Regional Operational Plan SF.2A.2013.01

Stock Assessment of Rainbow Trout at Lower Talarik Creek

by

Craig J. Schwanke

May 2013

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
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

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

REGIONAL OPERATIONAL PLAN SF.2A.2013.01

STOCK ASSESSMENT OF RAINBOW TROUT AT LOWER TALARIK CREEK

by

Craig J. Schwanke

Alaska Department of Fish and Game, Division of Sport Fish, Dillingham

Alaska Department of Fish and Game
Division of Sport Fish

May 2013

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Craig J. Schwanke,
Alaska Department of Fish and Game, Division of Sport Fish,
PO Box 230, Dillingham, AK 99576

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SIGNATURE PAGE

Project Title:	Stock Assessment of Rainbow Trout at Lower Talarik Creek
Project leader (s):	Craig J. Schwanke
Division, Region and Area	Division of Sport Fish, Region II, Bristol Bay
Project Nomenclature:	
Period Covered	January 2013 through December 2013
Field Dates:	May 2012 through June 2012
Plan Type:	Category II

Approval

Title	Name	Signature	Date
Project leader	Craig J. Schwanke		3/18/2013
Biometrician	Daniel J. Reed		3/18/2013
Research Coordinator	Jack Erickson		5/20/13

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BACKGROUND

Rainbow trout (*Oncorhynchus mykiss*) are an important sport fish species in the Iliamna Lake drainage of southwest Alaska as indicated by a recent 5-year (2007-2011) average catch of 53,677 rainbow trout (Jennings et al. 2010 a- b, 2011 a-b, *In prep.*). In the last 40 years the Department of Fish and Game has conducted studies of Iliamna Lake drainage rainbow trout to document stock status and life history (Russell 1977, Brookover 1990, Minard et al. 1992, Schwanke and Evans 2005, Dye *In prep*.). Currently management is directed by the Southwest Alaska Rainbow Trout Management Plan adopted by the Board of Fisheries in February 1990. The overriding philosophy of this plan is conservative wild stock management to maintain historical size compositions.

Lower Talarik Creek drains a 130 km^2 watershed and meanders approximately 13 km before flowing in to the northwestern corner of Lake Iliamna (Figure 1). Lower Talarik Creek is known for its high quality rainbow trout sport fishery. The Lower Talarik Creek rainbow trout fishery is managed to maintain historic size composition and provide a diversity of angling opportunity through the special management designation of artificial fly only, catch and release. Additionally, fishing is closed from April 10 through June 7 to provide protection of rainbow trout during spawning. In 1999, the uplands, shore lands and waters within the Lower Talarik Creek drainage were designated a Special Use Area by the Alaska Department of Natural Resources. With this designation, the special use area is managed ***(i)*** for fish and wildlife with emphasis on protecting the rainbow trout fishery and bear population; ***(ii)*** to provide for traditional subsistence harvest activities and ***(iii)*** to accommodate public recreation.

The creek is relatively small and most angler effort occurs during the fall in the first 1.9 km upstream of its entrance into Lake Iliamna (Figure 2). Rainbow trout enter the creek from Lake Iliamna in the fall to feed on salmon spawn and carcasses and to stage for spawning the next spring. The sport fishery takes advantage of this migration and is most active from mid-August through early October. Creel surveys examined effort, angler demographics and rainbow trout size composition of angler catch in the fishery in 1994 and 1996-2005 (Dye *In prep*).

From 1972 through 1975, the department conducted rainbow trout life history studies at Lower Talarik Creek with a weir that operated from late spring to October (Russell 1977). Spawning abundance, seasonal presence, size composition and growth information were collected. Visual surveys of the creek estimated that approximately 950 rainbow trout annually spawned in the drainage (Russell 1977). From 2009 through 2012 a weir was deployed at Lower Talarik Creek in April or May after the creek was ice free and operated until early June. An average of 95 sexually mature rainbow trout were passed upstream through the weir and an average of 392 post spawn fish were passed downstream from 2009 through 2012. The lower numbers of fish passed upstream than downstream was observed in the 1970s as well and is likely due to an inability to deploy the weir before fish begin migrating upstream. In addition, radio tagged fish were present in the head water lakes of the drainage during the winter of 2009/2010. These overwintering fish would only be counted when migrating downstream.

This project will provide data on rainbow trout spawning abundance and length composition that will be compared to data collected in 2009 through 2012 and over 30 years ago at Lower Talarik Creek. This project provides rainbow trout data for one tributary of the large Iliamna Lake drainage, a popular sport fishing drainage for rainbow trout. It is not possible to monitor the whole drainage, so Lower Talarik Creek serves as an indicator tributary for monitoring rainbow

trout in the drainage. In addition, the monitoring of the Lower Talarik Creek rainbow trout spawning population may provide information necessary to address future fishery and stock management issues.

OBJECTIVES

1. Census spawning rainbow trout immigrating and emigrating through the Lower Talarik Creek weir from April 15 through June 8, 2013;
2. Estimate length composition by length class of rainbow trout $\geq$300 mm fork length (FL) in Lower Talarik Creek during April, May and June 2013 such that the estimated proportions are within 5 percentage points of the actual values 95% of the time; and
3. Estimate the proportion of sexually mature rainbow trout that pass the Lower Talarik Creek weir such that the estimate is within 5 percentage points of the true value 95% of the time.

SECONDARY OBJECTIVES

1. Index the number of rainbow trout spawning in three sections of the drainage: between the weir and confluence of west and east fork and in the west and east forks up to the first headwater lake with foot surveys during the peak of spawning;
2. tag all rainbow trout $\geq$ 300 mm FL that pass upstream and downstream through a weir on Lower Talarik Creek;
3. check all rainbow trout passing through a weir on Lower Talarik Creek for previously applied marks;
4. collect hourly water temperature readings at Lower Talarik Creek while the weir is in operation;
5. record the number of other fish by other species immigrating and emigrating past the weir;
6. collect length information from a sample of other fish by species that pass the weir; and
7. describe spawning intervals of rainbow trout using Lower Talarik Creek by gender and test for independence between spawning history and gender and spawning history and size.

METHODS

DATA COLLECTION

Weir:

This will be the fifth year of a multi-year research project examining rainbow trout in Lower Talarik Creek. Consecutive years of weir data are being collected to assess spawning abundance, length composition and life history of Lower Talarik Creek rainbow trout. During April, May and June of 2013 a bidirectional weir will be deployed in Lower Talarik Creek approximately 1.6 km upstream from Iliamna Lake to capture migrating rainbow trout (Figure 2). The date of deployment will depend on breakup of the creek, but is expected to occur sometime in April or early May. The weir will be removed by mid June. All fish species passing through the weir

will be counted. All rainbow trout and a sample of fish from other species will be measured for length. Rainbow trout ≥ 300 mm FL will be tagged. The weir site will be staffed by one permanent seasonal Fishery Technician III and one permanent seasonal Fishery Technician II.

The weir is constructed of pickets that are 5-foot tall of ½-inch electrical conduit with holes drilled 12 inches from each end. The pickets are then strung on two, 1/8-inch aircraft cables with ¾-inch spacers made of ½-inch PVC conduit between each picket. These pickets are assembled into 10-foot long panels that can be rolled up for transport. The panels will be supported by a 3/8-inch cable, which will be strung across the channel on an angle and anchored to buried anchors on the bank. The panels will be attached to each other with cam straps and leaned against the upstream side of the cable. The flow of the creek will hold the panels against the substrate, effectively blocking off fish passage in the river. Sand bags and plastic mesh will be used to fill holes and secure areas that show signs of scouring. To increase rigidity, metal fence posts will be driven at a downstream angle on the downstream side of the weir and attached to the cable using t-shaped steel extensions. A 16-inch opening will be integrated between the larger panels for placing an upstream trap and downstream trap. A pyramid-shaped trap opening, located 12 inches from the streambed, will funnel migrating fish into a square holding pen for each trap. This pen is also constructed of conduit panels and will be supported by fence posts driven into the substrate. The weir traps will be open to fish entry at all times except during sampling when a mesh panel will seal the trap to prevent fish from escaping.

Biological Composition:

All rainbow trout captured at the weir for the duration of the project will be sampled for length and sexual maturity. Sexually immature fish lack secondary sexual features, whereas sexually mature fish are those fish believed to be capable of spawning or have already spawned during the spring of capture. Sexually mature males are dark, have a well-developed kype, and often exude milt. Sexually mature females are more silver, lack a kype, have an extended abdomen with an ovipositor protruding from the vent, and sometimes exude eggs. Post spawn fish often appear emaciated. Males will still be dark colored with visible physical trauma from the rigors of spawning and may still exude a small amount of milt or clear fluid. Females will have flaccid stomachs and often exude a clear liquid from the vent when light pressure is applied. Fork length will be recorded to the nearest millimeter.

All captured rainbow trout ≥300 mm FL will be tagged with an individually numbered Floy tag (Floy® FD-68 B T-bar anchor tag). Incidental recaptures of Floy tagged fish will provide additional movement information and possibly allow for the examination of survival, growth and other stock parameters for fish captured at the weir in subsequent years.

Recaptures of previously tagged rainbow trout will be used to describe spawning histories (spawning intervals) of trout spawning in Lower Talarik Creek. The proportions of rainbow trout exhibiting different spawning histories can be estimated, by gender, for the population. Additionally, we will test if spawning history is independent of gender or size of fish at first capture.

All captured rainbow trout will be sampled for length, however only fish ≥300 mm FL will be used when estimating length composition since fish smaller than this may pass through the weir undetected. Species other than rainbow trout expected through the weir include Arctic grayling

(*Thymallus arcticus*), longnose sucker (*Catostomus catostomus*), Arctic char (*Salvelinus alpinus*), round whitefish (*Prosopium cylindraceum*) and northern pike (*Esox lucius*). In 2009 through 2012 Arctic grayling and longnose sucker were abundant (>500), while the other species occurred in small numbers (<30).

Spawning Grounds Index:

Technicians hiking the banks of Lower Talarik Creek will visually count spawning rainbow trout in May to index the number of spawning rainbow trout in three sections of the drainage: between the weir and confluence of the two forks and the west and east forks to the first headwater lake of each fork. Each fork will additionally be separated into 1.6 km long subsections. The east fork is approximately 5 km long (3 subsections) and the west fork is approximately 8 km long (5 subsections). The boundaries of each subsection were documented with GPS coordinates during the spring of 2010 (Appendix A4). Starting at the confluence of the east and west fork a global positioning system (GPS) will be used to locate the 1.6 km boundaries of each 1.6 km subsection.

The technicians on site will conduct the survey once the passage of mature fish upstream through the weir has diminished and when the stream water temperature is near 6^{o} C which was identified to coincide with the peak of spawning (Russell 1977). Water temperature will be recorded hourly with temperature loggers and daily with a hand held thermometer. At the peak of spawning fish will be concentrated on spawning sites and countable. The peak of spawning should occur over the course of several days to a week. This will allow technicians to conduct a survey when conditions provide optimal visibility. Optimal survey conditions will consist of a sunny day, with little wind to riffle the water and good water clarity for observing and counting spawning rainbow trout.

Lower Talarik Creek is a small drainage with several headwater lakes. As a result, the stream has very little turbidity and usually provides good visibility for counting fish. When the stream does become turbid it usually clears up within a couple days (Fo, personal communication). However, if turbidity occurs the survey will be delayed until water quality is good for viewing fish. The survey will be conducted by two technicians wearing polarized glasses walking up each side of the creek in unison. The creek is less than twenty m wide and three m deep, so technicians will be able to verbally communicate and coordinate the count of fish in each survey section. If large numbers of spawning rainbow trout are observed in small areas the technicians will attempt to count them. If the fish are moving around making an accurate count difficult the number of fish in the concentration will be estimated.

Only sexually mature, spawning rainbow trout will be counted. Spawning rainbow trout will be differentiated from immature rainbow trout and other species by several factors of appearance and behavior. Spawning rainbow trout will generally be larger than immature rainbow trout and much darker in coloration. Spawning rainbow trout will often times be paired or in groups of three or more in shallow riffles and the tail outs of pools. There will be some prespawn or post spawn rainbow trout in deeper pools and runs, but their size and coloration should be identifiable. Immature rainbow trout will be silver in color and likely present in deeper pools, but may also be present downstream of spawning fish to feed on eggs. Given the width and depth of Lower Talarik Creek, rainbow trout should be easily discernable from Arctic grayling and longnose suckers.

The number of rainbow trout counted in each section will be tallied and recorded on a survey field form (Appendix A4). In addition to the numbers of rainbow trout counted other factors recorded will be water temperature, weather conditions such as cloud cover, the presence of wind that may riffle the water reducing visibility, water clarity and the time needed to survey each section and subsection.

Sample Size:

Estimates of length compositions that meet the precision criteria for Objective 2 require sampling a minimum of 509 rainbow trout ≥300mm FL (Thompson 1987). This sample size should be achieved at Lower Talarik Creek because all fish will be sampled and an average of 903 rainbow trout were sampled at the weir in 2009 through 2012.

To obtain the precision criteria for the estimated proportion of sexually mature rainbow trout (Objective 3) a minimum of 384 rainbow trout will need to be sampled (Cochran 1977). This sample size should be achieved at Lower Talarik Creek since all rainbow trout passed through the weir will be rated for maturity.

Although precision criteria are not desired for estimating length composition of other species a sample size of 130 will be collected from Arctic grayling and longnose sucker that pass through the weir. An average of 671 Arctic grayling were observed in 2009 through 2012, so we will systematically sample every 5th Arctic grayling for length to provide a sample of at least 130. Similarly, an average of 4,499 longnose suckers were observed in 2009 through 2012, and we will systematically sample every 35th longnose sucker. All specimens of less abundant species such as Arctic char, round whitefish and northern pike will be measured for length.

DATA REDUCTION

Weir:

All fish past the weir each day will be counted, the technicians will also tally the number of rainbow trout captured, the number of new tags deployed, the number of tagged fish recaptured, the number of fish killed or released with tags, note the hours worked, and any equipment problems. These daily tallies will be used to track crew and project performance in-season, and to keep a running tally of the number of tags deployed and recovered on a daily basis. At the end of the study period, all tagging data will be transferred to a Microsoft (MS) Excel spreadsheet.

Biological Composition:

All rainbow trout captured (≥300 mm FL) will be measured for fork length to the nearest millimeter, sexual maturity determined and Floy tagged. Following insertion of a Floy tag into a rainbow trout according to instructions given in Appendix A1 the release date, length, Floy tag number, sex, maturity and any other comments will be recorded on a sampling form. A subsample of other species will be measured (FL).

At the end of each day the data recorded in logbooks will be transferred according to instructions outlined in Appendix A2 to AWL Form Version 1.2 (Appendix A3). After transferring the data, the technicians will review the completed mark-sense forms and correct obvious coding errors.

The project leader will examine the mark-sense forms for obvious coding errors at the end of the season. The project leader will prepare the forms for shipment to Research and Technical Services (RTS) for optical scanning at the end of the fieldwork period.

Spawning Grounds Index:

Field technicians will hike the length of Lower Talarik Creek and visually count the number of fish to assess the proportion of fish that spawn in each reach. The number of sexually mature, spawning rainbow trout counted in each stream section will be recorded and the sum of all sections will be the estimated number of sexually mature, spawning rainbow trout in the survey area. This count will not include the entire drainage since spawning occurs in reaches between and upstream of headwater lakes, but it will be an index of the number of spawning rainbow trout in the survey area up to the lakes.

Archiving:

Final edited copies of the data (MS Excel spreadsheet and biological composition ASCII file) along with a data map, describing the data files, will be sent to Research and Technical Services (RTS) in Anchorage for archiving on the Division of Sport Fish intranet site ("Docushare") at http://docushare.sf.adfg.state.ak.us/. Archiving will be completed by end of winter 2013-2014. The specific location within Docushare has yet to be determined.

DATA ANALYSIS

Biological Composition:

Mean length of rainbow trout ≥ 300 mm FL in Lower Talarik Creek and its variance will be estimated using standard sample summary statistics (Cochran 1977).

The proportion of rainbow trout ≥ 300 mm FL of length class i (p_i), and its variance, will be estimated as a binomial proportion as follows (Cochran 1977):

$$\hat{p}_i = \frac{x_i}{x}, \tag{1}$$

where:

x_i = number of rainbow trout (≥ 300 mm FL) of length or maturity class i, and

x = total number of rainbow trout (≥ 300 mm FL) sampled.

The variance of this proportion will be estimated by (Cochran 1977):

$$var(\hat{p}_i) = \frac{\hat{p}_i(1-\hat{p}_i)}{x-1} \quad (2)$$

The estimated proportion of rainbow trout that are sexually mature and the sampling variance of the estimate will be estimated using equations (1-2) above with appropriate substitutions.

The sexual maturity by length relationship will be determined by plotting the proportion of fish that are sexually mature at each of a set of length categories. A logit model will be fitted to describe the relationship:

$$ln\frac{p_i}{1-p_i} = \beta_o + \beta_1 L_i \quad (3)$$

where:

p_i = proportion of fish that are sexually mature at length category L_i.

The length at which 50% of the rainbow trout are sexually mature (L_{50}) will be estimated as:

$$L_{50} = -\left(\frac{\hat{\beta}_0}{\hat{\beta}_1}\right) \quad (4)$$

The estimated proportions of rainbow trout exhibiting different spawning histories and the sampling variances of the estimates will be estimated using equations (1-2) above with appropriate substitutions. The hypothesis that capture history is independent of gender will be tested using contingency table analysis (Conover 1980). The hypothesis that capture history is independent of size at first capture will be tested using the K-sample Anderson-Darling test (Scholz and Stephens 1987) or the Kolmogorov-Smirnov two-sample test (Conover 1980) where appropriate.

SCHEDULE AND DELIVERABLES

The objectives of this project will be completed within one calendar year (one field season). Following completion, continued sampling will be necessary to properly monitor the status of the population. A 2013 time schedule for initiating and completing the Lower Talarik Creek rainbow trout project is summarized below.

Task	Time Frame	Responsibility
Procurement of Equipment	March-April, 2013	Schwanke
Capture and Tagging	April-June, 2013	Fo/Jalbert
Editing of Mark-Sense Data	Nov-Dec, 2013	Schwanke
Data Analysis	Jan-Feb, 2014	Schwanke/Reed
Report Describing Results	March, 2014	Schwanke

Results from the FY13 field season will be documented in an Alaska Department of Fish and Game, Division of Sport Fish Fishery Data Series Report. Analysis and reporting will be completed by March 2014.

BUDGET SUMMARY

Projected FY2013 costs:

Line Item	Category	Budget ($K)
100	Personnel Services	149.4
200	Travel	1.8
300	Contractual	15.5
400	Commodities	6.8
500	Equipment	0.0
Total		173.5

RESPONSIBILITIES

LIST OF PERSONNEL AND DUTIES:

1. Craig Schwanke, Assistant Area Management Biologist.

   Duties: Overall project supervisor. Write operational plan. Develop and administer project budget and hire seasonal staff. Primary author responsible for writing of the final project reports.

2. Jason Dye, Area Management Biologist.

   Duties: Review operational plan. Assist with collection of field data. Review final project reports.

3. Daniel Reed, Biometrician III.

   Duties: Review operational plan, provide sample size determination and estimation procedures, advise project leader regarding statistical procedures. Review Fishery Data Series report describing analyses and results of 2009-2013 fieldwork.

4. Vacant, Fishery Technician III.

   Duties: Assist with procurement of equipment. Ensure sampling activities and schedules are in accordance with methods prescribed in the operational plan. Make initial edit of mark-sense forms prior to their being sent to Anchorage for optical scanning. Assist in the writing of the final project reports.

5. Research and Technical Staff.

   Duties: Process mark-sense forms and archive data files.

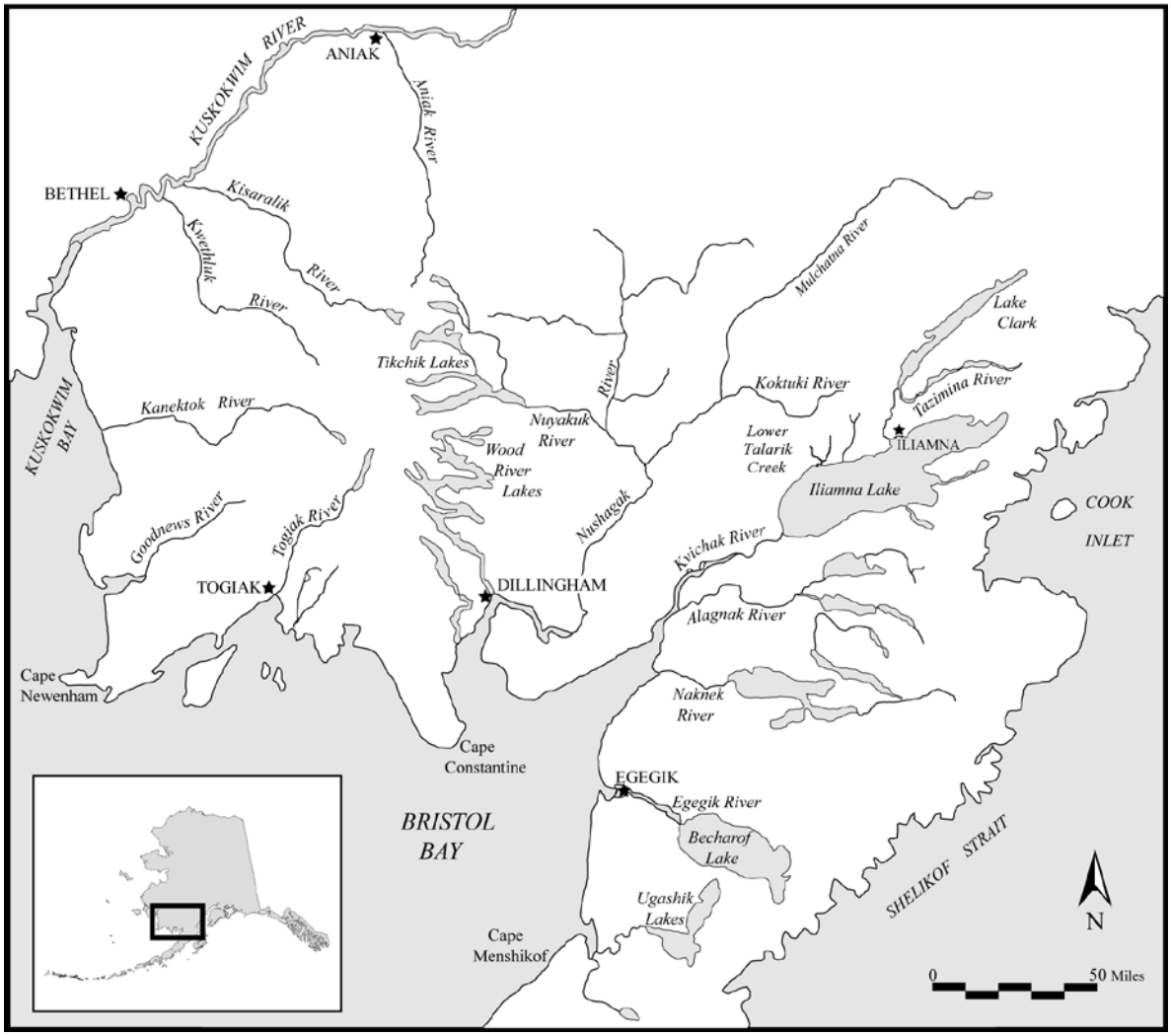

Figure 1.-Kvichak River drainage.

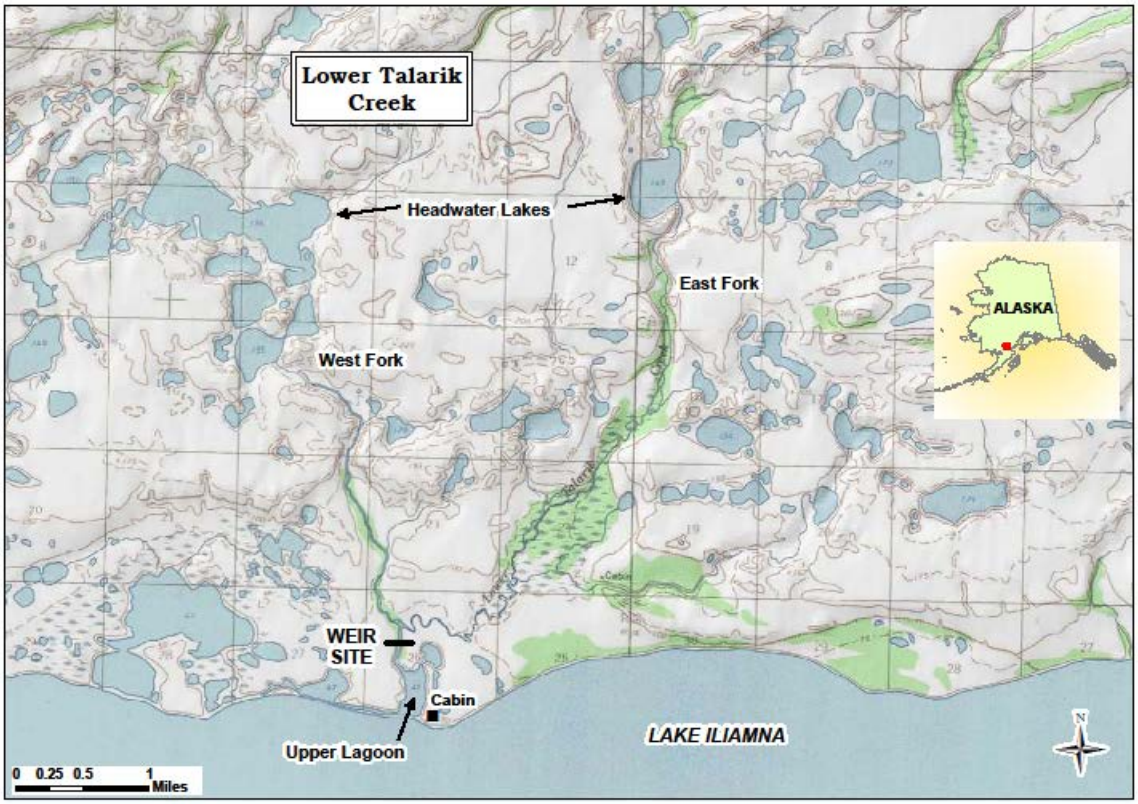

Figure 2.-Lower Talarik Creek drainage with weir site.

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APPENDIX A. INSTRUCTIONS FOR TAGGING, BIOLOGICAL SAMPLING, AND RECORDING DATA

APPENDIX A3. LOWER TALARIK CREEK RAINBOW TROUT TAGGING PROCEDURES.

Handling fish and inserting Floy tags:

Upon entrance into the weir trap box, rainbow trout will be netted and measured and tagged as quickly as possible.

The condition of all captured rainbow trout will be assessed. Rainbow trout with deep scars or lesions, damaged gill filaments, a lethargic condition, or otherwise appearing unlikely to survive will not be tagged. Rainbow trout less than 300 millimeters in fork length will be sampled for length but will not be tagged.

Rainbow trout that are 300 millimeters or greater in length and in suitable condition for tagging will be sampled for length and have a Floy tag inserted on the left side near the posterior base of the dorsal fin. Lengths from tip of snout to fork of tail (FL) to the nearest mm, will be taken with care that the snout is not compressed.

Fish will be checked for tags or clipped fins and recorded appropriately. Length of recaptures will be recorded as above; recapture measurements will be used to assess measurement error.

APPENDIX A4. CUSTOMIZED INSTRUCTIONS FOR THE ALASKA DEPARTMENT OF FISH AND GAME SPORT FISH DIVISION STANDARD AGE-WEIGHT-LENGTH FORM VERSION 1.2 FOR LOWER TALARIK CREEK RAINBOW TROUT.

All Floy tagging data associated with rainbow trout will be recorded on the Sport Fish Division Standard Age Weight Length Form version 1.1. Page numbers will start with 001 and continue throughout the season**. Up to 30 fish will be recorded on each form**.

FRONT OF FORM

Description: **Write** water body name, species, and page number (e.g. Lower Talarik Creek, rainbow trout, page 34). Page number to be assigned by crew leader at the end of the day.

Date: **Write** out the date (such as 5-13-02) and mark fields. Use leading zeros (e.g. the tenth of May 2013 is recorded as: YEAR 13 MONTH 05 DAY 2). Since each form can only have one date, data for each day will be on different forms.

Species: mark appropriate codes:

541 Rainbow Trout	640 Longnose sucker
610 Arctic grayling	586 Round whitefish
522 Arctic Char	500 Northern pike

Type of Measurement:

Length	FL Fork Length - snout to fork (all freshwater fish)
Fishery	TE test fishery.

Gear Code:
- 09 hook and line
- 01 gillnet
- 03 seine
- 25 hoop net
- 04 weir trap

Mesh Size: Leave blank.

Location and Sublocation of Sample:

Enter area code in first two columns of the top row, leave the last column blank. Enter site code in the second row (third row left blank).

Sublocation code is entered in the first row of the sublocation box. Additional sublocation codes may be designated by the project coordinator.

-continued-

Codes by location:

Area	Site	Sublocation	Area described
19	004	001	Passed Upstream
19	004	002	Passed Downstream

Project Number: Leave blank.

Page Number: Mark fields at end of day by crew leader. Pages will be numbered consecutively from 1 to XXX for each species for the season.

Sex: Mark only if absolutely known.

Maturity Index: This will apply to the work on spawning rainbow trout.

0 = not checked,

1 = immature: describes virgin fish; ovipositor not extended on females during spawning peak, no release of eggs or milt upon gentle pressure to abdomen; gonads reduced, eggs or sperm not visible, does not appear capable of spawning in present year,

2 = developing: describes first and consecutive maturation; gonads forming or fully formed with eggs or sperm visible, appears capable of spawning in present year (captured in spring) or following year (captured in fall),

3 = spawning: describes pre-spawning and spawning fish; abdomen swollen, ovipositor extended in females, males dark colored with developed kype, eggs or milt may be released upon gentle pressure to abdomen; exhibits digging or courtship behavior,

4 = post-spawning: describes spent fish; gonads may appear bruised or flaccid, majority of eggs or sperm expelled, although some reabsorbing eggs may be present; ovipositor in females may still be distended and red,

7 = unknown.

Length: record length (to the nearest millimeter) from snout to fork of tail.
Do not use leading zeros.

continued-

BACK OF FORM

Description: **Write** same information as front of form.

Collected by: **Write** name of collector.

Age Structure Type: None.

Type of tag: mark code for Floy tag = 24.

Variables 1-4: Skip.

Age of Fish: Leave blank .

Age Error: Leave blank .

Fate: K = killed, blank = released unharmed.

Recap: (Recapture) Mark "Y" for recaptured tagged fish and record tag color and number. If a fin-clipped fish missing a tag is caught, mark the recapture field and fin clip field, mark the RP box in the fin clip category (see Fin Clip) to signify loss of original tag, retag fish and record new number on the form.

Fin Clip: Mark appropriate MS code

ALSO: under Fin Clip for the following circumstances:

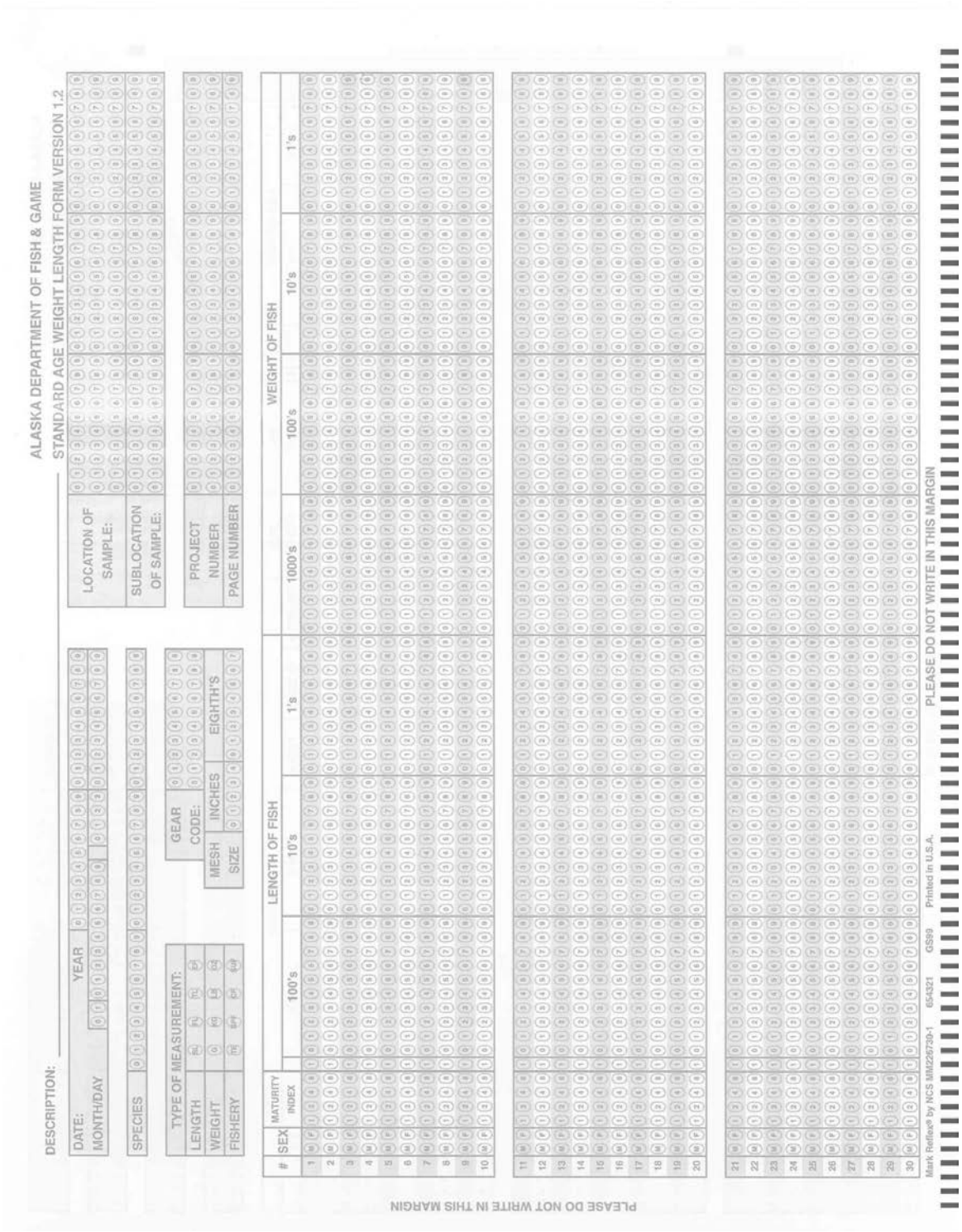
D = fish that were captured but not tagged because of poor condition.

RP = fish which have tag scars, fin clips and appear to have lost the original tag. Retag the fish and record the new number and tag color.

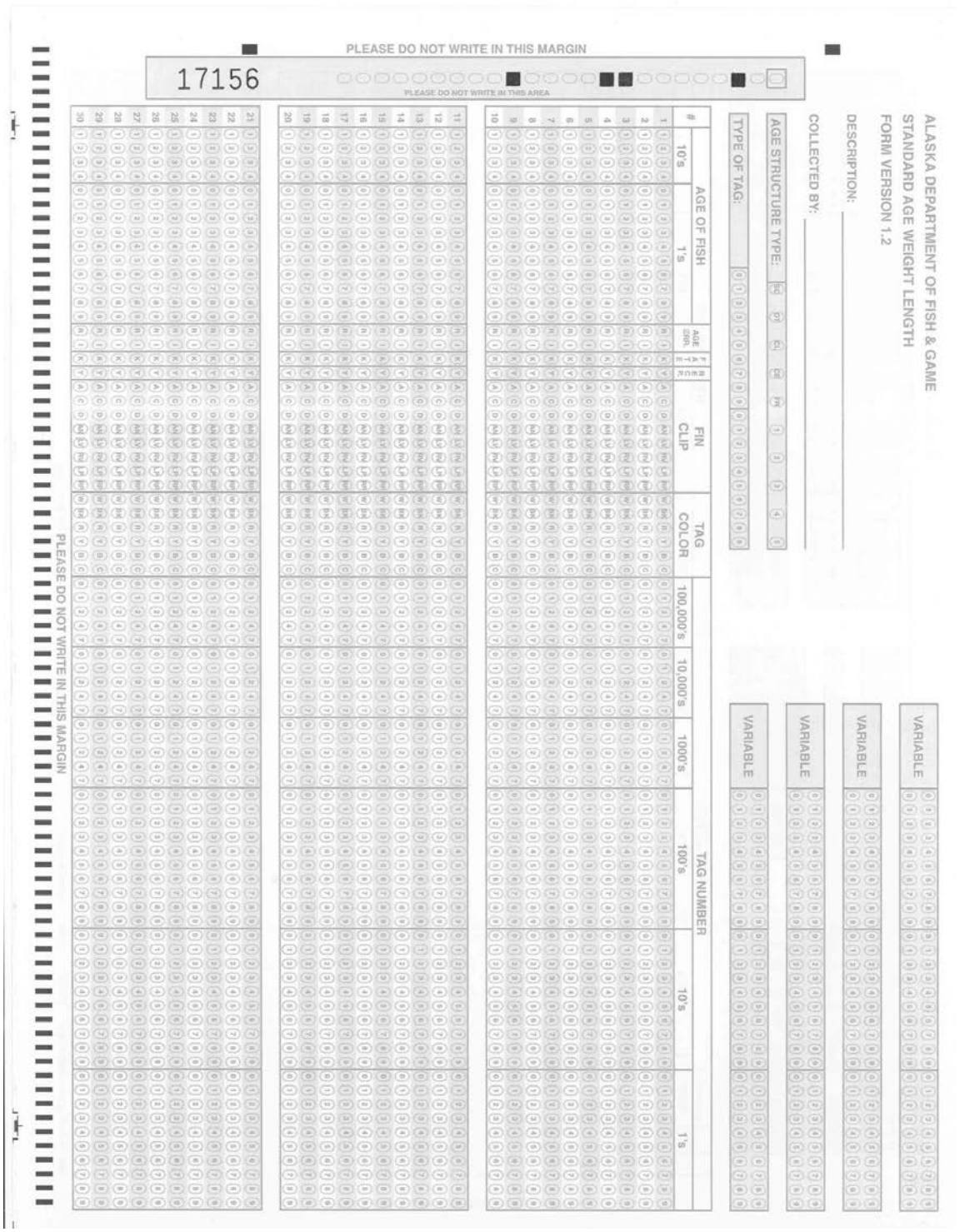
Tag Color: Mark appropriate MS code(s).

Tag Number: mark appropriate numbers for each tag number released or recaptured. Do not use leading zeros.

APPENDIX A3. ALASKA DEPARTMENT OF FISH AND GAME SPORT FISH DIVISION STANDARD AGE-WEIGHT-LENGTH FORM VERSION 1.2.



Appendix A3. (Page 2 of 2).



APPENDIX A4. SPAWNING SURVEY INDEX COUNT SURVEY FORM.

Date: _____

Water Temperature: _____

Weather: _____

Water Clarity:

Section	Subsection	Count
Weir to Forks		
Weir: N 59 37.364, W 155 32.209 End: N 59 37.882, W 155 32.008	**1**	
West Fork		
Start: N 59 37.882, W 155 32.008 End: N 59 38.453, W 155 32.426	**1**	
Start: N 59 38.453, W 155 32.426 End: N 59 39.186 W 155 32.563	**2**	
Start: N 59 39.186 W 155 32.563 End: N 59 39.567 W 155 33.722	**3**	
	Subtotal	
East Fork		
Start: N 59 37.882, W 155 32.008 End: N 59 38.161, W 155 30.566	**1**	
Start: N 59 38.161, W 155 30.566 End: N 59 38.666, W 155 30.205	**2**	
Start: N 59 38.666, W 155 30.205 End: N 59 39.177, W 155 29.157	**3**	
Start: N 59 39.177, W 155 29.157 End: N 59 39.827, W 155 28.653	**4**	
End: N 59 39.827, W 155 28.653 End: N 59 40.679 W 155 28.607	**5**	
	Subtotal	
	Total	