

# Wrangell Island Analysis Report

## Report Overview

The purpose of this report is to solicit public review and comment and provide a context for future project decisions on National Forest lands on Wrangell Island over the next ten years. It presents an overview of public comments, resource conditions, and possible projects (roads and access management, timber harvest, recreation). This report describes Wrangell Island old growth reserves and other management prescriptions designated by the Forest Plan (TLMP). It describes wildlife travel corridors and recreation use across the island. It includes the results of a watershed analysis that identified sensitive watersheds and important fisheries on the island. Within this framework of Forest Plan prescriptions, resource conditions, and human use, an interdisciplinary team has suggested projects including:

- Recreation trails and shelters.
- Timber harvest proposals of one to five million board feet that avoid the most sensitive watersheds and allow consideration of scenery and wildlife values.
- Road access management that considers wildlife and fisheries while maintaining access to potential timber sales and popular recreation sites.

This report is organized as follows:

- An introduction explaining why we wrote this report and how we intend to use it.
- A summary of public comment and highlights of a Wrangell Island Analysis conducted by the 1997 Wrangell High School Environmental Sciences Class.
- A summary of landscape design objectives from the Forest Plan.
- Descriptions of the seven landscape units on Wrangell Island, including specific design objectives, resource conditions, and possible projects on national forest lands within each.
- A summary of possible projects (timber, roads, recreation, etc.) on Wrangell Island.
- A summary of ecological processes (wildlife, watershed, etc.) and human use on Wrangell Island

## Introduction

Wrangell Island is a 200 square mile island located in the south central portion of the Alexander Archipelago commonly known as Southeast Alaska. It is home to roughly 2,500 people who live mainly in the city of Wrangell on the north tip of the island. The community of Thoms Place is located on the southwest side of the island (see Map 1). Like most Southeast communities, people rely on the surrounding sea and forest for food, jobs, and recreation. Many have lived here their whole lives; some for generations. A rich combination of natural and cultural history attracts visitors from all over the globe during the summer. The Forest Service manages most of the land on Wrangell Island as part of the Tongass National Forest. This report provides you with some information about Wrangell Island and the inter-relationships of physical, biological, and social factors that the Forest Service will consider in future management decisions. This document does not make management decisions. It provides a context for individual or collective management actions that could be taken on national forest lands in the future.

***We'd like you to comment on this report. Write, stop by or call us at the  
Wrangell Ranger District Office of the US Forest Service.  
P.O. Box 51 525 Bennett Street Wrangell, AK 99929 907-874-2323***

We began an island-wide analysis for two reasons. First, we wanted to look at relationships between ecological processes and forest management across Wrangell Island. When planning timber sales, roads, or recreation projects we focus on small project areas in one to three year timeframes. The past fifty years of project planning and implementation resulted in the present pattern of roads, clearcuts, trails, and campsites across the island. As resource development proceeds, it becomes increasingly important to understand how projects "fit" together and to anticipate their cumulative effects. For example, knowing where possible future recreation development might most likely occur helps us plan timber harvest and harvest prescriptions that would be compatible in that area. By looking ahead, considering public comment, and evaluating the ecological processes across the island, we will have a better understanding of what projects to plan and how to prepare informed decisions on those projects.

Secondly, although the Tongass National Forest has a ten year plan which describes ecological processes and resource development plans across the Tongass, the "Tongass Land and Resource Management Plan (TLMP)" is so broad that we wanted to evaluate in more detail how to apply the plan to Wrangell Island.

This analysis does not directly result in any decisions. Rather, it provides context for future project decisions on national forest lands on Wrangell Island over the next ten years. This analysis provides an overview of resource conditions and possible projects (roads and access management, timber harvest, recreation) on Wrangell Island. By putting this information together in one document it is possible to get a clearer picture of how one project or condition affects other resources, opportunities, or conditions. This will enable us to prepare informed decisions which minimize resource impacts and ensure that forest management proceeds in an efficient and responsible way.

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**Map 1- Vicinity Map - Wrangell Island**

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Forest plan decisions, which guide all national forest resource development projects, require analysis, formal documentation, and public comment. Decisions to proceed with land disturbing projects require more site-specific analysis, formal documentation, and public comment. The National Forest Management Act (NFMA) and the National Environmental Policy Act (NEPA) mandate these decision-making processes.

Within the framework of the Forest Plan (TLMP) we also conduct analyses and develop project plans and schedules which do not require NEPA decisions. This report is such an analysis. Figure A shows the relationship between this analysis, the Forest Plan and project environmental analysis, so that you can see how the ideas for projects listed in this report may eventually be evaluated through the NEPA process where actual decisions are made.

This report proposes project ideas, some of which will still require further environmental analysis, public review and decision-making mandated by NEPA. Timing of projects will depend on many factors, especially funding.

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**Figure A - Relationship Between Forest Plan and Other Analyses**

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<p><b>A formal analysis and decision document under NFMA that establishes broad land use allocations and standards and guidelines for projects.</b></p>	<p><b>EXAMPLE:</b> Forest Plan (TLMP)</p>
<p><b>Optional analysis or schedule which 1) narrows and prioritizes opportunities to implement the Forest Plan and 2) analyzes how projects fit together given a particular landscape. No decisions are made.</b></p>	<p><b>EXAMPLE:</b> Wrangell Island Analysis or other schedules or analyses where we look at island-level relationships between the Forest Plan and project plans</p>
<p><b>Formal Analysis and decision document under NEPA to proceed with specific project (timber sale, recreation site, or road management).</b></p>	<p><b>EXAMPLE:</b> Project Environmental Analysis (EA, EIS or Categorical Exclusion depending on possible environmental impact).</p>



## Public Ideas and Comments

### Summary of Public Comment

We began the Wrangell Island Analysis by reviewing public comments from past projects (Nemo Road, Timber Sale and Campsites, North Wrangell Trail, and the Five Year Recreation Goals process) as well as comments received about Wrangell Island on the Tongass Land Management Plan. We included our understanding of public desires from contacts with timber purchasers, outfitters and guides, environmental groups, city sponsored committees, ferry and cruise ship passengers and other agencies. And we reviewed past city sponsored planning efforts such as reports from the Economic Development Committee, Wrangell 2001 notes and the Tourism Marketing Plan.

Consideration of public comment is essential to this analysis and provides the basis for developing project ideas and objectives. From these past efforts we have noted the following:

- Public desires for recreation on the island often cite the need for more hiking trails, winter recreation opportunities (snowmobiling and skiing), cabins and shelters on the island and recreational driving/camping opportunities. People would also enjoy more land-based fishing opportunities and improved access for younger, older or disabled persons and families at recreational facilities.
- Some people would like to have primitive campsites designated near beaches around the island. This would provide camping opportunities for kayakers, canoers, or other boaters circumnavigating Wrangell Island.
- Marketable tourism opportunities would also be increased by the addition of more trails, particularly close to town. The city and private landowners have taken steps to develop a full service RV park and campground, so the Forest Service should keep its recreation developments further out the road system: smaller and more rustic.
- Local people and visitors alike enjoy interpretive and educational activities and informational maps and brochures about natural and cultural history.
- People seeking developed recreation facilities usually don't travel very far out the road. Road improvements (like the work on Zimovia Highway and Forest Highway 16) affect the pattern of road use by large recreation vehicles. Many do not travel far beyond McCormack Creek. The Nemo Campsites have become a very popular destination. People wanting to spend more time exploring or getting away from crowds are willing to travel further.
- Many people would like a loop road for all kinds of recreation. The most popular loop road ideas are the Nemo-Thoms Lake Road and the Pat-Spur Road connection (city/state land). People generally want to keep logging roads open for public use.
- State and federal agencies have suggested various kinds of road closures as a way to minimize wildlife and fishery impacts.
- Some timber operators are interested in buying very small (less than one million board feet) timber sales. These operators find Wrangell Island ideal since transportation costs are often lower than more remote areas. People would like to see the Forest Service increase the supply of small amounts of wood for possible "value-added wood processing". Opportunities along the existing road system improve the economics of these very small timber sales.
- Timber industry interest in sales of one to five million board feet is fairly steady, though road construction costs associated with these sales are of concern.
- The State of Alaska has responded to demand for small sales by planning several along the Spur Road extension, near Pat Creek, Hermit Creek, Earl West Cove and possibly near Thoms Creek. The City of

Wrangell is also planning timber harvest from its lands (along the Spur Road extension) and investigating ideas for a log sort yard which could supply small amounts of logs to small mill owners.

- Local residents generally consider timber and recreation to be compatible on Wrangell Island. Wrangellites have worked in the timber industry for generations and are proud of this heritage. Logging roads provide easy access and open up views and new areas for exploration, berry picking, hunting, and firewood cutting. Some people, particularly visitors, are disturbed by large clearcuts, but supportive of partial or small patch harvesting techniques which are more compatible with recreation, scenery and some wildlife values.
- Thoms Creek and Lake area and the Fools Inlet area are routinely cited for their high wildlife habitat values, as is Salamander Creek, although to a lesser extent.
- There is increasing concern about the cumulative effects of timber harvest, roading and recreation development on wildlife habitat. Past harvest has fragmented some relatively large stands of old growth into smaller isolated stands.
- Thoms Creek, Salamander Creek, and Pat Creek are cited frequently for their importance as fish habitat or recreational fishing destinations. In general, people would like to see enhanced fishing opportunities on lakes and streams. Wrangellites also have a strong heritage in commercial and subsistence fishing. The freshwater habitat supporting these fisheries is important to local fishermen.
- Residents of Thoms Place appear to prefer relative isolation from roads and other developments. They have a high degree of concern for any activities located on the south-west side of the island as well as the east side of Etolin Island along Zimovia Strait. Back Channel residents on the north-east end of the island also have a high degree of concern for development occurring around them, although some of them would prefer additional access.
- Small boat routes surround the island. Popular anchorages include Earl West, Fools Inlet, Thoms Place, Whiskey Cove, and Skip Creek. The most common ferry and cruise ship routes are located on the northwest portion of the island. The Back Channel (Eastern Passage and Blake Channel) is the most popular route to the Anan Wildlife Observatory and also a secondary ferry and cruise ship route. These patterns indicate that the hillslopes seen from the waters around the island have high scenic values.

## Wrangell High School Project

The Forest Service worked with the 1997 Wrangell High School Environmental Sciences students in a class project to evaluate Wrangell Island. The class came up with ideas about the future distribution of old growth, wildlife travel corridors between old growth stands, recreation projects, timber sales and road management. During the four week project, Forest Service employees gave the students maps and Forest Plan guidance and helped students understand ecological processes on Wrangell Island. The students picked out ecological patterns on Wrangell Island, balanced resource uses, and reflected a diversity of community values. Highlights of their ideas follow:

Students emphasized increasing recreation opportunities for Wrangell citizens with a secondary emphasis on developing tourism for travelers that could stay in Wrangell a few days and drive out the road system.

- More cabins or shelters (Midpoint, Highbush Lake, Fools Inlet, Salamander Ridge).
- More drive-to campsites (Nemo, Thoms Lake Road, Thoms Creek)
- More trails (Fools Inlet, subalpine lakes north east of Fools Inlet)

All student groups found areas to harvest a total of fifteen million board feet while balancing other resource interests. They avoided steep slopes and fish streams, minimized harvest in sensitive watersheds and high value wildlife habitat while minimizing new road construction. Two groups emphasized the use of clearcutting, citing more positive economics as the main reason. The other two groups used some partial cutting, primarily to reduce negative effects of harvest in sensitive watersheds or scenery and recreation.

Most student groups closed some roads. However, they emphasized closing new roads created by additional timber harvest or closing existing short spurs in sensitive watersheds. The students liked keeping roads open for recreation. They chose to keep Southeast Cove and Fools Inlet areas mostly unroaded over time.

Students were able to find and maintain wildlife travel corridors to connect large old growth stands in the southern half of the island but had difficulty making connections between old growth blocks in the northern part of the island due to past harvest and road patterns

## Wrangell Island Landscape Design Objectives

### Summary of TLMP Direction Specific to Wrangell Island

The Tongass Land and Resource Management Plan (also referred to as the Forest Plan or TLMP) contains goals, objectives, standards, and guidelines, and other direction which we follow in planning and designing projects on Wrangell Island. Map 2 displays the land allocations made by the Forest Plan. A summary of the direction most pertinent to Wrangell Island follows. TLMP pages are shown in parentheses.

#### Wildlife and Biodiversity

The Forest Plan designated two medium old growth reserves which contain the largest old growth habitat blocks remaining in the Fools Inlet and Thoms Creek and Lake areas (TLMP 3-76). Five smaller old growth reserves help provide connections between these reserves across Wrangell Island as well as connections from Wrangell Island to the mainland and Etolin Island (TLMP 4-120). Our objectives on Wrangell Island are to ensure that the reserve system meets Forest Plan guidelines (TLMP 2-2, Appendix K), and to maintain connectivity between and enhance wildlife values within these reserves. Map 3 displays the reserves and forested wildlife travel corridors connecting them.

Estuary and beach fringe areas (TLMP 4-4), riparian areas (TLMP 4-53), and the municipal watershed (TLMP 3-69) enhance connectivity and retain some old growth characteristics outside of the old growth reserves. Uneven-aged and two-aged timber management could also retain connectivity and old growth characteristics in managed areas (TLMP 3-135, 3-144), particularly in scenic viewsheds or along scenically sensitive travel routes (TLMP 3-104, 4-75). Connectivity is an especially important consideration in North Wrangell, Pat, and Salamander landscape units where old growth habitat is limited or isolated, and where non-national forest lands provide important old growth linkages.

We will work with state and federal wildlife agencies to monitor wildlife mortality in association with roads, especially for wolf and marten. Population problems will be addressed through road use restrictions or road obliteration, education of users, or harvest restrictions (TLMP 4-112, 4-104).

Intensive surveys may be conducted for projects with a high likelihood of affecting Wrangell Island's endemic (unique) mammal: the Wrangell red-backed mouse (TLMP 4-120).

Special guidelines for retaining forest stand structure important to martens in high value marten habitat apply to Wrangell Island (TLMP 4-118).

#### Soil and Water, Riparian, Fish, Wetlands

Watersheds on north and central Wrangell Island contain areas of inherently unstable terrain. Some of these watersheds have the most disturbance by timber harvest, road construction, and landslides on the island. Potential timber harvest projects listed in this report purposely avoid these areas to a large extent (TLMP 4-85). Site-specific verification of fish habitat will be an important part of project design and NEPA decisions. Modification of riparian buffers may be considered on a case by case basis in small coastal watersheds with little or no fisheries values but only where riparian objectives for long term channel stability are met (TLMP 4-53). Best Management Practices will be implemented to ensure the attainment of State of Alaska water quality standards, as well as the protection of wetlands.



## Local and Regional Economies

The Forest Plan directs us to work with local communities, identify opportunities for technical assistance, and support a wide range of natural-resource employment opportunities (TLMP 2-3). One of our objectives is to develop economical and viable timber sale offerings which may provide jobs in Wrangell and other southeast communities and wood products to local timber industry. We will continue to work with the local tourism industry to ensure that Forest Service projects support and enhance--and do not compete with--marketable tourism. Recreation facility development is dependent on funding for development and maintenance. Such funding is based on project by project competition for funds appropriated to Region 10 (Alaska) for such uses.

## Recreation and Tourism

We can provide a range of recreation opportunities consistent with public demand on Wrangell Island (TLMP 2-3, 4-35). Our objectives are to respond to public input by providing a variety of recreation developments in a range of settings across the island including trails, shelters, developed and primitive campsites, driving loops, etc. We have a strong interpretive services program that supports the local tourism industry (TLMP 4-44).

## Scenery

The Forest Plan designated Scenic Viewsheds on north Wrangell Island, and several locations near the shoreline along Zimovia Strait, Eastern Passage, and Blake Channel (TLMP 3-126). In addition, Visual Priority Travel Routes are designated throughout the island. Projects such as timber harvest in these areas will consider scenery and incorporate guidelines into harvest prescriptions accordingly. These could include partial harvest methods and small harvest units along outside waterways and roaded recreation destinations (TLMP 4-75).

## Timber

As part of our contribution to the Tongass National Forest timber supply (TLMP 2-4), over the next ten years we plan to offer 25 to 30 MMBF of timber in a way that responds to the need for very small and 1-5 MMBF offerings (Map 3). In particular, our objective is to provide wood products in an economical way close to Wrangell in support of local wood industries and jobs.

To limit cumulative effects we have limited harvest and road construction within sensitive watersheds. We will consider scenery and wildlife issues such as old growth reserve modification needs and travel corridors when we evaluate projects in more detail through environmental analyses.

## Transportation and Access Management

Our overall transportation objective is to provide access for timber harvest, recreation, firewood cutting, berry picking, and other forest uses. The Forest Plan directs us to manage and maintain roads to protect water, soil, fish, and wildlife resources (TLMP 2-5). We are initiating a thorough road condition survey on Wrangell Island to collect information for updating road management objectives. We are pursuing agreements with the State of Alaska to jointly manage roads and access where mutual road use and ownership occurs across Wrangell Island.

As we plan future projects, we intend to limit the new roads which are left open to those that have a strong recreation value (provide a recreation destination) or provide loop driving experience. We will avoid widespread closure of existing roads (TLMP 4-104), but we will seek opportunities to decrease road densities by obliterating roads which are not needed for resource management in the foreseeable

future, especially those with limited recreation value in sensitive watersheds or in watersheds that have the highest disturbance levels. (TLMP 4-112, 4-83).

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**Map 2- Tongass Land Management Plan Land Allocations - Wrangell Island**

**Map 3- Vegetation Management**

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## Landscape Unit Descriptions

In order to conduct some of our analysis, we divided Wrangell Island into seven landscape units based on major watershed divides and human use patterns. In most cases the landscape units do not follow the same boundaries as the VCUs (Value Comparison Units) described in the Forest Plan. The following section provides a map and describes the key features of each of these areas. Specific landscape design objectives and current and possible projects are listed.

References are made to island-wide maps found elsewhere in this document displaying access management, vegetation management, and major watersheds (see map 4).

The following terms are used:

**Productive Forest or Productive Old Growth:** Forest lands containing timber volume of at least 8,000 board feet per acre.

**Suitable Forest:** Productive forest lands available for commercial timber harvest. Suitable forest lands exclude unstable soils, riparian/beach/estuary buffers, old growth reserves, municipal watershed, and most second growth (existing clearcuts).

**"Tim Strata" Volume Classes:** For Wrangell Island, low volume class averages 16,900 board feet per acre, medium volume class averages 24,100 board feet per acre, and high volume class averages 29,300 board feet per acre.

**Current Projects:** Those which are ongoing, are awaiting funding, or for which we have completed or will soon complete environmental analyses (NEPA decisions).

**Possible Projects:** Those which are in early planning stages, or for which we anticipate conducting environmental analyses (and NEPA decisions) within the next ten years.

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### **Map 4 - Landscape Units**

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# North Wrangell Landscape Unit

The entire coastline of this landscape unit is in state, city or private ownership, resulting in a "doughnut hole" of national forest land. The total size of North Wrangell is about 15,300 acres; over one-third (5,600 acres) is non-national forest. Community development is heaviest along the north and west coast and is likely to increase along the east coast. Expanding community development may increase activity adjacent to national forest and provide increased access to national forest resources.

## Tongass Land Management Plan Direction (Management Prescriptions)

North Wrangell is mostly Scenic Viewshed (TLMP 3-126). It also contains a Municipal Watershed (TLMP 3-69), a small Old Growth Reserve (TLMP 3-76), and a Transportation and Utility System--the north end of the Tye powerline on Wrangell Island (TLMP 3-158). This landscape unit contains all of VCU 475 and part of VCU 476.

## Timber Harvest

National forest lands on North Wrangell include about 4,000 acres of forest suitable for timber harvest. We did not attempt to estimate the amount of suitable forest on non-national forest lands. Over 500 acres have been clearcut in North Wrangell. This includes past harvest on non-national forest lands, but does not include recent harvest along the Spur Road or private lands. Table 1 displays acres of volume classes in this land unit.

**Table 1 - Acres by Timber Volume Class, North Wrangell Landscape Unit**

Volume Class ("TIM Strata")	Total acres	National Forest Lands (acres)	Lands Selected by State but Not Conveyed (acres)	State and Private Lands (acres)	National Forest Lands Suitable for Timber Harvest (acres)
<b>Non-forest</b>	4764	3499	0	1265	0
<b>Low</b>	2591	1436	0	1155	1230
<b>Medium</b>	2866	2363	0	503	1522
<b>High</b>	5084	2383	0	2701	1260
<b>Totals</b>	15305	9681	0	5624	*4012

\* Does not include second growth

The city and state are currently harvesting and planning additional harvest on their lands in North Wrangell. Within national forest, we propose four timber sales in the range of one-half to three million board feet each. Timber sales would require access through state lands and new road construction from Zimovia Highway or the Spur Road extension; they could employ helicopter logging alone or in combination with road construction. Generally, timber harvest would not take place in the Municipal Watershed or Old Growth Reserve, although salvage might be considered on a case-by-case basis as long as it met the objectives of the Forest Plan in these areas. Timber harvest in the Scenic Viewshed would meet partial retention objectives. An estimate of four to eight MMBF harvest is proposed from this landscape unit in the next ten years (see North Wrangell Landscape Unit map).

## Road Management

There are about 23.9 miles of road in North Wrangell, almost all of which is near the shoreline on non-national forest lands. City streets account for about 9.2 miles. Total road density is 0.97 mi/sq mi. The city is currently building road through their land along the Back Channel (Eastern Passage) to extend access from the Spur Road to city, state, and private land. The city and the state have expressed interest in extending this road to Hermit Creek, connecting to the Pat road system (Road 6259) and creating a loop road. Steep slopes north of State Creek may prove an obstacle to this objective. Meanwhile, access to some state (and national forest) timber between State and Hermit Creek may be accomplished from a state extension of Road 6259 which has been constructed to the north across Hermit Creek.

We are actively pursuing a construction, use, and maintenance agreement with the State of Alaska Department of Natural Resources to cooperatively manage national forest roads which access state lands and state roads which access national forest lands.

### Wildlife Habitat

No high value deer winter habitats exist in the North Wrangell landscape unit. Small blocks of moderate value habitat exist along the beach on the west side, and north of the City Reservoir (on city and state lands). No high value marten habitat exists but blocks of moderate value habitat occur along the beach. Eagle nest density is low and most of the nests are on the east side -- this may be a result of the high level of human disturbance in this landscape unit. Northern Goshawks occasionally are seen here in fall and winter when they prey on domestic birds (pigeons, etc.) in town. Earlier analyses rated this area as moderate for wildlife.

The North Wrangell small Old Growth Reserve adjacent to the Municipal Watershed was placed here because of the proximity of the Stikine River. The influence of the river is reflected in the bird community on the northern end of the island. For example, this is where we often see Warbling Vireos - a species common to the Stikine River but not as common on islands. Approximately half of the reserve is moderate value marten habitat.

Natural fragmentation is relatively low for this landscape unit but human disturbance is high and likely to increase. Relatively large forest blocks still exist but occur in combinations of private, state, city and national forest lands. Attempts to reduce fragmentation will rely on the voluntary participation of land owners. The best wildlife travel corridor remaining between the North Wrangell small Old Growth Reserve and the Pat small Old Growth Reserve is along the west side and is generally in habitats over 1000 feet in elevation.

### Watersheds and Fisheries

Most of North Wrangell is characterized by small, steep, coastal watersheds. Landslides are found both in unmanaged forest and clearcuts. North Wrangell contains two third-order watersheds: Institute and State. State Creek (flowing into the Eastern Passage) is the most sediment sensitive third-order watershed on Wrangell Island. It contains a high proportion of steep terrain and unstable soils. Its high stream density offers efficient sediment transport to the short reach of fish habitat found at its mouth within state lands. A portion of this watershed is planned for harvest by the state.

Overall, fish habitat values in this landscape unit are the lowest on Wrangell Island. Coho salmon, cutthroat trout, and Dolly Varden char have been verified in several streams near the coastline, but there is little fish habitat within national forest.

Two reservoirs in Wrangell's municipal watershed provide the domestic water supply for most of the city. Most of the watershed (including reservoirs, dams, and waterlines) is on state land now and is expected to be turned over to the city in the near future. The headwaters of the municipal water supply remain in national forest. Many of the small watersheds in this land unit currently provide domestic water to private homes not connected to city water. City water lines are being extended on the west side of Wrangell Island, but it is expected that some homes will continue to use surface water originating from national forest streams. As development increases along the Spur Road extension, it is expected that domestic water use will increase in this area as well.

### Recreation & Scenery

Recreation use is high in North Wrangell because of its interface with the city. The Rainbow Falls and Institute trail system is probably the most popular trail on the island. The North Wrangell Trail will eventually connect this trail system with a loop back to the Spur Road with additional shelters along the way. About 2.5 miles of this trail system will be constructed in 1998-1999 along with the construction of the two shelters for hiker and camper use. A second phase of the trail would complete a loop with a road on state lands with an additional 2 miles of trail construction. We have applied for financing for the second phase of this trail. Actual allocations of funds has not yet occurred but we are hopeful that the second phase would be financed in the next 3 years.

Much of this landscape unit provides spectacular views of the surrounding waters, other islands, and coastal mainland. Likewise, it is seen from small boat, ferry, and cruise ship routes around the north end of the island. For this reason, scenery objectives will be an important consideration during resource development.

### Design Objectives on National Forest Lands

- Meet partial retention objectives for timber harvest as seen from Zimovia Highway and surrounding small boat, ferry, and cruise ship routes. Use harvest on national forest to soften visual impacts of harvest on adjacent non-national forest lands where possible.
- Work with state and city to develop road management objectives of mutual interest and agreements for management of access into mixed ownership areas.
- Consider modification of riparian buffers in small timber sales above Zimovia Highway if justified by site specific field verification of low or absent fisheries values and channel stability concerns.
- Manage national forest lands to protect downstream drinking water supplies where such uses occur.

### Current Projects on National Forest Lands

- Tyee Powerline Upgrade (resumes in 1999)
- North Wrangell Trail and Shelters 2.5 miles constructed in 1998/1999 with 2 shelters

### Possible Projects on National Forest Lands

- Small timber sales (one to three MMBF each): Institute, Zimovia, Doughnut, Back Channel Cedar Salvage.

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### Map 5 - North Wrangell Landscape Unit

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## Pat Landscape Unit

Like North Wrangell, Pat is over one-third non-national forest lands. The total area is about 13,900 acres. Much of the valley bottom (including Pat Lake, Pat Creek, and Hermit Creek) is state land. The low divide between Pat and Hermit Creek make this landscape unit an easy route for humans and animals traveling between the east and west shores of Wrangell Island at a relatively narrow point on the island.

### Tongass Land Management Plan Direction (Management Prescriptions)

Pat contains lands designated by the Forest Plan for Scenic Viewshed (TLMP 3-126), Modified Landscape (TLMP 3-135), a small Old Growth Reserve (TLMP 3-76), and a Transportation and Utility System--the Tyee powerline (TLMP 3-158). This landscape unit contains portions of VCU 476 and 477.

### Timber Harvest

About 2000 acres of national forest lands suitable for timber harvest remain in Pat. We did not attempt to estimate the amount of suitable forest on non-national forest lands. About 2000 acres have been clearcut, not including recent state harvest. Table 2 displays acres of volume classes in this land unit.

**Table 2 - Acres by Timber Volume Class, Pats Landscape Unit**

<b>Volume Class (`TIM Strata")</b>	<b>Total acres</b>	<b>National Forest Lands (acres)</b>	<b>Lands Selected by State but Not Conveyed (acres)</b>	<b>State and Private Lands (acres)</b>	<b>National Forest Lands Suitable for Timber Harvest (acres)</b>
<b>Non-forest</b>	4839	3642	0	1197	0
<b>Low</b>	1749	978	0	771	720
<b>Medium</b>	2015	1603	0	412	652
<b>High</b>	5250	2831	0	2419	632
<b>Totals</b>	13853	9054	0	4799	2004

Much of the valley bottom in this landscape unit has been harvested. The state has recently harvested units adjacent to Hermit Creek and the hillslopes north and south of Hermit Creek wrapping around to the Eastern Passage. The state is planning additional harvest in this area. National forest timber harvest under consideration in this land unit includes a small sale which overlaps between North Wrangell and Pat landscape units (Doughnut Timber Sale). Yellow cedar salvage will be considered in the Lost Joe area and Pat small Old Growth Reserve. We are currently planning roadside sales along Road 50051 to meet the needs of mill operators desiring low volume sales for value-added products.

Any additional timber harvest in Pat will require careful consideration of cumulative effects on wildlife habitat and fisheries due to the amount of recent and past harvest in the area.

### Road Management

There are about thirty miles of road system in Pat providing access to both state and national forest lands. These roads receive a lot of recreation and logging use year-round. The Pat Log Transfer Facility (LTF) is one of two on the island. Although it is on state land, the Forest Service is responsible for its maintenance.

The Midpoint Road (Road 50060) provides beautiful views of Zimovia Strait and Chichagof Pass and is a popular sight-seeing destination for recreational traffic, including snowmachines.

Road density in Pat is 1.38 mi/sq mi. Pat Creek watershed has a road density of 1.23 mi/sq mi and Hermit Creek watershed has a road density of 1.28 mi/sq mi. Road density at this level may begin to affect wildlife species such as wolves.

A thorough road condition survey is a high priority for this landscape unit. Several road segments are no longer drivable due to alder encroachment, failed drainage structures and landslides. Because most of the mainline road is on state land, the Forest Service and State of Alaska Department of Natural Resources are pursuing a cooperative road use agreement.

We are planning to obliterate the last half mile of Road 50051 beyond a landslide which renders it no longer accessible by motor vehicles. We will pursue obliteration of about two miles of spur which crosses both state and national forest lands north of Pat Creek. This road is no longer drivable due to failed drainage structures and landslides.

### Wildlife Habitat

The current version of the deer habitat capability model shows no high value wintering habitat in this landscape unit. Moderate value exists within the Pat small Old Growth Reserve. The best marten habitat parallels the Pat Creek riparian area and a patch exists in the west end of the Old Growth Reserve. Small raptors including Merlin, Kestrel, Northern Pygmy Owl and Western Screech Owl are frequently seen from Forest Highway 16. Trumpeter Swans routinely stop at Pat Lake during migration. Earlier analyses rated this area as moderately high value for wildlife.

The Old Growth Reserve for this landscape unit parallels Pat Creek road (Road 6259). Although fairly steep, this reserve contains the only remaining large forest block within this landscape unit. The large size of this reserve helps compensate for fewer acres in the Salamander reserve -- another important corridor on the island (see Old Growth Reserve section).

Fragmentation is high in this landscape unit due to timber harvest and there are numerous barriers to wildlife dispersal. Unlike the southern portion of Wrangell Island, this area originally contained large forest blocks with relatively low natural fragmentation. Old growth blocks remain within the Old Growth Reserve and along the eastern beach. Pat Creek and Hermit Creek provide important riparian wildlife habitats which are largely within state ownership. These drainages connect to form one of the primary travel corridors between the east and west sides of the island. Wildlife dispersal to the north or south is limited and requires road crossings except along the beach on the east side of the island. Homesite development reduces the value of beach stands as travel corridors.

### Watershed and Fisheries

Pat Creek and Hermit Creek are the two third-order watersheds in the Pat landscape unit. Both of these watersheds contain relatively high proportions of inherently unstable terrain. There are landslides throughout both watersheds, in clearcuts as well as unmanaged forest; many occurred in response to an intense storm in October 1993.

Both of these watersheds contain substantial reaches of high quality fish habitat. Coho, pink, chum, and sockeye salmon, Dolly Varden char, cutthroat trout, and steelhead have been verified in this landscape unit. A waterfall near the coast prevents upstream migration in Hermit Creek. Salmon have been verified upstream of Pat Lake. Pat Lake, Pat Creek, and Hermit Creek are popular cutthroat trout fishing areas.

The combination of inherently unstable terrain and high quality fish habitat make both Pat and Hermit Creeks sensitive watersheds. Recent landslides, road condition problems, roads and harvest on high hazard soils, roads and harvest in riparian areas, and the number of fish stream crossings are all higher in this landscape unit than anywhere else on the island.

### Recreation and Scenery

Because it is so close to town, Pat is a popular area for all kinds of recreational use. The road system receives extensive recreation use. Major activities include firewood gathering, hunting, fishing, berry picking, and recreational driving. During the winter, the Pat and Midpoint Road (Road 50060) systems are the most popular areas on the island for snowmachine use and access to high elevation areas.

### Design Objectives on National Forest Lands

- Soften visual impacts of harvest on adjacent non-national forest lands where possible.
- Work with state and city on road management objectives and use and maintenance agreements where non-national forest roads are used to access national forest resources.
- Work with state agencies to conduct road condition surveys, landslide surveys, and develop cooperative watershed restoration projects.
- Limit further disturbance in Pat and Hermit watersheds unless mitigated by watershed restoration activities. Consider road closures to reduce road density and erosion.
- Maintain access for snowmachines, scenic driving, and other recreation uses
- Maintain north/south corridors for wildlife dispersal.

### Current Projects on National Forest Lands

- Tye Powerline upgrade (resumes in 1999)
- Forest Highway 16 upgrade, including improved surfacing on Pat Creek Road (primarily non-national forest lands in Pat)
- Roadside timber sales (Road 50051)
- Obliterate last half-mile of Road 50051 beyond landslide.
- Pursue obliteration of Road 6259 spur (about two miles of road) north of Pat Creek after state timber sale

### Possible Projects on National Forest Lands

- Increased access and warming shelters for skiers and snowmachine users
- Cedar salvage timber sales (Pat Old Growth Reserve and Lost Joe)

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### Map 6 - Pat Landscape Unit

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**back of map**



## Salamander Landscape Unit

This is the second largest landscape unit on Wrangell Island. It is mostly national forest. There is a small parcel of state lands in lower McCormack Creek. About 440 acres near Earl West have been selected but not yet conveyed to the state. Low divides between Salamander and McCormack Creeks and Salamander and Skip Creeks create natural passages from east to west and north to south across the island.

### Tongass Land Management Plan Direction (Management Prescriptions)

Salamander is mostly designated by the Forest Plan for Timber Production (TLMP 3-144). It also contains Modified Landscape (TLMP 3-135), a small Old Growth Reserve and a sliver of medium Old Growth Reserve (TLMP 3-76), and a Transportation and Utility System--the Tyee powerline (TLMP 3-158). This landscape unit contains parts of VCU 477, 478, and 479.

### Timber Harvest

Salamander contains about 7200 acres of national forest lands suitable for timber harvest. Almost 3400 acres have been clearcut in this landscape unit. There are several opportunities for small timber sales in Salamander. Turn Timber Sale will be sold this year. Nemo Loop Road Timber Sale and Roadside timber sales are currently undergoing NEPA analysis. Yellow cedar decline in Turn and Skip Creek drainages may provide an opportunity for salvage sales (see Salamander landscape unit map).

**Table 3 - Acres by Timber Volume Class, Salamander Landscape Unit**

<b>Volume Class ("TIM Strata")</b>	<b>Total acres</b>	<b>National Forest Lands (acres)</b>	<b>Lands Selected by State but Not Conveyed (acres)</b>	<b>State and Private Lands (acres)</b>	<b>National Forest Lands Suitable for Timber Harvest (acres)</b>
<b>Non-forest</b>	12015	11606	203	207	0
<b>Low</b>	4831	4633	69	128	2832
<b>Medium</b>	4236	4124	97	15	1995
<b>High</b>	6350	6054	71	225	2365
<b>Totals</b>	27432	26417	440	575	7192

### Road Management

Despite this land unit's large size (which usually moderates road density), Salamander road density is 1.23 mi/sq mi. The road system (52.7 miles) is extensive as a result of past logging activities. Garnet and McCormack watersheds have the highest road densities on the island at 1.73 and 1.42 mi/sq mi respectively. Salamander Creek, in fact, is the only large watershed on the island to exceed a road density of one mi/sq mi. Road densities this high may affect some wildlife species such as wolves. About two miles of new road will be constructed for the Turn Timber Sale. The last mile beyond a large stream will be obliterated as temporary road after use. A gate will be installed near the junction of the new road with Road 6267 to maintain wildlife security.

We are currently planning to close the entire two miles of Road 50008 (the Twin Timber Sale road system) as part of a proposal to modify the Thoms medium Old Growth Reserve. This closure has been financed and will occur in 1998/1999. This road closure will improve wildlife security and travel corridor habitat consistent with old growth reserve objectives. It also reduces road density in anticipation of new road construction in this area (the Nemo Loop Road). This road is relatively new and does not appear to receive much public use. It does not access future timber sales or recreation sites.

We are planning to obliterate the ends of Roads 50022, 500251, and 50053 (one mile each) to reduce road densities and water quality concerns in Garnet, Salamander, and McCormack Creek drainages. A combination gate closure of one mile of Road 50024 with obliteration of Road 50005 after the Plate

Timber Sale will further reduce open road density in this landscape unit without affecting recreation or timber access.

### Wildlife Habitat

Most of the large blocks of moderate value deer winter range in Salamander have been heavily fragmented by past timber harvest. There was no high value deer winter range in this unit. Marten habitat exists adjacent to the Nemo Road and extends to the beach. This is the only area on Wrangell Island where we have reported nesting Ospreys, a species classified as sensitive by the Forest Service. Goshawks appear occasionally along the Nemo Road and along the road going to Salamander ridge but no nests have been found. A few unusual species have been reported in the Nemo area including Band-tailed pigeons (also seen in North Wrangell unit) and Three-toed woodpeckers. Earlier analyses rated this area as moderately high for wildlife.

The Salamander small Old Growth Reserve follows an important corridor (Salamander and Skip Creek) connecting the east and west sides of the island. Lower Salamander Creek lies within this reserve. The salmon in this stream provide an important food source for bears, mink, marten and other wildlife species. A small section of this reserve occurs on state selected lands--this may be a mapping error. To correct for these acres we recommend expansion along the beach to the north or by connecting to the Thoms medium reserve to the south. Expansion of the Thoms medium old growth unit will be explored in the Nemo Loop Timber Sale EA which may recommend amending the Thoms medium old growth unit to expand and connect to the Salamander small old growth reserve. Such expansion could help mitigate effects of modifications to the Thoms medium old growth reserve that have the potential to occur due to state land selections and modifications of the reserve to correct mapping errors in the area of the proposed Nemo Loop road.

Fragmentation within this landscape unit as a result of timber harvesting and road-building is high. The modification of the Thoms medium Old Growth Reserve will maintain an important forested connection between the Salamander small Old Growth Reserve and the Thoms reserve. Another important connection exists between the Salamander and Earl West small Old Growth Reserves along an Earl West Creek tributary. One unroaded interior corridor remains between the Salamander reserve and the Pat Landscape Unit on the east side of the island (see map). Beach harvesting and homesite development has reduced the quality of the beach as a wildlife corridor on the west side of the island.

### Watershed and Fisheries

The six watersheds in Salamander include McCormack Creek, Turn Creek, Skip Creek, and Salamander Creek with its two major tributaries, Garnet and Basin Creeks. Garnet and lower Salamander Creeks rank respectively as the third and fourth most inherently sensitive watersheds on Wrangell Island due to their steep terrain and fish habitat. McCormack Creek has sensitivity similar to Pat and Hermit Creeks, though it has less high quality fish habitat than either of those watersheds. McCormack Creek stands out as the most harvested watershed on Wrangell Island; 24% of the watershed has been clearcut. Turn Creek is moderately sensitive, and Basin and Skip Creeks have relatively low sensitivity to sediment impacts when compared to other Wrangell Island watersheds.

Coho, pink, chum, and Chinook salmon, Dolly Varden char, cutthroat trout, and steelhead have been verified in this landscape unit. Skip and Salamander Creeks contain the most fish habitat. Hatchery chinook and chum salmon from the Earl West terminal release net pens travel up Salamander Creek, but are not known to successfully reproduce there.



### Recreation and Scenery

There have been several recent recreation projects completed in this landscape unit which have improved access to and availability of campsites. These include three campsites along the Nemo Road and campsites at both the upper and lower Salamander Creek crossings. In addition, another campsite at milepost 3.3 of the Nemo Road has been developed, but currently there are no recreation facilities on site. At milepost 4.4 of the Nemo Road, a half-mile trail leading to a beach campsite north of Turn Island is planned. The Salamander Trail which begins adjacent to Road 50050 was recently developed and provides access to the ridge with outstanding views of the Back Channel and Salamander drainage.

### Design Objectives on National Forest Lands

- Provide roaded natural settings for recreation and scenic driving.
- Design timber harvest to open views while meeting objectives of partial retention and modification from scenic roads and boat routes.
- Manage roads to minimize road density and retain wildlife travel corridors while maintaining recreation access.
- Defer additional disturbance in McCormack Creek watershed and pursue watershed restoration opportunities.
- Monitor conveyance of state lands and adjust the small reserve boundary to exclude state acres as necessary.

### Current Projects on National Forest Lands

- Tye Powerline Upgrade (resumes in 1999)
- Second growth thinning
- Modification of Thoms medium Old Growth Reserve to correct mapping error, including closure of Road 50008
- Lower Salamander campsite shelters
- Nemo saltwater trail and campsite
- Turn Timber Sale with subsequent road closure (gate two miles of new road).
- Nemo Loop Road construction (3.0 miles) and Nemo Loop Timber Sale to create a recreation loop road for driving of about 17 miles
- Roadside timber sales
- Road closures: 50008 (two miles), last mile of 50022, last mile of 50025, and last mile of 50053

### Possible Projects on National Forest Lands

- Small sales: Plate and yellow cedar salvage
- Road closures: gate 50024 (one mile), obliterate 50005 ( half mile)
- Thinning of units and wildlife plantings within the Old Growth Reserve
- Roadside individual tree sales
- Drive-to cabin or shelter (fully accessible) located near the end of the Midpoint Road (Road 50060)

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### **Map 7 - Salamander Landscape Unit**

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**back of map**



## Earl West Landscape Unit

A large portion (over 3100 acres) of this landscape unit was recently selected by the state but will be managed as national forest until it is conveyed.

### Tongass Land Management Plan Direction (Management Prescriptions)

Earl West contains lands designated by the Forest Plan for Timber Production (TLMP 3-144), Scenic Viewshed (TLMP 3-126), a small Old Growth Reserve (TLMP 3-76), and a Transportation and Utility System--the Tyee powerline (TLMP 3-158). This landscape unit contains parts of VCU 478 and 504.

### Timber Harvest

Earl West contains about 2600 acres of national forest suitable for timber harvest (not including state-selected land). About 900 acres have been clearcut to date. Two areas in upper Earl West have been suggested as future timber sales in the range of two to four million board feet (Shady and Highbush). See Earl West landscape unit map.

**Table 4 - Acres by Timber Volume Class, Earl West Landscape Unit**

<b>Volume Class (`TIM Strata")</b>	<b>Total acres</b>	<b>National Forest Lands (acres)</b>	<b>Lands Selected by State but Not Conveyed (acres)</b>	<b>State and Private Lands (acres)</b>	<b>National Forest Lands Suitable for Timber Harvest (acres)</b>
<b>Non-forest</b>	6044	4951	1093	0	0
<b>Low</b>	1455	1009	446	0	787
<b>Medium</b>	2008	1571	438	0	935
<b>High</b>	2940	1795	1145	0	851
<b>Totals</b>	12447	9325	3122	0	2573

### Road Management

There are 15.79 miles of road in Earl West, contributing to a road density of 0.81 mi/sq mi. The Highbush Lake Road (Road 50040) will be extended to provide access into a future timber sale. We propose closing the last half mile of Road 50041 concurrent with this new road construction. A failing log stringer bridge on Road 50016 creates opportunity to close the last mile of this road. Earl West (sometimes called Venus Cove) LTF is one of two LTFs on the island. Although it is in state selected lands, the Forest Service has maintained an easement and will continue to be responsible for its maintenances. We are actively pursuing road use, construction, and maintenance agreements with the state for roads in the state-selected lands in this unit.

### Wildlife Habitat

Based on the latest model, there is no high value deer winter range within this landscape unit. Earl West Cove (the state selected lands) has traditionally been considered to have high habitat values for deer. As with deer, some of the highest value marten habitat lies on state selected lands. A small block of high value marten habitat exists on the north end of the Earl West small Old Growth Reserve. Creeks, ponds and muskegs are used by moose although these appear to occur in low densities. Earlier analyses rated this area as moderately high value for wildlife.

The Earl West small Old Growth Reserve adds to the Salamander and Fools reserve system and was placed to provide a "stepping stone" along a key landscape travel corridor from the Fools medium reserve to the north and mainland. This reserve is characterized by muskegs, ponds and low volume forests. Earl West marsh provides important habitat for species such as the Lincoln's Sparrow. A small patch of medium volume forest occurs along the north and west edge of this reserve and is believed to have value for old-growth species. We observed goshawks in the vicinity of this reserve in 1993 and 1994 but no nests have been located.

As with Salamander, timber harvest fragmentation is high within this landscape unit. We identified two important wildlife corridors: 1) forested land between the Fools medium Old Growth Reserve and the

Earl West small Old Growth Reserve and 2) "Moose Pass" through the proposed Shady Timber Sale area (see Earl West map). We will consider road management (restricted access, road obliteration, or road storage) for this sale which will reduce the impact on game species.

### Watershed and Fisheries

Earl West is one of the least sensitive watersheds on Wrangell Island. Although it contains over three miles of high quality fish habitat stream, the large watershed size and gentle terrain in the valley bottom limit the effects of steep headwater slopes.

Pink, coho, and chum salmon, and steelhead have been verified in this landscape unit.

### Recreation and Scenery

The LTF at Earl West provides a boat ramp for those who choose to trailer or carry their watercraft by vehicle on the road system. This access point provides boaters a shortcut south to such popular destinations as Berg Bay and Anan Wildlife Observatory as well as being able to avoid the less protected waters near Wrangell. The Earl West Cove recreation site is located adjacent to the parking area at the LTF. While the Earl West boat ramp, LTF, and adjacent recreation are within state selected lands, they were retained by the Forest Service and we will continue to maintain them.

There is a primitive campsite at Highbush Lake. The Highbush Lake trail leads 300 feet from the parking area to the lake. There is some interest in further trail and shelter or cabin development in this area.

### Design Objectives on National Forest Lands

- Manage roads to maintain wildlife travel corridors without reducing important recreation access.
- Work with the state on road use and maintenance agreements where non-national forest roads are necessary to access national forest resources.
- Develop semi-primitive recreation opportunities.
- Monitor state land conveyance process and land development that might lead to old growth reserve adjustments.

### Current Projects on National Forest Lands

- Tyee Powerline upgrade (resumes in 1999)
- Road closures: Road 50016 (last mile)
- Forest Highway 16 upgrade (mostly state land)

### Possible Projects on National Forest Lands

- Timber Harvest (two to five MMBF): Shady, Highbush
- Road closures: Road 50041 (last half mile)
- Highbush Lake trail construction with possible cabin or shelter
- Fully accessible dock or fishing platform at Highbush Lake accessed by trail or short road.

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**Map 8 - Earl West Landscape Unit**

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**back of map**

## Thoms Landscape Unit

The Thoms landscape unit contains large parcels of state and state-selected land. About 5000 acres in Thoms are currently state land including Thoms Marine Park, Thoms Lake, and Thoms Place. About 4250 additional acres have been selected for additional community development along the coast north of Thoms Place and for additional recreation lands along Thoms Creek between Thoms Lake and the Marine Park.

### Tongass Land Management Plan Direction (Management Prescriptions)

Thoms mostly consists of a medium Old Growth Reserve (TLMP 3-76), with small areas of Scenic Viewshed (TLMP 3-126), and Timber Production (TLMP 3-144). This landscape unit contains part of VCU 479. The lands selected by the state but not yet conveyed are all within the Old Growth Reserve.

### Timber Harvest

There are about 1240 acres of land suitable for timber harvest in Thoms. About 450 acres have been clearcut. The potential Southeast Cove and Scattered Valley timber sale areas overlap slightly with this landscape unit, but otherwise there are no plans for timber harvest within the next ten years on national forest land in Thoms. Unforeseen events such as windthrow could create an opportunity for salvage sales. (see Thoms landscape unit map)

**Table 5 - Acres by Timber Volume Class, Thoms Landscape Unit**

Volume Class ("TIM Strata")	Total acres	National Forest Lands (acres)	Lands Selected by State but Not Conveyed (acres)	State and Private Lands (acres)	National Forest Lands Suitable for Timber Harvest (acres)
<b>Non-forest</b>	8722	4891	1437	2395	0
<b>Low</b>	3459	1471	733	1255	484
<b>Medium</b>	3521	2356	733	432	546
<b>High</b>	4281	1968	1355	958	213
<b>Totals</b>	19983	10686	4258	5040	1243

### Road Management

Road density in Thoms is the lowest on the island: 0.34 mi/sq mi. There are only 10.75 miles of road in this landscape unit. The Thoms Creek bridge is on state-selected land and may eventually be conveyed to the state. Until that time it will be maintained by the Forest Service. The City of Wrangell has expressed interest in acquiring the state parcel of land surrounding Thoms Lake. If the city acquires this land, they may request an easement to construct road from the Thoms Lake road (Road 6290) into state land in the vicinity of Thoms Lake.

### Wildlife Habitat

A few patches of moderate value deer winter range exist within this landscape unit -- most within state or state-selected lands. Thoms has high habitat value for deer and was historically important as deer winter range. The quality of much of this deer winter range has been reduced as a result of homesite development. High value marten habitat parallels Thoms Lake, Thoms Creek and extends along the beach. This landscape unit contains the highest density of eagle nests on the island, most occurring in the new Thoms Place state selection. We have recorded raptor use along Road 6299 including a goshawk (1995), Barred owl, Saw-whet owl and Northern pygmy owl but have not located any nests. The south end of the island contains the habitat values and the isolation required by brown bears and wolves. Earlier analyses rated this area as moderate value for wildlife.

The Thoms Lake medium Old Growth Reserve contains valuable wildlife habitat but is dependent on state lands and state selected lands to meet Forest Plan size and old growth guidelines (Table 5 -see discussion under island-wide processes). In the event that any of these lands are developed, we recommend adding national forest acres to the north (Shady or Little Foot timber sale areas) or across Road 6299 to the east



to acquire additional high volume old growth. A mapping error which included a portion of the Nemo Loop Road will be addressed in the Nemo Loop Road and Timber Sale EA by modifying the reserve to add the south side of Skip Creek and connect with the Salamander small Old Growth Reserve.

Fragmentation within this landscape unit is low as a result of timber harvest but high due to natural factors. Forested lands have low timber volume with scattered openings. Larger blocks of forest exist north of Thoms Creek and Thoms Lake and along the beach. Important corridors connecting reserves have been discussed in the other sections. The only unroaded corridor between the Thoms Lake medium Old Growth Reserve and the Fools medium Old Growth Reserve is along the beach.

### Watershed and Fisheries

Thoms Creek has the highest fisheries values on Wrangell Island. It supports the major sockeye salmon run on the island, which contributes to a subsistence fishery at its mouth. Pink, coho, and chum salmon, Dolly Varden char, cutthroat trout, and steelhead have also been verified. The creek near the bridge, an hour's drive from town, is heavily fished throughout the spring and summer.

Despite its productive fishery, Thoms Creek is one of the least sensitive watersheds on Wrangell Island. It has a fairly low stream density and less unstable terrain than much of the rest of the island.

### Recreation and Scenery

Two areas in Thoms stand out as having high recreation values. Thoms Lake, primarily due to its high quality fishery, is a popular destination for recreationists. Thoms Lake and cabin are accessed by trail from the Thoms Lake Road (Road 6290). This 1.4 mile trail is on national forest for the first 0.6 mile, with the remainder on state lands. The cabin and state trail are no longer maintained. The Thoms Creek recreation site and parking area at the Thoms Creek bridge represent the "end of the road" for many Wrangellites, and serve recreational fishermen up and downstream of the bridge. This recreation site is on state-selected land and may eventually be conveyed to the state. If conveyed to the state, the Forest Service will no longer maintain the site.

### Design Objectives on National Forest Lands

- Monitor conveyance process and additional development on state lands to evaluate old growth characteristics relative to Forest Plan guidelines for modifying the old growth reserve.

### Possible Projects on National Forest Lands

- Thinning of units and wildlife plantings within the Old Growth Reserve.
- Possible units in Scattered Valley or Southeast Cove timber sales (Fools Landscape Unit).

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**Map 9 - Thoms Landscape Unit**

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**back of map**

## Fools Landscape Unit

This is the largest landscape unit (30,150 acres) and it is entirely national forest. There is a fairly low divide between upper Earl West and upper Fools that creates a natural corridor from north to south.

### Tongass Land Management Plan Direction (Management Prescriptions)

Fools contains lands designated by the Forest Plan for Timber Production (TLMP 3-144), part of a small Old Growth Reserve and a medium Old Growth Reserve (TLMP 3-76). This landscape unit follows the boundaries of VCU 480.

### Timber Harvest

Almost 1000 acres of this landscape unit have been clearcut. About 6000 acres of land suitable for timber harvest remain, the most of any landscape unit on the island. Fools offers the possibility of the largest timber sale offering (up to 15 MMBF) on Wrangell Island in the next ten years. We are currently planning a roadside small sale along Roads 6270 and 6273. (see Fools landscape unit map)

**Table 6 - Acres by Timber Volume Class, Fools Landscape Unit**

Volume Class ("TIM Strata")	Total acres	National Forest Lands (acres)	Lands Selected by State but Not Conveyed (acres)	State and Private Lands (acres)	National Forest Lands Suitable for Timber Harvest (acres)
<b>Non-forest</b>	15543	15543	0	0	0
<b>Low</b>	3760	3760	0	0	2009
<b>Medium</b>	5672	5672	0	0	2402
<b>High</b>	5177	5177	0	0	1576
<b>Totals</b>	30152	30152	0	0	5988

### Road Management

Fools contains 19.27 miles of road, contributing to a total road density of 0.41 mi/sq mi--the second lowest on the island. However, much of the road length is concentrated in two watersheds (Fools and West Fools), creating road densities of 1.39 and 1.33 mi/sq mi respectively. The last two miles of Road 6276 cross the boundaries of the old growth reserve. This road will be used to access Southeast Cove and a possible LTF in that vicinity. We propose to gate this road at a suitable site to meet old growth reserve objectives until the timber sale. There are other roads in Fools that will be evaluated during the Fools/Southeast EIS for closure. There is a possibility that the state would request an easement to construct road to Fools Inlet for a ferry terminal.

### Wildlife Habitat

Most of Fools contains low value deer winter range. An earlier island-wide analysis states that "Southeast cove provides winter range in areas with some of the densest deer during low cycle years". A small patch of moderate value habitat exists along Fools Creek between the Old Growth Reserves. This is also one of the only high volume stands remaining on Wrangell Island, however, road-building activities have reduced the canopy-cover once provided by this stand. Important marten habitat occurs along the beach and along Fools Creek. Earlier analyses rated this area as moderate value for wildlife.

Fools may contain some of the most important beach and riparian habitats on the island. Several salmon streams converge in Fools Inlet and are included within this Old Growth Reserve. The estuary provides important habitat for salmon and shellfish, which serve as a food source for many wildlife species including otter, mink and bear.

This landscape unit also has some of the highest eagle nest densities especially along the beach west of Fools Inlet. Goshawks were seen in this area in 1993 and Red-tailed hawks appeared to be nesting

within the Old Growth Reserve in 1996. Fragmentation is low due to timber-related activities but high as a result of terrain features and vegetation patterns.

The Fools medium Old Growth Reserve is 300-400 acres shy of the Forest Plan guidelines for high volume timber and approximately 800 acres shy on size. Two options exist for expansion: 1) to the north to connect with the Earl West small Old Growth Reserve and encompass an important riparian travel corridor area; or 2) expand east across the ridge into the Blake Landscape Unit and to the beach. Both areas overlap with proposed timber sales (Fools and Blake timber sales).

### Watershed and Fisheries

The three Fools watersheds (Fools Creek and its tributaries West Fools and Scat Creeks) have relatively low to moderate sediment sensitivity. Coho, chum, and pink salmon, Dolly Varden char, cutthroat trout, and steelhead have been verified in Fools. The state has expressed some interest in enhancing the Long Lake fishery for recreational cutthroat trout fishing.

### Recreation and Scenery

The estuary at Fools inlet is a popular waterfowl hunting spot. Hunters access the estuary from both saltwater and overland from the road system. There is no developed trail in this area. The Long Lake trail, road recreation site, and shelter site is a popular recreation complex in this landscape unit. It receives both day and overnight use.

Much of Fools is unseen from the major waterways or scenic roadways, so it is less visually sensitive than much of the rest of the island.

### Design Objectives on National Forest Lands

- Maintain primitive or semi-primitive recreation developments consistent with distance from Wrangell and high wildlife values.
- Manage roads to reduce road densities in wildlife travel corridors
- Apply alternative harvesting in important wildlife travel corridors such as Fools Creek

### Current Projects on National Forest Lands

- Gate Road 6276 (last two miles) at old growth reserve boundary
- Roadside timber sale

### Possible Projects on National Forest Lands

- Timber harvest (one to five MMBF): Little Foot, Scattered Valley, Southeast Cove
- Log Transfer Facility for Southeast Cove Timber Sale
- Primitive trail construction into high country northeast of Fools Inlet
- Trail construction from Road 6270 to Fools Inlet.
- Thinning of units and wildlife plantings within the Old Growth Reserve.
- Road closures in vicinity of Little Foot timber sale (about 1 mile).

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**Map 10 - Fools Landscape Unit**

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**back of map**

## Blake Landscape Unit

Blake consists of the small coastal watersheds facing the narrow waterway between Wrangell Island and the mainland south of "The Narrows." The prominent development along this strip of land is the Tye powerline, which provides power to the cities of Wrangell and Petersburg from the Lake Tye hydropower plant at the head of the Bradfield Canal. A slight overlap with Earl West selected lands occurs in this land unit. Conveyed lands are entirely located on Blake Island.

### Tongass Land Management Plan Direction (Management Prescriptions)

Blake contains lands designated by the Forest Plan for Timber Production (TLMP 3-144), Scenic Viewshed (TLMP 3-126), a small Old Growth Reserve and a piece of medium Old Growth Reserve (TLMP 3-76), and a Transportation and Utility System--the Tye powerline (TLMP 3-158). This landscape unit contains parts of VCUs 504 and 505.

### Timber Harvest

No timber harvest has occurred in Blake except for right of way clearing under the powerline. There are 3440 acres of forest suitable for timber harvest. The Highbush Lake timber sale will be accessed from Road 60040. The Midway EA will consider accessing 2 to 4 MMBF from the Blake Landscape Unit. This area would have to be accessed from saltwater. Much of the area might be suitable for helicopter logging but for the safety hazard associated with the powerline. Short roads build under the powerline may allow some helicopter logging. (see Blake landscape unit map)

**Table 7 - Acres by Timber Volume Class, Blake Landscape Unit**

Volume Class ("TIM Strata")	Total acres	National Forest Lands (acres)	Lands Selected by State but Not Conveyed (acres)	State and Private Lands (acres)	National Forest Lands Suitable for Timber Harvest (acres)
<b>Non-forest</b>	8337	8334	0	3	0
<b>Low</b>	1606	1603	3	0	1181
<b>Medium</b>	3307	3149	6	15	1459
<b>High</b>	2713	2694	9	2	801
<b>Totals</b>	15963	15781	26	156	3441

### Road Management

There are no roads in Blake. Road 50040 may be extended into Blake from the Highbush Lake area to access timber. It may be possible to build short roads under the powerline from the Blake Channel. This would require one or more new LTFs.

### Wildlife Habitat

Most high value old growth habitat is along the north end of this landscape unit and along the beach. This area is not highly suitable as deer winter range due to east-facing slopes and heavy snow conditions. High value marten habitat occurs along the beach. Most of this landscape unit is above 1000 feet. Fragmentation within this land unit is low due to timber-related activities but high as a result of natural processes.

The Blake small Old Growth Reserve has benefits to wildlife because of its adjacency to the mainland. There may be additional benefits in moving this reserve northward to be directly across from the Madan small Old Growth Reserve on the mainland. The US Fish and Wildlife Service has expressed interest in doing so.



### Watershed and Fisheries

This land unit is similar to North Wrangell in that it is comprised of small, steep, coastal watersheds with limited fisheries. Salmon have been verified in several of the streams at the south end near saltwater. Two third-order watersheds are found in Blake: Ham and Blake Creeks. Blake Creek is considered moderately sensitive and contains the most fish habitat (primarily resident fish). Ham Creek has low sensitivity.

### Recreation and Scenery

Recreation in this unit is limited by lack of road access and poor boat anchorages. Some of it is visible from small boats traveling to Anan. Much of it, however, is unseen from roads and saltwater.

### Design Objectives on National Forest Lands

- Design timber harvest to meet partial retention objectives as seen from small boat route to Anan

### Current Projects on National Forest Lands

- Tyee Powerline upgrade

### Possible Projects on National Forest Lands

- Highbush Timber Sale (up to 5 MMBF - overlaps from Earl West)
- Blake Timber Sale (up to 4 MMBF)
- Move Blake small Old Growth Reserve to the north
- Primitive trail construction from Fools into high country

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**Map 11 - Blake Landscape Unit**

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**back of map**

## Summary of Current and Potential Projects

### Timber Harvest

We propose to offer 25 to 30 million board feet (MMBF) of timber on Wrangell Island over the next ten years in a combination of very small sale offerings (group and individual trees), one to five MMBF offerings (small to medium size sales), and one large timber sale of up to 15 MMBF. There is a high level of interest in small sales that could help support local mills. There is also interest in a value-added wood industry which could make use of very small individual tree sales.

Potential harvest locations were selected by an interdisciplinary team relying on aerial photos and field knowledge. The list of proposed timber sales in tables 8 and 9 total up to about 47 MMBF to allow us some flexibility to select alternatives (when the sales are studied in more depth) and choose between offerings over time. Each will require in-depth environmental analysis and decisions under the National Environmental Policy Act.

Some of the harvest areas will be combined under single NEPA decisions to address similar issues in an efficient manner. For example, we anticipate that a single NEPA analysis and decision would be sufficient to 1) provide an offer of up to 15 MMBF (one large timber sale and several small timber sales) from the Fools Land Unit, 2) possibly evaluate modifications to Thoms and Fools medium Old Growth Reserves, and 3) update road management objectives to address an access management strategy for the entire Fools Land Unit.

Generally speaking, we were able to avoid locating harvest areas in the most sensitive watersheds. We attempted to choose harvest locations that avoid important wildlife travel corridors and high quality old growth habitats. Since this wasn't always possible we anticipate that wildlife issues will continue to be an important consideration as we plan timber sales on Wrangell Island. Some of the timber harvest proposals use existing road systems and temporary road construction to reduce costs and minimize road densities. However, much of the "easy" ground has already been harvested and some of the remaining areas are located near scenically sensitive travel routes, wildlife travel corridors, or potential old growth reserve modification areas. The design of each sale will consider land management objectives as well as the need to provide practical and economical harvest operations. We anticipate an increased emphasis on harvest methods other than clearcutting.

### Current Timber Harvest Projects

Table 8 shows timber sales which are already cleared through NEPA (Turn Timber Sale) as well as timber sales we are currently planning.

**Table 8 - Current Timber Sales on Wrangell Island**

<b>NEPA Name and Decision Date</b>	<b>Proposed Timber Sale Areas &amp; Estimated Volumes (MMBF)</b>	<b>Harvest System and Road Access</b>	<b>Key Issues</b>
Turn Timber Sale EA, 1997	Turn (1.7)	Cable, two miles new road construction off Road 6267.	Wildlife corridor values. Scenery from the Nemo Road. Gate new road after harvest.
Roadside CE, 1998	Three to four sale offerings of 0.01-0.05 MMBF for the next two to three years	Cable, existing roads only	Wildlife corridor values.
Nemo Loop Road and Timber Sale EA, 1998	Nemo Loop (2-4)	Cable & helicopter, clearcuts and partial cuts; three miles new road connecting Roads 6267 and 6290.	Views from saltwater and along the loop road. Wildlife travel corridor. Address mapping error modification of Thoms medium Old Growth Reserve.

### Potential Timber Harvest Projects

Table 9 displays timber sales we anticipate planning over the next ten years on Wrangell Island. Unforeseen events such as storms that cause extensive windthrow, or new information obtained during project analysis (difficult road location, actual field cruise of sale volumes compared to proposed estimates) could alter the timing, sequence, volume, and location of these projects. We evaluate the timber sale schedule on a regular basis and could alter this list for a variety of reasons.

**Table 9 - Proposed Timber Sales on Wrangell Island**

Likely NEPA Name and Decision Date	Proposed Timber Sale Areas & Estimated Volumes (MMBF)	Harvest System and Road Access	Probable Key Issues
Doughnut EA, 1999	Doughnut (1-2) Back Channel (0.5-2)	Cable & helicopter, small clearcuts, partial cuts, individual selection. Up to 2 miles of new road off the end of state extension of Road 6259.	Soften straight backlines of state land harvest as seen from Eastern Passage. Consider cumulative effects on wildlife and fisheries. Watershed restoration opportunities along haul route (Hermit & Pat Creeks). Consider future use of road for snowmobile and recreation access. Maintain wildlife corridors. Economics due to the amount of road construction needed.
Highbush EA, 2000	Shady (2-4) Highbush (3-5)	Cable & helicopter, up to 5 miles new road off Road 6270, up to 4 miles new road off Road 50004.	Wildlife corridor values. Part of the Shady area lies in a potential expansion area for the Thoms Medium Old Growth Reserve. Possible goshawk nest in area. Consider future use of road for snowmobile and recreation access. Maintain wildlife corridors. Economics due to the amount of road construction needed.
Zimovia EA, 2001	Institute (1-2) Zimovia (2-3)	Cable & helicopter, small clearcuts and partial cuts. Up to 2 miles new road off Road 50016 and Zimovia Highway.	Scenery from Zimovia Strait. Wildlife travel corridors. Address mapping error of the Pat small Old Growth Reserve.
Fools/Southeast EIS, 2003	Little Foot (1-2) Scattered Valley (3-5) Fools (2-3) Southeast Cove (3-5)	Cable & helicopter, up to 10 miles total new road off Roads 50001, 6296, 6270, 6273, 6276.	High road density in north end of Fools Land Unit. Potential modification areas from the Thoms and Fools medium Old Growth Reserves. Wildlife travel corridors between these reserves. Deer habitat values near Southeast Cove. Possible new LTF at or near Southeast Cove.
Plate EA, 2005	Plate (1-2)	Helicopter, partial cut. Use existing Road 50024.	Harvests above existing clearcuts in Basin Creek drainage. Consider road obliteration after harvest to reduce road density in Salamander drainage.
Midway EA, 2006	Blake (2-4)	Cable, new road construction from Blake Channel. Helicopter limited by powerline.	Scenery from Anan travel route. Evaluate need to modify Fools medium Old Growth Reserve (should be resolved in 2003, above). Possible new LTFs on Blake Channel.
Yellow Cedar Salvage CEs, unscheduled	Skip Yellow (0.5) Turn Yellow (0.5) Yellow Joe (0.5) Pat OGR (0.3-0.5)	Helicopter individual tree selection or small groups. Use existing roads.	Wildlife travel corridors, sensitive watersheds (Pat and Hermit Creeks), salvage compatibility with Pat small Old Growth Reserve objectives. Economics due to harvest by helicopter.

## Recreation

Recreation on Wrangell Island in the next ten years should respond to public desires for more trails (with shelters) and recreational driving, with the possible location of a drive-to cabin. In the winter, there is increasing desire for snowmobile and cross-country skiing access, possibly associated with warming shelters. Such developments have the advantage of serving local users and tourists willing to stay a few days in Wrangell. In general, development intensity on Wrangell Island should be based on the distance from Wrangell. Developed campsites, trails, roads and parking will occur closer to town. Dispersed sites and primitive camping and hiking opportunities will occur toward the southern end of the island.

### Current Recreation Projects

Environmental analysis has been completed on the following projects:

- North Wrangell High Country Trail and Shelters. Phase 1 - construct 2.5 miles of trail (1998/1999). Phase 2- construct 2.0 miles of new trail to connect to road system on the NE side of Wrangell Island
- Nemo Saltwater Campsite and Trail at Milepost 4.4 Construct 1/2 mile trail, primitive campsite
- Shelter(s) at the Lower Salamander campsite

### Potential Recreation Projects

- **Fools Inlet Access**  
Establish a small parking area off Road 6270 with a primitive trail to the estuary for fishing, hunting and kayaking access.
- **North Wrangell Snowmobile Access**  
Should be considered in association with the State roading off the Pat road system or additional roading associated with the proposed Doughnut Timber Sale.
- **Nemo Road (and other road) Clean-up**  
Logging slash should be cleaned up along the Nemo road and other road systems with high recreation use. Much of the clean-up can be accomplished through the timber sale contract.
- **Dispersed Coastal Campsites**  
Designate primitive water-accessible campsites for use by kayakers and other boaters at suitable locations around the island.

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**Map 12 - Access Management and Recreation**

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**back of map**

## Watershed and Fisheries

Our watershed analysis identified inherently sensitive watersheds with high levels of human disturbance: Pat, Hermit, Salamander, and McCormack Creeks. These will be priority watersheds for watershed restoration efforts on Wrangell Island. Road condition surveys will emphasize the collection of data pertaining to erosion control needs and fish passage barriers at culverts. Specific road obliteration projects which meet watershed restoration objectives are described under Road Projects (below). Landslide surveys will also identify erosion control needs.

The following projects would not need further environmental analysis under NEPA:

- Meet regularly with the State of Alaska (Departments of Natural Resources, Fish and Game, and Environmental Conservation) to exchange information and share opportunities for collaborative management and restoration of these mixed ownership watersheds.
- Develop cost-share agreement areas with the state and city for road maintenance.
- Inventory watershed restoration needs, emphasizing high priority watersheds.
- Investigate opportunity with the state to stock fish in the alpine lakes northeast of Fools Inlet

## Roads (Access Management)

There are approximately 150 miles of road on Wrangell Island. This includes about nine miles of city streets, but does not include recent road construction on state and private lands. Our current inventory indicates about 96 miles of open road on national forest lands. Consistent with public desires, most roads on Wrangell Island should remain open and available for recreation and future timber access. Some roads have closed 'naturally' as alder has taken over. The majority of these roads should remain closed but should be inventoried to determine erosion control needs. We will examine road closures for new roads (proposed under the timber sale schedule above) rather than pursue extensive closure of existing roads. A thorough road condition survey of the entire Wrangell Island road system will be completed within the next few years. We are actively pursuing an agreement with the State of Alaska Department of Natural Resources to cooperatively construct, use, and maintain state roads providing access to national forest as well as national forest roads providing access to state lands in North Wrangell, Pat, and Earl West Landscape Units. We hope to enlist the participation of the State of Alaska in surveying road conditions in mixed ownership areas in order to develop comprehensive access management and road maintenance plans which address long range objectives for both agencies.

When discussing roads and access management, we use the following terms to describe the intended action:

- **Closure:** This is a generic term that implies some restriction of use. This could be implemented through obliteration, storage, a gate or other physical barrier, or a signed closure order which restricts or prohibits use. The method selected corresponds to the objectives of closing the road or restricting access. The most common objectives include wildlife (improving wildlife security or habitat values), watershed (reducing erosion, reducing culvert failure risks, rehabilitating wetlands), and fisheries (removing fish passage barriers).
- **Obliteration:** When a road is obliterated it is removed from the National Forest Road System. It is mapped only for historical record and will not be shown on public maps. Generally, the road prism (embankment and surface material) is left in place. The road surface may be treated to promote revegetation. All drainage structures are removed, natural (self-maintaining) drainage is restored, and a physical barrier prevents motorized access. All temporary roads are treated in this manner when their use is completed.
- **Storage:** The road is treated physically the same as obliterated, but remains in our system roads inventory for future use.

### Wrangell Island Road System

There are four types of roads on Wrangell Island national forest lands. Map 12 displays the Wrangell Island road system accordingly. Reference numbers for current and proposed access management projects on the Wrangell Island road system are included in Tables 10 and 11.

**Maintenance Level 3** roads are maintained for passenger vehicle use. All mainline roads (Roads 6265, 6290, 6270, and 6299) are maintained for passenger vehicles. We propose Level 3 for the following roads because they lead to existing or proposed recreation sites:

- The Midpoint Road (50060)
- The Highbush Lake Road (50040)
- The existing Nemo Road (6267) as well as planned completion of the loop road connection with the Thoms Lake Road (Road 6290)
- The Thoms Lake Road (Road 6290)
- The Salamander Road (50050)

**Maintenance Level 2** roads are local roads maintained for high clearance vehicles only. Most of the roads that remain open for public travel but are not considered 'mainline' roads are maintained for high clearance vehicles. Level 2 roads will be shown as such on Wrangell Island road maps to alert the public to the need for high clearance.

**Maintenance Level 1** roads are not maintained for motorized access. These are roads which we propose using some day in the future for timber harvest or other reasons, but currently they are only maintained for protection of resources such as water quality or fisheries.

**Temporary** roads must be obliterated upon completion of their use. These roads will vegetate over time (usually with alder) and may still serve as foot or bicycle trails. There may be some old temporary roads on Wrangell Island that have not been fully obliterated. We will include these roads in our road condition survey to determine obliteration needs.

### Current Access Management Projects

We propose some changes in the way we manage access in some areas to be responsive to wildlife issues or watershed restoration needs in sensitive watersheds. In each case, we carefully considered current and likely future recreation use of the road, as well as future needs for accessing timber harvest areas.

Generally, no NEPA analysis or decisions are needed for these projects. However, we know that road closures in general may be controversial, so we will notify the public (through this report and other means) and request comments on these projects. Several of the projects below are necessary to protect resources such as water quality. Two projects (Roads 50008 and 6276) provide conditions consistent with management objectives in old growth reserves. Most of the roads listed below are the last segments of system roads that are no longer needed to access timber and do not appear to be used for recreational driving.

**Table 10 - Current Access Management Projects on Wrangell Island**

Roads	Landscape Unit	Map reference number	Description and Objectives
Turn Timber Sale roads (two miles)	Salamander	1	Combination of obliteration and gate closure on new road. Maintains wildlife security and minimizes risk of drainage structure failure.
Road 50008 (all)	Salamander	2	Storage. Reduces road density in Salamander Landscape Unit and Skip and Salamander watersheds. Reduces fish stream crossings in Skip Creek. Improves wildlife security and travel corridor habitat consistent with proposed modification of Thoms medium Old Growth Reserve into this area. Once the reserve is modified, the road will be obliterated (removed from future use).
Road 50022 (last mile)	Salamander	3	Storage after Roadside Timber Sales. Reduces road density in Garnet watershed, removes high risk stream crossings, improves wildlife corridors across Salamander Ridge
Road 50025 (last mile)	Salamander	4	Storage after Roadside Timber Sales. Reduces road density in Garnet watershed, in Salamander landscape unit.
Road 50016 (last mile)	Earl West	5	Storage beyond bridge to avoid isolating drainage structures beyond log stringer failure.
Road 6276 (last two miles)	Fools	6	Gate Closure. Road is within Fools medium Old Growth Reserve. Improves wildlife habitat security and travel corridor. Road needed for future access into Southeast Cove Timber Sale area.
Road 50051 (last half mile)	Pat	7	Obliterate beyond landslides. Avoid isolating drainage structures. Reduces road density in Pat Landscape Unit
Road 6259 (unnumbered spurs about 2 miles long)	Pat	8	Consider obliteration in cooperation with state after state timber sale on this mixed ownership road. Restore failed drainage and landslides along road to meet watershed restoration objectives in Pat watershed. Reduces road density in Pat watershed.
Road 50053 (last mile)	Salamander	9	Obliterate beyond landslide. Avoid isolating drainage structures. Reduces road density in McCormack drainage and Salamander Landscape Unit.

### Proposed Access Management Projects

The following projects will be considered during NEPA analysis on the projects listed.

**Table 11 - Proposed Access Management Projects on Wrangell Island**

Road	Landscape Unit	Map reference number	Description and Objectives
Road 50024 (one mile)	Salamander	10	Gate closure with parking area and turnaround. Improves wildlife security in Salamander Landscape Unit. Provides future access to Plate Timber Sale.
Road 50005 (half mile)	Salamander	11	Obliterate in conjunction with Road 50024 gate. Reduces road density in Salamander Landscape Unit.
Road 50041 (last half mile)	Earl West	12	Obliterate during Highbush Timber Sale. Reduces road density in Earl West Landscape Unit, reduces risk of culvert failure.
Road 6299 (unnumbered spurs about one mile)	Fools	13	Consider obliteration in Fools/Southeast EIS. Reduces road density in West Fools watershed. Evaluate use for accessing proposed Scattered Valley Timber Sale area

## Wildlife

We suggest the following minor refinements to the boundaries of existing old growth reserves identified in the Forest Plan. Such adjustments are non-significant amendments to the Forest Plan since they change allocations and would be considered during environmental analysis of adjacent timber harvest projects in consultation with federal and state fish and wildlife agencies. Table 12 identifies possible old growth reserve adjustments.

<b>Name of Reserve</b>	<b>Possible Refinement</b>
Salamander small	Mapping error overlaps with state selected lands. Expand northern boundary north to include beach fringe and productive forest below switchbacks on Road 50050. Expand eastern boundary to coincide with state land boundary. Provides greater connectivity and compensates for portion of reserve located in the Earl West state land selection. No timber sales are proposed near this area.
Blake small	Consider moving location directly across from the small reserve on the mainland along the narrowest separation between Wrangell Island and the mainland. Provides a stronger corridor linkage. Abuts proposed Highbush Timber Sale and possible recreation development. Boundary adjustment could be considered in the Highbush EA.
Thoms medium	Currently achieves TLMP guidelines but may not if state lands are conveyed and developed. A mapping error also exists and will be addressed in the Nemo Loop Road and Timber Sale EA: the reserve will be modified by dropping the portion that overlaps with the proposed Nemo Loop Road and adding the south side of the Skip Creek Valley (the old Twin Timber Sale area). Future options for expansion triggered by state land development include 1) east across Road 6299 (Thoms Creek Road) or 2) to the north. Both areas are being considered for road and timber harvest in the next ten years.
Fools medium	Falls short of TLMP guidelines for size and highly productive old growth forest. Consider modification to meet Forest Plan criteria either to the north or east during the Fools/Southeast EIS. Refine need for adjustment with Forest Supervisor.

Specific road access management projects which meet wildlife objectives are described within the Road Project section.

## Second Growth Management

Second growth management on Wrangell Island has focused on thinning for future timber production on suitable forest lands. Currently, from 200 to 650 acres are thinned annually on Wrangell Island. The most beneficial time to thin stands ranges from 20 to 35 years after harvest, depending on site conditions. The most productive sites on the island can grow trees 20 inches diameter (at breast height) in 60-75 years with pre-commercial thinning.

Many stands were planted with spruce in 1980. These will be ready to thin within the next ten years. Young stands adjacent to the Nemo Campsites will require special thinning to maintain the scenic views.

There is a need to inventory second growth in unsuitable lands (riparian areas, beach fringe, old growth reserves) to determine if second growth management techniques such as thinning could restore or enhance stand conditions to better meet the objectives of these lands. Funding such treatments may be a challenge.

## Wrangell Island Ecological Processes & Human Use

### Geology and Soil

The geology of southeast Alaska is fairly complex. Over time, land masses have accreted (added onto) the west coast of North America creating what is now the western edge of that continent. Land masses of similar origin are described as belts. Most of Wrangell Island lies within the Gravina Belt. The southeastern portion of the island (Blake and eastern part of Fools landscape units) are in the Mainland Belt.

The US Geological Survey maps Wrangell Island into seven major geologic units. Two basic rock types--intrusive igneous rocks and metasedimentary rocks--underlie most of the island. Intrusive igneous rocks are typically granite, diorite, and gabbro. Schists, phyllite, greenschist, shale, and metamorphosed andesite are the common metasedimentary rocks found on Wrangell Island. Maps and additional details are available at the Wrangell Ranger District office. The rock types on Wrangell do not follow obvious terrain features that match the landscape units, VCU's or watershed boundaries.

The plutonic rocks are inherently more prone to mass wasting than the metasedimentary rocks. However, mass wasting occurs on steep slopes in areas with metasedimentary bedrock as well. The recent large landslides in Pat are an example of naturally occurring slides on granitic plutons. In areas with metasedimentary bedrock, mass wasting is common when the bedding plane is parallel with the slope angle. The mass wasting events that occurred during construction of the Old Hermit road (Road 50051) are examples of this type of landslide.

A survey of all quarries on Wrangell Island in 1992 rated most of the quarries with intrusive igneous rock as "poor quality" for road building materials. Either the material weathers quickly (turns to sand) with heavy traffic, or it is oversized shot. This is unfortunate since most of the areas planned for future roading have this type of bedrock. Generally, the better quality rock is located along the boundary or contact with the metasedimentary rock. The best rock quarries are likely to be found well within the intrusive rock formations. The quarry survey summarizes water quality concerns, recreation potential (e.g. which quarries might make good campsites), and geological interpretations (e.g. which quarries have garnets).

All of Wrangell Island was covered by Pleistocene ice. The ice may have been as thick as 5000 feet on the mainland east of Wrangell Island (Huesser, 1960). Ice flowing down the major drainages of the Stikine River, Aaron Creek, and the Bradfield Canal would have affected Wrangell Island. The rounded scoured landforms at all elevations on the island attest to glacial activity.

Ice movement down the Eastern Passage (Back Channel) gouged the trough between Channel Island and Fools Inlet and another ice lobe pushed through to Thoms Lake, carving two low passes across the land mass. The rounded U-shaped valleys that resulted are plastered with glacial till on the lowlands, with steeply sloping and highly landslide prone side walls. Deep till residues in most places do not exceed 1000 feet elevation except where hanging valley glaciers have had local effects. Generally, soil depths are greatest along the western and southern portion of the island, and shallowest along the landforms of the Eastern Passage and Blake Channel.

Wrangell Island, like most of southeast Alaska, is still rising. The estimated rate is 1.5 centimeters per year. Uplifted beach soils occur along Zimovia Strait south of Skip Creek. Sand banks, thought to be remnant beach deposits from a period when the ocean level was higher, are exposed by road cut banks near Earl West Creek and to a lesser extent near McCormack Creek. Small amounts of sand are mined by locals to improve the soil in gardens and flower beds.

## Windthrow

Windthrow is a dominant stand-level disturbance agent in southeast Alaska. Fall and winter storms with gale force winds from a south to southeasterly direction cause most of the damage. Wrangell Island receives protection from the predominant storm path by Etolin Island and Cleveland Peninsula.

Large scale blowdown on the island appears to be uncommon, but is noticeable on the southwestern portion of the island. Most windthrow on the island appears to be associated with timber harvest or road construction that creates abrupt stand edges that receive new exposure to wind.

## Wildlife

### Influences on Species Composition

Wrangell Island contains the spectrum of habitat types typical of Southeast Alaska and as a result hosts over 40 different mammal species, as many as 100 breeding bird species and 2-3 types of amphibians. Old-growth spruce-hemlock forests provide the vegetative structure preferred by nesting goshawks. These forests also provide high canopy cover which helps to intercept snow, leaving the understory forage unburied and available for Sitka black-tailed deer. Game trails criss-cross nearly every muskeg system where bear, moose and deer have passed by. New growth within young clear-cuts is nibbled on by deer and bear and nested in by orange-crowned warblers. Forests that border Wrangell streams, referred to as riparian forests, provide key habitat features for northern flying squirrels, brown bear and marten. On a hike through some of the island's alpine habitats you may see signs of summering deer and blue grouse populations.

The composition of the wildlife community of Wrangell Island is influenced by its proximity to the mainland and the Stikine River. At the narrowest point along the Back Channel, the island is less than a half mile from the mainland and is recognized as a key corridor for mammal dispersal (Cook 1994). This distance is easily crossed by larger mammals such as moose, deer, wolves and bear and these crossings are often witnessed by the residents of Wrangell. Being close to the mainland, Wrangell Island supports black and brown bear populations, unlike many of the outer-coast islands. We see moose on the island -- another sign of the Stikine River influence. Species more typical of the mainland that have been reported on Wrangell Island include wolverine, mountain lion and porcupine. We see influences of the mainland and Stikine River in the island bird populations with species such as warbling vireo and black-billed magpie. Recent reports indicate that introduced elk from Etolin Island to the west may also be colonizing Wrangell Island.

Although close to the mainland, Wrangell Island is still isolated enough to be host to an endemic (unique) mammal. There are four subspecies of southern red-backed voles in Southeast Alaska (Cook 1994). The red-backed vole we see here is *Clethrionomys gapperi wrangeli* -- sometimes referred to as the Wrangell red-backed mouse.

There is a town and a road system on Wrangell Island - two features which set this island apart and impact wildlife species. Wrangell Island supports a human population of over 2500 and has a well-developed, extensive and open road system. Open roads connected to communities can pose problems for game species such as deer, wolf, bear and marten. Many of these animals cross or follow roads where they are exposed to legal or illegal hunting. Healthy marten populations may depend on roadless or low-road areas as refuges where young produced can disperse and reestablish trapped populations along roads. Some scientists believe that road densities of over one mile/square mile are detrimental to wolf populations. Others believe that it is more a matter of public education and cannot be set as a strict density calculation. The Pat and Salamander landscape units exceed one mile/square mile and North Wrangell is close behind. Table 13 summarizes road density on the island by landscape unit (also see Watershed Section).

**Table 13 - Road Density by Landscape Unit**

Landscape Unit	Miles of Road per Square Mile
Blake	0
Earl	0.81
Fools	0.41
North Wrangell*	0.97
Pat*	1.38
Salamander	1.23
Thoms	0.34

\*Does not include recent road construction on state and private lands (such as the Spur Road extension).

The Stikine River moose may be the most popular wildlife species for Wrangell Island residents. It is a tradition for island residents to embark on lengthy trips in the Fall to try and "bag a moose". Annual harvest on the Stikine is generally between 10 and 20 animals. Moose are a fairly new arrival to the Stikine, showing up here early this century. We believe that there are 300-400 animals but the population has fluctuated through the years. There have been hunting restrictions and hunts open only to rural residents in response to low population numbers. Recent browse studies indicate that there is plenty of food available so it is unlikely that the moose are lacking in nutrition. Overharvesting in the past combined with wolf and bear predation may have served to keep the Stikine moose population down. Over the past two years, the moose population appears to be increasing. Twenty-two percent of the moose observed on a flight survey in 1997 by the Alaska Department of Fish and Game were calves, indicating a healthy cow/calf ratio.

Wrangell Island residents and tourists like to hunt and view deer. However, most hunters leave Wrangell to hunt on nearby islands. Carrying capacity of Wrangell Island is estimated at 2,824 animals but current deer densities are believed to be much lower than that based on pellet counts. The average annual deer harvest on the island is 42 deer -- all by rural residents (TLMP 1997). There is no high value deer winter range habitat on Wrangell Island based on the most recent Deer Habitat Model. Much of the moderate value deer winter habitat has been logged or severely fragmented by past timber harvest. A few small blocks of moderate value habitat remain near the City Reservoir, at Fools Inlet and within the Thoms Old Growth Reserve. Deer densities may be low as a result of past timber harvesting, wolf predation, severe winters, hunting pressure, or a combination of all of these factors.

### **Forest Fragmentation**

"Forest fragmentation" is the term we use to describe a process in which a forest block becomes subdivided into smaller more isolated units. When fragmentation occurs in a forested environment we see an increase in the amount of "edge" habitat and a decrease in "interior" forested habitat. Some wildlife species prefer edge habitats (American robin), others prefer interior habitat (hairy woodpecker) and probably even more utilize both types of habitat (Sitka black-tailed deer). Fragmentation can cause problems for forest-dependent wildlife by isolating populations which in turn can lead to local extinctions.

Wrangell Island is characterized by fragmentation at many scales and is fragmented by different disturbance processes. The north end of the island originally contained the largest blocks of forest as well as the largest trees (highest volume). "Natural" forest fragmentation that exists as a result of natural openings like muskegs is highest on the south end of the island. Human-induced forest fragmentation is more prevalent on the north end of the island especially in the Pat and Salamander landscape units. The two medium Old Growth Reserves were placed on the south end because there is less human-related disturbance. The largest forested blocks remaining on the island exist within and north of the Pat small Old Growth Reserve, along Earl West Cove (State land selection) and along the northern edge of the Thoms Old Growth Reserve.



### Old Growth Reserves and Connectivity

We are depending on the system of Old Growth Reserves and the forested connections between these reserves as our primary method of ensuring the long-term survival of wildlife populations (TLMP 1997). The Forest Plan gives us specific direction on the total size, productive old growth (POG), and highly productive old growth (HPOG) guidelines for Old Growth Reserves. This island-wide analysis helps us evaluate the existing and future potential of the Wrangell Island Old Growth Reserves to meet the needs of wildlife. We have also identified important forested connections between reserves (discussed in detail under each landscape unit). The two primary east/west wildlife corridors on the island are the Pat-Hermit and Salamander-Skip drainages. The full system of these corridors and reserves can be viewed on Map 8.

- **Medium Old Growth Reserves**

Two medium reserves exist on the south end of Wrangell Island near Thoms Place and at Fools Inlet (see Map 8). The current location of the medium reserves includes important anadromous fish habitat and some of the largest blocks of remaining old growth on the island. These medium reserves maintain the required spacing criteria and are less than eight miles from other medium or large reserves on Etolin and the mainland. During the Forest Plan process, medium reserves were shifted from their original location largely for wildlife reasons documented at the Wrangell Ranger District office.

Table 14 displays the Forest Plan guidelines of the Thoms and Fools medium reserves and how well these are met. The Fools reserve does not meet guidelines for total size and highly productive old growth (HPOG) forest. Potential adjustment areas for the Fools Reserve are discussed under the Fools Landscape Unit discussion.

**Table 14 - Wrangell Island Medium Old Growth Reserves**

<b>Reserve</b>	<b>Size (Guideline = 10,000 ac)</b>	<b>POG (Guideline = 5000 ac)</b>	<b>HPOG (Guideline = 2500 ac)</b>
Thoms*	8046	4736	1670
Fools	9222	5108	2201

\* Includes only unencumbered National Forest Lands. Thoms Reserve is oversized if State lands and State land selections are included (see Table 15 below)

The Thoms reserve is oversized if state lands and state land selections are included. The Thoms reserve also contains a mapping error in the vicinity of the proposed Nemo Loop Road and Timber Sale. About 300 acres of the reserve overlap the proposed road. This mapping error will be resolved by recommending a non-significant Forest Plan amendment. This is further discussed under the Projects section of this report.

We have initiated dialogue with the state to determine the future management goals for the state lands and state-selected lands currently assumed to contribute to the Thoms reserve. Development of these lands would trigger reserve adjustments with the primary concern of maintaining the old growth (high volume timber) guidelines of the reserve. Table 15 displays the size and what we currently understand as the future development potential of the state and state-selected lands associated with the Thoms reserve. Lands that may continue to contribute to the reserve are contained within Thoms Lake Recreation parcel, Thoms Creek selection and Thoms Marine Park. In this report we have considered areas for expansion on National Forest lands if development occurs (see Thoms Landscape Unit discussion and Proposed Projects). The modification recommended as a non-significant Forest Plan amendment in the Nemo Loop Road and Timber Sale EA will partially address concerns for development of these lands

**Table 15 - Land Parcels Associated with Thoms Medium Old Growth Reserve**

Parcel	Total Size (acres)	POG (acres)	HPOG (acres)	Status
Unencumbered National Forest Old Growth Reserve	8,046	4,736	1,670	All National Forest with no selections; no development
Thoms Marine Park	2,144	1096	312	State Park; no development by statute
Thoms Creek Selection	2,401	1007	275	State-selected but not conveyed. Low priority for conveyance; development speculative
Thoms Lake Recreation	2,498	1028	470	State land for recreational purposes; development possible but unlikely
<b>Total</b>	<b>15,090</b>	<b>7,869</b>	<b>2,729</b>	

- Small Old Growth Reserves  
With the resulting placement of the medium reserves in the south end of the island, it became important that the small reserves be placed in such a way to provide links to the north, to the mainland, and to the larger blocks of habitat. We concentrated on meeting the objectives of the Old Growth Reserves with enough total productive old growth. We were not as concerned with identifying the total size. The wildlife benefits of the small reserves are discussed within the Landscape Unit sections.

The Forest Plan used Value Comparison Units (VCUs) to determine the size of small Old Growth Reserves. This system did not work for Wrangell Island since two of the VCU's are shared with the mainland and others are fragmented by State and Private Land. We used a different landscape division-- the landscape units described in this report--to locate the small reserves. Four or five small reserves are required on Wrangell Island using the VCU strategy. We placed a total of five small reserves on the island in landunits that lacked medium reserves.

To double-check on whether the placement of our small reserves was meeting the intent of the Forest Plan we applied the Forest Plan size (16% of area) and productive old growth guidelines (8% of area) to the entire island (excluding the VCUs with medium reserve. See total column in Table 16). These numbers show that the small old growth reserves amount to a total of 2200 acres less total size than what the Forest Plan guidelines indicate. However, the total productive old growth acres within small reserves meets Forest Plan guidelines. On an individual level --some small reserves are shy on acres while others are oversized (Table 16). The Pat reserve is oversized which compensates for the smaller size of the North Wrangell and Salamander reserves. The Salamander reserve will benefit from extra acres that are added to the planned expansion of the Thoms Medium reserve. The Blake reserve is not required due to the proximity of the mainland semi-primitive area. We created the Blake small reserve to enhance connectivity and because the Fools Medium reserve had previously been in this location.

In designing small reserves we focused on the biological intent of the small reserve strategy which is to place a block of productive forest within each 10,000 acre landscape. As stated in the Forest Plan, "the preferred biological objective is for each reserve to contain at least 800 acres of contiguous productive old-growth forest". All of the Wrangell Island small reserves meet this objective. We did not strive to meet the size guidelines because it was believed to be secondary to the main objective of meeting the productive old growth requirements.

**Table 16 - Wrangell Island Small Old Growth Reserves:  
Ability to meet size and productive old growth guidelines by land unit and combined**

## across the island

Land Unit	National Forest Acres in Landscape Unit	Percent of acres in OGR (guideline = 16%)	Percent of acres as productive forest in OGR (guideline = 8% of landunit)	Is the Old Growth Reserve 16% of the Landunit?	Does the Old Growth Reserve meet the productive forest guideline?	Comments
North Wrangell	9681	10%	8%	no	yes	With municipal watershed acres added, this reserve almost meets the size requirement
Pat	9054	22%	17%	yes	yes	Oversized; acres compensate for North Wrangell and Salamander reserves
Salamander	26857	12%	5%	no	no	Undersized; Pat's to north is oversized; future connection to Thoms medium reserve will add acres
Earl West	12447	15%	7%	no	no	Undersized but close to Blake and mainland reserves
Blake	15180	9%	7%	no	no	An extra reserve due to the proximity of semi-primitive on the mainland
<b>Totals</b>	<b>73219</b>	<b>13%</b>	<b>8%</b>	<b>no</b>	<b>yes</b>	<b>Productive old growth and spacing guidelines are met; size guidelines are not met</b>

Small old growth reserves are further evaluated during project-level planning in consultation with federal and state fish and wildlife agencies. Pat and Salamander small old growth reserves contain mapping errors or overlap with state-selected lands. Potential modification of the small reserves is summarized in the Landscape Unit sections and the Project section of this report.

## Watersheds and Fisheries

We conducted a watershed analysis following the process outlined in the July 1997 Draft Watershed Analysis Handbook for the Alaska Region (USFS 1997a). The Tier 1 watershed analysis described in this report relied on low resolution (primarily GIS-based) data and identifies watershed sensitivity, risk, and values.

### Wrangell Island Watersheds

Nineteen third order watersheds comprise approximately 120 square miles of Wrangell Island (Map 13). The rest of the island watersheds are first and second order coastal watersheds generally less than one square mile each. These small watersheds account for about forty square miles of Wrangell Island. Coastal lands draining directly to saltwater with no apparent streams account for the remaining forty square miles of this 200 square mile island. This analysis focuses primarily on the third order watersheds. However, recent reconnaissance of some coastal areas on the island discovered small streams not currently in GIS, some of which support both anadromous and resident fish populations (most of which are not catalogued by ADFG). These areas must not be excluded from field verification and analysis at the project level.

Local watershed names are used throughout this report. Published topographical maps routinely show the names "Institute", "Pat", and "Thoms". The names "Hermit", "McCormack", "Salamander", "Earl West", and "Fools" may not show up on maps but are commonly used by Wrangellites. Hermit Creek has also been called "Lowe Creek" and "Shane Creek" and it is very likely that other streams are known by other names as well. To minimize confusion associated with naming conventions, Table 17 provides a cross-reference to GIS location codes as well as ADFG catalogue numbers.

**Table 17 - Third Order Watersheds on Wrangell Island**  
(all watersheds within USGS Hydrologic Unit 19010202)

Watershed Name	Size (square miles)	GIS Code	ADFG Catalogue Number	Landscape Unit
Institute	2.62	S23A	108-40-10300	North Wrangell
State	2.64	S32A	107-40-10910	North Wrangell
Pat	6.50	S10A	108-10-10050	Pat
Hermit	7.35	S34A	107-40-10880	Pat
McCormack	4.49	S08A	108-10-10100	Salamander
Turn	4.31	S06A	107-30-10180	Salamander
Skip	9.58	S05A	107-30-10200	Salamander
Garnet	2.55	S37B	107-40-10820-2018	Salamander
Basin	8.74	S37C	107-20-10820-2026	Salamander
Salamander	6.44	S37D	107-20-10820	Salamander
Earl West	15.43	S39A	107-40-10780	Earl West
Thoms	16.78	S03A	107-30-10300	Thoms
Southeast	5.08	S64A	107-20-10600	Fools
Scat	4.20	S62B	107-20-10700-2003	Fools
West Fools	9.38	S62C	107-20-10700	Fools
Fools	8.49	S62D	107-20-10710	Fools
Off Point 1	1.16	S57A	none	Fools
Ham	1.93	S51A	none	Blake
Blake	5.32	S46A	none	Blake

Garnet and Basin are tributaries of Salamander Creek. The entire Salamander watershed is 17.73 square miles. Scat and West Fools are tributaries of Fools Creek, contributing to a total Fools watershed size of 22.07 square miles (the largest watershed on Wrangell Island). All other watersheds are individual. For the purposes of an island-wide landscape analysis, Wrangell Island was divided into seven landscape units, utilizing watershed boundaries.

## Components of the Wrangell Island Watershed Analysis

The Tier 1 Watershed Analysis considered each of the following components:

- **Mass Movement/Erosion**  
Mass movement (slumps, landslides, debris torrents) is the primary soil erosion process on Wrangell Island. In southeast Alaska, landslides are commonly associated with high intensity rainfall and/or windthrow on steep slopes. An intense fall rainstorm in 1993 triggered dozens of landslides on Wrangell Island and at least one debris torrent (Rainbow Falls tributary to Institute Creek). The most inherently unstable terrain (within third order watersheds) on Wrangell Island is found in State, Hermit, Off Point 1 and Pat Creek watersheds.
- **Hydrology and Stream Channels**  
Stream density, channel characteristics, precipitation, watershed steepness, floodplain and wetland locations and other factors affect hydrologic processes such as floods and sediment transport efficiency. Most of these factors were evaluated through the GIS database for this report. Precipitation data for Wrangell Island has been collected near the airport at the north end of the island since 1949 (Pruter 1997). Mean annual precipitation at this site is 80 inches. A regional precipitation analysis indicates that precipitation likely increases in a southeasterly direction, perhaps reaching as high as 120 to 160 inches at the south end of the island near the mouth of the Bradfield Canal (Jones and Fahl 1994).

Most of the precipitation falls as rain in the fall (the average peak occurs in October). June is the statistically driest month. The maximum rainfall in a 24-hour period was recorded in October 1993 when 5.5 inches was measured at the airport. Winter snowcover is transient below about 500 feet elevation.

Streamflow across the island responds directly to rainfall, with peak floods most likely to occur during fall storms and low flows corresponding to dry summer months.

Off Point 1, State, and Hermit Creeks appear to have the highest transport efficiency due to steep slopes and high stream densities in these watersheds. Thoms, Fools, and Salamander Creeks stand out as streams with high sediment deposition risks due to the presence of high proportions of very low gradient floodplain channels.

### Sediment Sensitivity

Soils and stream data were used to evaluate inherent mass movement risk by estimating proportions of unstable terrain in each watershed and drainage efficiency for transporting sediment. Overall watershed sensitivity to sediment impacts (due to the combined influence of unstable terrain and drainage efficiency on sensitive low gradient stream reaches) is highest in Salamander Landscape Unit. Salamander Creek itself contains the third and fourth most sensitive watersheds on the island. Table 18 shows the relative rank of each of the nineteen watersheds evaluated.

**Table 18 - Sediment Sensitivity and Disturbance Indicators for Wrangell Island  
Third Order Watersheds**

Watershed Name	Sediment Sensitivity Rating*	Percent of Total Watershed Area Harvested )	Road Density (mi/sq mi)	High Risk Stream Crossings	Fish Stream Crossings	Landscape Unit
Institute	19	3	less than 0.1	0	1	North Wrangell
State	1	0	0	0	0	North Wrangell
Pat	6	16	1.23	2	20	Pat
Hermit**	5	13	1.28	6	4	Pat
McCormack	7	24	1.42	5	6	Salamander
Turn	8	2	0.77	0	1	Salamander
Skip	14	11	1.03	3	7	Salamander
Garnet	3	10	1.73	6	2	Salamander
Basin	13	14	1.29	0	3	Salamander
Salamander	4	15	1.17	4	5	Salamander
Earl West	17	7	0.82	6	8	Earl West
Thoms	18	3	0.43	2	4	Thoms
Southeast	10	0	0	0	0	Fools
Scat	12	1	0.34	2	5	Fools
West Fools	15	7	1.33	1	4	Fools
Fools	11	5	1.39	2	2	Fools
Off Point 1	2	0	0	0	0	Fools
Ham	16	1	0	0	0	Blake
Blake	9	1	0	0	0	Blake

\*Combination of unstable terrain, drainage efficiency, and sensitive low gradient streams

\*\*Does not include recent road construction and harvest on state lands

- Disturbance Indicators

Table 18 also shows several disturbance indicators for the nineteen third order watersheds. Salamander Landscape Unit has some of the highest disturbance levels. Watershed harvest exceeding 20% is considered a threshold of concern in third order watersheds which would trigger a more intensive watershed analysis prior to additional disturbances such as road construction and timber harvest. McCormack Creek has reached this threshold. Pat and Hermit Creeks may be approaching this threshold with harvest underway on state lands.

Roads are more likely to have a direct impact on watershed processes and fish habitat than timber harvest. Road density, fish stream crossings, and high risk stream crossings (alluvial fan and V-notch channels) provide an index of road disturbance in each watershed. Combined road disturbance factors are highest in Pat, Hermit, McCormack, and Salamander Creek (and its tributaries). Skip, Earl West, and Fools Creek tributaries have secondary concerns related not so much to overall road density but to numbers of stream crossings.

The combination of sediment sensitivity and disturbance indicators lead to some conclusions that are discussed within each Landscape Unit section. Most notably, we do not propose any additional disturbance in McCormack Creek. We propose limiting further disturbance in Pat, Hermit, and Salamander Creek tributaries and examining opportunities for restoration projects in all these watersheds.

- Wetlands and Riparian Areas

The high precipitation results in the formation of extensive wetlands across the island. Wetlands associated with lakes, streams, or saltwater are usually the most biologically significant wetlands, primarily because of the diversity of habitat they provide and their relative scarcity. Earl West marsh is a good example, and the most important wetland on Wrangell Island. Floating bog soils found throughout this marsh are extremely sensitive to disturbance by off-road vehicles. The marsh

provides excellent waterfowl nesting habitat and potentially good cutthroat trout fishing. There is a similar, but smaller wetland along the McCormack Creek Road in the low divide between Garnet and McCormack Creeks. The most important estuarine wetlands are at Thoms and Fools Creeks. About twenty small lakes occur on Wrangell Island, ranging in size from a couple acres to 320 acres (Thoms Lake). Many of the lakes are glacially formed, especially east of the Earl West-Fools Inlet trough.

The most important riparian areas on the island are associated with very low gradient, floodplain stream channels found in Thoms, Salamander, Earl West, Fools, Hermit, Skip, and Pat Creeks. Pat Creek riparian forest has been substantially clearcut and is also affected by road use immediately adjacent to the stream at several locations. About two miles of stream length in the Pat and Hermit Creek drainages have been clearcut on one or both sides. This is by far the most riparian harvest on Wrangell Island.

- **Water Quality**  
In compliance with the Clean Water Act, most of Wrangell Island waters must be protected to maintain habitat for fish and other aquatic organisms. The headwaters of the city's municipal watershed flow from national forest. Many private homes in North Wrangell and Pat landscape units rely on potable water from streams originating from within national forest. No known point sources of water pollution are found within the national forest on Wrangell Island.
- **Fish Species and Habitat**  
Fish species vary widely throughout watersheds and across the island. Existing stream surveys provided data on fish distribution and habitat barriers. More thorough, site specific information will be gathered during project planning. Steelhead, rainbow, and native cutthroat trout; Dolly Varden char; chum, pink, coho, and sockeye salmon can be found in Wrangell Island streams. Chinook salmon do not successfully spawn in island streams, though they may be found on occasion as a result of hatchery releases at Earl West Cove. Thoms Creek is the most productive fishery on the island, providing a diversity of lake, stream, and estuary habitats and supporting an important subsistence sockeye fishery. No known aquatic species of concern (rare, sensitive, threatened, or endangered) occur on Wrangell Island.

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**Map 13 - Wrangell Island Watersheds**

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## Human Use Patterns

For thousands of years people have called Wrangell Island "home." Perhaps more than any other place in Alaska, Wrangell Island has been home to culturally diverse groups of people. Since the ice retreated after the last major glacial period people have relied on the island's rich natural resources for their sustenance and cultural survival. Although archaeological studies have been limited on Wrangell Island, other nearby sites reveal that people have occupied the southeast Alaska coast for at least 10,000 years. Who these early people were and their relationship to the Tlingit Indians is uncertain. Tlingit oral traditions, however indicate they have been here since time immemorial. Tlingit oral history recalls their first journey down the Stikine River, under an ice dam that crossed the river and eventually leading to the coastal rainforest. The Tlingits built their first village on the mainland coast across from Wrangell Island. Later some of the people moved and built a village on Wrangell Island, south of present-day Wrangell along Zimovia Strait.

In 1793 George Vancouver of the British Royal Navy became the first European to sail by Wrangell Island and he named Point Highfield on the northern end. The Stikine Tlingit claimed ownership of Wrangell Island when the first explorers arrived. Many early ethnographers reported that the Stikine Tlingit were the most populous and powerful of all the Tlingit Indian groups. Wrangell Island was a natural gateway to the Stikine River, one of the most important trade and travel routes connecting indigenous peoples of the coast with those of the interior. As owners of that territory the Stikine Tlingit were astute entrepreneurs who controlled most of the trade with the Tahltan Indians up the river.

As the sea otter trade dwindled in the 1820s land mammal furs and other riches of the interior drew a multitude of newcomers to the area. In 1834 the Russian American Company established Redoubt Dionysius at the present site of Wrangell. The Russians built their Redoubt to block the Hudson's Bay Company from establishing a trading post further up the Stikine River. The potential disruption of trade was of concern to both the Stikine Tlingit and the Russian American Company. The British claimed a right to travel the rivers in Russian territory according to a treaty signed in 1825. The British resolved the issue in 1839 with the annual payment of 2,000 sea otter pelts to the Russian American Company. In 1840 the Hudson's Bay Company took over the redoubt and renamed it Fort Stikine. The Hudson's Bay Company continued to rely on the Stikine Tlingit to obtain furs in trade with the Tahltan Indians. With the sale of Alaska in 1867, the United States military built a new fort named Fort Wrangell.

Gold discoveries lead to the next wave of immigrants to Wrangell Island. Former Hudson's Bay company trader Buck Choquette first discovered gold along the Stikine River in 1861. Choquette's discovery brought hundreds of people to Wrangell, replacing furs as the reason for trade and travel up the Stikine River. Although gold was never discovered in large quantities along the river, the Stikine river became an important travel route during the Cassiar gold rush of 1874 and the more famous Klondike gold rush of 1898. Wrangell became a boom town during these gold rushes as thousands of people made their way north to find their fortune. During the Klondike gold rush, Wrangell's population swelled to over 6,000 people. Almost as quickly as it began, though, the gold rush was over and Wrangell once again experienced lean times.

In August 1902, President Theodore Roosevelt established the Alexander Archipelago Reserve. Wrangell residents in particular had mixed reactions about the reserve's creation. Skeptics believed creation of the reserve would unduly restrict their use and access to the surrounding natural resources. Some logging operators also believed it would decrease the economic value of timber since it was in public domain. In 1908 the Alexander Archipelago Forest Reserve and the Tongass National Forest were combined into a single national forest that included much of Wrangell Island. The Twentieth Century has witnessed development of Wrangell Island for fishing industries, logging, mining, and other commercial development.

Over thousands of years people have left various traces of their existence on Wrangell Island. Most of the heritage sites are located within a short distance of the coast at relatively low elevations. Indigenous site types recorded for Wrangell Island include villages, camps, burials, petroglyphs, fish traps, and culturally modified trees. The petroglyphs on Wrangell Island's northern end represent the densest concentration of ancient rock art in southeast Alaska. Historic site types include cabins, canneries and other fishing industry sites, mines, roads, and various natural resource extraction sites.

Today's pattern of human use is still strongly associated with natural resources, and mostly oriented around the existing road system which was developed to access timber stands during the 1960s and 70s. Recreation site use and planning has stressed higher levels of development closer to town and more dispersed uses further from town. Community futuring efforts have stressed tourism and recreation developments that benefit both outside visitors willing to stay a few days and local citizens. Most people (especially visitors) make use of areas close to town for recreation as well as personal use and subsistence resources such as firewood, free wood, shellfish, and berries.

Subsistence and sport hunting for deer, moose, bear, waterfowl, and trapping for wolves and fur-bearing mammals occurs on the island and has become more widespread as the road system has grown. However, nearby islands and the mainland are more popular hunting and trapping destinations than Wrangell Island for many species.

Except for rock quarried for roads and site development, Wrangell Island has not seen much recent mineral development. The Tyee powerline, which provides electricity to the cities of Wrangell and Petersburg, traverses the island from south to north.

Economics plays an important role in human use patterns on the island. Because of the high costs of road construction, equipment mobilization, and hauling, forest resources accessed by the existing road system and close to town are generally more economically developed than those on surrounding islands or unroaded areas.

We anticipate some significant land use changes in the next ten years as state, city, and private lands on the north end of the island, and possibly in the Earl West and Thoms areas become more developed. Timber or home site development on these lands would set the stage for continued changes and greater interface between residential and forest users. Cooperation and information exchange between land owners will be critical to avoid conflicts.