGMA

- Legend**
- Area 2 Boundary
 - Viewpoint
 - Owl Sighting
 - Identified Wildlife Tree
 - Recreational Trail
 - Main Trail
 - Official Trail
 - Stream
 - Potential First Nations Values
 - New OGMA & Recreation Corridor Contours (20m Interval)
 - Logging Road
 - Public Road
 - Sensitive Ecosystem (Bluff)
 - VGO Boundary
 - Tenure Boundary
 - Wildlife Tree Patch
 - Existing OGMA
 - Parks
 - Lake or Wetland



Scale 1:8,000

N 1983 UTM Zone 10

Cartographer: Matthew Boeckmann
17 March, 2014

424000

425000

next on map?

FRST242 IRMP Inventory

Group: 2

Students: Matthew B, Will, Cody, Ken, Reid

CATEGORY	4	3	2	1
% Range:	100 - 85 (A+/A)	84 - 72 (A-/B)	71 - 55 (B-/C-)	< 55 (D/F)
Forest cover/volume Map, recce methods, suppl data, vol table	~All of the elements are covered well <i>No volume summary table, suppl-data, or calc-description</i>	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	4.0 3.8 3.6	3.4 3.2 3.0	2.8 2.6 2.4	2.2 2.0 1.8
Harvest units/roads Map, classes by system, equip, factors, non-harv areas, roads	~All of the elements are covered well <i>No map of roads</i>	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	4.0 3.8 3.6	3.4 3.2 3.0	2.8 2.6 2.4	2.2 2.0 1.8
Ecosystems Map, site series, sens ecos & soils descr	~All of the elements are covered well <i>Good map, few plots, weak on sens-site descr.</i>	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	4.0 3.8 3.6	3.4 3.2 3.0	2.8 2.6 2.4	2.2 2.0 1.8
Forest health Map, descr of current and potential issues	~All of the elements are covered well	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail <i>very brief</i>	Many of the elements are missing or not covered well
	2.0 1.9 1.8	1.7 1.6 1.5	1.4 1.3 1.2	1.1 1.0 0.9
Streams, lakes, wetlands Map, classn, descr, water users	~All of the elements are covered well <i>V. Good write-up, Excellent field notes on streams</i>	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	2.0 1.9 1.8	1.7 1.6 1.5	1.4 1.3 1.2	1.1 1.0 0.9
Wildlife features Map, R&B spp, snags, bear dens, OG vets	~All of the elements are covered well	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail <i>NO R+B description</i>	Many of the elements are missing or not covered well
	2.0 1.9 1.8	1.7 1.6 1.5	1.4 1.3 1.2	1.1 1.0 0.9
Recreation Map, trails, other features	~All of the elements are covered well <i>Good trail descriptions</i>	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	2.0 1.9 1.8	1.7 1.6 1.5	1.4 1.3 1.2	1.1 1.0 0.9
First Nations Map, FN use, cedar areas	~All of the elements are covered well	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	2.0 1.9 1.8	1.7 1.6 1.5	1.4 1.3 1.2	1.1 1.0 0.9
Visuals Map, VQOs described	~All of the elements are covered well	Most of the elements are covered well	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	2.0 1.9 1.8	1.7 1.6 1.5	1.4 1.3 1.2	1.1 1.0 0.9
Field Notes Original field notes, all aspects	~All of the elements are covered well <i>Eco/soil, stream describe, 21 snags</i>	Most of the elements are covered well <i>No date, names + BAF on cruise cards</i>	Some of the elements are missing or not covered in enough detail	Many of the elements are missing or not covered well
	2.0 1.9 1.8	1.7 1.6 1.5	1.4 1.3 1.2	1.1 1.0 0.9
Overall quality Maps and report	Information is very organized; quality presentation <i>Uneven quality of sections</i>	Mostly; some improvement needed	Could be improved significantly	Not adequate
	4.0 3.8 3.6	3.4 3.2 3.0	2.8 2.6 2.4	2.2 2.0 1.8
Points				

TOTAL Score 22.1 / 30

74% B