Tongass National Forest
Water Quality Best Management Practices – Annual Monitoring Report
Fiscal Year 2019

Introduction

This report summarizes evaluations completed in Fiscal Year (FY) 2019, with emphasis on documenting the actions identified to improve and maintain nonpoint source pollution control and the protection of water quality.

Corrective actions respond directly to problems or deficiencies observed during evaluations. They may be either immediate or longer term, and usually apply specifically to the evaluation site. Adaptive management actions apply more broadly to changes in procedures to improve and maintain nonpoint source pollution control and the protection of water quality.

Best management practices (BMP's) were evaluated at the project level on the basis of implementation and effectiveness. In general they were found to be mostly implemented and effective in FY 2019. Exceptions are described in this report along with associated corrective and adaptive management actions and their completion status (Table 1 & Table 2).

Table 1. FY19 list of corrective actions.

Site	Actions	Status (June, 2020)
Dude Mountain Trail	• Implement 2019 TRACS maintenance list items specifically those identified to improve water quality BMP effectiveness.	• KMRD working to identify alternative sources of funding for survey and design.

Table 2. FY19 list of future adaptive management actions.

Site	Actions	Status (June, 2020)
Redoubt Lake Fertilization	• Develop a formal project plan that specifies project BMP's.	• Plan is to be developed during the 2020/2021 off-season.
Dude Mountain Trail	• Ensure routine maintenance needs are completed at early signs of wear. • Use of more robust trail construction for high traffic trails through wetlands in alpine areas.	• Feedback provided to program staff.
Pump Unit 77	• Ensure Class I stream buffers meet minimum 100ft horizontal distance and FP channels receive appropriate RMA buffer (greatest of flood plain, riparian vegetation or soils, riparian associated wetland fens, or 130ft).	• Feedback provided to program staff.
Maas WaterLine	• Recommend including R10-D106 minimum streamflow provision when necessary, consider simple monitoring plan as alternative.	• Feedback provided to program staff.

FY 2019 Monitoring Overview

BMP evaluations were conducted by interdisciplinary teams (ID Teams) following national protocols (Photo 1). At a minimum, ID Teams included a soil, water or fisheries specialists and field personnel responsible for implementing the BMPs. Other interested Forest Service personnel along with representatives from state and federal agencies and private industry also participated. The protocols include standard data forms and instructions for site selection and evaluation. Forms were completed in the field and all findings were discussed before leaving the site. Completed forms are available on request.

Photo 1. Dennis Landwehr, Forest Soil Scientist and Sue Howle, Ketchikan Misty Fjords District Ranger evaluating a segment of Dude Mountain Trail, KMRD.

The Forest Plan emphasizes BMP monitoring of timber harvest, roads, and recreation activities. Additionally the Tongass NF was assigned a national BMP program target for FY 2019 and FY 2020 to monitor at least one protocol in each of the activities identified in the National Core BMP Technical Guide[1], with the exception of Rangeland Management and Wildland Fire.

FY 2019 monitoring efforts evaluated four sites across four Ranger Districts (Figure 1) representing four different activities (Table 3). Three sites were randomly selected from forest populations following national protocols. The fourth site Dude Mountain Trail was intentionally selected for review of the current trail condition and the Ketchikan Misty Fjords Ranger District's concern for resource impacts. Evaluations for aquatic ecosystems and roads were planned for FY19 however they were slightly delayed, being completed in the first month of FY20. These two categories will be evaluated again at the end of FY20.

[1]There are a total of eleven activities and forty-two monitoring protocols identified in the National Core BMP Technical Guide.

Table 3. Completed site evaluations for FY 2019 & 2020 monitoring cycle

Map ID	Site Name	Activity & Protocol	Ranger District
FY 2019			
1	Redoubt Lake Fertilization*	Chemical Use B – Use in water waterbodies	Sitka
2	Dude Mountain Trail**	Recreation D – Trail operation and maintenance	Ketchikan
3	Pump Unit 771*	Vegetation A – Ground based skidding and harvesting	Wrangell
4	JUN819 Maas Waterline*	Water Use E – Operation and maintenance of diversions and conveyances	Juneau
FY 2020			
	N. Kuiu Security Tributary Riparian Thinning*	Aquatic Ecosystems B – Completed improvements	Petersburg
	Staney Water Crossing 2050400-0.56*	Road B – Completed road and/or waterbody crossing construction or reconstruction	Thorne Bay
	Luck Water Crossing 3030000-0.05*	Road B – Completed road and/or waterbody crossing construction or reconstruction	Thorne Bay
	Hoonah Water Crossing 85082-0.436*	Road B – Completed road and/or waterbody crossing construction or reconstruction	Hoonah
	Big Thorne Harvest Unit 8-808*	Vegetation A – Ground based skidding and harvesting	Thorne Bay

*Sites randomly selected from Forest populations following protocols for national BMP monitoring targets.
**Sites not randomly selected from Forest populations.

Table 4. Sites tentatively scheduled for evaluation in remainder of FY2020

	Site Name	Activity & Protocol	Ranger District
	FY 2020		
	Staney East Middle Fork 2*	Aquatic Ecosystems B – Completed improvements	Thorne Bay
	Sitka Colocated office*	Facilities B – Operation and Maintenance	Sitka
	Helca Greens Creek Mine*	Minerals B – Active non-placer mineral operations	Juneau
	Man Made Hole Picnic Site*	Recreation A – Developed recreation sites	Petersburg
	Big Thorne Harvest Unit 12*	Vegetation A – Ground based skidding and harvesting	Thorne Bay
	Big Thorne Harvest Unit 401*	Vegetation A – Ground based skidding and harvesting	Thorne Bay

*Sites randomly selected from Forest populations following protocols for national BMP monitoring targets.
**Sites not randomly selected from Forest populations.

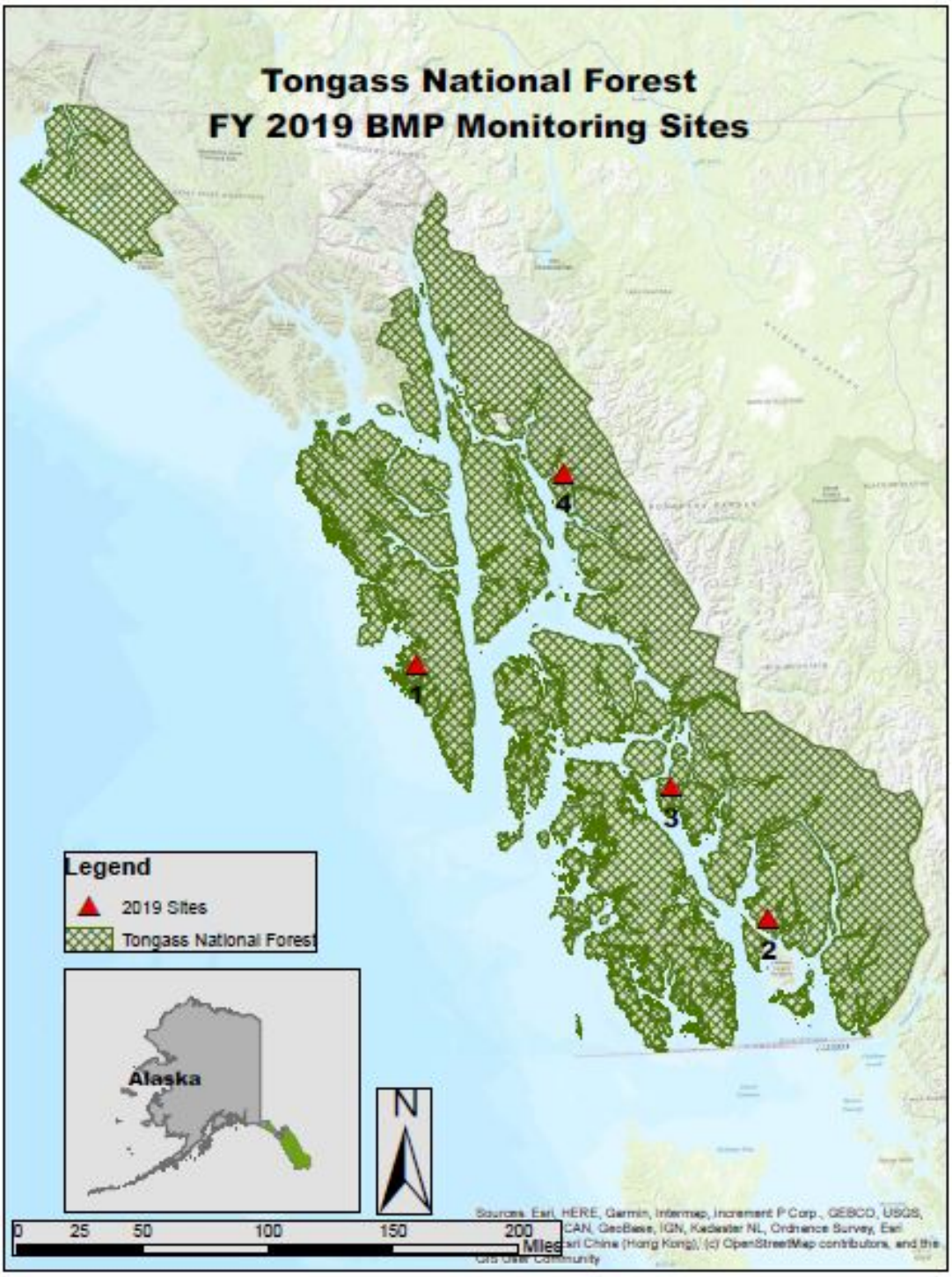

Figure 1. Tongass National Forest FY 2019 BMP monitoring sites (see table 3 for site map ID's).

Program Background

Background: Implementation of soil and water quality standards and guidelines is necessary to maintain soil productivity and water quality. The soil and water standards and guidelines are implemented as best management practices (BMPs) described in the Alaska Region Supplement to Forest Service Handbook 2509.22 and the National Core BMPs (National Best Management Practices for Water Quality Management on National Forest System Lands – FS-990a, April 2012).

Forest Plan Goals: Maintain soil productivity and minimize soil erosion from land-disturbing activities. Minimize sediment transported to streams from land-disturbing activities. Maintain and restore the biological, physical and chemical integrity of Tongass National Forest waters. Minimize the destruction, loss, or degradation of wetlands, and preserve and enhance wetland functions and values.

Forest Plan Objectives: Attain State of Alaska Water Quality Standards.

Soil and Water Forest Plan Monitoring Question: Are the soil and water conservation practices as described through the best management practices and site-specific prescriptions implemented and effective in minimizing soil erosion and maintaining the State water quality standards? [This question specifically addresses a requirement of the 2012 Planning Rule: "Progress toward meeting the desired conditions and objectives in the plan, including for providing multiple use opportunities" (36 CFR 219.12 (a)(5)vii]

Evaluation Criteria: The Forest Plan describes the evaluation criteria as "compliance and implementation of BMPs and the State Water Quality Standards." Properly implemented BMPs are the primary mechanism for meeting water quality standards from nonpoint pollution activities in the Tongass NF. BMPs are considered effective when field evaluations confirm that sediment or other pollutants have not moved off site or into water bodies.

Sampling/Reporting Period: The national BMP program targets are accomplished over a two year monitoring cycle, in which at least one site per resource is to be evaluated. Data are collected and recorded annually and entered into the Forest Service corporate BMP database. A summary report is compiled annually to provide feedback and follow through on corrective and adaptive actions.

FY 2019 Monitoring Results

Chemical Use B – Redoubt Lake Fertilization

Redoubt Lake on Baranof Island is one of North America's largest meromictic lakes, where a 100m deep layer of freshwater sits atop a dense anoxic saline waterbody. This results in a nutrient limited system unable to support what was once a high production self-sustaining Sockeye salmon run. In the early 1980's the USFS and ADF&G Fisheries Rehabilitation, Enhancement, and Development (FRED) division joined in a cooperative effort to enhance the run by increasing nutrient levels through the application of pharmaceutical grade fertilizer.

Project records include a CE that was completed in 1984 for Fisheries Enhancement Projects on the Sitka Ranger District. The CE does not specify BMP's or project guidance; however, it does reference project guidance provided in a similar fisheries enhancement EA completed in 1983. Project plans from 1987 and 1993 document changes in project management from ADF&G to TNF Sitka Ranger District. Currently a suite of procedural documents provides guidance on project operation, including water quality sampling protocols.

Since project inception in 1984, fertilizer mixtures of nitrate and phosphate have been applied seasonally, approximately beginning in mid-May and ending in mid-September for the years of 1984 – 1987, 1990 – 1995, and 1999 – present. Fertilizer currently being applied is Monoammonium Phosphate granules with an N:P:K ratio of 12:61:0. In the 2014 and 2015 summer seasons, a cyanobacteria bloom occurred and there was concern about potential toxicity. Corrective actions were taken, halting fertilizing and collecting samples for analysis. Results showed the bloom to be non-toxic and application resumed. Further studies suggested the observed blooms were more likely related to a large landslide that occurred in 2013 at the Lake Inlet and subsequent nutrient loading through runoff from the slide and/or the flooded forest lake created by the slide.

The BMP evaluation was conducted on September 5th, 2019 while fertilizer was being applied, and the entirety of the waterbody along with the onsite fertilizer staging location was evaluated. Other than the intended increase to primary productivity, visual field observations found no evidence of adverse consequences to water quality or aquatic health as a result from chemical use. BMPs regarding chemical transport, storage and disposal along with water quality monitoring as identified in standard operating procedures and chemical handling instructions were followed. No visual evidence of chemical spills or leaks were observed.

Corrective Actions:

None identified.

Adaptive Management Actions:

- To support program continuity of BMP implementation, it's recommend to summarize the suite of guiding procedural documents into a formal project plan. This document should include project specific BMP provisions that adhere to/reference Region 10 BMP Guide FSH 2509.22 Chapter 10 BMP 18.5 Lake Fertilization for Fish Habitat Improvement, and National Core BMP Tech Guide (2012) Chem-4 Chemical Use in Waterbodies.

Photo 2. One of five application sites where punctured bags of fertilizer soak and dissolve while tethered to shore.

Photo 3. Onsite fertilizer staging area along the southern lakeshore. Bags of fertilizer are kept inside the large white helicopter sling bag.

Recreation D – Dude Mountain Trail

The Dude Mountain Trail was constructed in 2000 on KMRD and is located approximately 15 miles from Ketchikan at the end of Brown Mountain Road. The trail is little over a mile in length with approximately the first half as gravel and boardwalk tread before transitioning to native tread as it climbs the ridge through alpine mixed wetlands towards the peak of Dude Mountain.

Trail BMP's were evaluated in regards to the operation and maintenance of the trail Sep 20th 2019. At the end of the boardwalk section the unimproved trail crosses through approximately 650 feet of alpine wetlands. This section of trail served as the waterbody crossing that we considered in our evaluation. BMP provisions contained within the INFRA database task guide, which serves as the O&M guidance document, were not found to be fully implemented or effective.

Evidence of erosion and sedimentation was observed both inside and outside the evaluated waterbody crossing. Forms of erosion identified included rill and sheet erosion, rutting, vegetation damage and bare ground, and localized sediment deposition. Routine trail INFRA inspections have been completed on the recommended five year rotation. These inspections have documented maintenance needs that have gone unresolved, some of which have been contributing to the erosion and sedimentation issues observed in this evaluation. No evidence of trash or domestic animal or human sanitary waste was observed.

The challenges faced from a lack of funding and staff have reduced the District's ability to address these robust maintenance items over the past years. District staff has considered funding sources such as RAC funds, but is looking to identify additional alternative sources for survey and design work.

Corrective Actions

- Complete the 2019 Trail Assessment Condition Survey (TRACS) maintenance items that include BMP provisions to reduce trail erosion and sedimentation. The maintenance items include improved tread, water control features, geotextile mat replacement, rehabilitation of user created trails, and reconstructed or rerouted sections of trail.
- Install more frequent and longer water bars that fully span across the trail, using 3" base material for improved drainage in deeply incised sections of trail, deterring use of user created trails/shortcuts with brush and trail signs, and rerouting sections of trail along drier routes and extending switchback distances.

Adaptive Management Actions

- Ensure maintenance needs are completed shortly after being identified and O&M plans are followed. In the case of Dude Mtn Trail, maintenance needs were identified as early as 2008 but have yet to be acted on. At this point the trail needs to be reconstructed.
- Trails traversing wetlands in alpine areas with high traffic levels should be designed and constructed to a more robust standard than trails on uplands. More robust trail construction will help avoid the long-term deferred maintenance identified on the Dude Mountain trail.

Photo 4. Rill-eroded section of evaluated trail segment.

Photo 5. Poor drainage within evaluated trail segment.

Vegetation A– Pump Unit 77

The Pump 77 harvest unit is located in the Mosman Inlet-Frontal Rocky Bay HUC12 watershed on the Wrangell Ranger District. Treatment prescription included single tree selection planned and implemented as small patch clear cuts using a shovel. It was planned as 53 acres holding 266 MBF, cruised as 425.75 MBF and sold as 14 acres. Additionally it included a 1500sq ft landing. Treatments began July of 2017 and concluded the following August of 2018. The unit lies adjacent to Pump (Mosman) Creek, a perennial Class I stream.

The evaluation was conducted on September 12, 2019 and considered ground-based skidding and harvesting activities. These activities were authorized with an environmental impact statement.

Adequate BMP's were included in the project contract/plan, however the provision regarding vegetation treatment near the waterbody was not fully implemented. Riparian buffer widths were measured in the field during the evaluation for verification. They fell short of the required 130ft minimum horizontal distance buffer in a few sections, with the narrowest distance measuring 90ft. The riparian buffer extent was shown on the sale area map and marked on the ground, but implemented too small in these few sections.

Supplemental erosion control was applied to skid roads and trails as planned and showed to be effective. There was no evidence of erosion or sedimentation observed from the log deck or within the RMA. There was no visual evidence of chemical or fuel spills or leaks or waste containers.

Corrective Actions:

None identified.

Adaptive Management Actions:

- Ensure Class I stream buffers meet minimum 100ft horizontal distance and FP channels receive appropriate RMA buffer (greatest of flood plain, riparian vegetation or soils, riparian associated wetland fens, or 130ft). Unit boundary coincided with deep notch/vertical cliff in vicinity of stream transition from FPM to MCM.

Photo 6. Pump Harvest Unit 77 Landing on FS-system road 51544.

Photo 7. Chelsey Bach, Forestry Technician evaluating the shovel trail on the Pump Harvest Unit 77, Wrangell Ranger District.

Water Uses E – JUN819 Maas Waterline

The Maas Waterline is located on the Juneau Ranger District in the Whiting River Outlet HUC12 watershed. The facility was authorized in 2011 by a special use permit set to expire in 2031 for the conveyance of water for municipal/domestic water supply. No water right is held for this facility and nor does the diversion-source waterbody support any aquatic organisms of interest.

The evaluation, conducted August 13th, 2019, considered the operation and maintenance of the waterline facility. Overall BMP's were found to be successfully planned, implemented and effective. The collection system and waterline appear to be operating as intended. Water automatically spills over the rock dam to maintain natural streamflow at all ranges of flow, with no impacts to stream morphology or water quality. There was no evidence of erosion, water leakage, hazardous materials or other pollutants.

Corrective Actions:

None identified.

Adaptive Management Actions:

- R10-D106 was added to this permit to specify minimum flows and a streamflow monitoring plan. No minimum flows were specified and no streamflow monitoring plan was developed. It was agreed that minimum flows were not a necessary provision for this site and should not have been added to the permit. It is recommended to only include the R10-D106 minimum streamflow provision when a hydrologist or fisheries biologist determines it essential; alternatively a very simple 'monitoring plan' could have been provided to the permit holder to comply.

Photo 8. Maas waterline collection feature.

Photo 9. Maas waterline pipe junction.

Appendix 1. Site locations

Table A1. FY 2019 BMP monitoring site coordinates.

Map ID	Site	Latitude	Longitude
1	Redoubt Lake Fertilization	56.894207	-135.241449
2	Dude Mountain Trail	55.419716	-131.611946
3	Pump Unit 77	56.188	-132.575
4	Maas Waterline	58.0053	-133.6947