

**Regional Operational Plan SF.1J.2015.08**

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**Survey of U.S. Forest Service Recreational Cabin  
Users during 2015**

by

**Carol L. Coyle**

May 2015

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient (multiple)	R
milliliter	mL	west	W	correlation coefficient (simple)	r
millimeter	mm	copyright	©	covariance	cov
		corporate suffixes:		degree (angular)	$^\circ$
<b>Weights and measures (English)</b>		Company	Co.	degrees of freedom	df
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	expected value	$E$
foot	ft	Incorporated	Inc.	greater than	>
gallon	gal	Limited	Ltd.	greater than or equal to	$\geq$
inch	in	District of Columbia	D.C.	harvest per unit effort	HPUE
mile	mi	et alii (and others)	et al.	less than	<
nautical mile	nmi	et cetera (and so forth)	etc.	less than or equal to	$\leq$
ounce	oz	exempli gratia (for example)	e.g.	logarithm (natural)	ln
pound	lb	Federal Information Code	FIC	logarithm (base 10)	log
quart	qt	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
yard	yd	latitude or longitude	lat or long	minute (angular)	'
		monetary symbols (U.S.)	\$, ¢	not significant	NS
<b>Time and temperature</b>		months (tables and figures): first three letters	Jan,...,Dec	null hypothesis	$H_0$
day	d	registered trademark	®	percent	%
degrees Celsius	°C	trademark	™	probability	P
degrees Fahrenheit	°F	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
degrees kelvin	K	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
hour	h	U.S.C.	United States Code	second (angular)	"
minute	min	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
second	s			standard error	SE
<b>Physics and chemistry</b>				variance	
all atomic symbols				population sample	Var
alternating current	AC			sample	var
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

***REGIONAL OPERATIONAL PLAN SF.1J.2015.08***

**SURVEY OF U.S. FOREST SERVICE RECREATIONAL CABIN USERS  
DURING 2015**

by  
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Alaska Department of Fish and Game, Division of Sport Fish, Juneau

Alaska Department of Fish and Game  
Division of Sport Fish  
Regional Address

May 2015

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**Signature Page**

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Project leader(s): Carol L. Coyle

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Title	Name	Signature	Date
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## ABSTRACT

A mailout survey will be sent to parties who reserved any of 74 U.S. Forest Service recreational cabins located near cutthroat trout *Oncorhynchus clarkii* and rainbow/steelhead trout *O. mykiss* systems in Southeast Alaska during 2015. The survey will be used to estimate trout (cutthroat and rainbow, combined) and steelhead catch and harvest by users of these cabins. The total nights the cabins were reserved, the number of people using these reservations, and whether or not someone in that party fished will be tallied. The overall response rate will be calculated along with an estimated number of trout caught, released and harvested by cabin. Similarly the number of steelhead caught, released and harvested by cabin will be estimated at those cabins in systems that contain steelhead.

Key words: Harvest, catch, steelhead, cutthroat trout, rainbow trout, Southeast Alaska, U. S. Forest Service recreational cabin, mail survey, creel survey, creel census.

## PURPOSE

The main purpose of this project is to identify trends in catch and harvest during 2015, for trout and steelhead in 74 select freshwater systems in Southeast Alaska. Catch and harvest data obtained from this project for these systems generally exceeds similar parameters produced from the statewide harvest survey in terms of spatial and temporal resolution. This survey is conducted every three years and intended to provide a long-term data set for evaluating trends in catch and harvest of trout and steelhead and formulating subsequent management action, if necessary.

## BACKGROUND

The Alaska Board of Fisheries (BOF) promulgated more restrictive bag limits and minimum size regulations for cutthroat trout (*Oncorhynchus clarkii*) and rainbow trout (*O. mykiss*) and steelhead (*O. mykiss*) in Southeast Alaska in 1994. There have been several small modifications of these regulations by the BOF since 1994, but the core regulations are still in place (Table 1). The wide distribution of trout and steelhead populations throughout Southeast Alaska makes monitoring of these mostly remote populations difficult. This cabin user mailout survey was developed as a means to cost-effectively monitor angler catch and harvest in many of the more popular and remote freshwater systems in Southeast Alaska.

Currently, there are 74 U.S. Forest Service (USFS) recreational cabins in 62 different systems throughout Southeast Alaska that are available for public rental near lakes and streams that have populations of cutthroat and rainbow trout and steelhead. The access to sport fishing opportunities from these cabins generates a significant proportion of the catch and harvest in fresh water of trout and steelhead in Southeast Alaska. Periodic monitoring of angler catch and harvest at the USFS cabins prior to BOF meetings held every 3 years helps the Division of Sport Fish (DSF) identify potential conservation concerns and areas where regulations might be liberalized or restricted, evaluate effects of regulations, and provide information for BOF proposals.

A similar project for estimating angler harvest and catch in Southeast Alaska is the annual Statewide Harvest Survey (SWHS). The focus of the SWHS is much larger, whereas angler effort in most Southeast Alaska systems with USFS cabins is relatively low. The sampling rates required by the SWHS yield only annual estimates for a few of the largest or most heavily used freshwater systems in Southeast Alaska (Schwan 1990). Specifically, the SWHS does not generate estimates if fewer than 12 responses from a specific location (e.g. Jim's Lake) are received and instead these responses are rolled up in to a larger geographic area (e.g. Admiralty Island). This cabin survey provides estimates of angler catch and harvest for individual systems, regardless of the level of use, and therefore exceeds SWHS capabilities in this regard.

Table 1.—USFS recreational cabins in Southeast Alaska identified by ranger district, system, cabin name, presence of steelhead and trout, 2012 trout regulations, and type of survey form sent.

Ranger district	System	Cabin name	Steelhead	Trout	Trout regulations <sup>a</sup>	Survey form
Admiralty Island	Admiralty Creek	Admiralty Cove	Yes	Yes	11"	Comb.
Admiralty Island	Distin Lake	Distin Shelter	No	Yes	25"	Trout
Admiralty Island	Distin Lake	Sportsmen	No	Yes	25"	Trout
Admiralty Island	Florence Lake	East Florence	No	Yes	Bait lake	Trout
Admiralty Island	Hasselborg Lake	Big Shaheen	No	Yes	25"	Trout
Admiralty Island	Hasselborg Lake	Hasselborg Creek	No	Yes	11"	Trout
Admiralty Island	Hasselborg Lake	Little Shaheen	No	Yes	25"	Trout
Admiralty Island	Jim's Lake	Jim's Lake	No	Yes	25"	Trout
Admiralty Island	Lake Alexander	Lake Alexander	No	Yes	14"	Trout
Admiralty Island	Lake Kathleen	Lake Kathleen	No	Yes	11"	Trout
Admiralty Island	Young Lake	North Young Lake <sup>b</sup>	No	Yes	14"	Trout
Admiralty Island	Young Lake	South Young Lake <sup>c</sup>	No	Yes	14"	Trout
Juneau	Peterson Lake	Peterson Lake	No	Yes	14"	Trout
Juneau	Turner Lake	East Turner Lake	No	Yes	C&R	Trout
Juneau	Turner Lake	West Turner Lake	No	Yes	C&R	Trout
Juneau	Windfall Lake	Windfall Lake	No	Yes	14"	Comb.
Ketchikan	Fish Creek	Fish Creek	Yes	Yes	11"	Comb.
Ketchikan	Heckman Lake	Heckman Lake	Yes	Yes	14"	Comb.
Ketchikan	Heckman Lake	SE Heckman Lake <sup>b</sup>	Yes	Yes	14"	Comb.
Ketchikan	Jordan Lake	Jordan Lake	Yes	Yes	14"	Comb.
Ketchikan	McDonald Lake	McDonald Lake	Yes	Yes	14"	Comb.
Ketchikan	Orchard Lake	Plenty Cutthroat	No	Yes	25"	Trout
Ketchikan	Patching Lake	Patching Lake	No	Yes	25"	Trout
Ketchikan	Reflection Lake	Reflection Lake	Yes	Yes	25"	Comb.
Misty Fjords	Bakewell Lake	Bakewell	No	Yes	14"	Trout
Misty Fjords	Ella Lake	Ella Narrows	No	Yes	25"	Trout
Misty Fjords	Hugh Smith Lake	Hugh Smith Lake	No	Yes	11"	Trout
Misty Fjords	Humpback Lake	Humpback Lake	No	Yes	25"	Trout
Misty Fjords	Manzanita Lake	Manzanita Lake	No	Yes	25"	Trout
Misty Fjords	Upper Checats Lake	Checats	No	Yes	11"	Trout
Misty Fjords	Wilson Lake	Wilson Narrows	No	Yes	25"	Trout
Misty Fjords	Wilson Lake	Wilson View	No	Yes	25"	Trout
Misty Fjords	Winstanley Lake	Winstanley Lake	No	Yes	11"	Trout
Petersburg	Castle River	Castle Flats	Yes	Yes	11"	Comb.
Petersburg	Castle River	Castle River	Yes	Yes	11"	Comb.
Petersburg	Duncan Salt Chuck	Salt Chuck East	Yes	Yes	11"	Comb.
Petersburg	Harvey Lake	Harvey Lake <sup>b</sup>	No	Yes	11"	Trout
Petersburg	Kadake Creek	Kadake Bay	Yes	Yes	11"	Comb.
Petersburg	Kah Sheets Creek	Kah Sheets Bay	Yes	Yes	11"	Comb.
Petersburg	Kah Sheets Lake	Kah Sheets Lake	Yes	Yes	14"	Comb.
Petersburg	Petersburg Lake	Petersburg Lake	Yes	Yes	14"	Comb.
Petersburg	Swan Lake	Swan Lake <sup>b</sup>	No	Yes	11"	Trout
Prince of Wales	Control Lake	Control Lake	No	Yes	11"	Trout
Prince of Wales	Honker Lake	Honker Lake	No	Yes	11"	Trout

-continued-

Table 1.–continued (page 2 of 2).

Ranger district	System	Cabin name	Steelhead	Trout	Trout regulations <sup>a</sup>	Survey form
Prince of Wales	Karta	Karta Lake	Yes	Yes	14"	Comb
Prince of Wales	Karta	Karta River	Yes	Yes	14"	Comb
Prince of Wales	Karta	Salmon Lake	No	Yes	14"	Trout
Prince of Wales	Red Bay Lake	Red Bay Lake	Yes	Yes	14"	Comb
Prince of Wales	Salmon Bay Lake	Salmon Bay Lake	Yes	Yes	14"	Comb
Prince of Wales	Sarkar Lake	Sarkar Lake	No	Yes	14"	Trout
Prince of Wales	Shiple Lake	Shiple Bay	No	Yes	11"	Trout
Prince of Wales	Staney Creek	Staney Creek	Yes	Yes	14"	Comb
Prince of Wales	Sweetwater Lake	Sweetwater Lake	No	Yes	11"	Comb
Prince of Wales	Black Bear	Black Bear Lake	No	Yes	11"	Trout
Prince of Wales	Kegan Creek	Kegan Cove	Yes	Yes	14"	Comb
Prince of Wales	Kegan Creek	Kegan Creek	Yes	Yes	14"	Comb
Sitka	Avoss Lake	Avoss Lake	No	Yes	11"	Trout
Sitka	Baranof Lake	Baranof Lake	No	Yes	14"	Trout
Sitka	Davidof Lake	Davidof Lake	No	Yes	11"	Trout
Sitka	Goulding Lake	Goulding Lake	No	Yes	14"	Trout
Sitka	Kook Lake	Kook Lake	No	Yes	14"	Trout
Sitka	Lake Eva	Lake Eva	Yes	Yes	14"	Comb
Sitka	Plotnikof Lake	Plotnikof Lake <sup>c</sup>	No	Yes	11"	Trout
Sitka	Salmon Lake	Salmon Lake	Yes	Yes	14"	Comb
Sitka	Sitkoh Lake	Sitkoh Lake East	Yes	Yes	14"	Comb
Sitka	Sitkoh Lake	Sitkoh Lake West	Yes	Yes	14"	Comb
Sitka	Suloia Lake	Suloia Lake	No	Yes	11"	Trout
Wrangell	Anan Creek	Anan Bay	Yes	Yes	11"	Comb
Wrangell	Anan Lake	Anan Lake <sup>b</sup>	Yes	Yes	14"	Comb
Wrangell	Eagle Lake	Eagle Lake	No	Yes	25"	Trout
Wrangell	Harding River	Harding River	Yes	Yes	11"	Comb
Wrangell	Marten Lake	Marten Lake	No	Yes	11"	Trout
Wrangell	Twin Lakes	Twin Lakes	No	Yes	11"	Trout
Wrangell	Virginia Lake	Virginia Lake	No	Yes	14"	Trout
Total number of cabins			28 <sup>d</sup>	74		

<sup>a</sup> 11" = 11 inch minimum size; 14" = 14 inch minimum size; 25" = 25 inch minimum size; C&R = catch and release only; bait lake = bait allowed, no minimum size; bag limit of 2/day for 11 and 14 inch minimum size limit, 1/day for 25 inch minimum size limit. Current statewide regulations for steelhead include a daily bag limit of 1 fish, 36 inches or more in total length, and an annual limit of 2 fish.

<sup>b</sup> Cabins not surveyed prior to the 2006 survey.

<sup>c</sup> Steelhead angling opportunities accessible from cabin. At Plotnikof Lake, one can take a 4 mile boat ride to the outlet stream, then hike a 4 to 5 mile trail to the stream below the barrier falls that has steelhead. At Young Lake, one can hike approximately 1 mile down the outlet stream and access the creek below the barrier falls to fish for steelhead.

<sup>d</sup> Does not include 2 locations where steelhead opportunities are accessible from cabin (per footnote c).

*Note:* ADF&G Division of Sport Fish (DSF) management boundaries coincide with USFS ranger districts as follows: Ketchikan DSF Management Area - Ketchikan and Misty Fjords ranger districts; Prince of Wales DSF Management Area -Prince of Wales Ranger District; Petersburg DSF Management Area - Petersburg and Wrangell ranger districts; Sitka DSF Management Area - Sitka Ranger District; Juneau DSF Management Area - Juneau and Admiralty Island ranger districts.

The SWHS does provide a means of evaluating the cabin user survey, but only on a large geographic scale. Results from the latest SWHS survey estimates that 82% of cutthroat trout and 32% of steelhead trout harvested during 2013 in Southeast Alaska (excluding Yakutat) were taken in fresh water (SWHS 2013 accessed on 4/6/2015). The SWHS also estimates that Southeast Alaska harvests of cutthroat trout, rainbow trout, and steelhead in fresh water have declined since 1994, but there was a near record estimate of steelhead catch in 2008. The more restrictive regulations adopted by the BOF in 1994 are assumed to be largely responsible for the decline from relatively large harvests observed in the early 1990s. The estimated average annual catch of steelhead between 1990 and 2013 has been 14,319 with peak catches occurring in 2000 (24,885) and 2008 (26,155); the estimated total annual catches of rainbow trout and cutthroat trout have averaged 15,177 and 30,155, respectively, since 1996 (SWHS 1996-2013, accessed on 4/7/2015).

This project will query users of 74 USFS recreational cabins in Southeast Alaska using a mail survey similar to that used in past years (Jones 1993–1995; Jones and Kondzela 2001; Harding et al. 2005, Harding et al. 2009, Harding 2012, Coyle 2014). The 2002 survey queried users of 75 USFS cabins. Four cabins were added to the 2006 survey (SE Heckman Lake, Harvey Lake, Swan Lake, and Anan Lake) that were either new or had been overlooked in previous surveys. All 79 cabins were near water bodies that have either cutthroat or rainbow trout, and about half of the cabins were near streams that also have steelhead runs. The 2009 survey was “simplified” to minimize missing data that has occurred in previous surveys. The primary change implemented in 2009 was eliminating questions on the survey form asking about angler effort (days or hours fished), and questions asking anglers to rate their angling experience and attitudes about regulations. The simplified form only asked questions related to trout and steelhead, i.e., no questions were asked about Dolly Varden catch or harvest. Both the 2012 and 2015 studies continued with the methods developed in 2009, although the number of cabins queried has changed due to cabin closures.

In the future, consideration should be given to conduct the cabin user survey in an on-line or web-accessible format, which will reduce costs associated with multiple mailouts and potentially lead to increased response rates and more accurate reporting by cabin users.

## **OBJECTIVES**

The research objective for 2015 is to:

Estimate angler catch and harvest of trout (cutthroat and rainbow combined) and steelhead occurring in 2015, by stream or lake (system), for parties registered to use USFS cabins.

## **METHODS**

### **STUDY DESIGN**

A survey will be mailed to registered users of 74 USFS recreational cabins in 2015. Returned responses will be used to estimate trout and steelhead catch and harvest. Prior to 2012, there were 136 USFS cabins in Southeast Alaska that provided fishing opportunities classified as: 1) none; 2) freshwater only; 3) marine only; and 4) both marine and fresh water. Sport fish area management and research biologists selected 79 of these cabins (58%) for the survey that were located on or near important streams and lakes that support steelhead, cutthroat and rainbow

trout. In 2012, five of these cabins were closed by the USFS. USFS cabins in the Yakutat area were not selected for the survey because the number of anglers who reserve cabins and fish in the Yakutat area is insignificant compared to total angler use in the area. The cabins chosen now all have access to trout populations, including 28 of which provide immediate access to steelhead systems. It is not an objective of this study to estimate catch or harvest of trout or steelhead by anglers that did not reserve a USFS recreational cabin. Those anglers might include users with day access such as anglers travelling by boat, hiking, or float plane; users with other lodging; or those who gained access through job-related activities such as employees of logging companies, ADF&G, or the USFS.

## **DATA COLLECTION**

USFS personnel will compile mailing addresses of party “heads” that registered to use USFS cabins in 2015. The party heads will be subsequently mailed a questionnaire and cover letter (Appendices A1–A3). To protect the privacy of cabin users and comply with the Federal Privacy Act, the names and addresses of people who reserve USFS cabins will not be provided to ADF&G, and the USFS will conduct and handle all mailings. After each mailing, ADF&G will be sent an electronic list of codes representing parties who made a reservation and were sent a survey. Anglers completing the survey will return their forms (identified with ID codes in place of names and addresses) to the Douglas ADF&G office. Coded ID numbers of those individuals not responding will be provided by the USFS so they can send reminders to the nonrespondents (Appendices A4 and A5).

The mailing lists will be captured in Excel® spreadsheets that include the city, state, and zip code of the reservation party head, cabin name and number, date of reservation, length of reservation in days, and number in the party. This mailing list will also include a customer number for cross-reference purposes so that ADF&G personnel can track respondents and develop a list for reminder letters.

This survey will be stratified by season: spring (January 1 to May 31), summer (June 1 to September 31) and fall (October 1 to December 31), because users in different seasons tend to have different objectives. For example, in past surveys the total and average effort fished for trout in the summer stratum was higher than in the spring or fall. Similarly, most reported effort for steelhead occurs in the spring stratum, simply because this is when most steelhead runs occur in Southeast Alaska. Also, providing questionnaires nearer the time of the visit through this stratification procedure allows party heads to more accurately recall their visits.

The USFS will be requested to prepare reservation lists on May 31, September 30, and December 31, 2015; initial mailings are scheduled for June 7 and October 11, 2012, and January 10, 2013 (Table 2). If no response is received 3 weeks after the initial mailing, a reminder letter will be sent to all nonrespondents (Appendix D). If, after 3 additional weeks, a response is still not received, a second reminder will be sent (Appendix E). If there is still no response after the second reminder letter, the party is considered a nonrespondent.

Table 2.–Tentative dates for 2012 mail out survey.

	Strata	Compile	Mail out	Reminder	Reminder
Strata	dates	list	date	letter 1	letter 2
Spring	Jan 1–May 31, 2015	June 1, 2015	June 8, 2015	June 29, 2015	July 20, 2015
Summer	June 1–Sept 30, 2015	October 2, 2015	October 5, 2015	Nov. 2, 2015	Nov. 2, 2015
Fall	Oct. 1–Dec. 31, 2015	Dec 31, 2015	Jan 11, 2015	Feb. 1, 2015	Feb 22, 2015

## DATA REDUCTION

The questionnaire is simply designed to estimate the number of trout and steelhead that are harvested and released, from which catch can be calculated. The number of people in the party and the number of days reserved at the cabin are generated from the original party’s registration information. Data from responding parties will be compiled into electronic spreadsheets for processing. Comments found on the forms will be parsed for information about angler experiences, and catch and harvest data germane to the survey questions. For example, in the past a few anglers failed to specify their catch or harvest in the provided spaces on the survey form, but did provide comments like “we only fished for salmon and caught no trout” that will let us unambiguously impute unbiased responses to survey questions.

All returned forms will be visually checked for obvious errors, such as omissions in any field. The data will be entered into a data file; during data entry a variable (data field) denoting that a particular record required further attention will be used to facilitate final editing of the data. Data will be analyzed using a SAS® program (SAS Institute 9.3 Cary, NC, USA) developed specifically for this project. The guidelines below will be used during data entry to provide consistency:

1. If a response to the question regarding number of fish caught or released is “> (some number)”, data entered will be (some number) +1.
2. If response to the question regarding the number of fish caught or released is a range (e.g., 20–30), the midpoint value will be entered. If the midpoint is not a whole number (e.g., midpoint of 15–20 fish = 17.5 fish), the value of 17.5 will be entered.
3. If the response to the question regarding number of fish caught or released is “none” or “zero”, the value of zero will be entered rather than leaving the entry blank.
4. If the response to the question regarding number of fish caught or released is ambiguous (e.g., some, many, or lots) or blank, the entry will be left blank.
5. All comments will be read and when possible, missing responses will be replaced with inferred or stated values. For example, if the respondent did not answer the question that asked whether they fished, but stated in the comment section that 3 trout were caught, it will be known that the party did indeed fish. When in doubt, questionnaires will be flagged for further review by the project biologists and/or biometricians.
6. If a respondent stated that somebody from their group fished, but they left the harvest/released question blank, and then they commented that they “caught 3 trout”, it will not be known whether these fish were harvested or released, and the harvest/released question will be left blank.

The final, edited data file, along with a data map, will be sent to Research and Technical Services (RTS) in Anchorage for archiving.

## ANALYSIS

In each temporal stratum, the total harvest estimated from responding parties  $H_r$  at each cabin will be the sum over mailings  $m = 1 \dots 3$ :

$$\hat{H}_r = \sum_{m=1}^3 H_{r,m} \quad (1)$$

The total harvest  $H$  at the cabin will be calculated as:

$$\hat{H} = \left( \frac{N}{N_r} \right) \hat{H}_r \quad (2)$$

$$\text{vâr}[\hat{H}] = \left(1 - \frac{N_r}{N}\right) N^2 \frac{\sum_{i=1}^{N_r} (\hat{H}_r - \bar{H}_r)^2}{N_r(N_r - 1)} \quad (3)$$

where  $N_r$  = number of responding parties, and  $N$  = number of parties on the USFS reservation list.

The total number of fish caught and released  $R$  at each cabin will be estimated as above after substituting the appropriate variable for  $H$ . For systems with only 1 cabin the yearly estimates for each system will be the sum of the seasonal estimates. For systems with more than 1 cabin the yearly estimates will be the sum of seasonal estimates for all cabins in that system. The SE for harvest and catch will be the square root of the total variance, (sum of variances from equation 3) from all cabins in a system.

Occasionally, catch or harvest data will not be recorded by respondents who reported fishing. The missing data will be imputed using a computer processing program that implements a regression-based multiple imputation technique. Predictor variables for the imputation include party size and length of stay. The procedure will not attempt to estimate missing values, but to simulate them and adjust the variance based on the uncertainty of the missing values.

A total of 500 completed (fully-imputed) data sets and an equal number of estimates of  $H$  (or  $R$ ) will be computed. Let each of the  $D = 500$  complete data estimates and variances (e.g.,  $\hat{H}$  and  $\text{vâr}[\hat{H}]$  in eq. (2) and (3) be  $\hat{\Theta}_d$  and  $W_d$ ,  $d = 1 \dots D$ . Combined estimates will be computed using the formula for multiple-imputed data sets (Little and Rubin 2002). The final point estimate (of  $H$  or  $R$ ) is:

$$\bar{\Theta}_D = \frac{1}{D} \sum_{d=1}^D \hat{\Theta}_d \quad (4)$$

and variance  $T_D = \text{vâr}(\bar{\Theta}_D)$  is:

$$\bar{W}_D = \frac{1}{D} \sum_{d=1}^D W_d \quad (5)$$

$$B_D = \frac{1}{D-1} \sum_{d=1}^D (\hat{\Theta}_d - \bar{\Theta}_D)^2 \quad (6)$$

$$T_D = \bar{W}_D + \left(\frac{D+1}{D}\right) B_D \quad (7)$$

where  $\bar{W}_D$  is the average within-imputation variance component, and  $B_D$  is a between-imputation component (Little and Rubin 2002, p. 85–86).

The total number of fully-imputed data sets generated in this analysis is set to 500 as described above. The original work of Rubin (1987) on the multiple imputation method indicates that a total of 5 imputation data sets is generally adequate for reliable estimates. However, due to the distributional characteristics of the underlying parameters, along with the small sample sizes for this study, it was determined that substantially more imputed data sets are needed to provide reliable estimates of the variances. Guidelines suggested by Graham et al. (2007) and further expanded upon by Enders (2010) indicate that increasing the number of completed-data imputation data sets is often necessary to reliably apply the multiple imputation method

## **SCHEDULE AND DELIVERABLES**

Mailing lists will be prepared by the US Forest Service on May 31, July 31 (pending USFS approval), September 30, and December 31, 2015. The mailings will be sent as close to June 8, October 5, 2015, and January 11, 2016, respectively, as possible.

Final error correction and reduction of the 2015 data will be completed by May 1, 2016. Final data analysis and report writing will culminate in the production of a draft FDS report by November 1, 2017.

Budget Summary: The budget for this project is included in the Freshwater Assessment studies (F-10-30 and F-10-31, Job S-1-6) and Freshwater Assessment Coordination (F-10-30 and F-10-31, Job C-1-3) and existing personnel are used to conduct the mailout survey.

## **RESPONSIBILITIES**

Carol Coyle, Fishery Biologist II, Project Leader

Duties: Perform all aspects of the project; edit, analyze, and report data.

Jeff Nichols, Fishery Biologist IV, Regional Research Coordinator

Duties: Provides supervisory support: edit, analyze, and report data.

Sarah Power, Biometrician II.

Duties: May provide input to sampling design and evaluation. May assist in data analysis and report writing.

Pete Schnieder, US Forest Service Biologist.

Duties: Develop mailing lists and physically mail survey forms. Cooperate with ADF&G to resolve problems with mailout of survey.

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## **APPENDICES**

Appendix A.–Cover letter sent with each questionnaire.



Forest Service  
Alaska Region  
Tongass National Forest

8510 Mendenhall Loop Road  
Juneau, AK 99801  
Phone: (907) 586-8790

**File Code:** 2620-3/2330

**Date:** June 7, 2015

Dear \_\_\_\_\_,

The US Forest Service (USFS) is assisting the Alaska Department of Fish and Game (ADF&G) with surveying anglers about their fishing experience while using USFS public recreation cabins in Alaska during 2015. Because you reserved the \_\_\_\_\_ Cabin on XX/XX/2015 we are forwarding this ADF&G survey form to you and request your participation with this survey. Information about you or your party's fishing experience while using the USFS cabin is important to this study.

Please complete and return the enclosed survey form directly to ADF&G in the postage-paid, addressed envelope provided with this letter. The U.S. Forest Service respects your privacy and has not shared any personal information with ADF&G or any other group or individual. Your responses to this survey will also remain strictly confidential; only the summary of information from all respondents will be published. ADF&G intends to publish a summary of information resulting from the 2015 survey on its web site in June 2017. To view the results of the most recent published survey (2012), please visit the ADF&G web site at: <http://www.sf.adfg.state.ak.us/FedAidPDFs/FDS14-50.pdf>.

Information about sport fishing at the USFS public recreation cabins is important to the management of the fisheries resources. Your information and that of other anglers will help the ADF&G and the USFS work together to sustain your opportunities to enjoy Alaska's recreational fishing. Thank you for participating in this survey.

If you have any questions or privacy concerns related to the procedures that were followed in conducting this survey, please contact me at (907) 789-6255.

Sincerely,

Pete Schneider, Fisheries Biologist  
Tongass National Forest

Enclosure



Appendix B.—Questionnaire combination of trout and steelhead.

1. Did you or anyone from your group use the XX Cabin that you reserved for X/XX/2015?

- NO ..... ▶ Your survey is complete; please return this form in the enclosed envelope.
- YES ..... ▶ Please continue the survey.

2. Did anyone from your group fish during your stay?

- NO ..... ▶ Please skip to question 3.
- YES ..... ▶ Please answer the questions below.

**Cutthroat or rainbow trout**

Approximately how many **cutthroat or rainbow trout** did your group keep to eat or bring home?

\_\_\_\_\_

Approximately how many **cutthroat or rainbow trout** did your group release or return back into the water?

\_\_\_\_\_

**Steelhead**

Approximately how many **steelhead** did your group keep to eat or bring home?

\_\_\_\_\_

Approximately how many **steelhead** did your group release or return back into the water?

\_\_\_\_\_

3. Please provide any comments about your experience at XX Cabin:

**Please return this form in the enclosed envelope. Thank you for your help.**

Appendix C.–Questionnaire: trout only

1. Did you or anyone from your group use the XX Cabin that you reserved for X/XX/2015?

- NO ..... ▶ Your survey is complete; please return this form in the enclosed envelope.
- YES ..... ▶ Please continue the survey.

2. Did anyone from your group fish during your stay?

- NO ..... ▶ Please skip to question 3.
- YES ..... ▶ Please answer the questions below.

**Cutthroat or rainbow trout**

Approximately how many ***cutthroat or rainbow trout*** did your group keep to eat or bring home?

\_\_\_\_\_

Approximately how many ***cutthroat or rainbow trout*** did your group release or return back into the water?

\_\_\_\_\_

3. Please provide any comments about your experience at XX Cabin:

**Please return this form in the enclosed envelope. Thank you for your help**

Appendix D.–First reminder letter to survey nonrespondents.

**File Code:** 2620-3/2330

**Date:** X/XX/ 2015

Dear \_\_\_\_\_:

Some time has passed since I first requested information about your fishing activities at X Cabin beginning on XX/XX. I still have not received your reply. Even if you did not use the cabin or fish during your stay, your response to the questions on the survey is important. Please complete and return the enclosed survey form directly to ADF&G in the postage-paid, addressed envelope provided with this letter.

The U.S. Forest Service respects your privacy and has not shared any personal information with ADF&G or any other group or individual. Your responses to this survey will also remain strictly confidential; only the summary of information from all respondents will ever be published. ADF&G intends to publish a summary of information resulting from the 2015 survey on its web site in June 2017. To view the results of the most recent published survey (2012), please visit the ADF&G web site at: <http://www.sf.adfg.state.ak.us/FedAidPDFs/FDS14-50.pdf>.

Each questionnaire is significant to the outcome of our study. We are very interested in your fishing and experiences in this system, and the information you provide will enhance our understanding of the existing sport fishery. If you have already returned your questionnaire, please disregard this letter and accept my sincere thanks.

If you have any questions or privacy concerns related to the procedures that were followed in conducting this survey, please contact me at (907) 789-6255.

Sincerely,

Pete Schneider, Fisheries Biologist  
Tongass National Forest

Enclosure



300 (1 of 1)



Appendix E.–Second reminder letter to survey nonrespondents.

**File Code:** 2620-3/2330

**Date:** X/XX/2015

Dear \_\_\_\_\_:

I have not yet received a completed cabin survey questionnaire regarding your use of Peterson Lake Cabin beginning on X/XX/2012. Even if you did not use the cabin or fish during your stay, your response to the general questions on the first page of the survey questionnaire is important. Please complete the questionnaire and return it in the postage-paid envelope that is provided for your use.

The U.S. Forest Service respects your privacy and has not shared any personal information with ADF&G or any other group or individual. Your responses to this survey will also remain strictly confidential; only the summary of information from all respondents will ever be published. ADF&G intends to publish a summary of information resulting from the 2015 survey on its web site in June 2017. To view the results of the most recent published survey (2012), please visit the ADF&G web site at: <http://www.sf.adfg.state.ak.us/FedAidPDFs/FDS14-50.pdf>. Please do not underestimate the importance of your fishing activities. The information you provide is valuable to our study, and may have significant impact on the future management of our sport fish resources. If you have already returned your questionnaire, please disregard this letter and accept my sincere thanks.

If you have any questions or privacy concerns related to the procedures that were followed in conducting this survey, please contact me at (907) 789-6255.

Sincerely,

Pete Schneider, Fisheries Biologist  
Tongass National Forest

Enclosure



300 (1 of 1)

