



SQUAXIN ISLAND TRIBE

RESOLUTION NO. 05-73

of the

SQUAXIN ISLAND TRIBAL COUNCIL

WHEREAS, the Squaxin Island Tribal Council is the Governing Body of the Squaxin Island Tribe, its members, its lands, its enterprises and its agencies by the authority of the Constitution and Bylaws of the Squaxin Island Tribe, as approved and adopted by the General Body and the Secretary of the Interior on July 8, 1965; and

WHEREAS, under the Constitution, Bylaws and inherent sovereignty of the Tribe, the Squaxin Island Tribal Council is charged with the duty of protecting the health, security, education and general welfare of tribal members, and of protecting and managing the lands and treaty resources and rights of the Tribe; and

WHEREAS, the Tribe is a federally-recognized Indian Tribe possessing reserved powers, including the powers of self-government; and

WHEREAS, the Squaxin Island Tribal Council has been entrusted with the creation of ordinances and resolutions in order to fulfill their duty of protecting the health, security, education and general welfare of tribal members, and of protecting and managing the lands and treaty resources of the Tribe; and

WHEREAS, it is in the best interests of the Squaxin Island Tribe to manage the forest resources of the Reservation so that healthy forest stands and potential timber yield may be sustained over the long term while minimizing harm to other natural and cultural resources of Squaxin Island; and


WHEREAS, the Tribal Council adopted the Squaxin Island Forest Management Plan on February 11, 1982 but the Squaxin Island Forest Practices Management Plan was not subsequently codified; and


WHEREAS, the Natural Resources Department, in consultation with the Bureau of Indian Affairs, has since proposed revisions to the Squaxin Island Forest Management Plan for adoption (as attached);

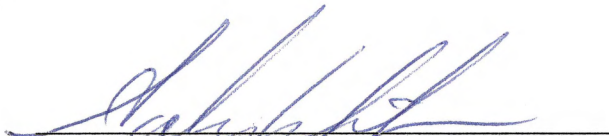
NOW THEREFORE BE IT RESOLVED, that the Squaxin Island Tribal Council hereby adopts the Squaxin Island Forest Management Plan.

CERTIFICATION

The Squaxin Island Tribal Council hereby certifies that the foregoing Resolution was adopted at the regular meeting of the Squaxin Island Tribal Council, held on this 25th day of August, 2005, at which time a quorum was present and was passed by a vote of 4 for and 0 against, with 0 abstentions.


James L. Peters, Chairman

Attested by: 
Vincent Henry, Sr., Secretary


Andrew D. Whitener, Vice Chairman

SQUAXIN ISLAND TRIBE FOREST MANAGEMENT PLAN

NATURAL RESOURCES DEPARTMENT



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CHAPTER ONE

INTRODUCTION

Nestled between the rugged mountain peaks of the Olympic Peninsula and the snow-capped volcanoes of the Cascade mountains, the inland sea stretches forth in mystery and enchantment, and clasped within the palm of her hand is a pearl of great beauty; a small island known as Squaxin. Squaxin Island is centered near the entrances to the seven inlets of southern Puget Sound which surround it like the cross poles of a sacred hoop. This is where our lifeblood begins and flows. This tiny island of sea fog and rain, salmon and cedar, is undaunted by the ebb of time. One with the sea that surrounds her, the pulse of the island is rhythmic and primal; it has become the very soul of the tribe that bears its name.

- Introduction for Harstein Oyster Company web page

Preface

The revised Forest Management Plan for Squaxin Island Indian Reservation is an organized effort to provide guidelines that will apply to forestry practices on the Island with consideration for and accounts of cultural resource holdings and the ecological health of the upland and the tidal zone. Furthermore, it provides an integrated document incorporating diverse values that emphasize habitat ecology, multiple-use strategies and the exercise of individual ownership rights with consideration for a limited resource. It will serve as a basis for decision-making by Squaxin Island Natural Resources Department and the Tribal Council.

The Island's relatively small size (1,487 acres not including tidelands), fractionated ownership, and lack of access make management planning difficult. Since the Island's quantity of timber and the scope of any logging operation are too small for the reservation to be important from an industrial standpoint, a modified forest management or operating plan is presented. All management decisions will be made with consideration for the possibility of land acquisition on Squaxin Island.

The plan is subdivided into multiple broad subjects discussing individual topics in detail. These subjects include:

- Management direction involving management's goals and objectives to reach a desired future condition of the forest resources;
- A resource protection program addressing timber protection, cultural interests and harvest policy standards;
- Forestry organization, planning, coordination and communication with other departments; and
- Wildland fire protection and management.

The following planning objectives were developed in order to fulfill the management goals stated above.

1. Provide management alternatives (Environmental Assessment) for the purpose of deciding the management direction desired.

2. An inventory and analysis of resources compiled and maintained to provide baseline information to craft adaptive management decisions.
3. Determine the annual allowable cut for each management alternative.
4. Establish resource management priorities for the forested and tidal areas.
5. Establish forest standards and practices to protect all resources.
6. Develop a process of review that involves all tribal resource departments.
7. Provide an opportunity for community input regarding all management activities.

Forest-Wide Goals and Policies

Forest-wide goals and policies are to be used in conjunction with the management area prescriptions to establish broad requirements and consideration on the planning and implementation of forest practices within the Squaxin Island Reservation. They are intended to work in cooperation with other Squaxin Island land use regulations, ordinances, and planning policies.

Human Aspect

Goal

Manage the forest resources in a manner that is consistent with the social, economic, and cultural objectives of the Squaxin Island Tribal Community.

Policy

Respect, support, and complement the traditional, spiritual, cultural, social, and administrative uses of the land by the Squaxin Island Indian Tribal Community.

Economic Development

Goals

Assist the Squaxin Island Tribal Community, its members, and trust landowners in meeting their economic goals.

Develop a dynamic sustainable harvest plan that reflects changes in the timber markets and to provide opportunity for non-traditional forest resource markets.

Develop and provide for multiple uses of forest resources on the Squaxin Island Reservation.

Policies

The Squaxin Island Forestry Program will strive for efficient operation, developing, and selling of forest products for financial return, while maintaining the biodiversity, and sustainability of the Squaxin Island forest resources for continuous production of forest products in perpetuity.

Cultural Resources

Goal

Protect and preserve areas, sites, objects, and places of significance to the Squaxin Island Tribal Community.

Policies

Before any ground-disturbing activities, professional staff will perform surveys to identify significant cultural, historic, or archaeological sites and to develop plans for protection, conservation, or restoration as necessary.

The Squaxin Island Cultural Resource office will review all project plans for timber sales or other substantial ground-disturbing projects.

Conflicts between forest management activities and traditional resources will be resolved in project plans.

Identify sensitive habitat during timber sale planning that can be enhanced, restored or developed for the purposes of a healthy ecosystem.

Natural Resources

Goal

Protect and preserve areas of ecological importance and sensitivity for the purposes of island forest and tideland health.

Policies

Identify sensitive habitat during timber sale planning that can be enhanced, restored or developed for the purposes of a healthy ecosystem

Maintain and increase protective buffers for ecologically sensitive areas including wetlands, riparian areas, tidelands and unstable slopes.

Protect and preserve buffer functions for shorelines, wetlands, riparian areas and unstable slopes.

Retain native protective vegetative cover to meet water quality standards and objectives.

No chemicals or chemical drift will be allowed in buffer areas.

Externally Imposed Federal Laws and Regulations:

1. Title 25, Code of Federal Regulations (CFR)
2. National Indian Forest Resource Management Act (NIFRMA, 25 USC 3101)
3. The Endangered Species Act (ESA, 42 USC 1531)
4. Federal Water Pollution Control Act (Clean Water Act, 33 USC 1251)
5. National Environmental Policy Act (NEPA, 42 USC 4321)
6. Clean Air Act (42 USC 7401)
7. National Historic Preservation Act (16 USC 470)
8. Bald Eagle Protection Act
9. Essential Fish Habitat provisions of the Magnuson-Stevens Act
10. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA, 7 USC 136)

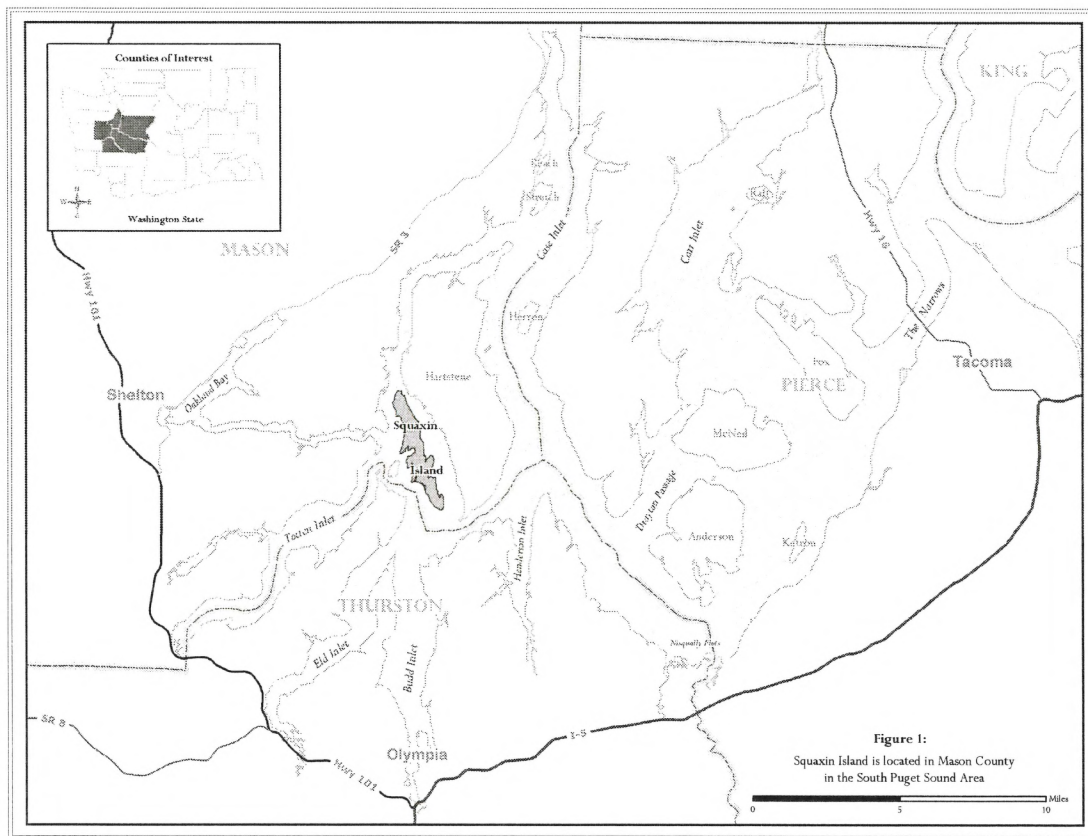
11. Toxic Substance Control Act (TSCA, 7 USC 136 and 15 USC 2601)
12. National Historic Preservation Act of 1966, as revised (NHPA) 36 CFR 800, 16 USC 470f
13. Archaeological Resource Protection Act of 1979 (ARPA) 16 USC 470ee
14. Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) Public Law 101-601, 43 CFR 10
15. Antiquities Act of 1906 16 USC 431-433
16. National Environmental Policy Act of 1969 (NEPA)
17. Executive Order 11593 – Protection and Enhancement of the Cultural Environment of 1971
18. Executive Order 13007 – Indian Sacred Sites

CHAPTER TWO

RESERVATION ENVIRONMENT

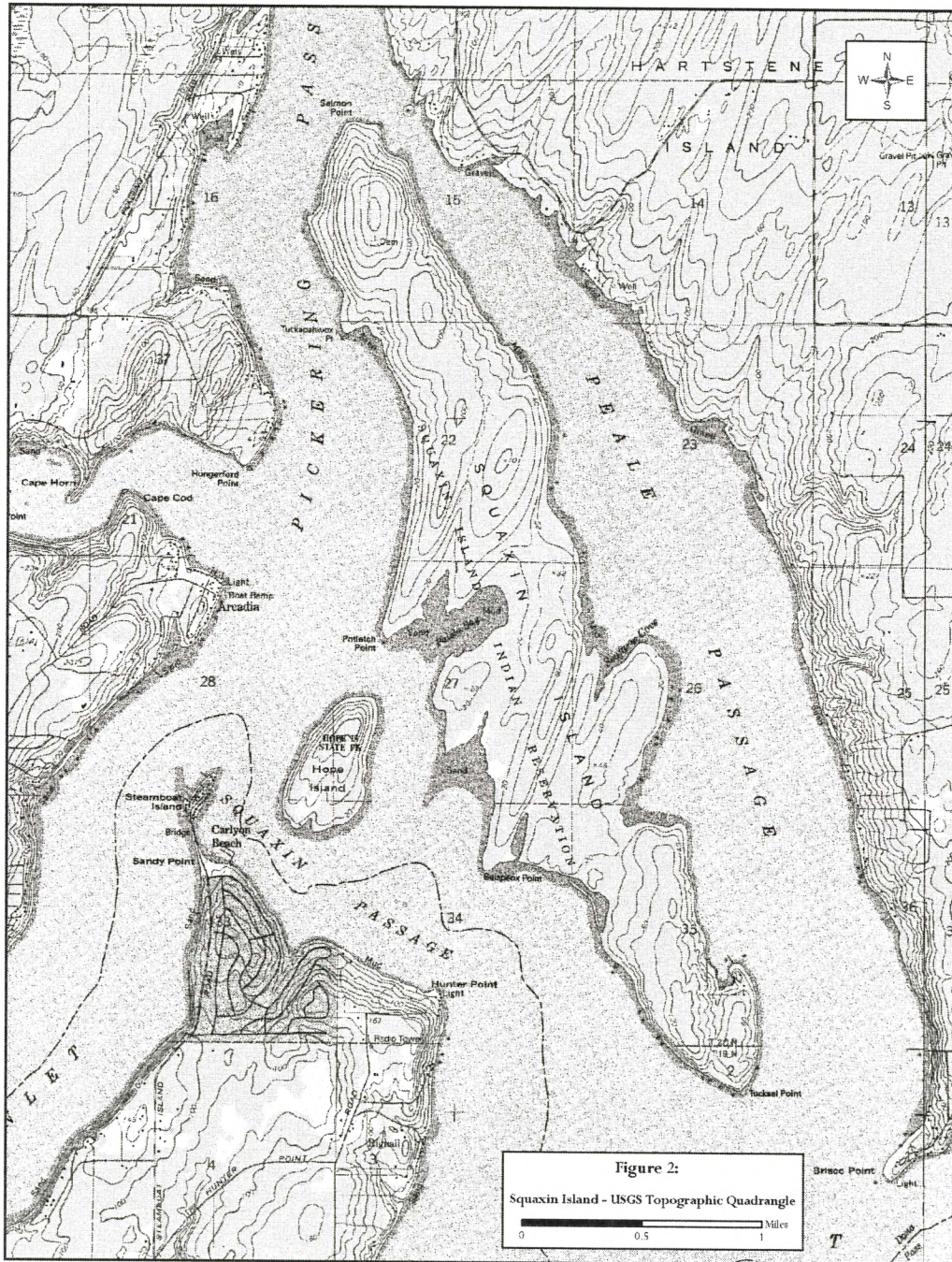
Location and Topography

Squaxin Island occurs at the junction of Budd, Totten, Eld and Hammersley Inlets and between Peale and Pickering Passage. Squaxin Island is positioned approximately ten miles north of the township of Olympia and 9 miles east of the township of Shelton (Figure 1). It lies in the southernmost tip of the Puget Sound and is contained in the region known as the Puget Trough. Access is only by boat and there is no road system on the island. Terrain on the island is a gently rolling series of hills generated about 15,000 years ago when the southern tongue of the last glacier receded rapidly leaving the lowland covered with glacial deposits. These deposits construct the landscape structures that reach a maximum elevation of 180 feet above sea level on the northern tip of the island.



Slopes on the island average from 0 to 15 percent, except in two small areas on the northern end that vary from 15 to 30 percent slope. One third of the island has slope of less than 5 percent and about one half of the island contains slopes between 5 and 15 percent (Figure 2). The island is approximately 4 miles long and varies in width from three-tenths to nine-tenths of a mile. The area totals 1,978 acres and is divided into ownership categories of tribally owned, allotted and alienated. All of the island's tidelands and small amount of the uplands are owned by the Squaxin Tribe and are held

in trust by the United States. The tidelands, totaling 492 acres, are entirely owned by the Tribe (Coastal Zone Management Study, NWIFC 1975). The uplands that were not alienated are allotted trust lands held by individual families (Figure 3.) that over time have been divided in an inheritance pattern that increases the number of owners (Comprehensive Plan, 1971).

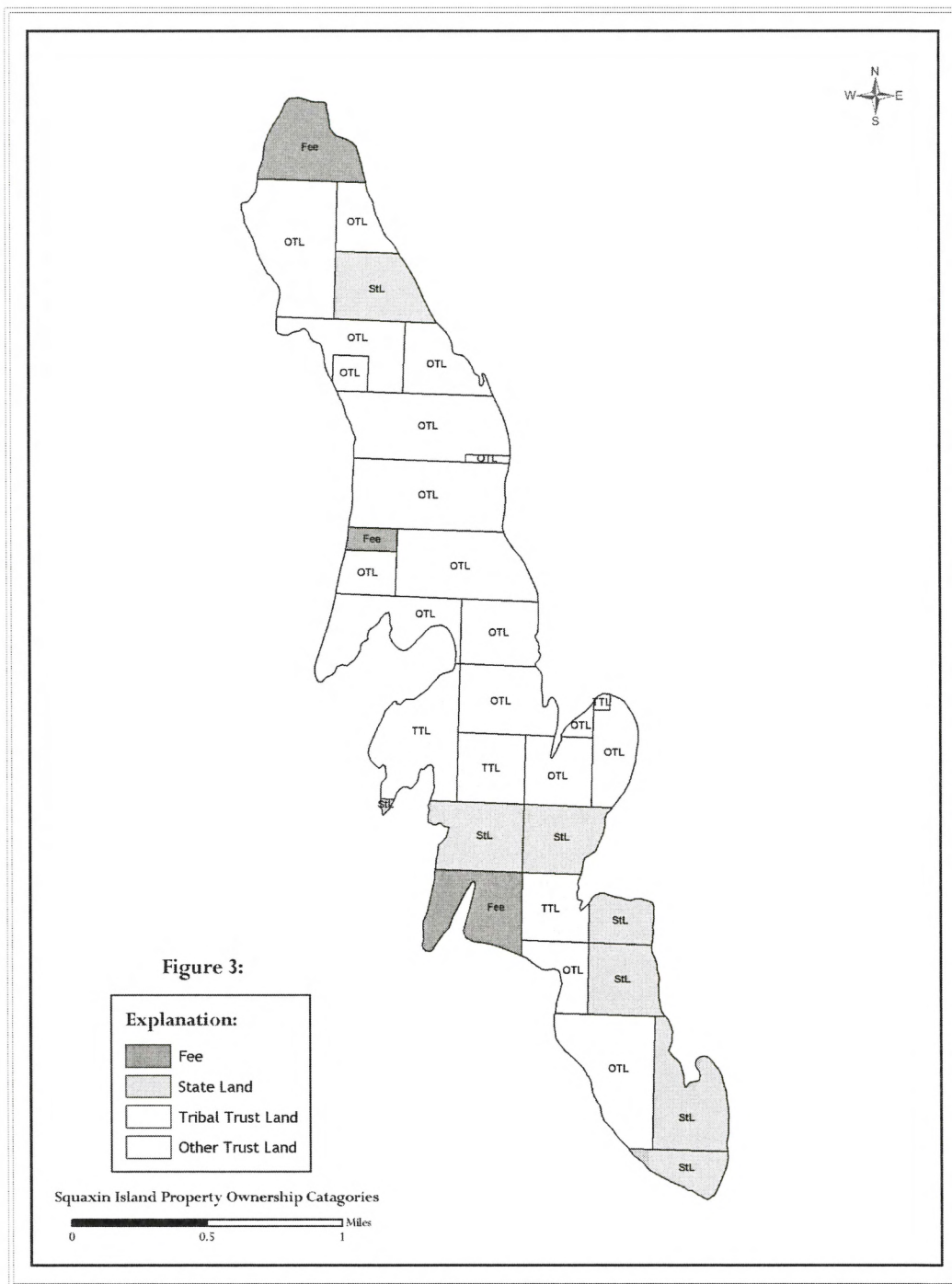


Climate

Squaxin Island is influenced by the maritime climate of the Pacific Northwest and is characterized by warm, dry summers and cool, wet winters. Typical precipitation for lower elevations in this region occurs almost entirely as rainfall during the months of October through April. The Months of June through September are usually quite dry. No direct precipitation data is available for the island; however it is known to lie within a region that can have large precipitation changes over short distances as a result of the orographic affect of the Olympic mountain range. During the 49-year period from 1948 to 2001, average annual precipitation for the City of Shelton was 66.19 inches. For the same period, the City of Olympia received an average of 51.25 inches. Maximum rainfall occurs in December ranging from 8.22 inches in Olympia to 11.09 inches in Shelton while minimum rainfall occurs in July in the range of 0.76 to 0.94 inches between the two cities. The variance of average temperatures for the area is 77.0 to 77.1 °F for the month of July and 31.4 to 33.1 °F for the month of January.

Demographics

Squaxin Island was set aside and the Tribe was relocated according to the agreement put forth by the Medicine Creek Treaty in 1855. The pre-treaty people that were required to live together by the terms of this agreement originated from five separate Tribes living in Case, Hammersley, Totten, Eld, Budd and Henderson Inlets. The Squaxin Island Tribe consists of descendants of the original inhabitants of the seven inlets of South Puget Sound which includes the Noo-Seh-Chatl of Henderson Inlet, Steh Chass of Budd Inlet, Squi-Aitl of Eld Inlet, Sawamish/T'Peeksin of Totten Inlet, Sa-Heh-Wa-Mish of Hammersley Inlet, Squawksin of Case Inlet and S'Hotle-Ma-Mish of Carr Inlet. The island was occupied by the original people and their descendants until some time in the late 1950's and 1960's; several acts of Congress provided for a transition off the island and the sale of allotted lands. Today tribal membership is approximately 700 enrolled members (pers. comm., Tammy Ford, Enrollment Manager) that do not currently reside on the island.



Land Use

Squaxin Island is managed for healthy forest ecosystems and to protect the tidelands and the health of the shellfish beds. Timber was harvested across most of the island in the early part of the last century. There are several building structure remnants, several holes that were excavated for wells, a couple of burial sites and one area in particular that is

notable for the variety of cultivated plants surrounding an abandoned homestead. The Henry Cooper No. 20 allotment, totaling a little over 40 acres, was harvested most recently. It was clearcut in 1987 and reforested with a combination of Douglas-fir and western red cedar seedlings in 1988. Eighteen acres located on the southern tip of Squaxin Island were managed as a State Park for several years until it was closed down in 1990. In recent years there has been little forestry activity on the island while being used extensively by tribal members for other purposes including hunting, fishing and camping. There has been little impact to the land and water, soil and air quality are high. The tidal areas are regularly harvested for commercially valuable shellfish.

The Geologic Setting

Massive glacial ice sheets covered the entire Puget Sound between 14,000 and 15,000 years ago. The retreat of these glaciers left large amounts of inorganic debris deposited at the southernmost terminus—generally extending over Mason, Thurston and Kitsap counties. The deposits are as much as 2,000 feet deep. The three general types of deposits are:

1. Sand and gravel.
2. Till—a mixture of rock fragments consisting of clay, sand, gravel and boulders, intermingled in any proportion, deposited by the ice as it moves over the substrate. Till is often termed “hardpan”.
3. Clay and silt—deposited in local depressions filled by lakes and ponds.

Compact glacial till underlies most of Squaxin Island at depths varying from 36 to 48 inches. The areas of clay/silt and sand/gravel are, for the most part, isolated deposits at the perimeter of the Island, except for an approximately 1,000 foot band of clay and silt which crosses the Island about one mile north of Unsal Point.

The Soil Resources

Six soil series are identified on Squaxin Island by the U.S. Soil Conservation Service in the Mason County Soil Survey: Bellingham, Kitsap, Sinclair, Indianola, Coastal beach and Tidal marsh. The most common soil on the Island is the Sinclair series. The Kitsap series is the second most commonly occurring soil. The following list is a forest management consideration of each series:

Sinclair:

The Sinclair series is the predominant soil on Squaxin Island. Trees grow slowly on these soils. Douglas-fir grows fairly well, but red alder occurs where surface drainage is slow. Site class varies from 4 to 5, depending on soil texture.

When the underlying till or hardpan is at moderate depths, trees are most susceptible to wind throw. Tree roots occur near the surface and may even be exposed. Logging equipment may damage exposed roots, providing an entry vector for pathogens that can cause root rots.

Indianola:

This is an upland soil that has developed from glacial outwash. Areas characterized by this soil contain almost pure stands of Douglas fir with some lodge pole pine. Competing hardwoods are not a problem and Douglas fir readily restocks logged areas.

Wind throw is generally not a problem, since trees typically have deep, well-anchored roots on this soil type. Skidder logging is possible year-round with no damage to tree roots. Indianola soils tend to be sandy and well drained.

Kitsap:

Kitsap soils are upland soils that have developed from glacial lake sediments. They are silty soils that tend to be moderately well drained, with hardpan only at considerable depth. Kitsap soils tend to support predominantly mixed stands of alder and maple with considerable amounts of Douglas fir.

Wind throw is a problem in Kitsap soils since the trees are shallow-rooted. This is particularly true when the soils are saturated or when associated with a shallow, fine textured subsoil. Winter tractor logging is not permitted. Erosion and surface runoff can be a serious problem as surface and internal drainage is slow. However, these soils are not usually waterlogged or swampy.

Bellingham:

Bellingham series are poorly drained soils found in upland depressions. Forests consist primarily of alder, maple, hemlock and cedar, with Douglas fir less common. Alder and maple are predominant on soils with less standing water.

Any partial cutting is hazardous, leaving trees susceptible to wind throw as root systems are shallow. Ground vegetation under hardwoods is dense and presents a brush competition problem after logging. Any clear cutting should be immediately followed by scarification, exposing mineral soil to assure survival of most desirable trees.

Coastal Beach:

This soil series consists of long, narrow beach-line areas of sand and gravel, with slopes between 0 and 2 percent. Coastal beaches are often washed by extreme high tides or by storm waves, although it is above reach of average tides.

Tidal Marsh:

Tidal marsh is a nearly level soil series normally covered by salt water during high tides. The soil is composed of various kinds of silt and sometimes very fine sand, and supports salt-tolerant vegetation, such as grasses and sedges.

Coastal and Tidal Zone

Squaxin Island has a shoreline and beaches similar to the other islands in the Puget Sound. These areas are characterized by cobbles, with gravel and shell material to predominantly mud, sand and/or silt, underlain in many places by hardpan clay. Sand and gravel are the dominant components of the eastern shore, except in the exposed areas of coarse gravels, cobbles and large rocks. Natural forces that determine these variances include winds, storms and tidal currents. Greater exposure on the western shore creates a

substrate environment of coarse material. These characteristics do not support the type and amount of commercially valuable shellfish communities that occur on the eastern side.

The island is categorized by two dominant shore types; rocky shores in areas of exposed water and mixed sediment along the protected areas. The communities of organisms associated with each area are unique with regards to their ability to use the substrate to their advantage in foraging and survival.

CHAPTER THREE

SUMMARY OF MANAGEMENT PLAN

The 2005 Squaxin Island Forest Management Plan is the guiding document for forest practices on the 1978.86 acres of the Squaxin Island Indian Reservation. Its format is based on the Bureau of Indian Affairs Manual (BIAM) 53, Supplement 2, Section 3 and 25 Code of Federal Regulation (CFR) 163. This management plan should be reviewed in 2015 to adjust for any possible changes in goals and objectives. Should forest practices remain constant along with the goals and objectives of the Tribe, the Plan may be extended without modification.

The timber assessment of Squaxin Island is presented in tabular data (Appendix II). The policy of the management plan is constructed around specific goals and objectives. The goals and objectives of the Squaxin Island Tribal Council are most concerned with forest protection, fish and wildlife habitat protection, watershed management, cultural values, economic interests and recreation. The management plan timber harvest strategy is based on area regulations to determine sustainable harvest on the island. Based on multiple management objectives there is justification to maintain the forested character of the island. Therefore, no single harvest unit will be allowed to exceed a continuous area of 25 acres. The location of clear cut harvests will not be on adjacent properties and will be separated by location on the South or North half of the island. Clearcuts will not exceed two per year of the continuous area equivalent to 25 acres.

Management and silvicultural regimes are planned with the purpose of promoting overall forest health. Squaxin Island Cultural Resources Management Office will be consulted and participate in the evaluation of all forest practices on the island. This document contains a specific chapter (Five) regarding the cultural in holdings of the island and the management goals and objectives.

Replanting of harvested sites that are understocked will be a management goal. Tree species will be determined from a native landscape perspective. The sites will be planted with species chosen on the basis of the characteristics of each site. Western red cedar trees will be left standing. These trees are culturally significant to tribal members for traditional uses, particularly the roots and bark. In the case of overstocked stands and forested riparian buffers, consideration can be given to pre-commercial thinning for the purposes of improved habitat quality.

An additional category of significant trees include culturally modified trees (CMT). Multi-topped trees and other non-typical shapes are viewed as a nuisance issue from a timber-marketing standpoint, the typical solution to which is removal of the tree. A determination must be made by the CRMO (Cultural Resources Management Office) through consultation with Tribal members whether the tree was naturally altered, and can be removed, or was culturally modified, and should be protected.

Low impact timber harvest will be done by encouraging helicopter (or other aerial) transport of timber, implementing regulations that discourage other options and by promoting new technology that may be developed. In addition buffer zone widths will be increased and the placement of log dumps will be eliminated or laid out to reduce detrimental impacts to wetlands, tidal areas and economic assets of the Tribe. Timber

harvest will be implemented so that road building will be unnecessary with the possible exception of swing roads, skid roads and landings. The impacts of heavy equipment on the glacially derived soils that comprise the majority of forest soil types will be reduced and potentially eliminated through the use of low impact harvest technology.

Insects and pathogens that affect tree and forest health occur on the island. Typical infections for this type of forest are root rot and beetle infestations for which there are management prescriptions and an overall goal to maintain healthy forest conditions. In the strips that were surveyed to have white pine trees there is a possibility of white pine blister rust because there were noticeable amounts of dead trees, but this could also be a result of a drought kill. No conclusive determination was made as to the cause of mortality.

Wildfire control and suppression are a management concern over most of the island although surveys showed that there is not a significant fuel load anywhere that was surveyed on the island and current fire danger is slight to moderate. The southern half of the island is covered so thickly on the ground with salal and evergreen huckleberry that it would be difficult to get a fire started. Lightning might ignite a ground fire but there is not enough fallen material to reach the crowns of the healthy trees. The island is narrow and small enough to provide for the use of water from the surrounding passages dumped from helicopter buckets to control a wildfire.

Observation and timber stand quality supports the hypothesis that deer populations are limited on the southern end of Squaxin Island and much better supported on the northern end. The deer population on the island is limited mostly by area as the deer have been observed swimming to the island to forage and find refuge from hunting pressures seasonally (Pers. Comm., SITNR wildlife manager).

Special forest products are vegetation other than timber that have value and hence the potential for generating revenue. This category deserves consideration on the basis of the potential for exploitation, permitting and trespass issues. There is also the need to assess and catalogue cultural resources, which includes traditional uses of native plants for materials and medicinal purposes.

All applications and permits are distributed by the Natural Resources Department as required for class I forest practices on the Island (Squaxin Island Forest Practices Act and Regulations) and the sales policy will follow current Bureau of Indian Affairs procedures and standards. It is to be noted that the Squaxin Island Tribal Council recognizes that plans are subject to change and that the forest management plan will be revised and updated as necessary to be consistent with new information as it becomes available.

The environmental assessment in Appendix I included with this report addresses the biological condition of the resources on the island and discusses the two management alternatives.

CHAPTER FOUR

MANAGEMENT PLAN

Squaxin Island Management Goals and Objectives

Forest management on Squaxin Island provides certain challenges to the development of a long range plan for the following reasons: 1) The island is small in area and distributed along a very narrow north-south axis; 2) Access to the island is limited by tribal control of the tidal zone (492 of 1,978 acres) and by a lack of docking structures that would provide for large water transportation equipment; 3) The majority of the island soils are characterized as glacially derived and underlain by hardpan, which contributes to increased concerns for environmental degradation; 4) 1,486 acres of the island are divided into ownership categories of allotments, trust lands and fee lands; 5) The cultural backdrop engenders a political setting that is especially sensitive to preserving the natural environment of the island for the purposes of tribal unity and generational continuity.

This revised forest management plan therefore takes up the issues of resource management with less consideration for the harvest of timber and the market value of wood. More consideration is given to the establishment of a long-term view of what the island will be like as the timber stands age and the Tribe is able to acquire more property through the generation of revenue through other enterprises not associated with the exchange of natural resource assets in the form of timber revenue.

Consideration must be given to the aquaculture industry and the overall health of the island and its unique natural features. The Tribe needs also to be concerned with identifying and preserving archaeological sites, described in chapter five (Cultural Resources), that have until now gone undetermined and will be considered a priority for many years as the goals and timelines are formulated and met.

Management goals for the revised forest management plan are outlined as the following:

- Minimize adverse impact on the aquaculture program from forest activities by protecting the water on and surrounding Squaxin Island.
- Secure the land base on the island through land acquisition for the purpose of Tribal control necessary for maximum Tribal benefit and economic return.
- Develop the island resources responsibly and promote good stewardship standards that will persist into the future.
- Continue to respect the interests of alienated and fee property-owners, while such property exists on Squaxin Island.

Regulation

Squaxin Island is not held in uniform ownership making it difficult for all parties to agree on general management or forest planning. The limited acreage of the Island requires that it be considered as a single unit for the purposes of planning allowable annual cut and other long and short-term management strategies that the Tribal Council has considered best for a uniform strategic approach to the revised Forest Management Plan. Tribal Policy is to acquire fee land on Squaxin Island whenever feasible to regain

exclusive ownership of the Reservation. Until the lands revert to tribal ownership, fee landowners may enter into the Squaxin Island forest management system with proper permits for the purposes of forest practices on private land. The plans for forest regulations were developed on a biological/economic rather than on a political basis.

Harvest Practices

The goal for forest management on Squaxin Island is to promote a healthy second-growth forest and to address the health of the tidelands that border the island. The need to satisfy the concerns of individuals that wish engage in forest practices will be considered thoughtfully in the standards and modifications of this forest management plan. A forest regulation method that is specifically not compatible for timber harvest planning on Squaxin Island is volume control, defined as an annual board foot harvest goal. An annual allowable cut, or even a five or ten year cutting budget, may not be compatible with excessive or minimal timber sales requests.

A more flexible regulation standard is area control, which is described as an annual quota based on an acreage harvest goal. This provides a practical solution for meeting the pressures from some landowners to harvest timber. The entire area of the Island uplands is 1,487 acres, which is the land base used to determine a sustainable harvest area. The Island is classified as a site class III and IV for Douglas fir with a rotation age of 70 years, the 70 year rotation standard will meet merchantability standards that include smaller and smaller logs and make this an economically feasible rotation age. Some stands on the island may reach economic rotation age at or near 50 years.

The annual harvest acreage is not economically feasible in terms of volume or adequate to meet the current demands for timber sales; a modified program based on a longer cutting cycle of 105 acres once every ten years is recommended. Over cut is not to exceed 10%, which will be calculated into and deducted from the next cutting cycle. Thinnings and partial cuts are not included in annual acreage determination.

In order to deter the possibility of large clearcuts, the maximum clearcut opening per ownership will be limited to 25 acres or 50% of the ownership acreage, whichever is determined to be less. The ownership parcel could be clearcut to the limit with the rest of the parcel thinned in one ten year cutting cycle. The thinned property would then be eligible to be clearcut, with the clearcut harvest area counting towards the next cutting cycle.

All clear-cut and thinning units will be located so as to comply with the Shoreline Protection Zone (200') and the Streamside Protection Zone (100'). Logging and thinning will be in strict compliance with the Squaxin Island Forest Practices Act pertaining to post-harvest clearing and reforestation.

In addition to the recommended cutting sequence there will be consideration and inclusion of blow-down salvage and defective and dying timber that may not survive through another ten year cycle. An alternative to this would be leaving down wood for the purposes of providing nutrients and structure for the recovery of harvested areas. Special requests will have to be submitted to the Natural Resources department for an evaluation and to get permission to take the down wood.

The kind of area control to be implemented is inconsistent with sustained yield management to maximize timber harvest volume over time. It does, however, set up an orderly progression of timber sales that are economically viable while simultaneously preserving the Island's traditional forested nature.

The cutting cycle regulations give priority to the importance of aesthetic concerns, protection and promotion of wildlife in providing both adequate shelter and browse, and the primary concern of protecting the Island's littoral zone including aquacultural and fishery resources.

Cultural Resources will also be given priority in determining the sensitivity of all proposed logging sites in order to protect the integrity of archaeological assets that have yet to be appraised and catalogued. Furthermore, the logging sequence specified for timber sales in any one ten year cycle should give priority to those lots closest to open water log dumps and/or any existing roads. Log dumps will not be permitted within the island's tidal zone nor will logs be stored in any bays or coves located on Squaxin Island. The BIA shall be responsible for obtaining necessary easements or rights of way.

Silvicultural and Management Prescriptions

The choice of specific silvicultural prescriptions should be made with consideration for following factors:

- The current condition of the forest stand;
- The desired future condition of the forest stand;
- Constraints to management such as Tribal concerns, cultural resources, wildlife issues, buffer widths, riparian areas, unstable slopes, wetlands etc.
- Federal laws.

The forested area of Squaxin Island is characterized as even-aged. Most of the stands have trees that are between 80 to 120 years old that originated clearcut harvest. There are also some stands that are 20 years old that originated from more recent clearcut harvest. Even-aged stands have trees that are the same age and have a single canopy.

The regeneration harvest method employed is clearcutting (include modified clearcuts). Other intermediate harvests include commercial thinning, and timber stand improvement cuts. Selection of which harvest method to use will be based on individual stand characteristics and the objectives of the owner(s). Primary emphasis will be to preserve functions of the forest for ecosystem health.

In the development of a stand of timber from regeneration to the final harvest, many different silvicultural treatments can be applied. Some silvicultural treatments remove commercial products; others involve site preparation, vegetation control, and timber stand improvement treatments (e.g., pre-commercial thinning).

Silvicultural practices that will be used on the island are those that promote health of the forested and tidal land area. Stands will be managed on a case-by-case basis. Site-specific management practices include, but are not limited to:

1. Partial cuts that remove undesirable trees, leaving the most vigorous trees or trees of a preferred species;

2. Reforestation with a species suited to the site, such as western hemlock or western red cedar, particularly on wet sites;
3. No active forest management; or
4. Protection of western red cedar, wherever this can be accomplished:
 - a) With the approval of the majority of the owners of a property to be logged or of the Tribal Council and Cultural Resources, in the case of Tribally owned or leased lands;
 - b) Without danger of blowdown; and
 - c) Without undue interference to forest management operations.

Stand condition and age are the primary factors that affect harvest priority. Management and silvicultural prescriptions for Douglas-fir sites may or may not include the following regeneration and intermediate harvest methods:

Clearcut

Clearcut harvest is an even-aged harvest/regeneration method in which all trees are cut and removed from a harvest unit at one time. These stands are generally planted with desired tree species to ensure adequate stocking and composition control. Natural regeneration or planting fewer trees per acre may be possible in some locations. This harvest method will be applied only for small clearcut units.

Modified Clearcut

This method of harvest is essentially the same as clearcut harvesting; however it retains suitable live trees (individual or clumps of trees) within the harvest unit. Retained trees can make sites more attractive, may provide habitat for wildlife and/or protect riparian areas, and retains the genetic material contained within trees within these stands. Stands cut by this method are also usually planted to ensure adequate stocking of the desired tree species although in some cases there may be reason to rely on natural regeneration.

Commercial Thinning

Commercial thinning occurs in stands that are generally less than 50 years old. Commercial thinning is an intermediate harvest method that removes trees from overstocked stands of timber, and reduces the number of trees per acre to increase the productivity and windfirmness of the remaining trees. This harvest method should not be applied to excessively dense mature stands because the resulting stand could be prone to windthrow. Commercial thinning is visually more attractive, improves wildlife habitat for some species and increases the potential future value of the residual timber.

Commercial thinning treatments will remove approximately 35-50 percent of the volume. The thinnings will usually remove smaller diameter classes (classic “thinning from below”), but options exist for minor removal of tree diameters across all size classes. The thinnings are designed to accelerate and redistribute growth for volume production, provide improved habitat, and increase potential

future stand value. The heavier thinnings are designed to develop understory conditions, but may make stands susceptible to windthrow.

Timber Stand Improvement (TSI)

Timber stand improvement cuts are intermediate harvest methods that generally occur in stands that are over 50 years old. TSI harvests differ from thinning because they occur in older, larger stands of timber. This harvest method should be applied carefully to dense mature timber. Heavy cutting could make stands prone to windthrow. Lighter cutting, repeated in subsequent cycles can slowly transform stands but requires several stand entries to achieve silvicultural goals while protecting against windthrow. TSI harvests are applied to improve the health and vigor of a stand of timber while retaining enough trees to keep the stand fully occupied. TSI harvests are visually more attractive; improve wildlife habitat for some species of wildlife, and increases the potential future value of the timber.

In stands that are highly differentiated into dominant and suppressed classes and are at the stage where understory is developing naturally an 80 percent removal may be implemented. On average 25-30 trees per acre will remain. The 80 percent removal leaves the stable, dominant overstory while letting in sunlight to more quickly advance the understory development. This treatment is similar to a shelterwood except the residual trees will remain on site longer. Harvest of residual trees is expected to be approximately 35 years later when the understory is commercially thinned the first time. Location and stand conditions are crucial because there is high potential for windthrow when removal of 80 percent of a stand is removed.

Site Preparation

Site preparation can be accomplished during skidding and yarding of timber. Site preparation activities shall be done as needed to provide adequate planting spots for 450 well-spaced trees per acre. These activities shall consist of scarification to reduce brush competition, slashing of non-merchantable species and whips following final harvest, and burning logging slash, either in a broadcast burn or in piles depending on soil type, topography and slash load per acre (heavier slash loads will probably need broadcast burning). An alternate site prep method should be proposed if aerial harvest is used.

Herbicide Application

Herbicide application may be necessary following reforestation efforts to release the conifers from competing brush or vegetation that would hinder their establishment. Care must be taken to plan and apply the herbicides to protect non-target areas and potential contamination of streams and shoreline areas. All herbicide applications shall conform strictly to the Squaxin Island Forest Practices Act.

Stand Management

General management recommendations are contained in the forest inventory for each stand. The recommendations are based upon stand volume per acre and include consideration for age, stocking and growth rate. Harvest plans should be designed using information provided by such management recommendations.

For the purpose of promoting the healthy forest stands on the Island, timber marking will be used exclusively for commercial thinnings on Douglas-fir sites; the marking of selected trees within the shoreline and the streamside protection zones. Timber marking in commercial thinnings should approximate the following general guidelines:

1. Remove diseased trees and trees around root rot pockets to prevent the spread of the root rot. This procedure will result in small openings in the stand.
2. Remove those trees that are suppressed and unlikely to survive to the next harvest entry.
3. Remove those trees that are defective but not determined to be culturally modified trees, i.e. multiple or missing tops, scarred butts, etc.
4. Remove intermediate trees to improve spacing.

Removal of trees within the shoreline and streamside protection zones shall be done on a selective basis. Harvesting should have as its desired result a windfirm buffer that will maintain the aesthetic appeal of the land and protect the adjacent shoreline from damaging erosion.

Other areas that require timber marking are protection buffers around areas of historical or archaeological significance and the nesting sites of blue herons, eagles and ospreys. Within historical and archaeological buffers, marking and harvesting operations should be limited to the removal of defective “danger” trees. Nesting sites should have a 100-foot buffer zone in which no harvesting occurs during the mating and nesting season (January through August). Selective logging may occur later in the year provided the nest trees and several trees the same height as the nest trees are left.

Non-Traditional Forest Resources

Special forest products include non-timber vegetation on the island that has some value to people for harvest purposes. These values include economic, cultural, medicinal and consumption purposes. The Pacific Northwest is a leader in the nation for producing mostly floral greens. Other product categories include mushrooms, medicinal plants, decorative boughs, cones and transplants. Squaxin Island possibly contains all of the varieties of vegetation and should implement a permitting process that would prevent the exploitation of all the species concerned in this category of forest management.

Special forest products are a forest management concern for several reasons. If the Squaxin Island Natural Resources Department wants to encourage commercial quality products, define accountability and/or regulate access, a baseline assessment should be done in conjunction with developing harvest guidelines that provide for sustainability. Additionally culturally significant vegetation could be assessed and assigned relative importance or otherwise suitably noted.

Action Plan

The majority of timber on Squaxin Island is second growth. The stands of timber consist of western red cedar, Douglas-fir or mixed conifer-hardwood stands. The timber stand composition (age and species) will dictate the location of timber harvesting operations on any given ownership. The following guidelines should be followed when laying out timber sale units on an ownership:

- First priority will go to a harvest plan that considers the overall ecological health and function of the island ecosystem.
- Second priority will be assigned to the harvest of older, high-value second growth and low volume and low-value mixed hardwood-conifer stands.

Partial cutting will generally be limited to those stands that are primarily stocked with Douglas-fir. In no case should a partial cut be done when it will:

1. Remove the merchantable conifers leaving a hardwood stand;
2. Reduce stand stocking below fifty percent of normal based upon basal area or volume parameters;
3. Result in a high possibility of blowdown because of shallow soils.

Forest Protection

Insects and Disease

Tree mortality on Squaxin Island mainly occurs in decaying mature Douglas-fir trees affected by root and butt rot from infections from *Poria weirrii* and *Fomes pini*. Although *Poria* rot can occur in small isolated pockets of young Douglas-fir, the harvest of decayed old growth Douglas-fir is no longer a priority in locating timber sales or logging units. *Poria* root rot affects second-growth Douglas fir, first in individuals and then spreading through the roots to other adjacent Douglas-fir. These root rot pockets of isolated *Poria* root rot should be identified and trees marked for harvest. Not only should visibly infected trees be harvested but apparently healthy trees in a buffer area surrounding the pocket should also be removed to increase the likelihood that pathogen spread can be controlled or reduced. Non-susceptible trees are sometimes be planted or allowed to take over the site once the Douglas-fir are removed where this fits with other management objectives.

The Douglas-fir bark beetle (*Dendroctonus pseudotsugae*) is the primary insect pest on Squaxin Island. It breeds mostly in wind-thrown or fire-damaged Douglas fir trees. Severe windstorms can cause large areas of blowdown, especially with Squaxin Island's shallow soils, producing large quantities of suitable host material. The resulting large beetle populations that develop can infect and kill healthy trees. Timber sales and logging units shall be designed to minimize potential windthrow especially in shallow soils, thinning and buffer strips. Logging slash does not present a suitable host for the Douglas-fir bark beetle.

Wildlife

Timber stand management on Squaxin Island will be done with precautions taken to preserve the habitat around the following nesting species: Bald Eagle (*Haliaeetus leucocephalus*) and Great Blue Heron (*Ardea herodias*) during the breeding season.

The maritime waters adjacent to the island are considered sites of occurrence for bull trout (*Salvelinus gairdneri*) and foraging marbled murrelets (*Brachyramphus marmoratus*).

Concerns that should be addressed in a biological assessment of the island and vicinity for any project impacts include:

1. Level of use of the project area by listed species;
2. Effect of the project on listed species' primary food stocks, prey species, and foraging areas in all areas influenced by any project; and
3. Impacts from project construction (i.e., habitat loss, increased noise levels, increased human activity) that may result in disturbance to listed species and/or their avoidance of the project area.

Trespass-Logging

Under circumstances where there are questions of boundary trespass during timber harvest, damages should be assessed at either single or treble value, depending on the intent (casual or involuntary versus willful or malicious). Harvest boundaries should be well marked and sale markers should be visible to minimize the possibility of trespass.

Timber trespass is the removal of forest products from, or damaging forest products (including by an act of willfully or accidentally causing to be kindled or setting of fire, without authority) on, Indian forest land without authorization. Unauthorized removal or damage of forest products inside a logging unit, but outside the boundaries of an authorized cutting unit, by a contractor or permittee of a legal contract or permit, will generally be handled under the terms of the contract or permit. All other unauthorized removal or damage of forest products on Indian forest land will be investigated and prosecuted using 25 CFR 163.29.

Fire Management

Fire hazard is present under the conditions of logging slash and debris and fuel build-up from excessive amounts of windthrow and other types of accumulations of dead vegetative material on the forest floor. In the case of drought, very dry seasons, occurrences of lightning strikes and the incidence of campfires there is the possibility of wildfires being generated spontaneously and unpredictably.

“It is the policy of the Squaxin Island Tribal Council to implement and maintain all reasonable controls to prevent wildfires and minimize the severity of accidental fires. All land owners, timber owners or operators operating upon the reservation shall furnish and maintain in good and serviceable condition such fire tools and equipment, and provide such fire protection as may be required by the Natural Resource Department. In the absence of specific SITC regulations, the regulations

shall not be less than are required under the State of Washington.” (Squaxin Island Forest Practices Act, 1981).

Specific measures to be followed regarding operating during fire season, fire tools and equipment requirements, and slash, disposal, may be found in the Squaxin Island Forest Practices Act. This topic is thoroughly outlined in the Fire Management Plan, Appendix III.

Transportation

Transportation needs for any logging operation should consider the following:

1. Transportation of logs, laborers and machinery will be by means that will most minimize environmental damage (e.g., helicopter).
2. Road construction should be minimized or eliminated through the use of air transport with the goal of access to maximum amount of timber.
3. Under the exception that roads are used, they should be constructed to meet the minimum standards described in the Forest Practices Act. In particular, they should be constructed and used in the summer months so as to reduce compaction and erosion problems and keep rock requirements to a minimum.

Main transportation systems under consideration in order of priority are:

- Helicopter transport of harvested trees over tidal area to barge or separate off-island area by helicopter. Helicopters are used to transport logs with fewer roads and no skid trails. The felled and bucked logs are hooked to a helicopter by a cable, and then the logs are lifted up and carried to a landing where they can be loaded onto trucks. Since the logging machine is in the air and not on the ground, damage to streams and soils can be minimized, and under good weather conditions, minimize damage to the trees still standing in the forest.
- Other resource options will be reviewed at the owner/operator’s request by the Squaxin Island Tribe Natural Resource Department on a case by case basis. Plans must be laid out and will be evaluated based on the effort to minimize damage to wetlands, buffer zones, cultural resources, adjacent stands, forest soils, coastal cliffs, shoreline edges and tidelands.
- There will be no permanent road system.

Land Acquisition

The primary goal for many tribal members and the central matter for guiding decision making on Squaxin Island will be the acquisition of parcels and allotments on the Island. In the past, revenue was generated for the acquisition of island property from the harvest of timber on the island. Timber represented a resource asset that had to be sacrificed in order to secure the more desired situation of land control. Today the situation is much different.

Permit Program

Class I forest practices as defined in the Squaxin Island Forest Practices Act require Applications or Notification in order to proceed with any action. Tidelands Access Permits are available through the Squaxin Island Tribal Council and are deemed mandatory for all forestry operations. Corps of Engineer and other necessary permits from a state or federal agencies is the responsibility of the purchasing entity or the Bureau of Indian Affairs. Permits are also available for brush picking (Special Forest Products) and for gathering firewood, both of these directly through the SIDNR.

Sales Policy

The sale of forest products will conform to current law (PL 101-630) and regulations as prescribed by 25 CFR 163 and the Bureau of Indian Affairs manuals and instructions.

The BIA Forestry Collections and Distribution Handbook provide procedures for the accounting of trust funds (25 USC Sec. 155 and 31 USC Sec. 1321) and non-trust funds collected from forest management activities on Indian trust lands.

Forest Inventories

Forest inventories for Squaxin Island will be done on an as needed basis in order to inform the Department of Natural Resources of current and ongoing forestry concerns. For the purposes set forth for the timber resources of Squaxin Island a continuous inventory would be overly costly and undesirable in terms of negative impacts to the environment. The diversity of land ownership makes the prospect of a continuous forest inventory unfeasible in terms of providing forest inventory data for determining harvest unit location. The situation as it is on Squaxin Island would preclude the defined terms for which a continuous timber inventory is necessary such as providing forest managers with information on which to base long range decisions, such as the location of a wood processing facility, or determination of annual allowable harvest levels on large single ownerships using volume regulation.

In 2002 a timber stand examination was completed for the entire Island and ignored tribal trust boundaries but excluded fee lands. The stand examination identified 12 timber types in addition to forested wetland (FW) and non-productive (NP) (Appendix II – Supporting Data). The timber types are based on species composition, age, and stocking. The timber stands in this examination are classified as either reproduction stands or merchantable timber stands except in the case of forested wetland or non-productive classification. Reproduction stands are defined as those stands where the average age is less than 20 years and management is directed at stand establishment. Merchantable timber is identified as those stands where the majority of the stand is merchantable timber. This stand examination can be updated on either a periodic basis (every ten years) or as information from timber cruises and timber sale cut out becomes available.

Economic Aspects of Management

Revenue generated by timber harvest on Squaxin Island is limited in scope and scale. Squaxin Island is a small, forested reservation with a total merchantable volume of 27 million board feet. A sustained yield program will not generate enough timber to make

an impact on the local forest products industry. Currently the main market value of forest products market is the harvest of conifer trees. This could change as hardwood timber increases in value and currently “minor” forest products increase in value. Changes in technology could also affect the relative value of forest materials available on the island.

Income generated by timber sales will be periodic and limited to ten-year cycles by this management plan. The largest trust allotment is 96 acres and could generate an income from logging and stumpage over four five-year periods. This would be a minimum of twenty years if the first entry occurs in year one. Stumpage prices can increase percentage-wise over time giving an allottee an income benefit when dispersing harvest activity across time. This will cause not only a potential increase in future stumpage values but an increase in growth.

The following are sources of revenue:

1. Assessing a fee or a toll for Tidelands Access Permits, for crossing Tribal trust land. The fee or toll could be either an actual price per MBF or a percentage of the stumpage for each sale.
2. Tribal takeover of the BIA functions of timber sale appraisal, layout, and sales compliance. The Tribe receives 10 % of the sale price. The forest management deductions withheld from timber proceeds are put in a Tribal account to be used for forest land management activities.
3. Logging or sale of timber located on Tribal trust property.

Squaxin Island is not a large enough forested area to support a full-time forest manager. The alternative is to manage the area through the BIA or a forestry consultant. A forestry consultant charges a fee based on percentages. The percentages range between 5%-15% for handling timber sale and per hour rate for other unrelated activities.

CHAPTER FIVE

CULTURAL RESOURCES

Introduction

The purpose of this section of the Forest Management Plan is to provide a framework for protection and preservation of areas, sites, objects, and places of cultural significance to the Squaxin Island people that are located on Squaxin Island.

Squaxin Island can contain the entire spectrum of sensitive cultural resources significant to the Squaxin Island Tribe. From a cultural resources management perspective, these include archaeological/cultural sites such as: village/habitation sites, encampment sites, burials and cemeteries, shell middens, petroglyphs, and lithic scatters, as well as historic era sites, buildings and homesteads. Additionally, there are sites that may or may not have an archaeological component, but are nonetheless cultural resources. These include: sacred and spiritual sites, Traditional Cultural Properties (TCP), traditional gathering/harvesting areas, traditional plants, and culturally modified trees (CMT).

Forest management activities can have a significant effect on these resources and uses, therefore it is necessary to have policies and procedures in place to identify and evaluate the cultural resources present on the Island, to protect them, and to avoid, minimize, and mitigate impacts to them from timber harvest and management related activities.

General Policy

The Cultural Resources Management Office (CRMO) has been tasked by the Squaxin Island Tribe's Tribal Council to carry out its mission statement: "to preserve, protect and promote Tribal culture and heritage. This includes the management of ancient and contemporary cultural use sites and resources that are fundamental in the recognition of traditional life ways, values and histories of the Tribe."

The CRMO, under specific delegation of authority by the National Park Service under the National Historic Preservation Act (NHPA), has also assumed the role and responsibilities of the State Historic Preservation Officer (SHPO) through the creation of a Tribal Historic Preservation Officer (THPO) for all on-reservation activities governed by the NHPA.

To carry out the Tribe's mission and responsibilities to protect cultural resources from disturbance and harm, relative to forest management the following steps should be taken:

Establish buffer zones around the various types of cultural resources. Most of the buffer sizes are established as ranges rather than single values because the appropriate buffer size will depend on the relative importance of the resource. For privately owned fee lands, the property owner should be consulted concerning buffer zones.

- Archaeological site - 50'-100' from the limits or as large as necessary to protect the site as established by professional cultural resources survey.
- Petroglyph – 25' unless determined by cultural resources survey to be part of a larger archaeological site.

- Cemetery/burial site – 100’ from the limits of the site as established by professional cultural resources survey
- Sacred site/Spiritual site – 50’-100’ from the defined boundary or as large as necessary to protect the site
- Traditional Cultural Property (TCP) – 50’-100’ from the formal boundary set per Section 106 of the National Historic Preservation Act.
- Culturally Modified Tree (CMT) – 50’ or distance needed to guarantee that neither the tree nor the root system is damaged. (Multi-topped trees and other non-typical shapes are viewed as a nuisance issue from a timber-marketing standpoint, the typical solution to which is removal of the tree. A determination must be made by the CRMO through consultation with Tribal members and Tribal Historic Preservation Officer (THPO) whether the tree was naturally altered, and can be removed, or was culturally modified, and should be protected.)
- Historic Site (Building, Homestead) – 50’ from the defined boundary of the site or as large as necessary to protect the site.
- Gathering/harvesting site for traditional plants and trees – 50’ from the resource. The possibility for transplanting should also be considered.

The following practices will be taken during the Forest Management planning process:

- Conduct a comprehensive cultural resource survey of Squaxin Island, including archival, written literature and oral history research, and field survey.
- Identify and establish the locations of cultural resources using GPS.
- Produce GIS layers that include cultural resource locations and their buffer zones.
- Coordinate with Natural Resources Department during the design and development of any proposals that involve forest practices.
- Delineate the cultural resource protection buffer zones with colored flagging prior to start of forest practice.
- Monitor ground disturbing activities using CRMO staff, as needed.

Notice of Proposed Actions

The CRMO and THPO shall be notified by letter of all proposed and contemplated land purchases, land development proposals, and forest management activities on lands subject to the Forest Management Plan.

The notification shall include a request for CMRO services. Based on the type of services needed, a scope of work, estimate of costs and method of payment will be agreed upon.

Forest inventories (timber cruises)

A trained representative of the CRMO will accompany all crews hired to conduct forest inventories (timber cruises) on Squaxin Island. The CRMO staff member will monitor the activities of the inventory crew to ensure protection of cultural resources. The CRMO representative will also identify cultural resources and gather cultural resource information during the course of the forest inventory monitoring. This will serve as preliminary cultural resources survey work, but will not constitute a comprehensive cultural resources survey.

Prior to the inventory, CRMO staff will provide the inventory crew members with a cultural resources orientation which will inform the crew:

- Those areas that are prohibited from entry
- That artifacts shall be left in place if discovered
- That the ground will not be disturbed during the inventory

Cultural Resources Inventory and Atlas

CRMO staff will conduct or cause to be conducted a comprehensive cultural resources survey of all forestlands on Squaxin Island that are subject to the Forest Management Plan to identify significant cultural, historic, or archaeological sites, and develop a plan for their protection and conservation.

Based on this survey, a confidential inventory atlas of cultural, historic, and archaeological resources will be prepared for use in the evaluation of proposed forest management activities. The inventory will be used to define areas where cutting will and will not be allowed; set buffer zones around certain resources such as CMTs, burials and cemeteries, sacred sites, and gathering areas; and to determine the proper siting of skid roads, swing roads, access roads, staging areas, and haul roads needed for harvesting activities to take place.

When new parcels that contain forestlands are to be acquired by the Tribe, supplemental cultural resource surveys will be conducted as needed, and the inventory atlas and GIS layers updated for use in decision-making prior to any forest management activities being allowed on those properties.

The inventory atlas will be continually updated as new cultural resource information is obtained by the CRMO.

All cultural resources surveys will be conducted and reports written in accordance with the Secretary of the Interior's Standards.

The information developed about cultural, historic, and archaeological resources, and the inventory atlas will be protected from disclosure, except as authorized by the Squaxin Island Tribe.

Harvesting Activities

Project plans will recognize the importance of native foods and medicines to the Squaxin Island people, and provide for their habitat preservation and enhancement.

Depending on the area to be impacted and the types of cultural resources that might be present, the CRMO staff will provide cultural resource monitoring of the harvesting activities.

Prior to approval, the CRMO staff will review all project plans for timber sale harvests and for other forest and ground disturbing activities such as commercial thinning, diseased tree removal, fire management, and defective (i.e. multiple top) tree removal.

Conflicts between forest management activities and the preservation of cultural resources shall be resolved by the CRMO and Natural Resources Departments during the development of project plans. The final plans shall include all conditions imposed to ensure cultural resource protection and any mitigation measures required for impacts to cultural resources.

CHAPTER SIX

FOREST INVENTORY ANALYSIS REPORT

A. Summary:

This report provides quantitative estimates of selected attributes from forestland owned by the Squaxin Island Tribe and managed on behalf of the beneficiaries of these trust lands. Three different management scenarios are analyzed:

- 1) An approach in which forest trees would be allowed to grow from their current condition into old forest without management intervention. This is referred to as the old forest scenario.
- 2) A commodity-oriented intensive timber management approach (commodity scenario) for which the outcomes reported includes harvested timber volume as well as changes to forest conditions.
- 3) An active management approach focused on keeping stand relative density below levels that are likely to invite incidence of wild fire and insect or pathogen infestations while also nudging stands towards a greater diversity of tree species and favoring growth of large western redcedar trees. This is referred to as the active scenario.

B. Approach:

Timber stands were delineated and cruised by Washington Timberland Management, Inc. in 2002, a contractor employed by the Squaxin Island Tribe. These stand data were formatted for analysis using the Forest Vegetation Simulator (FVS) a commonly used public domain, tree growth and yield model developed and maintained by the US Forest Service and designed specifically to allow users to explore alternative management approaches and their outcomes. Using the Pacific Northwest Variant of FVS, stand growth was projected out 100 years, implementing stand specific management appropriate to the characteristics of each stand and consistent with the requirements of each scenario. Selected stand attribute outputs were generated at ten-year intervals. Cutting operations, where appropriate were also spaced at ten-year intervals (cycles).

Old forest scenario: For the old forest scenario, no management was employed.

Commodity scenario: For the commodity scenario, current stand attributes were evaluated and a priority set for clearcut harvest of older stands established that would also be consistent with the Squaxin Island timber management plan calling for a regulated cut of approximately equal area each cutting cycle. Once older stands were clearcut, a silvicultural system was established for them in which Douglas-fir trees were planted to 436 trees per acre (10' x 10' spacing), the site pre-commercially thinned at 20 or 30 years of age to 222 trees per acre (14' x 14' spacing), and the stand clearcut harvested at either 50 or 60 years of age. Site quality varied slightly between stands so the estimated age at which thinning or clearcut harvest was most advantageous varied between sites.

Stand priorities for clearcut harvest at the beginning of the simulation period were set using the following criteria: 1) understocked stands on which the full capacity of the site was not being utilized were made a high priority for clearcut harvest, 2) stands with high relative density, high current stand volume and comparatively high recent mortality were made high priorities for clearcut harvest. Individual stands were selected by ranking stands on each of these characteristics and cutting the stands with the highest cumulative “score” of each of these ranking criteria. The rationale for using these criteria are that: 1) a relative density of 55 or higher indicates a point at which stands are entering a “competition-imminent mortality” phase of stand development in which volume growth, both of individual trees and for the stand as a whole is expected to decline, and tree mortality increase, 2) high stand volume, depending on specific access difficulties of given sites, would be expected to result in relatively higher financial return from timber harvest, and 3) stands with high tree mortality rates were made higher priority for harvest in order to capture tree volume that would otherwise be “lost” to snags or down wood.

All older stands were clearcut by the third cutting cycle. Two stands were young plantations at the beginning of the analysis period. They were pre-commercially thinned and then clearcut harvested later in the simulation period.

Active management scenario: The active management approach was aimed at thinning across all age classes and underplanting in stands. Western redcedar was not harvested. The goals of this approach were to favor growth of western redcedar trees, increase the tree species diversity, keep relative density below critical levels that could invite large scale infestations of insects and pathogens, create complex multi-tiered forest stands, retain snags and allow for snag recruitment, and provide some harvest volume at periodic but predictable intervals. During cycles in which management was invoked, all stands were treated according to stand-specific conditions such that treatment was congruent with the overall goals of this scenario. Stands were not prioritized for management and different stands cut each cycle. Instead, at twenty-year intervals, all stands were treated in the same year, removing 15% of the basal area of all tree species present except western redcedar.

C. Attributes Measured:

Desirable management outcomes can be measured by the conditions of the residual forest and/or by what is harvested from forest stands over time. For this analysis, criteria were selected that considered elements of: 1) cultural resources, 2) wildlife habitat and ecosystem functions, and 3) timber volume harvested. The measurement attribute selected for cultural resources was the number of large diameter western redcedar trees present over time. For wildlife and ecosystem function, measurable attributes identified included the characteristics and relative abundance, and size of snags by size class, stand structure (Crookston and Stage 1999), and standing tree volume by species. The third criteria, timber harvest volume, provides some estimate of the opportunity for generating revenue from these stands, although, while timber harvest volume can be predicted, the cost of getting cut trees to mills given the difficult logistics involved in transporting from the island makes estimating value problematic.

D. Results:

Cultural Resources:

Abundance of large western redcedar trees:

Large western redcedar tree abundance increased over time with both the old forest and active management approaches. In the commodity scenario, all trees, including large western redcedar trees, were removed by clearcut harvest in the first two cutting cycles (Figures 1-4) and regenerated stands were planted to Douglas-fir. The old-forest and active management scenarios produced approximately equal numbers of large western redcedar trees. In the active scenario, the light thinning across all diameter classes on all species except western redcedar created space in stands for residual western redcedar trees to grow, accounting for the greater number of large diameter western redcedar trees under this management scenario as compared to a scenario with no timber harvest.

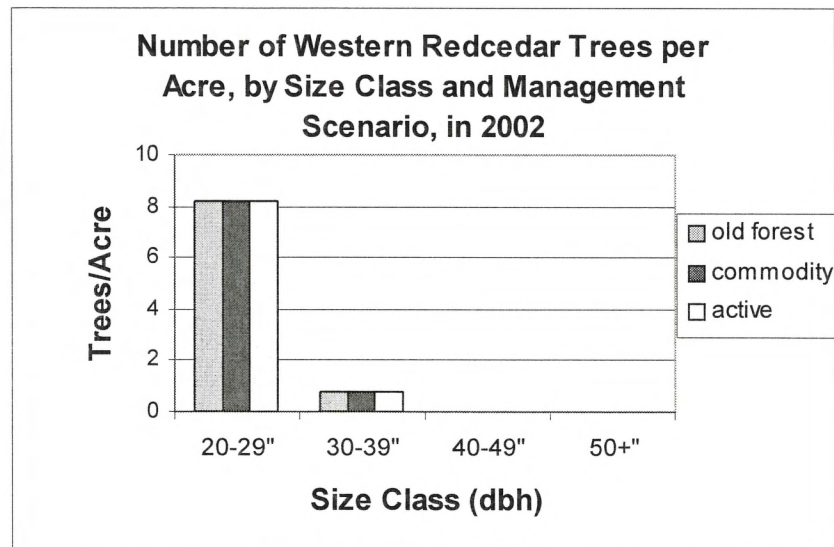


Figure 1 – Number of large western redcedar trees, by management scenario at the beginning of the simulation period in 2002. The number of trees per acre by size class, measured as diameter at breast height in inches are shown. The size classes used are 20-29", 30-39", 40-49" and 50+". The scenarios compared are, respectively, "old forest", "commodity" and "active".

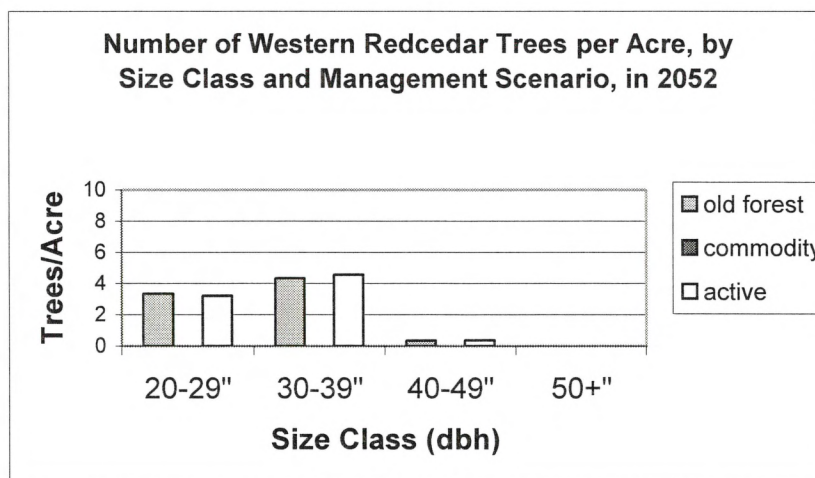


Figure 2 – Number of large western redcedar trees, by diameter class and management scenario in 2052. The number of trees per acre by size class, measured as diameter at breast height in inches are shown. The size classes used are 20-29", 30-39", 40-49" and 50+ ". The scenarios compared are, respectively, "old forest", "commodity" and "active".

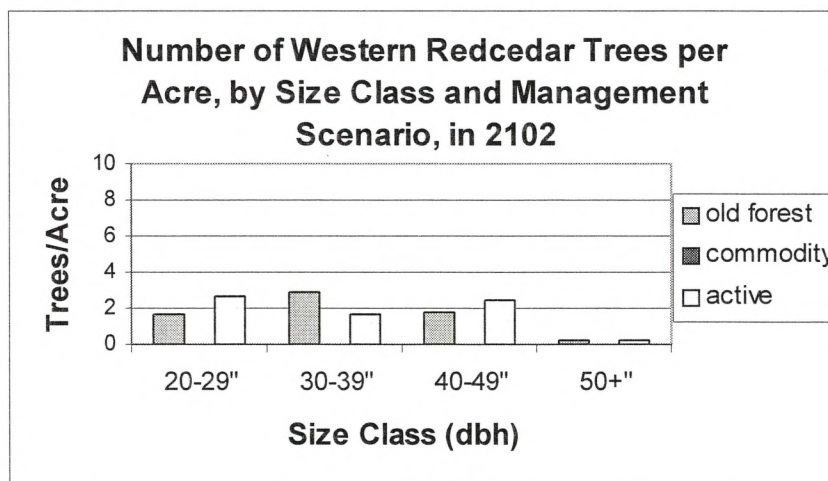


Figure 3 – Number of large western redcedar trees, by diameter class and management scenario in 2052. The number of trees per acre by size class, measured as diameter at breast height in inches are shown. The size classes used are 20-29", 30-39", 40-49" and 50+ ". The scenarios compared are, respectively, "old forest", "commodity" and "active".

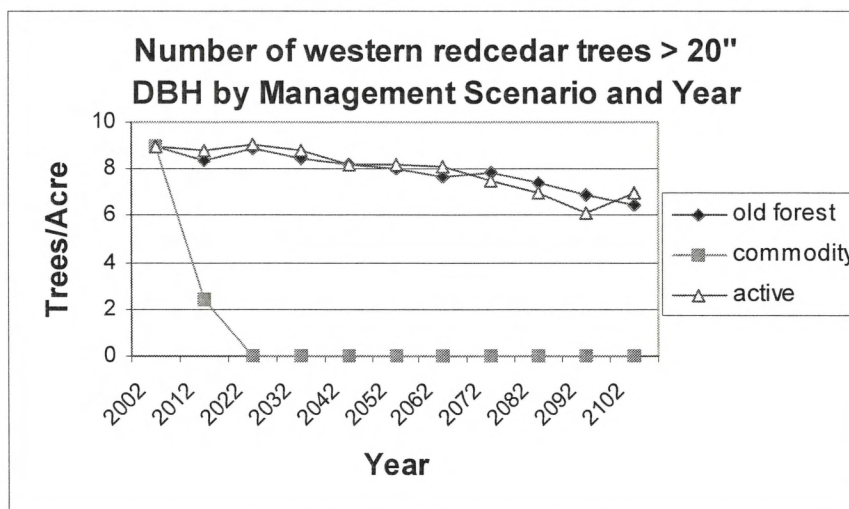


Figure 4 - Number of western redcedar trees present per acre that are greater than 20" DBH, by management scenario and decade from 2002 to 2102. The scenarios compared are, respectively, "old forest", "commodity" and "active".

Wildlife Habitat and Ecosystem Function: measurement attributes – snag recruitment, stand structure and tree species diversity

Snag recruitment:

Only the old-forest and active scenarios generated recruitment of large diameter snags. Stands that were clearcut harvested and planted back to Douglas-fir plantations generated an average of 11.1 snags/acre per decade, but these were all in the smallest two diameter classes after the first two decades (Figure 5 -9). Additionally, these snags were short-lived because they were cut along with the rest of the stand once stands entered the zone of imminent competition / mortality so their potential benefit to wildlife was short-term as compared to the old forest or active management scenarios.

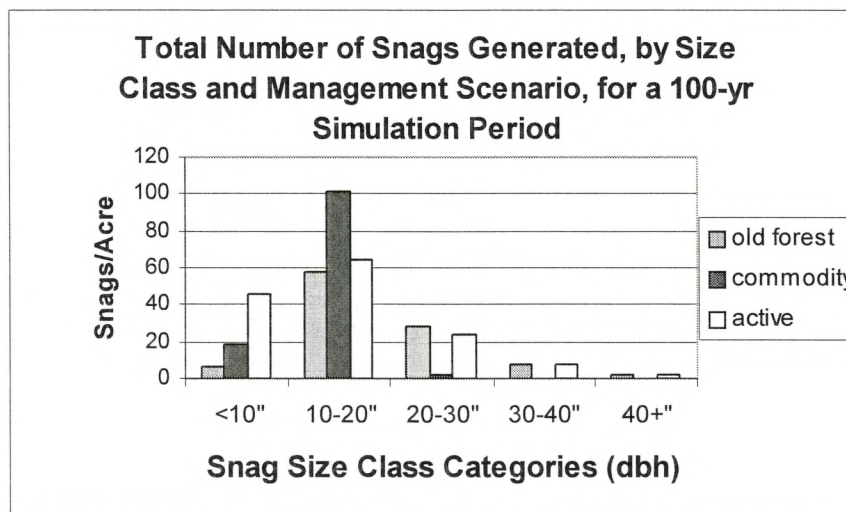


Figure 5 - Number of snags per acre, by diameter class (dbh), recruited over a 100-yr simulation period (2002 to 2012). The scenarios compared are, respectively, "old forest", "commodity" and "active". Diameter (dbh) categories (inches) are less than 10, 10-20, 20-30, 30-40 and 40+.

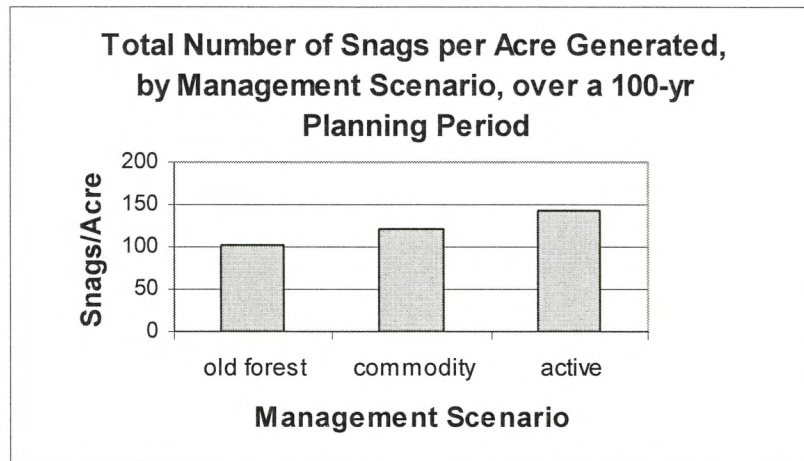


Figure 6 – Total number of snags per acre across diameter classes (dbh), recruited over a 100-yr simulation period (2002 to 2012). The scenarios compared are, respectively, “old forest”, “commodity” and “active”.

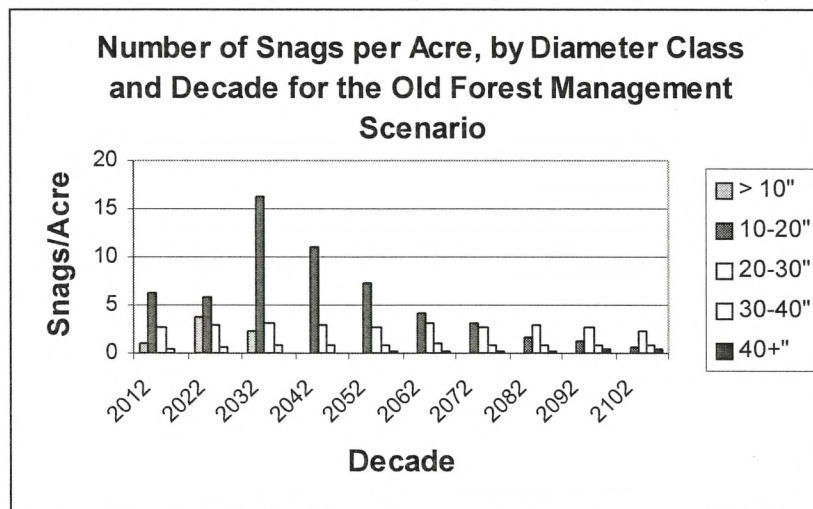


Figure 7 - Number of snags by diameter class for the “old forest” management scenario by decade from 2002 to 2012. Diameter (dbh) categories (inches) are less than 10, 10-20, 20-30, 30-40 and 40+.

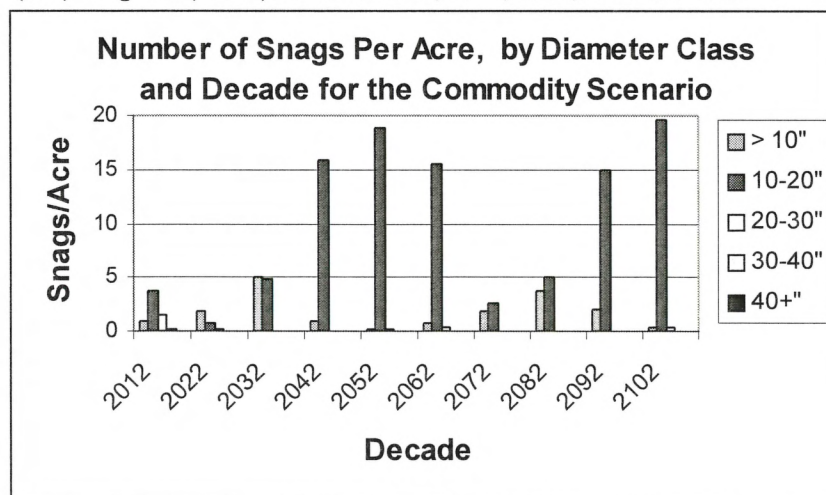


Figure 8 - Number of snags by diameter class for the “commodity” management scenario by decade from 2002 to 2012. Diameter (dbh) categories (inches) are less than 10, 10-20, 20-30, 30-40 and 40+.

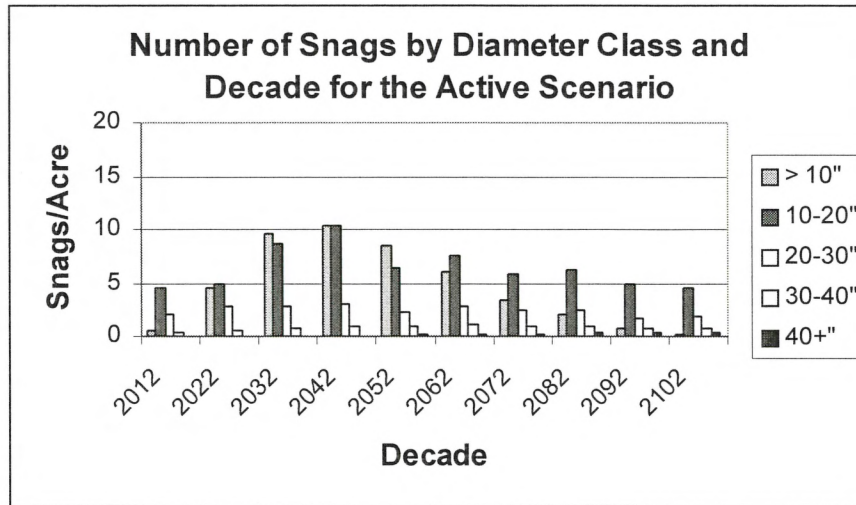


Figure 9 - Number of snags by diameter class for the “active” management scenario by decade from 2002 to 2012. Diameter (dbh) categories (inches) are less than 10, 10-20, 20-30, 30-40 and 40+.

Stand structure:

Two stands were in the stand initiation structural stage at the beginning of the simulation period and only the commodity scenario produced stand initiation structural stages during the course of the simulation period (Figure 10a). All scenarios had at least one stand in the stem exclusion structural stage throughout the simulation period except for the active scenario in 2012 and 2022 (Figure 10b). The commodity scenario produced the most stands in the stem exclusion scenario as stands were clearcut harvested, classed as stand initiation for one time interval and then reverted to stem exclusion until harvested again. The active scenario created stands in the understory re-initiation stage (Figure 10c) of stands that were classed as stem exclusion stands without selective harvest, as per the old forest scenario. No stands in the commodity scenario achieved a structural stage other than stand initiation or stem exclusion although one stand was classed as old forest, single-story in the first decade (Figure 10d). In the old forest scenario stands progressed over time from the stem exclusion stage to the old forest, single story stage (figures 10b and 10d). The selective harvest of the active management scenario created old forest, multi-story stands early in the simulation period with the number of such stands increasing for the first 7 decades then declining for the remainder of the simulation period (Figure 10e). After 7 decades the relative differences in tree sizes were less and the influence of the selective harvest simulated on tree size and stand opening was also less so stands were moved from old forest, multi-story to old forest, single story late in the simulation period in the active scenario. The old forest scenario exhibited the least fluctuation between structural stages between decades and by the end of the simulation period, 10 of 12 stands were classed as old forest, with 8 and 2 respectively in the single story vs. multi-story stages.

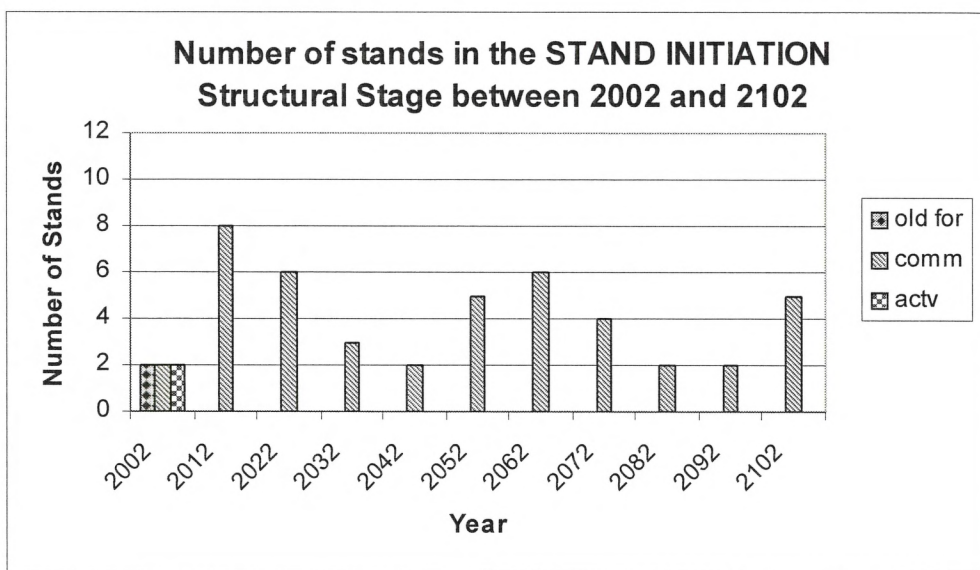


Figure 10(a) – Number of stands in the stand initiation structural stage between 2002 and 2102 by management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv). There are 12 total stands in this analysis that vary in size from 8.1 to 247.5 acres. This analysis is intended to show patterns of change based on management not the extent of change on an area basis affected by that management.

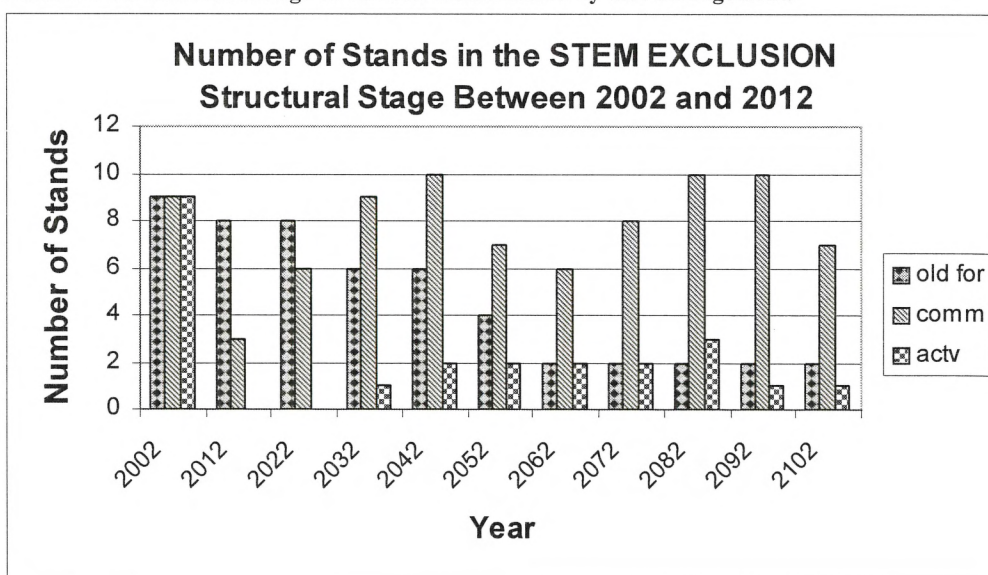


Figure 10(b) – Number of stands in the stem exclusion structural stage between 2002 and 2102 by management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv). There are 12 total stands in this analysis that vary in size from 8.1 to 247.5 acres. This analysis is intended to show patterns of change based on management not the extent of change on an area basis affected by that management.

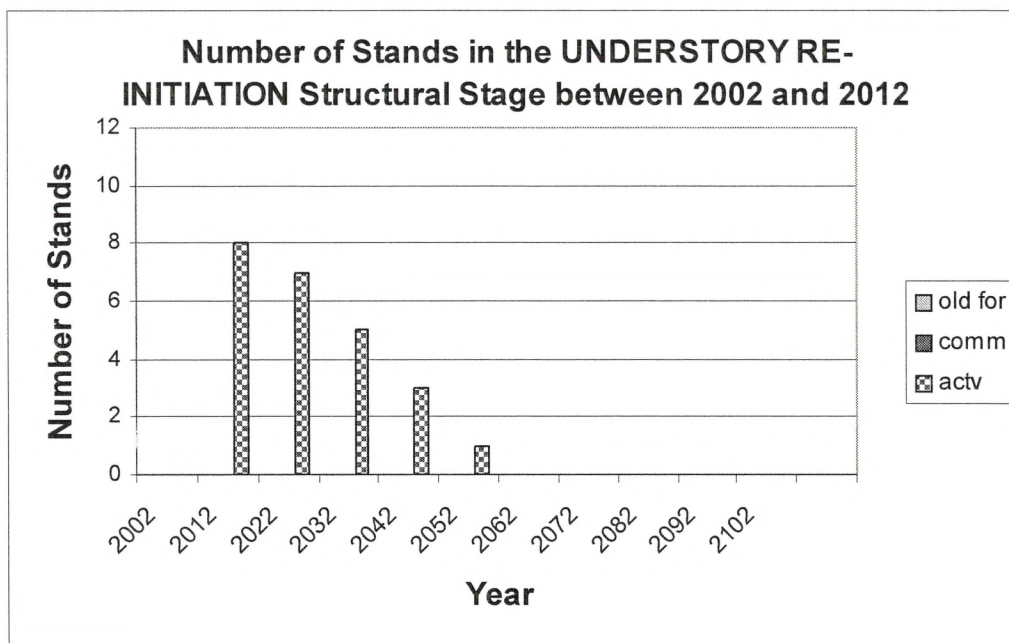


Figure 10(c) – Number of stands in the understory reinitiation structural stage between 2002 and 2102 by management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv). There are 12 total stands in this analysis that vary in size from 8.1 to 247.5 acres. This analysis is intended to show patterns of change based on management not the extent of change on an area basis affected by that management.

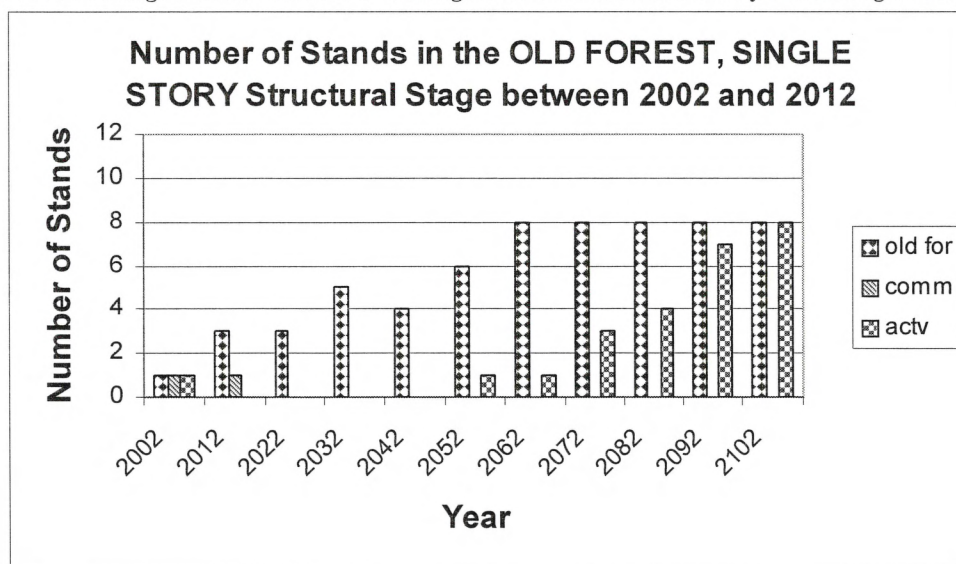


Figure 10(d) – Number of stands in the old forest, single story structural stage between 2002 and 2102 by management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv). There are 12 total stands in this analysis that vary in size from 8.1 to 247.5 acres. This analysis is intended to show patterns of change based on management not the extent of change on an area basis affected by that management.

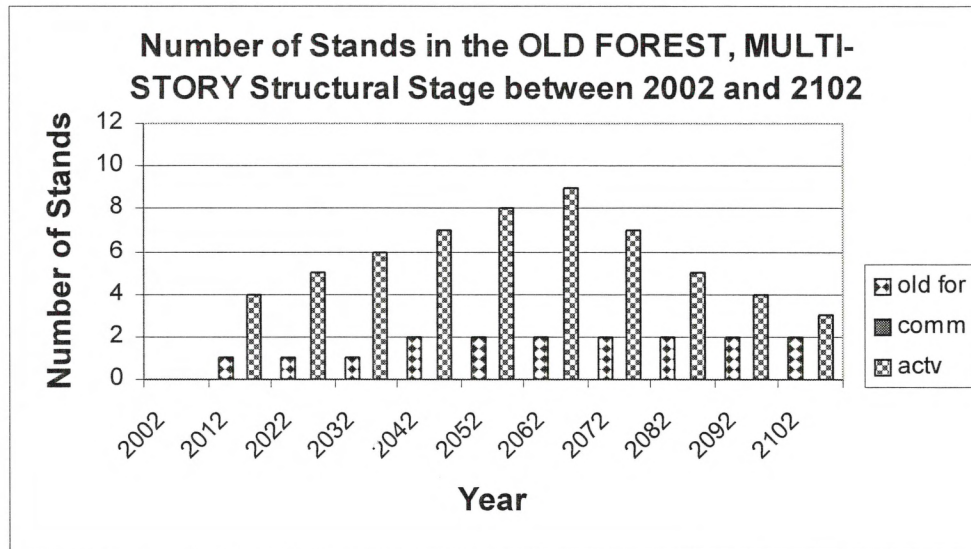


Figure 10(e) – Number of stands in the old forest, multi-story structural stage between 2002 and 2102 by management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv). There are 12 total stands in this analysis that vary in size from 8.1 to 247.5 acres. This analysis is intended to show patterns of change based on management not the extent of change on an area basis affected by that management.

Tree species diversity:

Tree species diversity, measured by standing volume by tree class, differed between scenarios. The exclusive focus of management in the commodity scenario was Douglas-fir and that was the only species present at the mid- and end-points of the simulation period (Figures 11a-11d). All of Douglas-fir, western redcedar, western hemlock, bigleaf maple and red alder were present throughout the simulation period for both the old forest and active management scenarios (Figures 11a-11d). There was more Douglas-fir, bigleaf maple and red alder under the old forest scenario than the active scenario because trees of each of these species were cut under the active scenario. Lacking understory trees of these species that would respond to a canopy opening and management that would create openings large enough to support regeneration of these species, the volume of these species declined over time as compared to the old forest scenario. Tree volume of western redcedar and western hemlock, however, was greater for the active scenario than for the old forest scenario. Western redcedar was not harvested in the active scenario. A key management goal of the active scenario was to create growing space for western redcedar and these results show that an increase in volume as well as number of large diameter trees (Figures 1-3) is predicted for this scenario. The greater volume of western hemlock for the active scenario than for the old forest scenario is somewhat surprising as active scenario management invokes harvest of some western hemlock at each harvest entry. The growth response of western hemlock to stand opening exceeds the amount harvested so that more volume is present at the mid- and end-point of the simulation period for the active scenario than for the old forest scenario for which no timber harvest is simulated.

Standing tree volume steadily increases throughout the simulation period for both the old forest and active management scenarios. Standing volume remains nearly static under the commodity scenario as trees are clearcut harvested, the harvested sites replanted, pre-commercially thinned and then clearcut harvested again with an approximately equal number of acres harvested each decade (area regulated management approach).

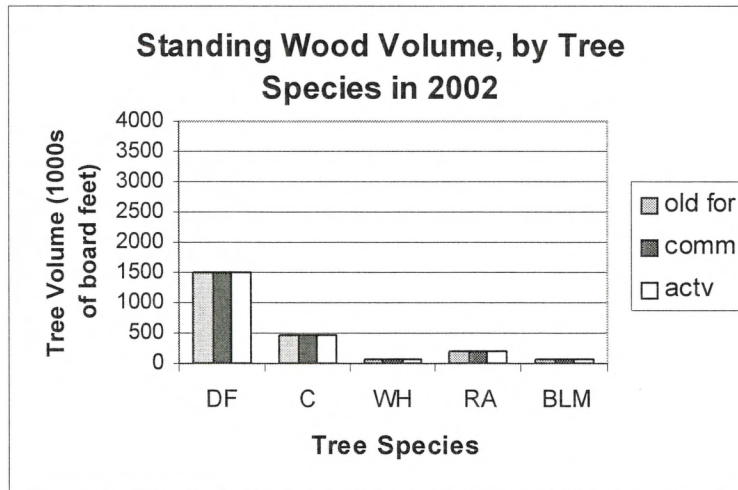


Figure 11(a) – Tree volume (thousands of board feet) by species in 2002, the beginning of the simulation period for management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv).

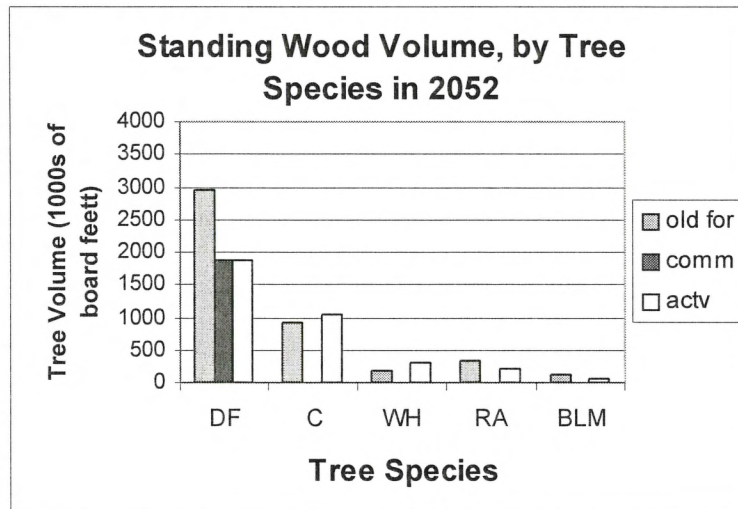


Figure 11(b) – Tree volume (thousands of board feet) by species in 2052, the mid-point of the simulation period for management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv).

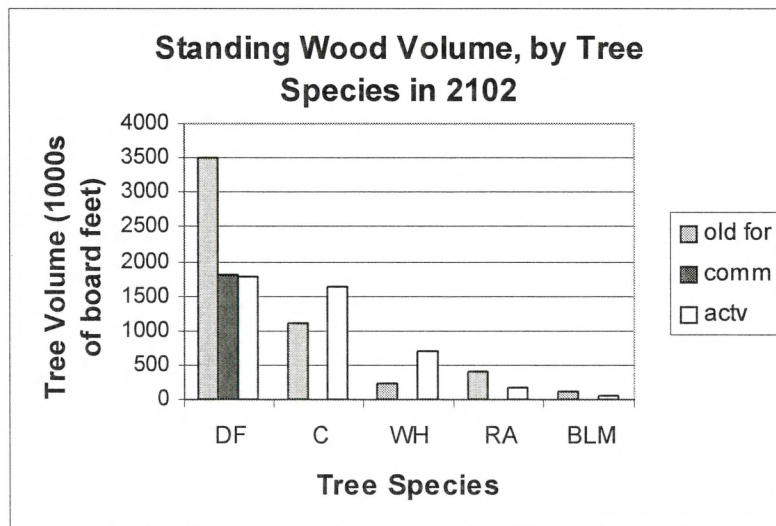


Figure 11(c) – Tree volume (thousands of board feet) by species in 2102, the end-point of the simulation period for management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv).

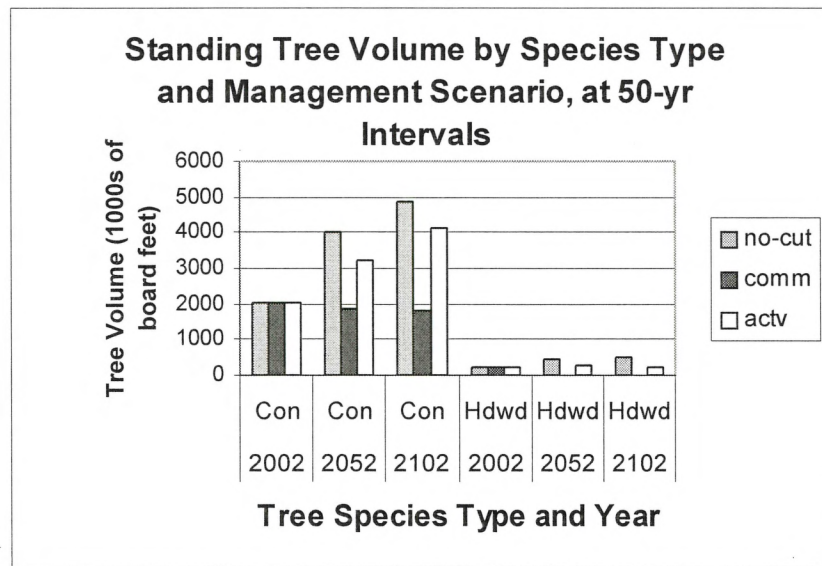


Figure 11(d) – Tree volume (thousands of board feet) by species in 2102, the end-point of the simulation period for management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv).

Timber Harvest Volume:

Timber harvest was simulated only for the commodity and active scenarios. Timber harvest volume fluctuated substantially between decades under the commodity scenario, a result of the unequal stand sizes and initial disparity in tree volume between stands (Figure 12a). In contrast, timber harvest volume increased steadily between harvest entries under the active scenario reflecting the gradual increase in tree sizes and increasingly large volume that resulted from harvest a similar percent of standing basal area at each harvest entry (Figure 12a). More tree volume was harvested under the active scenario than for the commodity scenario three times; in 2022, 2042 and 2082. But overall, an area regulated, intensive management approach to grow and harvest timber for economic return, produced more than three times as much timber volume removed as compared to the active scenario (Figure 12b).

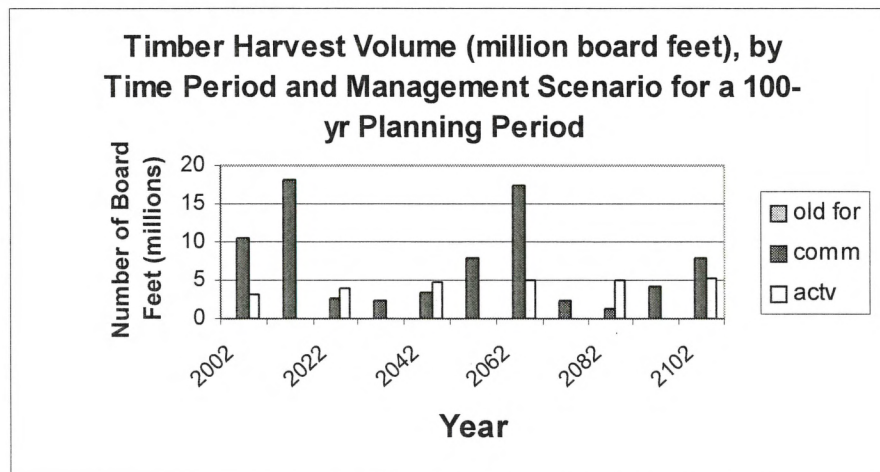


Figure 12(a) – Timber harvest volume (millions of board feet) by decade, from 2002 to 2102, for management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv).

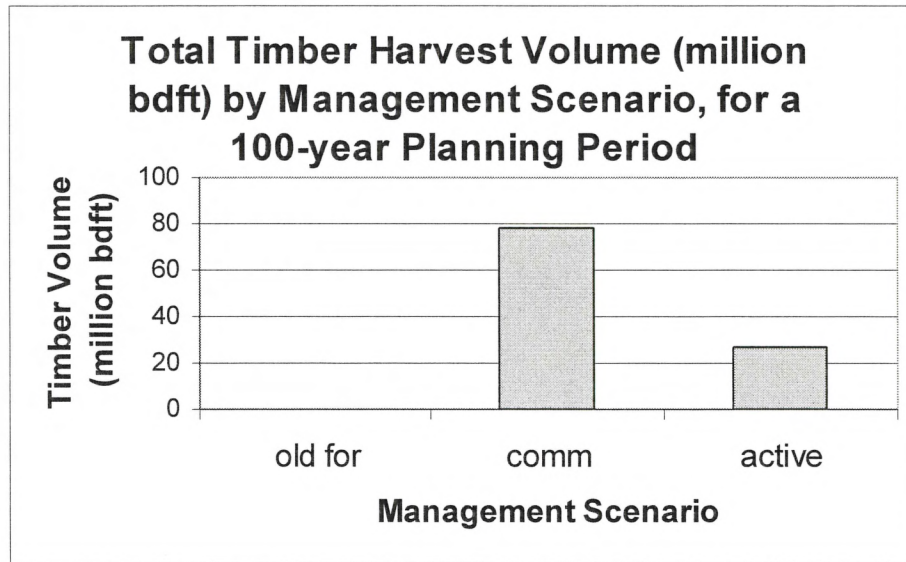


Figure 12(b) – Total predicted volume of timber harvested (millions of board feet) over a 100-yr planning period for management scenarios of: 1) old forest (old for), 2) commodity (comm), and 3) active (actv).

Discussion:

By far the most timber volume was generated under the commodity scenario but by creating young, simple, one strata, even-aged single species (Douglas-fir) stands, valuable stand attributes (e.g. large cedar trees, recruitment of snags and down wood, and stands with tree species diversity) were lost.

The active approach provided less timber harvested, but resulted in nearly equivalent amounts of large western redcedar trees over the simulation period and more snags although slightly fewer large diameter snags. The active scenario afforded some timber harvest opportunity at predictable intervals allowing for trustees to plan for harvest income and for the Tribe to plan for timber harvest operations at scheduled intervals. In some cases, deviating from this schedule may be appropriate for Tribes to meet needs of trustees or take advantage of specific market opportunities. This flexibility can be built into plans and requires only that someone monitor market conditions and trustee needs.

The old forest scenario requires no management costs other than those needed to guard against fire and insect or pathogen infestations, but produces no harvestable volume. Under the old forest scenario, trees grow steadily and stands move predictably to old forest structural stages, retaining the tree species diversity as measured by standing timber volume. Snags accrue abundant as trees die over time. The western redcedar trees present at the beginning of the simulation period grow, although not quite as fast as for the active scenario which specifically favors growth of large diameter western redcedar trees.

Conclusions:

The Squaxin Island Tribe has timberland that is valuable for the resource values, cultural and ecological, that exist there. The timber on these lands is also valuable from an economic standpoint should the Squaxin Island Tribe seek to capitalize on that opportunity. The management scenarios simulated show a range of possible outcomes

and stand conditions that can result from different management that could be applied. Different management scenarios could be devised to try to create specific stand conditions or outputs, should a specific management goal be defined.

700000
Feet
213344
Meters

Equal in
Proportion
to Feet
Equal in
Proportion
to Meters

880000
Feet
270296
Meters



880000
Feet
270242
Meters

140000 Feet
317030 Meters

TYPE NUMBER

CRUISE STATION

141000 Feet
320078 Meters

NOTE TO USERS

- Photography from 1960 (1:250,000)
- Some land areas are shown in white, indicating they are not covered by the 1:250,000 scale map.
- Some land areas are shown in white, indicating they are not covered by the 1:250,000 scale map.
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- Some land areas are shown in white, indicating they are not covered by the 1:250,000 scale map.

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LINE SYMBOLS

PUBLIC LAND SURVEY LINES

- Private Line
- Appropriated or Protected Line
- Ownership Land Claim Line

ADMINISTRATIVE BOUNDARIES

- State Boundary
- County Boundary
- Administrative Boundary
- CNR Trust Parcel Boundary

DEPARTMENT OF NATURAL RESOURCES MANAGED UPLANDS

- Number 1 located in the northwest corner of land parcels
- Number 2 located in the southeast corner of land parcels
- 01 - State Forest Board - Transfer
- 02 - State Forest Board - Purchase
- 03 - Common Wealth, Indemnity, and Reserve
- 04 - Agriculture - School
- 05 - University - Transfer
- 06 - Charitable (Educational, Penal, and Reformatory Institutions)
- 07 - Capital Building
- 08 - Normal School
- 09 - School
- 10 - University - School
- 11 - University - Original
- 12 - Community College Forest Reserve
- 13 - Administrative
- 14 - Under Contract to State Parks and Recreation Commission
- 15 - Natural Resources Conservation Area
- 16 - Water Pollution Control District

CORNER SYMBOLS

- Coordinated Corner
- Point Center
- Pin Center
- Approximate Corner
- Predefined Corner
- QWS Corner
- Grid Symbol
- State Plane

GRID SYMBOL

- 625,000 State Plane
- Feet Coordinate Value for NAD83
- 164,000 State Plane
- Meters Coordinate Value for NAD83

ORTHOPHOTO MAP SE 1/4 of T20N R02W Mason County Thurston County



WASHINGTON STATE DEPARTMENT OF
Natural Resources
6000 Southland - Corvallis, Oregon 97331

GLOSSARY OF FORESTRY TERMS

Aerial Photo Coverage - A series of photos that depict the surface features of a portion of the earth's surface.

Age Class - One of the intervals into which the age range of the forest is divided. When all age classes are shown it is called an age class distribution.

Annual Growth or Annual Increment - The annual increase in diameter, basal area, height or volume of an individual tree or forest stand.

Basal Area - The cross-sectional area of a tree outside bark, usually measured in square feet at breast height (4.5 feet).

Biological Control - Using birds, pathogens, predatory insects, or other non-chemical measures to control insect pests.

Board Foot - A unit of measurement represented by a board 1 foot long, 1 foot wide, and 1 inch thick.

Breast Height - A standard height from ground level for recording diameter or basal area, usually 4.5 above ground level.

Butt log - The lowest log from the bole of a tree.

Camprun - A designation applied when all logs, regardless of grade, are sold at the same price per unit.

Clearcut - Harvesting the entire standing crop including all non-merchantable stems.

Co-Dominant - One of the four major tree crown classes. Trees with crowns forming the general level of the crown cover and receiving full light from above but comparatively little from the sides; usually medium sized crowns more or less crowded on the sides.

Cold Deck - A pile of logs stored for later transportation.

Commercial Forest Land - Land that is specifically designated for growing timber as a commercial crop.

Commercial Thinning - Removing a portion of the merchantable trees from a timber stand, usually 30% to 40%, to improve spacing and generate income.

Control Points - Surveyed points on the ground that provide a framework on which further survey operations may be based.

Controlled Burning - Burning logging debris and slash before or after the forest fire season.

Conversion - Replacing a stand of undesirable trees, such as Red Alder, with a more desirable species such as Douglas fir.

Cord - A unit of measure of stacked wood four feet by four feet by eight feet.

Cross Sectioning - Determining the position of slope stakes using marking the points where the road bank cut slopes intersect the ground surface.

Cruise – A survey to estimate the quantity and quality (grade) of timber by species on a given area. Other characteristics may also be included.

Cull – Any log, tree or portion thereof that does not meet current utilization standards.

Cunit – A measure of solid wood volume defined as 100 cubic feet or CCF.

Cut out information – The record of actual gross and net volume and log grades scaled from a timber sale.

Defect – Any feature that lowers the quality and net volume of a log, such as sweep, rot or large knots.

Defect Percentage – That percentage of each log that is defective due to disease, insect or mechanical damage, and cannot be converted to lumber.

Diameter Breast Height (DBH) – The tree diameter outside the bark four and one-half (4.5) feet above the ground on the uphill side of the tree.

Direct Seeding – Replanting the forest with seeds broadcast by hand or airplane.

Dominant – One of four major tree crown classes. The trees have their crowns in the uppermost layers of the canopy and are largely freegrowing, receiving full sunlight from above and the sides. The sides of the crown may be crowded.

Felling – Cutting down a standing tree.

Form Class – The rate of taper of a tree.

Forest Cover – All woody growth occupying the ground in a forest, as distinct from the ground cover.

Grade Line – A gradient line marked in the field for the road survey line to follow.

Ground Cover – Mosses and shrubs.

Growing Space – The area suitable and available for growing timber of the area occupied by a single tree.

Growing Stock – The total volume or number of all the trees in a forest or specified part of it.

Hardpan – Hare, tight soil impervious to water percolation and tree roots.

Hardwood – A very conventional term for broad-leafed trees which lose their leaves every fall. Also, the wood produced by them.

Intermediate – One of the four major crown classes. Trees with crowns extending into the crown cover formed by the co-dominant and dominant trees. These trees receive a little direct light from above and none from the sides. Tree crowns are small and are crowded on the sides.

Landing – An area cleared of all standing timber. Logs are skidded to a landing where they are loaded onto trucks.

Location Line – The staked center line of the road to be constructed.

Log Dump – Point where logs are unloaded from a truck into water or on a dry land log storage site.

Log Grade – Indicates the grade and value of lumber that can be obtained from the log.

Log Rule – A system for determining the volume of lumber which may be recovered from different sized logs.

Log-Scale Board Foot – A unit of measure of the content of a log or run of logs in board feet, determined by means of a log rule. (See “Board Foot”)

M.B.F. - Thousand board feet.

Market Value – The price paid for logs at the mill.

Merchantable – Marketable products.

Mixed Stands – A timber stand composed of two or more species.

Mortality – Trees that die from natural causes such as insects, disease and competition.

Partial Cutting – Means the removal of a portion of the merchantable volume in a stand of timber so as to leave a well-distributed stand of residual, healthy conifers (not hardwoods), that will reasonably utilize the productivity of the soil as determined by the Natural Resources Department.

Precommercial Thinning – Spacing the desired crop trees at an early age by cutting the excess nonmerchantable trees, on overstocked stands between 10 and 20 years old.

Preliminary Line (P-Line) – A traversed line run along a proposed road route from which the location line is designed.

Pruning – Mechanically removing branches to improve the quality of wood. Also occurs naturally.

Random Sample – A sample selected in such a manner that all possible samples of the same size have an equal chance of being chosen. The basis of timber cruising.

Reforestation – Re-establishment of a tree crop by planting or seeding.

Regeneration – The renewal of a tree crop, whether by natural or artificial means.

Rehabilitation – The process of improving a tract of forest land which is poorly or non-stocked, or in poor condition.

Residual – Trees that remain on an area after an earlier logging or fire.

Rotation Length – The number of years between the establishment of a crop and its final harvest.

Sample Plot – A plot chosen as a sample point, generally of a fixed size, (usually 1/1000 to an acre) in a given area.

Salvage Logging – Logging carried out in windthrows, insect-infested areas and other altered areas in order to salvage remaining useable timber.

Sapling – A young tree generally less than 4 inches in diameter.

Scale – Determining the gross and net volume of logs or fuelwood. Usually expressed in board feet, cunits, etc. The person who measures is termed a scaler.

Scarification – Mechanically removing brush and logging slash to prepare an area for reforestation. A method of site preparation.

Scribner Log Rule – A diagram log rule for estimating the number of board feet in a log or standing timber. The most commonly used measurement in the Pacific Northwest.

Second Growth – The stand of trees that is established after the harvest of old growth timber. Generally trees less than 90 years old.

Selective Cut (shelterwood cutting) – Removal of timber, either as single scattered trees or in small groups at relatively short intervals.

Silviculture – The science and practice of controlling forest establishment, composition and growth.

Site Class – A relative grouping of site quality, site class I being the highest.

Site Index – A measure of forest soil productivity: the average height that the dominant and co-dominant trees on an area will attain at index ages such as 50 or 100 years.

Site Preparation – Preparing an area prior to reforestation. Usually done by fire or scarification.

Skid Trail – The route used by tractors and skidders to move logs from the stump to the landing.

Skidding – The process of moving logs from the forest to the landing, usually by tractors or skidders.

Slash – Debris or residue left on the ground after logging.

Softwoods – Generally coniferous, needle bearing tree. Evergreens.

Stocking – A measure of stand density expressed as a percentage of site potential.

Stumpage – The value of timber as it stands in the forest in terms of an amount per unit of volume or weight.

Suppressed – One of the four main tree crown classes. The Trees have their crowns in the lower layers of the canopy. The leading shoots are not free and the trees are slow growing. The class is often referred to as overtopped.

Taper – The decrease in diameter of a tree stem or log.

Timber Appraisal – An economic evaluation of the monetary value of a tract of timber.

Timber Type or Stand – A subdivision of the forest defined by age, size, species mix or other biological criteria.

Volume Table – A numerical table showing the timber volume of a tree, or stand based upon parameters that define the tree or stand.

Windfall – A tree that is uprooted or broken off by the wind.

Wolf Tree – A rough, limby dominant tree, usually of poor form and low quality.

Yarding – The process of moving logs to a landing. Usually indicates cable logging.

Yield Determination – The calculation of the amount of forest products that may be harvested from a specified area in a stated period of time.

Yield Table – A table showing for one or more species the growth pattern of a managed even-aged stand, derived from measurements.

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APPENDICES

I. Environmental Assessment

II. Forest Inventory

III. Fire Management Plan

IV. NEPA Documents (Notice of Availability, Finding of No Significant Impact, Comments, Record of Decision)

ENVIRONMENTAL ASSESSMENT

Purpose and Need for Action

It is the purpose of the Squaxin Island Natural Resources Department to provide increased environmental standards for the protection of the tidelands for ecologic and economic value; and to guide policy in altering forested stands. Updating assessments, implementing zoning classifications and improving environmental standards will curtail controversy, loss of cultural reserves, loss of ecosystem function and ill-conceived land use projects. Further, active management, assessments and monitoring will provide opportunities for habitat improvement through good forest stewardship practices.

The forest management plan has been developed on the basis of a thorough assessment of site quality and an inventory of the timber on the Island. Consideration has been given to the wishes of landowners and allotment-holders on the island in the cooperative interest of optimum management. It prescribes the terms of management for activities including timber harvest, selective thinning, reforestation and other land use options deemed acceptable in the area of tourism, recreation, habitat management and land development. Federal law requires a periodic update of the management plan and the Natural Resources Department wants to take this opportunity to strengthen the Tribe's management oversight of Squaxin Island.

If the current policy and standard of practices remain there is concern that tribal interest will not be met, landowner and allotment-holder activity will degrade cultural resource holdings and tideland integrity. Furthermore, the overall interest of the island will be undermined through neglect and the lack of unified management goals. The Tribe has determined that revision of policies currently in place is the primary step toward attaining future political and economic control of Squaxin Island for the purposes of self-determination and unity.

Ownership of property on Squaxin Island is complicated and diverse. In order to better control the tribal interests regarding land management and land use issues the acquisition of alienated lands and allotments by the Tribe is an integral issue to the Forest Management Plan and its ability to be an effective tool for the future.

The function of this Environmental Assessment (EA) is to help the Tribal Council select an alternative that grants the desired mix of goods and noncommercial values from the forestlands. To aid in the decision, it will identify the key issues and concerns related to the management of forest resources on Tribal and allotted lands. These issues and concerns will be evaluated under a series of alternatives that will culminate in the identification of a preferred alternative.

The Environmental Assessment is a product of the National Environmental Policy Act written to establish a detailed understanding of the impacts that are likely to occur as a result of the proposed action or actions, which in the case of the Squaxin Island Tribe is a Revised Forest Management Plan.

The preferred alternative will guide the development and implementation of the Squaxin Island Tribe's Forest Management Plan (FMP) for the years 2005-2015. An additional purpose of this EA is to provide the information and mitigation measures to support a

“Finding of No Significant Impact” (FONSI). The FONSI documents the selection of an alternative by the Tribal Council, it summarizes the factors leading to a finding of no significant impact for that alternative and it is signed by the Tribal Chairman.

The need for planning is required to define the expectations for resources produced by a finite forestland base. Forest resources on the Reservation are critical to the cultural, spiritual, and economic well being of present and future generations of Squaxin Island people and the community as a whole. Forest health and productivity are among the indicators of success and failure of past land management activities on the Reservation. Forest management practices are a significant factor in defining and influencing the structure and function of the Reservation landscape.

The multiple demands placed upon Reservation forests; be it for timber revenue, subsistence, recreation, development, etc., foster many differing perspectives on how forested Trust land should be managed. Any plan intended to guide the management of Reservation forestlands must be sensitive to the variety of natural resources users.

Affected Environment

Area

Squaxin Island is located approximately ten miles north of the township of Olympia and 9 miles east of the township of Shelton. It lies in the southernmost tip of the Puget Sound and is contained in the region known as the Puget Trough. It is bordered on the west by the body of water known as Pickering Passage and on the east by Peale Passage. The island is nearly four miles long and varies in width from three tenths of a mile to almost nine tenths of a mile. The total acreage of the island is 1978.86 acres, which are classified as 1,486.86 acres of wooded uplands and 492 acres of tidelands. The tidelands are measured to the line of extreme low tide at minus 4.5 feet (Comprehensive Plan).

Land Use

Squaxin Island is managed for healthy forest ecosystems and to protect the tidelands and the health of the shellfish beds. The Tribe holds control over access to island tidelands, which they control through a permit system. Forested lands are separated among several interests and ownership categories.

Geology and Soils

Squaxin Island was formed by a glacial advance and retreat period that ended around 14,000 years ago as evidenced by the form of the almost parallel drainages that cross the island. Occasional outcroppings of glacial drift and a layer of till that comprises the substratum below the soil characterize the entire island. Soil series on the island fall into four categories: Sinclair, Kitsap, Bellingham, and Indianola. In addition to the upland soils, two soil groups (Coastal and Tidal) are also mapped along the perimeter of the island.

The northern portion of the island is predominantly Sinclair series soils. These soils consist of a shotty clay loam that is unique to Squaxin Island. Cemented glacial till underlies this series at a depth of 22 to 42 inches which affects the drainage capabilities especially in areas of very shallow occurrence. Upper soils absorb moisture readily and

can be described as moderately well drained but in areas of shallow till the moisture moves horizontally to outlet at springs, streams or cliff faces.

Kitsap silty clay loam, which is also underlain by cemented glacial till characterizes the southern part of the island; the till depth varies from 20 to 36 inches in most areas, but can be as shallow as 12 inches near the shore. Infiltration is slow especially when the soils are wetted though it does not impede the movement of moisture, as these soils are rarely swampy.

The soil series most easily compacted and most closely associated with wetland characteristics is the Bellingham series. These soils are deep, clay-rich and poorly drained.

Indianola soils are found in only a few pockets on the hills on the northern portion of the island. These deep sandy loams permit rapid infiltration and would not represent potential wetland areas due to their excessive drainage and the fact that there is no till layer in the upper horizon to stop the downward movement of moisture.

Biological Resources

Vegetation

Squaxin Island is covered by dense second-growth Douglas-fir forest. Western hemlock and western red cedar are also common in these forests. Occurrences of grand fir and Pacific yew are sporadic, with the frequent appearance of red alder, big leaf maple, vine maple and willow along drainages and as invaders of disturbed areas. A lower canopy layer is made up of taller shrub and shorter trees. They range in height from 5 to 20 feet. However, under optimum conditions some of these plants can form the top canopy: hazelnut, cascara flowering dogwood, Oregon white (Garry) oak, Oregon ash, Sitka willow, evergreen huckleberry, red huckleberry, Nootka rose, ocean spray, poison oak and elderberry (Lidman and Soule, 1978).

The drier better-drained sites are often populated by madrone and Garry oak. Quaking aspen is thought to occur naturally along Palela Bay. A stand of lodge pole pine occurs along the northwestern margin of Squaxin Island and at one time supported a heronry that failed after a winter windstorm broke many of the trees.

Salal and evergreen huckleberry dominate the understory on the southern half of the island. Forests in the southern part of the island are so overgrown as to be impenetrable. The northern half of the island has a more open understory associated with the larger areas where western red cedar and western hemlock dominate. The forest floor in these areas is commonly carpeted with vanilla-leaf, sword and bracken fern, and a mixture of shrubs and thickets composed of salal and evergreen huckleberry.

Invasive species that occur in areas of disturbance include tansy ragwort, Scotch broom, Canada thistle, bull thistle and frequently oxeye daisy, which is co-dominant with tansy. An ecologically distinct area south of Palela Bay is characterized by a collection of native species including low-growing salal, evergreen huckleberry, Oregon grape, wild rose, bracken fern. Douglas-fir has been replanted, red alder is returning and other species such as willow, aspen, madrone, Pacific dogwood, Pacific crab apple, ocean spray and elderberry are present. Trailing blackberry has become very abundant.

Palustrine wetlands identified as perimeter drainages, small streams, lateral drainages and upland wetlands give rise to vegetation unique on the island from the forested areas because of the variation in inundation by fresh water sources. Characteristic species include, water parsley, creeping buttercup, marsh speedwell, youth-on-age and, in the wettest spots skunk cabbage, wild ginger and frequently stinging nettles.

Estuarine wetlands, recognized on the island in two categories characterized by standing marine water or as marine water associated grassy areas. Two standing water areas are further defined as lagoons in which the water movement is restricted by a narrow passage and therefore represent quite different and most likely more complex wetland habitat. Vegetation associated with these areas includes pickleweed, succulent jaumea and associated parasitic coral vine, succulent plantain, gumweed, rushes and sedges. Invasive species including Scotch broom, tansy ragwort, oxeye daisy, and other composites inhabit the drier borders of these estuarine areas.

Poison oak, madrone, willows, ocean spray, salal, evergreen huckleberry and Oregon grape line the shorelines immediately above the beach along with the major tree species of the island. Bitter cherries are located along the shore of a shallow bay on the northeast side of the Island. Domestic apple, pear and other fruit trees are found at old homesteads all around the island, and near the southern lagoon on the west side there is a substantial old orchard.

Timber

Volume findings are reported assuming a typical Washington Forest Practice class III forest practice scenario (see definition of terms in December 2002 Forest Inventory for Squaxin Island). Where applicable, reported volumes are reduced reflecting harvest restrictions in stream and wetland buffers. Larger and more identifiable areas that would likely require protection and/or buffers have been stratified as independent stands and are included in the FW (forested wetland) or the NP (non-productive) timber stand categories. Additionally, a 200-foot shoreline buffer was removed from the inventory area. The shoreline buffer was designed to address protection requirements applicable to the Puget Sound Shoreline and associated aquatic resources. Merchantable log volumes are reported in board feet using Scribner volume rules.

Marine Species

The rocky shores support communities of barnacles, small snails, periwinkles and limpets along the high tide line. Larger snails, chitons, mussels and algae are distributed in mid-tidal zones along the vertical plane. The deeper tidal zones are used predominantly by larger algal species such as the brown kelps along with invertebrate animal species such as sea stars and anemones.

In the mixed sediment areas marine animals utilize burrowing as a means of survival to avoid predation and endure the effects of exposure to air during low tides. Commercially valuable hard-shell clams are associated in these areas and consume mostly drifting plankton in combination with some amounts of detritus.

Cultivated Pacific oyster (*Crassostrea gigas*) and manila clam (*Venerupis japonica*) beds are common features of the shoreline; these species are important commercially to the Squaxin Island Tribe along with Olympia oysters (*Ostrea lurida*) and geoducks (*Panope*

generosa) which are also cultivated to a much lesser extent on the island at the time of this assessment. A saltwater lagoon on the west-side of Squaxin Island and a section of the northeastern shore support a population of the native Olympia oyster. This species was once found abundantly all along the coast of Washington (Coastal Zone Management Study; Lidman and Soule, 1978).

Ghost shrimp (*Callinassa spp.*), shore crab (*Hemigrapsus spp.*), periwinkles (*Littorina spp.*), limpets (*Collisella spp.*), anemones (*Cnidaria*), hermit crabs (*Pagurus spp.*), barnacles (*Balanus glanula*), amphipods, and isopods occur in this area and are important food sources to bottom fish and some waterfowl. Starfish (*Pisaster spp.*), Moon snail (*Polinices spp.*) egg cases and sand dollars (*Dendraster spp.*) are visible at low tide and in shallow areas at many locations along the shores. The subsurface of the island beaches support diverse communities of ribbon worms (*Nemertea*), segmented worms (*Annelida*), flatworms (*Platyhelmintha*) and polychaete worms.

Several species of algae along with beds of eelgrass and offshore kelp are present in the tidal zones around Squaxin Island. The three species of algae that appear to be most common are; sea lettuce, *Enteromorpha intestinalis* and *Gigartina papillata*. Among the benefactors of the eelgrass beds are black brant geese that feed upon the grass; Dungeness and red crabs that use the grass for cover, and herring that use the areas for spawning.

Salmonids, forage fish, groundfish and other marine fish species are reliant on the health of the Squaxin Island tidal zone. Salmonids generally encountered in the nearshore fishing area used by the Squaxin Island Tribe include: Chinook (*O. tshawytscha*), Chum (*O. keta*), Coho (*O. kisutch*), Cutthroat (*O. clarki*) and Steelhead (*O. mykiss*). The more common fish species identified as forage fish within Washington include Pacific herring (*Clupea harengus pallasi*), surf smelt (*Hypomesus pretiosus*), Pacific sand lance (*Ammodytes hexapterus*), and northern anchovy (*Engraulis mordax*).

Forage fish are an important and abundant fish species in Washington. As the name implies, the significance of forage fish is related to the critical part they play as the prey base for a large variety of other marine organisms, their popularity as recreational fishing bait, and their significance to commercial and subsistence fisheries. For centuries, various species of forage fish have been utilized for food by aboriginal tribal peoples along the west coast. Today, forage fish are harvested by recreational and commercial fisheries and continue to be utilized for tribal subsistence. The condition of the stocks that comprise each forage fish genera are vitally important for those marine species that use them as a food source. The vitality of the aggregate forage fish resource in Washington is also a valuable indicator of the health and productivity of our marine environment.

Non-salmonid fish species generally seen in the fisheries department seining project net include: Buffalo sculpin (*Enophrys bison*), Pacific staghorn sculpin (*Leptocottus armatus*), Tidepool sculpin (*Oligocottus maculosus*), Speckled sandab (*Citharichthys stigmatæus*), Starry flounder (*Platichthys stellatus*), Sand sole (*Psettichthys melanostictus*), Pile perch (*Rhacolchilus vacca*), Shiner perch (*Cymatogaster aggregate*), Kelp perch (*Brachysistius frenatus*), Three spine stickleback (*Gasterosteus aculeatus*), Bay pipefish (*Syngnathus griseolineatus*), goby species (*Gobiidae*) and Gunnel species (*Pholis laeta* and *clemensi*) (S. Steltzner, pers. comm. 2005).

In consideration of the economic value of island fish and shellfish resources, priority is repeatedly emphasized in the consideration of any upland activity. Concerns about contamination and siltation are relative to the harvest of shellfish and the optimal utilization of the tidelands. Protection measures include but are not limited to buffer strips, limited island access points, and restrictions of all activities in critical drainage basins, written standards for sewage and solid waste disposal.

Wildlife

There is no quantitative documentation of wildlife population on Squaxin Island. Commonly observed animals include black-tailed deer, black bear, raccoons, opossums, squirrels, moles, shrews and other small mammals. The island supports residential and migrational bird populations including herons, woodpeckers, raptors, songbirds, shorebirds, seabirds and other waterfowl. Types and numbers of reptiles, fish, amphibians and insects are unaccounted for. There is no population account of deer on the island. The deer population appears to regulate itself by using the waterways as passage to and from the island. General consensus holds that deer are plentiful, although in consideration of the dense overgrown nature of much of the island it is possible that browse has been reduced in availability to the extent that it has suppressed the deer population. The tribal harvest of deer on the island is not a factor in population management.

Listed and Proposed Endangered and Threatened Species - U.S. Fish and Wildlife

Information from the U.S. Fish and Wildlife Service requested for the vicinity of Squaxin Island (T20N, R02W, S15, 22, 26-27, 35) describes species and impacts that are relevant to the project area. According to their records four bald eagle (*Haliaeetus leucocephalus*) nesting territories exist in the vicinity of T20N, R02W, S22 and 35; nesting activity is stated to occur from January 1 through August 15. Wintering bald eagles in this area may occur during the period from October 31 through March 31.

The maritime waters adjacent to the island are considered sites of occurrence for bull trout (*Salvelinus gairdneri*) and foraging marbled murrelets (*Brachyramphus marmoratus*).

Concerns that should be addressed in a biological assessment of the island and vicinity for any project impacts include:

4. Level of use of the project area by listed species;
5. Effect of the project on listed species' primary food stocks, prey species, and foraging areas in all areas influenced by any project; and
6. Impacts from project construction (i.e., habitat loss, increased noise levels, increased human activity) that may result in disturbance to listed species and/or their avoidance of the project area.

Species of Concern

The following species of concern have been documented in the county where the island is located. These species or their habitat could be located on or near this site.

Cascades frog (*Rana cascadae*)
 Coastal cutthroat trout (*Oncorhynchus clarki clarki*)
 Long-eared myotis (*Myotis evotis*)
 Long-legged myotis (*Myotis volans*)
 Northern goshawk (*Accipiter gentilis*)
 Olive-sided flycatcher (*Contopus cooperi*)
 Olympic torrent salamander (*Rhyacotriton olympicus*)
 Pacific fisher (*Martes pennanti pacifica*) (last documented sighting in Mason Co.,
 1/08/92, Washington Status Report for the Fisher)
 Pacific Townsend's big-eared bat (*Corynorhinus townsendii townsendii*)
 Pacific lamprey (*Lampetra tridentate*)
 Peregrine falcon (*Falco peregrinus*)
 River lamprey (*Lampetra ayresi*)
 Tailed frog (*Ascaphus truei*)
 Western toad (*Bufo boreas*)

Priority Habitats and Species - Washington State

Washington State Department of Fish and Wildlife discloses information through their Priority Habitats and Species Program (WAC Title 232, Chapter 12). PHS is the principal means by which WDFW provides important fish, wildlife, and habitat information to local governments, state and federal agencies, private landowners and consultants, and tribal biologists for land use planning purposes.

Washington State Department of Fish and Wildlife habitats and species map shows the occurrence of four bald eagle (*Haliaeetus leucocephalus*) nesting sites and a great blue heron (*Ardea herodias*) rookery on Squaxin Island. Two of the eagle nest sites have been indicated to be active in most recent surveys. The heronry was abandoned in 1987 according to survey records and has not been reestablished.

On May 9, 2003, possible Marbled Murrelet (*Brachyramphus marmoratus*) habitat was assessed with technical support from a State Department of Fish and Wildlife biologist. Indicative habitat features included large-diameter trees, moss cover, deformities and flight access. A preliminary walk through raised concern that the most likely area on the island does not have enough trees per acre of the quality required to characterize marbled murrelet nesting habitat. In the methods for surveying marbled murrelets in forests document put out by the Pacific Seabird Group (6 January 2003) it states:

"Perceived lack of flight access for murrelets into an area should not eliminate that area for consideration. Stands on $\geq 20\%$ slope often create natural access due to the layering of canopy trees...Aspect has not been identified as a limiting factor for murrelet nests. In summary, any area with a residual large tree component, small patches of potential habitat, or suitable nest platforms should be evaluated for the need for surveys."

Habitat

Marine

Areas that likely have high fish and wildlife diversity include estuary or estuary-like habitats, marine/estuarine shorelines and mature forest stands, all of which exist on

Squaxin Island. Estuary habitats and adjacent tidal wetlands are usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open marine water, and in which marine water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the Puget Sound by evaporation. Along some low energy coastlines there is appreciable dilution of sea water.

Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5‰ during the period of average annual low flow both in estuaries and lagoons. The estuaries on the island support high fish and wildlife density and species diversity, important breeding habitat, important fish and wildlife seasonal ranges and movement corridors. This habitat should be noted for its limited availability and its high vulnerability to alteration.

Shorelines are important for the intertidal and subtidal zones of the beaches and may also include the backshore and adjacent components of the terrestrial landscape (cliffs, snags, mature trees, dunes and meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function. The shores of Squaxin Island contain both consolidated and unconsolidated substrate providing a great diversity of habitat to support fish and wildlife density, diversity and important seasonal ranges. This habitat type is of limited availability and vulnerable to alteration which impacts the associated dependent species.

Upland

Squaxin Island is characterized by mature forested lands above the shoreline. Downed logs and woody debris are interspersed throughout the island stands. Each stand is characterized by at least two species of trees and multi-layered canopies with dense growths of shrubs and other forest floor plant species. The mature forest habitat of the island supports wildlife species diversity, important breeding habitat and seasonal ranges. The island contains forests of limited and declining availability that are very vulnerable to habitat alteration.

Water Resources

Precipitation and climate conditions

Estimated rainfall for Squaxin Island is estimated to be 56.7 inches annually (Source: PRISM). This extrapolation is from a WRIA 14 watershed analysis report that includes Squaxin Island in the Case Inlet sub-basin. Orographic effects influence a large precipitation variation over short distances, however, so these figures are only estimates.

Rainfall accumulation occurs mainly during the months of October through April. Snowfall accumulation is negligible annually (Western Regional Climate Center); rain accumulates in low intensity and extended duration storms that allow for a large fraction of soil infiltration and groundwater recharge through slow percolation. This relatively slow process does not promote erosion because rapid runoff is limited.

Mild temperature extremes are characteristic of the maritime climate of the Pacific Northwest, with the temperatures only dropping below freezing in January and average

maximum mid-summer temperatures falling under 80° F. On average there are 203 frost-free days that start in mid-April and continue until early November.

Surface and Groundwater

Of the total amount of precipitation accumulated on Squaxin Island, approximately half is used in the evapotranspiration process. Distribution of the remaining water accumulation infiltrates into the soil recharging groundwater supplies, seasonal streams, springs, seepage or in a rapid runoff response to rainfall. Surface water on the island is ephemeral and only persists into the dry season a month or two, with the exception of about a half a dozen streams on the northeast end of the island and some of the marshy areas. There are several drainages that carry significant amounts of water that would be influenced by changes in vegetative cover, landforms or soil structure resulting in rapid erosion.

Wetlands

Wetlands on Squaxin Island fall into two categories; Palustrine and Estuarine and function in a variety of capacities related to the health of the island communities and resources. The associated plant communities and evidence of saturated soils as defined by the soil profile can identify wetlands during those times when water is scarce. Further consideration of these wetlands, as described by a recent baseline inventory (Envirovision, 1998), indicates four Palustrine categories: perimeter drainages, small streams, lateral drainages, and upland wetlands.

There are twenty-one areas of perimeter drainages; these are formed where wetted soils are exposed along a cliff face or by wave action on a beach. Three areas of prominent seeps are identified on the southern end of the island. The general locations of each of these are as follows: the cove surrounding Sea Farm Creek, a majority of the lower quarter of the eastern shoreline, and the southern tip and lower 4000 feet of shoreline along the southwest shore. In some cases estuarine wetlands coincide with these streams and seeps.

Small stream-related wetlands extend further than perimeter drainages and in some instances represent fairly extensive wetland complexes. Many of these areas can be distinguished in aerial photos and 10 of them have been mapped on the baseline survey matrix. One area in particular that drains into Palela Bay is larger than the others and has distinct vegetation that at one point supported a heron rookery.

There are three lateral drainages characterized as stream/wetland system that bisect the island on the southern end. It is suggested that these drainages are composed of two streams flowing in opposite directions and sharing a water source. They are significant enough in terms of stream flow to be considered as contributing to the fishery and tideland resources. The north end of the island appears to have a lateral bisection similar to the southern lateral drainages but island topography indicates an east west divide that separates the streams, not allowing for cross-island flow.

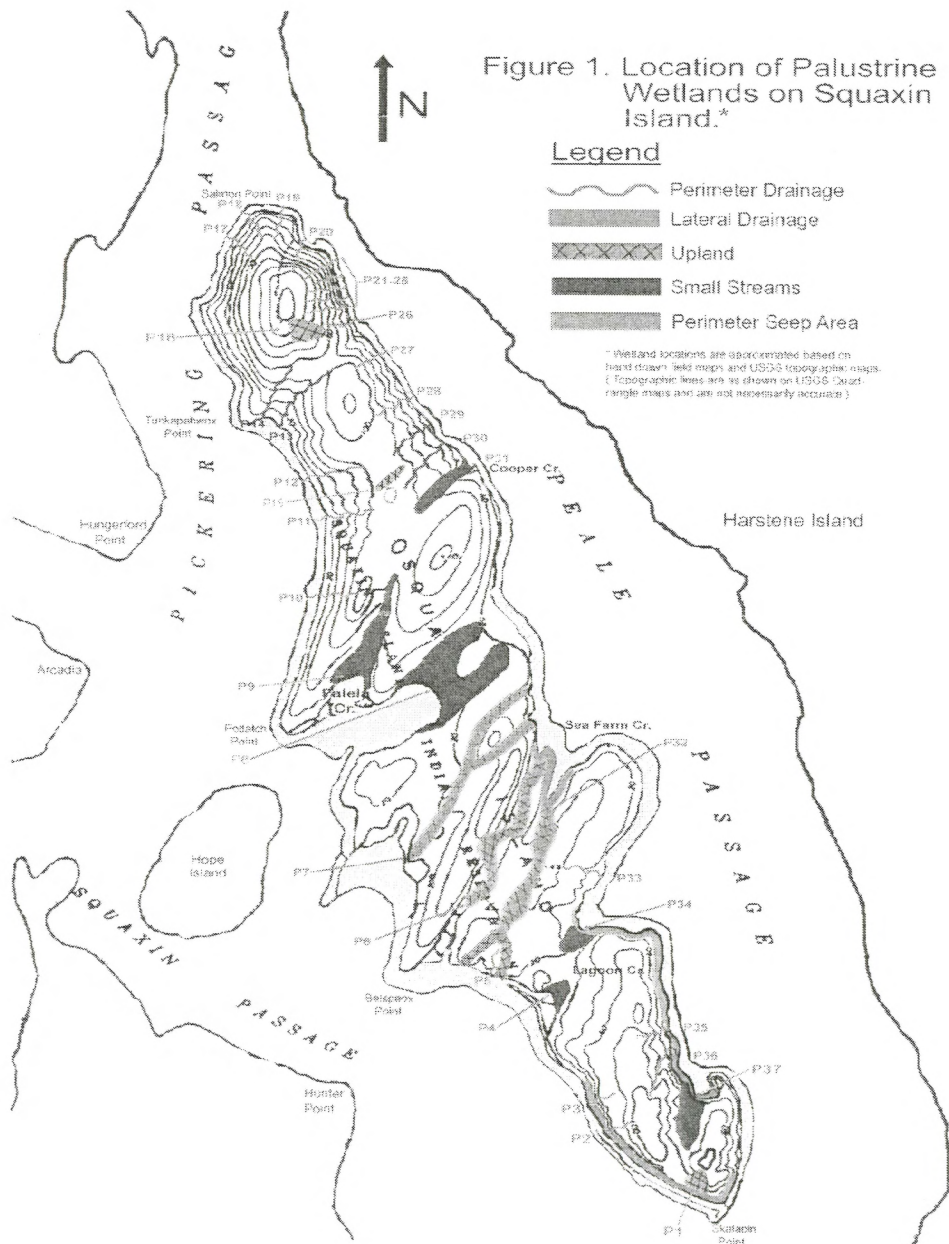
Upland wetlands are those not hydrologically connected to streams or perimeter seeps. There is limited information on these types of wetlands due to the nature of past assessments and evaluations of Squaxin Island. These wetlands are defined by outcroppings of Bellingham soils and verification by field inventory or persons familiar with the island. In addition to the three mapped upland wetland sites (Figure 1), others

could exist but have yet to be defined by these methods. Perched groundwater, ponded seepage water and mechanical soil compaction associated with logging activities are the most likely causes of this wetland type and serve as categories for defining their origins. Two wetlands are located on the northern part of the island while the third confirmed wetland is on the southern most tip near a large perimeter seep area.

Estuarine wetlands on Squaxin Island fall into two major categories. There are surface inundated wetlands classified as emergent wetlands with unconsolidated bottoms and entirely vegetated or “grassy” wetlands above the shore. There are sixteen surface inundated wetlands and sixteen “grassy” wetlands (Figure 2).

Subdivisions were created for the wetlands in the surface inundated category in order to describe the occurrence of flooding by tidal flows. Ten of sixteen are standing water irregularly flooded by marine water during high tides and flood events. Four are located in the tidal zone and are flooded on a more regular basis. Two areas are specially designated as lagoons in which there are unique bay formations subject to restricted water movement by a narrow passage; these areas are quite different and represent a more complex wetland habitat.

The sixteen remaining “grassy” sites, classified as emergent wetlands, do not have standing water and are only expected to be inundated by marine water during extreme tides and flood events. All of these wetland areas occur to the greatest extent on the southern parts of the island, and except for purposes of categorization should be considered as complex, interconnected systems that provide extensive functions and diverse habitats sensitive to major impacts.



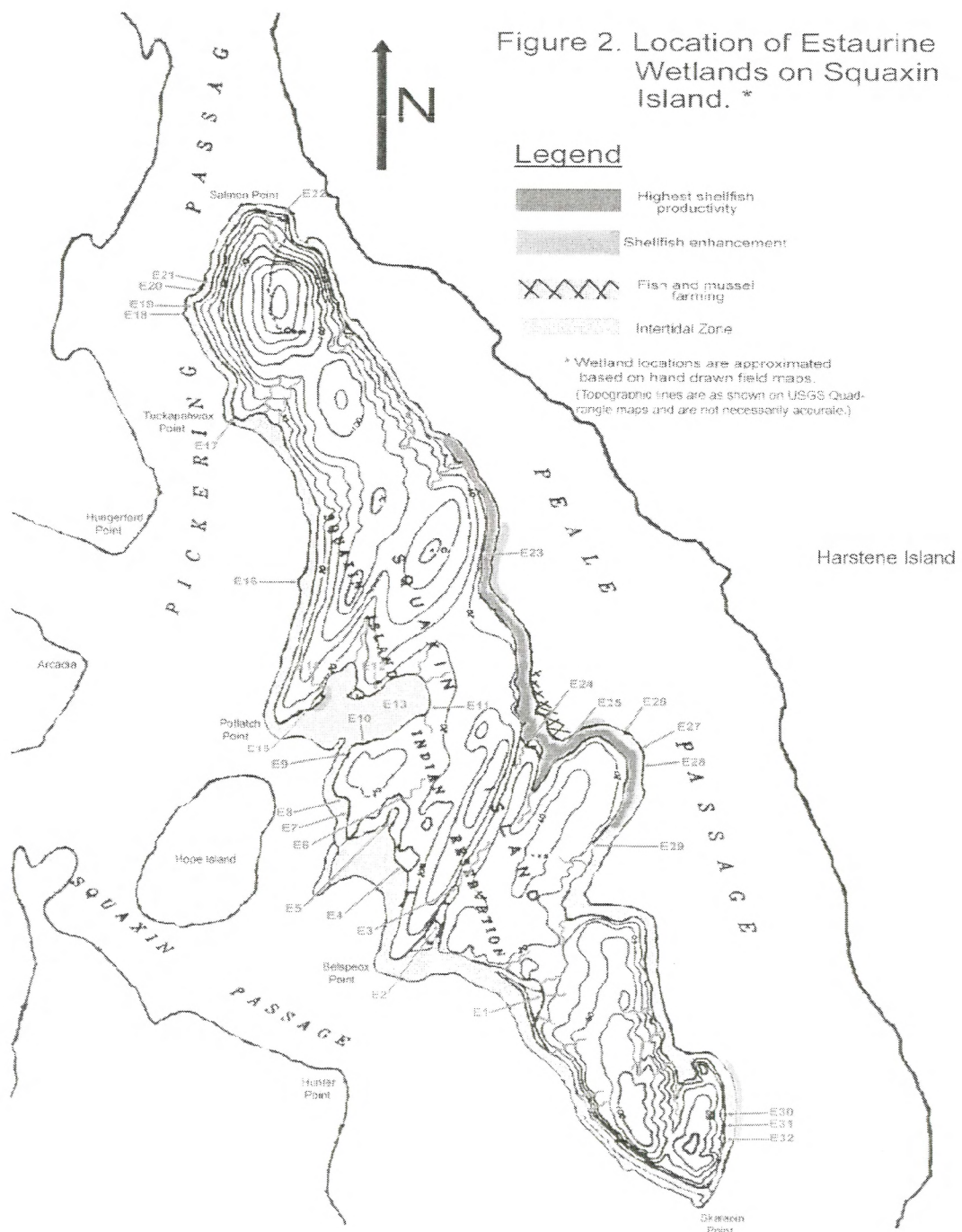


Figure 2. Location of Estaurine Wetlands on Squaxin Island. *

Cultural Resources

Squaxin Island has many unaccounted for cultural sites that represent valuable historical information. The remains of many sites date back to the mid-nineteenth century when five bands of resident Tribes were put together on the island as the Squaxin Island Tribe. There are two burial sites, one on the northwest end and one on the southwest end. Furthermore an inventory conducted in 1953 indicated several archaeological sites predating the occupation of the island in 1855. Shell middens on the beaches characterize many of these sites but further observational research is required to achieve a complete assessment.

Ethnobotany

Although information is limited on the types and uses of plant matter on Squaxin Island or by the tribal members, it is relevant and important to report such practices. Five plants that occur on the island are indicated as ethnobotanical resources in the literature: Western Red Cedar, Pacific Ninebark, Stinging Nettle, Willow and Cattail.

Red Cedar exceeded the other plants in uses according to the literature. It was used the most and in more varied ways by all of the Tribes documented. Uses for the wood include: housing, canoes, arrow shafts, spindles, posts, boxes and particularly by the Squaxin Tribe for herring rakes. The bark appears to be more versatile in use than the wood for such things as clothing, infant cradle pads, dishes, cooking pit lining, mats, canoe bailers, torches and much more. Limbs were used to weave baskets and make fish weirs. Medicinal uses included remedies for tuberculosis, colds, sore lungs, toothaches, kidney trouble, and fevers. Specific ceremonial or medicinal purposes are not documented for the Squaxin Island Tribe, yet the distribution and usefulness of this tree species indicates the use of the western red cedar tree is possible for all known activities in this subset of native people.

Squaxin Island tribal members used willow for building sweat lodges, lashings and tying tongs. Infusions of boiled bark were used for sore throats and antiseptics were made from bruised leaves soaked in water to treat cuts. The peeled and dried bark of stinging nettle was rolled on the thigh to create a 2-ply string. Drinking the crushed leaves in water was used as an aid to childbirth and further medicinal uses by other local Tribes included relief from rheumatism, colds, soreness or stiffness, headaches and nosebleed. A tonic made from the bark was used as an all-purpose remedy.

Pacific ninebark and cattail are not indicated for many uses. Children ate the berries of the ninebark while the peeled young shoots could be used to induce vomiting. Cattails are used for general purposes such as making mats, screens, baskets and other similar items. Known ethnobotanical uses of island species by tribal people is limited by lack of information. However, this does not necessarily indicate that the Squaxin Tribe was any less reliant on these resources than other Tribes in the region.

Recreational and Visual Resources

Squaxin Island lies in the area of the Cascadia Marine Trail System. Published information is available about nearby camping and recreation access locations on Hope Island State Park to the southwest, at Jarrell Cove State Park on Harstein Island to the

northeast and Joemma Beach State Park on the southeast side of Case Inlet. The publication and use of these nearby locations attracts attention to the position and natural appearance of Squaxin Island. This creates an appreciation and curiosity about the site that should be addressed in terms of access and trespassing issues and further consideration of Squaxin Island as a pristine viewscape subject to local and seasonal tourism concerns.

Management Alternatives

Assessment of environmental impact resulting from our proposed activities requires the exploration of alternative management scenarios. The two alternatives are:

No Action

Management practices on the island would remain unrevised. Concerns for buffers and ecological function would not be addressed and a multispecies approach to stand management will not be considered programmatically.

Proposed Management Action

The management guidelines of the revised Forest Management Plan describe in detail a process by which necessary steps will be taken toward a program of integrated tribal interests, landowner and allotment-holder concerns using well constructed island stewardship methods for the purpose of proceeding into the future with a better mandate for diverse issues.

Applied Management Alternatives

Alternative #1 - No Action

The no action alternative would result in no change to management practices as they are presently for Squaxin Island. The nature of the forest stand development would continue as it has since being harvested decades ago, where the processes that lead to diverse stand structure and the rate of ecological succession are much slower than a naturally occurring regenerating forest. This means that the vegetation continues to go through changes in species composition characteristic of a maturing forest; some trees attain the great size of old-growth while others are eliminated or suppressed by competition for light, water and nutrients are taken up by the dominant trees.

The no action alternative would also allow the continued use of harvest roads and provide no guidance for low impact harvest methods or the decrease of road building for the purpose of forested and tidal area ecosystem health and economic viability. The unrevised plan does not provide large enough resource buffers and lacks language to support aerial transport methods for timber harvest. Harvest management goals and values should determine the process that best provides desirable forest practices through the mechanism of tribal consensus.

Alternative #2 - Revised Forest Management Plan

The implementation of a revised forest management plan with stated goals including land use classification, an updated forest practices act, increased resource protection,

extensive archaeological assessment of the island and the development of a tribal environmental policy act will provide a cultural fit of policy and practice arrangements for Squaxin Island. Priority consideration will be given to the acquisition and stewardship of land acquired and assessment needs that follow for the purposes of forest health, cultural resources and specific management goals with regards to timber holdings, tidal areas, critical habitats, sensitive species and land use potential.

Avoidance of road systems by using aerial log transport (helicopter or balloon for example) will be encouraged through the emphasis on this topic in the revised FMP and prioritization of harvest plans using these methods over other applications using traditional overland hauling methods. There will be no permanent road system or use of logging trucks on the island, the Tribe can opt for swing roads and log dumps, as long as the log dumps are chosen with care so as to minimize damage to coastal cliffs and tidelands.

Unavoidable Adverse Effects

Any process on the island involving active management practices, timber harvest, fire suppression or the varied occasions of development for recreation or inhabitation will result in soil degradation, introduction of non-native pioneer plant species and habitat disruption. These issues will best be reduced through planning and consideration of all activities. The best planning and management practices will be facilitated by good assessments, careful observations and monitoring.

Despite the best efforts on the part of those carrying out forest operations according to the specifications of the Forest Management Plan, there will inevitably be some environmental damage, albeit limited in scale and duration. A limited amount of soil disturbance is likely to occur; on logging sites however, sheet erosion can probably be reduced to negligible amounts, and rill and gully formation substantially prevented. Road construction and use that conforms to the specification in the Squaxin Island Forest Practices Act will be a source of some erosion, but the mobilized soil will in large part be deposited in the uplands and will not damage aquaculture along the Island's beaches. It is critical that the Shoreline Protection Zone be respected, in order for it to serve as a filter for any upland erosion that may take place.

As with erosion, colonization of logged sites by undesirable plants (e.g. tansy and poison oak) is an unavoidable environmental impact associated with logging. However, as shade-intolerant species, these plants will be suppressed once the Douglas fir canopy is established. The habitat of sensitive species – e.g. the nesting trees of the Great blue heron and Pileated woodpecker – will be protected in logging operations by this management plan. Finally, the controlled sequence of logging and reforestation as prescribed in the plan will increase, rather than reduce the management options on the Island, by providing for long-term timber yield while leaving portions of the Island in an undisturbed condition. It is to be stressed that by anticipating environmental impacts of logging it is possible to reduce most of those impacts to the point that there will be no lasting damage.

Relationship between Short-Term Uses and Long-Term Productivity

Short-term uses of the land and effects of activities that have beneficial bearing on the future include the possibility of selective timber harvest or thinning for habitat, the reduction of fuel loads and the creation of fire barriers. The processes influencing the landscape on Squaxin Island currently are that of a mature second-growth forest structure that is under-managed. Specific management goals and objectives would be written in order to facilitate a closer relationship between the tribal community and the natural and cultural holdings as resources of Squaxin Island. Productivity issues can be addressed through a well-designed set of desires for potential of the island's forests that can be defined through a public forum.

Irreversible/Irretrievable Commitments of Resources

Areas of the island harvested or thinned based on the Forest Management plan will be subject to losses of certain plant species in return for diversity of stand structure and recruitment of animal species for the purposes of overall ecosystem health. Soil loss and damage will be reduced to a minimum with regards to the impacts on water quality, health of critical habitats and inconsideration of the time necessary for the regeneration of soil. Historical data on soil erosion indicates that forest management practices that are planned to minimize soil loss are conservative enough that even under conditions of high rainfall intensity the erosion rate is well within tolerable limits as prescribed by the Soil Conservation Service.

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The Squaxin Island Tribe Fire Management Plan

Introduction

This fire management plan (FMP) is a strategic plan that defines the program to manage Wildland and prescribed fires on Squaxin Island. The FMP outlines broad goals and objectives that will provide overall guidance to the natural resources program ensuring that desired program resource management objectives are met. This plan is derived from an overarching fire management plan and is supplemented by operational procedures such as a preparedness plan, mobilization plan, prescribed fire plan and prevention plan. An Environmental Assessment (EA) has been prepared covering the FMP and was approved on DATE. A National Environmental Policy Act (NEPA) document for this FMP is attached as an appendix to this plan. Operational plans must be completed and approved for each individual project such as a prescribed burn.

As part of the collaborative processes used to develop a plan for multiple interests, scoping documents were circulated to all Tribal Council members and to other effected and participating entities. One of the key components of initiating the fire policy is to gather within the FMP Tribal goals and objectives for fire management. As a result of initial scoping and subsequent review the goals and objectives and general content of this plan have been agreed upon by all effected parties.

The current fire program consists of : (1) providing Wildland fire protection and suppression through the Washington Department of Natural Resources under Cooperative Agreement A G P000723 between the Bureau of Indian Affairs and WA DNR (Appendix 1); (2) providing fire protection compliance through timber sale contracts; (3) participation in interagency training, fire suppression, and pre-suppression activities; (4) supporting fire prevention programs; and (5) providing oversight and direction for prescribed fire and fuels management.

Relationship to Land Management Planning/Fire Policy

Fire Management planning is required for every acre of burnable vegetation as directed by federal fire policy (U.S. 1996). The Department's Wildland Fire Management Policy is cited in the Department of the Interior, Departmental Manual Part 620: Chapter 1. Operation plans must be completed and approved for each individual project such as a prescribed burn. Requirements for National Environmental Policy Act (NEPA) are addressed in the Environmental Assessment (EA). This "stand alone" Fire Management Plan contains specific information required to implement Wildland fire management within the scope of this new policy. Overall guidance and policy for fire management is found in these documents:

- Departmental Manual, Part 620, Wildland Fire Management
- Authority for the development of the OPA FMP, are listed in the Wildland Fire and Aviation Program Management and Operations Guide, Chapter 2.C.1.

- Department of Interior policies for the development of the OPA FMP are listed in the Wildland Fire and Aviation Program Management and Operations Guide, Chapter 2.D.3.

Wildland Fire Management Strategies

General Management Considerations

The use of Wildland fire is very restricted. All forest management plans limit the use of Wildland Fire as a tool for broadcast and pile burning. The preferred method of fuel reduction is by mechanical slash treatments. The forest resource is extremely important as part of the Tribal culture and religious well being, and is less important as a source of Tribal revenue.

The objective of this plan is to minimize the number of acres burned through active fire suppression. The use of prescribed fire is permitted and is used on a limited basis for pile burning and for an occasional broadcast burn. All burns require that the national prescribed fire standards are met, and that all burns are coordinated by the State of Washington Department of Environmental Quality. Coordination with WA DNR is done on a regular basis for fire planning and general management strategies on the various ownerships. Coordination efforts also occur with private timber companies, USFS, and other land management organizations on project plans.

The Following is a list of fire preparedness planning documents:

1. Master Cooperative Fire Protection Agreement, April 13, 2004
2. Northwest Washington Fire Protection Services Operating Plan, Aug. 2004
3. Protection/Cooperative Agreement with State of Washington Dept. of Natural Resources #3 AGP000723
4. Fire Management preparedness Analysis (FMPA), 1998
5. Mobilization Guides:

Washington State Department of Natural Resources

- Olympic Region
- Central Region
- South Puget Sound Region

Puget Sound Interagency Coordination Center

National Interagency Mobilization Guide

Fire pre-suppression and suppression is provided, under contract, by the State of Washington Department of Natural Resources. This contract is funded through the BIA, Northwest Regional Office, with different levels of administration handled at both the Regional Office level and at Olympic Peninsula Agency level. The BIA Northwest Regional Office administers the suppression contract with the WA DNR and the OPA completes a local operating plan with the local WA DNR Regions.

Wildland Fire Management Goals

There are several basic principles that must be adhered to during any fire management planning and on the ground activities. These are further outlined in the Wildland Fire and Aviation Program Management and Operations Guide, 2004.

- Firefighter and public safety is the number one priority in every fire management activity.
- The role of wildland fire is an essential ecological process and natural change agent and will be incorporated into the planning process.
- Fire management plans, programs, and activities support land and resource management plans and their importance.
- Sound risk management is a foundation for all fire management activities.
- Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
- Fire management plans must be based on the best available science.
- Fire management plans and activities incorporate public health and environmental quality consideration.
- Federal, Tribal, State and local interagency coordination and cooperation are essential.
- Standardization of policies and procedures among Federal and State agencies is an ongoing objective.

Based on Tribal resource management goals developed from Forest Management/Forest Operation Plans, the following fire management goals have been adopted:

- Ensure that firefighter and public safety is the priority in every fire management activity.

- Minimize damage to resources from wildland fires, taking into consideration values at risk.
- Afford employment opportunities for Tribal members I support of local and national fire management operations including prescribed fire.
- Actively participate in interagency fire management operations through planning and sharing of resources under formal agreements.
- Control smoke emissions from prescribed fires to minimize the impact on air quality.
- Minimize the sedimentation and dissolved solids reaching anadromous fishery waters.

Wildland Fire Management Options

This section addresses the scope of Wildland fire management program options to be implemented and further developed through Resource Management Plans generated by the Tribes within OPA jurisdiction.

Based on the goal of minimizing the potential damages and hazards posed by wildland fires, all fires not ignited by management will be suppressed. This option has been employed on virtually all wildland fires on trust lands under OPA. The Agency/Tribe will provide an “Appropriate Management Response” on all wildland fires, with emphasis on minimizing suppression costs, considering fire fighter and public safety, benefits and values to be protected consistent with resource objectives, standards and guidelines. Responses to each wildland fire will be initiated in a timely manner with a force mix, based upon established fire management direction as documented in the approved Resource Plan. The use of an appropriate management response will allow land managers to tailor preplanned wildland fire responses to meet objectives established in resource plans and their associated implementation plans.

Description of Wildland Fire Management Strategies by Fire Management Unit

Identification of fire management units and strategies within the units is the basis for planning the management of wildland fire program. The Fire Management Unit (FMU) is any land management area definable by resource objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, or major fire regimes that set on unit apart from an adjacent unit. The management strategy is the same for all units and even for most small forest land owners within the geographic area. For the purpose of this plan, Squaxin Island Ordinary high water is identified and explained, and the strategy for fire suppression is the same on all lands in this administrative unit. Minimize damage on all trust lands and adjacent allotment and fee lands.

The suppression strategy for Squaxin Island is to implement AMR to suppress all fires in accordance with management objectives based on current conditions and fire locations. Implement the full range of wildland fire and fuels management practices, including prescribed fire, mechanical, chemical, biological, and cultural treatments that will move all affected landscapes toward desired future condition as described in the Resource Management Plan. Riparian and shoreline protection is critical for the aquatic resources.

Squaxin Island is considered by the BIA to be included in the Puget Sound FMU. This is the area west of the Puget Sound and east of the Olympic Mountains plus south of Puget Sound west of the Cascade range and inland more than 30 miles from the Pacific coast. This area includes the Skokomish, Chehalis, and Lower Elwah Reservations along with Western Washington Public Domain tracts that are in Clallam, Mason, Thurston, Grays Harbor, and Lewis Counties. Average annual precipitation in this zone is 42 inches. The vegetation is characterized by Douglas-fir, and western hemlock with a minor component of western red cedar. The under story is made up of ferns, salal and huckleberry. The soils in this zone tend to be more gravelly and less susceptible to damage by ground based machinery.

Objectives/Desired Future Condition – The desire is to manage both riparian and general forest stands with a healthy ecosystem in mind. Salmon habitat in streams is critical in all plans with the objective on ensuring the protection to the riparian vegetation to maintain and improve stream quality. Emphasis on creating mature stands with a diverse mixture of traditional plants is a secondary condition desired by many Tribal members.

Fire Management Strategy – Implement a limited range of wildland fire and fuels management practices, including prescribed fire (broadcast and pile burning), mechanical, chemical, biological, and cultural treatments that will move all affected landscapes toward desired future condition as described in the RMP's. The appropriate management response is guided by the suppression target that limits all fires to less than 5 acres 95% or the time. Cyclical reviews with WADNR should address this target to evaluate the effectiveness of suppression actions.

Management Constraints – Use of heavy equipment is restricted on Squaxin Island in order to reduce impacts to soil and riparian vegetation and subsequent deterioration of stream water quality and habitat. Except for cases where immediate action is warranted, suppression and pre-suppression activities will be coordinated with Tribal staffs to determine impacts to sensitive sites. Appropriate water bars must be installed on all slopes greater than 15%.

Topographic Features - Slopes on the island average from 0 to 15 percent, except in two small areas on the northern end that vary from 15 to 30 percent slope. One third of the island has slope of less than 5 percent and about one half of the island contains slopes between 5 and 15 percent.

Access - The Island is approximately 4 miles long and varies in width from three-tenths to nine-tenths of a mile. The area totals 1,978 acres and has divided ownership. All

of the island's tidelands and small amount of the uplands are owned by the Squaxin Tribe and are held in trust by the United States. The tidelands, totaling 492 acres, are entirely owned by the Tribe (Coastal Zone Management Study, NWIFC 1975).

Values to be protected – Protection will be for all tidal areas and forestland, emphasis is given to riparian protection and maintaining water quality for salmon production. Wildland fuels are represented by 3 types: timber hardwoods, and slash. The timber type covers the largest area, with lesser component of hardwood timber and a much smaller component of slash.

Political Boundaries – The Squaxin Island trust lands are scattered and intermingled with private fee patent lands. Checkerboard land ownership pattern on this reservation constrains the execution of the fire management program. The intermingling of allotted, Tribal, and deeded tracts make it much more difficult to acquire agreement from landowners for management practices such as prescribed fire and mechanical fuel reduction treatments. These ownership patterns greatly complicate the management of lands within the administrative jurisdiction.

Fuel Types – Fire regime V is the predominant fire regime in the region (>200 year fire interval, high severity, environmental extremes where natural ignitions are very rare and conditions rarely result in large fires.) The main fuel types are timber, hardwood and slash.

The timber fuel type consists mainly of conifer trees including Douglas-Fir, western red cedar, sitka spruce, and western hemlock. Fire spread in the timber is low, mainly through leaf litter, duff, herbaceous materials and small woody fuels, with moderate resistance to control. Slow burning surface fires with low flame lengths are generally the case although occasional jackpots of downed woody fuels wood cause flare ups and a higher intensity burn.

The slash type is usually generated by logging. The slash models fire spread is carried by downed woody fuels, leaf litter and other dead herbaceous materials. Fires in the slash fuel models generally have a very high intensity with low to moderate rate of spread and medium range spotting potential. The resistance to control is generally very high. Areas that have been logged are generally planted with trees in the first few years after cutting. An abundance of shrubs can also move into these sites; however the shrubs generally do not carry the fire spread.

Proposed Treatments – Resource Fuels Treatment – None

Hazardous Fuels Treatment – Fuels treatments (mechanical, prescribed fire and chemical) may be considered as needed when supported by a site specific plan. Use of prescribed fire must follow BIA guidelines, and coordination with Smoke Management and WADNR is essential.

Non-Fire Fuels Treatments – Generally will be restricted to use of chemicals to reduce brush competition on forest regeneration areas following harvest.

Wildland Fire Management Program Components

Wildland Fire Suppression

The BIA reference document used in the suppression of wildland fires in our region is titled: “Wildland Fire and Aviation Program Management and Operation Guide” (Blue Book) which can be found at the following website:
<http://www.bianifc.org>.

Wildland Fire Occurrence

In the past 10 years there has been minimal fire activity (1987-1996). There were 10 fires which burned a total of 21.7 acres. All fires were suppressed by the DNR and they were all man caused except for one lightning fire on the Makah Reservation. It should be noted that the fire history of 10 fires includes events that occurred on the Quinalt and Makah Trust Lands which are covered by individual Fire Management Plans. The acreages on these two reservations far over-shadows the acreages covered in the Olympic Peninsula Fire Management Plan. Most of the tribes have not had any fires this ten year fire history period.

The WA DNR Daily Action and Manning Guide

The WA DNR has pre-suppression and suppression responsibilities for all Trust lands under the jurisdiction of the OPA. The WA DNR has developed daily manning levels and action procedures based on Industrial Fire Precaution Levels (IFPL). Manning levels and action procedures are covered in Regional Mobilization Guides, by region of responsibility, and are updated annually. The reservations and public domain lands under the jurisdiction of the OPA are covered by three districts of the WA DNR, as follows:

- Olympic Region covers Hoh, Lower Elwha, Quileute, Jamestown S’Klallam.
- Central Region covers Chehalis and Shoalwater Bay.
- South Puget Sound covers Skokomish and Squaxin Island.

Appropriate Management Responses (AMR’s)

AMR’s define specific actions taken in response to wildland fires to implement protection and fire-use objectives. A prudent suppression response is required for all man-caused fires. Protection of life and property are the highest priorities.

Given the Agency’s interest in minimizing the potential damages and hazards posed by wildland fires, all fires will be suppressed. In the past, this option has been employed on virtually all wildland fires at the Agency. Within the scope of this response there exists a variety of operational procedures. These include the sub-strategies of direct and indirect attack, and an array of tactical options ranging from relatively passive

operations (such as cold-trailing or using natural barriers) to very aggressive operations (such as construction and firing operation).

Fire Precaution Levels and Fire Severity

During the fire season it is important to track fire danger. Fire danger readings are needed for daily wildland fire operations and for prescribed fire operations. There are a variety of ways to obtain fire danger ratings and they can be obtained in a tabular format (data) or a graphical format (maps). The graphical format is a quick and easy way to make interpretations of fire danger for any given area. Access to fire danger and fire severity information is as follows:

Wildland Fire Assessment System – <http://www.fs.fed.us/land/wfas/>.

Components of this system include: fire danger maps of the US showing general fire danger ratings, fire weather observations and next day forecasts, dead fuel moisture maps, live fuel moisture maps (visual and relative greenness), and drought maps including the Keetch-Byram index and the Palmer index, lower atmospheric stability index and fire weather forecasts. Much of the information is displayed in a graphical format and can be quickly interpreted for this area. This is an excellent system for monitoring general fire danger on a day by day basis and for monitoring general severity of fire conditions.

Industrial Fire Precaution Levels (IFPL) – The IFPL ratings are issued by the WA DNR. These ratings are posted along major roadways and are available from local DNR offices. IFPL ratings inform the industrial forest user of requirements for operations during the fire season.

Detection – There is no formal detection system used. The general public will call the local fire department (911) or the WA DNR (1-800-527-3305) to report fires.

Initial Attack Mobilization Strategy – This service is provided by the WA DNR. Several Tribe/Agency personnel are qualified and made available as fire incident overhead are dispatched if requested by WA DNR.

Extended Attack Mobilization Strategy – The WA DNR provides for all extended attack operations. The Agency will assign a resource advisor as needed.

Wildland Fire Situation Reports – There are a variety of sources for obtaining general information concerning ongoing events and wildland fire situation reports. One source of this information is the Northwest Coordination Center:
<http://www.fs.fed.us/r6/fire/nwcc/index.html/>

Aircraft – Department of Interior regulations require that when BIA personnel use aircraft and pilots for fire suppression or fire preparedness purposes, they must meet the Office of Aircraft Services (OAS) guidelines and requirements. Listings of aircraft under contract by OAS can be located in the SAC's system and on the OAS Web page. Tribal personnel should also consider using either OAS or USFS carded aircraft for all

fire related activities. WA DNR uses USFS carded aircraft and pilots for all their fire related activities, and can be used by BIA personnel.

Shared Resources – The Agency has no shared resources.

Communications – Good communications is essential on prescribed burns and wildfires. Cell phones can be used in many areas. Two-way radio communication is also available and there is one repeater. Radio frequencies are defined in local operating plans.

Fire Reporting Requirements

Incident Status Summary, ICS-209 – WA DNR handles all wildland fire suppression on Trust lands and fills out the Incident Status Summary, ICS-209 to report all aspects of fire suppression efforts at least once a day depending on fire complexity. Current federal policy dictates that Wildland Fire Implementation Plans (WFIP) and Wildland Fire Situation Reports (WFSR) will be initiated on all wildland fire incidents. Because WA DNR manages all suppression efforts on the Trust Lands of WFIPs and WFSRs are not required.

Individual fire reports (form DI-1202) – The DI-1202 will be submitted to the National Interagency Fire Center (NIFC) through the Shared Applications Computer System (SACS). These reports will be prepared by the designated OPA personnel. It is the policy of the WA DNR to provide fire reports to OPA within ten working days following suppression of fires on Trust lands. This is to be followed by a financial report within 90 days. Reimbursements for suppression costs are handled annually between the state offices of the WA DNR and the BIA NW Region.

Mobilizing Resources for Non-local Assignments – Requests for use of Agency fire resources are received and processed through the Puget Sound Interagency Coordination Center (PSICC).

Wildland Fire Use

This section provides the direction for managing wildland fires for resource benefits. It would normally include direction for decision criteria inputs, implementation procedures, identified objectives, constraints, public and personnel involvement, and the documentation and reporting requirements.

The OPA and Tribes in the OPA administrative area have made the decision not to allow any fires to burn for resource improvement on any of the trust acres within their jurisdiction. This decision has been based on review of current management plans. No further information is necessary to be developed in this plan for management of Wildland Fire Use.

Prescribed Fire

With the high natural fire return intervals, (300 year plus Fire Regime 5); natural fuels will not be treated in most cases. Given the high value of the timber and the

potential for damage, natural fuels treatment is unlikely but the option should be left open. Wildland Urban Interface (WUI) and/or fuel break projects may be developed for natural fuels hazard reduction on a case by case basis.

Treatment of activity fuels may be prescribed to meet resource management objectives identified in Forest Management Plans and for site specific project needs. On-going timber sales and forest development activities will often require fuels treatment. The objectives of fuels management will primarily be to reduce fuel loadings in preparation for planting or to alter fuel profiles in such a way as to provide resource protection from catastrophic fire. Site specific fuels treatment plans will be incorporated into cutting permits, timber sales contracts, and thinning and other site preparation projects as appropriate. Activity fuels will be treated as prescribed by project.

Two general prescribed fire treatment strategies are projected for activity fuels treatment: pile and burn slash piles or broadcast burn.

Timing for Prescribed Fire Activities – Prescribed burns must be coordinated through the WA DNR at the regional level for purposes of air shed management. Broadcast burns will generally be conducted in the late spring and early summer. Pile burning should be accomplished during periods of low fire danger after significant rain.

Burn Plan – A prescribed fire burn plan will be written for each burn or type of burn that is proposed. Burn plans must follow guidelines as established in the “*BIA Prescribed Fire System Handbook*”. Each burn plan will be reviewed and approved by the appropriate officials before any burning can take place. Each burn plan will prescribe different fire behavior parameters and fire effect objectives depending on the fuel type and purpose of the burn.

The burns will be conducted within a specific range of environmental parameters, including fuel and weather conditions, as identified in the burn plan. Meteorological dispersion conditions will also be considered to minimize any adverse impacts from fire and smoke. Both ground based equipment and helicopters may be used for ignition depending upon the size of the project and other constraints. Ground based ignition includes drop torches, backpack propane devices and terra torches. Helicopter ignition with an aerial drip torch can be a very effective tool for larger projects especially with heavy fuels and with marginal fuel moistures (at the high end of the prescription).

Project Size – Burn plans should be completed for the largest size possible (acres) where similar fuel types, safety concerns, NEPA compliance, and other constraints allow. Individual burn blocks within an overall (larger) planned burn area should be identified in sized that will achieve the desired objectives while maximizing efficiency of Agency resources as well as local and national shared resources. Generally project size will be small in size and short in duration.

Organization Strategy – A Burn Boss is required for every burn. For low complexity burns a Burn Boss must be in overall charge of the burning but does not necessarily need to be on site. Qualified prescribed fire personnel can be ordered as

needed. Additional resources will be used from outside the Agency whenever needed on larger and higher complexity burns.

Smoke Management Strategy – The following information must be considered when developing the Smoke Management section within each burn plan. The burns should be carried out during “Fair” or better dispersion meteorological conditions. Night-time ventilation indexes of “poor” are common during high pressure weather events and should be avoided. Wind direction and speed restrictions should be prescribed to avoid impacts to receptors. Individual burn day termination times should be specified depending on location of receptors. Other factors include burn size (small vs. large blocks), timing, emission reduction techniques such as firing techniques (backing vs. strip head firing), reduction of area burned (use of mechanical and other non-fire techniques) etc.

The Simple Approach Smoke Estimation Model (SASEM) is a tool that can be used to predict smoke dispersion and air pollutant levels created by proposed burns. The burn prescriptions must be designed so that there will not be a violation of the National Ambient Air Quality Standards.

Smoke can be objectionable, dangerous and cause health problems when conducted near highways and populated areas. Burning should be done during the daytime and when the atmosphere is unstable so that the smoke will rise and disperse at high altitudes. Burning should be done when winds are blowing away from nearby towns, highways, etc.

Sensitive Receptors – Each individual burn plan will identify the local towns, airports, highways, individual residences, and other specific sensitive receptors that will potentially be impacted from smoke.

Monitoring Strategy – Reference the VIA Prescribed Fire System Handbook for monitoring standards. Levels of monitoring for all prescribed burns will be specified in each burn plan.

Weather Stations – Contact the Puget Sound Interagency Coordination Center (PSICC) for daily fire weather observations and forecasts. Weather station observations are used for daily planning purposes and for making fire behavior and fire danger calculations. Fire weather observations are also valuable for planning and implementing prescribed burns. General weather and climatologically data can be accessed through the following website: <http://www.seawfo.noaa.gov/>

Fire Weather forecasts – Fire weather forecasts are available from the National Weather Service in Seattle, WA (website: <http://www.seawfo.noaa.gov/>) or from PSICC. General weather forecasts are available in some areas via two way radio. Reference the following web site for the appropriate radio frequency: <http://www.seawfo.noaa.gov/nwr/html>. It must be noted that this is not a fire weather forecast and it is not intended to be a replacement.

Spot Weather Forecast – A request can be made to the PSICC. Spot weather forecasts are usually obtained for prescribed fires, large wildland fires and for fires that escape initial attack. Spot forecasts are normally obtained prior to the ignition of any prescribed fires, as they are an integral part of the “go-no go” check list. Spot forecasts can also be obtained from the National Weather Service in Seattle, Washington. Spot weather forecast forms can be located in the National Weather Service Operating plan and in the BIA Prescribed Fire Handbook.

Non-Fire Fuel Applications

Mechanical Fuel Reduction – In general, mechanical manipulation of activity fuel is more precise but costly, while prescribed fire is less precise but usually cheaper. Mechanical treatments may be more effective than burning to achieve desired results on selected sites but may not be feasible to treat large acreages due to time and funding constraints.

Mechanical fuels treatment projects may be developed for WUI and/or fuel breaks for natural fuels hazard reduction. These projects may consist of thinning, pruning, push backs using cats or other heavy equipment, fire trails, piling slash and burning piles, chipping or lop and scatter of the slash off site for disposal, or any combination of the above.

As appropriate and required by forest practice regulations, slash created by timber sale operations or other projects will be pulled back from major roads. In addition, slash may be pulled back as required and appropriate from riparian areas. Generally the pull back is from 50 to 100 foot. Another strategy is to scatter the slash and allow it to naturally decompose.

Emergency Stabilization and Rehabilitation

Burned area emergency stabilization and rehabilitation (ESR) activities are an integral part of wildland fire incidents. Departmental policies are set forth in the Interagency Burned Area Emergency Stabilization and Rehabilitation Handbook.

Emergency Stabilization – To prescribe cost effective post-fire stabilization measures necessary to protect human life, property and critical cultural and natural resources.

To promptly stabilize and prevent further degradation to affected resources on lands within the fire perimeter for areas affected directly by wind or water erosion from the burned areas and repair damages caused by fire suppression operations in accordance with approved land management plans and policies.

Rehabilitation – To repair or improve lands damaged directly by the wildland fire and that are unlikely to recover naturally from severe wildland fire damage by emulating historic or pre-fire ecosystem structure, function, diversity and dynamics according to approved land management plans. Restore or establish healthy, stable

ecosystems in the burned area, even if these ecosystems cannot fully emulate historic or pre-fire conditions as specified in approved land management plans.

Implementation of this policy at OPA should be discussed with regional office ESR staff in order to develop criteria for call out of National or Regional Teams. Due to the relatively small land mass most incidents would not qualify for a national team call-out. The next level of call-out is the Regional Team which would be the normal team acting at the Agency. Criteria for this level of manning have not been developed by the Regional Office and Westside Tribe/Agency programs. These programs are unique and an activation plan should be developed and added to the operational planning documents at both agency and regional office.

Policy is well defined in the Interagency Handbook, and the Agency will administer any ESR project according to Interagency Handbook.

Prevention, Community Assistance, and Education

Prevention Strategy – The Prevention Strategies for Trust lands in OPA include public information/education, fire burn permit systems, closure restrictions, trespass/arson investigation, and enforcement of regulations. The WA DNR coordinates these activities with the interagency wildland fire community through PSICC. A Wildland Fire Prevention Plan (WFPP) including the Risk Assessment Mitigation Strategies (RAMS) Analysis is in the planning process but, has not yet begun the development stage. Further planning is scheduled for winter of 2004/2005.

Wildland fire pre-suppression and suppression is provided by the WA DNR. The reservations and public domain lands under the jurisdiction of the OPA are covered by three districts of the WA DNR, as follows:

Olympic Region covers Hoh, Lower Elwa, Quileute, Quinalt and Makah.

Central Region covers Chehalis and Shoalwater Bay.

South Puget Sound Region covers Skokomish and Squaxin Island.

Training and Qualifications – Fire suppression personnel are assigned only to positions for which they meet the National Wildland Coordination Groups, standards for job qualification and training. Annually, the Agency sends prospective firefighters to basic firefighter training conducted locally and some others are sent to more advanced training regionally and/or nationally.

National qualification standards for wildland and prescribed fires are listed in National Wildfire Coordination Group (NWCG) handbook 310-1, NFES #1414. Personnel qualifications are required to be recorded annually in the Shared Application Computer System (SACS). Position descriptions of the duties for different wildland fire positions are listed in the Fire line Notebook NWCG Handbook 3, NFES #0065. Additional information on fire course planning, management, presentations and follow up is in the Course Administrator's Guide, NFES # 2226.

More information: <http://fire.nifc.nps.gov/mats/matsframe.asp>

Fire Business Management – Fire business management practices include policy and procedures concerning time keeping and payroll, personnel, acquisition, property management, incident business management coordination, interagency cooperative agreements, accident investigation and reporting, claims against the United States, and cost accounting and reporting.

Monitoring and Evaluation

The FMP is a working reference for wildland fire management and hazardous fuels treatments within the Unit. It will be reviewed annually and revised as needed to ensure that the strategic guidance provided in the plan is assisting the Agency and Tribes in meeting its resource management goals and objectives in the RMP's. Revisions, additions, and adjustments that are compliant with the RMP's may be incorporated into the FMP.

Any major changes may require amending the RMP's. The review will also insure that the fire program is being implemented in a safe, cost effective manner and as directed in the FMP. As national wildland fire performance measures are issued, monitoring and evaluation protocols will be developed to meet those requirements and follow Department and Bureau guidelines.

Glossary

Confinement – Confinement is the strategy employed in AMR's where a fire perimeter is managed by a combination of direct and indirect actions and use of natural topographic features, fuel, and weather factors.

Direct Attack – Any treatment of burning fuel, e.g., by wetting, smothering, or chemically quenching the fire by physically separating the burning from unburned fuel. A suppression strategy in which resources are directed to work close to the fire edge.

Indirect Attack – A method of suppression in which the control line is located some considerable distance away from the fire's active edge. Generally done in the case of a fast-spreading or high-intensity fire in order to utilize natural or constructed firebreaks or fuel breaks and favorable breaks in the topography. The intervening fuel is usually backfired; but occasionally the main fire allowed to burn to the line, depending on conditions.

Initial Attack – An aggression suppression action consistent with firefighter and public safety and values to be protected.

Prescription – Measurable criteria which define conditions under which a prescribed fire may be ignited, guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic public health, environmental, geographic, administrative, social, or legal considerations.

Wildland Fire Suppression – An appropriate management response to wildland fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire. All wildland fire suppression activities provide for firefighter and public safety as the highest consideration, but minimize loss of resource values, economic expenditures, and/or the use of critical firefighting resources.

Reference Material

Agee, James K.; Huff, Mark H. 1980. First year ecological effects of the Hoh Fire, Olympic Mountains, Washington. In: Martin, Robert E.; Edmonds, Donald A.; Harrington, James B.; [and others], eds. Proceedings, 6th Conference on Fire and Forest Meteorology; 1980 April 22-24 Seattle, WA. Bethesda, MD: Society of American Foresters: 175-181.

Baily, Robert G. 1995. Descriptions of the Ecoregions of the United States. U.S. Department of Agriculture Miscellaneous publication 1391.

Morrison, Peter H.; Swanson, Frederick J. 1990. Fire history and pattern in a Cascade Range landscape. Gen. Tech. Rep. PNW-GTR-254. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 77p.

Lotan, James E.; Alexander, Martin E.; Arno, Stephen F.; [and others]. 1981. Effects of fire on flora: A state-of-the-knowledge review. National fire effects workshop; 1978 April 10-14; Denver, CO. Gen. Tech. Rep. WO-16. Washington, DC: U.S. Department of Agriculture, Forest Service. 71 p.

Notice of Availability

Description of Action: The Squaxin Island Tribe has amended and updated the Squaxin Island Forest Management Plan as part of their management responsibilities for reservation lands. This includes an updated Environmental Assessment and Finding of No Significant Impact (FONSI).

Environmental Assessment: The management strategy stated in the Forest Management Plan does not have an increased environmental impact; the substantive changes support good management practices by addressing forest ecosystem and tideland health with low impact harvest practices, increased resource buffers, a new cultural resources chapter and a shift in guiding principle to an overall landscape protection.

Public Comment Session:

Where: Mary Johns Room, 70 S.E. Squaxin Lane, Shelton, 98584

When: May 16th, 4p.m. to 6 p.m.

Comment period: Deadline is June 10, 2005

Contact: Squaxin Island Tribe Natural Resources Department, (360)432-3818, 2952 S.E. Old Olympic Hwy, Shelton, Washington 98584

Finding of No Significant Impact

The Environmental Assessment for the Squaxin Island Tribe Forest Management Plan 2005 details the environmental condition of the island area and describes a preferred alternative that will not significantly alter the environment. This can be reviewed by reading the attached Environmental Assessment.

The Environmental Assessment documents the impact to the human environmental conditions that will result from the amended Squaxin Island FMP. It evaluates the revisions that will promote a broader concern for the forest ecosystem and increased landscape protections. These include buffers on unstable slopes, riparian areas, wetlands, shorelines, and cultural areas. The plan mitigates logging and the associated impacts by including prioritized consideration of low impact methods such as aerial transport to a barge or another land mass.

The following bullets summarize the substantive changes in the amended **Forest Management Plan**. The page numbers correspond to the Forest Management Plan.

- Amended **harvest operations and practices** to include sustainable harvest and low impact methods (pp. 12, 15, 16, 18, 21, 23, 24).
- Amended to include entire chapter on **Cultural Resources** aspect of plan including buffered areas (pp. 12, 15, 17, 27-30).
- Amended forest protection by **increased resource buffers**: riparian, wetlands, tidelands and unstable slopes (pp. 17).
- Amended **native vegetation** content to include cover to improve water quality standards and address non-traditional forest resource markets (pp. 12, 21, 22).
- Amended forest plan to include **fire management plan** in an appendix (pp. 14, 23).
- Amended forest plan **shifts emphasis** onto **resource management** from timber management (pp. 15, 17, 18, 25).

The EA provides two alternatives. The first alternative is the “no action” alternative which establishes the potential for increased environmental risks to the tidal areas and forested uplands. The second alternative is the “preferred alternative”. This describes increased landscape protections, mitigation of logging activities, tidal and forest ecosystem importance and broadens the treatment of cultural resources.

The reasons for a FONSI and the specific portions of the EA by page number:

- 1) Lasting Tribal control over the tidal area supporting the quality and protection of the tidal zone (EA pp.3,6);
- 2) Ongoing policy of land acquisition on the island as a management priority that will support future wildlife values and an intact forested and marine ecosystem (EA pp. 6-9);
- 3) The addition of a cultural resources chapter for the preservation of Tribal heritage (EA p. 11);

- 4) Increased resource buffers(Timber volume findings: EA p. 5) and low impact harvest methods that will maintain current high water quality on and surrounding the island(EA pp. 9, 10; Summary of wetland assessment p. 10); and
- 5) Selection of a preferred alternative (#2) supports the no significant impact in stating the merits of establishing the amended Forest Management Plan (EA pp. 14,15).

Other environmental documents related to the EA:

Coastal Zone Management Plan. Prepared by South Puget Intertribal Planning Agency. 47 p.

Envirovision. 1998. Squaxin Island Baseline Wetland Inventory. Prepared for the Squaxin Island Tribe Natural Resources Department. 17 p.

Latourell, John A. and Latourell, Elaine D. 1975. Coastal Zone Management Study of Indian Trust Lands in Western Washington. Prepared for the State of Washington Department of Ecology. 209 p.

Soule, Oscar and Lidman, Russell. Assisted by Gay Vogt. 1978. Coastal Zone Management Study. Prepared for South Puget Intertribal Planning Agency.

Squaxin Island Forest Management Plan. 1982.

Squaxin Island Forest Practice Act and Regulations. 1982.

United States Department of Agriculture, Soil Conservation Service. 1960. Soil Survey: Mason County, Washington. 76 p.

Signature

Ray Peters, Executive Director, Squaxin Island Tribe