

*TREASURED LANDSCAPES, UNFORGETTABLE EXPERIENCES*

# *Twelvemile Creek Restoration*

Stewardship and Restoration on the Tongass National Forest in Southeast Alaska

2009-2014  
Final Site Report



# Partners



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## Engaging Communities

Project partners included national and local community-based nonprofit organizations, contractors in the community, and state and federal agencies. To connect and support the watershed restoration efforts occurring in the Tongass National Forest region, the NFF provided extensive capacity building and technical assistance to the Prince of Wales Watershed Association, Southeast Alaska Watershed Coalition, Organized Village of Kasaan, and Klawock Watershed Council.

**Implementation Partners:** Sitka Conservation Society, the Nature Conservancy in Alaska, the Student Conservation Association, and the U.S. Forest Service

**Financial Support:** Gordon and Betty Moore Foundation, FishAmerica Foundation, Wilburforce Foundation, Prince of Wales Resource Advisory Committee, and the U.S. Forest Service

**In-Kind Support:** U.S. Forest Service

## *Treasured Landscapes, Unforgettable Experiences* • • •

The National Forest Foundation (NFF), chartered by Congress, engages America in community-based and national programs that promote the health and public enjoyment of the 193-million acre National Forest System, and accepts and administers private gifts of funds and land for the benefit of the National Forests.

The NFF launched the *Treasured Landscapes, Unforgettable Experiences* conservation campaign to address critical forest and watershed restoration needs across millions of acres nationwide – focusing on iconic places that resonate with the American public. Our goals are to:

- Raise awareness about America’s public lands and our unique National Forest System – and reconnect our people to these great places.
- Generate expanded media attention, public interest, and partnerships in the Treasured Landscapes campaign.
- Grow the support base to ensure successful restoration projects at a suite of 14 or more campaign sites across the nation.

The Tongass National Forest located in Southeast Alaska was one of fourteen designated *Treasured Landscapes* sites.



## Site Overview • • •

### **Tongass National Forest**

Folded into Alaska’s Southeastern peninsula between British Columbia and the Pacific Ocean, the Tongass National Forest encompasses 17 million acres of breathtaking forests, glaciers and coastlines. Spectacular watersheds are blanketed with old-growth Sitka spruce, Western hemlock, and Western red cedar. The Tongass also boasts a dizzying array of wildlife, including grizzly and black bears, wolves, bald eagles, moose, Sitka black-tail deer, sea otters, whales, porpoises, and seals.



Alaska is considered the last stronghold for wild salmon. All five species of Pacific salmon – chum, Coho, king, pink and sockeye – depend on the streams and waters of the Tongass for spawning before making their way out to the rich seas nearby. Dolly Varden, rainbow, steelhead, and cutthroat trout also thrive on the Tongass waterways.



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As in the past, today the landscape's ancient and largely intact natural ecosystems are the genesis for valuable economic resources that support local communities and provide livelihoods for thousands of Southeastern Alaskans. Timber from the Tongass supplies a worldwide demand for wood products and its waters support a vibrant fishing industry. Tourism also has a strong economic impact on the region, especially in the long days of summer.

Within the Tongass – in the Alexander Archipelago – the Prince of Wales Island is a critical component of the forest in both its cultural fabric and bountiful natural resources. The coastal rainforest environment supports the Island's communities through subsistence hunting and fishing, commercial timber harvesting, and sharing the beauty of the landscape with many visitors and tourists. The Twelvemile Creek watershed is situated in this environment amongst the southern hills of Prince of Wales Island, and was the focus of our efforts on the Tongass National Forest.

The Twelvemile Creek watershed is a 12,800 acre (20 mi<sup>2</sup>) watershed draining into Twelvemile Arm on east Prince of Wales Island in Southeast Alaska. The narrow U-shaped valley of the watershed is characteristic of a glacially carved basin. The mainstem flows from a broad floodplain in the headwaters and then transitions to a high gradient contained channel. The high gradient contained channel is a series of bedrock falls and chutes that restricts anadromous fish migration to the lower one-third of the basin. The stream then transitions back and forth between broad and restricted geography before becoming a wide open estuarine system and emptying into Twelvemile Arm.

## Ecosystems in Decline

More than most other places in Southeast Alaska, timber harvest has played a key role in the development of Prince of Wales Island. The rate of today's timber harvest is greatly reduced from the large-scale harvests that occurred on the Tongass between the 1960s and 1980s.

However, in the Twelvemile Creek watershed, a history of extensive riparian and hillside harvest led to erosion from roads and trails, invasive species and inadequate fish and wildlife habitat. Thousands of previously harvested acres are in need of thinning to return the ecosystem to more favorable habitat quickly – not only for the benefit of wildlife, but also for the communities that depend on the wildlife and natural resource values.

After assessing the watershed's restoration needs, in 2007 the U.S. Forest Service designated Twelvemile Creek watershed as a high priority for rehabilitation to improve the existing fishery and repair riparian and forest conditions to promote healthy fish populations.

As the effects of past timber harvest become more apparent, landslides are no longer carrying large woody debris and sediment into the mainstem of Twelvemile Creek. Stream systems with healthy sediment and large woody debris form dynamic instream structures that develop sediment storage bars, deep pools, cover from predators, complex velocity gradients, and riffles with sorted sediment. These processes form complex beneficial aquatic habitat.

The lack of large wood, plus the presence of young growth riparian zones, has led to channel widening and unstable banks. These factors contribute to increased sedimentation and an elevated risk for bank failure, as evidenced in recent stream surveys in both the mainstem and tributaries that concluded that the Twelvemile Creek watershed scored low in terms of large woody debris, pool to riffle ratios, and width to depth ratios. The result of these factors is a loss of vital overwinter habitat for rearing salmonids.

Wildlife habitat has also been impacted by the riparian and hillside harvest, especially when combined with the natural "pinch point" topographical features in the lower portion of the watershed. In order to address the negative impacts, the high priority riparian treatment areas on this *Treasured Landscapes* site were comprised primarily of young-growth riparian stands in the Twelvemile Creek watershed.

The areas are generally within 100 feet from the high end of the stream banks with past harvesting on one or both sides of the stream. Non-native plants also adversely impact fish and wildlife habitat. A 2005 non-native plant survey of Twelvemile Creek watershed documented the presence of 62 non-native species, of which 18 are considered highly invasive. These plants include Japanese and spotted knotweed, reed canary grass, orange hawkweed, Canada thistle, and tansy ragwort to name a few.

During the years of active timber harvest a total of 59 miles of roads were constructed to support timber extraction in the Twelvemile Creek watershed, leaving the watershed with an average road density of 2.9 miles per square mile. Such high road densities negatively impact aquatic habitat through increased rates of sedimentation, erosion, road failures, blocked fish passage and reduced hydrologic connectivity. Many roads are



no longer needed to assure public access and allow for forest management, and are in need of storage and decommissioning. Other roads will remain open but require maintenance and upgrades to reduce negative impacts and increase fish passage.

### **Restoring a *Treasured Landscape***

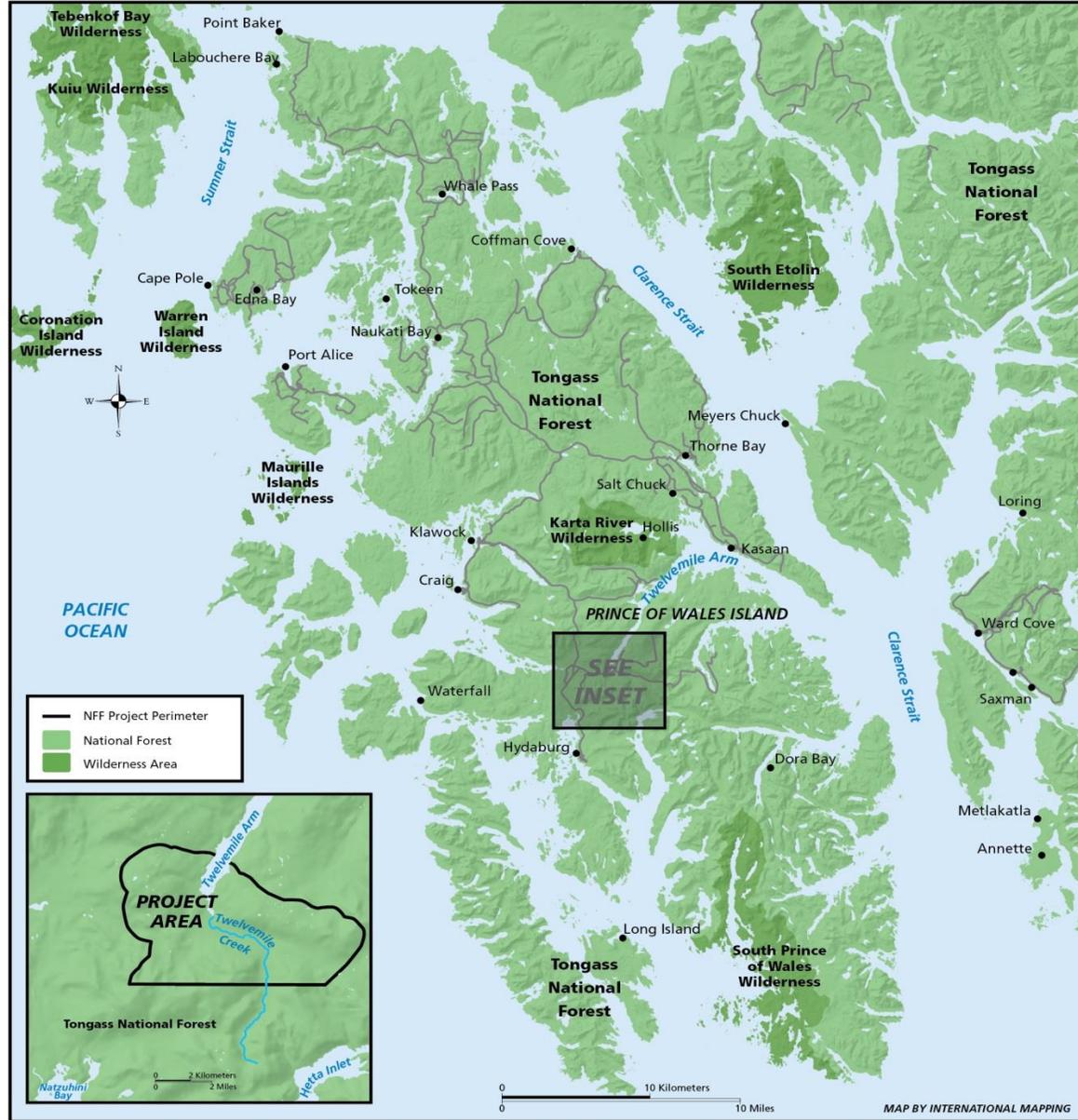
Working with the Forest Service, the NFF developed a comprehensive suite of goals for the restoration of the Twelvemile Creek watershed that focused on restoring the stream and riparian areas, improving wildlife habitat, and decommissioning roads. Restoration work included instream habitat improvement through floodplain roughening, bank stabilization, and placement of large wood to improve both fish and wildlife habitat that is so important to the communities of Prince of Wales Island. Additionally, we assisted in the development of a monitoring protocol. With the protocol, we led efforts to assess the impacts of this priority work with other restoration initiatives and organizations focused on the Tongass. In order to support the capacity of local communities, we also provided technical assistance to several local watershed organizations. This work directly contributes to increased awareness and local community engagement in the monitoring and restoration of important resources.



# Location Map • • •



Treasured Landscapes, Unforgettable Experiences  
**TONGASS NATIONAL FOREST**



# Restoration in Practice • • •

## Action-Oriented Projects

The NFF worked closely with conservation organizations and the Forest Service through a partnership-based approach to improve, monitor, and build capacity around watershed restoration on Twelvemile Creek in the Tongass National Forest. Through the implementation of action-oriented projects, these partnerships set the foundation for effective and sustainable restoration efforts. This work helped improve fish and wildlife habitat instream and in riparian areas, develop a monitoring protocol, and support community-based watershed organizations, all of which aided in ensuring the long-term health of the landscape.

## Project Accomplishments

Our collaborative efforts resulted in a set of five high-level project goals:

1. Instream and Riparian Restoration
2. Native Plant Restoration
3. Wildlife Habitat Restoration
4. Road Maintenance, Storage, and Decommissioning
5. Connecting Science and Action with Community

Together with our partners, we implemented projects that accomplished each of these goals.

## Instream and Riparian Restoration

We partnered with the U.S. Forest Service and The Nature Conservancy (TNC) to fund and implement work to reverse the effects of past timber practices on Twelvemile Creek. Our objective was to stabilize degraded instream and riparian habitat in the watershed and provide the natural channel with conditions necessary to promote recovery.

Strategies included riparian thinning and vegetation planting to improve riparian areas, and placement of large woody debris and wood structures instream to enhance fish habitat. In order to reintroduce and resupply large woody debris, local contractors collected wood from nearby areas and dispersed debris over 25 acres of the riparian area. Over 600 cut and full trees were transported (mostly by helicopter) to the stream to be used for



present and future habitat structures. The placement of large wood physically armored unstable banks, helped to mitigate stream erosion, and discouraged gravel bar development, resulting in increased habitat diversity.

Our partnership with TNC and the Forest Service resulted in 3.1 km of instream habitat restoration over two years, and upgraded the Forest Service’s classification of the watershed from “Functional at Risk” to “Properly Functioning.” The instream restoration will help ensure persistence of a sustainable salmon population, and the improved wildlife habitat will benefit sport and subsistence hunters. Moreover, contracts required to complete the work benefitted local communities and helped them participate in the growing restoration economy.



Planned restoration work for Twelvemile Creek is complete; however, the Forest Service and TNC will continue to focus on instream restoration in other watersheds on Prince of Wales Island, thereby transferring many of the lessons learned during the Twelvemile Creek instream and riparian restoration project.

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**“When you put logs in the stream, you immediately make the stream less homogeneous, and provide more diversity for fish. The stream banks are more stabilized. You are returning the stream to a more natural functioning condition.”**  
– Shelia Jacobson, Tongass National Forest

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## **Native Plant Restoration**

Shared support from the local Resource Advisory Committee and Forest Service funded invasive plant control. Hand pulling was used to treat Japanese knotweed, and “tarping and drying,” or piling weeds on plastic sheets before covering with tarps to dry, was used along stream channels to eradicate creeping buttercup, reed canary grass, and forget-me-not. Additional work to control these species will continue in the future.

## **Wildlife Habitat Restoration**

In partnership with the Forest Service and TNC, we thinned 530 acres of dense upland second-growth forest in the Twelvemile Creek watershed to promote more favorable wildlife habitat conditions. The newly-thinned forests allow for more sunlight to reach the forest floor, sustaining blueberry shrubs and other plants that are a diet staple for Sitka black-tailed deer, wolf, black bear, and other wildlife.

## **Road Maintenance, Storage, and Decommissioning**

Through partnerships with the Forest Service and TNC, we were able to decrease the impact of roads to aquatic habitat in the Twelvemile Creek watershed. The high road density of Twelvemile Creek resulted in increased sedimentation and erosion, road failures, blocked fish passage, and reduced hydrologic connectivity. In 2013 our partners were able to complete 7.8 miles of road storage and 1.6 miles of road decommissioning. Fish passage culvert replacement began in 2014 and will continue through 2015.

## Connecting Science and Action with Community



Community involvement is an important part of the partnership-driven work the NFF supports across the country. Through this work, community interests are able to develop capacity and resources to engage actively as stewardship partners. By working together with land managers and resource scientists, communities are better able to provide input to help sustain forests and watersheds over the long term, help implement project work, and collect data on changes to help inform management decisions over time.

At the Tongass National Forest *Treasured Landscapes, Unforgettable Experiences* site, this type of direct engagement was fostered throughout the restoration process. Fish monitoring carried out by the Student Conservation Association (SCA), and now continued by the Sitka Conservation Society, will measure the restoration project's effectiveness and help support adaptive management in the watershed. For more details, see the *Project Spotlight* (page 12).

We used a variety of approaches to connect to local communities and build capacity for watershed conservation in Southeast Alaska. Notably, we helped build an island-wide watershed council – the Prince of Wales Watershed Association (POWWA) – to connect

watershed initiatives across the island with Tongass National Forest priorities. Leading up to our work in building POWWA, we assessed the organizational needs of six community watershed councils. Following the assessments, we provided in-depth coaching and training in board development, managing financial systems, strategic planning and visioning, fundraising, and working effectively with agencies. In addition to technical assistance, we provided grant funding to each group to enable them to build their organizational capacity.

For example, funding was provided to hire and mentor the Southeast Alaska Watershed Coalition (SAWC)'s first full-time coordinator (who later became the Coalition's first executive director). SAWC is now a regional leader in supporting its member watershed councils and fosters networking and learning among the groups. We feel strongly that our multi-year investment in local community watershed councils will help sustain our efforts so they may have a lasting impact on Prince of Wales Island and throughout the Tongass National Forest.

Additionally, we partnered with acclaimed nature photographer Amy Gulick, the U.S. Forest Service, Alaska Wilderness League, and Braided River to bring *Salmon in the Trees*, a photography exhibit showcasing the inter-connected cycles of salmon, trees, and people of the Tongass National Forest, to six communities throughout Southeast Alaska. The exhibit helped to celebrate the International Year of the Forests (2011) by inspiring the protection and restoration of the Tongass National Forest and its fish habitat.

## Project Spotlight: Twelvemile Creek Smolt Investigation and Monitoring • • •

The name “smolt” is used to describe a young salmon or trout that make the journey from an inland stream to the sea for the first time. Because the health and abundance of smolts is a key indicator of salmon production and survival, we wanted to assess the smolts emigrating from Twelvemile Creek to the Pacific Ocean in order to determine the watershed-scale effectiveness of our habitat restoration actions.

For the project we partnered with SCA and the Forest Service. Over two years, SCA’s field interns and Forest Service staff monitored coho salmon, steelhead trout, and Dolly Varden trout smolt by counting the number and measuring the timing, size and age composition of smolts leaving Twelvemile Creek. During the second year, the SCA interns also coded wire tagged 11,600 of outmigrating coho smolts to determine marine survival and harvest rates for fish coming from Twelvemile Creek. SCA volunteer interns contributed 2,284 total hours to the project and gained valuable professional skills for future careers in fisheries and aquatic biology.



In 2014 and beyond, monitoring responsibilities will be continued by the Sitka Conservation Society with the goal of supporting a local workforce. The Sitka Conservation Society will utilize procedures and lessons learned from the SCA to continue the work of assessing the effectiveness of instream and riparian habitat restoration efforts. The NFF will provide tools, funding, and other capacity to help the Sitka Conservation Society succeed in years to come. We support this transition as a way to build local capacity in Southeast Alaska, help local communities engage in the growing restoration economy, and provide on-the-ground restoration monitoring opportunities for students. We hope to see the Sitka Conservation Society and other local community organizations engage in the restoration of Twelvemile Creek in the future.

The NFF is pleased to have been able to support this key regional restoration partnership.

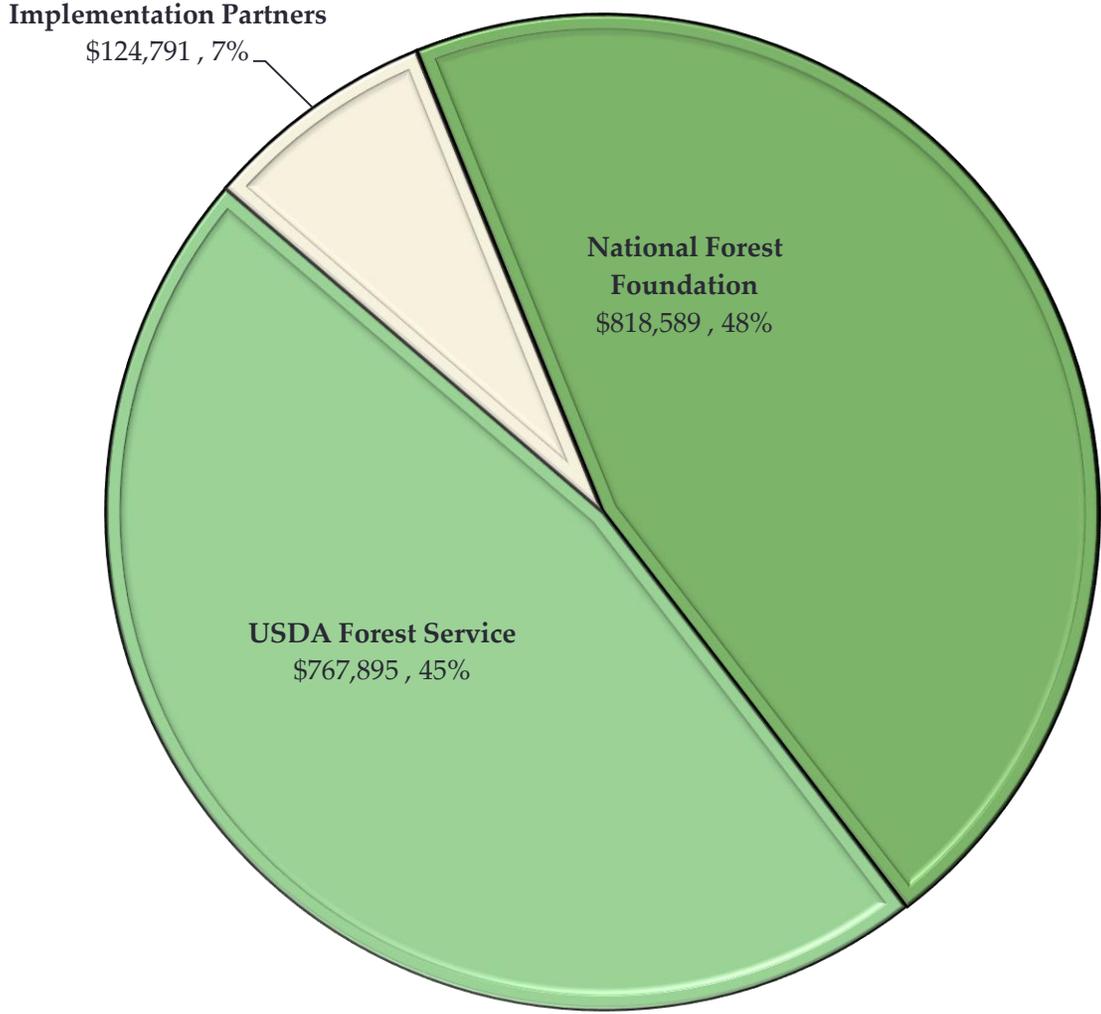
## Lessons Learned • • •

One of the key lessons learned at the Tongass National Forest *Treasured Landscapes, Unforgettable Experiences* campaign site is the incredible power of partnerships in accomplishing conservation work at scale. The support that comes from having local grassroots, regional and national conservation organizations working with state and federal agencies, and committed private funders is incredible. By leveraging the resources these partnerships provides more work can be accomplished than any one group could do on its own. On the Tongass National Forest, the partnership with the Forest Service was especially valuable. In fact, the budget was adjusted over time when the agency was able to provide more resources than originally expected.

Another key lesson is the ability to perform technical work at a large scale in a rural setting such as Prince of Wales Island. The limited availability of contractors, and challenges associated and communication made thoughtful planning, project design and communication highly valuable while the restoration and capacity building work was being completed.



# Project Contributions • • •



## A Committed Community • • •

Although the NFF's formal role in the Tongass National Forest *Treasured Landscapes* site concluded in 2014, work continues through engaged local partners. Instream and riparian restoration, monitoring, and community engagement events will continue to thrive on this special Southeast Alaska landscape.

- **Sitka Conservation Society:** In 2014 the NFF provided the Sitka Conservation Society with funding to continue Twelvemile Creek monitoring, while developing local capacity for future restoration work in Southeast Alaska.
- **The Nature Conservancy:** NFF provided financial support for TNC's instream and riparian restoration work in Twelvemile Creek, which the organization will continue in other priority watersheds throughout Southeast Alaska in the future.
- **Forest Service:** The Twelvemile Creek restoration project is complete; however, the Forest Service will continue the "Tongass Transition" to restore the Tongass National Forest to a pre-management state. Efforts will include thinning dense young-growth stands and restoring priority watersheds.
- **Prince of Wales Watershed Association:** The Prince of Wales Watershed Association (POWWA) is flourishing in its young existence. Under the leadership of Executive Director Brandy Prefontaine, who participated in the NFF's peer mentoring program, POWWA continues to work towards long-term sustainability and management of the Island's watersheds by providing training, outreach, and educational programs.
- **Southeast Alaska Watershed Coalition:** Due in large part to the NFF's capacity building efforts, SAWC is a thriving organization that will continue to bring community based watershed organizations in Southeast Alaska together to share information, network, and learn about watershed conservation. SAWC's efforts will help sustain the NFF's work in Southeast Alaska into the future.



## For More Information

National Forest Foundation  
[www.nationalforests.org](http://www.nationalforests.org)  
(406) 542-2805