Westward Region Lake Sampling and Kodiak Island Limnology Laboratory Processing Schedule, 2013

by

Darin C. Ruhl

April 2013

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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

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by

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Funding for the majority of the 2013 Lake Assessment Project is provided by the Kodiak Regional Aquaculture Association and Karluk Lake Limnology Fund (AKSSF; project 44528). Afognak Lake is monitored as part of the U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring (FRM) Program (project 07-401).

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: http://www.adfg.alaska.gov/sf/publications/.

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ABSTRACT

The Lake Assessment Project for Kodiak and Afognak islands was started in 1987 as part of a comprehensive plan to examine and prioritize the region's salmon production potential. The Alaska Department of Fish and Game (ADF&G), Near Island Laboratory (NIL) was established in 2000 to continue these investigations, and since then has expanded sample collection and analysis throughout the Westward Region. In 2013, the ADF&G NIL moved into the new ADF&G building on Near Island and renamed the ADF&G Kodiak Island Limnology Laboratory (KILL). This report provides the specific lake assessment sample collection schedule and sample processing protocol for the KILL in 2013.

Key words: Limnology, lake assessment, water sample collection, zooplankton, laboratory analyses, Kodiak Island, Afognak Island, Alaska Peninsula.

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) began sampling Kodiak and Afognak Island lakes for limnological data in 1963. Limnology sampling was invigorated and expanded in 1989 with concern for the effects of the Exxon Valdez oil spill and to address rehabilitation and enhancement opportunities. As part of the Kodiak Regional Comprehensive Salmon Plan, limnological and fishery investigations were initiated to determine a strategy for rehabilitation of depressed sockeye salmon *Oncorhynchus nerka* stocks and also to evaluate the potential for stocking barriered lakes without anadromous fish. The limnology program was expanded to the Alaska Peninsula in 2000 and was designed to work in conjunction with the fishery and smolt monitoring projects to assess salmon rearing habitat projects. The 2013 Lake Assessment Project consists of limnology sampling on Kodiak Island, Afognak Island, and the Alaska Peninsula. The Lake Assessment Project supports the long-term goals of the Kodiak Regional Comprehensive Salmon Plan (KRPT 1992; Honnold et al. 1996; Schrof et al. 2000) and has become an integral part of salmon enhancement, rehabilitation, and biological monitoring projects within the Kodiak Management Area.

The 2013 Lake Assessment Project consists of limnology field sampling and laboratory processing of samples from 23 Kodiak and Afognak Island lakes (Tables 1 and 2; Figure 1). Limnological sampling will be conducted at Afognak, Akalura, Big Waterfall, Crescent, Dry Spruce, Frazer, Hidden, Horse Marine, Karluk, Laura, Little Kitoi, Little Waterfall, Lower Jennifer, O'Malley, Red (Ayakulik), Ruth, Saltery, Spiridon, Thumb, Uganik, Upper Jennifer, Upper Malina, and Upper Olga (Upper Station) lakes. Additionally in 2013, the Kodiak Island Limnology Laboratory (KILL) will process and analyze zooplankton and nutrient samples from Bear, Black, Chignik, McLees, and Orzinski lakes (Tables 1 & 2; Figure 2) located on the Alaska Peninsula.

To assist ADF&G programs in other regions of the state, the Near Island Laboratory (NIL) processed zooplankton samples sent from the ADF&G, Region I, Division of Commercial Fisheries (CF, Southeast) for the past eight years (2005 to 2012) and nutrient samples for the past four years (2009 to 2012). In 2013, zooplankton samples from Chilkat, Chilkoot, Coghill, and McDonald lakes located in Southeast Alaska will be processed and the data summarized at the KILL (Table 1). Additionally, McDonald Lake will have nutrients processed and analyzed in 2013. The NIL processed nutrient samples sent from Norton Sound Economic Development Corporation (NSEDC) for the past five years (2008 to 2012) and zooplankton samples since 2010 from Salmon Lake in Nome. Nutrient and zooplankton samples from Salmon Lake will be processed at the KILL in 2013 (Tables 1 & 2).

GOAL

Assess the chemical, biological, and physical characteristics of lake ecosystems to help managers assess rearing potential for juvenile sockeye salmon (*Onchorhynchus nerka*).

OBJECTIVES

1. Estimate water chemistry, seasonal nutrient concentrations, and chlorophyll-*a* concentrations.
2. Estimate the seasonal mean density, biomass, and size of each genus or species of macrozooplankton in each sampled lake.
3. Estimate the seasonal mean density, biomass, and size of each of the genus and species of phytoplankton from Afognak, Chignik, Frazer, Hidden, Karluk, Little Waterfall, and Spiridon lakes.
4. Estimate the euphotic volume and euphotic zone depth of each sampled lake.
5. Determine the temperature and dissolved oxygen depth profiles of each sampled lake.

METHODS

Instrument measurements, water samples, zooplankton, and phytoplankton samples will be collected from each lake as summarized below and in Table 1. Sample collection, processing, and analyses will follow the methods outlined in Thomsen (2008) and Koenings et al. (1987). The estimated dates of nutrient experiments and the samples included in each analysis will follow Table 2. The Karluk Lake Limnology Project goals, objectives, and methods are covered in the specific statement of work (Finkle 2010). The Afognak Lake project goals, objectives, and methods are comprehensively covered in the specific project operational plan (Foster et al. 2010). The samples will be processed and data compiled and entered into the ADF&G limnology database.

LOCATION, FREQUENCY, AND COLLECTION TYPE

1. Collect approximately 4 L of lake water at four-week intervals at each lakes single station at 1 m depth at the following:

Afognak Island

- Afognak

Alaska Peninsula

- Black
- Orzinski

Kodiak Island

- Akalura
- O'Malley
- Thumb

2. Collect approximately 4 L of lake water at four-week intervals at 1 m and 15 m depths at Little Waterfall (st 1) Lake on Afognak Island.

3. Collect approximately 4 L of lake water at four-week intervals at 1 m and 30 m depths from the following:

Afognak Island

- Hidden (st 1)

Alaska Peninsula

- Bear (st 2 and 4)
- Chignik (st 2 and 4)

Kodiak Island

- Frazer (st 1)
- Karluk (st 3, 4, and 7)
- Red (st 1)

4. Collect approximately 4 L of lake water at four-week intervals at 1 m and 50 m depths from the following Kodiak Island lakes:

- Frazer (st 3)
- Spiridon (st 1 and 2)
- Uganik (st 1)
- Upper Olga (st 1)

5. Collect one vertical zooplankton tow at six-week intervals from each lakes single station 1 m off the bottom at the following:

Afognak Island

- Little Kitoi
- Lower Jennifer
- Ruth
- Upper Jennifer

  Note: KRAA crew will collect data from Little Kitoi, Lower Jennifer, Ruth, and Upper Jennifer lake stations.

6. Collect one vertical zooplankton tow at four-week intervals at a depth of 50 m or from 1 m off the bottom from the following:

Afognak Island

- Afognak (st 1 and 2)
- Big Waterfall (st 1)
- Hidden (st 1)
- Laura (st 1)
- Little Waterfall (st 1)
- Upper Malina (st 2)

Alaska Peninsula

- Bear (st 2 and 4)
- Black (st 1)
- Chignik (st 1 thru 4)
- McLees (st 1)
- Orzinski (st 1)

Kodiak Island

- Akalura (st 1)
- Crescent (st 1)
- Dry Spruce (st 1)
- Frazer (st 1 and 3)
- Horse Marine (st 1)
- Karluk (st 3, 4, and 7)
- O'Malley (st 1)
- Red (st 1)
- Saltery (st 1)
- Spiridon (st 1 and 2)
- Thumb (st 1)
- Uganik (st 1)
- Upper Olga (st 1)

7. Collect depth profiles of light attenuation (PAR, 400-700 nm) at six-week intervals from just above the following lakes surface (Incidence) until a reading of 1% of the surface measurement is reached:

Afognak Island

- Little Kitoi
- Lower Jennifer
- Ruth
- Upper Jennifer

Note: Kitoi Bay Hatchery personnel (KRAA) will collect data from Little Kitoi, Lower Jennifer, Ruth, and Upper Jennifer lake stations.

8. Collect depth profiles of light attenuation at four-week intervals from just above the following lakes surface until a reading of 1% of the surface measurement is reached:

Afognak Island

- Afognak (st 1 and 2)
- Big Waterfall (st 1)
- Hidden (st 1)
- Laura (st 1)

- Little Waterfall (st 1)
- Upper Malina (st 1)

Alaska Peninsula

- Bear (st 2 and 4)
- Black (st 1)
- Chignik (st 1 thru 4)
- Orzinski (st 1)

Kodiak Island

- Akalura (st 1)
- Crescent (st 1)
- Dry Spruce (st 1)
- Frazer (st 1 and 3)
- Horse Marine (st 1)
- Karluk (st 3, 4, and 7)
- O'Malley (st 1)
- Red (st 1)
- Saltery (st 1)
- Spiridon (st 1 and 2)
- Thumb (st 1)
- Uganik (st 1)
- Upper Olga (st 1)

9. Measure dissolved oxygen (mg/L) and temperatures (°C) at six-week intervals from the following lakes single station from the lake surface to 50 m or the bottom:

Afognak Island

- Little Kitoi
- Lower Jennifer
- Ruth
- Upper Jennifer

  Note: KRAA crew will collect data from Little Kitoi, Lower Jennifer, Ruth, and Upper Jennifer lake stations.

10. Measure dissolved oxygen and temperatures at four-week intervals from the following lakes surface to 50 m or the bottom:

Afognak Island

- Afognak (st 1 and 2)
- Big Waterfall (st 1)
- Hidden (st 1)

- Laura (st 1)
- Little Waterfall (st 1)
- Upper Malina (st 1)

Alaska Peninsula

- Bear (st 2 and 4)
- Black (st 1)
- Chignik (st 1 thru 4)
- McLees (st 1)
- Orzinski (st 1)

Kodiak Island

- Akalura (st 1)
- Crescent (st 1)
- Dry Spruce (st 1)
- Frazer (st 1 and 3)
- Horse Marine (st 1)
- Karluk (st 3, 4, and 7)
- O'Malley (st 1)
- Red (st 1)
- Saltery (st 1)
- Spiridon (st 1 and 2)
- Thumb (st 1)
- Uganik (st 1)
- Upper Olga (st 1)

11. Measure the water clarity (m) at six-week intervals at each lakes single station with a Secchi disc from the following:

Afognak Island

- Little Kitoi
- Lower Jennifer
- Ruth
- Upper Jennifer

  Note: KRAA crew will collect data from Little Kitoi, Lower Jennifer, Ruth, and Upper Jennifer lake stations.

12. Measure the water clarity (m) at four-week intervals with a Secchi disc from the following:

Afognak Island

- Afognak (st 1 and 2)
- Big Waterfall (st 1)

- Hidden (st 1)
- Laura (st 1)
- Little Waterfall (st 1)
- Upper Malina (st 1)

Alaska Peninsula

- Bear (st 2 and 4)
- Black (st 1)
- Chignik (st 1 thru 4)
- Mclees (st 1)
- Orzinski (st 1)

Kodiak Island

- Akalura (st 1)
- Crescent (st 1)
- Dry Spruce (st 1)
- Frazer (st 1 and 3)
- Horse Marine (st 1)
- Karluk (st 3, 4, and 7)
- O'Malley (st 1)
- Red (st 1)
- Saltery (st 1)
- Spiridon (st 1 and 2)
- Thumb (st 1)
- Uganik (st 1)
- Upper Olga (st 1)

SAMPLE PROCESSING

1. Process and analyze water samples from prescribed Kodiak and Afognak Island lakes at the KILL for the following nutrients, water chemistry parameters, and algal pigment concentrations:
    - alkalinity
    - chlorophyll *a*
    - filterable reactive phosphorous (FRP)
    - nitrate + nitrite (N+N)
    - pH
    - phaeophytin *a*
    - reactive silicon (SI)

- total ammonia (TA)
- total filterable phosphorous (TFP)
- total Kjeldahl nitrogen (TKN)
- total phosphorus (TP)

2. Process and analyze water samples from Bear, Black, Chignik, and Orzinski lakes on the Alaska Peninsula at the KILL for the following nutrients, water chemistry parameters, and algal pigment concentrations:
   - chlorophyll *a*
   - FRP
   - phaeophytin *a*
   - N + N
   - TA
   - TFP
   - TKN
   - TP
   - SI
3. Process and analyze water samples from Salmon Lake in Nome at the KILL for the following nutrients, water chemistry parameters, and algal pigment concentrations:
   - chlorophyll *a*
   - color
   - FRP
   - N + N
   - phaeophytin *a*
   - TA
   - TFP
   - TKN
   - TP
4. Process and analyze water samples from McDonald Lake in Southeast Alaska at the KILL for the following nutrients and water chemistry parameters:
   - N + N
   - TKN
   - TP

5. Process zooplankton samples from Kodiak and Afognak Islands, Alaska Peninsula, Southeast, and Nome lakes for seasonal mean density, biomass, and size of each genus or species of macrozooplankton at the KILL.
6. Preserve and process phytoplankton samples from unfiltered water samples from Kodiak and Afognak Islands, and Alaska Peninsula lakes. Phytoplankton sample analysis will be subcontracted to BSA Envrionnmental Services Inc. and processed by John Beaver. Contract phytoplankton samples will consist of the following:

Afognak Island

- Afognak (5 samples; st 1, 1 m)
- Hidden (5 samples; st 1, 1 m)
- Little Waterfall (5 samples; st 1, 1 m)

Alaska Peninsula

- Chignik (8 samples; st 2, 1 and 29 m)

Kodiak Island

- Frazer (12 samples; st 1 and 3, 1 m)
- Karluk (12 samples; st 3 and 4, 1 m)
- Spiridon (12 samples; st 1 and 2, 1 m)

ACKNOWLEDGEMENTS

Funding for the majority of the 2013 Lake Assessment Project is provided by Kodiak Regional Aquaculture Association and Karluk Lake Limnology Fund (Alaska Sustainable Salmon Fund project #44528; Finkle 2011; Table 1). Afognak Lake is monitored as part of the U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring (FRM) Program (project 07-401; Honnold and Schrof 2004; Baer 2010; Table 1; Figure 1).

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TABLES AND FIGURES

Table 1.–Limnology sampling schedule and number of water, zooplankton, and phytoplankton samples, by lake, in Kodiak and Afognak islands, and Alaska Peninsula, 2013.

	Number of			Sampling Month						Sampling Interval	Times to Sample	Number of Samples		
	Stations	Lakes	Project	May	June	July	August	September	October	(Weeks)	in 2013	Water	Zooplankton	Phytoplankton
Kodiak Lakes														
Akalura	1		General monitoring	W, Z	W, Z	W, Z	W, Z	W, Z		4	5	5	5	0
Crescent	1		Stocking	Z	Z	Z	Z	Z		4	5	0	5	0
Frazer	2		General monitoring	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P	4	6	24	12	12
Horse Marine	1		General monitoring	Z	Z	Z	Z	Z		4	5	0	5	0
Karluk	3		General monitoring	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P	4	6	36	18	18
O'Malley	1		General monitoring	W, Z	W, Z	W, Z	W, Z	W, Z	W, Z	4	6	6	6	0
Red	1		General monitoring	W, Z	W, Z	W, Z	W, Z	W, Z		4	5	10	5	0
Saltery	1		Broodstock monitoring	Z	Z	Z	Z	Z		4	5	0	5	0
Spiridon	2		Stocking/EA compliance	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P	4	6	24	12	12
Thumb	1		General monitoring	W, Z	W, Z	W, Z	W, Z	W, Z		4	5	5	5	0
Uganik	1		General monitoring	W, Z	W, Z	W, Z	W, Z	W, Z		4	5	10	5	0
Upper Olga	1		General monitoring	W, Z	W, Z	W, Z	W, Z	W, Z		4	5	10	5	0
Afognak Lakes														
Afognak	2		Stock status	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P		4	5	5	10	5
Dry Spruce	1		General monitoring	Z	Z	Z	Z	Z		4	5	0	5	0
Big Waterfall	1		Stocking	Z	Z	Z	Z	Z		4	5	0	5	0
Hidden	1		Stocking/EA compliance	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P		4	5	10	5	5
Laura	1		General monitoring	Z	Z	Z	Z	Z		4	5	0	5	0
Little Kitoi	1		Stocking	Z	Z		Z	Z		6	4	0	4	0
Little Waterfall	1		Stocking	W, Z, P	W, Z, P	W, Z, P	W, Z, P	W, Z, P		4	5	10	5	5
Lower Jennifer	1		Stocking	Z	Z		Z	Z		6	4	0	4	0
Ruth	1		Stocking	Z	Z		Z	Z		6	4	0	4	0
Upper Jennifer	1		Stocking	Z	Z		Z	Z		6	4	0	4	0
Upper Malina	1		General monitoring	Z	Z	Z	Z	Z		4	5	0	5	0
Kodiak and Afognak Totals:		23										155	144	57
Peninsula Lakes														
Bear	2		General monitoring	W, Z	W, Z	W, Z	W, Z			4	4	16	8	0
Black	1		General monitoring	W, Z	W, Z	W, Z	W, Z			4	4	4	4	0
Chignik	4		General monitoring	W, Z, P	W, Z, P	W, Z, P	W, Z, P			4	4	16	16	8
McLees	1		General monitoring		Z	Z	Z			4	3	0	3	0
Orzinski	1		General monitoring		W, Z	W, Z	W, Z			4	3	3	3	0
Peninsula Totals:		5										39	34	8
Outside Region Contracts														
Region I (South East)		1										24	44	0
Region III (Nome)		1										12	12	0
Totals All:		30										230	234	65

Notes: Exact sampling dates are not provided to account for inclement weather and to allow for project cost-sharing. May sample dates are dependent on when the lakes become ice free. Westward region staff only provides sample processing for outside region contracts.

W = water sampling, Z = zooplankton sampling, P = phytoplankton sampling

Table 2.–Limnology nutrient experiment schedule and number of water samples to be tested, by date, from Kodiak and Afognak islands, and Alaska Peninsula, 2013.

Experiment	Date To Be Tested	# Samples	Samples Included
Chl a/Phaeo	May 28-29th	28	May
	July 29-August 1st	56	June, July
	September 23-26th	56	August, September
	October 21-24th	54	October, Ak Peninsula
	November 11-12th	12	Contract
filtrate			
TA/N+N	June 24-25th	56	May, June
	August 26-27th	56	July, August
	October 1-4th	43	September, October
	November 25-26th	75	Contract, Ak Peninsula
TFP	July 1-2nd	56	May, June
	September 3-4th	56	July, August
	November 4-5th	43	September, October
	December 5-6th	51	Contract, Ak Peninsula
FRP	July 8-9th	56	May, June
	September 5-6th	56	July, August
	November 7-8th	43	September, October
	December 9-10th	51	Contract, Ak Peninsula
unfiltered			
TP/TKN	June 26-28th	56	May, June
	August 29-30th	56	July, August
	October 28-30th	43	September, October
	December 2-3rd	75	Contract, Ak Peninsula
SI	November 18-19th	84	May, June, July
	November 21-22nd	71	August, September, October
	December 16-17th	39	Ak Peninsula
Color	December 12th	12	Contract

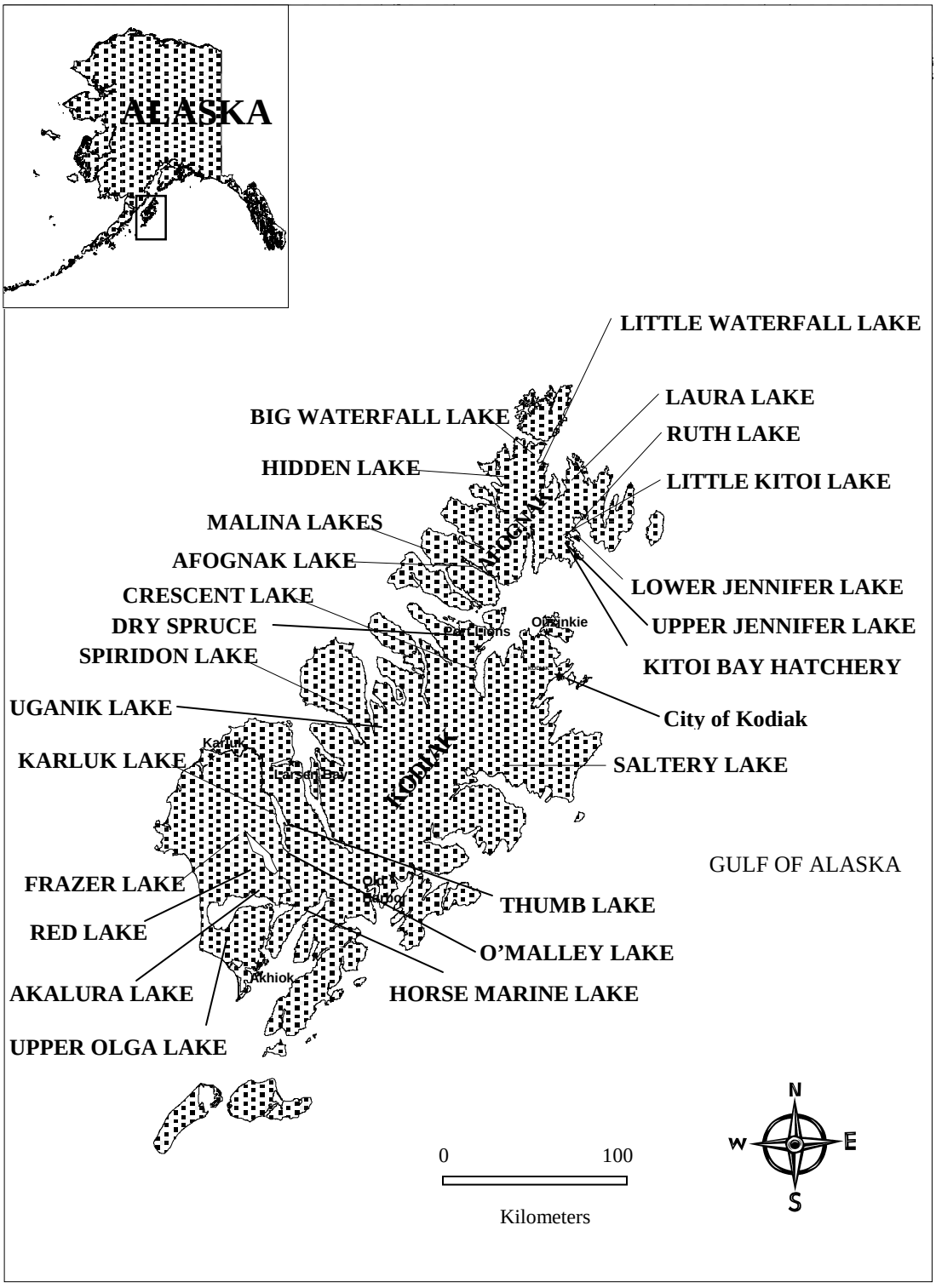

Figure 1.–Locations of lakes on Kodiak and Afognak Islands scheduled for limnology sampling in 2013.

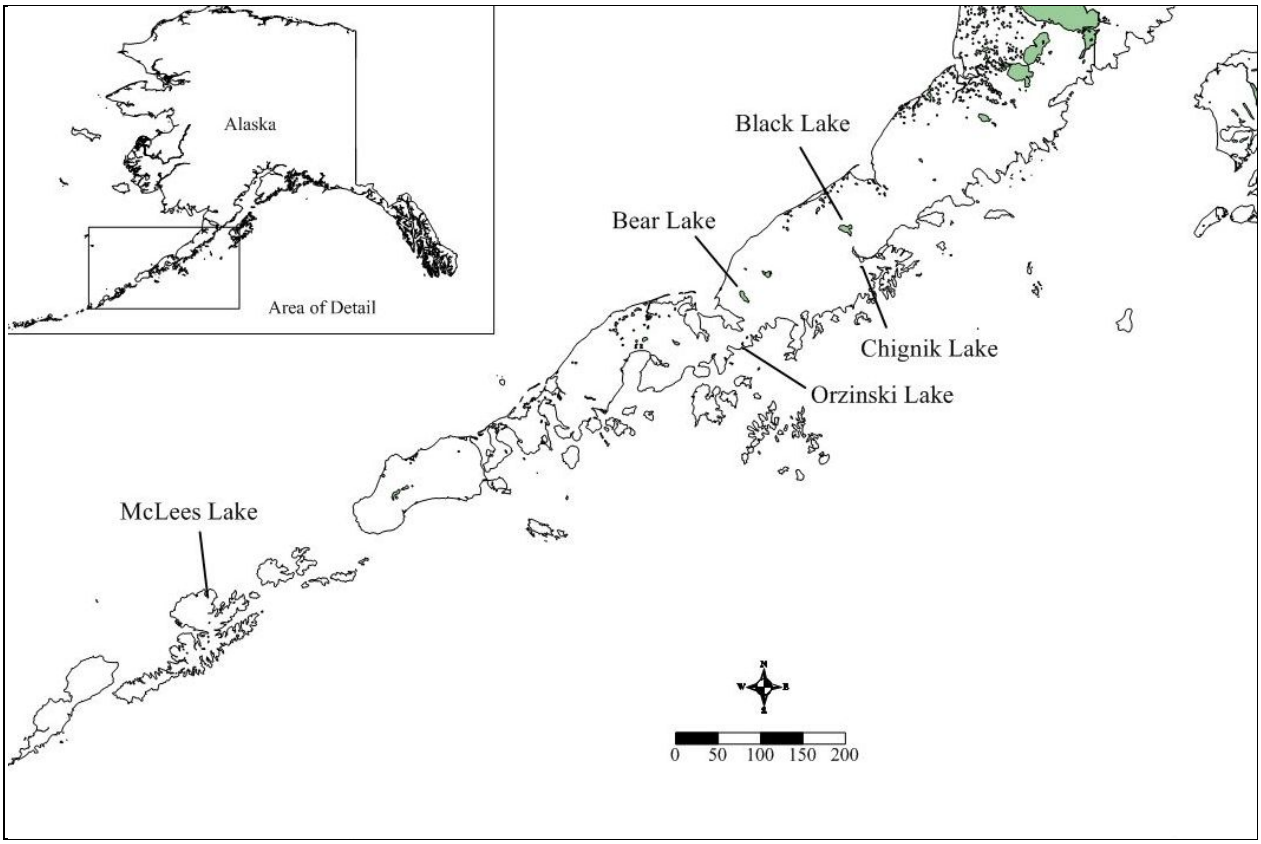

Figure 2.–Locations of lakes on Alaska Peninsula scheduled for limnology sampling in 2013.

APPENDIX A. KODIAK ISLAND LIMNOLOGY LABORATORY SAMPLE PROCESSING AND CONTRACTUAL CONTACT LIST FOR 2013

Appendix A1.–Kodiak Island Limnology Laboratory sample processing and contractual contact list for 2013.

Contact	Processing/Analysis	Institution	Address	Phone Number
Uttam Saha	Total Kjeldahl Nitrogen (TKN)	University of Georgia, Feed and Environmental Water Laboratory	2300 College Station Rd. Athens, GA 30602	(605) 688-5466
Jake Mosely	Total Kjeldahl Nitrogen (TKN)	University of Georgia, Feed and Environmental Water Laboratory	2300 College Station Rd. Athens, GA 30602	(605) 688-5466
John Beaver	Phytoplankton	BSA Environmental Services Inc.	23400 Mercantile Rd., Suite 8 Beachwood, OH 44122	(216) 765-0582
Michael Agbeti	Phytoplankton	Bio-Limno Research and Consulting, Inc.	28 Stone Gate Dr. Halifax, Nova Scotia B3N 3J2 Canada	(902) 425-8989
Kerry Parish	Quality Control Testing	Department of Fisheries & Oceans	4222 Columbia Valley Highway Cultus Lake, B.C. V2R 5B6	(604) 824-4704
Kevin Keith	Nome Water/Zooplankton Contract	Norton Sound Economic Development Corporation	P.O. Box 358 Nome, AK 99762	(907) 443-2477
Charlie Lean	Nome Water/Zooplankton Contract	Norton Sound Economic Development Corporation	P.O. Box 358 Nome, AK 99762	(907) 443-2477
Andrew Piston	SE Water/Zooplankton Contract	Alaska Dept. Of Fish and Game	2030 Sea Level Dr. #205 Ketchikan, AK 99901	(907) 225-9677
Malika Brunette	SE Water/Zooplankton Contract	Alaska Dept. Of Fish and Game	2030 Sea Level Dr. #205 Ketchikan, AK 99901	(907) 225-9677
Steve Heinl	SE Zooplankton Contract	Alaska Dept. Of Fish and Game	2030 Sea Level Dr. #205 Ketchikan, AK 99901	(907) 225-9677
Randall Bachman	SE Zooplankton Contract	Alaska Dept. Of Fish and Game	P.O. Box 330 Haines, AK 99827	(907) 766-2830
Tommy Sheridan	SE Zooplankton Contract	Alaska Dept. Of Fish and Game	401 Railroad Ave. Cordova, AK 99574	(907) 424-3212
Amanda Wiese	SE Zooplankton Contract	Alaska Dept. Of Fish and Game	401 Railroad Ave. Cordova, AK 99574	(907) 424-3212