

Fairyslipper Forest Nature Reserve Management Plan Thetis Island



Prepared for



ISLANDS TRUST CONSERVANCY

Prepared by

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Approved by

the Islands Trust Conservancy Board, May 21, 2019

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Executive Summary

Islands Trust Conservancy acknowledges and respects that Thetis Island is within the traditional territory of many Coast Salish peoples, whose historical relationship to the land, culture, and spirit of this place continues to this day. Islands Trust Conservancy is committed to honoring the rich history of Indigenous stewardship in the lands and waters of the Islands Trust Area and to building mutually respectful relationships between Indigenous and non-Indigenous partners in conservation. Therefore, this Management Plan for Fairyslipper Forest Nature Reserve is a living document that will evolve as opportunities for knowledge sharing arise and understanding grows.

Fairyslipper Forest Nature Reserve protects 16.58 hectares (40.96 acres) of land on southern Thetis Island. It was acquired in 2018 by the Islands Trust Conservancy (ITC), the Thetis Island Nature Conservancy (ThINC), and the Cowichan Community Land Trust (CCLT) after a three-year fundraising campaign.

Fairyslipper Forest is currently the only publicly accessible protected area on Thetis Island. It protects maturing Coastal Douglas-fir forests with many older veteran trees. There are two seasonal creeks in the northwestern part of the reserve. Eight rare species (one bat, four birds, one frog, one plant, and one lichen species) have been observed in or near the reserve. The reserve is named after the fairy-slipper orchids (*Calypso bulbosa*) that bloom throughout the reserve in the spring.

There is a public hiking trail through the eastern portion of the reserve, which currently passes through adjacent privately-managed land. A key management action is to provide public access to the reserve directly from North Cove Road by constructing a low-impact hiking trail that links up with the existing trail. Any unlicensed trails on adjacent privately-managed lots that connect with the reserve will be closed at the boundary, with boundary signage and trail decommissioning to limit ongoing use. Once the trail route has been determined, signage should be installed to identify trailheads and outline permitted uses.

The number of non-native invasive woody plants in the reserve is currently low and removal efforts should focus on Scotch broom and English holly since they are in early stages of invasion. Establishment of a volunteer warden program would help monitor the property and provide early detection of management concerns.

Tables and Lists

Table of Contents

Executive Summary	2
Tables and Lists.....	3
Acknowledgements	6
1.0 Introduction.....	7
1.1 Islands Trust Conservancy	7
1.2 Purpose of Islands Trust Conservancy Management Plans.....	8
1.3 Scope of Islands Trust Conservancy Management Plans	8
1.4 Protected Area Purpose	9
1.5 Protected Area Objectives.....	9
2.0 Property Information.....	9
2.1 Location	9
2.2 Legal description.....	10
2.3 Legal Access	10
2.4 Landscape Context	10
2.5 Site History.....	12
2.6 Anthropogenic Features	12
2.7 Undersurface Rights	13
2.8 Notations, Charges, Liens and Interests	13
2.9 Local Planning Designations	13
2.10 Existing Public, First Nations and Other Use	14
3.0 Inventory by Ecological Community.....	16
3.1 Ecological Significance	16
3.2 Climate.....	17
3.3 Geology and Physiology.....	18
3.4 Hydrology.....	18
3.5 Soils.....	18
3.6 Ecological Classifications	19
3.7 Ecological Communities and Site Series	19
3.7.1 Ecological Community 1	19
3.7.2 Ecological Community 2	23
3.7.3 Ecological Community 3	26
3.8 Wildlife Species.....	29
3.9 Expected Change Over Time.....	30
4.0 Threats.....	30
4.1 Expected Change to Threats Over Time.....	32
5.0 Community Engagement	32
5.1 Adjacent Landholders.....	32
5.2 First Nations.....	32
5.3 Conservation Partners and Community Members.....	33
5.4 Engagement Results	33
6.0 Management Recommendations.....	33

6.1 Management Roles.....	34
6.2 Permitted and Prohibited Uses	34
6.3 Proposed Monitoring Program.....	34
6.4 Public Access.....	35
6.5 Signage.....	35
6.6 Trail Use, Maintenance and Development.....	35
6.7 Protection Initiatives for Sensitive Ecosystems and Species and Ecosystems at Risk ...	36
6.8 Ecological Restoration Options.....	36
6.9 Scientific Research/Education Opportunities.....	36
6.10 Exotic and Invasive Species Management.....	37
6.11 Wildfire Risk Management	37
6.12 Climate Change Impacts and Management	37
7.0 Action Items.....	37
7.1 Immediate Actions (1-2 years)	38
7.2 Short term Actions (3-5 years)	38
7.3 Ongoing or Annual Action Items	38
8.0 Conclusion	39
9.0 References	40
10.0 Appendices	43

List of Figures

Figure 1. Location of Fairyslipper Forest Nature Reserve and other protected areas, Thetis Island.	11
Figure 2. Map showing rare species, vegetation types, wildlife trees, trail and other features	15
Figure 3. Average temperature and precipitation at Nanaimo A (nearest weather station to Thetis Island).	18

List of Tables

Table 1. The primary author and other contributors to the management plan, and their contributions, affiliations, and professional qualifications.....	6
Table 2. Anthropogenic features in Fairyslipper Forest Nature Reserve	13
Table 3. Species at Risk found in Fairyslipper Forest Nature Reserve (ranks from Province of British Columbia 2018).....	16
Table 4. Ecological communities found in Fairyslipper Forest Nature Reserve.....	17
Table 5. Summary description of Ecological Community 1.....	21
Table 6. Species associated with Ecological Community 1.	22
Table 7. Summary description of Ecological Community 2.....	24
Table 8. Species associated with ecological community 2.....	25
Table 9. Summary description of Ecological Community 3.....	27
Table 10. Species associated with ecological community 3.....	28
Table 11. Wildlife species observed in Fairyslipper Forest Nature Reserve	30
Table 12. Summary of Threats to the Nature Reserve.....	30

List of Photos

All photos by Carrina Maslovat

Fairyflipper Forest Nature Reserve Management Plan 2019

Photo 1. One of many fairy-slipper orchids in Fairyflipper Forest Nature Reserve..... 1
Photo 2. Ann Eriksson (ThINC) looks at the brass monument in the northwest corner of the
reserve..... 9
Photo 3. Rotting abandoned lumber to the eastern boundary of the Nature Reserve..... 13
Photo 4. Foot trail in the eastern part of the Nature Reserve. 14
Photo 5. Blue-listed Ozette Coralroot in the Nature Reserve..... 19
Photo 6. Ecological Community 1 showing representative dense understory vegetation..... 20
Photo 7. Vegetation Type 2 showing large western redcedar tree and mixed understorey
vegetation in wetter portions of Ecological Community 2. 23
Photo 8. Ecological Community 3, young forest. 26
Photo 9. Raptor bones, possibly from a Bald Eagle..... 29
Photo 10. Veteran Douglas-fir tree in the Nature Reserve with diameter at breast height of
approximately 2 m. 29
Photo 11. Erosion caused by seasonal creek flowing along old road. 32
Photo 12. Existing trail in the Nature Reserve. 35
Photo 13. Non-native English holly seedlings in the Nature Reserve. 37

List of Appendixes

Appendix A. Plant species recorded in Fairyflipper Forest Nature Reserve April 15, 2015 43
Appendix B. Avian Species Observed in Fairyflipper Forest Nature Reserve 46
Appendix C. Photographic Documentation..... 47
Appendix D. Acoustic Survey of Bat Species Diversity: Hunter’s Pond, Thetis Island, August
2015..... 49
Appendix E. Letter to Residents of Thetis Island..... 52
Appendix F. Management Planning Questionnaire for Fairyflipper Forest Nature Reserve... 54
Appendix G. Letter to First Nations..... 56
Appendix H. Photopoint Photographs of Reserve Boundaries 59

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Table 1. The primary author and other contributors to the management plan, and their contributions, affiliations, and professional qualifications.

Name	Position/Affiliation	Professional Accreditation or subject expertise	Contribution
Carrina Maslovat	Biologist, Consultant	R.P. Bio.	Author, rare plant inventory 2015, 2018
Nuala Murphy	Ecosystem Protection Specialist, Islands Trust Conservancy		Review of document, public consultation
Jemma Green	Property Management Specialist, Islands Trust Conservancy		Review of document
Ann Eriksson	Thetis Island Nature Conservancy (ThINC)	Biologist	On site guidance and expertise
Ryan Batten	Biologist, Beacon Consulting	Biologist	Inventory of lichens, mosses and rare plants, 2015
James Clowater	Consultant	M.Sc. Biologist	Inventory of avian species, 2015

1.0 Introduction

Thetis Island is situated within the traditional territory of the Coast Salish peoples, who share a rich history of stewardship in the lands and waters of the Islands Trust Area that inspires the work of Islands Trust Conservancy and its partners. Fairyslipper Forest Nature Reserve, located on lower Burchell Hill, southern Thetis Island, was protected in 2018 by the Islands Trust Conservancy (ITC), the Thetis Island Nature Conservancy (ThINC), and the Cowichan Community Land Trust (CCLT) after a three-year fundraising campaign that raised over half the purchase amount from generous resident donors and other individual supporters. The remaining half of the purchase price was raised through grant contributions and funding from the CCLT (Islands Trust Conservancy 2018b). The property is held by Islands Trust Conservancy and the ITC is currently negotiating a covenant with ThINC and CCLT. ITC will co-manage the reserve with these partners, the Thetis Island community, and First Nations.

Fairyslipper Forest is currently the only publicly accessible protected area on Thetis Island. It protects maturing Coastal Douglas-fir forests and there are significant watershed values in the reserve. The reserve is named after the fairy-slipper orchids (*Calypso bulbosa*) that bloom throughout the reserve in the spring. There is a pre-existing public hiking trail through the eastern part of the reserve that will be incorporated into a new trail loop within the reserve.

1.1 Islands Trust Conservancy

Since time immemorial, the lands and waters between Vancouver Island and mainland British Columbia have been home to the Coast Salish people, whose ecological, cultural, and spiritual connections to this place continue to this day. In 1974, the Province of British Columbia recognized this region as a special place within the province where the unique beauty, rural character and diverse ecosystems should be protected for future generations. Through the Islands Trust Act, the province established the Islands Trust, a local government, with the following mandate (known as the Object of the Islands Trust):

To preserve and protect the trust area and its unique amenities and environment for the benefit of the residents of the trust area and of British Columbia generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the government of British Columbia. (Islands Trust 2018a)¹

In 1990, through the enactment of a section of Islands Trust Act, the Islands Trust Conservancy (originally called the Islands Trust Fund) was established as a conservation land trust to assist in carrying out the “preserve and protect” mandate. Part 6 of the Islands Trust Act establishes the corporate status, responsibilities, and governance structure of the Islands Trust Conservancy. The Islands Trust Conservancy is one of fifteen corporate entities charged to uphold the Object of the Islands Trust and, since 1990, has protected 1,292 hectares (3,191 acres) of land as nature reserves and conservation covenants.

¹ As well, on March 14, 2019 the Islands Trust Council passed unanimously a Reconciliation Declaration to acknowledge First Nations (Islands Trust 2019)

The vision of the Islands Trust Conservancy is that the islands and waters of the Strait of Georgia and Howe Sound/Atl'ka7tem will be a vibrant tapestry of culture and ecology where humans live and work in harmony with the natural world. This special place will have a network of protected areas that preserve in perpetuity the native species and natural systems of the islands. Engaged residents and conservation partners will work together to protect large natural areas and key wildlife habitat. Viable ecosystems will flourish alongside healthy island communities.

The mission of the Islands Trust Conservancy is to protect special places by encouraging, undertaking and assisting in voluntary conservation initiatives within the Islands Trust Area. Islands Trust Conservancy nature reserves are managed to maintain, preserve and protect the natural features and values of ecosystems. This level of protection is similar to the International Union for Conservation of Nature (IUCN) protected area Category 1B: Wilderness area: "a large area of unmodified or slightly modified land and/or sea; retaining its natural character and influence, without permanent or significant habitation, which is protected and managed in order to preserve its natural condition" (Lockwood 2006).

1.2 Purpose of Islands Trust Conservancy Management Plans

ITC management plans provide background information and set out the direction of property management as follows:

- Provide general and descriptive information on the property, including location, history, and land use.
- Set out the conservation goals and objectives for the property.
- Identify the property's ecological and/or cultural values and features.
- Describe the management issues associated with the property.
- Provide short, medium and long-term management recommendations (action items or tasks) on issues such as: Species at Risk protection; ecological restoration; public access; educational and research opportunities; invasive species management; and signage needs.
- Preserve and protect cultural, spiritual, and sacred locations.

Once the management plan process is complete, the ITC will work to carry out the management actions or strategies identified in the plan, as resources allow. Following general practice and as outlined in the draft conservation covenant and statutory right of way, the ITC will revise the Management Plan every ten years.

1.3 Scope of Islands Trust Conservancy Management Plans

Consistent with the Islands Trust Reconciliation Declaration (Islands Trust 2019), ITC recognizes that its nature reserves may be places of great cultural and spiritual significance to First Nations. Cooperative management of these protected places will provide opportunities to establish and maintain mutually respectful relationships between the Islands Trust Conservancy and First Nations. Relationship-building, knowledge-sharing, healing, and establishment of trust are long-term processes that do not necessarily conform to the timeline required for many management activities (e.g. protecting species at risk, maintaining trails and signage, controlling invasive species, etc.); therefore, Islands Trust

Conservancy is committed to developing a parallel *Management Plan for Areas of Cultural Heritage and Sacred Significance* with a flexible timeline. This parallel Management Plan sets out guiding principles for cooperative collaboration between ITC and those First Nations with historical and cultural interests in the area defined by one or more nature reserves.

Moreover, the Management Plan defines the common vision, objectives, policies, and best management practices for the nature reserve(s) to ensure that its natural values and cultural and sacred heritage are maintained for future generations.

1.4 Protected Area Purpose

The purpose of Fairyslipper Forest Nature Reserve is to protect, in perpetuity, the upland forest and seasonal creeks for the benefit of the flora and fauna of the reserve, and to allow for low impact recreation and nature appreciation opportunities for visitors to the reserve.

1.5 Protected Area Objectives

The objectives for the Fairyslipper Forest Nature Reserve are:

1. Preserve the forested areas as an undisturbed natural area and wildlife sanctuary;
2. Protect the distinct ecological communities and the species at risk that depend on them;
3. Protect and, where necessary and feasible, restore the plant and animal communities and ecological processes at the site;
4. Provide low impact public access in areas where such uses are compatible with protection of ecological and archeological values;
5. Support and enhance continued use of areas of sacred and cultural significance by First Nations where such uses are compatible with protection of ecological values;
6. Support ongoing inventory, mapping and monitoring to guide management provided it does not interfere with species at risk protection; and
7. Allow the natural ecological processes and functions to proceed unimpeded without human intervention, except in the case of exceptional situations where remediation is considered imperative.

2.0 Property Information

The Fairyslipper Forest Nature Reserve is 16.58 hectares (40.96 acres) in size. The property was surveyed in October 2017 by Edwin Wilson, Duncan, BC.

2.1 Location

From the Thetis Island ferry dock travel 66 m northwest to Pilkey Point Road. Travel north on Pilkey Point Road for 300 m as it veers northeast, then turn left (north) on North Cove Road. Travel 400 m north on North Cove Road then veer left, staying on



Photo 2. Ann Eriksson (ThINC) looks at the brass monument in the northwest corner of the reserve.

the road as it curves west and then north. Fairyslipper Forest Nature Reserve is approximately 800 m along North Cove Road on the east side of the road.

2.2 Legal description

The legal description of the property is: Lot A District Lots 6 and 10 Township Thetis, Cowichan District, Plan EPP76866 (PID: 030-332-184).

2.3 Legal Access

The property is accessed via North Cove Road.

2.4 Landscape Context

Fairyslipper Forest is the second-largest of six protected areas on Thetis Island, which is itself recognized by ITC as being of Very High conservation priority within the Islands Trust Area based on factors such as the need for sensitive ecosystem protection, level of unprotected land, and disturbance threat (ITC 2018a). Fairyslipper Forest is also the only publicly accessible protected area on Thetis Island. Other protected areas on the island are located within approximately 1-1.5 km of the reserve, to the northeast (Figure 1).

Fairyslipper Forest is surrounded by privately-managed lots that range in size from 1.0 hectares (2.5 acres) to 37.8 hectares (93.4 acres). The adjacent privately-managed lots to the south and southwest of the reserve are smaller with single large parcels on each of the north, west and east sides of the reserve. The southwestern corner of the property lies along North Cove Road (Figure 1). The adjacent lots east of North Cove Road are undeveloped next to the reserve.



Figure 1. Location of Fairyslipper Forest Nature Reserve and other protected areas, Thetis Island.

2.5 Site History²

Thetis Island is within the traditional territory of several Coast Salish First Nations who have called this place home since time immemorial. The Coast Salish peoples maintained a vital, dynamic, and sustainable connection to their territory and developed rich cultural, spiritual, and traditional ecological knowledge. However, cultural heritage and sacred sites of Thetis Island and the greater Islands Trust Area were severely impacted by European settlement. Past archeological activities, vandalism, and land use have disturbed sites of cultural and spiritual importance. Nevertheless, the land and the greater territory remains an embodiment of the stories, oral history, and culture of these First Nations.

Europeans first settled on Thetis Island in 1873 and the early settlers built the roads and homesteads that delineate the island today (Islands Trust 2011). The land on which the Nature Reserve now sits was formerly part of the Burchell Farm and was later sold to become part of Overbury farm in approximately 1910 (Kasting pers. comm. 2018). The site was first logged over 100 years ago. It was selectively logged in the 1960s (Kasting pers. comm. 2019), when many of the larger trees were left standing. There are remnants of the old logging skid road on the property which have regenerated to forest. Fire scars on the veteran Douglas-firs indicate that the last wildfire occurred approximately 150 years ago (Kasting pers. comm. 2019). There are no mapped historical fires in the reserve, although small fires were recorded elsewhere on southern Thetis Island in 1950, 1955 and 1966 (iMap BC 2019).

2.6 Anthropogenic Features

There are no buildings or structures in the reserve and no known archeological sites. One of the old skid roads is now a trail, which is located in the eastern part of the property close to the property line. The trail is currently accessed via the privately-managed properties to the north and east of the reserve (Figure 2). A new trail will be developed to connect this trail to North Cove Road as the primary access to the reserve, though one or both pre-existing trails on the adjacent properties may be licensed to allow continued use.

There are other old skid roads on the property and many of them have become revegetated with trees and shrubs, making them difficult to map. A seasonal creek now flows along an old road in the northwest part of the property: it is unclear if the creek has been diverted and now flows over the road or if the road was built over the creek.

There is a rotting pile of lumber along the eastern property line. Details are provided in the table below.

² The Islands Trust Conservancy recognizes that the language commonly used to refer to land may be disrespectful to First Nations. For example, notions of 'private' and 'Crown' land do not appropriately recognize aboriginal title. The words "provincially managed land" or "federally managed land" will be used in place of "Crown." "Privately managed" will be used in place of "private" and "land holder" instead of "land owner."



Photo 3. Rotting abandoned lumber to the eastern boundary of the Nature Reserve.

Table 2. Anthropogenic features in Fairyslipper Forest Nature Reserve

Anthropogenic Feature	Description	Condition	Photopoint Location
Trail	Walking trail in the eastern portion of the property, which was once a skid road.	30 cm average cleared width.	P4, P14, Figure 2
Old skid road	Old road has become a seasonal creek.	Some trees and shrubs have established on the old road.	P6, Figure 2
Lumber	Abandoned pile of decomposing lumber.	Pile is moss-covered and decomposing.	P3, Figure 2

An archeological assessment, completed in partnership with First Nations knowledge holders, would be required to identify archeological sites on the property.

2.7 Undersurface Rights

There is no mention of undersurface rights on the state of title certificate.

2.8 Notations, Charges, Liens and Interests

There is a Right of Way in favour of the British Columbia Hydro and Power Authority (Registration Number 246383G). This Right of Way is not currently used.

A Conservation Covenant and associated Statutory Right of Way have not yet been registered on the property.

2.9 Local Planning Designations

The property is zoned R2 (Rural) (Islands Trust 2017). The eastern part of the property has been identified as a Water Resource Area (W) (Islands Trust 2016). There are no Development Permit Areas on Thetis Island.

2.10 Existing Public, First Nations and Other Use

Fairyslipper Forest Nature Reserve falls within the territory of several First Nations, including the core territory of the Penelakut Tribe, and as such has been a site of cultural activity for thousands of years. There is knowledge and oral history relating to this site that may or may not be shared outside of the membership of a First Nation. As a first step toward strengthening cultural connections to the land that were negatively impacted by European settlement, ITC is working with the Penelakut Tribe to draft a Management Plan for Areas of Cultural Heritage and Sacred Significance that will support and enhance the continued use of the site by the Penelakut community.

The current access trail to the reserve from North Cove Road trespasses over one adjacent privately-managed property to the south and east (Figure 2). To remedy this, there are plans to install a low-impact hiking trail from North Cove Road which will connect with the existing trail to provide an authorized public access point to the reserve. Signs will be installed at the trailhead after completion of the connector trail and parking will be limited to a pullout at the side of North Cove Road. If trails on adjacent properties become licensed, their connection to the authorized Fairyslipper Forest Nature Reserve trail may remain open.



Photo 4. Foot trail in the eastern part of the Nature Reserve.

There is currently no other infrastructure within the reserve.

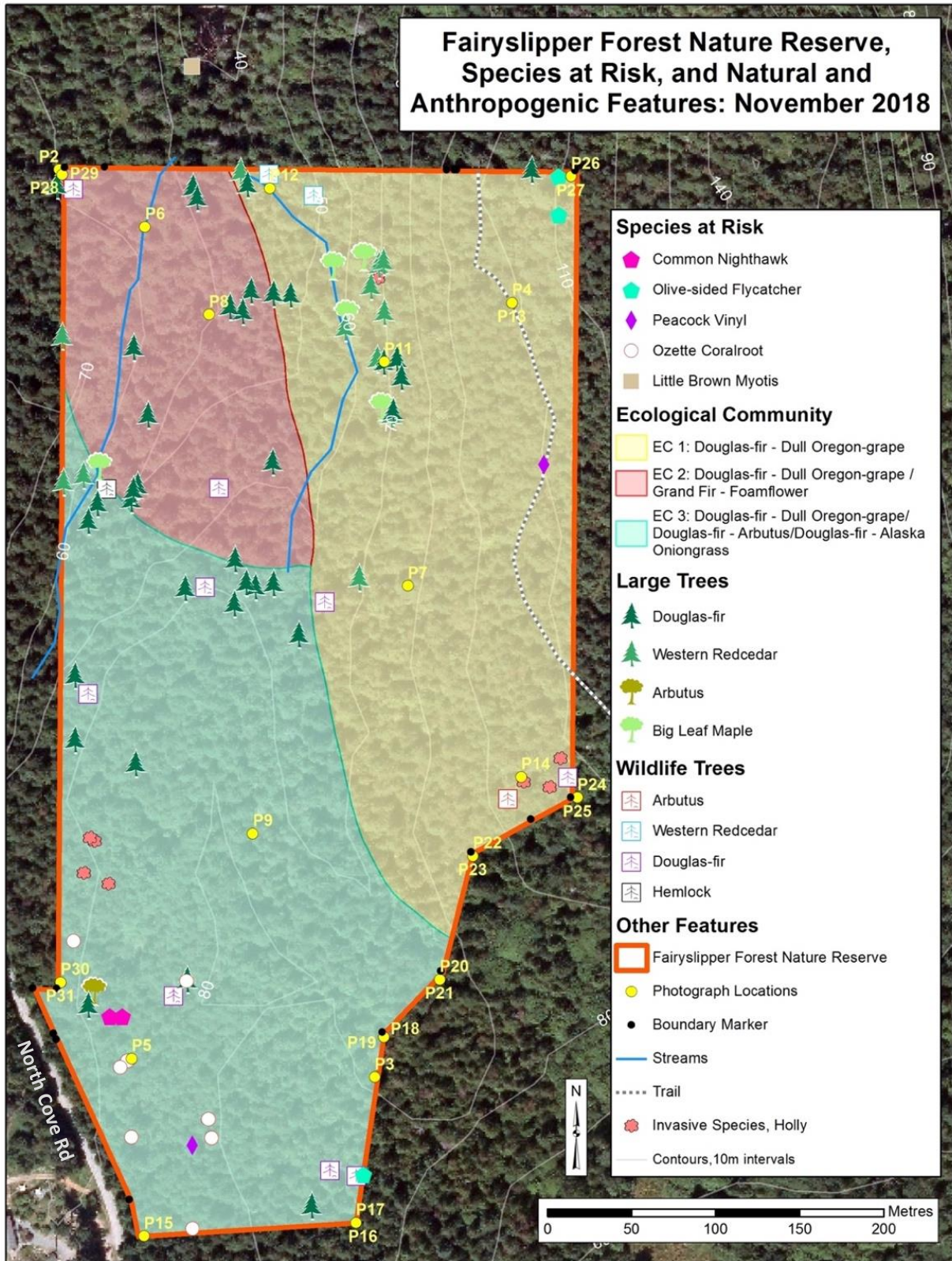


Figure 2. Map showing rare species, vegetation types, wildlife trees, trail and other features

3.0 Inventory by Ecological Community

3.1 Ecological Significance

Fairyslipper Forest Nature Reserve is made up of maturing Coastal Douglas-fir forests with large veteran trees that provide excellent wildlife habitat (Figure 2). There are two seasonal creeks in the northwestern part of the property that flow into Hunter pond to the north (Figure 2). The reserve protects significant watershed values on the island. The reserve is named after the fairy-slipper orchids that bloom throughout the reserve in the spring. It is currently the only publicly accessible protected area on Thetis Island.

Eight species of conservation concern are confirmed or likely to occur within Fairyslipper Forest Nature Reserve (Table 3, Figure 2). Purple Martin and Great Blue Heron were observed flying over the property (Clowater 2015). Common Nighthawks may forage over the property but there is little nesting habitat for them in the reserve (Clowater 2015). Little brown myotis was detected at Hunter’s Pond just north of Fairyslipper Forest Nature Reserve but likely uses the reserve as well. Northern red-legged frog was noted in the reserve (Ann Eriksson, pers. comm.), though coordinates of the location were not taken.

Islands Trust Conservancy acknowledges that there is a wealth of traditional ecological knowledge and a long history of ecosystem stewardship among the First Nations whose territory encompasses the nature reserve. ITC will strive to work with First Nations knowledge holders to deepen its understanding, improve its stewardship practices, and, ultimately, support the transfer of traditional ecological knowledge to younger generations within First Nations communities to ensure that it is not lost. At this time, the ecological information presented in this management plan was formed using systems that are based in foundations of Western science.

Table 3. Species at Risk found in Fairyslipper Forest Nature Reserve (ranks from Province of British Columbia 2018).

Species Name		Status				
English	Scientific	Provincial	BC List	COSEWIC	SARA	Global
Little brown myotis*	<i>Myotis lucifugus</i>	S4 (2015)	Yellow	E (2013)	1-E (2014)	G3 (2015)
Common Nighthawk	<i>Chordeiles minor</i>	S4B (2015)	Yellow	SC (2018)	1-T (2010)	G5 (2014)
Great Blue Heron	<i>Ardea Herodias fannini</i>	S2S3B (2018)	Blue	SC (2008)	1-SC (2010)	G5T4 (2017)
Olive-sided Flycatcher	<i>Contopus cooperi</i>	S3S4B (2015)	Blue	SC (2018)	1-T (2010)	G4 (2008)
Purple Martin	<i>Progne subis</i>	S3B (2015)	Blue			G5 (2014)
Northern red-legged Frog	<i>Rana aurora</i>	S3 (2016)	Blue	SC (2015)	1-SC (2005)	G4 (2015)
Ozette coralroot	<i>Corallorhiza maculata</i> var. <i>ozettensis</i>	S3 (2018)	Blue			G5T1T3 (2014)
Peacock vinyl	<i>Leptogium polycarpum</i>	S4 (2018)	Yellow	SC (2011)	1-SC	GNR (2000)

* Detected just north of the nature reserve at Hunter’s Pond and inferred to be present.

There are four listed ecological communities that are found within the reserve (Table 4).

Table 4. Ecological communities found in Fairyslipper Forest Nature Reserve.

Ecological Community Name		Status		
English	Scientific	Provincial	BC List	Global
Douglas-fir/dull Oregon-grape (CDFmm01)	<i>Pseudotsuga menziesii</i> – <i>Berberis nervosa</i>	S1 (2018)	Red	G2
Douglas-fir/alaska oniongrass (CDFmm03)	<i>Pseudotsuga menziesii</i> – <i>Melica subulata</i>	S1 (2018)	Red	G1
Grand fir/three-leaved foamflower (CDFmm06)	<i>Abies grandis</i> – <i>Tiarella trifoliata</i>	S1(2013)	Red	G1
Douglas-fir/arbutus (CDFmm02)	<i>Pseudotsuga menziesii</i> – <i>Arbutus menziesii</i>	S2 (2004)	Red	GNR

3.2 Climate

The southern Gulf Islands have a climate pattern of warm, dry summers and mild, wet winters with little snowfall. The maritime influence moderates the effect of elevation, latitude, and aspect on local temperature and precipitation.

The weather statistics for Nanaimo A (the closest weather station), show that the annual precipitation from 1981-2010 averaged 1165 mm/year and most of it comes in the form of rain rather than snow (Environment Canada 2018). Precipitation is highest in the winter months from November to January (averaging 190 mm/month) with July and August being the driest months (averaging 27 mm/month). Average daily temperatures peak in the summer months (July and August), with an average daily temperature of 18°C, and are lowest in the winter at 3°C (December and January) (Environment Canada 2018; Figure 3).

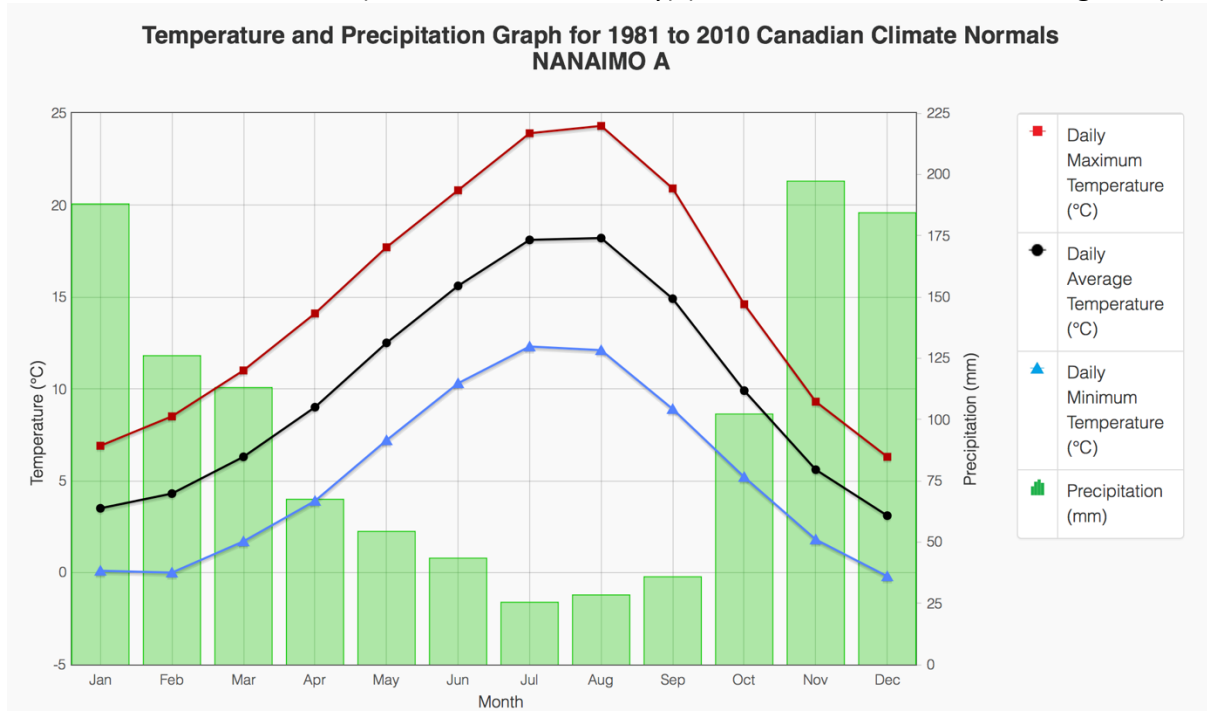


Figure 3. Average temperature and precipitation at Nanaimo A (nearest weather station to Thetis Island).

The future impacts from climate change are unknown although a summer drying trend and an increase in storm events are predicted (Mauger et al. 2015). More powerful storms may cause increasing erosion, especially in areas with exposed soil, such as trails, and in riparian areas due to increased flows. Drier summers may impact riparian hydrology causing premature drying. Over time, there may be shifts in the riparian vegetation community away from western redcedar (*Thuja plicata*) and towards the spread of Douglas-fir (*Pseudotsuga menziesii*). Higher temperatures and less precipitation may lead to localized stress on trees and understory plants. Maintaining habitat connectivity, biodiversity and ecosystem resilience may assist flora and fauna adaptation to climate change stresses.

3.3 Geology and Physiology

Thetis Island was formed 42 to 55 million years ago as plate tectonic movement pushed the seabed sediments towards the mainland, resulting in the island's characteristic horseshoe shape (Islands Trust 2011). The island is composed of sedimentary rock in the Nanaimo Group that ranges from sandstone to shale (Islands Trust 2011). At Fairyslipper Forest Nature Reserve, the parent material is in the Northumberland formation which consists of a massive mudstone layer with thinner embedded sandstone layers (Islands Trust 2011). The island was glaciated 11,000 to 13,000 years ago (Islands Trust 2011).

3.4 Hydrology

There are two seasonal creeks in the northwestern part of the property that flow north to Hunter's Pond, a large wetland on an adjacent property. The highest elevation areas in the nature reserve are along the eastern boundary and most surface flow is shed to the west. The property is the southern portion of a watershed that flows north to Cufra Inlet on northern Thetis Island (Islands Trust 2018b).



Photo 5. Creek with skunk cabbage and ferns along old road bed in Fairyslipper Forest Nature Reserve.

3.5 Soils

There are two soil types mapped in the reserve. Brigantine (BE) soils are found in the northwest corner of the reserve. These soils are loamy sand to sandy loam marine or fluvial deposits, 30-100 cm thick over silty clay loam to silty clay marine deposits over 100 cm deep. Slopes are gentle to moderate (6-15%). They are imperfectly drained with seasonal fluctuations in the water table (Green et al. 1989).

The remainder of the reserve has Saturna (ST) very shallow lithic (sl) soils, which are described as channery sandy loam to loamy sand, colluvial and glacial drift materials less than 50 cm deep over sandstone bedrock. Slopes are gentle to strong (6-30%). Soils are well drained, becoming droughty in the summer months (Green et al. 1989).

3.6 Ecological Classifications

The reserve is within the moist maritime subzone of the Coastal Douglas-fir biogeoclimatic zone (CDFmm) (Green & Klinka, 1994) within the Pacific Maritime Ecozone and the Georgia Puget Basin Ecozone.

3.7 Ecological Communities and Site Series

An ecological inventory of biological features was conducted in the nature reserve on April 26, 2018 by the author. Three site series were identified using *A Field Guide for Site Identification and Interpretation for the Vancouver Forest Region* (Green and Klinka, 1994) and structural stage was determined as defined in *Standards for Terrestrial Ecosystems Mapping in British Columbia* (Province of British Columbia 1998). The site series and corresponding ecological communities are described below, mapped in Figure 2, and summarized in Tables 5-10.

A list of all plant species observed is included in Appendix A. A total of 37 bird species have been recorded in Fairyslipper Forest Nature Reserve and a list is included in Appendix B (Clowater 2015). Locations of photopoints and other photograph locations are included in Appendix C.

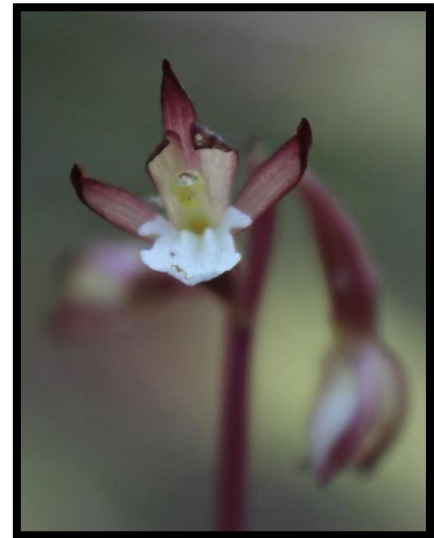


Photo 5. Blue-listed Ozette Coralroot in the Nature Reserve.

3.7.1 Ecological Community 1

This ecological community consists of maturing Douglas-fir/Dull Oregon-grape (*Pseudotsuga menziesii*/*Mahonia nervosa*) forest with many scattered veteran trees. The dominant canopy tree is Douglas-fir with smaller numbers of western redcedar, arbutus (*Arbutus menziesii*) and western hemlock (*Tsuga heterophylla*). This community includes areas with open understory and there are pockets of salal (*Gaultheria shallon*) in moister sites and dull Oregon-grape (*Berberis nervosa*) in drier locations. There is a thick moss layer in areas with few shrubs. There are many wildlife trees that provide habitat for cavity nesters and other wildlife and there is a large number of older veteran trees. A small number of non-native English holly (*Ilex aquifolium*) occur in the southern part of the ecological community.

This ecological community slopes to the west and although most of the terrain has gentle to moderate slopes, in some areas the slopes are steep. The soils are mapped as Saturna (ST) very shallow lithic (sl) soils, which are described as channery sandy loam to loamy sand, colluvial and glacial drift materials less than 50 cm deep over sandstone bedrock. Soils are well drained, becoming droughty in the summer months (Green et al. 1989).



Photo 6. Ecological Community 1 showing representative dense understory vegetation.

Table 5. Summary description of Ecological Community 1.

Polygon ID:	1
Ecological Community:	Douglas-fir/Dull Oregon-grape
Classification:	CDFmm/01
Structural Stage:	5 – Young Forest
Status (BC List):	Red listed (S1)
Photopoint(s):	P7
Ecological Community Description:	Mixed age (60 – 100 years old) Douglas-fir forest with scattered mature Douglas-fir with western redcedar. The understorey is dominated by salal, dull Oregon-grape and mosses, primarily step moss (<i>Hylocomium splendens</i>) and Oregon beaked moss (<i>Kindbergia oregana</i>).
Disturbance Notes:	The polygon includes some historical disturbance from logging (old stumps present) with an old skid road through the east side which is used as a trail. There are burn scars on the older Douglas-fir. There are some small English holly (<i>Ilex aquifolium</i>) plants in the south of the ecological community along the eastern boundary.
Anticipated Change/Succession:	Deer grazing may restrict recruitment of understorey species. Dominant vegetation is likely to continue to be Douglas-fir trees, except in drier areas where arbutus will persist and in wetter areas which will support western redcedar.
Wildlife observations:	Black-tailed deer (<i>Odocoileus hemionus</i>) scat and browse, American Robin (<i>Turdus americanus</i>) observed; Olive-sided Flycatcher (<i>Contopus cooperi</i>) observed by Ann Eriksson in northeast corner; peacock vinyl (<i>Leptogium polycarpum</i>) observed on arbutus tree along trail by Ryan Batten.

Table 6. Species associated with Ecological Community 1.

VEGETATION SPECIES	PERCENT COVER (%)						NOTES
	Main Canopy	Secondary Canopy	Shrub Layer	Herb Layer	Moss, Lichen Layer	Non-natives	
<i>Pseudotsuga menziesii</i> (Douglas-fir)	40	2					MC: uneven-aged, 60-100yrs, ht: 25-35m DBH: 30-50cm SC: 15-20 years, ht: 5-7m, DBH: 5-10cm
<i>Thuja plicata</i> (western redcedar)	15	1					MC: uneven-aged, 40-60yrs, ht: 25-35m DBH: 25-40cm SC: 8-10 years, ht: 3m, DBH: 2-5cm
<i>Arbutus menziesii</i> (arbutus)	5						MC: 50-60yrs, ht: 20m, DBH: 40-50cm
<i>Tsuga heterophylla</i> (western hemlock)	2						MC: 40-60yrs, ht: 30-40m, DBH: 30-40cm
<i>Abies grandis</i> (grand fir)		1					SC: 8-10yrs, ht: 3m, DBH: 2-5cm
<i>Gaultheria shallon</i> (salal)			20				
<i>Mahonia nervosa</i> (dull Oregon-grape)			10				
<i>Vaccinium parvifolium</i> (red huckleberry)			T				
<i>Lysimachia latifolia</i> (broad-leaved starflower)				2			
<i>Achlys triphylla</i> (vanilla-leaf)				1			
<i>Lonicera hispidula</i> (pink honeysuckle)				T			
<i>Polystichum munitum</i> (sword fern)				T			
<i>Linnaea borealis</i> (twinflower)				T			
<i>Calypso bulbosa</i> (fairy-slipper orchid)				T			Only leaves visible
<i>Eurhynchium oreganum</i> (Oregon beaked-moss)					30		
<i>Hylocomium splendens</i> (step moss)					50		
<i>Eurhynchium praelonga</i> (slender beaked-moss)					5		
<i>Rhytidiadelphus triquetrus</i> (electrified cat's-tail moss)					3		
Cover by Layer (%)	70	4	30	3	85		Total Canopy Cover: 50-60%

T stands for Trace or less than 1%

3.7.2 Ecological Community 2

Ecological Community 2 is found at lower elevations in the reserve in moisture-receiving sites. It includes a mix of Douglas-fir/dull Oregon-grape in slightly drier sites and grand fir/three-leaved foamflower (*Abies grandis/Tiarella trifoliata*) in lower, wetter areas. Soils are richer in the grand fir/three-leaved foamflower sites than in the Douglas-fir/dull Oregon-grape areas; although no foamflower was observed in the reserve, because of the moisture level and soil nutrient levels, the grand fir/three-leaved foamflower community is the closest fit. There are scattered large veteran Douglas-fir trees throughout the community which provide excellent habitat for wildlife and maturing western redcedar. Understorey vegetation is dominated by salal and sword fern with patches of dull Oregon-grape in drier areas. A seasonal creek flows along the low areas of the community, along the old logging road (now the trail) (Photo 6).

The soils are mapped as Brigantine (BE), loamy sand to sandy loam marine or fluvial deposits over silty clay loam to silty clay marine deposits. The soils are imperfectly drained with seasonal fluctuations in the water table. The ecological community has a western aspect and gentle slopes (10%).



Photo 7. Vegetation Type 2 showing large western redcedar tree and mixed understorey vegetation in wetter portions of Ecological Community 2.

Table 7. Summary description of Ecological Community 2.

Polygon ID:	2
Ecological Community:	Douglas-fir/dull Oregon-grape; Grand fir/three-leaved foamflower
Classification:	CDFmm/01; CDFmm/06
Structural Stage:	5 – Young Forest
Status (BC List):	Red listed (S1)
Photopoint(s):	P8
Ecological Community Description:	Mixed age (60 – 100 years old) Douglas-fir forest with scattered mature Douglas-fir and a few scattered mature bigleaf maple (<i>Acer macrophyllum</i>) and western redcedar (<i>Thuja plicata</i>). Grand fir (<i>Abies grandis</i>) forms the secondary canopy. The understorey is dominated salal (<i>Gaultheria shallon</i>), sword fern (<i>Polystichum munitum</i>) and mosses, primarily step moss (<i>Hylocomium splendens</i>) and Oregon beaked moss (<i>Kindbergia oregana</i>).
Disturbance Notes:	The polygon includes some historical disturbance from logging. There are burn scars on the older Douglas-fir.
Anticipated Change/Succession:	Deer grazing may restrict recruitment understorey species. Dominant vegetation is likely to continue to be Douglas-fir trees, except in wetter areas which will support western redcedar and red alder. Grand fir may become more dominant over time.
Wildlife observations:	Black-tailed deer (<i>Odocoileus hemionus</i>) scat

Table 8. Species associated with ecological community 2

VEGETATION SPECIES	PERCENT COVER (%)						NOTES
	Main Canopy	Secondary Canopy	Shrub Layer	Herb Layer	Moss, Lichen Layer	Non-natives	
<i>Pseudotsuga menziesii</i> (Douglas-fir)	20						MC: uneven aged, 60-100yrs, ht: 25-35m DBH: 30-50cm Vet: 150-250 years, ht: 50-65m, DBH: 130-140cm
<i>Thuja plicata</i> (western redcedar)	15	3					MC: uneven-aged, 40-80yrs, ht: 25-35m DBH: 40-65cm SC: 20-30 years, ht: 3-5m, DBH: 5-15cm
<i>Acer macrophyllum</i> (big-leaf maple)	5						MC: 30-50yrs, ht: 15m, DBH: 40cm
<i>Alnus rubra</i> (red alder)	2						MC: 10-15yrs, ht: 10-15m, DBH: 10-15cm
<i>Abies grandis</i> (grand fir)		5					SC: 10-15yrs, ht: 3-5m, DBH: 2-5cm
<i>Gaultheria shallon</i> (salal)			60				
<i>Mahonia nervosa</i> (dull Oregon-grape)			5				
<i>Vaccinium parvifolium</i> (red huckleberry)			2				
<i>Lonicera ciliosa</i> (orange honeysuckle)			1				Climbing on trees
<i>Polystichum munitum</i> (sword fern)				15			
<i>Achlys triphylla</i> (vanilla-leaf)				2			
<i>Galium triflorum</i> (three-flowered bedstraw)				T			
<i>Rubus ursinus</i> (trailing blackberry)				T			
<i>Adenocaulon bicolor</i> (pathfinder)				T			
<i>Eurhynchium oreganum</i> (Oregon beaked-moss)					40		
<i>Hylocomium splendens</i> (step moss)					20		
<i>Rhytidiadelphus triquetrus</i> (electrified cat's-tail moss)					T		
Cover by Layer (%)	40	8	68	17	60		Total Canopy Cover: 40%

T stands for Trace or less than 1%

3.7.3 Ecological Community 3

This ecological community is a mix of Douglas-fir/dull Oregon-grape, with Douglas-fir/arbutus (*Pseudotsuga menziesii*/*Arbutus menziesii*) in drier, well drained locations such as small knolls or in areas with greater southern exposure. There are a few very small pockets of Douglas-fir/Alaska oniongrass (*Pseudotsuga menziesii*/*Melica subulata*). The stand is dominated by Douglas-fir with smaller amounts of western redcedar and arbutus and a developing secondary canopy of grand fir and western hemlock. The age class is young forest although there are veteran Douglas-fir in the northern part of the community and along the western boundary. The veteran trees are important for wildlife.

The aspect faces west and the land is gently sloping (15%). The soils are mapped as Saturna (ST), very shallow lithic (sl) soils which are described as channery sandy loam to loamy sand, colluvial and glacial drift materials less than 50 cm deep over sandstone bedrock. Soils are well drained, becoming droughty in the summer months (Green et al. 1989).



Photo 8. Ecological Community 3, young forest.

Table 9. Summary description of Ecological Community 3.

Polygon ID:	3
Ecological Community:	Douglas-fir/dull Oregon-grape; Douglas-fir/arbutus; Douglas-fir/Alaska oniongrass
Classification:	CDFmm/01; CDFmm/02; CDFmm/03
Structural Stage:	5 – Young Forest
Status (BC List):	Red listed (S1)
Photopoint(s):	P9
Ecological Community Description:	Young (30 – 50 years old) Douglas-fir (<i>Pseudotsuga menziesii</i>) forest with scattered mature Douglas-fir and a few scattered arbutus (<i>Arbutus menziesii</i>). The understorey is dominated by dense salal (<i>Gaultheria shallon</i>) with mosses, primarily step moss (<i>Hylocomium splendens</i>) and Oregon beaked-moss (<i>Kindbergia oregana</i>).
Disturbance Notes:	The polygon includes some historical disturbance from logging (old stumps present).
Anticipated Change/Succession:	Deer browsing may restrict recruitment of understorey species. Dominant vegetation is likely to continue to be Douglas-fir trees although dominance may shift to western hemlock (<i>Tsuga heterophylla</i>) over time.
Wildlife observations:	Black-tailed deer (<i>Odocoileus hemionus</i>) scat observed, Pacific wren (<i>Troglodytes pacificus</i>) heard, ozette coralroot (<i>Corallorhiza maculata</i> var. <i>ozettensis</i>) in many locations in the southern part of the ecological community, and Olive-sided Flycatcher (<i>Contopus cooperi</i>) observed in southeast part of ecological community; Common Nighthawk (<i>Chordeiles minor</i>) observed flying over southern part of ecological community by James Clowater; peacock vinyl (<i>Leptogium polycarpum</i>) observed on arbutus tree by Ryan Batten.

Table 10. Species associated with ecological community 3

VEGETATION SPECIES	PERCENT COVER (%)						NOTES
	Main Canopy	Secondary Canopy	Shrub Layer	Herb Layer	Moss, Lichen Layer	Non-natives	
<i>Pseudotsuga menziesii</i> (Douglas-fir)	30						MC: 30-50yrs, ht: 18-25m DBH: 20-50cm
<i>Thuja plicata</i> (western redcedar)	10	2					MC: 30-50yrs, ht: 20-30m DBH: 30-50cm SC: 10-15yrs, ht: 3m; DBH: 2-5cm
<i>Arbutus menziesii</i> (arbutus)	5						MC: 60-100yrs, ht: 20-25m, DBH: 50-80cm
<i>Abies grandis</i> (grand fir)		5					SC: 20-40yrs, ht: 12-15m, DBH: 20cm
<i>Tsuga heterophylla</i> (western hemlock)		2					SC: 5-10yrs, ht: 3-4m, DBH: 2-5cm
<i>Gaultheria shallon</i> (salal)			75				
<i>Vaccinium parvifolium</i> (red huckleberry)			5				
<i>Mahonia nervosa</i> (dull Oregon-grape)			2				
<i>Polystichum munitum</i> (sword fern)				2			
<i>Eurhynchium oreganum</i> (Oregon beaked-moss)					15		
<i>Hylocomium splendens</i> (step moss)					15		
Cover by Layer (%)	45	9	82	2	30		Total Canopy Cover: 40%

3.8 Wildlife Species

There are mature Douglas-fir trees in Fairyslipper Forest Nature Reserve that provide food for woodpeckers, sapsuckers, nuthatches and creepers (Clowater 2015). Some of the wildlife trees have cavities for cavity-nesting birds and provide perch sites that may be used by raptors. One location in the reserve had whitewash (guano) below a tree suggesting birds of prey use the area, although the tree above the whitewash was relatively young. The old-growth veteran trees may provide nesting habitat for marbled murrelets (*Brachyramphus marmoratus*) (Clowater 2015). A list of bird species observed in the reserve is included in Appendix B.

Wildlife trees also provide roost sites for bats and decaying wood provides habitat for invertebrates, amphibians, reptiles and other wildlife.

The wildlife species that have been observed in or near the reserve are listed in Table 11. Bat species were observed north of the property in Hunter's Pond and likely use the habitat in the reserve as well.



Photo 9. Raptor bones, possibly from a Bald Eagle.



Photo 10. Veteran Douglas-fir tree in the Nature Reserve with diameter at breast height of approximately 2 m.

Table 11. Wildlife species observed in Fairyslipper Forest Nature Reserve

Common Name	Latin Name
Black-tailed deer	<i>Odocoileus hemionus</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Garter snake	<i>Thamnophis</i> sp.
Northern red-legged Frog ⁺	<i>Rana aurora</i>
Banana slug	<i>Ariolimax columbianus</i>
Pacific sideband	<i>Monadenia fidelis</i>
Big brown bat*	<i>Eptesicus fuscus</i>
California myotis*	<i>Myotis californicus</i>
Hoary bat*	<i>Lasiurus cinereus</i>
Little brown myotis**	<i>Myotis lucifugus</i>
Long-eared myotis*	<i>Myotis evotis</i>
Silver-haired bat*	<i>Lasionycteris noctivagans</i>
Yuma myotis*	<i>Myotis yumanensis</i>
Common nighthawk ⁺	<i>Chordeiles minor</i>
Great blue heron ⁺	<i>Ardea Herodias fannini</i>
Olive-sided flycatcher ⁺	<i>Contopus cooperi</i>
Purple martin ⁺	<i>Progne subis</i>

* Bat species were detected using an Anabat Express bat detector from August 14th - 22nd, 2015 at Hunter’s Pond (on the adjacent property to the north). Examination of acoustic spectrograms was done by Peter Ommundsen (report in Appendix D). Townsend’s big-eared bat (*Corynorhinus townsendii*), which is well known on the island, was not detected; however, the detector was not full-spectrum, which is preferred for confirmation of this species.

⁺Species of conservation concern

3.9 Expected Change Over Time

The upland forests will continue to mature and biological diversity will increase over time. In areas with heavy deer browsing, conifer regeneration may be impeded, and an open stand or gap may result. Over-browsing by deer will continue to impact biodiversity of shrub and herb layers. There will be development of old forest characteristics over time as trees mature and gaps develop through natural mortality and wind. In areas with dense growth, there will be self-thinning due to density related mortality.

4.0 Threats

Table 12. Summary of Threats to the Nature Reserve.

Threats	Coastal Douglas-fir Forest	Seasonal Creeks	Overall Threat Rank
Recreational Activities: Trail development to connect the existing trail through the reserve to North Cove Road and subsequent hiking may impact conservation targets through wildlife disturbance, soil disturbance and erosion. Careful placement of the new trail will help mitigate the threat. With increasing population and development pressure on Thetis Island, this threat is expected to	Medium	Low	Medium

Fairyslipper Forest Nature Reserve Management Plan 2019

increase, especially since Fairyslipper Forest is the only nature reserve with public trails on the island.			
Wildfire: Coastal Douglas-fir ecosystems are adapted to low-intensity wildfires that historically occurred every 100-300 years, maintaining the dominance of Douglas-fir by controlling the growth of competing species and preventing tinder-dry debris from building up on the forest floor. The last fire in Fairyslipper Forest was in the late 1800s and scars from this fire are visible on the older Douglas-fir trees. Fire suppression results in a change of fire regime to lower frequency and higher intensity fires. Higher intensity fires are also generally larger in size. A more intense fire could potentially replace Coastal Douglas-fir forests. High-intensity fires would destroy the ecosystem's herbaceous species, which are adapted to frequent, low-intensity fires and could result in stand replacement. Vegetation recovery post-catastrophic fire is slow and invasive terrestrial species are likely to invade areas with bare soil. Stand-replacing fires will also have potential impacts on riparian areas due to subsequent soil erosion.	High	Low	High
Invasive Non-Native Species: Currently, there are low numbers of invasive species in the reserve. There are a few scattered, small English holly (<i>Ilex aquifolium</i>), negligible Scotch broom (<i>Cytisus scoparius</i>) and small amounts of non-native grasses and forbs. According to the International Union for Conservation of Nature (IUCN 2018), the threat of invasion by non-native species is second only to habitat loss. The impact on native ecosystems, habitats and species can be severe and often irreversible.	Low	Low	Low
Problematic Native Species: Hyper-abundant black-tailed deer (<i>Odocoileus hemionus</i>) in the reserve have dramatically altered understory vegetation structure and composition. Excessive deer herbivory can reduce songbird diversity (Martin et al. 2011).	Medium	Low	Medium
Erosion: Seasonal creeks flow along an old skid road and in some locations, erosion is occurring because the flow is now straight along the road. Over time, with extreme flooding events, erosion may become more severe, causing high levels of silt to be deposited into the wetland on the adjacent property to the north.	N/A	Medium	Medium
Climate Change: The impacts of changing climate are difficult to predict and are likely to impact every ecosystem type differently. An increase in storm events with high rainfall will cause increased erosion in creek beds and in upslope areas. Prolonged summer droughts may cause shifts in species composition, such as the declining western redcedar trees noted in other protected areas on the Gulf Islands.	Low?	Low?	Low?
Overall Threat Status for Protected Area	Medium	Low	Medium

High: The threat is likely to seriously degrade the biodiversity target.

Medium: The threat is likely to moderately degrade the biodiversity target.

Low: The threat is likely to only slightly impair the biodiversity target

4.1 Expected Change to Threats Over Time

The human population on Thetis Island is growing slowly, from a total population of 340 in 2011 to 389 in 2016 (Statistics Canada, 2016). This increase is compounded by visitors to the island, especially over the summer months. With an increasing number of people, pressure on the trail is expected to increase, as Fairyslipper Forest is currently the only publicly-accessible nature reserve on the island. Impacts may include increased trampling, erosion and the potential for the spread of non-native invasive species.

Bigger fuel loads associated with fire suppression increase the risk of catastrophic, stand-replacing fires if a wildfire occurs.

The risks associated with climate change, including vegetation shifts and increased erosion associated with more extreme storm events, are likely to increase over time.



Photo 11. Erosion caused by seasonal creek flowing along old road.

5.0 Community Engagement

5.1 Adjacent Landholders

In preparation for the development of the Management Plan, letters were sent to all landholders and neighbours within a 100 m radius of the reserve. A total of 12 letters were sent by email on October 1st, 2018 (Appendix E). The letters contained information about Fairyslipper Forest Nature Reserve, an invitation to an open house and a link to the online survey (see Appendix F).

5.2 First Nations

Letters were sent to the following First Nations on October 12th, 2018 by email (Appendix G):

- Cowichan Tribes
- Halalt First Nation
- Lake Cowichan First Nation
- Lyackson First Nation
- Penelakut Tribe
- Semiahmoo First Nation
- Stz'uminus (Chemainus) First Nation

The letters acknowledged First Nation treaty and territorial rights and title and expressed the intention for the management plan to reflect reconciliation and conservation goals. The letter asked for input to ensure the management plans are informed by cultural significance and traditional use of the reserve site. The letters contained information about Fairyslipper Forest and welcomed any information to help understand and manage the reserve.

5.3 Conservation Partners and Community Members

The Islands Trust Conservancy held a public consultation meeting on October 13th, 2018 to coincide with the Thetis Island Nature Conservancy annual general meeting. People attending this open house were asked to provide input on the draft Management Plan and management planning for the reserve. Maps and photographs were on display and residents were asked for their input at that time. Between 20 and 25 people attended.

An online survey was made available and was completed by 22 people.

5.4 Engagement Results

To date, ITC has met with the Penelakut First Nation to discuss management of the two ITC nature reserves on Thetis Island.

Survey respondents were primarily residents, of which 32% are based off-island. Most respondents (36%) have visited the reserve a few times and most engage in hiking and wildlife observation activities. The most important values for respondents were protection of habitat for at-risk species (73%), conservation for the sake of the intrinsic value of nature (68%), ecosystem services (64%), and education and research opportunities (64%). Several respondents expressed concern about threats associated with the potential overuse of the nature reserve by large groups of people.

6.0 Management Recommendations

This document is the first management plan developed for the reserve. The purpose of Fairyslipper Forest Nature Reserve is to protect, in perpetuity, the Coastal Douglas-fir forests and seasonal creeks for the benefit of the flora and fauna of the reserve and to allow for low impact recreation and nature appreciation opportunities for visitors to the reserve.

The ecological condition of the property is good; there are maturing forests with diverse understory vegetation and riparian areas that provide excellent wildlife habitat. The seasonal creeks and surrounding riparian areas provide significant watershed values. The threats to the reserve are assessed as moderate since there are few anthropogenic features and minimal invasive species to impact ecological function. The most serious threats are associated with wildfire, hyper-abundant black-tailed deer browse, and impacts associated with public use.

Ongoing monitoring and management is required to ensure that ecosystems and species continue to remain protected from threats and to ensure public safety. Key management issues include mitigating impacts associated with trail use, preventing unauthorized activities that may result from public access and controlling the spread of invasive species. Communication and planning to reduce the risk of future wildfires is also recommended.

All management within the reserve must consider the specific sensitivities of the species at risk and their habitat. This will include ensuring new trail placement avoids rare species, wildlife trees or riparian areas. Signage will be used to inform visitors about permitted and

prohibited uses within the reserve and to identify reserve boundaries. Ongoing wildlife surveys and monitoring will be used to inform management.

An early management action is to provide public access to Fairyslipper Forest Nature Reserve by constructing a low-impact hiking trail which will reduce trespass on adjacent privately managed lots. It is recognized that there are trails on adjacent privately managed properties that are used by the public. If those trails are licensed for public use by the landholder, a connection with the nature reserve trail may be maintained. Any unlicensed trails on adjacent privately managed property that connect with the nature reserve will be closed at the boundary with boundary signage and trail decommissioning to limit ongoing use. To ensure public safety, trails should be built to ITC standards to avoid danger trees and riparian areas. The installation of boundary and trail signs will instruct visitors to stay on designated trails to prevent impact to off-trail areas.

6.1 Management Roles

Islands Trust Conservancy is the sole landholder of Fairyslipper Forest Nature Reserve and will work in partnership with the Thetis Island Nature Conservancy to implement on-the-ground management. The ITC is negotiating a covenant with ThINC and CCLT and the covenant holders will be responsible for monitoring the covenant.

6.2 Permitted and Prohibited Uses

The Nature Reserve is open to the public for hiking and nature appreciation. Visitors are requested to keep dogs on a leash, pick up after their dogs, and dispose of dog waste off-site.

The following activities by the public are prohibited:

- Use of motorized vehicles
- Bicycling
- Horseback riding
- Camping
- Fires
- Hunting
- Smoking
- Trail development
- Tree cutting
- Collection or harm of plants, fungi or animals

6.3 Proposed Monitoring Program

Most public use will be restricted to a designated trail system. Annual monitoring should focus on assessing the trail for areas of erosion and to identify any new unauthorized side-trails or off-trail use. Monitoring should also determine whether trail use continues to be restricted to hiking or if any unauthorized uses are occurring such as off-road vehicles or mountain bikes. The recommended monitoring route will be determined after finalization of the trail.

An ecological monitoring program could be developed to assess creek bed erosion over time, should resources become available. If resources are available, invasive species monitoring and further wildlife inventories are recommended.

6.4 Public Access

A trailhead and public trail will be developed on the reserve from North Cove Road which will connect to the existing trail in the eastern part of the property. If trails on adjacent privately-managed lots become licensed, access to the reserve trail network may remain open via these routes. Any unlicensed trails on adjacent privately-managed land that connect with the reserve should be blocked with signage, and debris should be piled on the unlicensed trail to discourage access.

Alternative access opportunities for First Nations may be established through a separate Management Plan for Areas of Cultural Heritage and Sacred Significance.

6.5 Signage

There are currently no signs on the property. It is recommended that a sign be installed to show the location of any trailheads created on North Cove Road and to request that visitors stay on designated trails and notify of prohibited activities. Boundary signs should be placed at main access points and outline permitted activities in the reserve. A sign should be installed on the trail at the property boundary to block access to unlicensed trails on privately-managed land.

6.6 Trail Use, Maintenance and Development

There is a low-impact hiking trail that enters the reserve from privately-managed property to the north and east and passes through the eastern portion of the reserve. ITC and ThINC plan to develop a trail from North Cove Road through the reserve to connect with this trail. A connection between the ITC trail and trails on adjacent privately-managed properties may remain open if those trails become licensed. Any unlicensed trail that continues onto privately-managed property should be closed and restored.

Any new trails should be designed to avoid areas that will be wet in the winter and will cause future trail widening as hikers look for dry footing. Trail route should also avoid steep grades and areas prone to erosion. If possible, the trail should also avoid wildlife trees to minimize impacts to wildlife and prevent their removal as danger trees. Areas with species at risk, particularly ozette coralroot, should be avoided.



Photo 12. Existing trail in the Nature Reserve.

6.7 Protection Initiatives for Sensitive Ecosystems and Species and Ecosystems at Risk

Maintaining the forests will be sufficient to support species at risk and their current use of the property. Care should be taken to avoid trail placement in locations next to ozette coralroot and wet areas that support northern red-legged frog. Peacock vinyl is unlikely to be impacted by any activities within the reserve. Protection of existing forest cover will maintain foraging habitat for Olive-sided Flycatcher and little brown myotis. There is limited foraging habitat for Olive-sided Flycatcher and limited nesting habitat for Common Nighthawk (Clowater 2015), so activities within the reserve are unlikely to impact these species.

If funding is available, surveys for Western Screech-owl (*Megascops kennicottii*) would be beneficial.

Increasing connectivity between the Fairyflipper Forest Nature Reserve and other protected areas would help ensure the persistence of species at risk.

6.8 Ecological Restoration Options

The seasonal creek along the skid road should be carefully monitored for erosion. It is unclear if the creek has been diverted and now flows along the road or if the road was placed over the creek but the straight path and lack of meanders or swales is causing erosion where the creek has cut into the road bed. Although ecological restoration would be beneficial to the creek, accessing the site with heavy equipment would cause significant damage to the adjacent forest.

6.9 Scientific Research/Education Opportunities

There have been preliminary species at risk inventories within the reserve to support the acquisition of the property. A visual and auditory avian survey was done by James Clowater over a period of five days in June 2015 with morning, afternoon, and late evening observations (Clowater 2015). A one day survey for rare plants, lichens and mosses was done by Carrina Maslovat and Ryan Batten in April 2015 (Maslovat and Batten 2015). Ann Eriksson has also surveyed the reserve for rare species (Eriksson pers. comm. 2018). There has been no formal research. Scientific research plays a critical role in understanding natural processes and shaping potential management options. All research in the reserve should be approved by ITC and should ensure there is no associated harm to species at risk and/or their habitat.

6.10 Exotic and Invasive Species Management

There are very few invasive and exotic species in the reserve in comparison to most sites in the Gulf Islands. Management efforts should focus on the removal of English holly and Scotch broom wherever they are encountered within the reserve. Because both species are at early stages of invasion, prompt removal will greatly decrease maintenance efforts in the future. English holly plants are small and the entire plant should be removed, rather than cut, because the plants can re-establish from cut stems or root fragments.



Photo 13. Non-native English holly seedlings in the Nature Reserve.

6.11 Wildfire Risk Management

Wildfire and wildfire suppression can be extremely damaging to sensitive ecosystems. It is recommended that a fire management plan be developed in consultation with the Thetis Island Fire Department and the BC Wildfire Service to identify best management practices for wildfire suppression.

6.12 Climate Change Impacts and Management

Climate change may impact the distribution of ecosystems across the landscape, affecting vegetation patterns, hydrology, and outbreaks of pests. Trends that may prevail in this region include up-slope migration of tree lines and ecosystem boundaries, and increased fire frequency. Predicted climate change scenarios indicate that Douglas-fir-dominated stands will expand and western redcedar stands will diminish (Hebda, 1997).

Ensuring ongoing protection of the site and creating connectivity between large areas of protected ecosystems will facilitate dispersal of species into new habitats and across elevations as vegetation patterns shift. These protected area matrices will provide potential reservoirs for dispersal into suitable habitats in adjacent areas as climate change shifts the distribution of ecosystem types (McCloskey et. al. 2009).

Ongoing monitoring is important to determine if climate change is impacting the ecosystems in the reserve. Restoration of the creek bed would help prevent future erosion, but the benefits of this action must be weighed against the high level of impact caused by accessing the site with heavy equipment.

7.0 Action Items

Management Plan action items are measurable and achievable specific tasks that the ITC and partners can complete to ensure that the protected area is managed in the best possible

way. The following management action items are based on the recommendations made in this Management Plan and listed in priority sequence, subject to available funding resources.

7.1 Immediate Actions (1-2 years)

1. Determine the location for trail access to the reserve from North Cove Road to provide public access to the reserve and a link to the existing trail.
2. Keep abreast of the work of management partners and the Thetis Island Rate Payers Association (TIRRA) to license trails on privately-managed lots.
3. Create a barrier and restore any unlicensed trails to/from adjacent privately-managed properties. A “trail closed” sign should be installed at the property boundary of all unlicensed trails.
4. Identify opportunities for cooperative management with First Nations.
5. Establish a volunteer warden program and designate a warden to visit the site regularly and work with ThINC to monitor the property and identify management concerns.
6. Remove invasive, non-native woody species through cooperation between ThINC and ITC. Prompt removal will make future management more cost effective. Establish a regular monitoring schedule to assess effectiveness of invasive species removal.
7. If funding is available, survey for Western Screech-owl to determine if this blue-listed species is present on the reserve.

7.2 Short term Actions (3-5 years)

1. Install a low-impact trail from North Cove Road to provide access to the reserve for hiking and nature appreciation.
2. Install boundary signs at key access points and trail map and usage signs at the trail head.
3. Consult with the Thetis Island Fire Department and the BC Wildfire Service to identify best management practices for wildfire management.
4. Initiate development of parallel Management Plan for Areas of Cultural Heritage and Sacred Significance documents with First Nations.
5. If funding is available, conduct a more intensive wildlife survey, with a focus on species at risk, over a range of seasons to more fully document the biodiversity of the reserve.

7.3 Ongoing or Annual Action Items

1. Conduct annual monitoring to identify and address management concerns.
2. Work with the Penelakut Tribe towards cooperative management of the reserve using the *2018 Islands Trust Conservancy-Penelakut Tribe Management Plan for Areas of Cultural Heritage and Sacred Significance* as a guide.
3. Continue ongoing invasive species removal and management. Monitor to determine effectiveness of management and to identify new locations of invasive species that can be targeted for removal.
4. Conduct ongoing maintenance and management of signs and trails, once installed.

8.0 Conclusion

Fairyslipper Forest Nature Reserve is located within an area of high ecological value, both within Thetis Island and the greater Islands Trust Area. The reserve protects two seasonal creeks and four rare Coastal Douglas-fir ecosystems that provide important habitat for five confirmed species of conservation concern and many other native species.

There are few anthropogenic features within the reserve and current public use is limited to a low-impact trail in the eastern portion of the property. The overall impact of assessed threats to the property is moderate, with the greatest threats being stand-replacing wildfire caused by wildfire suppression, understory overbrowsing by hyper-abundant native black-tailed deer, and soil disturbance caused by heavy trail use.

A key action item for the reserve's first management plan is the provision of a formalized public access route to the the reserve from North Cove Road. Other recommended management actions include establishing a volunteer warden program and identifying First Nations co-managers, managing invasive non-native woody plants that are in the early stages of invasion, and ongoing trail maintenance.

The Islands Trust Conservancy will work towards the management actions identified in this Plan to achieve the vision, objectives and purpose of the Fairyslipper Forest Nature Reserve. Future management issues may lead to further action items that will be identified in work plans and in future revisions of this Management Plan.

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10.0 Appendices

Appendix A. Plant species recorded in Fairyslipper Forest Nature Reserve April 15, 2015

Recorded by Ryan Batten, Carrina Maslovat and Ann Eriksson

Latin Name	Common Name	
Vascular Plants		
<i>Abies grandis</i> (Douglas ex D. Don) Lindl.	Grand fir	
<i>Acer macrophyllum</i> Pursh	Big-leaved maple	
<i>Achlys triphylla</i> (Sm.) DC.	Vanilla-leaf	
<i>Adenocaulon bicolor</i> Hook.	Pathfinder	
<i>Aira caryophylla</i> L.	Silver hairgrass	
<i>Aira praecox</i> L.	Early hairgrass	
<i>Arbutus menziesii</i> Pursh	Arbutus	
<i>Bellis perennis</i> L.	English daisy	Introduced
<i>Bromus hordeaceus</i> L.	Soft brome	Introduced
<i>Calypso bulbosa</i> (L.) Oakes	Fairy-slipper orchid	
<i>Carex deweyana</i> Schwein.	Dewey's sedge	
<i>Carex inops</i> ssp. <i>inops</i> L.H. Bailey	Long-stolon sedge	
<i>Carex obnupta</i> L.H. Bailey	Slough sedge	
<i>Cerastium arvense</i> L.	Field chickweed	
<i>Claytonia parviflora</i> Douglas ex Hook.	Streambank spring beauty	
<i>Clinopodium douglasii</i> (Benth.) Benth.	Yerba buena	
<i>Collinsia parviflora</i> Lindl.	Small-flowered blue-eyed Mary	
<i>Corallorhiza maculata</i> var. <i>maculata</i> (Raf.) Raf.	Spotted coralroot	
<i>Corallorhiza maculate</i> var. <i>ozettensis</i>	Ozette coralroot	Blue-list (S3)
<i>Cytisus scoparius</i> (L.) Link	Scotch broom	Introduced
<i>Dactylis glomerata</i> L.	Orchard grass	Introduced
<i>Daucus pusillus</i> Michx.	American wild carrot	
<i>Elymus glaucus</i> Buckley	Blue wildrye	
<i>Festuca occidentalis</i> Hook.	Western fescue	
<i>Frangula purshiana</i> A. Grey ex J.G. Cooper	Cascara buckthorn	
<i>Galium aparine</i> L.	Common bedstraw	
<i>Galium triflorum</i> Michx.	Three-flowered bedstraw	
<i>Gaultheria shallon</i> Pursh	Salal	
<i>Goodyera oblongifolia</i> Raf.	Menzie's rattlesnake plantain	
<i>Hieracium albiflorum</i> Hook.	White hawkweed	
<i>Holcus lanatus</i> L.	Common velvetgrass	Introduced
<i>Holodiscus discolor</i> (Pursh) Maxim.	Oceanspray	
<i>Hypochaeris radicata</i> L.	Hairy cat's-ear	Introduced
<i>Ilex aquifolium</i>	English holly	Introduced
<i>Jacobaea vulgaris</i> Gaertn.	Tansy ragwort	Introduced
<i>Juncus effusus</i> L.	Common rush	
<i>Lapsana communis</i> L.	Common nipplewort	Introduced
<i>Leucanthemum vulgare</i> Lam.	Oxeye daisy	Introduced
<i>Linnaea borealis</i> L.	Twinflower	
<i>Lonicera ciliosa</i> (Pursh) Poir. ex DC	Orange honeysuckle	
<i>Lonicera hispidula</i> (Lindl.) Douglas ex Torr. & A. Gray	Pink honeysuckle	
<i>Lysimachia latifolia</i> (Hooker) Cholewa	Broad-leaved starflower	

Fairyslipper Forest Nature Reserve Management Plan 2019

<i>Mahonia aquifolium</i> Pursh	Tall Oregon-grape	
<i>Mahonia nervosa</i> Pursh	Dull Oregon-grape	
<i>Melica subulata</i> (Griseb.) Scribn.	Alaska oniongrass	
<i>Moehringia macrophylla</i> (Hook.) Fenzl	Large-leaved sandwort	
<i>Monotropa uniflora</i> L.	Indian pipe	
<i>Montia parvifolia</i> (Moc. ex DC.) Greene	Small-leaved montia	
<i>Mycelis muralis</i> (L.) Dumort.	Wall lettuce	
<i>Nemophila parviflora</i> var. <i>Parviflora</i> Douglas ex Benth.	Small-flowered nemophila	
<i>Pentagramma triangularis</i> (Kaulf.) Yatsk., Windham & E. Wollenw.	Goldenback fern	
<i>Plantago lanceolata</i> L.	English plantain	Introduced
<i>Plantago major</i> L.	Common plantain	Introduced
<i>Polystichum munitum</i> (Kaulf.) C. Presl	Sword fern	
<i>Prunella vulgaris</i> L.	Common self-heal	
<i>Pseudotsuga menziesii</i> (Mirb.) Franco	Douglas-fir	
<i>Pteridium aquilinum</i> (L.) Kuhn	Bracken fern	
<i>Quercus garryana</i> Douglas ex Hook.	Garry oak	
<i>Ranunculus occidentalis</i> Nutt.	Western buttercup	
<i>Ranunculus repens</i> L.	Creeping buttercup	Introduced
<i>Rosa gymnocarpa</i> Nutt.	Bald-hip rose	
<i>Rubus spectabilis</i> Pursh	Salmonberry	
<i>Rubus ursinus</i> Cham. & Schtdl.	Pacific trailing blackberry	
<i>Rumex acetosella</i> L.	Sheep sorrel	Introduced
<i>Sanicula crassicaulis</i> Poepp. ex DC.	Pacific sanicle	
<i>Selaginella wallacei</i> Hieron.	Wallace's spikemoss	
<i>Symphoricarpos albus</i> (L.) S.F. Blake	Common snowberry	
<i>Thuja plicata</i> Donn ex D. Don	Western redcedar	
<i>Trifolium repens</i> L.	White clover	Introduced
<i>Trifolium willdenovii</i> Spreng.	Wildenow's clover	
<i>Triteleia hyacinthina</i> (Lindl.) Greene	White triteleia	
<i>Tsuga heterophylla</i> (Raf.) Sarg.	Western hemlock	
<i>Vaccinium parvifolium</i> Sm.	Red huckleberry	
<i>Vulpia myuros</i> (L.) C.C. Gmel.	Rat-tail fescue	Introduced
Mosses		
<i>Amphidium californicum</i> (Hampe ex C. Müll.) Broth.	California yoke-moss	
<i>Anacolia menziesii</i> (Turn.) Par.	Menzies' anacolia moss	
<i>Atrichum selwynii</i> Aust.	Crane's-bill moss	
<i>Claopodium crispifolium</i> (Hook.) Ren. & Card.	Rough-moss	
<i>Dicranoweisia cirrata</i> (Hedw.) Lind.	Curly thatch-moss	
<i>Dicranum fuscescens</i> Turn.	Curly heron's-bill moss	
<i>Dicranum scoparium</i> Hedw.	Broom-moss	
<i>Eurhynchium oreganum</i> (Sull.) Jaeg.	Oregon beaked-moss	
<i>Eurhynchium praelongum</i> (Hedw.) Schimp	Slender beaked-moss	
<i>Homalothecium nuttallii</i> (Wils.) Jaeg.	Nuttall's homalothecium moss	
<i>Hylocomium splendens</i> (Hedw.) Schimp.	Step moss	
<i>Hypnum circinale</i> Hook.	Coiled-leaf claw-moss	
<i>Isothecium myosuroides</i> Brid.	Variable moss	

Fairyslipper Forest Nature Reserve Management Plan 2019

<i>Leucolepis acanthoneuron</i> (Schwaegr.) Lindb.	Palm tree moss	
<i>Metaneckera menziesii</i> (Hook.) Steere	Menzie's neckera	
<i>Neckera douglasii</i> Hook.	Douglas' neckera	
<i>Plagiomnium insigne</i> (Mitt.) T. Kop.	Coastal leafy moss	
<i>Plagiomnium venustum</i> (Mitt.) T. Kop.	Magnificent leafy moss	
<i>Plagiothecium undulatum</i> (Hedw.) Schimp.	Flat-moss	
<i>Pleurozium schreberi</i> (Brid.) Mitt.	Red-stemmed feathermoss	
<i>Polytrichum juniperinum</i> Hedw.	Juniper haircap moss	
<i>Racomitrium canescens</i> (Hedw.) Brid.	Grey rock-moss	
<i>Rhizomnium glabrescens</i> (Kindb.) T. Kop.	Large leafy moss	
<i>Rhytidiadelphus loreus</i> (Hedw.) Warnst.	Lanky moss	
<i>Rhytidiadelphus triquetrus</i> (Hedw.) Warnst.	Electrified cat's-tail moss	
<i>Zygodon viridissimus</i> (Dicks.) Brid.	Green yoke-moss	
Lichens		
<i>Buellia muriformis</i> A.Nordin & Tønsberg	Coastal buttons	
<i>Buellia punctata</i> (Hoffm.) A.Massal.	Common buttons	
<i>Chaenotheca ferruginea</i> (Turner ex Sm.) Mig.	Blood whiskers	
<i>Cladonia coniocraea</i> (Flörke) Spreng.	No common name	
<i>Cladonia fimbriata</i> (L.) Fr.	No common name	
<i>Cladonia transcendens</i> (Vainio) Vainio	No common name	
<i>Evernia prunastri</i> (L.) Ach.	No common name	
<i>Fuscopannaria pacifica</i> P.M.Jørg.	Silver-rimmed crackers	
<i>Hertelidea botryosa</i> (Fr) Printzen & Kantvilas	No common name	
<i>Hypocenomyce scalaris</i> (Ach. ex Lilj.) M.Choisy	Charcoal clamshell	
<i>Hypogymnia inactiva</i> Krog	No common name	
<i>Hypogymnia physodes</i> (L.) Nyl.	No common name	
<i>Hypogymnia tubulosa</i> (Schaer.) Hav.	No common name	
<i>Lepraria torii</i> Pérez-Ortega & T. Sprib.	No common name	
<i>Leptogium polycarpum</i> P.M.Jørg. & Goward	Peacock vinyl	COSEWIC Special Concern
<i>Parmelia saxatilis</i> (L.) Ach.	No common name	
<i>Parmelia sulcata</i> Taylor	No common name	
<i>Peltigera britannica</i> (Gyeln.) Holt.-Hartw. & Tønsberg	No common name	
<i>Peltigera collina</i> (Ach.) Schrad.	No common name	
<i>Peltigera membranacea</i> (Ach.) Nyl.	No common name	
<i>Physcia tenella</i> Moberg	No common name	
<i>Platismatia glauca</i> (L.) W.L.Culb. & C.F.Culb.	No common name	
<i>Platismatia herrei</i> (Imshaug) W.L.Culb. & C.F.Culb.	No common name	
<i>Protoparmelia ochrococca</i> (Nyl.) P.M.Jørg, Rambold & Hertel	Honey curds	

Appendix B. Avian Species Observed in Fairyflipper Forest Nature Reserve

Species list taken from Clowater 2015.

Species Common Name	Species Latin Name	Status
Great Blue Heron	<i>Ardea Herodias fannini</i>	COSEWIC: Special Concern BC CDC: Blue-listed
Turkey Vulture	<i>Cathartes aura</i>	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	
Red-tailed Hawk	<i>Buteo jamaicensis</i>	
Barred Owl	<i>Strix varia</i>	
Common Nighthawk	<i>Chordeiles minor</i>	COSEWIC: Special Concern
Belted Kingfisher	<i>Megaceryle alcyon</i>	
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	
Hairy Woodpecker	<i>Picoides villosus</i>	
Northern Flicker	<i>Colaptes auratus</i>	
Pileated Woodpecker	<i>Dryocopus pileatus</i>	
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	
Olive-sided Flycatcher	<i>Contopus cooperi</i>	COSEWIC: Threatened BC CDC: Blue-listed
Warbling Vireo	<i>Vireo gilvus</i>	
Common Raven	<i>Corvus corax</i>	
Purple Martin	<i>Progne subis</i>	BC CDC: Blue-listed
Violet-green Swallow	<i>Tachycineta thalassina</i>	
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	
Red-breasted Nuthatch	<i>Sitta canadensis</i>	
Brown Creeper	<i>Certhia Americana</i>	
House Wren	<i>Troglodytes aedon</i>	
Pacific Wren	<i>Troglodytes pacificus</i>	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	
Swainson's Thrush	<i>Catharus ustulatus</i>	
American Robin	<i>Turdus migratorius</i>	
Cedar Waxwing	<i>Bombycilla cedrorum</i>	
Orange-crowned Warbler	<i>Oreothlypis celata</i>	
Townsend's Warbler	<i>Setophaga townsendi</i>	
Wilson's Warbler	<i>Cardellina pusilla</i>	
Western Tanager	<i>Piranga ludoviciana</i>	
Spotted Towhee	<i>Pipilo maculatus</i>	
Song Sparrow	<i>Melospiza melodia</i>	
Dark-eyed Junco	<i>Junco hyemalis oreganus</i>	
Brown-headed Cowbird	<i>Molothrus ater</i>	
Purple Finch	<i>Carpodacus purpureus</i>	
Red Crossbill	<i>Loxia curvirostra</i>	
Pine Siskin	<i>Spinus pinus</i>	

Appendix C. Photographic Documentation

PHOTO STATION	LOCATION (UTM Coordinates)	DIRECTION	PHOTO-GRAPHER	DATE YYYY-MM-DD	DESCRIPTION
Anthropogenic Features as noted on Figure 2					
P4	10U 449907 5427018	180°	CM	2018-04-26	Hiking trail in eastern portion of the property
P13	10 U 449907 5427018	360°	CM	2018-04-26	Hiking trail in eastern portion of the property
P3	10 U 449829 5426558	315°	CM	2018-04-26	Abandoned rotting lumber now decomposing
Natural Features as noted on Figure 2					
P1	Not taken		CM	2018-04-26	Fairy-slipper orchid
P2	10 U 449638 5427097	90°	CM	2018-04-26	Ann Eriksson with brass monument corner pin
P5	10U 449679 5426568	0°	CM	2018-04-26	Ozette coralroot
P6	10 U 449689 5427063	360°	CM	2018-04-26	Seasonal creek with skunk cabbage and ferns along old road bed
P7	10 U 449845 5426850	180°	CM	2018-04-26	Representative of Ecological Community 1. Douglas-fir forest with salal understorey
P8	10 U 449727 5427011	270°	CM	2018-04-26	Representative of Ecological Community 2 – mixed Douglas-fir/dull Oregon-grape and grand fir/three-leaved foamflower
P9	10 U 449753 5426703	270°	CM	2018-04-26	Representative of Ecological Community 3 – mixed Douglas-fir/dull Oregon-grape and Douglas-fir/arbutus
P10	Not taken		CM	2018-04-26	Raptor bones
P11	10 U 449831 5426983	90°	CM	2018-04-26	Extremely large veteran Douglas-fir
P12	10 U 449763 5427086	360°	CM	2018-04-26	Erosion on old road bed

Fairyslipper Forest Nature Reserve Management Plan 2019

P14	10 U 449914 5426734	310°	CM	2018-04-26	Small English holly plants
P15	10 U 449690 5426462	90°	CM	2018-04-26	Photopoint 1, southwest corner
P16, P17	10U 449793 5426471	270° 360°	CM	2018-04-26	Photopoint 2, southeast corner
P18, P19	10U 449837 5426577	180° 340°	CM	2018-04-26	Photopoint 3, on eastern boundary
P20, P21	10U 449873 5426603	200° 360°	CM	2018-04-26	Photopoint 4, on eastern boundary
P22, P23	10U 449885 5426691	180° 360°	CM	2018-04-26	Photopoint 5, on eastern boundary
P24, P25	10U 449945 5426728	225° 360°	CM	2018-04-26	Photopoint 6, on eastern boundary
P26, P27	10U 449942 5427093	180° 270°	CM	2018-04-26	Photopoint 7, northeast corner
P28, P29	10U 449638 5427079	90° 180°	CM	2018-04-26	Photopoint 8, northwest corner
P30, P31	10U 449644 5426625	180° 360°	CM	2018-04-26	Photopoint 9, along western boundary

* CM = Carrina Maslovat

Acoustic Survey of Bat Species Diversity:

Hunter's Pond, Thetis Island

August 2015

Prepared for:

Thetis Island Nature Conservancy
PO Box 18-2
Thetis Island, BC V0R 2Y0

Ann Eriksson¹ and Peter Ommundsen²
October 15, 2015

¹ Thetis Island Nature Conservancy

² Salt Spring Island Community Bat Program

Introduction

The goal of this survey was to sample bat species diversity at a wetland adjacent to a 17.8 ha property of conservation value on Thetis Island, British Columbia. Bats are attracted to wetlands as a source of insect prey and can utilize adjacent forest as roosting habitat. Half of the bat species in British Columbia are considered species at risk, and protection of ecosystems that support bats is of high conservation priority.

Site Description

The survey was conducted at the south end of Hunter’s Pond, adjacent to a potential nature reserve (Lot 1, District Lots 6 and 10, Thetis Island, Cowichan District), which is primarily maturing second growth Douglas-fir/Arbutus forest with a scattering of old-growth trees and snags . The site is located in the coastal Douglas-fir moist maritime biogeoclimatic zone and sampling was conducted lakeside.

Methods

A point location was sampled during eight nights (see Table 1) using a tree-mounted Anabat Express zero-crossings bat detector set for “night-only” recording, with the microphone sensitivity set at “115,” and frequency division set at “8.” The elevation of the bat detector was 2.0 metres. All acoustic files were visually inspected and species identifications made using the criteria of Humboldt State University Bat Lab (2011). Rare species were searched using Analook W filtered scans.

Results

The bat detector recorded 15,263 files during eight nights of sampling. One file usually represents a recording triggered by a single bat passing the detector, but in some cases two or more passing bats were recorded in a single file. The number of files per night is shown in Table 1. Bat species detected are listed in Table 2.

Table 1. Number of files recorded per night at Hunter’s Pond, Thetis Island, by the bat detector.

Date	Number of files	Time of first/last bat passing	Temperature degrees C evening/morning
2015 08 14	1848	2042 / 0600	20.25 / 17.00
2015 08 15	1453	2041 / 0556	18.75 / 14.75
2015 08 16	1987	2022 / 0602	21.25 / 17.75
2015 08 17	2023	2021 / 0602	23.50 / 19.5
2015 08 18	2025	2021 / 0603	26.00 / 21.00
2015 08 19	2079	2026 / 0604	25.00 / 17.50
2015 08 20	1918	2020 / 0600	20.25 / 17.00
2015 08 21	1929	2030 / 0608	19.75 / 14.25

Table 2. Bat species detected at Hunter's Pond, Thetis Island.

List of species inferred from examination of sonograms.

Big Brown Bat *Eptesicus fuscus*
Hoary Bat *Lasiurus cinereus*
Silver-haired Bat *Lasiorycteris noctivagans*
Long-eared Myotis *Myotis keenii* or *Myotis evotis*
California Myotis *Myotis californicus*
Little Brown Myotis *Myotis lucifugus*
Yuma Myotis *Myotis yumanensis*

Discussion

At least seven bat species were detected at Hunter's Pond, including the Little Brown Myotis which has a COSEWIC rank of "Endangered." It is possible that other species were present, such as the Townsend's Big-Eared Bat *Corynorhinus townsendii*, as that species is known to inhabit Thetis Island. Some calls were consistent with those of a Townsend's Big-eared Bat but no diagnostic sequences were observed.

The number of recordings (number of files) triggered by passing bats equals or exceeds results at other Gulf Island lakes and indicates the presence of large numbers of bats. The acoustic data from this short sampling period demonstrate that Hunter's Pond is very productive bat foraging habitat, and preservation of adjacent forest in its natural state would be a valuable complement to the wetland.

Literature Cited

Humboldt State University Bat Lab. 2011. Echolocation Call Characteristics of Western US Bats. http://www.sonobat.com/download/WesternUS_Acoustic_Table_Mar2011.pdf

Acknowledgements

The authors wish to thank the Salt Spring Island Conservancy for loan of a bat detector for this project.

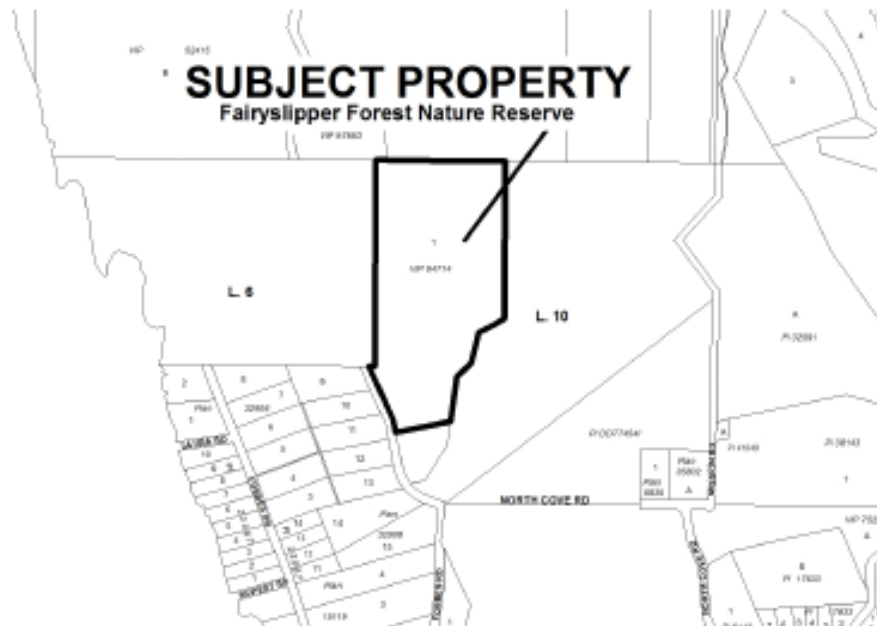
Appendix E. Letter to Residents of Thetis Island



October 1, 2018

Dear Neighbour,

The Islands Trust Conservancy is creating a management plan for the Fairyslipper Forest Nature Reserve on Thetis Island and we are interested in hearing from you.



Fairyslipper Forest Nature Reserve (PID 030-332-184, Lot A, District Lots 6 and 10, Township Thetis, Cowichan District; District Plan EPP76866) is a 16-hectare (40 acre) protected area on lower Burchell Hill. The Islands Trust Conservancy is working with the Thetis Island Nature Conservancy (ThINC) and the Cowichan Community Land Trust (CCLT) to manage the property in order to protect its unique ecological values. Fairyslipper Forest Nature Reserve is the first publicly accessible protected area on Thetis Island and is named after the fairyslipper orchid that dots the forest floor with its pink blossoms every spring.



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Fairyslipper Forest Nature Reserve has significant watershed values and contains sensitive Douglas-fir and arbutus woodland which is considered to be endangered or threatened in British Columbia. It is home to several species at risk, including the red-legged frog.

The management for the nature reserve focuses on protecting the natural values of the property. There will be restrictions on the use of the property outlined in a conservation covenant which will be held by ThINC and CCLT put in place to protect all of the native plants and animals on the reserve.

We would like to hear from the neighbours of the Fairyslipper Forest Nature Reserve with your ideas and concerns regarding the long-term management of this special place. Please complete a questionnaire on our website:

<http://www.islandstrustconservancy.ca/survey/>

or complete the enclosed questionnaire and scan and send it to me by email or mail, or drop off at the open house. There will be a drop in style open house on October 13, 2018 from 1:30-3:30 pm at the Forbes Hall Community Centre (292 North Cove Road) in conjunction with the ThINC AGM.

Many thanks for taking the time to consider the management of this nature reserve. For more information, please contact me at the number or email below.

Yours sincerely,



Nuala Murphy
Property Management Specialist, Islands Trust Conservancy
Phone: 250-405-5193
Email: nmurphy@islandstrust.bc.ca

The Islands Trust Fund has changed its legal name to the Islands Trust Conservancy. Please visit us on our updated website at www.islandstrustconservancy.ca.

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Appendix F. Management Planning Questionnaire for Fairyslipper Forest Nature Reserve

Fairyslipper Forest Nature Reserve Questionnaire

Fairyslipper Forest Nature Reserve is a 16-hectare (40 acre) protected area on lower Burchell Hill. It has significant watershed values and contains sensitive Douglas-fir and arbutus woodland which is considered to be endangered or threatened in British Columbia. It is home to several species at risk, including the red-legged frog.

Fairyslipper Forest Nature Reserve was protected in 2018 in partnership with the Thetis Island Nature Conservancy and the Cowichan Community Land Trust, thanks to the incredibly generous support of donors and granting organizations. It is the first publicly accessible protected area on Thetis Island. The Islands Trust Conservancy's primary goal is to protect and nurture the sensitive ecosystems on this land. To do that, we create a management plan, with revisions approximately every 10 years, to guide the management of the property. We are asking you to help us develop this plan. Please share your thoughts on the protection and long-term management of Fairyslipper Forest Nature Reserve.

1. Where do you live?

- North Thetis Island
- Mid Thetis Island
- South Thetis Island
- Off-island

2. Have you ever visited Fairyslipper Forest Nature Reserve? If so, how often?

- No, never
- Once
- A few times
- Once a year or less
- Once a month or more

3. If you have visited Fairyslipper Forest Nature Reserve, what did you do there?

- Hiking/walking
- Dog walking
- Wildlife viewing
- Other (please list)

4. Please list any wildlife and unique plant species you have seen at or near Fairyslipper Forest Nature Reserve?

5. What do you believe to be the most important values of nature reserves (choose three)

- Protection of habitat for at-risk species
- Ecosystem services (e.g. clean water and air, erosion control, groundwater recharge, etc.)
- Recreational opportunities
- Education and research opportunities
- Tourism
- Aesthetic appeal
- Conservation for the sake of the intrinsic value of nature
- Other (please specify):

6. What activities do you believe are incompatible with the protection of natural features, and should not be allowed within the Fairyslipper Forest Nature Reserve?

7. What do you feel could be the greatest threat to the health of this nature reserve, and should be the highest management priority for the Islands Trust Conservancy?

8. Please provide any other relevant information that will help us make the best management decisions for Fairyslipper Forest Nature Reserve.

9. Please share with us any history you know about this property or any knowledge you have about unique cultural or other special features on the property or nearby.

10. If you would like to receive periodic updates from the Islands Trust Conservancy on this and other conservation projects on the islands, please provide your name and email address:

Thank you for your time spent helping us plan the future of the Fairyslipper Forest Nature Reserve.

Appendix G. Letter to First Nations



October 12, 2018

Dear Chief and Council,

Re: Thetis Island Nature Reserves

The Islands Trust Conservancy, through its work as a land trust, is working on draft management plans for two protected areas on Thetis Island. These management plans would ensure long-term nature conservation of the lands. The protected areas include Fairyslipper Forest Nature Reserve and Moore Hill Nature Reserve (please see information and map below).

The Islands Trust and the Islands Trust Conservancy wish to acknowledge First Nations treaty and rights within the Islands Trust area and ensure that the direction of our management plans is reflective of reconciliation and conservation goals.

As well, we would like to ensure that the management plans are informed by the cultural significance and traditional use of the area to ensure that this significance and use is protected now and into the future. We understand that the cultural significance of the areas may be confidential and we would like to work with you to ensure the management plans reflect this significance appropriately.

Moore Hill Nature Reserve

The Moore Hill Nature Reserve (PID 000-324-671, Lot 9, District Lot 23, Thetis Island, Cowichan District, Plan 35106, Except Part in Plan 39716) a 21 hectare (52 acre) reserve protecting maturing Coastal Douglas-fir forest and rocky shoreline. Moore Hill forms one of the highest peaks on Thetis Island and contains a rich mix of habitat types. It is closed to the general public due to its cultural significance and dangerous terrain.

[REDACTED] Because of the ecological and cultural significance of the area, we would like to know if limited access is acceptable and if so, what terms of reference should guide this. [REDACTED]

[REDACTED] We would welcome any information to help us better understand and manage the Nature Reserve.



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significance of this location. We would welcome any information to help us better understand and manage the Nature Reserve.

The name Moore Hill does not recognize the historical or cultural significance of this location. As part of recognition and reconciliation the Islands Trust Conservancy would like to work with the Nations to rename the Natural Reserve either to its traditional name, or to a name that would be appropriate.

Fairyslipper Forest Nature Reserve

Fairyslipper Forest Nature Reserve (PID 030-332-184, Lot A, District Lots 6 and 10, Township Thetis, Cowichan District; District Plan EPP76866) is a 16-hectare (40 acre) protected area on lower Burchell Hill. Presently, the Islands Trust Conservancy is working with the Thetis Island Nature Conservancy and the Cowichan Community Land Trust to manage the property to protect its unique ecological values. Fairyslipper Forest Nature Reserve is the first publicly accessible protected area on Thetis Island and is named after the fairyslipper orchid that dots the forest floor with its pink blossoms every spring. Fairyslipper Forest Nature Reserve has significant watershed values and contains sensitive Douglas-fir and arbutus woodland which is considered to be endangered or threatened in British Columbia. It is home to several species at risk, including the red-legged frog.

The Conservancy's management for the Fairyslipper Forest Nature Reserve focuses on protecting the natural values of the property. We would welcome any information to help us better understand and manage the Nature Reserve.

Thank you for your kind attention to this matter. We look forward to hearing from you and beginning a conversation, please feel free to contact me at the number below.

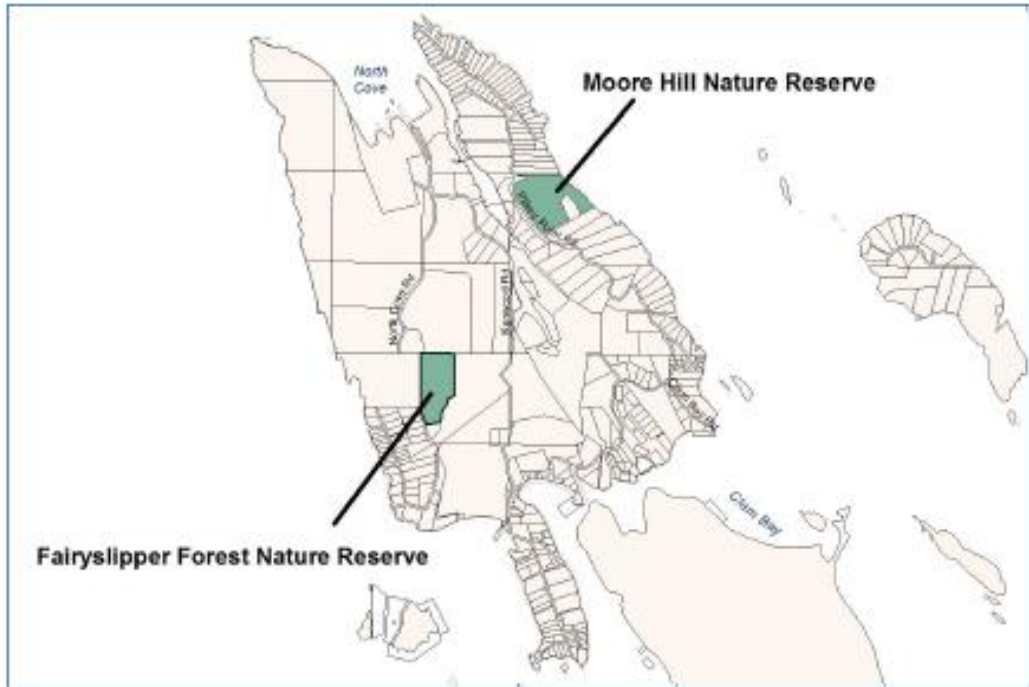
Yours sincerely,



Nuala Murphy
Property Management Specialist, Islands Trust Conservancy
Phone: 250-405-5193
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Appendix H. Photopoint Photographs of Reserve Boundaries



Photo 15. Photopoint 1 at southwest corner of the reserve, taken at 90°



Photo 16. Photopoint 2 at southeast corner of the reserve, taken at 270°



Photo 17. Photopoint 2 at southeast corner of the reserve, taken at 360°



Photo 18. Photopoint 3 on eastern property line, taken at 180°



Photo 19. Photopoint 3 on eastern property line, taken at 340°



Photo 20. Photopoint 4 on eastern property line, taken at 200°



Photo 21. Photopoint 4 on eastern property line, taken at 360°



Photo 22. Photopoint 5 on eastern property line, taken at 180°



Photo 23. Photopoint 5 on eastern property line, taken at 360°



Photo 24. Photopoint 6 on eastern property line, taken at 225°



Photo 25. Photopoint 6 on eastern property line, taken at 360°



Photo 26. Photopoint 7 at northeast corner of the reserve, taken at 180°

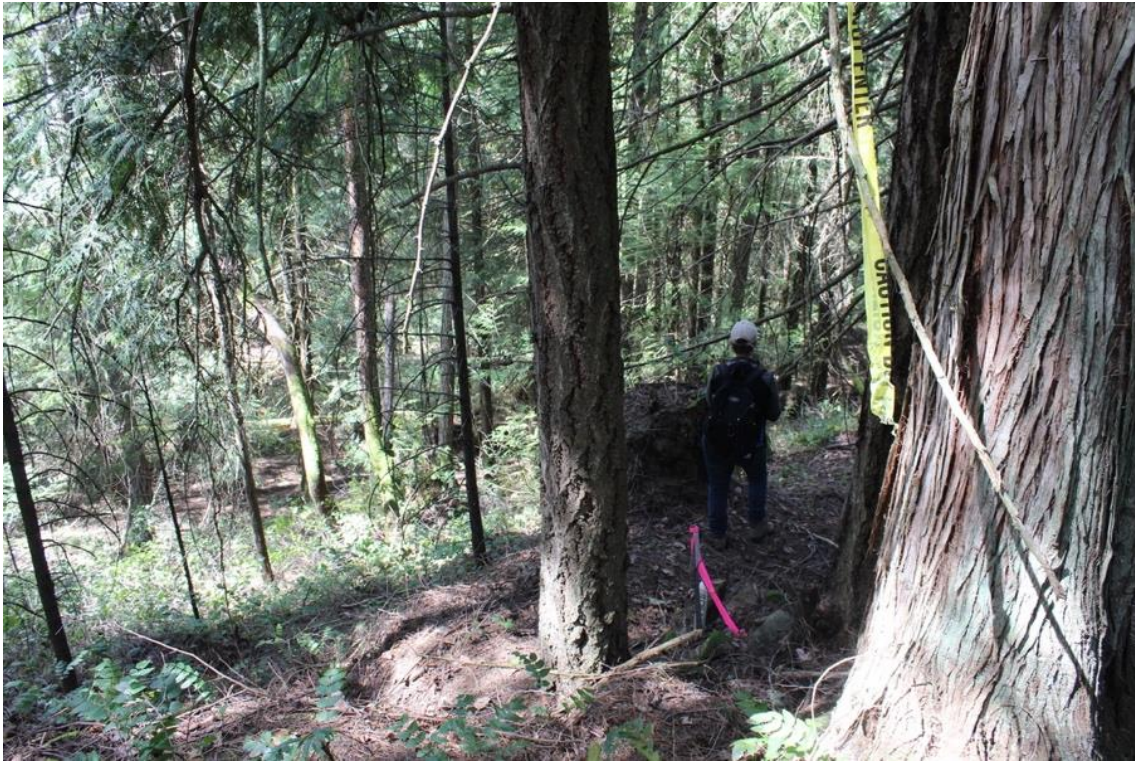


Photo 27. Photopoint 7 at northeast corner of the reserve, taken at 270°

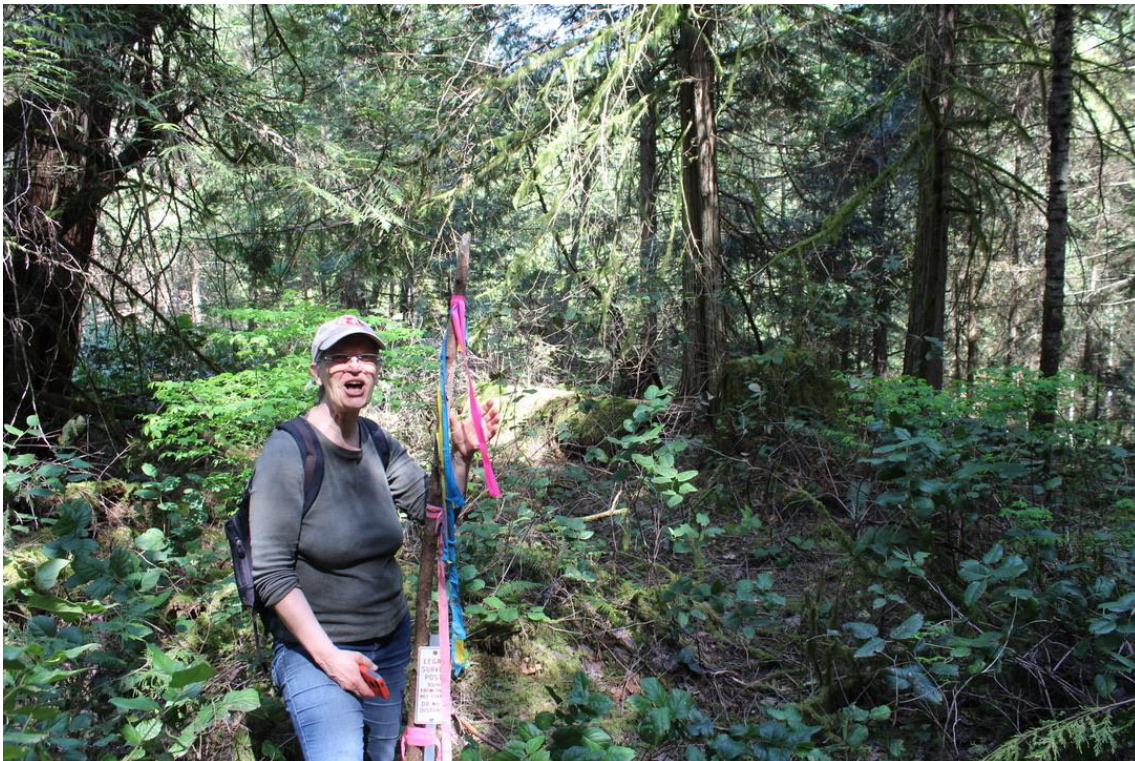


Photo 28. Photopoint 8 at northwest corner of the reserve, taken at 90°



Photo 29. Photopoint 8 at northwest corner of the reserve, taken at 180°



Photo 30. Photopoint 9 on western boundary, taken at 180°



Photo 31. Photopoint 9 on western boundary, taken at 360°