CHUGACH NATIONAL FOREST

Forest Plan Monitoring Report
Fiscal Year 2012

Nellie Juan-College Fiord Wilderness Study Area in western Prince William Sound - Orcas

United States Department of Agriculture
Forest Service
Alaska Region
Chugach National Forest

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EXECUTIVE SUMMARY

The 2002 Chugach National Forest Land and Resource Management Plan, as amended, (the "Forest Plan") established 26 monitoring questions to evaluate the Forest Plan's effectiveness. Sampling protocols have been finalized for 23 of these questions. In fiscal year 2012, information was successfully collected to evaluate 19 of the 26 monitoring questions.

This report summarizes the monitoring activities conducted in FY 2012 and provides results of monitoring efforts. It provides recommendations for remedial action if monitoring identified concerns related to progress toward achieving goals, objectives and desired conditions described in the Forest Plan.

I have reviewed the FY2012 Forest Plan Monitoring and Evaluation Report for the Chugach National Forest and am making the results available to the public. I find that our monitoring and this report meet the intent of the Forest's Monitoring Plan. No need to amend the Forest Plan was identified as a result of this monitoring.

12/18/2018

Terri Marceron
Forest Supervisor

Date

INTRODUCTION

This is the annual monitoring and evaluation report for fiscal year 2012 for the Forest Plan. The Forest Plan provides guidance for all resource management activities on the Chugach National Forest (CNF). It does this in part by establishing Forest-wide goals, objectives, and management direction. The monitoring and evaluation process is used to ensure that Forest Plan direction is being implemented, is effective, and is not causing effects that were not predicted in the Forest Plan's Final Environmental Impact Statement (FEIS). The evaluation process is also used to assess progress in achieving desired conditions, goals, and objectives expressed in the Forest Plan, and to verify that assumptions made in the Forest Plan and FEIS are valid.

The overall strategy for this monitoring and evaluation program is described in Chapter 5 of the Forest Plan. The strategy includes a series of monitoring questions and indicators by which Forest Plan effectiveness and implementation progress can be measured. Detailed protocol for collecting and analyzing information needed to address each question has been developed separately and is described in the Chugach Monitoring Guide (USDA Forest Service 2011). The development and revision of these sampling and analysis protocols occurs independently from the Forest Planning process.

The monitoring questions as described in the Forest Plan have been substantially revised through a series of Forest Plan amendments. As of 2012, there are 26 monitoring questions that form the basis of the monitoring evaluation and are addressed in this annual report (Table 1). For three of these questions the indicators and associated sampling and analysis protocols have not yet been developed and approved. Therefore, information for these questions was not collected in 2012. For two questions, no information was obtained this year because the planned implementation schedule did not include 2012 as a sampling year for the question. For two questions, unfavorable weather or inadequate staffing prevented sampling. As a result, the new information presented in this annual report is limited to 19 of the 26 monitoring questions.

The data collection status for Forest Plan monitoring questions in FY 2012, including items for which no monitoring occurred, are summarized in Table 1.

Details related to each monitoring question follow the summary provided in Table 1. This detailed information was extracted from individual project reports that were prepared for each of the monitoring questions. These project reports were prepared by those Chugach Forest specialists responsible for collecting and analyzing the relevant monitoring data.

Monitoring results are summarized and evaluated only for items monitored in FY12 and include (1) recommendations for remedial action, and (2) actions taken in FY12 to respond to previous

recommendations. The monitoring strategy specifically calls for these items to be included in the annual reports.

Table 1. Summary of Forest Plan monitoring questions with data collection status for FY 2012

Category	Monitoring Question	Data Status
Plan Compliance	Q1 - Are projects being implemented consistent with the Forest Plan direction?	Yes
Plan Effectiveness	Q2 - Are management activities achieving their intended outcomes?	Yes
	Q3 - To what extent is ecosystem composition and structure changing and has forest management influenced those changes? How do these changes compare to the expected range?	Yes
Air Resources	Q4 - Are Forest management actions contributing to changes in air quality on the Forest?	Yes
Soil Resources	Q5 -What is the effect of summer OHV use on soils and/or vegetation where OHV use is allowed? Are management practices (standards, guidelines, BMPs, mitigation measures) effective in maintaining soil quality and in meeting the severity limits for selected soil properties?	No, Need Protocol
Water Resources	Q6 - Are best management practices (including wetland management) effective in meeting water quality standards?	No, Staffing Shortage
Aquatic and Riparian Habitat	Q7 - Are riparian and aquatic habitat protection measures included in project planning and are Revised Forest Plan standards and guidelines being met during project implementation?	No, Need Protocol
Sensitive and Exotic Plants	Q8 - What is the abundance and distribution of sensitive plants in areas affected by management activities?	Yes
	Q9 - What is the distribution and abundance of exotic plants, particularly in areas affected by management activities?	Yes
Management Indicator Species	Q10 - Has the Revised Forest Plan direction prevented adverse interactions between bears and humans?	Yes, Need Database
	Q11 - What are the population trends for brown bear and the relationship to habitat?	No, Need Protocol

Category	Monitoring Question	Data Status
	Q12 - What are the population trends for dusky Canada geese and the relationship to habitat?	Yes
	Q13 - What are the population trends for moose and the relationship to habitat?	No, Not Scheduled
	Q14 - What are the population trends for mountain goat and the relationship to habitat change?	Yes
	Q15 - What are the population trends for black oystercatchers and the relationship to habitat?	Yes
Species of Special Interest	Q16 - Is Forest management maintaining favorable conditions for sustaining Kenai wolverines?	No, Adverse Survey Conditions
Forest Products	Q17 - Are forestlands restocked?	Yes
	Q18 - Have conditions changed that would affect the suitability of timber production lands?	Yes
Heritage Resources	Q19 - Are National Register eligible heritage resources being adequately maintained and protected?	Yes
Recreation	Q20 - Is the revised Forest Plan direction for motorized and non-motorized access working?	No, Not Scheduled
	Q21 - What are the trends in the use of developed recreational facilities and how does it compare to capacity?	Yes
	Q22 - What are the trends in commercial recreation services on the Forest and how does it compare to capacity?	Yes
Scenic Quality	Q23 - Are areas of the Forest being managed in accordance with the Scenery Integrity Objectives (SIO) in Forest-wide Standards and Guidelines?	Yes
Fire and Fuels	Q24 - What is the pattern of abundance of different fuel types on the Kenai Peninsula?	Yes
Wilderness	Q25 - Is the wilderness character of the Wilderness Study Area (WSA) and areas recommended for Wilderness being maintained?	Yes
Research Natural Areas	Q26 - Are proposed and established Research Natural Areas being maintained in a state unmodified by human activity?	Yes

MONITORING RESULTS

Compliance with Forest Plan

Q1 - Are projects being implemented consistent with the Forest Plan direction?

Category: Compliance with Forest Plan

Status: Monitored in FY 2012

Findings: This protocol evaluates whether projects were implemented consistent with Forest Plan Direction and NEPA decision documents. This protocol was coordinated with other monitoring protocols (intended outcomes, sensitive plants, invasive plants, and scenery integrity objectives). Four projects were examined on the Glacier Ranger District:

- Whistle Stop Project (EIS),
- Chugach Electric Line Relocation (CE),
- Fuller Group Mining Plan of Operations (EA), and
- Granite Creek Fuel Reduction Project (CE),

All of the projects were implemented consistent with Forest Plan Direction except for the Whistle Stop Project. Regarding the Forest Plan standard for exotic plants to "[i]ncorporate exotic plant prevention and control into project planning and design", the Whistle Stop Record of Decision (ROD) included the following stipulation:

> "*When building trails, the trails specialist and project botanist will meet to develop the minimum trail tread necessary to ensure the maintenance of native grasses and forbs in close proximity to the tread and to help prevent invasive plant establishment. When drainage work along trails is needed, care will be used to maintain the root structure of the native plants present. When brushing the trail edge, vegetation will be left at least 10 inches tall which will usually allow more native species to persist, prosper, and perhaps out-compete invasive species. In addition, we will maintain dead organic matter on the surface, rather than remove it, since such mulch can reduce the establishment and growth of invasive plants*".

During monitoring it was noted that the tread of some segments of trail may exceed desirable width for helping prevent invasive plant establishment and that the project botanist did not meet with the trails specialist to develop minimum trail tread. Consequently, the Whistle Stop ROD was not fully implemented in accordance with the Forest Plan in regard to exotic plant prevention.

Evaluation: Monitoring shows that three out of four projects reviewed on the Glacier Ranger District are being implemented consistently with NEPA decision documents. One project was not being implemented consistently with a NEPA decision document. The threshold to trigger a management review has not been surpassed (3 or more projects not fully implementing the relevant forest plan direction in a rolling 5 year period).

Recommendations for remedial action: The District Ranger was notified that one component of the Whistle Stop ROD related to invasive plant establishment was not implemented in accordance with the Forest Plan. Further work in the project area should include coordination between the trails specialist and the project botanist to develop the minimum trail tread necessary to ensure the maintenance of native grasses and forbs.

Actions taken in FY12 to respond to previous recommendations: None

Integrated Effectiveness/Validation Monitoring

Q2 - Are management activities achieving their intended outcomes?

Status: Monitored in FY 2012

Findings: This protocol evaluates if management activities achieved their intended outcomes. This protocol was coordinated with other monitoring protocols and specialists. Four projects were examined on the Glacier Ranger District:

- Whistle Stop Project (EIS),
- Chugach Electric Line Relocation (CE),
- Fuller Group Mining Plan of Operations (EA), and
- Granite Creek Fuel Reduction Project (CE),

All of the projects achieved their intended outcomes except for the Whistle Stop Project; which only partially achieved its intended outcome.

A deficiency was noted for this project in terms of the coordination between the trails specialist and the project botanist which may have resulted in some trail segments exceeding desirable width for helping prevent invasive plant establishment. Consequently, the Whistle Stop ROD may have only partially achieved the intended outcome of having trail widths that help prevent invasive plant establishment.

Evaluation: Monitoring shows that three out of four projects reviewed on the Glacier Ranger District are achieving all their intended outcomes, and one project only partially achieved its intended outcomes (one mitigation measure did not occur). The threshold for

triggering a forest leadership team management review has not been surpassed (one or more projects does not achieve any intended outcome, two or more projects only partially achieve intended outcomes, or five or more intended outcomes are not achieved).

Recommendations for remedial action: For the same reasons as described in Question 1, the District Ranger was notified that the Whistle Stop ROD did not fully achieve its intended outcomes. Further work in the project area should include coordination between the trails specialist and the project botanist to develop the minimum trail tread necessary to ensure the maintenance of native grasses and forbs. Ensure required consultation between Botanist and trails specialist occurs throughout the remainder of project implementation.

Actions taken in FY12 to respond to previous recommendations: None

Q3 - To what extent is ecosystem composition and structure changing and has forest management influenced these changes? How do these changes compare to the expected range?

Status: Monitored in FY 2012

Findings: This monitoring summarizes trends in ecosystem composition and structural attributes across the Forest and by geographic area to identify if and where there are changes of sufficient magnitude to be of concern to management. In FY2012, the primary task accomplished was Moderate Resolution Imaging Spectroradiometer (MODIS) satellite image analysis (Mohatt and Werstak 2012). Analysis of LANDFIRE data was not implemented since the accuracy of the LANDFIRE data was deemed unacceptable (see Boucher et al. 2009, DeVelice 2012a).

MODIS surface reflectance imagery was acquired for two dates from 2002 and 2011 spanning the time period since the latest Forest Plan revision (USDA Forest Service 2002). These images were more than 95 percent cloud free, have similar view angles, and are from a similar time of year. Normalized difference vegetation index (NDVI) and normalized difference moisture index (NDMI) were calculated for both dates and the images were differenced to determine location and magnitude of relative change.

The monitoring protocol states that "…contiguous areas larger than 2000 ha that have differences in index values exceeding 20 percent will be evaluated more closely to interpret the potential causes for the change". Using this threshold, continuous data values resulting from the differenced images were grouped into three classes that identify relative change greater than 20 percent, less than negative 20 percent, and between negative 20 percent and 20 percent. Relative change meeting protocol thresholds was not detected anywhere

on the Forest. These results are consistent with what was found for two differenced images from 2002 and 2007 where a majority of change occurred in the +/-10 percent range (Werstak et. al. 2009).

Several areas where change was evident over a large area but below relative change thresholds were identified as follows: near receding glaciers (Figure 1) and in the vicinity of the Copper River Delta where uplift from the 1964 earthquake altered plant succession. Neither of these processes (glacial recession, earthquakes) is influenced by Forest management practices.

Evaluation: This monitoring has not identified any ecosystem composition and structure changes that were of sufficient magnitude to be of concern to management.

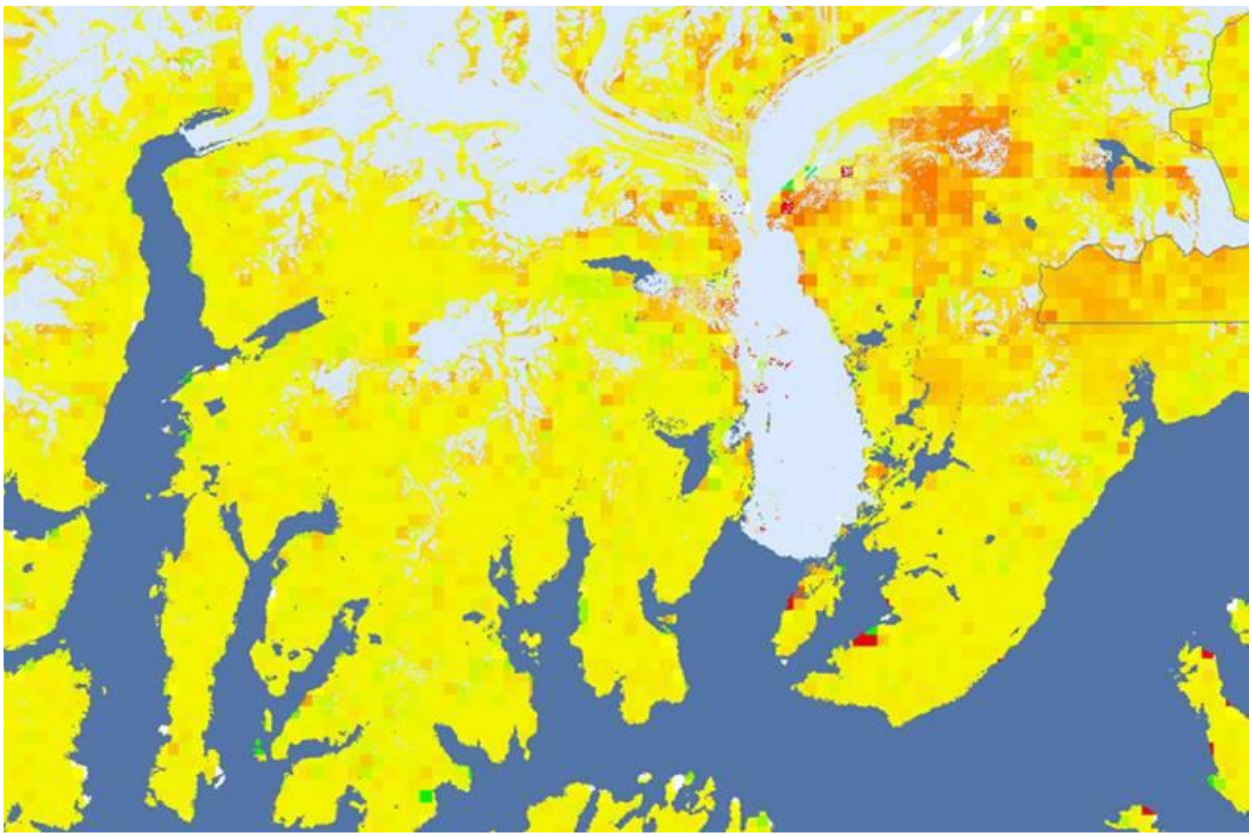

Figure 1. Normalized difference vegetation index changes in the vicinity of Columbia Glacier from 2002 to 2011; where areas highlighted in red indicate a decrease in vegetation, areas in yellow indicate no change in vegetation cover, and areas in green indicate an increase in vegetation.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Air Resources

Q4 - Are Forest management actions contributing to changes in air quality on the Forest?

Status: Monitored in FY 2012

Findings: This was the second round of air quality monitoring following the pilot Air Quality Monitoring Protocol established in 2007. This monitoring addresses concerns that winter motorized use on the Forest may be impacting air quality. The purpose is to quantify the levels of air pollutants in areas with high levels of winter motorized use on the CNF.

In 2012, air quality was monitored by measuring particulate matter (PM2.5) and carbon monoxide for eight days in the Turnagain Pass motorized area. The initial round of air quality monitoring in 2007 found that the carbon monoxide detectors specified in the protocol failed. This year we tested a different carbon monoxide detector rated for extreme cold weather, the AltaAir Pro for carbon monoxide. The testing established equipment and software configurations for effective future carbon monoxide monitoring.

Monitoring in the 2011-2012 winter found increased levels of carbon monoxide and fine particulates at sites measured near the parking lot at Turnagain Pass. The carbon monoxide and fine particulate data collected on the sample days indicated no violations of the State of Alaska air quality standards. Under the present motorized use trends at Turnagain Pass, the likelihood of exceeding the standards as a result of winter motorized use is relatively low.

Evaluation: Although the data show that motorized use at Turnagain Pass resulted in increased levels of carbon monoxide and fine particulates at sites measured near the parking lot on the days sampled, the threshold levels that would trigger a management review were not exceeded. The thresholds that define high potential to exceed the State standards are based on the air quality standards established by the State of Alaska, Department of Environmental Conservation.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Soil Resources

Q5 - What is the effect of summer OHV use on soils and/or vegetation where OHV use is allowed? Are management practices (standards, guidelines, BMPs, mitigation measures) effective in maintaining soil quality and in meeting the severity limits for selected soil properties?

Status: Not monitored in FY 2012; sampling protocol have not yet been developed

Findings: None

Evaluation: None

Water Resources

Q6 - Are Best Management Practices (including wetland management) effective in meeting water quality standards?

Status: Not monitored in FY 2012; inadequate staffing to conduct surveys.

Findings: Best Management Practices (BMPs) are recognized as the primary control mechanisms for non-point sources of pollution on National Forest System lands. Application of BMPs on all ground-disturbing projects on the Forest is designed to protect water and soil resources. Monitoring of BMP implementation and effectiveness is intended to call attention to areas in which management activities are not following BMPs and/or are contributing to non-point sources of pollution that may lead to State water quality standards not being met. Best Management Practice implementation monitoring was not conducted in FY 2012 due to staffing limitations.

Evaluation: None

Aquatic Habitat

Q7 - Are riparian and aquatic habitat protection measures included in project planning and are Forest Plan standards and guidelines being met during project implementation?

Status: Not monitored in FY 2012; sampling protocol has not yet been developed.

Findings: This is a new monitoring question and is intended to replace two monitoring questions related to coho salmon and Dolly Varden char that were removed from the

monitoring strategy because they were determined to be not feasible. A decision memo dated 5/29/2012 added this question to the monitoring strategy. The protocol for this new monitoring question is under development at this time.

Evaluation: None

Sensitive and Exotic Plant Species

Q8 - What is the abundance and distribution of sensitive plants in areas affected by management activities?

Status: Monitored in FY 2012

Findings: This monitoring evaluates the likelihood that Forest management activities are contributing to a downward trend in sensitive plant populations. Both effectiveness and implementation monitoring components are included. The effectiveness monitoring is to determine whether sensitive plant population abundance or distribution is changing in areas where management activities are occurring. The implementation monitoring is to determine the extent to which mitigation measures from biological evaluations (BEs) and other botanical input are carried into NEPA documents, incorporated into decisions and permits, and finally implemented. Under the protocol, reporting occurs every five years (beginning in 2012), data entry to NRIS TESP occurs annually, and once there are at least five populations available for sampling, annual effectiveness monitoring occurs.

In FY2012, a selection of up to five projects where sensitive plants have been found were to be reviewed to determine if they are in compliance with Forest Plan standards and guidelines; and to determine if mitigation measures from biological evaluations and other botanical input are carried into NEPA documents, decisions, and permits. Currently, there are fewer than five known instances of overlap of sensitive plant populations and areas of active management.

Under Forest Plan Consistency Monitoring the following four projects were evaluated on the Glacier Ranger District in 2012:

- Whistle Stop Project (EIS),
- Chugach Electric Line Relocation (CE),
- Fuller Group Mining Plan of Operation (EA), and
- Granite Creek Fuel Reduction Project (CE)

Sensitive plant populations had not been found in field surveys previously conducted in the four areas, so sensitive plant monitoring was not needed.

Two previously unreported populations of *Aphragmus eschscholtzianus* were documented near Swetmann Mine in Palmer Creek Valley and a population of *Papaver alboroseum* was found in the Milk Glacier area near Crow Pass.

Evaluation: Currently, there are fewer than five known instances of overlap of sensitive plant populations and areas of active management.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Q9 - What is the distribution and abundance of exotic plants, particularly in areas affected by management activities?

Status: Monitored in FY 2012

Findings: This monitoring documents the contribution of human-caused disturbance on the distribution and abundance of non-native plants. Work in FY12 focused on summarizing changes in abundance of non-native plants on the Forest from the following three data sources: 1) Forest Inventory and Analysis (FIA) plots sampled on a 4.8 km grid, 2) a systematic sample of roadside plots at 1.6 km increments, and 3) a systematic sample of plots at 1 km increments along the first five kilometers of trails.

To date, non-native plants have not been reported on any of the FIA plots on the Forest. Since about 99% of the Forest is non-roaded, the systematic FIA grid represents non-roaded conditions and provides strong evidence in support of the contention that non-native plants are presently rare within natural communities on the Forest.

In contrast, non-native plant species have been reported at high frequency (> 90% of records) on road edges, visitor facilities, trailheads, mineral material sites, and trails of the Forest. Although the number of non-native plant species is less on trails than on roads, a statistically significant ($P < 0.20$) increase in number occurred on trails over the monitoring period. The sum cover of non-native plant species increased significantly on roads and trails of the Kenai Peninsula over the monitoring period but not on the Copper River Delta (Table 2). Further, the average cover of individual non-native plant species increased significantly on Kenai Peninsula trails over the monitoring period. The incidence of non-native plants appears to be increasing most markedly along trails.

Under Forest Plan Consistency Monitoring the following four projects were evaluated on the Glacier Ranger District in 2012:

- Whistle Stop Project (EIS),
- Chugach Electric Line Relocation (CE),
- Fuller Group Mining Plan of Operation (EA), and
- Granite Creek Fuel Reduction Project (CE)

The four projects are being implemented consistent with exotic/non-native plant standards and guidelines in the Forest Plan and project specific mitigation measures. The tread of some segments of trail in the Whistle Stop project area may exceed desirable width for helping prevent invasive plant establishment.

Table 2. Average sum cover of combined non-native plant species present between the initial sample year (2003 to 2007) and follow-up sample year (2011); statistically significant (P < 0.20) increases in cover are in bold.

Location[1]	Sample Size	Non-native plant cover				Observed Change	Student's t (P)
		Initial Sample		Follow-up Sample			
		mean	sd	mean	sd		
FW R	220	27.41	23.04	37.87	37.54	**10.45**	**2.9E-06**
KP R	148	36.31	22.36	54.27	35.28	**17.96**	**1.9E-08**
CR R	72	9.13	9.90	4.15	7.50	-4.97	2.7E-07
FW T	187	9.40	18.05	29.07	38.05	**19.67**	**3.2E-13**
KP T	153	10.82	18.09	34.79	39.66	**23.98**	**4.8E-14**
CR T	31	3.32	17.48	3.66	9.41	0.34	0.92

[1] FW = Forestwide, KP = Kenai Peninsula, CR = Copper River Delta, R = Roads, and T = trails.

Evaluation: The sum cover of non-native plant species has increased significantly on the roads and trails on the Kenai Peninsula over the monitoring period. Although there are not enough occurrences of species with invasiveness ranks of ≥ 70 (i.e., the "highly invasive") for separate analyses (since there are only four such species in the sampled data set occurring on a total of 18 sites), the overall increase of non-native plant species should be brought to the attention of leadership.

Recommendations for remedial action: New trails increase the likelihood of non-native plant expansion into areas previously unoccupied by non-natives. Continuing to follow the Chugach National Forest Invasive Plant Management Plan (DeVelice et al. 2005) should facilitate non-native plant prevention, early detection, and rapid response.

Actions taken in FY12 to respond to previous recommendations: None

Management Indicator Species

Q10 - Has the Revised Forest Plan direction prevented adverse interactions between bears and humans?

Status: Monitored in FY 2012

Findings: The Forest Plan seeks to manage human use within bear habitat to minimize the risk of "*defense of life and property" (DLP) mortality to brown bears. The Forest Plan states: "Brown bear/human confrontations will be minimal in important seasonal feeding areas and travel corridors, resulting in limited risks to brown bears through 'defense of life and property' (DLP) mortality".* The plan also designated Brown Bear Core Management *Areas "to manage selected landscapes and their associated habitats to meet population objectives for brown bears and to reduce dangerous interactions between humans and brown bears"*.

The defense of life and property (DLP) tally is the number of brown bears that are killed as a result of humans defending life or property. DLP data is tracked by the Alaska Department of Fish and Game (ADF&G) for brown bears by general location of the incident. DLP numbers are a subset of overall adverse interactions between bears and humans. Emphasis was on brown bears in the Kenai Peninsula. This protocol reports absolute numbers and trends of DLP incidents. It does not attempt to examine the reasons for those results, since cause-effect reasons for adverse interactions are complex and not cleanly reflected in annual DLP numbers.

There were no DLPs on Chugach National Forest lands in FY 2012. All reported brown bear DLP deaths in 2012 occurred on non-National Forest lands on the Kenai Peninsula.

The monitoring protocol recommended the use of the Bear Human Interactions Management System, (BHIMS), but that database has not been developed to meet the needs of multi-agency DLP tracking, as was predicted in the protocol.

Evaluation: When DLP incidents on NFS lands meets or exceed three per year the information will be brought to the forest leadership team for review. DLP numbers on Chugach NF lands did not exceed the one year thresholds for this monitoring protocol.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Q11 - What are the population trends for brown bear and the relationship to habitat?

Status: Not monitored in FY 2012; sampling protocol have not yet been developed

Findings: Population monitoring of brown bear on the Chugach National Forest provides feedback during implementation of the Forest Plan. The Forest works with agency partners to monitor brown bear population abundance. To date, this monitoring for population trends has been focused on the Kenai Peninsula. Largely as a consequence of the difficulty monitoring bear populations in any environment, and particularly in a remote, relatively roadless landscape, the Forest has not finalized a monitoring protocol. Rather, the Forest has been collaborating with agency partners while working toward an acceptable monitoring protocol.

Evaluation: None

Q12 - What are the population trends for dusky Canada geese and the relationship to habitat?

Status: Monitored in FY 2012

Findings: This project monitors habitat improvement work on dusky Canada goose (*Branta canadensis occidentalis*) nest platforms. Monitoring nest islands produced data on long term trends in dusky Canada goose occupancy and nesting success. Data from this project show that nests on artificial islands are more than twice as likely to succeed as nests on shore. Determining nest island use, nest success, and maintenance needs requires annual monitoring. The information collected on the types of nest islands and locations preferred by dusky Canada geese will aid in future management decisions on the type of island to use and size and location of ponds suitable for a nest island. The dusky Canada goose population breeds primarily on the Copper River Delta in south central Alaska. Population declines occurred, in part, because the uplift from the 1964 earthquake caused habitat changes and loss of suitable nesting habitat. Artificial nest islands in ponds have proven to be an effective method for increasing nest success in dusky Canada geese.

More than 850 artificial nest islands of different styles have been installed on the Copper River Delta to enhance nest success of dusky Canada geese since 1984. In the summer of 2012, 350 islands, including the new islands installed in 2010 and 2011 were active in the program and all of them were visited to monitor nest success. A total of 138 dusky Canada goose nests were found. Final nest success on the islands was 61 percent. Over 350 goslings hatched from nest islands on the Copper River Delta in 2012. From 1984-2012, nest success on artificial islands has averaged 65 percent which is nearly double that found

at natural sites in the area. Artificial islands produced 86 successful nests in 2012. The overall effort is a partnership between the monitoring and wildlife programs.

Evaluation: Nest island monitoring shows that the use and nest success of artificial nest islands by dusky Canada geese meets management objectives.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Q13 - What are the population trends for moose and the relationship to habitat?

Status: Not monitored in 2012; monitoring not scheduled to begin until 2013.

Findings: None

Evaluation: None

Q14 - What are the population trends for mountain goat and the relationship to habitat change?

Status: Monitored in FY 2012

Findings: This monitoring focuses on assessing trends in mountain goat abundance using tracking survey data collected by ADF&G and the USFS Subsistence program in game management units (GMUs) on the Chugach National Forest. The CNF contains GMUs 6, 7, and 14C (Figure 2). Survey data compiled and evaluated in FY 2012 includes available data from 1996 through 2011.

GMU 6: Mountain goats are endemic to the mainland in GMU 6 and to Bainbridge, Culross, and Knight Islands. Mountain goat populations have fluctuated widely over the last 60 years. Since 1999, it appears the number of goats has rebounded from the lower levels of the past and has remained relatively stable at approximately 4,000 animals. Crowley (2010) states that this improved condition is due in part to a series of milder winters and the implementation of a more conservative harvest management approach by ADF&G which has reduced harvest.

GMU 7: Mountain goats are endemic to the mainland in Unit 7, which includes portions of the Kenai Peninsula. Mountain goat populations are most abundant on the coastal mountains and least abundant in the interior portions of the Kenai Mountains where they

coexist with Dall sheep. Preliminary analysis in Unit 7 indicates that there are four hunt units that appeared to exceed the mountain goat monitoring protocol threshold. Hunt units 335, 339, 343, and 346 of Game Management Unit 7 indicated declines greater than 35 percent. A decline of over 35 percent in a hunt unit over a ten year period triggers consultation with ADF&G.

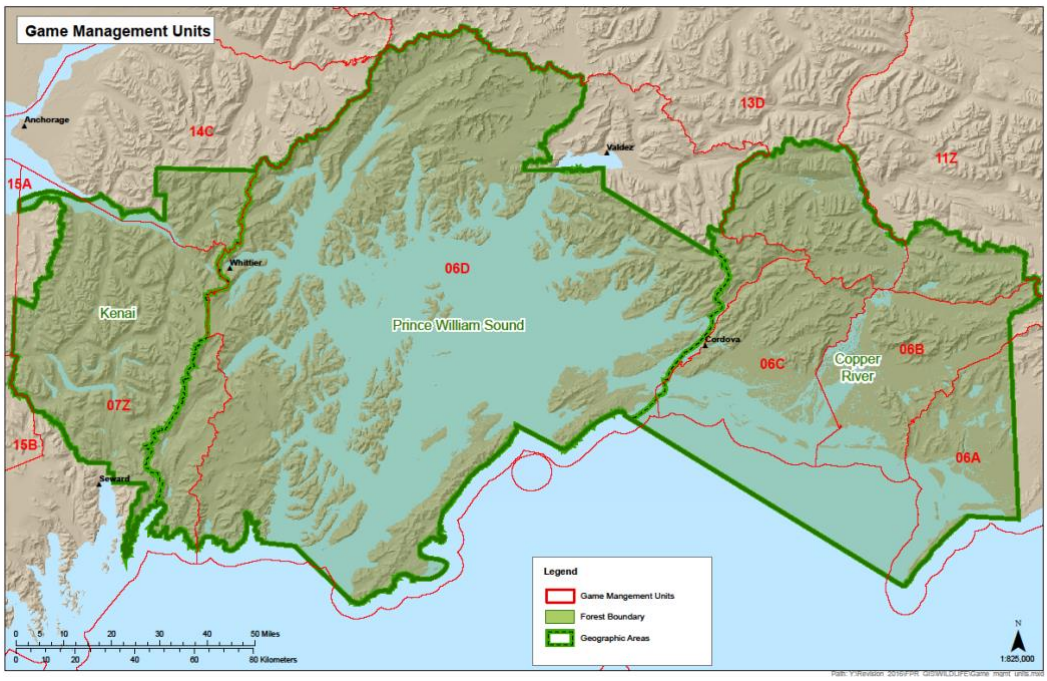

Figure 2. Map of CNF with overlay of State of Alaska game management unit boundaries.

GMU 14C: Mountain goats are endemic to the mainland in Unit 14C. Unit 14C contains CNF and Chugach State Park lands. On the CNF Unit 14C includes Glacier, Placer and Twenty Mile hunt units. Due to infrequent surveys, poor survey conditions and incomplete surveys over the past decade, it is difficult to assess population trends for goats in Unit 14C. Most of the goats counted in these surveys were incidental to sheep surveys. Using the data available, a simple logarithmic regression suggests that the goat population is increasing. Anecdotal evidence suggests that goats in Unit 14C may be expanding their range throughout the Chugach State Park.

These trends should be evaluated with some caution. The sample size is too small and data variability is too great in GMUs 7 and 14C to make reliable trend estimates (including those hunt units showing declines). Surveys have not been consistent across all hunt units. Poor visibility and weather constraints have led to incomplete surveys of some hunt units.

Evaluation: Preliminary analysis indicates the threshold requiring consultation with ADF&G has been surpassed within Unit 7, although this trend should be evaluated with caution as

the sample size is small and data variability is great across most units on the Kenai Peninsula.

Recommendations for remedial action: It is recommended that Forest leadership be briefed on these preliminary results and that ADF&G be consulted regarding the basis for these trends and ways to improve data collection and surveys. It is also recommended that the forest work with ADF&G to discuss other population parameters with ADF&G: breeding success, number of young, adult survival, and age of first kids, to see if those demographics are consistent with declining populations, as compared to goat populations in other areas. Forest management activities and habitat in affected hunt units should be evaluated to consider if habitat conditions or Forest management are contributing factors to population trends.

Actions taken in FY12 to respond to previous recommendations: None, this is the first year this protocol has been implemented.

Q15 - What are the population trends for black oystercatchers and the relationship to habitat change?

Status: Monitored in FY 2012

Findings: Black oystercatchers (*Haematopus bachmani*) are listed as a CNF Management Indicator Species (MIS), and a US Forest Service Alaska Region Sensitive Species, a "species of high concern" in the U.S. National Shorebird Conservation Plan, and a Focal Species for the U.S. Fish & Wildlife Service (USFWS). Approximately 800-1200 individuals inhabit the shoreline and rocky islets of Prince William Sound, an area primarily managed by the CNF. The Chugach Forest Plan calls for monitoring population trends, habitat relationships, and habitat change for nesting black oystercatchers in Prince William Sound. The CNF has been monitoring black oystercatcher nest locations since 1999. These data has been used to analyze interactions between oystercatchers and human use and have been integrated into a sensitive species analysis for Prince William Sound.

The sampling design was developed in an attempt to retain the historically important survey regions of Harriman Fjord, Green Island, Montague Island, and the Dutch group, while supplementing this sample with shoreline segments from the entire Prince William Sound. In order to minimize travel time and expense to visit other sampled shorelines we took a regional approach to sampling, and developed a split-panel rotating design to provide a balance between estimation of trend and estimation of yearly status. This design designates some areas with high historic concentrations of oystercatchers to be visited every other year and other less populated areas to be visited less frequently. The design also has the advantage of allowing more shorelines to be visited during the life of the

monitoring program, which provides more opportunity to detect changes in the spatial distribution of nesting oystercatchers in Prince William Sound.

In 2011 the Chugach developed a revised monitoring protocol to efficiently examine trends in black oystercatcher populations in Prince William Sound. The protocol built on over a decade of experience and was designed to meet Forest Plan direction for MIS. The design was specifically crafted to examine trends in oystercatcher nesting territories along the shoreline of Prince William Sound with sufficient rigor to detect a 2 percent decline in territorial occupancy per year, over 10 years with 80 percent power and $\alpha = 0.20$.

In late-May and early-June, 2012 the CNF implemented the first year of field sampling under the protocol. A crew of four biologists visited nine sample sites dispersed throughout Prince William Sound and surveyed 20 km of shore for black oystercatchers as outlined in the protocol. All sample sites identified in the protocol for sampling in 2012 were successfully sampled and the data entered into the corporate Natural Resource Information System (NRIS) database.

The monitoring program made substantial progress coordinating with partners to broaden the sample. District personnel sent coordinates for locations of oystercatcher sightings on to US Department of Interior personnel immediately following the field survey. That data was used immediately by the field team in Prince William Sound to facilitate studies of diet and associated shore-zone monitoring. The CNF continued coordination with National Park Service and ADF&G to agree on processes for data sharing and collaborative analysis of data after the field season. The multi-agency group also worked to further standardize field protocols and data recording.

Evaluation: As this is the first year implementing field sampling under this protocol, analysis for trends in black oystercatcher populations is not yet possible. Trend analysis should occur after five years of monitoring under this protocol.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Species of Special Interest

Q16 - Is Forest management maintaining favorable conditions for sustaining Kenai wolverines?

Status: Not monitored in FY 2012; surveys not possible due to adverse observation conditions.

Findings: The goals of this monitoring are: (1) to update and expand our estimate of wolverine abundance in the Turnagain Arm and Kenai Mountains (TAKM) and (2) to compare wolverine abundance within and outside areas used for helicopter skiing. This information should provide CNF with better tools to balance helicopter skiing activities with wildlife habitat needs and ADF&G with improved ability to assess wolverine populations for harvest management. Results of this project will contribute to a larger project designed to estimate wolverine abundance and harvest potential in southcentral Alaska (Golden 2007).

The wolverine favors areas minimally modified by human activity and is considered a potential indicator of ecosystem condition (Carroll et al. 2001). Wolverines have low reproductive potential and usually occur at low densities relative to other furbearer species (Copeland and Whitman 2003), and they also have relatively low survival rates (Krebs et al. 2004). Because of their life history strategies, wolverines are sensitive to harvest and human disturbance. In addition, the extent and availability of refugia from harvest could be a key factor in maintaining a sustainable yield. Therefore, it is important to have timely and reliable data on population abundance, distribution, availability of refugia, and harvest levels and patterns to manage wolverines adequately.

In this protocol ADF&G conducts flights across grids on the Kenai Peninsula. The protocol specified use of the sample unit probability estimator (SUPE) technique (Becker et al 2004), which requires snow conditions conducive to being able to see and decipher wolverine tracks, and the ability to follow those tracks back to their origin.

These conditions did not exist when ADF&G attempted the flights. Although five reconnaissance flights were conducted from mid-January through mid-March, the survey protocol could not be applied because of unfavorable snow conditions for observing tracks or weather conditions that were hazardous for aircraft. These conditions prevented conducting a successful SUPE survey over a sufficient area (≥ 1000 km2) in 2012.

Evaluation: Monitoring scheduled but not accomplished due to unfavorable aerial survey conditions.

Forest Products

Q17 - Are forestlands restocked?

Status: Monitored in FY 2012

Findings: This monitoring documented if areas where timber has been harvested from National Forest System lands have been adequately restocked within five years after harvest to meet the legal requirements listed in NFMA.

Currently the Forest does not have any outstanding acres where timber was harvested that have not been certified as being adequately restocked. Since the reforestation needs associated with timber harvest on the Forest were zeroed out at the end of FY2006, no more reports are necessary. In addition, under the Forest Plan of 2002, no areas of the Forest are designated for timber production so there are no restocking needs at this time. The "restocking" protocol is a placeholder should the Forest embark in activities that require restocking certification, but this is not anticipated.

Evaluation: None

Q18 - Have conditions changed that would affect the suitability of timber production lands?

Status: Monitored in FY 2012

Findings: This monitoring documented if lands identified as unsuitable for timber production have become suitable as required in the National Forest Management Act (NFMA). The FY 2012 work was an initial evaluation of changes in timber suitability since the 2002 plan (DeVelice 2012b). The complete suitability analysis would be part of the next Forest Plan revision.

Of the 5.5 million acres CNF, about three percent is classified as tentatively suitable timberland in both the 2002 and 2012 analyses (Table 3). Therefore, the change in tentatively suitable timberland acreage between the 2002 and 2012 analyses are small. All of the tentatively suitable land was allocated to uses other than commercial timber production in the Record of Decision for the 2002 Forest Plan. If timber production is a consideration of the next Forest Plan the portion of tentatively suitable timberland appropriate for such production would be identified.

Table 3. Summary of changes in timber suitability from the 2002 Forest plan to evaluation completed in 2012.

Timberland Suitability Classification	2002 acres	2012 acres
Total National Forest (item a plus item 1)	**5,491,580**	**5,463,420**
a. Non-Forested Land (includes water)	4,295,540	4,382,950
1. Forested Land	1,196,040	1,080,470
2. Forested Land Withdrawn from Timber Production	103,250	397,850
b. Available Forested Land (item 1 minus item 2)	1,092,790	682,620
3. Non-productive Forests: Not capable of producing crops of industrial wood	712,940	296,680
c. Available Timberland (PFL) (item b minus item 3)	379,850	385,940
4. Timberland Physically Unsuitable	74,630	46,830
5. Timberland Inadequate Information (uncertain on restocking within five years)	22,610	182,730
d. Tentatively Suitable Timberland (Item c minus items 4 and 5)	**282,610**	**156,380**
Percent of Total Forested Lands Tentatively Suitable for Timber Production	**23.6**	**14.5**
e. Productive Wilderness Study Area and research natural area not included above	100,430	-
f. 2002 Tentatively Suitable Timberland minus WSA and RNA (item d minus e)	**182,180**	-
Percent of National Forest Tentatively Suitable for Timber Production	**3.3**	**2.9**

Evaluation: Changes in tentatively suitable timberland acreage between 2002 and 2012 is small, from 3.3 percent to 2.9 percent of Chugach NF lands.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Heritage Resources

Q19 - Are National Register eligible heritage resources being adequately maintained and protected?

Status: Monitored in FY 2012

Findings: The objective is to monitor the effectiveness of the Forest Plan in reaching the goal of protecting heritage resources. There are four measurements of interest: 1) the status of each undertaking, 2) the number of management plans completed, 3) the number National Register of Historic Places (NRHP) evaluations/nominations, and 4) if collaborative inventory and monitoring programs have been established.

The information gathered regarding these measurements of interest are shown below. FY 2012 monitoring was conducted by thorough analysis of data from the national INFRA database (report date 02/28/2013), the Schedule of Proposed Actions (SOPA) (report date 11/27/2012, provided by the CNF NEPA Coordinator), consultation and agreements documentation, and through verification with the Seward District Archaeologist and the Prince William Sound Zone Archaeologist. Note that the terms "heritage resources" and "cultural resources" are synonymous and used interchangeably within this report.

For each of the four measurement elements the results for FY 2012 are described here.

1) Was the NHPA Section 106 process completed on each undertaking during FY2012?
Yes. According to the FY2012 SOPA there were 17 projects completed in FY2012, and INFRA records indicate 30 projects evaluated under Section 106 in FY2012 (See Tables 2, 3, and 4 in full report). All seventeen projects listed on the SOPA were evaluated in accordance with the Section 106 process. The additional reviews were from a mix of projects that were either initiated in earlier year SOPAs or from Heritage Program actions that were not reviewed under NEPA.

2) Have any Cultural Resource Management Plans been developed within the current five-year period?
No. No CRMPs have been developed since 2008 (the beginning of the current five-year period). Since no CRMPs have been developed within the current five-year period, management action is triggered.

3) Have any NRHP evaluations/nominations been completed in FY2012?
Yes. One heritage resource, SEW-1076 was evaluated in FY2012 and determined to be ineligible for inclusion in the National Register of Historic Places. However, because the unit of measure for this is five evaluations in the annual cycle, management action is triggered.

4) Has a collaborative inventory and monitoring program been established?
No. A collaborative inventory and monitoring program with tribes/universities has not been established on the forest. Management action is triggered on this unit of measure.

Evaluation: Evidence reviewed in this assessment suggests that the forest is successfully carrying out its Section 106 responsibilities in compliance with the Third Amended Alaska Region's Programmatic Agreement (12/6/2010). The monitoring also suggests that the Heritage Program manages project data poorly and the forest is not meeting Forest Plan criteria for effective stewardship of known significant cultural resources.

Recommendations for remedial action:

Heritage Recommendation 1. Develop CRMPs on individual sites or districts where most needed.

Management plans for the Linblad Placer Mining District, forest-wide historic structures and the Iditarod Trail have been under development for the past several years. In addition, with the Russian River Land Act, Congress ratified an agency agreement with collaborators to develop a CRMP for the Sqilantnu Archaeological District. Beginning in FY2013, the Heritage Program Manager has been working collaboratively with staff of Kenaitze Indian Tribe, Cook Inlet Region Incorporated, and the Fish and Wildlife Service to develop a CRMP for this archaeological district. CIRI is assigned the lead responsibility for the CRMP. Concurrently, the district and zone archaeologist should each be assigned a CRMP to develop for a specific cultural resource in their respective area. The Heritage Program Manager should collaborate with the district and zone archaeologists and their supervisors to determine specific CRMPs to develop beginning FY2014.

Heritage Recommendation 2. Identify specific cultural resource sites to evaluate for inclusion in the National Register of Historic Places.

Because this measure corresponds to a Heritage Program, Managed to Standard national target, the Heritage Program should identify specific sites for evaluation prior to the beginning of each fiscal year. Beginning in FY2014, the specific cultural resource sites to be evaluated should be captured in the annual performance measure for each Heritage Program staff in a manner that is commensurate with a specific budgeted task in the annual work plan for the Heritage program of work.

Heritage Recommendation 3. Establish collaborative monitoring programs for specific cultural resources on the forest and partner with tribes and qualified archaeologists at the University of Alaska for cultural resources inventories on the forest.

Prior to FY2014, the Heritage Program should identify specific significant cultural resources and potential inventory areas, and potential partners to assist in site monitoring and inventory activities. For FY2013, the Prince William Sound Zone Archaeologist should invite affiliated and interested tribes and local interest groups to participate in condition assessments that are currently due on five Priority Heritage Assets sites on the Cordova Ranger District. Although it may not be possible for FY2013, by FY2014 the Seward District Archaeologist should develop a research design and incorporate collaboration that is already established with the Kenaitze Indian Tribe on the “Ice Patch Archaeology” inventory. The Heritage Program should identify areas

needing inventory and collaborate with the University of Alaska to implement field schools and research during FY2014.

Actions taken in FY12 to respond to previous recommendations: None

Recreation Opportunities, Tourism, Access, and Facilities

Q20 - Is the Revised Forest Plan direction for motorized and non-motorized access working?

Status: Not monitored in 2012; next monitoring scheduled for 2016.

Findings: None

Evaluation: None

Q21 - What is the use of developed recreational facilities and how does it compare to capacity?

Status: Monitored in FY 2012

Findings: The purpose of this monitoring is to meet the Forest Plan objective to "*develop information on recreational activities, patterns of use, and key recreational issues,*" specifically to help determine how well the supply of overnight use developed recreation sites (OUDS) is meeting demand. Data is gathered on use at campgrounds during the high season of Memorial Day to Labor Day and at cabins at different times of the year based on the expected high season of use. The threshold defined in the monitoring protocol is 60% occupancy of campground sites and cabins during the high season. The assumption when the protocol was developed was that use on the Kenai Peninsula and in Prince William Sound (PWS) is either nearing or exceeding this threshold, while use at facilities in the Copper River Delta area would not approach the threshold.

Data were consolidated annually from two primary sources. Cabins occupancy data was generated by the National Recreation Reservation System (NRRS) records and occupancy data for campgrounds came from Alaska Recreation Management, the campground concessionaire that operated all 13 campgrounds on the Kenai Peninsula during the monitoring cycle. This report analyzes data from 2008 – 2012. Several of the facilities were temporarily closed at some time during the monitoring period. These anomalies are highlighted in the data spreadsheets, but occupancy rates were not adjusted in any way to account for these closures.

Evaluation: From 2008 to 2012, the occupancy rate for 13 of the 17 cabins located in the Kenai Peninsula geographic area exceeded 60% (Table 4). The average occupancy rate for all 17 cabins was 68%. The highest occupancy rate was 91% at Crescent Lake, and the lowest was 35% at West Swan Lake.

For campgrounds in the Kenai Peninsula area, 4 of the 13 sites had occupancy rates during the high use season that were greater than 60%. The highest occupancy rate was 82% at Quartz Creek, and the lowest was 28% at Trail River. Average occupancy across all campgrounds was 53% for the 5-year period.

For Prince William Sound (PWS) geographic area 7 out of 17 cabins had occupancy rates above 60% over the monitoring period. With the exception of Green Bay and Jack Bay cabins, the highest occupancy rates tended to be those located in western PWS. Within the PWS area, the Green Island cabin had the highest rate at 86%, and the Hook Point cabin had the lowest rate at 23%. There is speculation, but no empirical evidence, that Green Island has a high rate because reservations are coordinated by a commercial guide. Total occupancy rate for the 5-year period in PWS cabins was 54%.

For cabins in the Copper River Delta geographic area, occupancy rates varied considerably from a low of 4% for Tiedeman Slough cabin to a high of 75% for the McKinley Lake cabin. The occupancy rate exceeded the 60% threshold for only 2 of the 6 cabins. The total average occupancy rate for the 5-year period for all of the cabins was 28%.

Occupancy rates for the only campground in this geographic area, Childs Glacier, was low, ranging from 3% to 16%, considerably below the 60% occupancy threshold. Also of note in 2012 was the closure of the state highway that was access to this campground due to the washout of a highway bridge. This loss of road access may be long term, as it appears the repair of the bridge will be costly and unlikely to occur in the near future.

Recommendations for remedial action: No immediate action is needed, though results will be considered in ongoing efforts to revise the CNF Recreation Facility Analysis and realign budget priorities. Results show that the CNF is meeting campground demand overall, except at campgrounds near the Russian River during salmon runs. Cabin occupancy rates at high use areas (Kenai Peninsula and western PWS) indicate that CNF facilities may not be meeting demand for this type of facility. Additional cabins are planned as part of the Iditarod National Historic Trail Southern Trek project and the Whistle Stop project, though decreased capital investment and maintenance funding has resulted in a focus on annual maintenance and reducing the overall facility footprint across Region 10. The CNF does not have plans to construct more cabins in western PWS, though Alaska State Parks does plan to add three news cabins in PWS. At the same time, the CNF may need to re-look spending on some of the lower use cabins and campgrounds for operations, maintenance, and capital investment funding. If recreation facilities funding

continues to decline, the CNF could look for other possible sources for O&M or decommission sites to ensure the facilities most used are maintained to standard. This occupancy data and trends also give managers information to help make recommendations related to increasing fees at select cabins to more fully cover O&M costs.

Actions taken in FY12 to respond to previous recommendations: None

Table 4. Average percent occupancy rates for CNF cabins by geographic areas Copper River Delta (CRD), Kenai Peninsula (KP), and Prince William Sound (PWS) from 2008 to 2012

Area	Sample Period	Cabin	2008	2009	2010	2011	2012	5-year average
CRD	Aug. 1 – Dec. 31	MARTIN LAKE CABIN (AK)	37%	33%	23%	34%	0%	25%
CRD	Sat. Mem. – Sept. 20	MCKINLEY LAKE CABIN (AK)	74%	62%	79%	55%	61%	66%
CRD	Sat. Mem. – Sept. 20	POWER CREEK CABIN (AK)	40%	29%	46%	24%	26%	33%
CRD	Sat. Mem. – Sept. 20	SOFTUK BAR CABIN (AK)	8%	6%	3%	17%	3%	7%
CRD	Sat. Mem. – Sept. 20	TIEDEMAN SLOUGH CABIN (AK)	6%	1%	8%	3%	1%	4%
CRD	Sat. Mem. – Sept. 20	MCKINLEY TRAIL CABIN (AK)	85%	83%	51%	78%	83%	76%
KP	Sat. Mem. – Sept. 20	ASPEN FLATS CABIN (AK)	59%	40%	63%	61%	53%	55%
KP	Sat. Mem. – Sept. 20	BARBER CABIN (AK)	63%	92%	99%	99%	98%	90%
KP	Sat. Mem. – Sept. 20	CARIBOU CREEK CABIN (AK)	70%	34%	78%	74%	72%	66%
KP	Sat. Mem. – Sept. 20	CRESCENT LAKE CABIN (AK)	93%	93%	83%	94%	94%	91%
KP	Sat. Mem. – Sept. 20	CRESCENT SADDLE CABIN (AK)	70%	61%	70%	76%	73%	70%
KP	Sat. Mem. – Sept. 20	CROW PASS CABIN (AK)	73%	76%	53%	84%	85%	74%
KP	Sat. Mem. – Sept. 20	DALE CLEMENS CABIN (AK)	73%	74%	76%	17%	83%	65%
KP	Sat. Mem. – Sept. 20	DEVILS PASS CABIN (AK)	83%	87%	90%	88%	86%	86%
KP	Sat. Mem. – Sept. 20	EAST CREEK CABIN (AK)	56%	57%	60%	64%	59%	59%
KP	Sat. Mem. – Sept. 20	JUNEAU LAKE CABIN (AK)	63%	87%	95%	88%	84%	83%
KP	Sat. Mem. – Sept. 20	LOWER PARADISE LAKE CABIN	46%	46%	60%	67%	45%	53%
KP	Sat. Mem. – Sept. 20	ROMIG CABIN (AK)	60%	77%	83%	85%	85%	78%
KP	Sat. Mem. – Sept. 20	SWAN LAKE CABIN SEWARD	81%	76%	84%	78%	79%	80%
KP	Sat. Mem. – Sept. 20	TROUT LAKE CABIN (AK)	89%	82%	0%	90%	86%	69%
KP	Sat. Mem. – Sept. 20	UPPER PARADISE LAKE CABIN	43%	49%	44%	60%	53%	50%
KP	Sat. Mem. – Sept. 20	UPPER RUSSIAN LAKE CABIN	81%	82%	85%	84%	90%	84%
KP	Sat. Mem. – Sept. 20	WEST SWAN LAKE CABIN	35%	31%	41%	29%	37%	35%
PWS	Sat. Mem. - Sept. 20	COGHILL LAKE CABIN (AK)	73%	70%	61%	16%	65%	57%
PWS	Sat. Mem. - Sept. 20	HARRISON LAGOON CABIN	66%	81%	87%	79%	82%	79%
PWS	Sat. Mem. - Sept. 20	PAULSON BAY CABIN (AK)	68%	89%	83%	84%	91%	83%
PWS	Sat. Mem. - Sept. 20	PIGOT BAY CABIN (AK)	59%	84%	83%	88%	83%	79%
PWS	Sat. Mem. - Sept. 20	SHRODE LAKE CABIN (AK)	78%	71%	46%	59%	61%	63%
PWS	Sat. Mem. - Sept. 20	SOUTH CULROSS CABIN	78%					78%
PWS	Sat. Mem. - Sept. 20	GOOSE BAY CABIN		84%	92%	87%	0%	66%
PWS	Sat. Mem. - Sept. 20	GREEN ISLAND CABIN (AK)	81%	88%	81%	92%	86%	86%
PWS	Sept. 20 - Dec. 31	BEACH RIVER CABIN (AK)	40%	40%	48%	31%	35%	39%
PWS	Sept. 20 - Dec. 31	DOUBLE BAY CABIN (AK)	26%	43%	25%	44%	13%	30%
PWS	Sept. 20 - Dec. 31	HOOK POINT CABIN (AK)	22%	16%	12%	49%	19%	23%

Area	Sample Period	Cabin	2008	2009	2010	2011	2012	5-year average
PWS	Sept. 20 - Dec. 31	LOG JAM BAY CABIN (AK)	14%	36%	43%	53%	19%	33%
PWS	Sept. 20 - Dec. 31	PORT CHALMERS CABIN (AK)	35%	39%	26%	56%	42%	40%
PWS	Sept. 20 - Dec. 31	SAN JUAN BAY CABIN (AK)	46%	46%	36%	36%	42%	41%
PWS	Sept. 20 - Dec. 31	SHELTER BAY CABIN (AK)	61%	27%	26%	49%	28%	38%
PWS	Aug. 1 - Dec. 31	NELLIE MARTIN RIVER CABIN	16%	23%	51%	41%	25%	31%
PWS	Sat. Mem. - Sept. 20	JACK BAY CABIN (AK)	72%	44%	53%	44%	68%	56%

Q22 - What are the trends in commercial recreation services on the Forest and how do they compare to capacity?

Status: Monitored in FY 2012

Findings: The Special Uses Service Team (SUST) annually compiles final use reports from all special use permittees providing transportation, packing, outfitting, guiding, leading, and instructing on National Forest System lands. These data are compiled the following fiscal year, as reports from outfitters and guides are due later after September 30. Analysis is done every third year.

In FY12, the SUST compiled all use from FY12, and used the access database that was developed in FY11 for the storage of the information. For the purposes of this protocol, however, only commercial use reported between Memorial Day and Labor Day are included in this monitoring. The table below shows a compilation of the FY12 commercial outfitter/guide use reported on the Forest from Memorial Day to Labor Day.

Evaluation: The actual client days for FY between 5/26/2012 and 9/3/2012 are well below the theoretical carrying capacities of the three geographical areas of the CNF, so do not surpass the thresholds in the protocol. There does not appear to be any capacity issue at this time. As per the protocol, trends will be evaluated in FY13, after three years of data is compiled.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Table 5. Commercial outfit and guide use type for CNF in 2012 from Memorial Day (May 5) to Labor Day (September 3); by the three geographic areas, Copper River Delta (CRD), Kenai Peninsula (KP), and Prince William Sound (PWS).

Activity	CRD	KP	PWS	CNF Total
ATV Tours	0	10	0	10
Camping	0	137	3390	3527
Canoeing	0	243	0	243
Dog Sled Tours	0	1140	0	1140
Fishing	53	673	13	739
Flightseeing/Glacier Landings	0	36	0	36
Gold Panning	0	0	0	0
Hiking	114	1884	584	2582
Horseback Riding	0	332	0	332
Hunting	29	5	68	102
Ice Climbing	0	197	0	197
Interpretation/Nature Tours	71	73	0	144
Kayak Camping	0	0	90	90
Kayak Day Trips	0	207	186	393
Motorized Boat Tours (jet boat)	0	401	0	401
Mountain Biking	0	75	0	75
Mountaineering	0	0	0	0
Photography	17	0	4	21
Picnic	0	28	8	36
Rafting	52	4596	0	4648
Sightseeing	59	0	0	59
Ski Touring/Snowshoe	0	0	0	0
Wildlife Viewing	0	26	0	26
TOTALS	395	10,063	4,343	14,801

Scenic Quality

Q23 - Are areas of the Forest being managed in accordance with the Scenery Integrity Objectives (SIO) in Forest-wide Standards and Guidelines?

Status: Monitored in FY 2012

Findings: The objective of this monitoring is to determine to what extent the applicable Forest Plan direction and mitigation measures for SIO prescribed by NEPA decisions are implemented. In FY12 the Forest landscape architect in conjunction with district staff

completed monitoring for Scenic Integrity Objective on four projects on the Glacier Ranger District:

- Whistle Stop Project (EIS),
- Chugach Electric Line Relocation (CE),
- Fuller Group Mining Plan of Operations (EA), and
- Granite Creek Fuel Reduction Project (CE),

In all projects examined the Forest Plan direction for Scenic Integrity Objectives were followed. There were no specific mitigation measures related to SIO.

Evaluation: Areas of the Forest are being managed in accordance with the Scenery Integrity Objectives in Forest-wide Standards and Guidelines. In no instance did the findings result in a Forest Plan amendment being triggered because of diminishing SIO quality.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Fire Protection and Fuels Management

Q24 - What is the pattern of abundance of different fuel types on the Kenai Peninsula?

Status: Monitored in FY 2012

Findings: This monitoring includes both effectiveness and implementation components. The effectiveness monitoring component interprets whether changes in fire regime condition class (FRCC) and down wood abundance (based on Forest Inventory and Analysis data) on the Kenai Peninsula geographic area are of sufficient magnitude to be a concern to management. The effectiveness monitoring is reported every five years. The implementation monitoring component is to determine if fire protection and fuels management activities are consistent with the goals, objectives, standards and guidelines specified in the Forest Plan. The implementation monitoring occurs annually.

In FY 2012, 230 acres of hazardous fuel reduction via pile burning were accomplished. The Forest Plan specifies that 400 acres of hazardous fuel reduction via burning should be completed annually to reduce fuel buildups. The completed 230 acres is 58 percent of the 400 acre goal. Attaining the 400 acre goal may not be consistently feasible since other priorities in the integrated vegetation management program may dictate what treatments,

objectives and projects are funded and may impact the available acres to be burned in a given year.

All other fire and fuels management activities were consistent with the Forest Plan except for the treatment guideline to treat visible debris from activity fuels within one year of vegetation management. Ten percent of total treatments met this guideline. Piled debris requires one or two curing seasons, dependent upon management objectives, site location, species of piled material, and time of year the material was cut. These factors contributed to not meeting this goal.

Fire Regime Condition Class (FRCC) analyses were not conducted in FY 2012 since the Landscape Fire and Resource Management Planning Tools Project (LANDFIRE) data from which FRCC is derived was found to have low accuracy. The data was likely to have limited utility on the Chugach.

Evaluation: All fire and fuels management activities were consistent with the Forest Plan except for non-attainment of the prescribed burning target and only partial treatment of visible debris from activity fuels within one year of vegetation management. The above explanations are sufficient and further evaluation is not necessary at this time.

Recommendations for remedial action: Treatment guidelines in the Forest Plan for treating visible debris from activity fuels should be evaluated during Forest Plan Revision to determine if they need to be modified.

Actions taken in FY12 to respond to previous recommendations: None

Wilderness Study Area

Q25 - Is the wilderness character of the Wilderness Study Area (WSA) and areas recommended for Wilderness being maintained?

Status: Monitored in FY 2012

Findings: This monitoring detects changes and trends in four qualities of wilderness character to determine if the CNF is managing the WSA in a way that prevents degradation of wilderness character, in accordance with the Forest Plan's "Wilderness Study Area Management Area' prescription. The WSA monitoring protocol is based on direction intended for monitoring designated wilderness areas because (1) the monitoring question is essentially the same as that used for designated wilderness areas (maintain wilderness character), and 2) Alaska Regional policy directs that the management of the WSA will

follow the same direction provided for wildernesses established by ANILCA. The four qualities of wilderness character are taken from Landres et al. (2008); Untrammeled, Natural, Undeveloped, and Solitude or Primitive and Unconfined Recreation.

FY 2012 marked the first year for implementing monitoring of the condition of wilderness character in the Nellie Juan – College Fiords Wilderness Study Area (WSA), and is the first of two pilot years for this protocol. The vast majority of the work was completed by the Glacier Ranger District (GRD) staff, who gathered applicable data from corporate databases, external agency data, other CNF resource specialists, and observations. GRD staff also developed a template for storing data that will effectively display trends in wilderness character conditions. FY 2012 data was compiled into the spreadsheet.

Untrammeled Quality - For the most part, vegetation, soil, fire, and wildlife actions are not being taken that would affect this quality of wilderness character in the WSA.

Natural Quality - Nonindigenous plant species are estimated to affect a "trace" (less than one percent) of WSA lands (DeVelice 2012c). Two nonindigenous animal species are known (Sitka black-tailed deer, European black slug) and a third is subject to debate (mink on Naked Island). Percent of land cover is only known for Naked Island mink. There are no known extirpations of species or habitats in the WSA.

At least two dams and two weirs affect streams within the WSA. One dam is at Cannery Creek Fish Hatchery and the other is at a USFS fisheries project at Solf Lake. Several USFS Fisheries fish ladders and structures are also in place. The WSA is being managed consistent with direction in ANILCA which provides for aquaculture activities within the WSA. The Cannery Creek Fish Hatchery preceded the designation of the WSA by ANILCA.

The following two measures in the CNF Wilderness Character Monitoring Plan cannot presently be answered for the WSA: Ozone and concentration of sulfur and nitrogen in wet deposition, and average sum of anthropogenic fine nitrate and sulfate. The protocol measures list Castnet data from Mount Rainier, NADP data from Denali, and IMPROVE data from Tuxedni NWR as data sources. In 2012, data from each source were gathered and discussed among Region 10 wilderness managers, air quality specialists, and recreation planners. The consensus was that the data sources cannot be applied to the WSA and no data sources for the measures exist in or near the WSA.

Undeveloped Quality - Human development, including roads, buildings, and installations are present in the WSA. ANILCA provides for establishing and maintaining certain types of human development (communication sites and navigation aids, aquaculture improvements, public use cabins, structures necessary for the taking of fish and wildlife, ANILCA privately owned cabins). While provided for by ANILCA, the hatcheries and the Naked Island communication site do affect the undeveloped nature of the WSA. The best

undeveloped qualities of wilderness character exist in areas away from hatcheries, communication sites, and other developments, including the southwest part of the WSA, Kings Bay, Knight Island, College Fiord, Wells Bay, Long Bay and Columbia Bay.

Indices were created to catalog authorized buildings, authorized installations/other developments, and unauthorized developments. As a means of tracking trends, values were assigned to each type of development. The values are the same as those used on the Tongass National Forest and stem from BLM wilderness character monitoring protocol.

While the indices begin to describe the WSA's undeveloped quality, a full picture is difficult to obtain because developments are not always accurately or fully described in special use permits and field inspections of permitted activities are not common. Also, MRDGs (Minimum Requirements Decision Guide) are either not in place for a number of developments or existing MRDGs do not describe all developments at a given project. This is partly because some developments pre-date the MRDG process.

Outstanding Opportunities for Solitude and Primitive Recreation Quality - This quality is affected by various motorized/mechanized uses in the WSA and the area's popularity, especially in summer. Indices were created for authorized motorized/mechanized uses and visitor use data. Many authorized uses are provided for by ANILCA. Observations by CNF field staff found that it is likely significant impacts to this quality occur near hatcheries and include development, machinery, noise, air traffic, and persistent congregations of commercial fishing boats in June, July and August.

Overall motorized/mechanized uses were hard to catalog because they are not always accurately or fully described in special use permits and field inspections of permitted activities are infrequent. Also, MRDGs are either not in place for a number of motorized/mechanized uses (Wolverine Glacier RNA, Earthquake Information Center, USFS administrative projects) or existing MRDGs do not describe a project's range of uses (Columbia Bay research, UNAVCO). In some cases, this is because uses became established prior to the MRDG process.

Visitor use trends were also hard to catalog. No protocols are in place for tracking visitor use trends, recording encounters in the field, or identifying/preserving areas with outstanding opportunities for solitude or primitive recreation.

Evaluation: This is the first year of implementation of this protocol. Per the protocol, trends will be evaluated every five years.

Recommendations for remedial action: None

Actions taken in FY12 to respond to previous recommendations: None

Research Natural Areas

Q26 - Are proposed and established Research Natural Areas being maintained in a state unmodified by human activity?

Status: Monitored in FY 2012

Findings: This monitoring documents the ways that each of the Research Natural Areas (RNAs) on the Forest are being managed in a manner consistent with Standards and Guidelines and the RNA Management Area Prescription specified in the Forest Plan. In FY 2012, quarterly reviews of data in corporate databases were conducted to ascertain compliance with Standards and Guidelines and the RNA Management Area Prescription. Remote (via aircraft or boat) and ground based visitor-effects monitoring was conducted.

Database review found no cases of non-compliance for any of the five RNAs on the Forest. Inspection of the RNAs by CNF specialists from the air or on the ground found little to no evidence of human-caused disturbance. The detail on these observations follow.

No visible occurrences of human-caused disturbance were observed from the air in the visitor-effects monitoring of:

- Copper Sands RNA (though there was some "marine" trash on the beaches)
- Wolverine Glacier RNA other than in the immediate area of the U.S. Geological Survey weather station and research hut.

No visible occurrences of human-caused disturbance were observed in shoreline and ground surveys of:

- Green Island RNA (though there was some "marine" trash on the beaches of Green Island and Little Green Island)
- Olsen Bay Creek RNA. There is very little remaining evidence of the fisheries research facility that had been removed just outside the RNA boundary.

Shoreline survey of Kenai Lake-Black Mountain RNA found some tree stumps (probably from firewood cutting) at multiple locations near the shore, as shown in the adjacent picture (Figure 3). The damage is likely not of a magnitude to impede natural processes.

Figure 3. Photograph of shoreline of Kenai Lake-Black Mountain RNA with red circle showing location of damage from likely firewood cutting.

The established campsite immediately adjacent to the RNA near where Meadow Creek enters Kenai Lake was surveyed. There is moderate tree damage and ground vegetation was worn away around the center of activity within the campsite. Very little trash was present in the campsite and there was little evidence of human-caused disturbance within the adjacent RNA.

Evaluation: Database review found no cases of non-compliance for any of the five RNAs on the Forest. Although a shoreline survey of the Kenai Lake-Black Mountain RNA found some tree stumps that are likely from firewood cutting, it is suspected that the damage is not of a magnitude that would impede natural processes.

Recommendations for remedial action: The District Ranger has been notified that undesired tree cutting has occurred at the edge of the Kenai Lake-Black Mountain RNA, and that it is recommended that signage be posted at most likely access points that state tree cutting is not allowed.

Actions taken in FY12 to respond to previous recommendations: None

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