ENVIRONMENT AND EFFECTS

This section summarizes the physical, biological, social and economic environments of the project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives.

Alternative 1: No Action – Current Condition

Vegetation—Direct and Indirect Effects

Since the early 1950's timber harvest has been the dominant human use affecting the project area. Table 3 shows the oldest young-growth stands of any significant acreage are approximately 50 years old. Most of the stands on the upper slopes, were harvested under an even-aged regeneration system using high-lead cable logging systems.

Early even-aged harvesting was conducted from 1959 to 1961 in the Harris River basin. Harvested areas included steep headwater streams and nearly half of the Riparian Management Areas (RMAs). More recent even-aged harvests have occurred in the Upper Harris River basin in 1995 and 2003 with smaller harvest blocks and less intrusive techniques (Table 3).

Regeneration at time of stand initiation for stands above the RMA, is typically abundant (thousands of stems per acre). At ages 15-25, intermediate treatments on timber emphasis acres have typically been precommercial thinning. Approximately 1,226 acres of thinning has occurred in the Harris River watershed to date.

Timber harvest and road building have been the primary management actions that have altered watershed processes. Timber harvest in almost 23 percent of the basin occurred within a 10 year time frame. Most timber harvest and road building within the watershed occurred prior to implementation of the 1997 Tongass Land Management Plan (TLMP), which set specific guidelines for land management activities. As a result, harvested areas included steep headwater streams and nearly half the Riparian Management Areas (RMA). The Lower Harris River sub-basin and Fubar Creek sub-basin RMA's were most heavily harvested followed by harvest in the Upper Harris Watershed.

Early even-aged harvesting methods have caused old growth coniferous stands to be temporarily replaced with mixed deciduous/coniferous stands, particularly in riparian areas. Succession will eventually move these stands toward a conifer dominant stand.

Recent inventories have grouped these stands into commercial, pole and precommercial site types. The existing condition of these stands includes dense canopies and shaded understories. It is anticipated that intermediate treatments on these stands in the near future (5-20 years) would benefit overall forest health by opening the canopy.

Access for these treatments becomes an issue depending on type of stand treatment, equipment needs, resource goals, and existing road conditions. Road decisions will have to take into account stand conditions now and in the near future.

The existing conditions of the stands treated in the RMAs are different due to several factors. The gentler slopes along the streams may have allowed for more ground-based logging systems to be used. This "heavier handed" approach to logging along with more naturally wide spaced conifers occurring in those zones, has contributed to stands being composed of a more deciduous regeneration component than the upslope stands. A dominant conifer component will be necessary for providing large woody debris for the streams in the future. At this time, trees in harvested riparian areas are too small to provide a long lasting stream component. Maximizing growth on this conifer component has become the emphasis for RMA treatments. Access needs may vary depending on prescription goals and treatment options and would need to be considered for any future treatments in the RMA.

Table 3: Harris River timber harvest history

Harris River Sub-basin	Year Harvest	Harvest Area, acres	Harvest Sub-basin Total, acres	Total Basin Area, acres	Percent
Upper Harris River	<1959	3			
Upper Harris River	1960	166			
Upper Harris River	1961	519			
Upper Harris River	1962	321			
Upper Harris River	1994	17			
Upper Harris River	1995	218			
Upper Harris River	2003	68	1,313	8,678	15%
Fubar Creek	1960	444			
Fubar Creek	1987	33	477	2,982	16%
Lower Harris River	<1959	1,115			
Lower Harris River	1959	53			
Lower Harris River	1960	609			
Lower Harris River	1962	811			
Lower Harris River	1963	290	2,879	7,348	39%
		Totals	**4,669**	**19,009**	**25%**

Size classes of the young-growth stands will determine the types and timing of future treatments (Table 4). The following table shows acres of young growth by size class in the Harris River watershed.

Cumulative Effects of the No Action Alternative on Vegetation

The vigor of some young growth conifers would continue to be suppressed until either, young growth conifers breach the deciduous canopy or the deciduous stands reach the end of their lifespan, and the resulting forest stand approaches climax succession stage.

The lack of mature vegetation and roughness created by floodplain large woody debris within untreated project areas makes them vulnerable to channel avulsions or diversions. Channel avulsion or diversion means that streams abandon their existing channel and pioneer a new channel or divert through an existing smaller side channel. Channel avulsions are natural occurrences. However, when they occur in areas that lack adequate vegetation or roughness they can cause severe erosion and long-term channel instability. Risk of these accelerated stream processes would remain high until riparian stands approaches climax succession stage.

Table 4 Size class distribution of young growth stands in the Harris River

Young Growth Size Class	Acres
Commercial	639
Pole	1,124
Pre-commercial	1,260
Other	528
Private	866
Total	4,417

Water Quality—Direct and Indirect Effects

Although mass movement is the dominant natural disturbance process in the Harris River watershed, land management operations in the Harris River have influenced both frequency and size of mass movement (Swantson 1991). Studies have shown the occurrence of mass movement processes in harvested areas range from 3 times to 10 times greater than in non-harvested areas. Swanston and Marion, 1991, found a 3.5 fold increase in landslides in harvested areas versus unharvested areas in southeast Alaska. They also noted that landslides in harvested areas tend to be smaller than landslides in unharvested areas. Bishop and Stevens (1962) found a 4 fold increase in landslide rates in harvested areas versus unharvested areas in the Maybeso Experimental Forest. Landwehr (1998) found a 10 fold increase in the numbers of landslides in harvested areas (over a 20 year time period) but noted that slides in harvested areas were typically much smaller than slides in unharvested areas. In another inventory Landwehr (1994) found a three to five fold increase in landslides in harvested areas versus unharvested areas (depending on methods). Vegetation in previously harvested areas would continue to grow and add root mass and stability to the soil, thus landslide frequency would likely decline over time in the harvested areas (Landwehr 1994). Landslides resulting from harvest activities have accelerated sediment delivery to the footslope and associated stream channels causing bank instability, channel widening and/or diversion potential in tributary and mainstem channels. Turbidity and other water quality components would continue to function at existing rates and levels. These background levels would continue to fluctuate with rainfall, rainfall intensity, and residual at new disturbances.

Natural disturbances such as landslides when coupled with human induced stressors may have a greater impact on watershed processes. Landslides are a natural process on the steep slopes of the Harris River Watershed. Two heavy rainfall events in 1961 and 1993 (7.0 year and 4.2 year recurrence interval respectively) initiated widespread landslides across the entire Harris River and surrounding environment (Gomi, 2004). Site factors usually determine where a landslide will occur but precipitation determines when a landslide will occur (Patric and Swanston, 1969). The 1993 storm event caused at least ten landslides in the Fubar Creek sub basin. Since 1991, eleven landslides led to the aggradation of Fubar Creek alone. Eight out of the 11 landslides originated in harvest units or along the backline of harvest units, where initiation is very common due to windthrow disturbance and the dynamic force that these exposed trees put on the unstable soils at the clearcut edge (Mayn, 2003). These landslides resulted in significant downstream impacts to instream habitat as fluvial processes adjust in response to the massive influx of sediment. Four of these eleven landslides reached Fubar Creek and emptied debris containing high volumes of gravel and sediment directly into or across the stream (Mayn, 2003). Aggradation alters stream processes and hence, stream characteristics such as slope, width, depth, pool frequency, and sinuosity. Downstream impacts resulting from these adjustments include bank failure and channel diversion, altered floodplain connectivity, and ultimately decreased fish habitat.

Roads in the Harris River basin represent a valuable asset for local economic potential, enhanced subsistence opportunity, and other recreational activities. Roads in the Harris River basin, including the Klawock-Hollis Highway (924), total 44 miles. Without proper maintenance, these roads pose a threat not only to current and future usage, but also to hillslope and aquatic resources due to landslides, altered hydrologic connectivity, and stream sedimentation. Culverts are the most common structures used to pass surface water downslope and are often the point of failure through plugging or structural collapse by rusting through as they reach their designed lifespan. Roads may be sources of chronic and catastrophic sediment through fill failures and landslides. Fill saturation caused by unmaintained ditch lines on unstable slopes may result in mass wasting of the road prism and slope below.

Cumulative Effects of the No Action Alternative on Water Quality

The processes associated with sedimentation would continue as sediment supply out competes the streams ability to transport it. Bank erosion and stream diversions would continue to develop in response to increasing width to depth ratios and lack of deeply rooted riparian and bank vegetation. Risk of mass movement caused by road fill failure would increase through time as unmaintained roads and drainage structures age and fail. To preserve rehabilitated areas and maintain water quality, new road construction would require reconnaissance and design to ensure that slope instability and the road drainage are properly addressed.

Identified stream channels lacking a large wood component would not develop needed complex habitat, would not provide the conditions necessary to maintain sediment transport, and would be more susceptible to bank failure.

Fish and Aquatic Habitat—Direct and Indirect Effects

River riparian ecosystems are critical components of aquatic habitat health.. The greatest economic benefits attributable to these riparian areas, however, are from the aquatic species including Pacific salmon that are highly dependent on healthy riparian ecosystems. The Tongass National Forest provides over 80 percent of the freshwater habitat that sustains commercial, recreational, and subsistence fisheries in southeast Alaska. Southeast Alaska has by far the largest number of healthy wild salmon stocks on the Pacific Coast (Casipit et al., 2000). These fisheries conservatively contribute over $250,000,000 annually to the southeast Alaska economy and average $4,300,000 to the Prince of Wales outer island area (Division of Community Advocacy, Southeast Regional Office: http://www.dced.state.ak.us/dca/).

A Forest Service interdisciplinary team conducted stream habitat assessment work during the 2002 and 2003 field seasons in the Harris Watershed. Results indicated that the lower segment of the Harris River was functioning at risk with an upward trend; Fubar Creek was found to be functioning at risk with a downward trend; and Upper Harris was found to be functioning at risk with an upward trend. Non-functioning reaches exist in the more heavily managed areas of the Upper Harris and are interspersed throughout the entire watershed. Non-functioning stream reaches are those that have been found to display instream processes that are uncharacteristic compared to similar undisturbed channel types. These processes are often in response to upstream disturbances. Several factors were identified as limiting watershed function, including lack of large woody debris, inadequate riparian vegetation (structure and composition), and excessive channel erosion and aggradations.

With 47 percent of the RMA harvested, there has been a reduction in bank stability due to the loss of root strength of large conifers and a reduction in floodplain roughness resulting in an increase in the frequency of bank failure and stream diversion. Riparian harvest also resulted in conversion from conifer to alder dominated canopy. Alder dominated canopy is shading and suppressing conifer recovery in riparian areas. Large mature conifers provide critical instream structure, fish habitat, and floodplain protection.

Cumulative Effects of the No Action Alternative on Fish and Aquatic Habitat

Current water temperature, sediment inputs, woody debris and hydrologic processes would continue to function at existing rates and levels. Fish species and populations would remain relatively unchanged from current negative trends. Under the No Action Alternative, unstable stream bank conditions will continue to be indirectly affected by degraded riparian conditions and low levels of large woody debris.

Off-channel habitat conditions would continue to be negatively affected by degraded riparian and floodplain large woody debris levels. The lack of mature vegetation and roughness created by large woody debris on the floodplains within the project area makes them vulnerable to channel avulsions.

Channel width to depth ratio may continue to increase from the lack of stable large riparian vegetation (conifers) and further exacerbate problems in the existing wide, shallow, homogeneous stream reaches. Lacking cover and cold water refuge, resident and anadromous fish become susceptible to predation, algal blooms, decreased oxygen levels, limited drift feeding locations, and sustained elevated water temperature and therefore does not meet the Purpose and Needs.

The decline of instream habitat quality would result from continued sedimentation from historic and future landslides stalling in the system instead of being transported through, road failures, disrupted hydrologic connectivity, and stunted recovery of riparian and floodplain environments. Sustained sedimentation would continue to widen and shallow the Harris River mainstem causing additional bank failure and channel diversions that further aggravate sedimentation. A further decline in instream habitat would stress sensitive salmonid populations important to the economy of Prince of Wales Island communities. Natural recovery would be susceptible to new natural and management related impacts due to uncoordinated activities, inability to take advantage of funding opportunities, and lack of consideration for cumulative affects.

The inland aquatic habitat is a critical component to the salmon life cycle. Aquatic impacts from past management activities would continue to stress some salmon species and ultimately affect local fisheries and the associated economy.

Wildlife—Direct and Indirect Effects

The base information for most of this analysis comes from the Geographical Informational System (GIS). GIS data provides the best information currently available to describe habitats in this area. The Harris River Watershed Rehabilitation Project Area encompasses one Value Comparison Unit (VCU) 6220, as identified by the Forest Plan (USDA 1997) and three Wildlife Analysis Areas (WAAs) 1317, 1318, and 1332, as defined by the Alaska Department of Fish and Game (ADF&G). A WAA is a geographical area used by ADF&G to manage game populations.

The Project Area includes a high number of managed timber stands which are currently approaching understory exclusion, which has significant implications for wildlife species that depend on understory plants for forage. Sitka black-tailed deer rely on high-volume, mature forest at lower elevations for winter habitat (Hanley and Rose 1987); (Yeo and Peek 1992). These mature old-growth stands intercept snowfall, provide thermal cover, and provide a largest biomass of shrub and herb forage for deer (Alaback 1982). The young generation stands in the Project Area may have provided forage during past snow-free months, but offer little in the way of available forage during heavy snowfall years or after they reach understory exclusion stage. Deep snow winters and limited suitable habitat can combine to impact deer populations. Predation interacts strongly with winter severity in impacting deer populations. Fragmented winter habitat and high road densities also make deer populations more vulnerable to wolf predation and human harvest.

An interagency model (Suring 1992) based on WAAs has been developed to evaluate potential winter habitat capability for deer. WAAs 1317, 1318, and 1332 are included in the Harris River Watershed Rehabilitation Project Area. The model is a tool used to assess the effects of timber harvest activities on the habitat suitability and capability of an area. The model calculates habitat suitability indices (HSIs) base on timber volume strata, aspect, elevation, and typical snowfall. Habitat suitability indices values are used to calculate and compare habitat capability and to estimate changes in habitat capability. Habitat capability is the theoretical number of deer that particular habitat types can be expected to support. Although it does not reflect the actual number of deer in an area, the model can be used to estimate the percentage of habitat capability remaining after harvest. The average habitat capability of the three WAAs in the Project Area is 83 percent (USDA 1997).

A major reduction in the amount of high-value deer winter range has occurred in the Project Area. Past timber harvests in this area concentrated on the large tracts of historic high-value deer winter range. Harvested stands are currently even-aged homogenous stands that provide little deer winter range value. The typical development of an even-aged stand without intermediate thinning treatment includes a seedling stage (1-25 years following harvest), a stem exclusion stage (26-150 years), and an understory re-initiation stage (150-250 years) (Alaback 1984). A large portion of the young growth is in the stem exclusion stage and is considered poor wildlife habitat.

Cumulative Effects of the No Action Alternative on Wildlife

Quality of wildlife or riparian habitat would continue to function at existing rates and levels. No additional thinning projects would be implemented to improve habitat for wildlife species. Forbes and shrubs that support wildlife would continue to be shaded from dense overstory vegetation in stem exclusion serial stage and even-aged homogenous stands would continue to provide poor deer winter range.

Subsistence—Direct and Indirect Effects

The Alaska National Interest Lands Conservation Act (ANILCA) Section 810 requires the Forest Service to analyze the potential effects of proposed rehabilitation activities on subsistence uses and needs. Criteria used to assess the effects of the No-Action and Proposed Action alternatives include whether subsistence uses within the Project Area may be significantly restricted by any of the alternatives. Only rural residents qualify as Federal subsistence users (ANILCA, Title VIII).

Subsistence use in the Harris River is high due to ease of access from the Hollis-Klawock Highway, relative distance from island communities and the Hollis Ferry Terminal, and access points to river and upland habitats. Subsistence opportunities are very important to both Native and non-Native people on POW. Subsistence hunting, fishing, trapping, and gathering activities occur within the proposed action area. Effects on subsistence resources and uses important to rural communities are discussed in three categories: abundance and distribution, access, and competition.

Abundance and Distribution

The Harris River Restoration Plan encompasses a geographical area that includes diverse subsistence resources such as deer, black bear, furbearers, small game, waterfowl, salmon, plants, and firewood throughout the proposed Project Area.

The No Action alternative may affect subsistence use. Reductions in both fish and wildlife habitat capability would likely become less complex as forests move into stem exclusion stage.

Community use of deer for subsistence purposes is well documented and studied for the rural communities of SE Alaska. Community use of specific geographic areas for obtaining deer is estimated by the WAAs used by the State of Alaska. The WAAs included in this Project Area have the following average deer harvest numbers: WAA 1317 (76 deer), WAA 1318 (328 deer) and WAA 1332 (67 deer).

With application of the riparian standards and guidelines on the Forest Plan, no significant adverse effects on salmon or trout species are anticipated. No significant adverse effects are anticipated for wildlife species, including deer.

Access

The road network on POW provides access to many areas that were previously unconnected and can affect subsistence both positively and negatively by providing access, dispersing hunting and fishing pressure, and creating the potential for increased competition. While road systems tend to bring more people into an area, roads also provide subsistence hunters access to previously remote regions and provide a greater opportunity for subsistence harvest. Long-term access into the area may be compromised as old road vegetate over.

Competition

Subsistence resources are distributed across POW. The extensive road system on POW tends to disperse competition for available resources. No reduction in wildlife populations is expected due to this project or overall subsistence harvest of deer, bear, or wolves due to changes in competition. Overall long-term access into the area should be improved, due to road improvements which distributes subsistence users and decreases competition. There would be no significant possibility of a significant restriction on subsistence use of deer, black bear, marten, wolf, otter or other wild foods as a result of the proposed action. Reductions in fish and wildlife habitat capability may result in less fish and wildlife resources within the watershed

Cumulative Effects of the No Action Alternative on Subsistence

Subsistence users would continue to be limited to existing access and the deteriorating condition of the existing roads and trails. Access trails and roads would not be improved. Changes in subsistence use would not be expected to occur in the short-term. Roads and trails that do not receive maintenance may vegetatively close in, eventually limiting access. Road surface erosion may also continue to deteriorate to the point of limiting access or increase public safety risk. Reductions in wildlife habitat capability would occur as existing young growth reaches stem exclusion stage. Fisheries resources may be reduced due to reduced habitat capability. As instream wood breaks down, the channel becomes less complex.

Recreation—Direct and Indirect Effects

Two of the three established trails in the Harris River basin, Twentymile Trail and Harris River Trail, have been converted from old haul road routes. These trails provide access to the headwaters of the Harris River mainstem and the lower Harris River mainstem. Both trails have moderate (seasonally high) public use. Annual trail maintenance occurs on these trails to remove vegetation and improve the tread, but major reconstruction may be needed in some sections. These old road beds are impeding the natural flow of water from upslope streams. Small dilapidated low elevation foot crossing structures have been placed across some small stream crossings where waterbars were constructed. Other stream crossings were left for hikers to ford. The foot crossing structures are collapsing into the stream crossings and posing risk to hikers falling through or having the structure collapse from failing fasteners or rotting timbers. Forded stream crossings suffer from bank trampling.

Cumulative Effects of the No Action Alternative on Recreation

Visitors to Prince of Wales Island would continue to find trail systems and access roads affected from stream capture, erosion, and inadequate drainage. Hikers would continue to ford streams, washed-out sections of trail, and cross deteriorating stream crossing structures.

As road and trail infrastructure deteriorate due to lack of maintenance and improvement recreation use would decrease. Some trails and roads would eventually become unsafe to the point of administrative closure to the public. Use of the roads and trails would be expected to increase regardless of condition or closure as public awareness of and access to Prince of Wales Island improves. Although annual maintenance keeps the trails open and free of vegetation, stream crossing structures and portions of trails are derelict and somewhat unsafe. Some trail and road recreational users would be dissuaded from using some areas while others who venture on would be at greater risk of injury.

One Duck Trail is an established trail that begins in the headwaters of Fubar Creek which accesses alpine areas along the Fubar Creek - Indian Creek ridgeline. The One Duck Trail does not have immediate environmental resource concerns and will not be further considered for watershed rehabilitation treatments; however, design work is being completed and major reconstruction is scheduled for 2008-2009.

The Harris River Trail (2024050-North) would continue to be eroded away by the adjacent stream. In more than one location the trail has captured the stream leaving the lower portion of trail in an obliterated state with debris and cobbles to be traversed. The Harris River side channel crossing would continue to be a forded crossing causing bank erosion and potential damage to active spawning beds at crossing. Bank failure along the "island" would continue to erode and undermine the trail and potentially divert across the trail blocking access.

The Fubar Creek Road/Trail (2024050-South) would not be reopened as part of the Fubar Creek Rehabilitation Phase II project and would remain an unimproved dispersed recreation site.

The Twentymile Road (2025000) leading to the trailhead would not be improved and continue to provide an unnecessarily rough ride on a road designated for passenger cars and increase public safety risk.

The Twentymile Trail beyond the trailhead would not be improved. Stream crossing structures will continue to deteriorate and increase public safety risks. Stream crossings currently causing flooding or diverting down the trail would not be corrected, forcing visitors to either abandon their hike or ford less safe portions of the trail.

Heritage—Direct and Indirect Effects

The cultural history of Prince of Wales Island, as archaeologists currently understand it, begins at the end of the Holocene era after retreat of the Wisconsin ice sheets. With the melting of the continental glacier at the end of the Ice Age (17,000 to 11,000 years ago), sea levels, once depressed by as much as 380 feet in the vicinity of Prince of Wales Island, began to rise. A complex interaction of rising sea level, isostatic rebound with removal of the weight of ice, and deformation of the earth's crust result in changing locations of the island shorelines. This change in relative sea level was accompanied by changes in the vegetation and wildlife components of the environment. The arctic conditions of 17,000 years ago gave way to tundra-like conditions by 13,000 years ago and a forest composed of the same species represented today by approximately 11,000 years ago (Ager 2002).

Prince of Wales Island was formerly divided among several subgroups of Tlingit. The Stikine (Shax'heen) kwaan included the northeast coast of Prince of Wales Island in their territory. The Heenya kwaan inhabited the northern half of the western part of the island. The Klawock (Lawaak) kwaan, who may have also been part of the Heenya kwaan, resided along the west-central coast of Prince of Wales. Finally, the Tongass (Taant'akwaan) kwaan held the southern third of the island before the Kaigani Haida displaced them in the early 18th century (Ardnt et al. 1987:85-95). The Haida village of Kasaan is located in Kasaan Bay, east of the current project area.

Kasaan was a substantial community in the 1800s. The current project area falls firmly in the heartland of the Kaigani Haida people of Kasaan.

The historic period on Prince of Wales Island encompasses the major themes seen throughout Southeast Alaska. These are described in detail by Ardnt et al. (1987). The periods represented include Exploration and the Maritime Fur Trade (1741-1799), American Military Rule (1867-1884), Salteries and Canneries (Commercial Fishery 1867 – present), Mining (1900 – 1942), and Timber Industry and forest management (1902 – present).

The material remains of the hard rock mining era in and around Hollis is a significant cultural resource and holds significant potential for study and interpretation. The cultural landscape of the project area reflects the most recent economic use of the area. Designated as an Experimental Forest, the Maybeso Valley became a field laboratory for forestry practices. Large scale experimental clear cutting began near Hollis with the establishment of the Ketchikan Pulp Company camp in 1955. With movement of the Hollis camp north to Thorne Bay in 1961 the intensity of activity in the Hollis area diminished.

Cumulative Effect of No Action on Heritage

Alternative 1 (No Action) results in no change in the existing condition. Selection of Alternative 1 would result in no direct or indirect effects on heritage resources. Cumulative effects would derive entirely from past activities in the watershed.

Scenery—Direct and Indirect Effects

The project area is primarily seen by forest visitors when traveling between Hollis, Klawock and Hydaburg. Views are generally within foreground and middle ground distance zones.

Extensive timber harvest occurred in the Harris River watershed during the 1960's. As a result of past harvest abundant second-growth regeneration blankets most of the seen landscape. Little if any variation in form, line, color and texture is visibly evident. This continuous vegetative cover with little or no pattern results in a landscape with minimal visual features.

Due to the continuous vegetative blanket of second young in the project area, changes to the visual appearance of the landscape are easily noticed and perceived as disturbances. Disturbances that exist in the project area are generally not of size or shape to completely dominate the viewshed. In some cases changes are noticeable but resemble natural patterns as a result of aging second growth. As a result of past harvest within the project area the Existing Visual Condition (EVC) is a Type IV.

Cumulative Effects of the No Action Alternative on Scenery

Cumulatively the disturbances caused by past management activities are well within the percent allowable disturbance thresholds for change in each LUD designation.

~~Alternative 2: Proposed Action~~

~~The preferred action alternative would have a long-term benefit to channel function, aquatic and riparian habitat, and reductions in turbidity and channel diversions. This alternative would store or decommission approximately 9 miles of road, improve 3.5 miles of road, improve 4 miles of trail, complete 5 miles of instream rehabilitation, and improve about 100 acres of riparian and floodplain.~~

~~Vegetation—Direct and Indirect Effects~~

~~The goal of riparian thinning within priority treatment areas is to accelerate the growth and development (successional pathways) of young-growth riparian areas toward their climax successional stage. These characteristics typically include large and widely spaced trees having a diverse understory of shrubs. There are 439 acres of thinned riparian area in the Harris River Watershed.~~

~~Preliminary monitoring results from early thinning treatments and stand modeling elsewhere on the Tongass indicate that the direct effects of thinning can reduce the time it takes to attain desired future riparian stand conditions by as much as 50 percent (Twelvemile Arm Landscape Assessment, 2006).~~

~~Several management objectives have been identified to address thinning treatments in riparian areas. Since the riparian area is an important ecological corridor for a number of ecosystem functions, we have broken the objectives into three broad groups of indirect effects: Stream morphology/fish habitat; nutrient cycling/energy regimes; and wildlife~~