Saginaw Creek
Watershed Restoration Plan

Contributors: Heath Whitacre, Justin Anderson

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Executive Summary

The Saginaw Creek watershed (Hydrologic Unit Code 190102020104) lies within the North Kuiu priority watershed in the north central portion of Kuiu Island on the Petersburg Ranger District of the Tongass National Forest (Figure 1). This 8,302-acre watershed is managed primarily for timber production, but is also important for commercial fisheries production, subsistence and recreation activities. Users from the nearby communities of Kake, Point Baker, Port Protection, Kupreanof, and Petersburg as well as approximately 25 outfitters and guides use this watershed for fishing, hunting, trapping, sightseeing, kayaking, camping and hiking. Recent changes in the physical conditions of the watershed have been driven primarily by timber harvest and road building, with natural and management-induced landslides also contributing to physical changes within the watershed. Commercial riparian harvest has altered forest stand conditions along much of Saginaw Creek and its tributaries, possibly altering patterns of wood recruitment and wood function in streams. Temporary and unused National Forest System (NFS) roads contribute sediment to streams and alter drainage patterns. Restoration projects respond to the need for speeding the development of riparian stands through riparian 2nd growth treatments, enhancing fisheries habitat through placement of large woody debris (LWD) structures, reducing sediment input and risk of mass wasting as well as restoring natural surface and groundwater drainage pathways by decommissioning temporary and NFS roads, and expanding stream, road, and invasive weed surveys to better characterize the watershed.

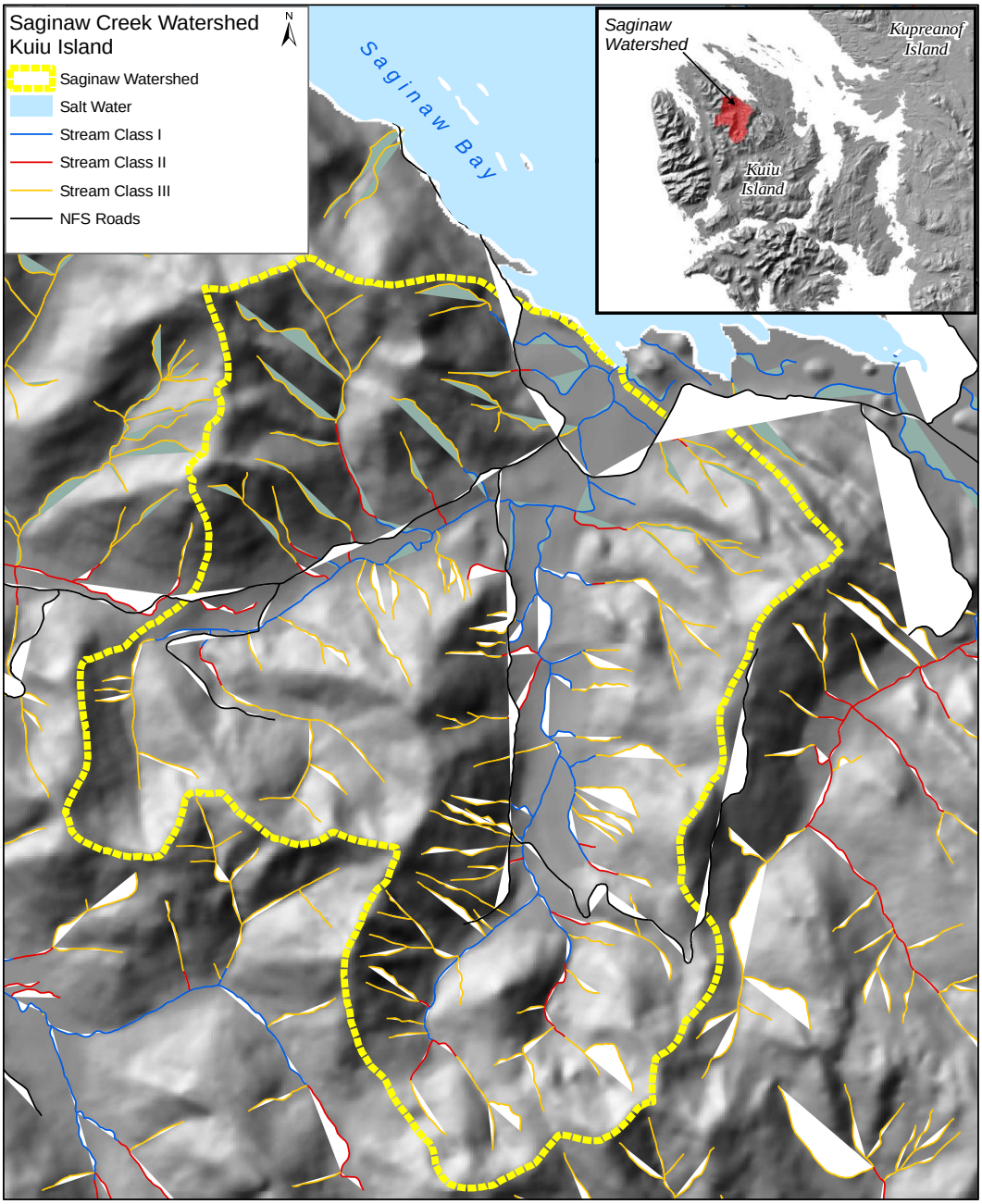

Figure 1. Saginaw Creek watershed on Northern Kuiu Island.

Watershed Characterization

Overview

Saginaw Creek (ADF&G # 109-44-10390) drains an 8,302-acre watershed. The Saginaw Creek watershed lies almost entirely within a Timber Management LUD, but also contains a smaller portion in the Old Growth Habitat LUD. In addition to providing timber, the Saginaw Creek watershed is also an important producer of coho salmon (*Onchorhynkiss kisutch*) and pink salmon (*O. gorbuscha*), both of which support commercial fisheries in Southeast Alaska. The dominant land uses affecting watershed processes in the Saginaw Creek watershed are timber harvest and road building.

The scope of the Saginaw Creek WRP includes the entire Saginaw Creek watershed from ridge tops to sea level. This boundary corresponds to the 6th level HUC, and is a true watershed drained by a single river. This boundary is focused enough to capture the site-specific problems associated with the watershed, yet broad enough to consider cumulative impacts within the watershed.

Climate

North Kuiu Island's climate is strongly influenced by a nearly constant procession of storms originating from a semi-permanent low-pressure system called the Aleutian Low (USDA Forest Service, 2001). Maritime air masses originate over the warm waters of the Pacific Ocean, where heat and moisture are transferred to the atmosphere. The northward movement of warm ocean currents and air masses transports warm moist air into the coastal mountain ranges of the Alexander Archipelago. As the moisture-laden air rises into the mountains, it cools causing heavy precipitation. Annual precipitation ranges from near 90 inches at the mouth of Saginaw Creek to around 120 inches in the headwaters of the watershed (USDA Forest Service, 1979).

Basin Geology

The watersheds in North Kuiu are formed from the Alexander terrane. The terrane includes interbedded ocean trench sediments, shallow water limestone, sedimentary rocks (primarily mudstone, graywacke, and turbidites), volcanic rocks, and chert (USDA Forest Service, 2001). The Saginaw Creek watershed lies primarily in the Rowan Sediments ecological subsection, but also contains a small portion in the North POW-Kuiu Carbonates subsection (USDA Forest Service, 2001). This watershed is characterized by a landscape altered through time by repeated glaciation, from Pleistocene events 10 to 13 million years ago to more recent glaciations 3000-4000 years ago. The topography reflects this influence, with long, smooth forested hillslopes dissected by broad U-shaped valleys.

Vegetation

Vegetation in this watershed is primarily forested non-wetland habitat, but the forests are also interspersed with muskeg, scrubland, and alpine plant communities (Table 1). The forests are primarily western hemlock with a Sitka spruce component and scattered Alaska yellow-cedar. Higher percentages of Sitka spruce are found along streams and

other well-drained sites. The understory shrubs are primarily blueberry, huckleberry, and rusty menziesia. Many species of vascular plants, lichens, and mosses occur throughout all habitat types. Forested muskeg with a high percentage of yellow-cedar occurs throughout the watershed, especially in the lower elevations. Alder is found on disturbed sites such as roadsides, managed stands and along stream banks. Muskegs support shore (lodgepole) pine.

Table 1. Vegetation types in the Saginaw Creek watershed.

Vegetation Type	Acres	% of Total
Forested Non-Wetland/Alpine Shrub-Emergent Short Sedge Wetland, > 50 Percent Forested	27	0
Alder/Salmonberry Shrublands on Mountain Slopes	165	2
Emergent Short Sedge Wetland	6	0
Forested Wetland/Moss Muskeg Complex, > 50 Percent Forested	265	3
Forested Non-Wetland	7,405	89
Forested Wetland	99	1
Moss Muskeg (Sphagnum Peat Muskeg)	111	1
Forested Non-Wetland/Non-Forested Non-Wetland Complex, > 50 Percent Forested	200	2
Unknown	25	0
Total	8,302	

Fisheries

The combined fisheries of the South and West Forks of Saginaw Creek includes sockeye, coho, chum, and pink salmon, Dolly Varden char, steelhead, and cutthroat trout (ADFG, 2007). Saginaw Creek watershed provides sport and subsistence fish for users from Kake, Kupreanof, Petersburg, Point Protection, and Point Baker. Rockfish is harvested commercially in the area south of Saginaw Bay.

Recreation

Several outfitters/guides do business in or near Saginaw Creek watershed. Black bear hunting, sightseeing, and fishing are the primary guided activities, with occasional use of the shoreline for guided kayak trips. Guided sightseeing includes small cruise ships and tour boats, as well as private boats and yachts. These boats often visit the unique fossil bluffs and limestone cliff areas in Halleck Harbor and Saginaw Bay, and the Cool/Ledge lake area provides additional recreation opportunities. Several outfitters have clients who go ashore for hiking or fishing out of Saginaw Bay. Much of the eastern shoreline provides opportunities for rock hounding, fossil collecting, and the study of Native culture. Waterfowl hunting occurs at the head of the bay, and fishing is popular in Saginaw Creek. Future recreation potential includes trail development to Cool and Ledge Lakes for easier access to stream and lake fishing, and identification of spelunking opportunities near the limestone bedrock adjacent to Saginaw Bay, which has been identified as having a high potential for cave formations. Since 2004 eight to ten outfitters and guides had special use permits for North Kuiu.

Watershed Conditions

Hydrology

The Saginaw Creek hydrograph was estimated using the USGS gage on nearby Hamilton Creek, corrected for watershed area (Figure 2). The hydrograph is similar to other north Kuiu watersheds and is driven by rainfall and snowmelt. Annual maximum flows are controlled by fall and winter rainstorms. Snowmelt augments stream flows in the spring and early summer months (Figure 3). Annual minimum flows occur during periods of drought in June, July or August.

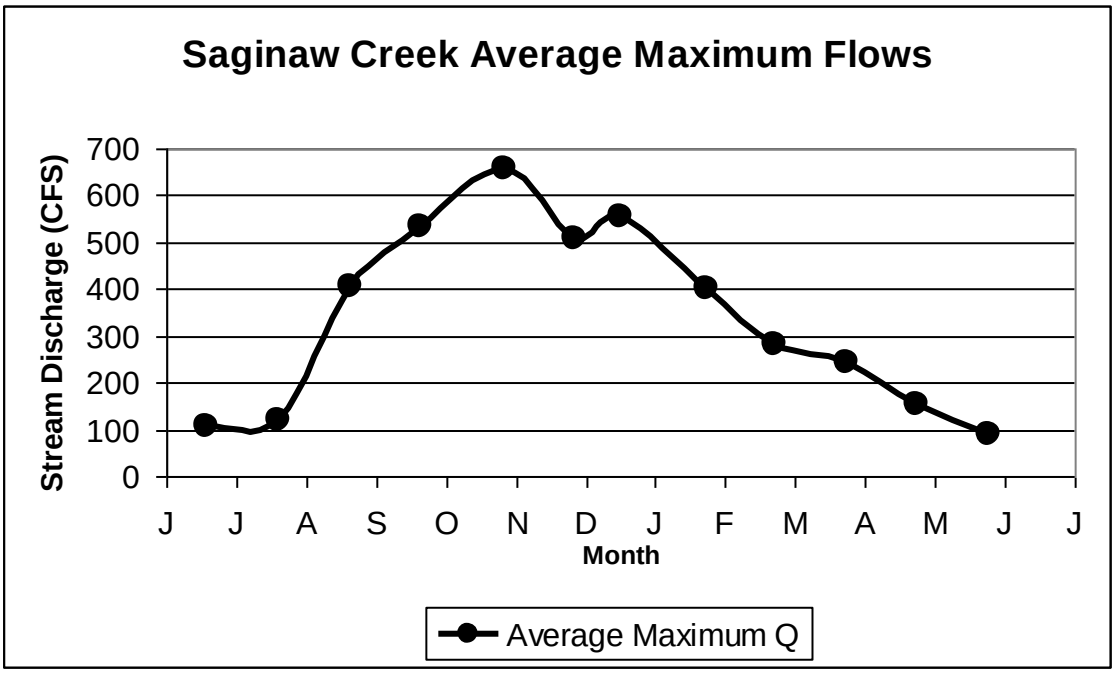

Figure 2. Hydrograph of average maximum flows on Saginaw Creek

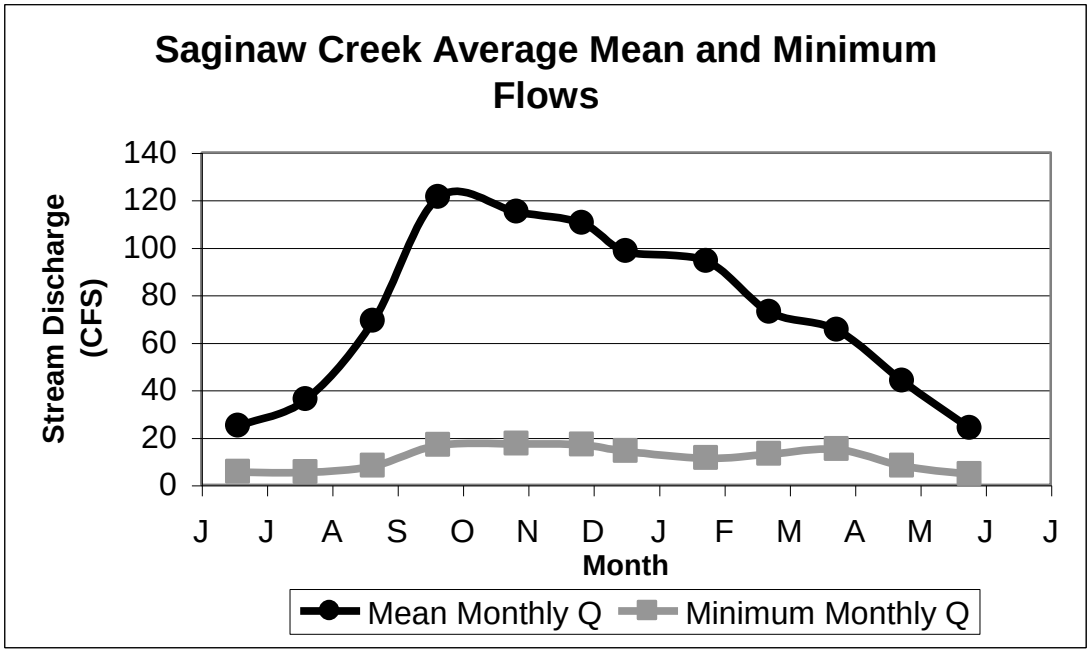

Figure 3. Average mean and minimum flows on Saginaw Creek

Wetlands

The Saginaw Creek watershed is a mosaic of forestland and wetlands. Different wetland types within the watershed are found from sea level to mountain top. Resource values associated with these wetlands vary, depending on biological qualities, proximity to water bodies, and position on the landscape.

Based on the Soil Resource Inventory approximately 5.8 percent of the Saginaw Creek watershed is classified as wetlands (Table 1). Most of the wetlands are grouped at the head of Saginaw Bay. Determining what constitutes high value wetlands is largely dependant on human use or the perceived benefit of the wetland. Because human perceptions change over time, the values placed on wetlands or upland ecosystems also changes over time. Wetland Types in this watershed include Subalpine Forest/Muskeg Mosaic, Forested Wetland, Muskeg, Muskeg/Forested Wetland Mosaic, and Sedge Fen. There are no high value wetland habitat types in the Saginaw Creek watershed.

Stream channels

The Saginaw Creek watershed contains five of nine process groups defined in the Aquatic Habitat Management Handbook for the Tongass National Forest (USDA Forest Service, 2001b) (Figure 4). Though the majority of stream channels in the Saginaw Creek watershed are in the high-gradient-contained (HC) process group, mile per mile, there are a relatively large proportion of streams in the Moderate-gradient Mixed-control (MM) and Flood Plain (FP) process groups when compared to other Kuiu watersheds (Figure 4). The watershed lies between the 75th and 90th percentile for the density of these types of streams when compared to other Kuiu Island watersheds. This means a high proportion of stream channels are of high value for anadromous and resident fish habitat (Figure 5).

Because these streams have moderate to low gradient they may be susceptible to sediment-related changes in channel morphology, such as pool filling and widening. With a drainage density of 5.3, the Saginaw Creek watershed lies above the 90th percentile for drainage density amongst Kuiu watersheds, reflecting the low permeability of the parent geology and subsequent well-developed stream network. This network is highly efficient at routing water and sediment from headwater areas to low gradient streams in valley bottoms. This watershed is nearly devoid of lakes, with one small lake located in the northeast portion.

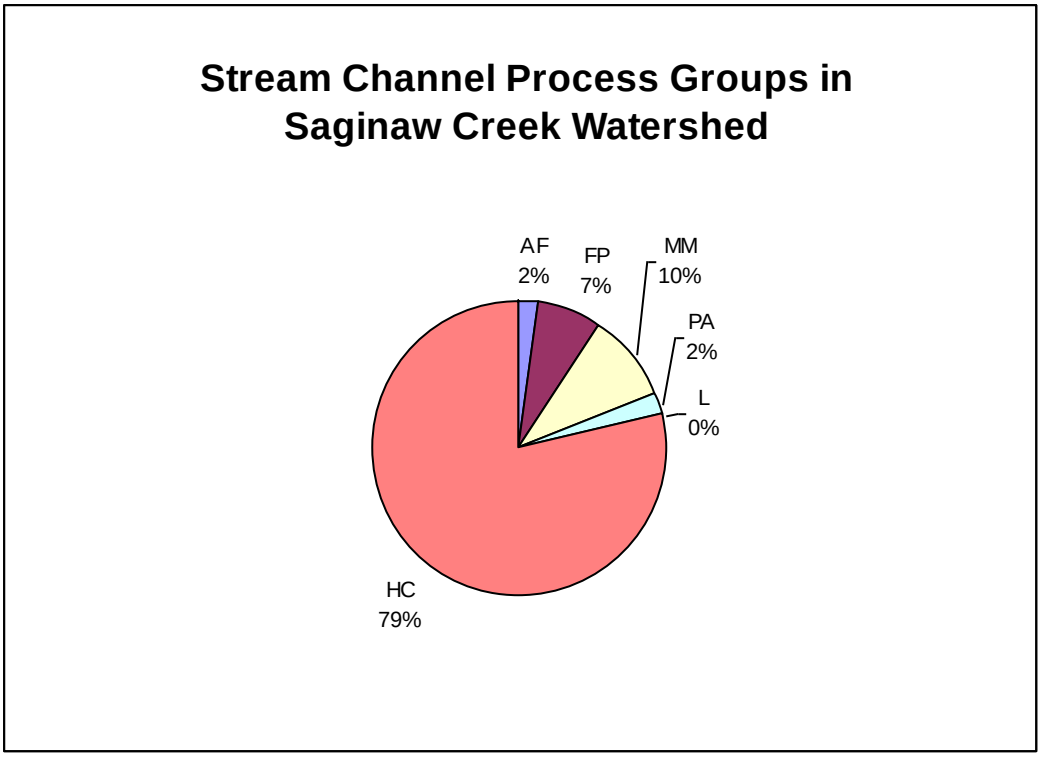

Figure 4. Comparison of stream channel process groups in Saginaw Creek watershed.

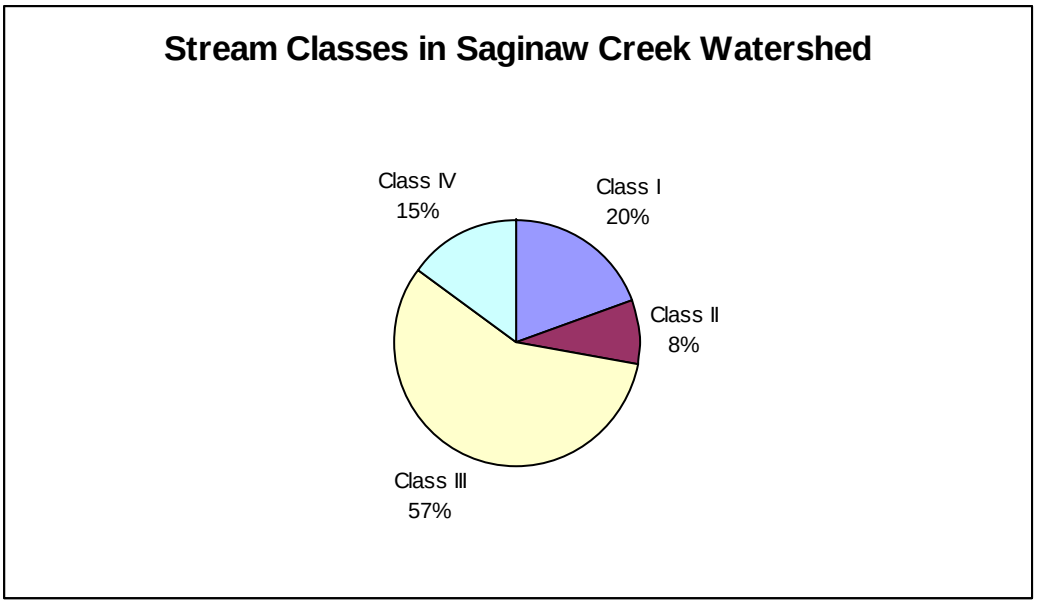

Figure 5. Comparison of stream classes in Saginaw Creek watershed.

Water Quality

In 1996 Saginaw Bay was placed on the Section 303(d) list of impaired waters due to bark accumulation from the log transfer facility (LTF). However, dive survey reports from May of 2002 showed that the water body was compliant with the water quality standard for residues, so Saginaw Bay was removed from the Section 303(d) list of impaired waters in 2003 (ADEC, 2006).

The desired condition for water quality in Saginaw Creek watershed is for maintaining State-designated beneficial uses, which include the growth and propagation of fish, shellfish, other aquatic life, and wildlife. The criteria used to ensure beneficial uses are being met include standards for stream temperature, dissolved oxygen, pH, turbidity, total dissolved solids, and sediment (ADEC, 2006b). Little is known about water quality in the West and South Forks of Saginaw Creek and their tributaries, but low water conditions, warm stream temperatures, and low levels of dissolved oxygen are the primary concerns for salmonid species. Low rainfall in mid-to-late summer is directly responsible for low stream flows in August and September in Saginaw Creek. Water temperatures are affected by climatic factors including solar radiation, air temperature, and wind; basin characteristics such as elevation, aspect, and snow accumulation; and channel characteristics including width, discharge, and the effects of tributaries (Beschta et al., 1987).

Upland Hillslope Conditions

Soils

Mineral soils in the Saginaw Creek watershed originate from weathered bedrock, glacial till, alluvium, and colluvium and are typically overlain with a thick organic layer. Soil depth beneath a 6 to 10 inch layer of organic matter ranges from 10 inches to more than 20 feet. Drainage in mineral soils ranges from poorly drained to extremely well-drained. Organic soils such as sphagnum peat and sedge muskegs are derived from highly decomposed plant material, typically found on slopes with low gradient (0-35 percent), are very poorly drained, and make up a low proportion of Saginaw Creek watershed soils. Histosols develop in water-saturated environments and contain between 12 and 18 percent organic carbon, and almost all are considered wetlands. Kwatahein silt loam dominates this watershed, comprising 68 percent of the overall area (Table 2). This type of soil is considered very deep and well drained.

Table 2. Soil types in the Saginaw Creek watershed.

Soil Type	Acres	% of Total
Kupreanof-Tolstoi association, 75 to 100% slopes	250	3
Kupreanof-Typic Cryumbrepts, loamy-skeletal complex, 15 to 75% slopes	188	2
Kupreanof-Mitkof complex, 5 to 35% slopes	253	3
Kupreanof silt loam, 5 to 35% slopes	485	6
Tuxekan very fine sandy loam, 0 to 5% slopes	272	3
Kushneahin-Maybeso complex, 3 to 35% slopes	265	3
Kwatahein silt loam, 5 to 35% slopes	914	11
Kwatahein silt loam, 35 to 75% slopes	4,759	57
Other	917	11
Total	8,302	100

Natural Processes

Landslides have been a prominent morphological process shaping the Saginaw Creek watershed. A landslide inventory was completed in December 2003, using 1998 aerial photos and the Forest Service land surveys completed in the 1960s and 1980s. There were 19 landslides identified in the Saginaw watershed totaling 118 acres or approximately 1.4% of the watershed. This puts the Saginaw watershed above the 90th percentile for landslide density compared to other Kuiu watersheds. The majority of slides in the Saginaw watershed occurred in 1988, including a large rotational failure near Saginaw Bay caused by a rain on snow event in December. Aerial photographs and field reconnaissance indicate that 4 landslides deposited material in stream channels, while many slides ended prior to entering streams but are close enough to influence future sediment supply.

Mass Movement Potential is evaluated using the mass-movement index (MMI) for soils within the watershed, and is based on the steepness and soil drainage characteristics of each soil series (USDA Forest Service, 1997). Areas of high and very high mass

movement potential are assumed to be potential sediment sources for input to stream networks. The Saginaw Creek watershed is comprised of 32% MMI-1, 61% MMI-2, and 7% MMI-4 soil classes, which places it between the 25th and 50th percentile for the proportion of the watershed lying on slopes in the high or very high MMI category. A sediment risk assessment for Kuiu Island (USDA Forest Service, 2005) identified the Saginaw Creek watershed as having a moderate inherent risk for sediment related changes in stream channel characteristics compared to other Kuiu watersheds. The risk rating increased to high after accounting for harvest and road-building proposed in the Kuiu Timber Sale FEIS (USDA Forest Service, 2007). This increase indicates the inherent characteristics of the stream channel network may make it susceptible to changes in stream channel condition if sediment supply is increased. Since timber harvest and road building have increased the area of potential sediment sources within the watershed, the risk of sediment-related changes to stream channels has also increased.

Windthrow is also a major source of natural disturbance in the Saginaw Creek watershed. The 2005 Tongass Monitoring and Evaluation Report notes that riparian buffers on south facing slopes on North Kuiu were more prone to increased windthrow, while windthrow on slopes oriented other than to the south was negligible. The most notable windthrow events in the Saginaw Creek watershed have occurred along the edges of old southeast facing clearcut units along road 6413, which parallels the South Fork of Saginaw Creek.

Harvest History

Twenty nine percent of this watershed (2,440 acres including road clearings) has been harvested since 1968, 8 percent of which has occurred in the last 30 years. Early harvest was concentrated in valley bottoms and toe slopes, including 259 acres of harvest in riparian areas where commercial timber harvest is prohibited under current standards and guidelines. With cumulative harvest levels approaching 30% of the total watershed area it can be expected that harvesting additional acreage would require accessing steeper, mid-slope terrain. Comparison of the 1977 and 1997 aerial photos indicates many harvested areas have regenerated with alder, or a matrix of alder and conifers, and that alder currently comprises a much larger component of the canopy cover than it did in 1977. On the hillslopes, alder are visible on temporary roads and within harvest units.

Roads

There are 10.7 miles of National Forest System (NFS) roads and 9.8 miles of temporary roads in the Saginaw Creek watershed. NFS roads 6402 and 6413 are located primarily on the toe slopes, and run parallel to the West and South Forks of Saginaw Creek respectively (Figure 6). Approximately half the length of road 6418 is located within the floodplain of West Fork Saginaw; the remainder continues uphill to access timber units harvested from 1968-1974. Most of the temporary roads occur along the South Fork and extend from road 6413, gaining elevation to access timber on the hillslopes. Portions of these temporary roads, as well as road 46096 are located within the floodplain of the South Fork. Approximately 40 percent of timber harvested in this watershed was accessed from 1968-1979, and some of these roads have had little vehicle traffic since

then. The last timber entry in this watershed was 1993, and generally, maintenance needs are increasing as the road system and drainage structures age.

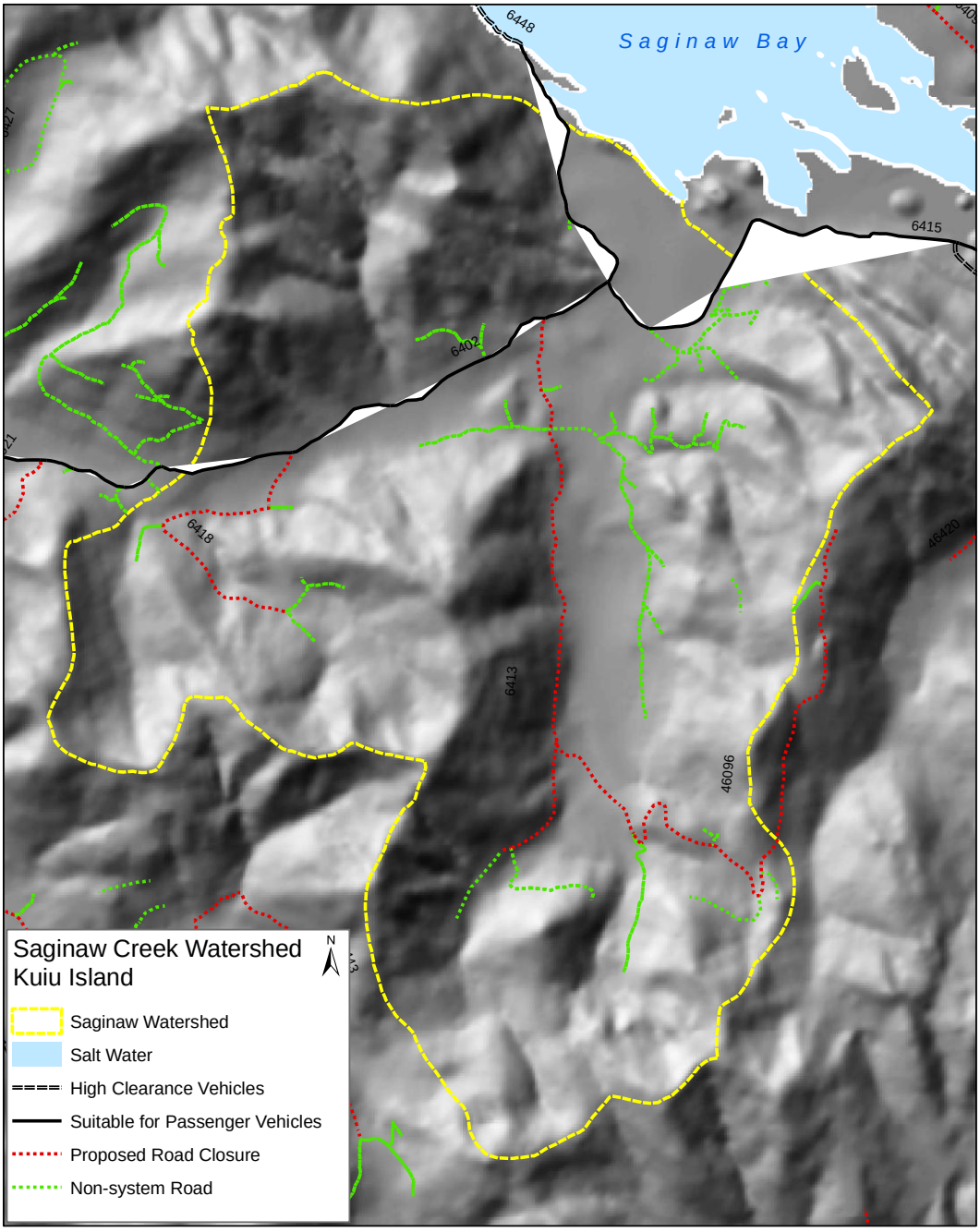

Figure 6. Road locations and management objectives in the Saginaw Creek watershed.

Previous Enhancement Activities

Hillslope enhancement activities have primarily been restricted to pre-commercial thinning treatments and landslide stabilization (Table 3). Previous thinning treatments have focused on reducing conifer density, alder density, or overall tree spacing to improve conifer growth and understory condition, but have not incorporated other ecosystem components such as wildlife, soil and stream chemistry, or leaf litter.

Table 3. Upland enhancement activities in Saginaw Creek watershed.

Resource	Activity	Acres Treated	Year Implemented
Silviculture	Pre-commercial thinning and pruning	510	1980
Silviculture	Pre-commercial thinning and pruning	64	1981
Silviculture	APC fill-in planting at Saginaw without site preparation	4	1984
Silviculture	Pre-commercial thinning and pruning	10	1984
Silviculture	Pre-commercial thinning and pruning	107	1984
Silviculture	Pre-commercial thinning and pruning	235	1984
Silviculture	Pre-commercial thinning and pruning	173	1985
Silviculture	Pre-commercial thinning and pruning	174	1985
Silviculture	Pre-commercial thinning and pruning	98	1986
Silviculture	Pre-commercial thinning and pruning	627	1987
Silviculture	Pre-commercial thinning and pruning	254	1989
Silviculture	Saginaw area fill-in planting without site preparation.	21	1990
Botany	APC non-structural improvements with grasses and forbs.	1	1990
Watershed / Silviculture	Saginaw area slide in 1988 followed by fertilization and marsh development	88	1990
Silviculture	Pre-commercial thinning and pruning	102	1990
Transportation	Replace 46500 with shorter spur road, replace road 46354 with 46360, and convert road 6466 from specified to temporary road	0	1991

Transportation	200 feet of temporary road approved in order for APC to harvest 22 acres of blowdown.	22	1991
Transportation	Kuiu Island Blowdown Salvage	6	1992
Transportation	Identification and removal of logs that could threaten road safety for travelers throughout island		1993
Silviculture	Pre-commercial thinning and pruning	36	1995
Silviculture	Pre-commercial thinning and pruning	32	1997
Silviculture	Saginaw area defined as "leave tree" acres	221	1999
Silviculture	Thinning of 23 overstocked second growth stands on Kuiu and Kupreanof to promote growth of largest best formed trees within.	85	2001

Floodplain Conditions

Streams

Floodplain conditions in the Saginaw Creek watershed reflect the influence of the very deep, well drained Kwatahein silt loam soils occurring on steep upland slopes. These soils comprise 68 percent of the watershed and contribute to the well-developed floodplains in the valleys. There are 13.2 miles of floodplain (FP), alluvial fan (AF), and moderate gradient mixed-control (MM) channels in the watershed (Table 4).

Table 4. Summary of process group types in the Saginaw Creek watershed.

Process Group	Length (miles)	Percent of Total
AF	1.5	2
FP	5.0	7
MM	6.7	10
PA	1.4	2
L	0.0	0
HC	53.8	79
Total	68.4	100

In 2005, stream channel characteristics were measured in randomly selected FP4 stream reaches in the South and West Forks of Saginaw Creek (USDA Forest Service, 2005), and the results were compared to Tongass standards for habitat response variables. The South Fork of Saginaw Creek was in fair condition both for the number of pools and the percentage of channel area in pools; in good condition concerning the width-to-depth ratio; and in excellent condition for wood loading (Table 5). The West Fork of Saginaw Creek was in good condition for number of pools; in fair condition for pool area; in

excellent condition for wood loading, and in good condition considering the width-to-depth ratio (Table 6). Because the available stream channel condition data represent a snapshot in time, it can not be determined whether the below-average pool area in South and West forks of Saginaw Creek, and below-average pools per kilometer in South Fork Saginaw represent a decrease in pools over time, or occur within the natural range of variability in stream channel conditions.

Table 5. Stream channel condition: South Fork Saginaw Creek

Channel characteristic	Value	Percentile ranking	Condition
Number of pools / kilometer	37.1	Between 25th and 50th	Fair
% channel area in pools	37.9	Between 25th and 50th	Fair
Pieces of wood per 1000 m^2	56.3	Greater than 75th	Excellent
Width-to-depth ratio	20.0	Between 25th and 50th	Good

Table 6: Stream channel condition: West Fork Saginaw Creek

Channel characteristic	Value	Percentile ranking	Condition
Number of pools / kilometer	48.9	Between 50th and 75th	Good
% channel area in pools	31.8	Between 25th and 50th	Fair
Pieces of wood per 1000 m^2	54.7	Greater than 75th	Excellent
Width-to-depth ratio	20.0	Between 25th and 50th	Good

Tier II stream surveys were conducted in 2007 on ten FP and MM channels, primarily along the West Fork of Saginaw Creek and its tributaries (Figure 7). Sites were chosen according to the perceived amount of disturbance using criteria including previous riparian harvest, high road density, and landslides. The data from these surveys will be summarized in winter 2007-2008, but initial reconnaissance indicates at least two sites needing instream wood enhancement due to very low instream wood loading and a lack of pool habitat.

Saginaw Tier 2 Survey Sites

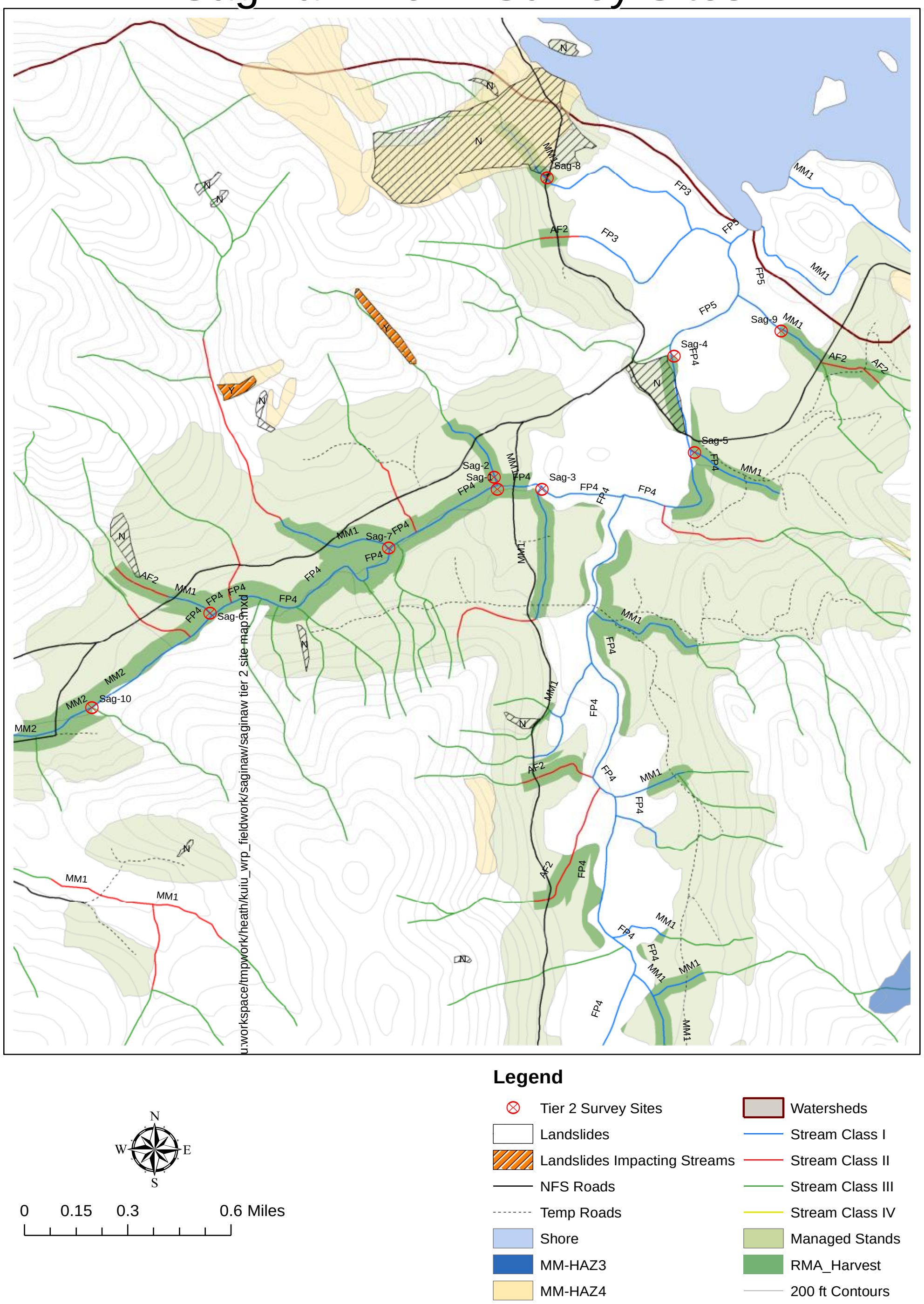

Figure 7. 2007 Tier II stream site locations within the Saginaw Creek watershed

Riparian Harvest

The degree to which logging in riparian areas may have altered watershed processes in the Saginaw Creek watershed is not known. Approximately 259 acres of timber was harvested in RMAs over a 20-year period, comprising an area equal to 6% of the watershed. Most RMA harvest occurred in FP and MM stream channel types in low-gradient valley bottoms with easily accessible, productive timber stands (Figure 8). Second-growth riparian stands are currently between 15 to 35 years old, and stand conditions differ from pre-harvest conditions in that trees are much smaller, much more densely stocked, and alder makes up a larger component of the canopy cover. Harvest in riparian areas in the Saginaw Creek watershed occurred adjacent to approximately 4.75 miles of Class I/II stream. Large-scale riparian harvest in the Saginaw Creek watershed may have directly altered wood loading in streams, wood recruitment, stream shading, and wildlife habitat quality, while indirectly affecting stream channel morphology, fish habitat quality, stream temperature, and summer low flows. While natural disturbance (mainly windthrow) can be stand replacing in Southeast Alaska forests, the conversion of such a large portion of riparian forest to second growth in a short time is likely a very rare occurrence in nature.

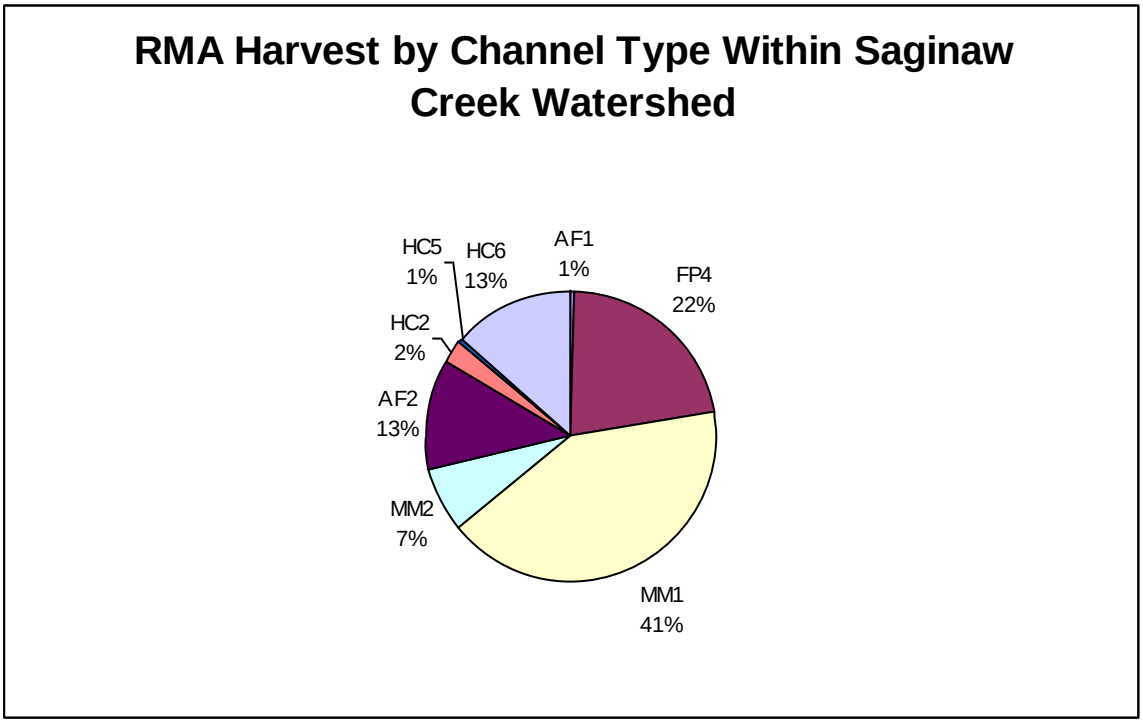

Figure 8. Summary of timber harvested in the RMA within Saginaw Creek watershed.

Riparian stands along Saginaw Creek were harvested in the 1960s, 1970s, and 1980s with the most extensive riparian harvest occurring in 1968. Lack of woody debris and wood recruitment is a future concern for some segments of stream, since Saginaw Creek supports large populations of pink, chum, and coho salmon. Riparian stands along FP4 reaches on Saginaw Creek are particularly productive, and are generally well stocked with a patchy mixture of spruce and alder. Some patches are characterized by an

overstory of alder with co-dominant or suppressed spruce in the understory. Spruce are either the dominant species, or where alders dominate, are just beginning to overtop alders in riparian stands harvested in 1968. Spruce dominated stands are in the stem exclusion stage of stand succession. Thinning projects in these areas may require different strategies due to the more advanced successional stage of the older riparian stands.

Data from the 2007 Tier II surveys will help quantify the degree to which riparian harvest has altered instream habitat and wood loading. Initial site reconnaissance indicates at least 4 sites (Sag #4, #7, #9, and ~ 0.5 miles downstream of Sag #3) would benefit from riparian 2nd growth thinning (Figure 7). The objective for the proposed riparian thinning is to speed the development of mature stand characteristics in order to benefit fish and wildlife. Benefits for fish include the recruitment of key pieces of large wood into streams, cover, shading, channel complexity, and bank stability. Benefits for wildlife include increased understory forage production and maintenance of travel corridors. The guiding philosophy is that the maximum benefits for fish and wildlife will be provided by a multi-aged stand that, once established, will be maintained into perpetuity by natural disturbance processes. Table 7 provides a summary of proposed riparian thinning sites resulting from field reconnaissance in 2007.

Table 7. Riparian 2nd growth thinning sites in Saginaw Creek Watershed.

Site	Channel Type	Stream Length Impacted (miles)	Acres
Sag #3b	FP4	0.5	5
Sag #4	FP4	0.25	4.5
Sag #7	MM1	0.5	10
Sag #9	MM1	0.25	6
	Total	1.5	25.5

Roads

Timber harvest and logging roads were developed from Saginaw Bay beginning in 1962 and from Rowan Bay in 1972. The two road heads were connected in 1979 to form a contiguous road system that still exists today. The Petersburg Ranger District (PRD) began road condition surveys in 1995 and used this data to develop the 2001 Kuiu Island Road Analysis, which provided descriptions of current condition and made recommendations for desired future conditions (USDA Forest Service, 2001c). From 2003-2004 Petersburg Ranger District conducted surveys to assess the condition of temporary roads on Kuiu Island. The results of these surveys were used in conjunction with recommendations in the 2001 Kuiu Island Roads Analysis to develop the road management objectives outlined in the Draft Access Travel Management (ATM) Plan on PRD (USDA Forest Service, 2005b) (Figure 6). In 2007, information from these sources was used to target specific temporary roads with drainage structures still in place, in order to develop project proposals consistent with management recommendations (see project descriptions). Temporary roads that have been improperly decommissioned and/or have drainage structures that are not maintained increase the risk of road failure at stream

crossings, culvert plugging, stream blocking, and stream diversion. Current known work needs include 4 temporary roads that were not properly decommissioned as well as additional temporary road closures proposed in the 2005 Draft ATM (Table 8).

Table 8. Temporary roads proposed for decommissioning or identified in 2004 as improperly closed.

RTE_NO	miles
46096_2.19R	0.1
46096_0.795R	0.7
6402_10.89L	0.1
6402_12.67L	0.1
6402_13.94L	0.1
6413_2.684ST	0.6
6415_12.44R	0.1
6415_14.50R	0.1
6415_14.59R	0.1
6415_14.62R	0.1
6415_14.72R	0.1
6415_2.15L	0.1
6415_3.55R	0.2
6415_9.97R	0.1
6418_1.653L	0.1
6418_1.653R	0.1
Total	2.5

In addition to temporary roads, 6.4 miles of NFS roads have been proposed for closure, not including newly constructed NFS roads proposed for closure in the Kuiu Timber Sale FEIS once harvest is complete. Roads 46096, 6413, and 6418 are currently closed by vegetation. Road 6418 was traversed to access temporary roads for Tongass WIT data and has received little, if any vehicle traffic since the final timber entry in 1974. Structures were left in place on this road and include 18 culverts and 3 log stringer bridges (Table 9). The two remaining NFS roads haven't received field verification for their entire length, but are blocked by vegetation near milepost 0+00. Culverts and bridges on these roads do not receive regular maintenance, and are therefore at risk of failure.

Table 9. Proposed NFS road closures in Saginaw Creek watershed.

Route #	Miles	Proposed Action
46096	2.0	remove up to 62 Culverts, 1 log stringer bridge
6413	2.8	remove up to 44 culverts (1 red pipe), 3 log stringer bridges
6418	1.6	remove up to 18 culverts, 3 log stringer bridges
Total	6.4	

Data from road surveys conducted in 2007 will be entered in the Tongass WIT database in winter 2007-2008, and plans to verify the condition and work needs of the remaining temporary roads, as well as NFS roads will continue. Specific project proposals resulting from the collected data will be added as the Tongass WIT database is updated.

Previous Enhancement Activities

Table 10 is a summary of known riparian area enhancement activities occurring in the Saginaw Creek watershed. The acreages presented were generated from GIS and may vary slightly from on-the-ground acres. There are sparse details concerning some of the projects. LWD stream placements continue to be encountered in the field while conducting Tier II or fisheries surveys. Site locations and general conditions are documented when encountered. The potential exists for monitoring past LWD placements and riparian thinning treatments in this watershed (see Monitoring section).

Table 10. Riparian / watershed-related enhancement projects in Saginaw Creek watershed.

Resource	Activity	Description	Year implemented
Watershed / Silviculture	Landslide stabilization	Saginaw area slide in 1988 followed by fertilization and marsh development	1990
Fisheries	LWD Placements	LWD placements on Saginaw Creek and some tributaries; Sag #7 has 2 log weirs near Rd 6402 associated w/debris torrent	1990
Fisheries	Riparian 2nd Growth Thinning	Past riparian thinning project along West Fork Saginaw near Rd 6418	1990
Watershed	Authorize placement and use of a water transmission line at Rocky Pass Resort	Special Use Permit issued to Rocky Pass Resort for installation and maintenance of a 300 ft plastic water line near the head of Saginaw Bay	1997
Watershed	6415 Road Relocation	Relocate a portion of Forest Development Road 6415 to reduce the risk of washouts	2002

Restoration Opportunities

Timber harvest and road building have been the dominant forces of change in the Saginaw Creek watershed over the last 35 years. The watershed restoration strategy for the Saginaw Creek watershed addresses change caused by timber harvest and road building, and focuses on restoration of watershed processes in harvested riparian areas and along roads with maintenance problems (Table 11).

Restoration recommendations and objectives include:

- Improve riparian young growth condition using thinning treatments on 25.5 acres along 1.5 miles of high quality MM and FP stream habitat on 4 separate stream reaches.
- Rehabilitate 0.5 miles of stream habitat along one MM channel through the addition of LWD to the stream channel to benefit fish habitat.
- Restore natural floodplain function on 54 acres by closing 3.4 miles of road 6413 (with spurs) and 2.0 miles of road 46096 (without spurs) encroaching on the South Fork Saginaw Creek floodplain.

- Restore natural floodplain function on 18 acres by closing 1.8 miles of 6418 (with spurs) encroaching on the West Fork Saginaw Creek floodplain.
- Enhance 6.1 miles of Class I and 3.2 miles of Class II fish habitat by removing up to 110 culverts and 2 log stringer bridges and closing 5.4 miles of roads 6413 & 46096 and their associated spurs.
- Enhance 2.0 miles of Class I and 0.7 miles of Class II fish habitat by removing up to 20 culverts and 3 log stringer bridges and closing 1.8 miles of road 6418 and its associated spurs.
- Reduce sediment input and risk of mass wasting, and restore natural surface and groundwater drainage pathways by decommissioning 2.5 miles of temporary roads in the upper Saginaw Creek watershed.
- Expand inventories of stream channel condition on streams where initial inventories identified deficiencies compared to Tongass Fish Habitat Objectives, and inventory randomly selected reference reaches for comparison with Tier II stream data obtained in summer 2007.
- Expand inventories of temporary and NFS roads for input into the Tongass WIT database and subsequent project proposal development.
- Eradication / control of 1 acre of invasive weed (Perennial Sow thistle) on Road 6402.
- Expand invasive weed surveys on approximately 30 miles of mainline road in Saginaw Creek and other North Kuiu watersheds.

Table 11. Saginaw Creek Watershed restoration opportunities priority list.

Project Name	Sub-Basin	Landscape Position	Project Type	Watershed Processes	Relative Priority	Length (miles)	Acres	Admin / NEPA	Survey Design	Implementation	Total
Temporary Road Decommissioning	All	Upper - Slope	Road Decommission	Hydro	Medium	2.6	26	$ 5,000	$ 6,000	$ 25,000	$ 36,000
NFS & Temp Road Inventory for Decom/Closure	All	All	Road closure inventories	Hydro / Instream	Medium	~10.0		$ -	$ -	$ 6,000	$ 6,000
Invasive Weed Road Surveys	All	All	Road / Invasives	Terrestrial	Medium	~5.0		$ -	$ -	$ 5,000	$ 5,000
Invasive Weed Eradication / Control	W Fork	Low - Slope	Invasive Weed Control	Terrestrial	Low		1	$ -	$ -	$ 5,000	$ 5,000
Riparian 2nd Growth Treatments	All	Low - Riparian	Riparian Thinning & Pruning	Riparian	High	1.5	25.5	$ 4,700	$ 2,000	$ 16,500	$ 23,200
Tributary LWD Modifications & Enhancements	W Fork	Low - Riparian	Instream LWD Enhancements	Hydro / Riparian	High	0.5		$ 4,700	$ 1,500	$ 5,000	$ 11,200
6418 Hydrologic Connectivity Restoration	W Fork	Low - Riparian	Road Storage	Hydro / Riparian	High	1.8	18	$ 8,000	$ 8,000	$ 40,000	$ 56,000
6413 Hydrologic Connectivity Restoration	S Fork	Low - Riparian	Road Storage	Hydro / Riparian	High	3.4	34	$ 16,000	$ 12,000	$ 80,000	$ 108,000
46096 Hydrologic Connectivity Restoration	S Fork	Low - Riparian	Road Storage	Hydro / Riparian	High	2.0	20	$ 12,000	$ 10,000	$ 70,000	$ 92,000
Riparian 2nd Growth Treatment Inventory	All	Low - Riparian	2nd Growth Inventory	Hydro / Instream	Medium		350	$ -	$ -	$ 10,000	$ 10,000
Tier II Stream Channel Inventories	All	Low - Riparian	Instream habitat surveys	Hydro / Instream	Medium	~5.0		$ -	$ -	$ 5,000	$ 5,000
											$ 357,400

Project Descriptions

Riparian 2nd Growth Treatments

Field reconnaissance in 2007 yielded 4 potential sites for riparian thinning (Table 6). This project proposes to lump all 4 sites into one funding package. The primary objective for all sites is to speed development of mature stand characteristics in order to benefit fish and wildlife, assuming maximum benefits are provided by a multi-aged stand maintained by natural disturbance processes. Silvicultural prescriptions for riparian stands will be developed in FY 2008 for each site.

Sag #4 is located along an FP4 channel on South Fork Saginaw Creek and was harvested in 1980. This stand is generally well stocked with a patchy mixture of spruce and alder, with some patches characterized by an overstory of alder with co-dominant or suppressed spruce in the understory. This site needs approximately 4.5 acres of thinning. Site Sag #7 was harvested in 1968 and contains large and small alder, intermixed with spruce and hemlock. This site needs approximately 10 acres of thinning along both sides of an MM1 channel. Sag #9 was harvested in 1970 and needs approximately 6 acres of high-density conifer thinned along both sides of an MM1 channel. Harvest occurred in 1987 primarily on the east bank of an MM1 stream channel downstream of Sag #3 for a distance of about 2,200 feet, requiring approximately 5.0 acres of thinning. Total thinning needs for the sites visited in summer 2007 is approximately 25.5 acres along approximately 1.5 miles of FP and MM stream channels.

Temporary Spur and NFS Road Closure Inventory

This project proposes a multi-year systematic approach to acquire data for entry into the Tongass WIT database. The primary objective of additional data collection is the eventual decommissioning or storage of temporary and NFS roads. Methods will include removing drainage structures, adding water bars as needed to improve drainage, and blocking the entrance to the roads to eliminate unmanaged use. Road condition and Tongass WIT surveys identified 4 improperly closed temporary roads containing 6 metal culverts and 1 log stringer-bridge. Closing system roads 46096, 6413, and 6418 is consistent with current Petersburg Ranger District management objectives and could require removing up to 124 culverts and 7 log stringer bridges (Table 9). Approximately 7.5 miles of temporary and NFS roads would be closed, primarily in the valley bottoms along South and West Fork Saginaw Creek. Project proposals will be developed through the Tongass WIT database and will be submitted for NFVW and CIP funding. Completion of these closures will reduce the risk of road failures at stream crossings, culvert plugging, stream blocking, and stream diversion, and will re-establish more natural drainage patterns.

Tier II Stream Channel Condition Assessments

The Saginaw Creek watershed has approximately 13.5 miles of Class I stream, and 5.5 miles of Class II stream. Only a very small portion of these streams have been

inventoried for the purpose of comparing channel characteristics to the Tongass Fish Habitat Objectives. This project proposes a multi-year systematic approach for acquiring Tier II stream data on high priority and reference stream reaches. The primary goal is to expand inventories of stream channel condition on streams where initial inventories identified deficiencies compared to Tongass Fish Habitat Objectives, and inventory randomly selected reference reaches for comparison with Tier II stream data obtained in summer 2007. Information gathered will aid project planning for future riparian 2nd growth thinning treatments and instream LWD enhancement projects, as well as provide additional data on the long-term effects of riparian disturbance on downstream habitat and channel conditions.

Project Monitoring and Evaluation

Comprehensive monitoring plans will be developed prior to implementation of specific restoration / enhancement projects. General objectives and foreseeable monitoring needs include the following:

- Collect routine implementation and effectiveness monitoring information on LWD placement site locations as projects are completed using channel cross sections, longitudinal profile, and photo points. Track changes through site monitoring module in Tongass WIT database. Continue monitoring sites as necessary to determine effectiveness.
- Locate and survey past LWD placement sites implemented beginning 1989 to determine effectiveness of a variety of techniques (cabling, keying into bank, placement location, etc.)
- Collect routine implementation and effectiveness monitoring information to riparian thinning treatments as projects are implemented using photo points, measures of canopy cover/shading, and Tier II stream surveys. Evaluate effectiveness of project and changes in channel morphology and fish habitat condition through time. Continue monitoring on multi-year rotation.
- Implement OHV education, enforcement, and monitoring programs in conjunction with district ATM direction following proposed road closures.

Future Needs / Information Gaps

- Summarize stream data collected in summer 2007 and compare with Tongass Fish Habitat Objectives.
- Enter and summarize road survey data gathered in summer 2007 into Tongass WIT database for CIP and NFVW proposals.
- Expand inventories of stream channel condition on streams where initial inventories identified deficiencies compared to Tongass Fish Habitat Objectives, and inventory randomly selected reference reaches for comparison with Tier II stream data obtained in summer 2007.

- Expand inventories of temporary and NFS roads for input into the Tongass WIT database, particularly the 6.4 miles of NFS roads and their associated spurs proposed for closure. Data will be used for project proposal development.
- Update the PRD landslide inventory in North Kuiu watersheds; update GIS layer.
- Update and complete the barrier inventory for known data gaps in the Saginaw watershed; update GIS layer.

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