USDA Forest Service Watershed Condition Framework

FY2012 TRANSITION WATERSHED RESTORATION ACTION PLAN

Pacific Northwest Region

Olympic National Forest, Hood Canal Ranger District

Upper South Fork Skokomish River

1. Summary

a. Watershed Name and HUC: Upper South Fork Skokomish River, 171100170101

b. General Location: The Upper South Fork Skokomish watershed is located in the southeast corner of the Olympic Peninsula, approximately 25 miles northwest of Shelton, Washington. The majority of the watershed lies within the Hood Canal Ranger District, on the Olympic National Forest.

c. Total Watershed Area: 38,538 acres **NFS area within watershed:** 95% (36,762 acres)

d. Watershed Characterization:

General Physiography: The watershed is characterized as a steep mountainous terrain, highly dissected by a riverine system, and covered predominantly by a mixed age coniferous forest. Dominant landforms in headwaters have formed a topography that ranges from near vertical basalt hills and dissected incised valley side slopes. Landforms in the lower portion of the watershed once occupied by continental glaciers, have relatively thick deposits of till and outwash forming smooth mountain side slopes and ridges. The mainstem channel occupies the relatively broad, low gradient portion of the main glacial valley.

This watershed covers the upper area of the South Fork Skokomish River. The Upper and Lower South Fork Skokomish 6th field watersheds combine to form the South Fork Skokomish. The South Fork and North Fork are the two major tributaries to the Skokomish River. The Skokomish River drains into the southern end of Hood Canal, a basin of the Puget Sound. The Skokomish River is the largest freshwater tributary to, and has the biggest estuary in, Hood Canal. The Puget Sound empties into the Pacific Ocean.

Land Use: The 1990 Olympic National Forest Land and Resource Management Plan (LRMP), and its amendments, including the 1994 Record of Decision (ROD) for Amendments to the Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, provide broad management direction for the Upper South Fork Skokomish. The 1994 ROD designated new land allocations and replaced some standards and guidelines in the 1990 LRMP. Where the 1990 LRMP is more restrictive or provided greater benefits to late-successional forest species, the 1990 standards and guidelines remain in place. For this document, the 1990 LRMP as amended by the 1994 ROD is referred to as the Forest Plan.

Land allocations on National Forest System (NFS) lands within the Upper South Fork designated by the 1994 ROD include 33,055 acres Late-Successional Reserve (LSR) and 3,704 acres Adaptive Management Area (AMA), overlain with 20,858 acres of Riparian Reserves. In addition to the standards and guidelines that apply to these allocations, the following management area prescriptions from the 1990 LRMP are relevant to the

watershed: A1A-Undeveloped Recreation (Non-Motorized); A1B-Undeveloped Recreation (Motorized); A2-Scenic; A4BG-General Level River Corridor; A4BGA3-Developed Recreation and Administrative Sites; A4BM-Minimum Level River Corridor; A4BN-Natural Level River Corridor; and E1-Timber Management.

Primary land use on NFS lands is vegetation management and recreation. Vegetation management is primarily within the LSRs and is focused on commercial and pre-commercial thinning. Thinning treatments are designed to promote terrestrial habitat diversity and accelerate late-successional forest characteristics. Planning is currently underway on the Upper South Fork Skokomish Vegetation Management Project, a commercial thinning project. The planning area for this project encompasses the NFS lands within the entire Upper South Fork Skokomish 6th field watershed.

Other uses within the watershed include recreation, hunting, and Tribal activities associated with use as their Usual and Accustomed (U&A) area. Recreation use includes activities such as camping, hiking, horseback riding, mountain biking, and berry picking. Hunting for grouse, deer, and bear is common. Tribal U&A activities include hunting, berry picking, and harvesting of plants that support tribal customs.

General Overview of Concerns: Past timber harvest activities associated with commercial timber production from the 1940s to 1992, was the dominant land use within the South Fork Skokomish River. Between the late 1940s and 2002, the watershed area was included in the Shelton Multiple Use Sustained Yield unit. As a result of these historic timber harvest activities which included clear cutting, broad cast burns, and road construction, the South Fork Skokomish watershed was one of the most intensively harvested watersheds in Washington State. By the mid-1990s, approximately 60 percent of the NFS land area within the South Fork Skokomish had been clearcut and the overall road density was over 3.6 miles per square mile. Comparative figures for the NFS land area within the Upper South Fork Skokomish, show that by the mid-1990s, approximately 41 percent had been clearcut and overall road density was 3.3 miles per square mile.

Extensive timber harvest and road construction in decades leading up to the 1990s, inherent watershed conditions such as steep, unstable terrain being subjected to high rainfall or rain-on-snow events, insufficient funds to maintain the road system during the last two decades, and an aging road infrastructure, have culminated in substantial degradation of aquatic and terrestrial habitats and species within the watershed. These conditions have led to increased frequency and magnitude of surface erosion and mass wasting incidents. Watershed analysis conducted in 1995 determined that ninety percent of the 2,500 mass wasting and erosion sites inventoried within the South Fork Skokomish were related to roads, and the remaining ten percent were either stream bank or in-unit (harvest unit) slope failures. Delivery of sediment to aquatic systems from these events, the vast majority of which are road related, is the key contributor to degraded fish habitat and water quality. Changes to aquatic habitats generally include an increase in fine sediments, channel aggradation, and loss of in-channel wood throughout much of the mainstem and most of the tributaries.

In terms of terrestrial habitat, past harvest practices have led to fragmentation and simplification the biodiversity within forest stands. Composition of much of the riparian vegetation has changed; areas that once supported conifers now have high percentages of small-diameter conifers and hardwoods, and the available supply of trees for recruitment of large wood, an important component of fish habitat, into streams has been reduced.

In the early 1990s, the management emphasis on NFS lands within the watershed changed from one of resource extraction to restoration, due initially to direction under the Northwest Forest Plan. Since the early 1990s, the Forest Service and various partners have focused on watershed recovery efforts at the landscape scale that are aimed at recovery of fish stocks and habitat, improving and protecting water quality, and restoring late-successional forest stand conditions. Between the early 1990s and 2004, $10.6 million in road, instream, riparian and vegetative work was completed. Since 2004, the Forest Service in collaboration with the Skokomish Watershed Action Team, the Skokomish Tribe, and several other partners, has completed an additional $11.1 million in restoration work. During this latter period restorative actions have emphasized road decommission, closure, stabilization, and trail conversion work, and commercial and pre-commercial thinning.

Remaining work needed to recover this watershed is similar to restoration efforts implemented during the past two decades - primarily road decommission, closure, and stabilization work and commercial and pre-commercial thinning. The tendency of road-related landslides is to move down stream to channels and either scour out habitat with debris torrents or bury spawning and rearing habitat under aggradations of silt, cobble, and debris. It is therefore critical to complete the road decommissioning and stabilization work on the uplands to cut off the source of elevated sediment and allow the system to recover. Commercial and pre-commercial thinning treatments will improve structure and diversity of forest stands. Cumulatively, these recovery efforts will increase the resiliency of the watershed and improve its ability to respond to impacts of climate change.

Important Ecological Values: The Upper South Fork Skokomish supports diverse aquatic and terrestrial habitat and species. It provides around 16 miles of anadromous habitat and about 43 miles of resident habitat. It contains designated critical habitat for Puget Sound Chinook and Puget Sound Coastal Bull Trout. The watershed supports the following anadromous fish species: Bull Trout, Steelhead, Coho Salmon, Coastal Cutthroat Trout, River lamprey and sculpin. Of these species, three are listed as threatened under the Federal Endangered Species Act (ESA), the Puget Sound Coastal Bull Trout, Puget Sound Steelhead, and Puget Sound Chinook. The Puget Sound Chinook have been extricated from the upper South Fork Skokomish watershed, but will be reintroduced as part of the Chinook recovery effort. Fish on the Sensitive Species List include Puget Sound/Strait of Georgia Coho Salmon, Puget Sound Coastal Cutthroat Trout, and River lamprey. Resident fish species present include resident rainbow and cutthroat trout.

Protecting water quality is a concern for supporting beneficial uses within and downstream of this watershed. Waters from the Upper South Fork Skokomish also

influence key anadromous spawning and rearing habitat downstream in the Lower South Fork Skokomish and mainstem Skokomish River. According to Washington State, all surface waters within this watershed area are to be protected for the designated uses of: Char Spawning and Rearing; extraordinary primary contract recreation; domestic, industrial and agricultural water supply; stock watering, wildlife habitat; fish harvesting; commerce and navigation; boating and aesthetic values.

The 2008 federal CWA 303(d) list includes two water bodies listed for temperature within the South Fork Skokomish watershed – one within LeBar Creek and one on the mainstem South Fork Skokomish River. The LeBar Creek water body is within the Upper South Fork Skokomish watershed, and the South Fork Skokomish River water body is downstream of the watershed in the Lower South Fork Skokomish. Currently no TMDL is in place to address the two 303(d) listed water bodies within the South Fork Skokomish watershed. However, development of the Westside Forest TMDL is underway, and includes these two listed water bodies.

The watershed also supports a wide spectrum of wildlife species. Two terrestrial species of concern, the Northern Spotted Owl and the Marbled Murrelet, are listed as threatened under the federal ESA.

Current Condition Class: Functioning at Risk

Target Condition Class: Functioning Properly

e. Key Watershed Issues

1) Attributes/Indicators within FS control to affect

ATTRIBUTES /INDICATOR	REASON FOR RATING
1.1 Water Quality – Impaired Waters (303d Listed)	The 2008 federal CWA 303(d) lists one water body listed for temperature within the Upper South Fork Skokomish watershed on LeBar Creek. The Upper South Fork watershed provides contributing waters to a second water body that is also listed for temperature located on the mainstem South Fork Skokomish River in the Lower South Fork Skokomish watershed. Currently no TMDL is in place to address the two 303(d) listed water bodies within the South Fork Skokomish watershed. However, development of the Westside Forest TMDL is underway, a tri-Forest effort that includes these two listed water bodies.
1.2 Water Quality – Water Quality Problems (for non-303d Listed Waters)	Field surveys have determined direct evidence of, or conditions that pose a likelihood of, accelerated sediment delivery to aquatic systems, due primarily from surface erosion and mass wasting incidents from roads. Fine sediment contributions to streams result in elevated suspended sediment and turbidity levels, and contribute to degraded stream conditions.
3.3. Aquatic Habitat - Channel	Field survey have evidenced the following channel alterations of channel habitat due to sediment delivery associated primarily with

	mass wasting events from roads: increased channel width to depth ratios, increased size and extent of gullied channel sections, active streambank erosion and instability, channels disconnected from their floodplain or braided, channel degradation and/or or aggradation. The Upper South Fork Skokomish contains habitat designated as critical for Puget Sound Chinook and Puget Sound Coastal Bull Trout. All anadromous reaches are designated as Essential Fish Habitat.
4.2 Aquatic Biota – Native Species	The watershed supports three fish species listed under Federal ESA as threatened, the Coastal Puget Sound Bull Trout, Puget Sound Steelhead, and Puget Sound Chinook. Puget Sound Chinook are currently expatriated, but will been introduced as part of the Chinook recovery plan.
6.1 Roads and Trails – Open Road Density	Historic road densities in the watershed measured 3.3 miles per square mile. Road densities have been substantially reduced through decommissioning efforts over the last two decades, down 40 percent from the historic high. Current road densities measure less than 1.9 miles per square mile. Implementation of decommission work identified in this action plan would further reduce road densities to 1.25 miles per square mile.
6.2 Roads and Trails – Road and Trail Maintenance	The following factors contribute to road maintenance needs: the occurrence of frequent intense winter storms that distribute high amounts of precipitation or rain-on-snow events on steep, unstable terrain; an aging road infrastructure, and; insufficient road maintenance funds. Substantial gains have been made since 2005 in implementation of deferred road maintenance. Implementation of storm damage risk reduction and culvert upgrade work within this action plan would effectively target priority sites in need of road maintenance. Stabilization work on Forest Service Trail 872.1 would target priority work primarily associated with erosion or failures at trail stream crossings.
6.3 Roads and Trails – Proximity to Water	Roads intersect highly dissected terrain, with stream densities measuring 5.8 miles per square mile. The road system acts as an extension to the drainage network. Decommissioning and storm damage risk reduction work identified within this plan would reduce connectivity of roads to the stream system.
6.4 Roads and Trails – Mass Wasting	Mass wasting associated primarily with roads is a primary contributor to degraded water quality and fish habitat. The 1995 South Fork Skokomish watershed analysis indicated that of the 2,500 erosion sites inventoried, 90% were associated with roads and 5% were identified as mass wasting. Decommissioning, storm damage risk reduction, and culvert upgrade work identified in this plan targets priority sites that would reduce the potential for future road-related mass wasting events.
5.0 Riparian/Wetland	Past timber harvest practices resulted in reduced riparian areas associated with clearcut units. The lower portions of the LeBar

Vegetation	Creek and Brown Creek drainages were harvested as part of the abandoned dam construction project, and the upper portions were intensively harvested in more recent years. Pine Lake is the largest lake in the watershed. Infestation of reed canary grass along the lakeshore has altered the riparian vegetation community. Restoration efforts are underway to recover the vegetation community of riparian lakeshore through treatments designed to remove the grass and plant native species. Work identified in this plan would complete the next phase of treatments.
7.2 Soil Erosion	Surface erosion associated primarily with roads is a primary contributor to degraded water quality and fish habitat. The 1995 watershed analysis that covered the entire South Fork Skokomish watershed, indicated that of the 2,500 erosion sites inventoried, 90% were associated with roads and 95% were identified as surface erosion. Decommissioning and storm damage risk reduction identified in this plan targets priority sites that would reduce the surface erosion.

2) Attributes/Indicators that require other parties to address

ATTRIBUTES /INDICATOR	**REASON FOR RATING**
No substantial issues (negligible)	The Olympic National Park is the only federal non-FS ownership within this watershed is the Olympic National Park. Lands within the park total 3% of the watershed, located in the upper headwaters. Management actions within the Park support protection and conservation of the natural environment, and wilderness recreation use. Private land holdings total 2% of the watershed and are held by the Tacoma Power. These lands are located within the Brown Creek drainage and are being managed for wildlife conservation for the next 10+ years.

2. Watershed Characteristics and Conditions

a. General Context/Overview of the Watershed

Geology and Soils

The dominant landform in the upper part of the watershed is that of steep basalt hills. The South Fork Skokomish watershed is predominately underlain with complexly folded basalts and breccias, with some small interbeds of siltstones, shale, and sandstone. In the uppermost headwaters, bedrock consists of bedded marine slates, argellites, and sandstones. Continental glaciation extending from the mountains in British Columbia overran the lower basin and deposited hundreds of feet of sediment in the southeast corner of the basin and a thin veneer of unstable sediments on some hillslopes. Soil depths are variable. Where glacial sediments occur in valley bottoms, soils are deep. On steep hillslopes soils are typically less than 3 feet in depth. Subsequent fluvial erosion has formed steep gorges and valley walls, and a broad flat alluvial valley bottom in the lower basin. It has also formed smaller gorges in the upper basin. Alpine

glaciation in the upper basin has steepened side slopes and rounded valley bottoms leaving substantial deposition in the valley bottoms, particularly in the South Fork near the confluence of Brown Creek.

Soils reflect a varied and complex history, but are generally quite young. The geologic and glacial history of the watershed has left a diversity of parent materials from which a variety of soils have been formed. The soils can be divided into two main types based on the parent materials they developed from: Deep Glacial Valley Soils are derived from glacial parent material; Mountain Upland Soils are derived from marine basalt from volcanic rocks.

The majority of soils have a moderate to high productivity due to soil development and a climatic regime which provides adequate moisture for plant growth. The major category of soil types in the area are Andisols. These soils hold a high amount of water that is available to plants, and have high infiltration rates, light bulk densities which are easily penetrated by roots, high aluminum contents, and low base saturation. Soils are generally moderate in fertility; however soil fertility does not seem to be a limiting factor in tree growth.

Climate

The maritime climate of the South Fork Skokomish Watershed is characterized by relatively dry cool summers and wet mild winters. The proximity of this watershed to the Pacific Coast subjects it to strong maritime influences. Seasonal changes in weather result from shifts in the pathways of dominant westerly trade winds. During the summer, fewer wet fronts off the Pacific move across the land resulting in more solar radiation reaching the forests and higher air temperatures during July and August. The wet season begins in the fall and reaches a peak during the winter months of November, December, and January. Major storms that occur in the fall and winter most often approach the Olympic Peninsula from the Pacific Ocean following a southwesterly to northeasterly pattern.

Precipitation in the watershed comes in the form of both rain and snow. Average annual rainfall varies from about 90 inches in the southern portion of the watershed to over 200 inches at higher elevations. Almost 90 percent of the average annual precipitation falls between mid-September and May 1. Snowfall in the watershed typically occurs during the months of November through March, with the greatest amounts falling in January and February. Snow accumulation is uncommon in most years below the 1,000 foot elevation. In general, snow accumulates above the 2,500 foot elevation, and a snow pack persists above this elevation through late spring. There is rarely any snow pack remaining in the watershed by August. Snow and rain are common between 1,000 and 2,500 feet. Generally shallow snow packs (less than 15 inches deep) accumulate and melt quickly several times each winter as alternating cold fronts and warm fronts transit the area.

This watershed is lies predominantly within the precipitation zones categorized as rain-on-snow or rain-dominated zones. Several of the major tributary drainages within the watershed have greater than 50 percent of their area in the rain-on-snow transition zone and these are: South Fork Skokomish – Pine Creek to Headwaters, Steel Creek, LeBar Creek, Brown Creek, Rule Creek, Church Creek, Pine Creek and Cedar Creek.

Streamflows and Floods

Stream flow runoff in the South Fork Skokomish watershed closely mimics seasonal precipitation patterns, dependent in part upon elevation of the basin and the degree of snow pack influence. Stream levels begin to decrease in late spring or early summer as precipitation and snowmelt subside, with lowest streamflow levels occurring in August or September. Highest flows occur in December through February corresponding to peak in precipitation patterns.

Floods are a common natural disturbance within the South Fork Skokomish watershed and generally occur in the fall and winter as the result of prolonged rainstorms. These floods may be augmented by water from snowmelt if rain falls on snow. Rain-on-snow storm events can be a predominant source of peak flows and typically occur during the months of October through May.

Potential Effects of Climate Change on the Hydrology

Model projections show increased air temperatures will affect snowpack and timing of streamflow. Increased temperatures are predicted to result in more precipitation falling as rain rather than snow in the winter and earlier snowmelt. The greatest reductions in snowpack are expected for lower elevations (<3,280 feet). This will increase winter and spring streamflows and reduce summer flows. The Skokomish watershed receives most of its precipitation as rain, but also some snow in higher elevations. It is expected that warming temperatures will have a moderate impact on streamflows within Skokomish, relative to other river systems on the Olympic Peninsula.

Changes in precipitation will affect streamflow and the frequency and magnitude of flood events. It is recognized that model projections for precipitation are much more uncertain than those for temperature. Projections for seasonal precipitation changes show increases in winter precipitation and decreases in summer precipitation. Increased cool season precipitation is projected to lead to increases in runoff. Precipitation intensity is also projected to increase, with greatest increase in flood magnitude and frequency predicted in December and January.

Shifts in hydrologic processes resulting from predicted increased air temperatures and changes in precipitation will likely impact physical watershed processes in a number of ways. Increased precipitation and storm intensity could lead to increased rate and volume of water delivery to channels, increased mass wasting and debris flows, and increased sediment and wood delivery to streams. Increased winter and spring flow volume in streams could lead to increased floodplain inundation, increased channel migration, and increased channel erosion and scour.

Channel Geomorphology and Fish Habitat

The channel network within the entire South Fork Skokomish watershed includes at least 517 miles of stream. The stream channel analyst for the 1995 watershed analysis subdivided the watershed into six areas based on general stream and valley type and described the channel network in simple terms as follows. The lower and middle extents of the South Fork Skokomish mainstem occupy a relatively broad, low gradient glacial valley.

Fish habitat in the watershed can be categorized into one of four principle types; 1) alluvial mainstems, 2) bedrock gorges, 3) large incised tributaries, and 4) small alluvial terrace tributaries. The Upper South Fork Skokomish is different from other watersheds in that it lacks medium to large sized low gradient tributaries, features that are typically the most productive anadromous fish habitat in other watersheds. Within the South Fork, all but the lowest reaches of major tributaries are either too steep or are inaccessible due to natural barriers.

Within the watershed there is roughly 16 miles of anadromous habitat and over 43 miles of resident habitat. Upper extents of anadromous habitat within the mainstem South Fork Skokomish and its tributaries are as follows: South Fork Skokomish Rivermile (RM) 26.5; Brown Creek RM 6.5; LeBar Creek RM 1.2; Cedar Creek RM 0.4; Pine Creek RM 0.2, and; Church Creek RM 0.7. Resident fish habitat covers the same reaches as anadromous habitat, but extends further upstream on both the mainstem and tributaries.

b. Watershed Conditions - Past management that involved intensive timber harvest, broadcast burns, and road construction spanning the decades leading up to the 1990s, have been the major contributors to impacts of aquatic and terrestrial resources in this watershed. Since the early 1990's implementation of the Forest Plan has emphasized restoration aimed at recovery of terrestrial and aquatic species and their habitats.

Overall watershed conditions are expected to improve over time as the result of result of a substantial restoration program of work implemented on NFS lands in the watershed since the early 1990's. Priority work has been implemented to improve ecological health of watershed through implementation of projects aimed at recovery of aquatic and terrestrial habitats. It is recognized that it may take decades to realize the benefits of this work. Restoration efforts to date have involved the following types of projects: commercial thinning; pre-commercial thinning; riparian nutrient enhancement; floodplain restoration; road decommission, closure, trail conversion storm damage risk reduction and maintenance; resident fish passage barrier correction; elk forage enhancement; Pine Lake reed canary grass treatment; invasive species control, and native revegetation.

Uplands/Hillslope Conditions – Intensive timber harvest and road construction in decades leading up to the 1990's led to extensive management related surface erosion and mass wasting incidents. Inventories in 1990's determined approximately 2,500 erosion sites ranging in size form one quarter to five acres were present in the entire South Fork Skokomish watershed. Ninety-five present of these were associated from roads and the remaining 10 percent were either in-unit (harvest unit) or stream bank slope failures.

Construction of 188 miles of road leading up to the 1990s resulted in high road densities that intersected inherently high drainage densities; road densities measured 3.3 miles per square mile and drainage densities measured 5.8 miles per square mile. Road remediation efforts, including decommissioning and closure treatments implemented since the early 1990s have improved hillslope hydrologic processes by effectively disconnecting several mile of road from the stream network. This work, along with road stabilization and culvert upgrade work, has also markedly reduced the risk of mass wasting and surface erosion.

For road and trail treatments within the South Fork Skokomish, the projected effects of climate change on hydrology and impacts to watershed processes were considered in prioritizing road decommissioning work and determining the general treatment intensity. For, instance, valley bottom roads or roads having significant drainage area within rain-on-snow or snow dominated areas may be higher priority for treatment. Qualitative assessments were used to identify roads within these areas. Valley bottom roads are those located at the base of slopes and in close proximity to stream systems. Roads with substantial drainage area within rain-on-snow or snow dominated zones were considered for increased treatment intensity. In the case of decommissioning, design considerations included more frequent drainage features such as cross ditches, increased pullback of unstable fill material, or outsloping. Trail conversion and stabilization design will also consider treatment intensities, including those at stream crossings.

Riparian Conditions – Historic timber management and activities associated with reservoir clearing for a dam project that was abandoned altered riparian conditions within the Upper South Skokomish watershed. Analysis conducted in 1997 based on review of 1929 aerial photography, found that historically 90 to 95 percent of the riparian areas examined were composed of old, dense conifer stands with good canopy cover. Only the mainstem South Fork Skokomish River segments were rated below 90 percent shade. The 1997 analysis characterized riparian areas within the upper South Fork Skokomish River, Cedar Creek, Pine Creek, Rule Creek, and Steel Creek drainage areas were as having alternating stands of mature old growth and wide swaths of clear cut with good riparian leave areas. The clearcut areas with riparian buffers show reduced riparian areas. For LeBar Creek and Brown Creek drainages, the lower portions of these drainages were harvested as part of the abandoned dam construction project, and the upper portions were intensively harvested in more recent years. It is reasonable to assume some recovery of riparian stands has occurred in the 15 year period since following the 1997 assessment on NFS lands given the growth in vegetation and curtailment of clearcut harvest practices.

In-channel Habitat Conditions – Current habitat conditions are highly variable in the watershed and are strongly influenced by channel type, local sediment dynamics, and the amount of instream large wood. Several reaches in the mainstem South Fork Skokomish display extensive aggradation and channel shifting which appear to be largely natural events. Past management activities have substantially degraded fish habitat within the watershed. Changes to aquatic habitats generally include an increase in fine sediments, channel aggradation, alterations of the natural streamflow regime, loss of in-channel woody debris, and elevated stream temperatures. The net result has been a reduction of in-stream habitat complexity and a reduction in the diversity and productivity of the aquatic community. The upper watershed above Steel Creek has been minimally affected by management activity and currently represents some of the best spawning and rearing habitat for resident trout in the watershed.

3. Restoration Goals, Objectives, and Opportunities

a. Goal Identification and Desired Condition – The overall restoration goals on NFS lands in the Upper South Fork Skokomish is to recover fish and other aquatic organisms and their habitat, improve water quality, mitigate flood hazards, and restore healthy watershed conditions. Implementation of work in this plan would complete priority restorative actions

in this watershed, and includes: road decommissioning, road closure, road storm damage risk reduction, culvert upgrades, trail stabilization, rehabilitation of riparian lake vegetation, commercial thinning and pre-commercial thinning. This work, in combination with restoration work implemented over the last two decades, will move this watershed toward a more properly function condition.

b. Objectives

i. Alignment with National, Regional, or Forest Priorities includes:

- United States Forest Service Watershed Condition Framework
- United States Forest Service Pacific Northwest Region Aquatic Restoration Strategy – the South Fork Skokomish is a focus watershed within the Puget Sound, a priority basin identified by the Region.
- 1994 Northwest Forest Plan – identified the South Fork Skokomish as a Tier 1 Key Watershed.
- 2003 Olympic National Forest Access and Travel Management Plan, as updated in within the South Fork Skokomish watershed in 2007.
- 2004 Olympic National Forest Strategic Plan – identified the South Fork Skokomish as a priority watershed for restoration work.

ii. Alignment with State or local goals include:

- 2007 Skokomish Watershed Action Team 3-Year Action Plan
- 2000 Forest Service and Washington State Department of Ecology Clean Water Act Memorandum of Understanding – plan helps FS meet commitments in MOA regarding Federal and State water quality laws.
- Puget Sound Partnership
- 2005 Hood Canal Coordinating Council Salmon Habitat Recovery Strategy
- 2004 Draft Recovery Plan for the Coastal Puget Sound Distinct Population Segment of Bull Trout
- 2010 Draft Skokomish Chinook Recovery Plan
- Draft Hood Canal Integrated Watershed Management Plan

c. Opportunities

i. Partnership Involvement – Restoration actions within the watershed have had strong partner support over the past two decades. It is expected that partners will play an active and vital role in future restoration actions outlined in this plan, similar to collaborative efforts that have occurred in the watershed in recent years.

Since the mid-2000s, the Skokomish Watershed Action Team, the Skokomish Tribe, and several other partners have been actively engaged in various aspects of restoration projects, instrumental in securing funds to complete the work, conducted outreach, and assisted or led monitoring efforts. SWAT is a diverse collaborative partnership representing federal, state, county governments, Skokomish Tribe, commercial timber company, power company, watershed residents, and non-government organizations working together to restore the Skokomish basin.

SWATs mission is to work towards common ecological and economic goals in the Skokomish River watershed through collaborative basin restoration projects. One of SWATs primary focuses is restoring NFS lands in the South Fork Skokomish watershed. SWAT members have contributed significantly through development of the 3-Year Action Plan, support of planning efforts, and coordination and participation in field trips to educate members about the benefits of restoration work throughout the Skokomish basin. *In 2009, SWAT received international recognition as one of three restoration case studies representing the United States at the XIII World Forestry Congress held in Buenos Aires, Argentina.*

ii. Outcomes/Output

a) Performance Measure Accomplishment – Specific accomplishments will include:

Essential Projects

- Road Decommission – 10.1 miles
- Road Closure – 1.2 miles
- Road Storm Damage Risk Reduction – 7.1 miles
- Trail 872.1 Stabilization – 4.0 miles
- Pine Lake Restoration – 3 acres
- Commercial Thinning – ~ 400 to 800 acres
- Pre-Commercial Thinning – ~ 2,000 acres

The SWATs Action Plan Update, currently in development, demonstrates collaborative landscape scale restoration on multiple ownerships and outlines recovery work aimed at benefiting aquatic and terrestrial habitat and species throughout the Skokomish Basin. It identifies other projects on NFS lands in addition to those brought forward in this 6th field Action Plan as Essential Projects, and are listed below.

- Nutrient Enhancement – Annual Salmon Carcass Placement
- Riparian Assessment
- Elk and Deer Forage Enhancement
- Wildlife Tree Enhancement - Snag Creation
- Trail Stabilization and Maintenance

b) Socioeconomic Considerations: Restoration work implemented under this plan totaling roughly $3,900,000 would support the local economy by generating work for individuals in nearby communities. The types of jobs that would be supported through implementation of with the restoration actions outlined under this plan include: contract work for heavy equipment construction for road work, commercial timber harvest pre-commercial thinning, native revegetation and invasive weed treatments, and; youth crews to carry out revegetation, erosion control, and maintenance work.

Work under this plan would contribute directly to restoration of the natural sediment regime, improved water quality, fish habitat, and terrestrial habitat

within the Upper South Fork Skokomish watershed. It contributes indirectly to restoration of the natural sediment regime, improved water quality, fish habitat, and terrestrial habitat within the lower Skokomish watershed. It also directly enhances aquatic and terrestrial resources within Skokomish Indian Tribe's U&A area. Improved watershed conditions benefit the Skokomish Valley and Skokomish Indian Reservation residents, the closest downstream communities.

Collaborative efforts associated with implementation of this plan are expected to strengthen the solid and durable relations forged between the Forest Service SWAT, the Skokomish Tribe, and other partners. One of SWATs goals is to work to enhance the economic and environmental sustainability of the Skokomish watershed, recognizing the best available science, technology, community values and other means as appropriate. Outreach and education conducted by Forest Service, SWAT, and others partners is expected to reach a variety of organizations or individuals representing diverse interests at local, national and international levels, congressional representatives, and local youth.

d. Specific Project Activities (Essential Projects)

a. <u>Road Decommission and Closure</u>

- **Attribute/Indicator Addressed:** 1.1 Water Quality – Impaired Waters (303d Listed); 1.2 Water Quality – Water Quality Problems (for non-303d Listed Waters); 3.3 Aquatic Habitat – Channel; 4.2 Aquatic Biota – Native Species; 6.1-6.4 Roads and Trails – Open Road Density, Road & Trail Maintenance, Proximity to Water, and Mass Wasting; 5.0 Riparian and Wetland Vegetation, and; 7.2 Soil Erosion.
  Project Description: Work under this project includes decommissioning of 10.1 miles and closure of 1.2 miles of FS roads, for a total of 11.3 miles. ***Completion of this project will implement all the remaining road decommissioning and closure work currently identified within this 6th field watershed.*** Planning is complete for all roads within this project. Road decommissioning will improve hillslope hydrology, and reduce potential for management related mass wasting and surface erosion that has the potential to deliver sediments to anadromous and resident spawning and rearing habitat. Treatment intensities vary for individual road segments based on aquatic risk and field reconnaissance that determined existing conditions and are grouped into three general categories: low, moderate, and high. Treatments could include: removal of ditch relief culverts or culverts at intermittent or live streams and associated road fill, construction of drainage swales and cross ditches, removal of unstable road fill material, outsloping or recontouring, scarification of the roadway, and construction of a road closure barrier. Road closure treatments will reduce the potential for sediment delivery to the aquatic system through implementation of treatments that reduce the potential for water diversion and fillslope failure, but also retain the road for future access needs.

FS Road Project	Total Miles	Treatment	ONF RMS Aquatic Risk Rating	Site Conditions	Estimated Total Cost
2360200	2.1	Decommission	Very High	Road transects highly dissected terrain, adjacent within 1000 feet of SF Skokomish tributary. Work requires removal of 10 large stream crossings, requiring end haul of excavated material to stable location.	$322,000
2353230	1.4	Decommission	High		$123,000
2355400	3.9	Decommission (2.7 miles); Closure 1.2 miles	Decommission = Moderate; Closure = Low	Road transects highly dissected terrain with multiple drainage features. Decommission work involves removal of two extremely large volume fill removals, with end haul of material to stable location.	$925,000
2270300, 2270390, 2270391	3.9	Decommission	Low to Moderate	1.2 miles of road are within convergent headwall areas of SF Skokomish tributaries.	$247,000

- **Partners Involvement:** Potential partner involvement:
  Skokomish Watershed Action Team – in-kind contributions to support projects, conduct and lead coordination of education and outreach efforts, potential for individual members to secure funds, participate in multiparty monitoring.
  Skokomish Tribe - in-kind contributions that include project support, assist in education and outreach efforts, potential to secure funds, and participate in multiparty monitoring.
  United States Environmental Protection Agency – contributes funds for road survey, design and photo monitoring.
  Washington State, Washington Conservation Corp – implement revegetation treatments on road decommission and closure projects following construction.
  Great Old Broads and Olympic Forest Coalition – potential for in-kind contribution to conduct both road surveys and photo monitoring, produce summary report of findings for road decommissioning projects, and present findings to SWAT and other interest groups.
- **Timeline:** Starting in 2013 and continuing for 5 years, pending availability of funds.
  Estimated costs and associated Budget Line Item: Approximately $1,732,000 is needed to implement project work. Potential BLIs include CMLG or CMRD. Substantial partner funding sources will likely be needed to implement this work. CMLG and NFXF funds covered project planning and design work that was completed in prior years.

b. <u>Road Storm Damage Risk Reduction (SDRR)</u>

- **Attribute/Indicator Addressed:** 1.1 Water Quality – Impaired Waters (303d Listed); 1.2 Water Quality – Water Quality Problems (for non-303d Listed Waters); 3.3 Aquatic Habitat – Channel; 4.2 Aquatic Biota – Native Species; 6.2-6.4 Roads and Trails – Road & Trail Maintenance, Proximity to Water, and Mass Wasting, and; 7.2 Soil Erosion.
- **Project Description:** Roads targeted for SDRR treatments include those high priority sites on 7.1 miles of road that are to remain on the transportation system. ***Completion of this project will complete SDRR work currently identified within this 6th field watershed.*** The main objective of SDRR work is to reduce the likelihood and consequence to aquatic resources due to sediment delivery through treatments designed to reduce the potential for water diversion and fill slope failure. Treatments vary for individual road segments by site conditions, aquatic resources at risk, and maintenance level requirements for the road. Treatments associated with existing culverts prone to plugging or failure and diversion may include activities such as replacement of culverts with larger capacity crossing structures, lowered road fills, and cleanout of culvert basin inlets and lead in ditches. At other locations, activities may involve: installation of new or replacement of existing ditch relief culverts, placement of armoring at inlets and outlets of culverts, lowering of fills at culvert crossings, construction of drivable dips, placement of armoring at select ditch segments, road surfacing, construction of water bars, maintenance of culvert inlet basins and ditches, and removal of unstable road fill slopes.

FS Road Project	Total Miles	ONF RMS Aquatic Risk Rating	Treatments	Estimated Total Cost
2361000	0.5	Very High	Culvert Upgrade – replace 2 existing culverts with larger one; address diversion potential. Planning complete.	$150,000
2361600	0.8	High	Address diversion potential. May involve culvert upgrade at 3 sites, ditch berm, fillslope pullback, road surfacing.	$350,000
2353210	0.7	High	Address diversion potential. May involve culvert upgrade at 3 sites, ditch berm, fillslope pullback, road surfacing.	$350,000
2353000	0.2	High	Address diversion potential. May involve culvert upgrade at 1 site, ditch berm, fillslope pullback, road surfacing.	$120,000
2355000	0.1	Very High	Replace culvert, armor outlet.	$4,000
2355400	3.9	1.2 miles Low; 2.7 miles Moderate	Reconstruct waterbars, clean culvert inlets and ditches, remove cutslope failures.	$8,500
2300000	0.9	High	Surface reshaping, removal of slough material.	$2,500

- **Partners Involvement:** Potential partner involvement:
Skokomish Watershed Action Team – in-kind contributions to support projects, conduct and lead coordination of education and outreach efforts, potential for individual members to secure funds, participate in multiparty monitoring.

Skokomish Tribe- in-kind contributions to include project support, assist in education and outreach efforts, potential to secure funds, and participate in multiparty monitoring.

- **Timeline:** Starting in 2013 and continuing for 5 years, pending availability of funds. **Estimated costs and associated Budget Line Item:** Approximately $987,000 is needed to implement project work. Potential BLIs include CMLG, CMRD, and NFVW. Partner funding sources may be needed to implement this work. CMLG and NFXF funds covered project design work that was completed in prior years.

c. <u>Trail 872.1 Stabilization</u>

- **Attribute/Indicator Addressed:** 1.2 Water Quality – Water Quality Problems (for non-303d Listed Waters); 3.3 Aquatic Habitat – Channel; 4.2 Aquatic Biota – Native Species; 6.2-6.4 Roads and Trails – Road & Trail Maintenance, Proximity to Water, and Mass Wasting, and; 7.2 Soil Erosion.
- **Project Description:** Stabilization of Trail 872.1 would involve removal of remaining unstable fill associated primarily with stream crossings on this previously decommissioned road, and reconstruction of trail segments at these locations to meet standards for the specified trail management objectives. It would also include removal of unstable sidecast material and outsloping at select sites, installation of drainage structures, trail realignment in areas of chronic erosion, and revegetation with native plant species. Trail 872.1 was a former road that was decommissioned and converted to a trail. The formed road was rated as very high aquatic risk and transects steep, highly dissected, and unstable terrain. Since its conversion, several trail stream crossings have eroded or failed and make access through the crossings difficult or not possible for some users such as equestrians. In some cases access through these sites is unsafe.

  This project aligns with other decommission trail conversion projects previously or currently being implemented in the watershed that affords protection of aquatic resources through designs aimed at preventing surface erosion or mass wasting and provides safe access to multiple users.
- **Partners Involvement:** Potential partners for this project include SWAT, Backcountry Horsemen of Washington, and Washington State Washington Conservation Corps.
- **Timeline:** The proposed project timeline for this project would initiate design in 2014, and begin implementation in 2014 or 2015, continuing for 2 years.
- **Estimated costs and associated Budget Line Item:** Approximately $223,000 is needed to implement the project**.** A potential BLI includes CMLG and NFRW. Substantial partner funding sources may be needed to implement this work. CMLG funds totaling ~$4,000 covered project planning costs completed in prior years.

d. Pine Lake Restoration

- **Attribute/Indicator Addressed:** 5.0 Riparian and Wetland Vegetation
- **Project Description:** The goal of this project complete the final phases of treatment focused on eradication of 2-3 acre infestation of reed canarygrass (RCG) around the perimeter of Pine Lake. Treatments aim to both improve habitat and exclude weeds from the site once RCG eradication efforts are complete. Most of the 7.7 acre shoreline of Pine Lake is dominated by the invasive weed RCG, which has displaced the native vegetation and greatly reduced available habitat for amphibians, waterfowl, and other freshwater lake-associated wildlife. Treatments, which began in 2012, have included the use of mechanical, cultural, and chemical methods to treat the RCG infestation, and planting locally collected native shrubs, sedges, grasses, and forbs to restore the native plant component of the lakeshore habitat. Remaining work emphasizes additional planting of native species, monitoring the success of treatments and conducting maintenance work.

  Pine Lake is accessed by FSR 2361210, which is currently be converted to a trail. Treating the RCG and restoring the native lakeshore vegetation will greatly improve the recreational experience of hikers using the new trail, and the lake's value as habitat for wildlife.

  Partners Involvement: *Back Country Horsemen of Washington* – in-kind contribution in activities associated with invasive weed treatments and planting of native plant species.
  Washington State – contribute matching funds for WCC crews to implement invasive weed treatments and planting of native plant species.
  Mason Count Noxious Weed Control Board – assist with treatment of invasive weeds.
  Skokomish Watershed Action Team – in-kind contribution support of project, participate in field trip to educate members about project.
- **Timeline:** Starting in 2013 and continuing for 2 years (Supplements prior work conducted in 2010 -2013).
- **Estimated costs and associated Budget Line Item:** Approximately $32,000 is needed to implement this project. Potential BLIs include NFVW. Substantial partner funding sources will likely be needed to implement this work. Over $56,200 in Forest Service and partner funds and partner in-kind contributions was expended in prior years to complete planning and implementation work.

f. Commercial Thinning – Upper South Fork Skokomish Vegetation Management Project

- **Attribute/Indicator Addressed:**
- **Project Description:** This project involves **c**ommercial thinning under the proposed Upper South Fork Skokomish Vegetation Management Project, an effort currently in the planning phase. The proposed action is to manage stand density and restore forest diversity by conducting variable density commercial thinning treatment on approximately 400 to 800 acres of forest stand plantations that contain trees over 9 inches in diameter and over 40 years of age. The thinning treatment would be a variable density thinning from below incorporating skips, gaps, and areas of heavy thinning. A primary objective of the proposed treatment would be to promote the development of late-successional habitat characteristics within the project stands. Thinning would reduce stand density, add structural and spatial complexity, maintain or increase crown and branch size and diameter growth of individual trees, introduce or continue to develop an understory of seedlings/saplings, shrubs, and herbs, increase the number of snag recruitment trees suitable for cavity nesters, and contribute to coarse woody debris recruitment.

  Within Riparian Reserves, an additional objective would be to enhance the long-term recruitment of large woody debris in streams adjacent to project stands. Within Riparian Reserves, commercial thinning may enhance long-term recruitment of large woody debris to streams, however, implementation of required no-cut buffers along all streams would limit potential benefits.

  This project work contributes to the landscape scale restoration work implemented in the entire South Fork Skokomish watershed since the early 1990s, including approximately 1,520 acres of commercial thinning. Restoration, habitat enhancement, and sale area improvement activities that may be implemented after commercial thinning activities in an area are complete, if sufficient revenue is generated by the timber sales to support them.
- **Partners Involvement:**
  Skokomish Watershed Action Team - would contribute in-kind contributions to support projects, lead collaboration in stewardship efforts, conduct and lead coordination of education and outreach efforts, and participate in multiparty monitoring. SWAT has engaged with the Forest Service during planning stages of the Upper South Fork Skokomish Vegetation Management Project. SWAT has expressed strong interest in collaborating in Stewardship Contract opportunities associated with this project.
  Skokomish Tribe- in-kind contributions that include project support, education and outreach, collaborate in stewardship efforts, and participate in multiparty monitoring.
  Great Old Broads and Olympic Forest Coalition – potential for in-kind contribution to conduct road surveys and photo monitoring, produce summary report of findings for roads associated with commercial thinning, and present findings to SWAT and other interest groups.
  Timeline: Implementation will likely begin in 2013 and continue for 4 to 7 years.

Planning was initiated in 2010, and a NEPA decision notice is expected in 2013. **Estimated costs and associated Budget Line Item:** Approximately $565,000 is needed to implement the project. Planning was completed in prior years, with an approximate cost of $550,000 using NFTM funds. Potential BLI includes NFTM. Preliminary estimates of the potential stewardship receipts that could be generated from this project range from $0 to $100,000. Stewardship receipts would be used to fund restoration work within the South Fork Skokomish watershed.

g. <u>Pre-Commercial Thinning</u>

- **Attribute/Indicator Addressed:**
- **Project Description:** This project will pre-commercial thin an estimated 2,000 acres of forest stand plantations that contain trees measuring less than 8 inches in diameter and are less than 35 years of age. Planning for this project was completed in prior years. Pre-commercial thinning overstocked plantations are designed to enhance wildlife habitat and species diversity by moving stands more rapidly toward attainment of late-successional conditions. Thinning in early and mid-seral patches will begin creating the structural diversity and promoting a reconnection of wildlife corridors. These treatments will enhance species and height diversity by favoring minor species. Stocking control is intended to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species by restoring the species composition and allowing increased water, nutrients, and light into the stands.

  This project work contributes to landscape scale restoration work implemented in the entire South Fork Skokomish watershed since the early 1990s, including nearly 5,000 acres of pre-commercial thinning.
- **Partners Involvement:**
  Skokomish Watershed Action Team - SWAT would contribute in-kind contributions to support projects, conduct and lead coordination of education and outreach efforts, and participate in multiparty monitoring
  Skokomish Tribe- in-kind contributions that include project support, education and outreach efforts, potential to secure funds, and participation in multiparty monitoring.
- **Timeline:** Starting in 2013 and continuing for 10 years.
- **Estimated costs and associated Budget Line Item:** Approximately $423,000 is needed to implement this project. Potential BLIs include NFTM and NFVW. Substantial partner funding sources will likely be needed to implement this work. Planning was completed in prior years using $10,000 in NFTM.

e. Costs:

Contribution	Planning	Design	Implementation	Project Monitoring
FS Contribution	$21,000	$342,000	$3,356,000	$83,000
Partner Contribution (both in kind and $)		$9,000 (Secured) $10,000 (Pending)	$17,000 (Pending)	$24,000 (Pending)
Total	$21,000	$361,000	$3,373,000	$107,000

f. Timelines and Project Scheduling

FY	Task	FS Cost	Partner Cost
2013-2018	Road Decommission and Closure - Planning and preliminary design is complete for all roads. Additional design will be completed for FSRs 2355400 and 2360200 in 2013 in order to better inform contract costs. Projects will be implemented as funds become available. Project sequence will be dependent upon priority of work, consideration of changed site conditions, and receipt of adequate funds to complete the work. Two projects, FSR 2355400 decommission and closure and 2360200 decommission, have substantially higher unit cost per mile due to high volume of road fill and associated end haul of material.	$1,705,000	$9,000 (Secured); $18,000 (Pending)
2013 - 2018	Road Storm Damage Risk Reduction - Planning and preliminary design is complete for all road segments. Projects will be implemented as funds become available. Project sequence will be dependent upon priority of work, consideration of changed site conditions, and receipt of adequate funds to complete the work.	$985,000	$2,000 (Pending)
2014 - 2016	Trail 872.1 Stabilization – Planning is complete for this project. Preliminary surveys were conducted in 2010 to identify key areas of concern, primarily trail stream crossings with significant erosion or channel down cutting. Design and implementation could begin in 2014 pending availability of funds, and will likely take 2 construction seasons to complete once the work is initiated.	$215,000	$8,000 (Pending)
2013 - 2015	Pine Lake Restoration – Complete final phases of project: implementation, maintenance, and monitoring.	$23,000	$9,000 (Pending)
2013 - 2020	Commercial Thinning – Upper South Fork Skokomish Vegetation Management Project. Planning is nearly complete for this project; signature of the decision notice expected in FY2013.	$553,000	$12,000 (Pending)
2013 - 2023	Pre-Commercial Thinning – planning and implementation pending availability of funds.	$421,000	$2,000 (Pending)

4. Restoration Project Monitoring and Evaluation

a. The forest will monitor: The type and degree of monitoring will vary for individual projects. For project work done under contract, compliance monitoring to determine if treatments are implemented as specified in the contract will be conducted through contract administration. The Forest will conduct Best Management Practices (BMP) monitoring at select sites using protocols currently being developed at the national-level of the Forest Service. This BMP monitoring is designed to determine the effectiveness of treatments implemented to protect water resources.

For road decommission, closure, and trail stabilization projects within this plan, the following type of monitoring will occur in addition to compliance and BMP monitoring described above. Photo monitoring will be conducted at specific road or trail segments to capture comparative conditions for pre, post and some during treatment project phases**.** The Forest will continue to coordinate with Region 6 and Forest Service Rocky Mountain Research Station in monitoring the effectiveness of road work funded through the Legacy Roads Program. For the Pine Lake Restoration project, ONF botanists will monitor the effectiveness of treatments and determine if additional treatments are needed.

b. Monitoring will be done in cooperation with:

- ***Multi-Party Monitoring by SWAT*** – With SWATs strong interest in project results, multi-party monitoring is expected to continue. Since 2005, SWAT has led and participated in several field trips to review watershed restoration projects being implemented on NFS lands.

- ***Skokomish Tribe –*** ONF will actively engage with the Skokomish Tribe in monitoring restoration activities under this plan.

- ***Great Old Broads/Olympic Forest Coalition*** – In 2010, 2011, and 2012, the Great Old Broads and Olympic Forest Coalition have conducted road surveys and photo monitoring on road decommissioning and trail conversion projects, and roads proposed under commercial thinning projects. Results for their 2010 and 2011 efforts are documents in individual reports. Monitoring for the 2012 projects is underway. The Forest Service will continue to help coordinate future efforts by these groups.

- ***Legacy Road & Trail Program*** – The Forest Service PNW Region coordinated monitoring of select roads that received decommissioning or SDRR within the South Fork Skokomish watershed. The Forest Service Rocky Mountain Research Station (RMRS) conducted this monitoring, with results summarized in findings in published reports. ONF will continue to with RMRS in their future monitoring efforts.

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