EW28 Final Report: Wild Edible and Medicinal Mushrooms

‘The Chanterelle Forest’?

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INTRODUCTION

Coastal British Columbia is recognized for its rich mushroom diversity. Fungi perform important ecological roles in forests. Wood and litter decomposers (saprophytes), mycorrhizal (tree-root symbionts), pathogenic and parasitic fungi interact with other organisms creating ecosystem stability and biological diversity. To date over 400 vascular plants, mosses, liverworts, lichens, and fungi have been identified from the study areas. There are an estimated 1200 species of fungi in the tenure areas.

Non-timber forest products are derived from botanical and mycological species that can be harvested for commercial, recreational or traditional use. These include wild edible, medicinal, and nutraceutical mushrooms. The management of botanical resources has received increased
attention in the Sunshine Coast Community Forest recently.

The extensive commercial harvest of wild edible mushrooms and resource conflicts have led to concern regarding the sustainability of mushroom diversity and abundance. This has heightened awareness amongst resources managers and the public of their importance. The impacts of timber harvesting on forest fungi has become the focus of political debate, particularly in one stand in East Wilson (EW28), often referred to as "The Chanterelle Forest".

The objective of this research is to examine and compare the diversity and abundance of several economically valuable mushrooms in EW28 with a similar block in the tenure, EW19. The results are discussed in this report.

Research has increased our understanding of ecologically sensitive fungi in coastal ecosystems. This information will help foresters to develop programs that sustain key mycological values in the SCCF tenure.

STUDY AREAS

The Sunshine Coast Community Forest tenures are located approximately 50 km north of Vancouver, British Columbia, the in the Pacific Ranges Drier Maritime Coastal Western Hemlock Biogeoclimatic Sub-zone (CWHdm). Elevation of the research sites ranges from 200 to 600 m above sea level. This zone has relatively dry, warm summers and moist, mild winters with little snowfall.

Douglas fir (*Pseudotsuga menziesii*), Western Hemlock (*Tsuga heterophylla*) and Western Red Cedar (*Thuja plicata*) dominate. Other prominent tree species include white pine and alder. Aside from scattered veterans, the dominant trees are between 90 and 150 years old. Timber volume estimates range from 700 to 1100 m3/ha. Major under-story species include salal, red huckleberry, twinflower, sword fern, and a variety of mosses liverworts and lichens.

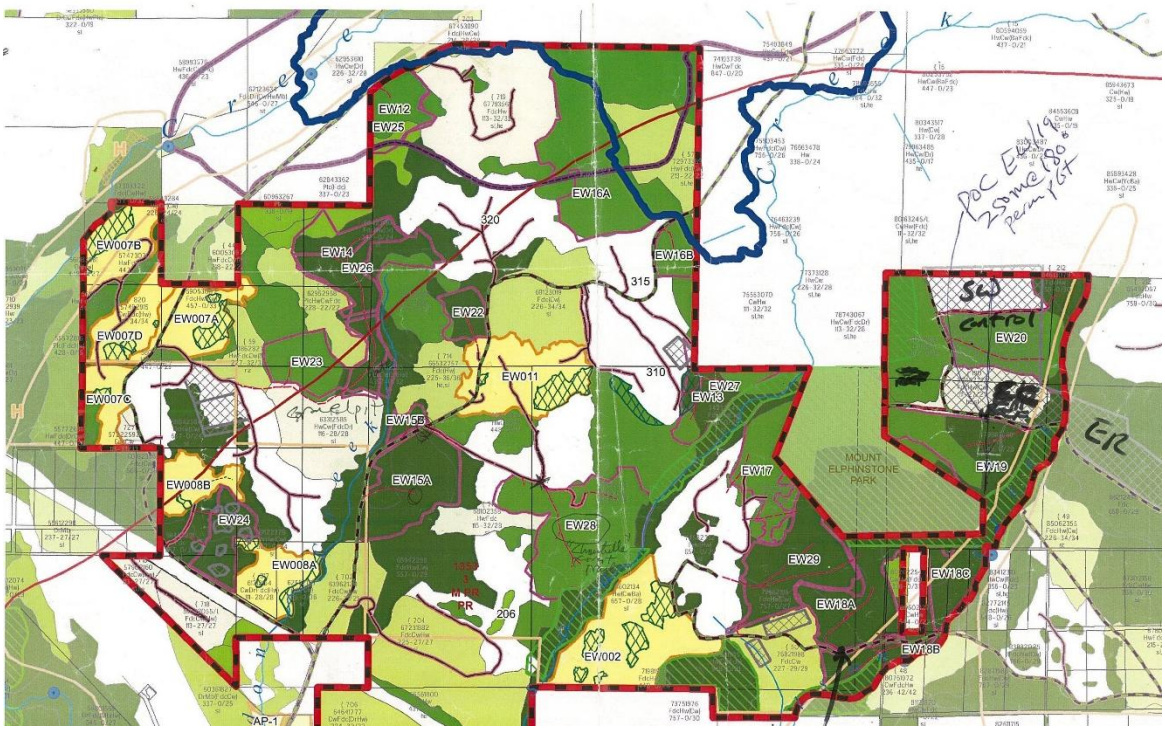

Figure 1. East Wilson area showing EW28 and EW19.

MUSHROOM SAMPLING METHODS

From preliminary research ten major species were selected for study in 2017. These covered a range of ecological roles (saprophytic, parasitic, and mycorrhizal) and include many well-known edible and medicinal mushrooms. Some of these, such as the pine mushroom (*Tricholoma magnivelare*) and chanterelles (*Cantharellus* spp.), represent potential indicator species and are of ecological and economic importance.

Appendix 1 shows the 10 mushrooms selected: Edibles--Pine mushrooms, chanterelles, boletes, morels and cauliflower mushroom. Medicinal and nutraceuticals—Artists conk, hemlock varnish cap, red belt, turkey-tail and split-gill.

Mushroom surveys were performed from July to December, 2017 to collect information on the selected species. Approximately a one-hectare area (1000m line x 10m swath) was examined in each site on successive days. Specimens were identified, counted and samples collected during reconnaissance surveys. Data was tabulated and compared on the types and abundance of the selected mushroom species encountered during surveys.

Fungi were identified using mushroom field guides, texts, literature and local knowledge. Specimens of select species were dried, labeled and stored for reference purposes.

RESULTS

Table 1 shows the types and numbers of selected mushrooms observed (to date) at each site.

Table 1. Mushroom species and numbers observed in EW28 and EW19

Latin Name	Common Name	EW28	EW19
Cantherellus formosus	Chanterelles	29	34
Tricholoma magnivelare	Pine Mushroom	8	11
Morchella esculenta	Morels	0	0
Boletus edulis	Boletes	1	1
Sparassis radicata	Cauliflower	1	2
Ganoderma applanatum	Artists Conk	15	12
Ganoderma tsugae	Hemlock Varnish Cap	0	1
Fomitopsis pinicola	Red Belt	85	56
Trametes versicolor	Turkey Tail	24	19
Schizophyllum commune	Split Gill	11	9

General Trends

Edible Mushrooms:

Chanterelles and allies began fruiting late October at both sites, after the rains began. Flushes continued into November and we can expect further fruiting well into late December until heavy frosts or snow occurs. To date chanterelles and pine mushrooms were slightly more prevalent in EW19. Pine mushrooms flushed in early to mid-November with modest, relatively short-lived production to date. Further flushes are expected, and will also last until the heavier frosts.

Few boletes or cauliflower mushrooms were observed at either site to date. These have also been found fruiting in the area well into December in previous years. Overall the numbers of wild edible mushrooms were similar for both blocks. Not surprisingly ‘wormy’ mushrooms due to insect larva infestations were less prevalent than in previous years--likely due to the hot, dry summer and fall, and rapid onset of wet, cool weather in late November.

Medicinal Mushrooms:

The artists conk, turkey-tail and split-gill were encountered in similar numbers at both sites. Hemlock varnish cap was found only in EW19. We can expect an increase in turkey-tail and split-gill as autumn progresses and possibly a few more varnish cap if the temperatures remain

above freezing. The pioneering split-gill fungus will fruit well into December, even after frosts, on decaying stumps, logs and branches.

The Red Belt (depicted on the title page) was observed in significantly higher numbers in EW28. Growing primarily on decaying, outcompeted, understory hemlock, it is one of the most prevalent shelf or bracket-fungi in BC forests and is ubiquitous throughout the SCPI tenure.

DISCUSSION

Autumn 2017 was warmer and drier than usual which impacted all forest mushrooms. This combined with an extremely dry summer may be responsible for reduced abundance of some mushroom species thus far this year. Mushrooms are generally ephemeral and sporadic in nature. Mycelium mats, mycorrhizae-associated mycelium, primordia development and eventual mushroom production depend much upon the moisture content of the substrate.

Generally, mushrooms fruited much later in 2017 than previous years. Chanterelles for example are usually encountered late-July to August in the area; pine mushrooms mid-September. However, this year the first flush of chanterelles and pine mushrooms occurred late October.

Reconnaissance surveys cover more ground and are similar to mushroom pickers meandering through the stand in search of 'patches'. Inherent problems for surveyors include the fact that forest fungi can be sporadic and ephemeral in nature and other mushroom harvesters picking the crop prior to surveyors. With this potential sampling error in mind, data for edibles must be interpreted carefully and these and other factors considered prior to making broad conclusions.

The 10 mushrooms selected for the present study represent a wide range of ecotypes.
They are all economically valuable and sensitive to disturbances including over-harvesting, soil disruption and compaction by pickers and hikers (all more prevalent in EW28 than EW19).

Timber harvesting results in successional changes for all types of forest fungi. The greater the tree cover post-timber harvest, the higher the component of mycorrhizal fungi prevail. Saprophytic and parasitic tree-fungi often fare well post-logging. Roots, stumps, coarse woody debris and humus support a wide variety of species such as the medicinal mushrooms *Ganoderma*, *Trametes* and *Schizophyllum*.

Fungi with known medicinal properties are the most valuable non-timber resource. These saprobes are easily cultured and grown and result in light-weight, high value extract products. Logged areas can support a greater number of perennial, wood-decay species. For example, the split-gill is more prevalent in logged areas and only found in isolated, scattered patches on coarse woody debris and stumps in unlogged areas.

There are over 1000 species of forest fungi in the SCCF tenures. Nearly 400 types have been identified in the Roberts Creek portion alone. The impact of timber-harvesting on 120 of these was examined in previous research by the author. Detailed inventories are beyond the scope of the present research, prior to EW28 timber harvesting.

Question: Is EW28 "THE Chanterelle Forest" as it is often referred to locally? The answer is no. EW28 is "a forest that produces chanterelles"; as does EW19, and many other areas throughout the SCCF tenure. Nor is EW28 'The Pine Mushroom Forest', nor in my humble opinion is it 'The Elk Forest'. No specific block in the SCCF can be designated as 'The Mushroom Forest'.

Over the past 30 years the author has examined hundreds of sites throughout the PNW for mycological values. In my opinion EW28 is a rather a 'normal' mushrooming site. In fact, the relatively high cedar component may reduce the diversity and abundance of ectomycorrhizal fungi in portions of the block. Not to mention disturbances incurred from high human activities onsite. EW28 is scheduled for logging and there appears to be no particular mycological reason to preserve it over EW19 or any other similar age-class forest in this portion of the tenure.

In my humble view, EW19 is likely more 'mycologically' significant, more proximal to the proposed Elphinstone park expansion, closer to the urban interface (as the crow flies) and less trampled by human activity, making it a better candidate than EW28 for 'preservation'. EW19 is located adjacent to the existing research forest (Roberts Creek Study Forest) and could easily be added to the existing study area as a cultivation forest where mushrooms, plants and other economically and culturally valuable non-timber species are grown and enhanced in situ.

Resilience of wild mushroom populations after disturbance needs more research, especially in areas identified as high priority for mushroom values. A number of models have been developed to predict long-term mushroom productivity in managed stands. Many parameters and assumptions are involved and it will be several decades before some of the longer-term hypotheses can be tested

Clearly a priority is to examine areas of increased mycological diversity and develop ecological and economic models to predict changes for sensitive mushroom species. Forest cultivation and enhancement of valuable fungi requires R & D.

This study focuses on the value of important edible and medicinal mushrooms from a range of ecological roles. The report summarizes only baseline data and results to date from mushroom surveys. In order to make meaningful comparisons between the two sites numerous factors have to be considered to determine longer term trends. Specimens of the selected species have been dried and stored for reference purposes.

Further potential research couldinclude the establishment of an Agroforestry Cultivation Forest for edible and medicinal plants and fungi where valuable types are enhanced or grown in situ. Use approximately 50 hectares of the Roberts Creek Study Forest and surrounds, including EW19, for agroforestry projects; primarily plant and mushroom cultivation and product research and development. Promote and initiate an education/research facility on the Sunshine Coast for the development of products made from economically viable non-timber species.

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Appendix 1. Wild Edible and Medicinal Mushrooms Selected for Surveys

Ten of the Major Indigenous Wild Edible and Medicinal Mushrooms for Agroforestry Research and Development

Table 1: Wild edible mushrooms in the Sunshine Coast Community Forest

Common name	Scientific name	Photograph
1. PINE MUSHROOM	Tricholoma magnivelare	
2. CHANTERELLES	Cantherellus cibarius and allies	
3. MORELS	Morchella esculenta and M.elata	
4. BOLETES	Boletus edulis and allies	
5. CAULIFLOWER	Sparassis radicata	

Ten of the Major Indigenous Wild Edible and Medicinal Mushrooms for Agroforestry Research and Development

Table 2: Medicinal Mushrooms in the Sunshine Coast Community Forest

Common name	Scientific name	Photograph
6. ARTISTS CONK	Ganoderma applanatum	
7. HEMLOCK VARNISH CAP	Ganoderma tsugae	
8. VARNISH SHELF	Ganoderma oregonense	
9. TURKEY TAIL	Trametes (Coriolus) versicolor	
10. SPLIT GILL	Schizophyllum commune.	

NOTE: There are several toxic mushrooms such as several Amanitas and False morels than exist in the SCPI tenures. These are sometimes mistaken for similar looking edible mushrooms leading to several mushroom poisonings annually in the province. Caution: If in doubt about the edibility take specimens to an mycologist or to a reputable mushroom buying station.